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JOHNSON'S NEW GENERAL CYCLOPÆDIA AND COPPER-PLATE HAND-ATLAS OF THE WORLD

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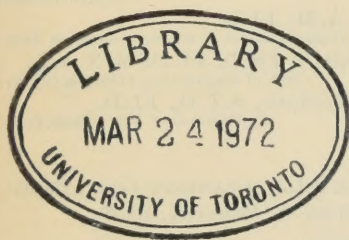
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JOHNSON'S GENERAL CYCLOPÆDIA is not wholly an abridgment of JOHNSON'S UNIVERSAL CYCLOPÆDIA, for it is, to a certain extent, as the title-page indicates, an original and independent work, aiming to present in an attractive and condensed form the essential results of thought and endeavor in nearly every department of human knowledge and achievement, and at a price that readily places it within the reach of all.

The GENERAL CYCLOPÆDIA is bound in one or two volumes of handy size, and contains about 1600 pages, and will be sold by subscription *only*, and at about *one quarter* of the price of the UNIVERSAL. That there has been, and is, a great and growing demand for a superior work of this kind—one that will command the respect of scholars for its sterling merits and attract attention for its workmanship and low price—is evident from the many urgent requests which have been made of us to utilize the excellent material in our hands in getting up such a work, and also from the unsuccessful attempts frequently made by those who have tried to produce simply a *cheap* cyclopædia.

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Like the UNIVERSAL, the GENERAL CYCLOPÆDIA claims to be an *authority* up to the times in all the numerous branches of which it treats; and to make it so, eminent scholars, who stand at the head of their professions, have had charge of the work in their respective departments, as will be seen by referring to the "*Organization of the Staff*" on another page—this plan being original in making the UNIVERSAL CYCLOPÆDIA.

The work has been prepared by and under the supervision of the same Editors-in-Chief, by the same corps of Associate and Assistant Editors, with the addition of several new names, and from the labors of special Contributors to the larger work, whose thorough mastery of their respective subjects has placed the UNIVERSAL CYCLOPÆDIA unquestionably at the head of all works having the same general end in view.

The Editors and Contributors have appended their names to their articles, a feature which our works alone possess, thereby imparting a degree of accuracy and responsibility obtainable in no other way; and we freely admit that without the cordial co-operation of the Editors and the use of the special articles this work could not have been made, and would not have been undertaken. The UNIVERSAL is unquestionably the father of the GENERAL CYCLOPÆDIA, and hence the latter is entitled to whatever benefit may arise from the high reputation of the former. We therefore print the following extracts from the ablest judges in the world, giving their unqualified opinions of JOHNSON'S UNIVERSAL CYCLOPÆDIA—a work which cost more than \$250,000, and has received *more and higher* encomiums from the greatest scholars and the public generally than any similar work ever issued.

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This Cyclopædia is in no sense partisan, as such, but it is a record of established facts, historical, political, ecclesiastical, etc., and not a bundle of opinions and theories. Men of recognized authority as representatives in their special departments of thought, political, social, and theological, were selected to write for JOHNSON'S UNIVERSAL CYCLOPÆDIA, and the same is true of this work, as a perusal of its pages will show. The labor upon it has occupied nearly three years, and no part of the manuscript was placed in the hands of the type-setters until the whole work was so far advanced that further scrutiny seemed unnecessary, besides which every article was subjected to final revision by the Editors, the proof having passed through their hands.

Perfection, however, cannot be claimed, especially for a work involving such an infinitude of detail as a cyclopædia, but every care has been taken to avoid errors of statement as to points of fact; and besides the constant supervision of the Editors themselves, every page has been submitted for examination and final reading to two expert proof-readers in our office, who have had it in special charge to find and correct errors of every kind. The plan was carefully studied many months before it was submitted to the Editors-in-Chief, to whom it is but simple justice to give credit for having improved and matured it. Pres. Barnard said: "It must be a book of reference, suited to the requirements of the great body of intelligent American readers, as well as to pupils—a handbook for the students in our colleges, seminaries, and academies;" and Prof. Guyot, in approving of the plan, said, "The move is a good one;" and it is confidently believed that all will find in the work the information which they seek embodied in such shape that it can be referred to readily and with satisfaction.

The *County-colored-reference-maps* which comprise the *Hand-Atlas* part of the work—a new feature in a cyclopædia in the way they are used—were drawn by Mr. T. W. Baker, and engraved by Mr. C. X. Craig upon copper-plates in our office; and therefore, without fear of contradiction, we declare them to be peerless in *freshness, accuracy, and beauty*. The type is *new*, and the illustrations were not borrowed or bought, nor are they old casts put in simply to fill space, please the eye, and sell the work, but are mainly new and from the UNIVERSAL CYCLOPÆDIA, and are inserted where the pencil of the artist is necessary to supplement the pen of the writer.

There are many new and valuable features connected with this Cyclopædia which cannot be as well understood from a short written description as by a careful examination of the work itself, and hence an attempt to set them forth here will not be made. The Publishers, in addition to their own daily supervision in every business line of the work, have spared no expense to secure its thorough execution in every respect; and they feel confident, knowing the work as they do from its beginning, that it will meet the requirements of that great and ever-growing body of the American people for whose use it is especially designed. In conclusion, we would call special attention to the Appendix and to the fine engravings of the Editors; gratefully thank the public for their very liberal patronage in the past, and respectfully ask for its continuance in the future.

PREFACE.

THE considerations which have led the Editors of JOHNSON'S UNIVERSAL CYCLOPÆDIA to present to the public a second work of the same general character may be briefly stated. For several years past there has been manifested an urgent and increasing demand for a work of general reference adapted to the uses of a large class of persons whose time is valuable and whose means are limited—a work, in short, which should embody the largest amount of information practicable and at a moderate price. This last condition appears to be indispensable, since very many who have been desirous of possessing the UNIVERSAL CYCLOPÆDIA have been deterred by the consideration of cost.

Such a work, therefore, the Editors have felt bound to make. They do not offer it as a sufficient substitute for their former work, or as one likely to be preferred by a purchaser whose means permit him to own, and whose time enables him to use, the UNIVERSAL; but they have given to its preparation all the care which they bestowed on that work.

The characteristics of this work are, generally, conciseness, wide range of topics, accuracy of information, and limitation of statement to ascertained facts, rigorously excluding all discussions, speculations, or mere opinions. More particularly, the book will be found to embrace—

1.—In *Biography*, by far the largest number of complete notices of eminent men to be found in any work of this character, are here contained. Of *living* men of note the number in the UNIVERSAL far surpasses anything before attempted, even in systematic biographical dictionaries. The object being to furnish information, and not to pronounce judgment on the claims of men to celebrity, it has sufficed that men are much talked about, and are mixed with affairs of political, industrial, financial, or literary interest, to give their names a place in our pages. Many of them may have but a temporary notoriety, and in future years may disappear. For the time being it is convenient to the general reader to have a book of reference at hand which will tell him something satisfactory about them.

2.—In *Geography, Physical and Political*, great care has been taken, and every important title in the UNIVERSAL CYCLOPÆDIA is given, the articles being either new or rewritten, greatly condensed, and brought up to the present state of knowledge; and to show better the increase or decrease in the United States, the populations of 1870 and 1880 are both given.

3.—In *History, Political and Religious*, all important incidents and dates are succinctly given, without any attempt at historic narrative; as the use of a book of reference is mainly for the purpose of recalling or ascertaining isolated facts, and the conciseness of these historic notes will be found an advantage.

4.—In *Mathematics*, abstruse articles are for the most part suppressed, but the most important mathematical processes are described in simple language, and all necessary definitions have been presented as concisely and as clearly as possible.

5.—In *Medicine*, including Pathology and Therapeutics, care has been taken to give such information as will enable the reader to ascertain the general character of a disease and to apply the proper immediate treatment in the absence of a physician. Emergencies of frequent occurrence will thus be met, thereby often alleviating suffering and saving life. The articles in regard to the diseases of children have been especially prepared by medical practitioners of the greatest experience and highest authority.

6.—In *Natural History*, an attempt has been made to popularize knowledge by the avoidance, as far as possible, of technical terms, and by making the brief descriptions, which will here be found, intelligible to the unlearned as well as to the learned. But in this department occasionally, definitions were found necessary to supply the deficiencies of the latest dictionaries.

7.—In *Physics and in Science generally*, abstract or applied, all interesting facts and phenomena are given under their proper heads, but no attempt has been made to introduce, as in the UNIVERSAL, elaborate or extended monographs on any topic.

8.—In *Statistics*, the facts have been derived from the latest and most authentic sources, embracing for our own country the results of the *tenth census* of the United States.

9.—In *Botany, Chemistry, Education, Fine Arts, Geology, Law (Municipal, Civil, Constitutional and International), Literature, Mechanics, Philosophy, Political Economy*, etc., the substance of all the important articles of the *UNIVERSAL* has been preserved, and wherever abridgment has been attempted, it has been done by the able Editors personally, or under their immediate direction.

10.—In *Abbreviations*, the same general object has been pursued—viz., of combining comprehensiveness of substance with economy of space. Various expedients of abbreviation will be observed in the text, by which room is gained for valuable articles which must otherwise have been omitted. These abbreviations, however, are simple, and are explained in the article *Abbreviations* [on page 2] of this work.

11.—In *Bibliography*, reference is made at the close of the important articles to the leading work, or works, treating more fully of the several topics; and in the *Biographies* of authors and artists mention is made of one or more of the principal productions of each.

12.—In *Cross-references*, the plan pursued in the *UNIVERSAL CYCLOPÆDIA*, of reference from one article to another, and inserting popular titles, and referring to others under which the subjects are treated, has been followed in this work.

13.—In *Etymologies and Accentuation*, the plan of the *UNIVERSAL* is also followed, and wherever the pronunciation is not sufficiently determined by the accent it is given immediately after in *phonetic* spelling.

14.—In *Illustrations and Maps*, especial care has also been taken to have them life-like and accurate. The *Maps* have been engraved on *copper plates* expressly for this work, and all the numerous counties of the United States and Territories are distinctly colored, and the principal mountains, lakes, rivers, railroads, stations, etc. are clearly shown.

15.—In *Type*, special regard has been had to the purpose of a cyclopædia, which is mainly designed as a *book of reference*, and not, as in a history or a novel, for continuous reading. The aim of such a book should be to furnish the greatest amount of valuable information within the least possible space compatible with entire legibility. The cost of paper and printing of a page of small type is no greater than that of a corresponding page of larger type, which contains *one-half*, or perhaps only *one-quarter*, as much matter. In this work, as in the *UNIVERSAL CYCLOPÆDIA*, the end is secured by using a comparatively small but legible type, and thus giving a very large amount of matter within a small space, much of which would otherwise have been lost.

In short, the design of the Editors has been to embody in this work *all the essentials of a hand-book of daily reference*, excluding non-essentials, even though, in so doing, it has been indispensable to omit much useful matter the bulk of which would interfere with this main purpose. In accordance with this design also, nearly all titles are excluded which can be found sufficiently explained in the unabridged dictionaries of the English language. Nothing, in other words, is here admitted which is not strictly appropriate to an encyclopædia.

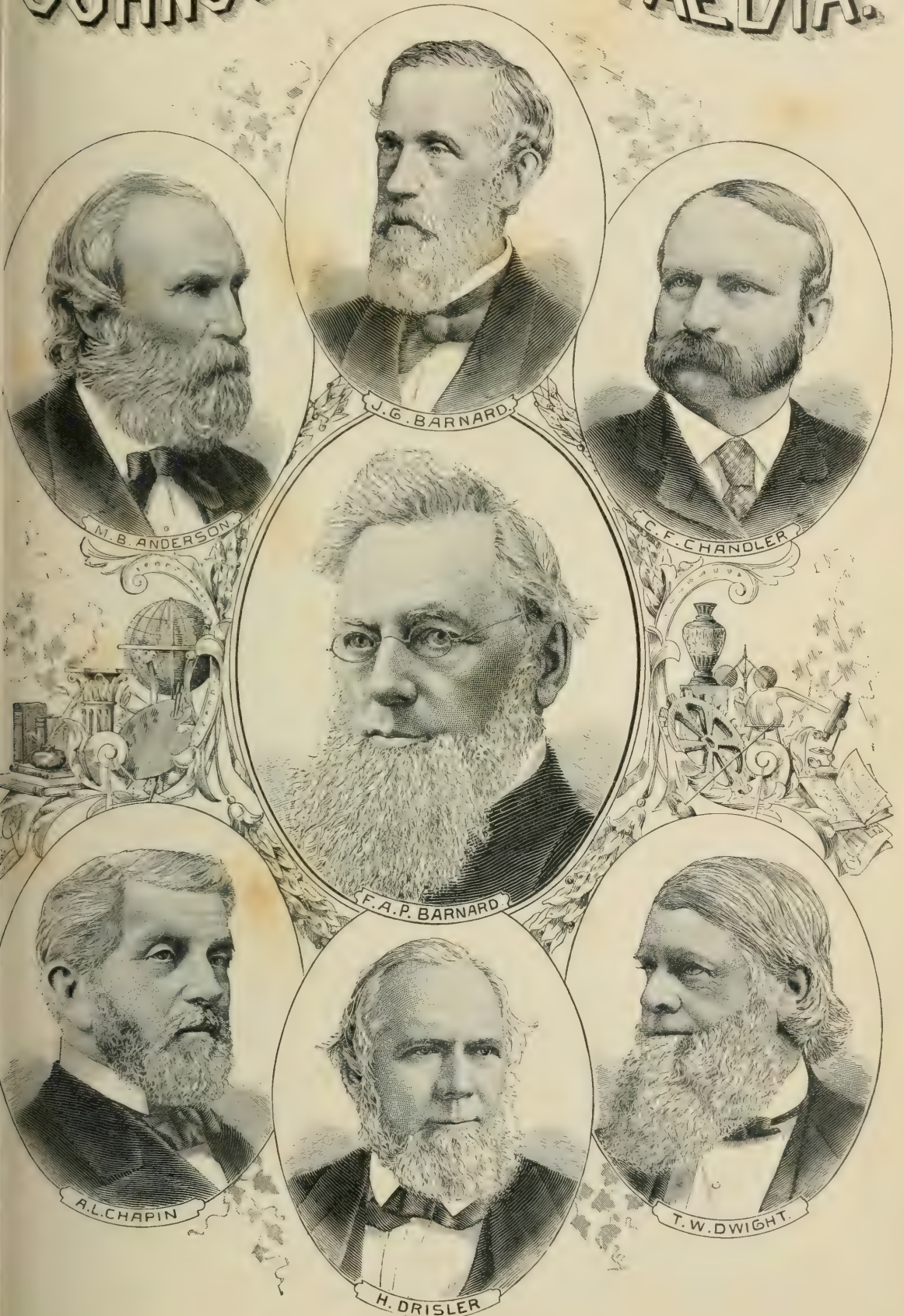
The *GENERAL CYCLOPÆDIA* is, of course, founded on the *UNIVERSAL CYCLOPÆDIA*, and is, to a certain extent, abridged from that work; but it is also largely an independent and original work. In order to secure the desired condensation many articles had to be rewritten. Many *special* articles, signed by their authors' names in the *UNIVERSAL*, have been rewritten for this work by the same authors, and bear their names. Others of this class have been replaced or abridged by the Editors, but in such instances, if the original article is used, credit is given to the author at the end.

The effort has been to make this work a true presentation of the state of the world's knowledge on all important subjects, up to the date of its publication. But inasmuch as time brings change to most things, and especially to progressive Science and to History, it is a part of the design of the Editors to keep watch of these changes, and to maintain the work abreast of the progress of knowledge by making corrections, from time to time, in the plates before the successive editions are printed. In order to provide the earlier subscribers with such valuable additions, *Supplements* will be issued to them at a reasonable price.

In view of the foregoing statements, the Editors of this work claim for it the merit of embodying in convenient compass a larger amount of useful information than is found in any other of similar character that has ever before been presented to the public, combining, as it does, the practical advantages of a compendium of scientific and general knowledge, and a *Hand-Atlas* of the world. They submit it, therefore, to an intelligent public, which has shown its high appreciation of their former work by the purchase already of many large editions, and a demand still increasing from year to year, with full confidence of a no less favorable reception.

F. A. P. BARNARD, } *Editors-in-*
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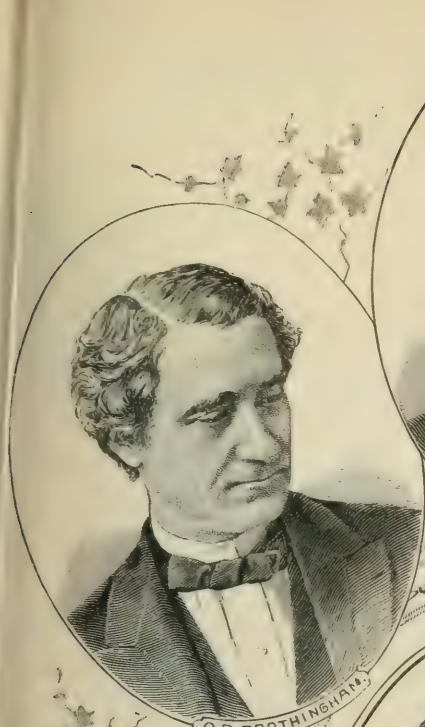
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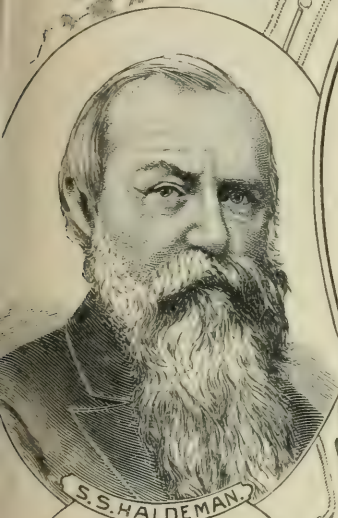
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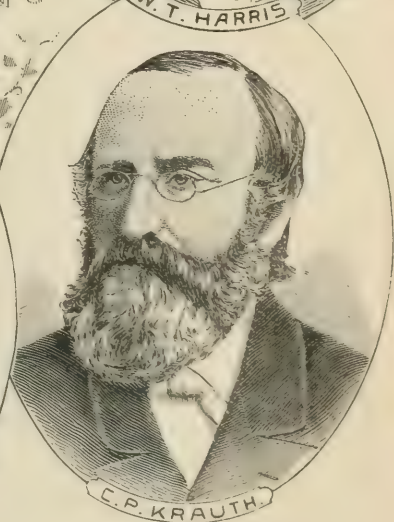
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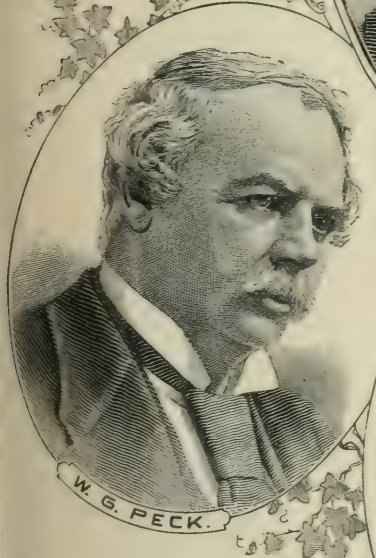
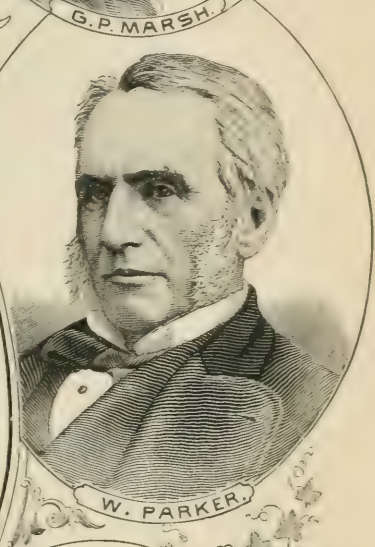
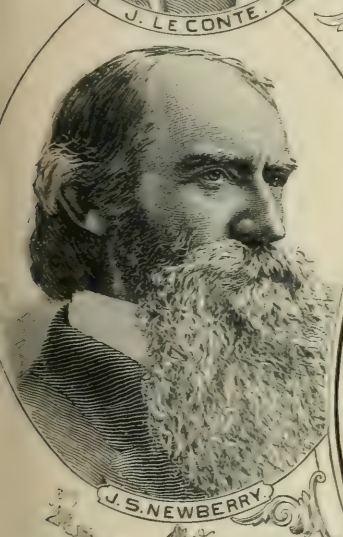
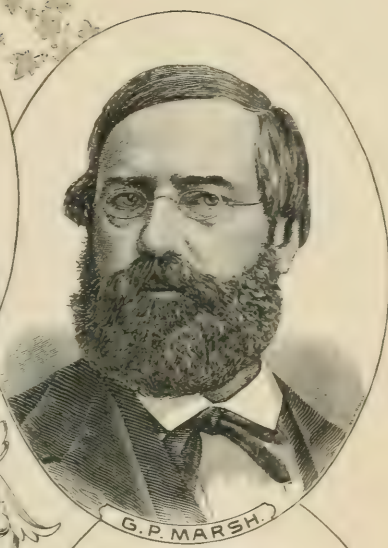
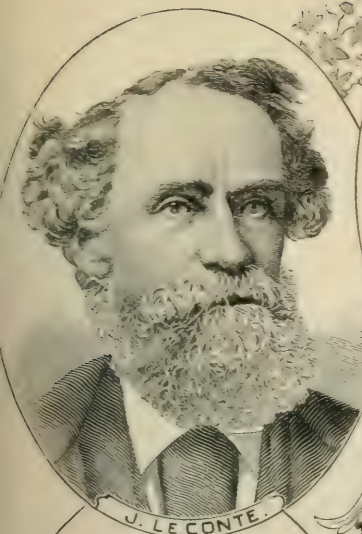
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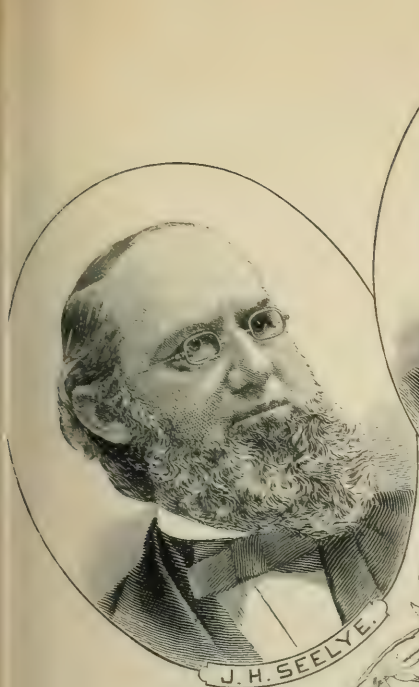
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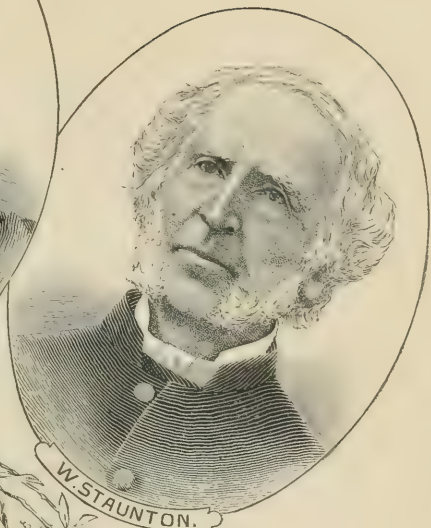




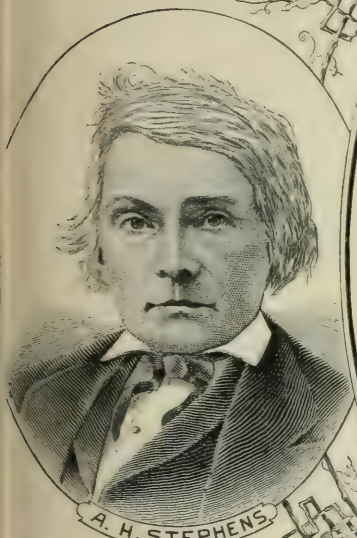
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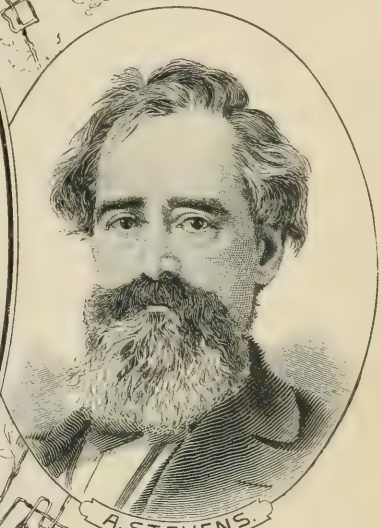
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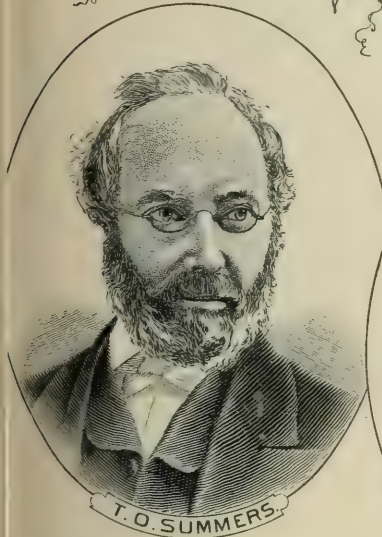
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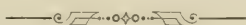
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A.

A, the first letter of all known phonetic alphabets, except the Abyssinian (or Ethiopian), in which it forms the thirteenth, and the Runic, in which it is the tenth. The cause of its being placed at the head of all the principal European and Asiatic alphabets is not certainly known, but is probably to be found in the fact that the original sound of the letter (similar to that of our *a* in *far*) is the most easily formed of all the vowels, requiring for its utterance scarcely any effort and the slightest possible change in the position of the vocal organs, except simply opening the mouth; it is accordingly the first sound that children usually utter. A 1 (or "A No. 1") is often applied in mercantile affairs to denote any article of the very highest class. In registering vessels A designates the character of the hull of the vessel, while the figure 1 marks the efficient state of her anchors, cables, stores, etc.

Aachen. See AIX-LA-CHAPELLE.

Aa'li Pasha (MEHEMED EMIN), b. at Constantinople 1815; in 1845 became minister of foreign affairs, filling the position at intervals until 1853; made pasha 1846, grand vizier in 1852 and several times afterward; represented Turkey in the Conferences of Vienna and Paris 1855-56; in 1867 regent during a journey of the sultan, and settled the difficulties in Candia; was known as a poet. D. Sept. 6, 1871.

Aard-Vark (i. e. "earth-pig"), a name adopted by the English from the Dutch colonists of the Cape of Good Hope, for the *Oryctolagus Capensis*.

Aard-Wolf (i. e. "earth-wolf"), the designation adopted by the Eng., from the Dutch of the Cape Colony, for the *Proteles cristatus*, a carnivorous mammal related to the hyenas.

Aaron, elder brother of Moses and first high priest of the Israelites; was spokesman of Moses, whom he aided in the Exodus. D. on Mt. Hor, still known as the "Mountain of Aaron," and was succeeded as high priest by his son Eleazar.

Aaron (SAMUEL), b. in Pa. in 1800, ordained as Bap. minister 1829; held several pastorates, and was a successful teacher; wrote several school-books. D. Apr. 11, 1863.

Aasvæ, a group of small islands within the polar circle, and about 10 m. from the coast of Norway, which have within a few yrs. become important as a fishing-station. During the herring-season, lasting about three weeks in Dec., the islands are visited by more than 10,000 fishermen, the annual catch being about 200,000 kegs; during the rest of the year they are inhabited only by a few fishermen.

Abaca, or **Manila Hemp**, the fibre of the leafstalk of a species of plantain growing in the Philippine Islands; from it cordage is made which is not rotted by sea-water, so that it does not require tarring; it is also an excellent material for paper.

Abacus (Gr. ἀβάξ). In architecture, a table constituting the crowning member of a column and its capital. In mathematics, an instrument formerly used for making arithmetical computations. It is still in use among the Chinese, and to a certain extent it is employed in our own schools to illustrate the operations of addition and subtraction. As thus used, it usually consists of several parallel wires stretched from side to side of a rectangular frame, each wire carrying ten sliding beads or counters. The wires represent successive orders of units, and the counters stand for units of the several orders.



Aard-Vark.



Doric Abacus.



Corinthian Abacus.

Abalo'ne, a name derived from the Sp., and applied in California to species of *Haliotis*, especially the *H. Cracherodii*.

Aban'donment [from the Fr. *abandonner*], in law is used in several senses, depending upon the subject to which it is applied.

1. *In Insurance*.—In this branch of the law it is applied to recovery by the insured in case of loss. Loss is either total or partial. In certain cases of partial loss the insured may, at his election, transfer the entire property to the insurers, and claim a total loss. The insurers would thus become the owners of the property in its impaired condition. This act is A., and the "total loss" thus occasioned is termed constructive. It is applicable particularly to marine insurance. The subject is governed by rules differing somewhat in England and in America. The general principle is, that a serious injury must have happened by a marine peril to the ship or cargo (the value must have usually been diminished more than one half), or the purposes of the voyage as to the ship must have been substantially defeated, as in the case of an embargo for an indefinite time. The act of A. must be exercised not upon mere conjecture, but upon credible information and without delay. No particular form is necessary.

2. *As to Personal Property*.—An owner may cast away or otherwise relinquish personal property, so as to cause his ownership to cease. This may readily occur in the case of property at sea. The intent is a principal subject of inquiry. Property in this condition is otherwise called "derelict."

3. *Real Estate*.—A. in this branch of the law applies to incorporeal rights, such as easements. There can be no A. of the ownership of the land itself. This must be parted with by some recognized mode of conveyance, such as a deed, or the principle of estoppel must be invoked or the rules of the statute of limitations.

4. In the legal relation of husband and wife the word A. is frequently employed as an equivalent to desertion. It is in some instances defined by statute. T. W. DWIGHT.

Abarim ("regions beyond"), a mt.-range of Moab, on the E. side of the Jordan. The range rises 3000 ft. above the level of the ocean, and more than 4000 ft. above that of the Dead Sea. The highest summit, called Mt. Nebo, is supposed to be the Nebo from which Moses viewed the Promised Land.

Abate'ment [from the Fr. *abatre*, "to strike away"] is a legal term applied in various branches of the law.

1. *Title to Real Estate*.—Here it refers to the wrongful entry of a stranger upon land after an ancestor's death, and before the entry of an heir or devisee, and thus keeping him out of possession. The wrong-doer is termed an abator.

2. *Nuisances*.—In this case it means the act of destroying or removing a nuisance, which may take place without legal process. No unnecessary damage must occur, and the act must be done without a breach of the peace.

3. In respect to legacies and creditors' claims the word means a proportionate reduction of them where there are not sufficient assets to make full payment.

4. In actions the word has 2 significations: (1) In respect to pleadings. A defendant may assert by a "plea in A." that the plaintiff's action ought to cease by reason of some informality or irregularity. If the cause is abated on such grounds, a new action may be brought. (2) In respect to the termination of a litigation by the occurrence of some event during its progress, such as the death or disability of a party. The effect of this doctrine is largely modified in codes of procedure in this country and in Eng. by the "Common-Law Procedure" act. An instance is that of a cause of action for a personal wrong (tort). This is said to "die with the person." T. W. DWIGHT.

Abattoir', ab-at-twor', a public establishment in which cattle, sheep, etc. are killed with such sanitary arrangements as will guard the population of a city against the nuisances of private slaughter-houses. This improvement originated in Paris in 1807, and has been adopted in New York and other large cities.

Abbadie (ANTOINE), b. 1810 (and ARNOULD MICHEL), b. 1815, brothers and African explorers. Between 1838 and 1848 they travelled together in Abyssinia and Upper Egypt, ascended the White Nile, and penetrated into the interior as far as Darfoor, making collections of manuscripts and publishing works of value.

Abbās', or, more fully, **Abbās-Ibn-Abd-il-Moot'-talib**, a paternal uncle of Mohammed, and the ancestor of the dynasty of Abbassides, was b. at Mecca about 566 A. D. He fought against Mohammed at the battle of Bedr, but was afterward converted, and rendered important services to that prophet.

Abbās I., or **Shāh Abbās**, surnamed **THE GREAT**, a king of Persia, b. 1557, was a son of Mohammed Mirza. He began to reign about 1584, and distinguished himself by his ability and energy. In 1605 defeated the Turks in a great battle, and recovered the Persian provinces which they had occupied. D. 1628.

Abbās-Mir'za, a son of Fatah Ali Shah, king of Persia, b. 1783. He commanded the Persian army which was defeated by the Russians in 1811. He was a prince of superior talents, and promoted the introduction of European culture and military tactics into Persia. D. 1833.

Abbās Pasha, viceroy of Egypt (the third of his dynasty), a grandson of Mehmed Ali, b. at Yedda, in Ar., in 1813. He succeeded his uncle, Ibrahim Pasha, Nov. 9-10, 1848, and d. July 1854. He was succeeded by his uncle, Saïd Pasha.

Abbasides (ab-bas'idz; sing. **Abasside**, ab-bas'id), or **Abbasids** [Lat. *Abbasidae*], called by the Arabs **BENI ABBAS** (i. e. "sons or descendants of Abbās"), a dynasty of caliphs who reigned at Damascus, and afterward at Bagdad, from 762 to 1258 A. D. They traced their genealogy to Abbās, the uncle of Mohammed. To this dynasty belonged the caliphs Harun-al-Rashid and Al-Mamun.

Ab'be (CLEVELAND), M. A., b. in N. Y. Dec. 3, 1838, grad. at the N. Y. Free Coll., taught math. at Ann Arbor and Cambridge; was engaged in the U. S. Coast Survey 1860-64; visited European observatories 1864-66; became director of the Cincinnati Observatory 1868, and of the govt. weather bureau 1871; pub. many scientific papers.

Abbeoku'ta, or **Abbekuta** ("under the rock"), a large town of W. Africa, and capital of the kingdom of Egba in Yorubaland, is built on granite hills around a rock 250 ft. high, and is situated on the left bank of the Ogoon River, 120 m. N. W. of Benin. It was founded in 1825, but increased rapidly. Estimated pop., 130,000. It has become an important missionary station.

Ab'bot [Lat. *abbas*, from Heb. *abba*, "father"], in the R. Cath. Church an ecclesiastic presiding over a convent or monastery, ranking next to bishops.—"A. of Misrule" or "A. of Fools," called in Scot. the "A. of Unreason," was in the Middle Ages the title given to the master of revels, especially to the one who presided over the Christmas festivities.

Abbott (BENJAMIN), LL.D., b. at Andover, Mass., 1762; grad. at Harvard, became a teacher, and was for 50 years, up to 1838, principal of Phillips Acad., Exeter, N. H.; among his pupils were Daniel Webster, Alexander H. Everett, Edward Everett, Lewis Cass, Jared Sparks, and George Bancroft. D. Oct. 25, 1849.

Abbott (EZRA), b. at Jackson, Me., Apr. 29, 1819, grad. at Bowdoin 1840; in 1856 became assistant librarian at Harvard, and in 1872 prof. of N. T. criticism and interpretation in the Cambridge Divinity School. He has written upon bibliographical and theological topics, and acted as ed. or reviser of learned works. D. Mar. 21, 1884.

Abbott (FRANCIS ELLINGWOOD), b. in Boston Nov. 1836, grad. at Harvard; edited (1870-73) *The Index*, devoted to the interests of "Free Religion."

Abbott (GORHAM DEEMER), LL.D., brother of Jacob **Abbott**, b. at Brunswick, Me., Sept. 3, 1808, grad. at Bowdoin, studied theol. at Andover; travelled abroad to study educational systems, and in 1843 founded the Spingler Institute, a female school in New York, remaining its principal till 1866, meanwhile putting forth several text-books. D. July 31, 1874.

Abbott (HENRY L.), b. at Beverly, Mass., Aug. 13, 1831, grad. at West Point 1854; served as assistant in the Pacific R. R. surveys (1854-57), and in the hydrographic survey of the delta of the Mississippi (1857-61), concerning which he published an elaborate report. During the c. war he served in the Bull Run campaign, being wounded; in the construction of the defences of Washington; in McClellan's Peninsular campaign; as topographical engineer in Banks's Red River campaign; in the siege of Petersburg, becoming brevet brig.-gen. of the U. S. A. and brevet maj.-gen. of volunteers. After the war he was in command of the engineer battalion and torpedo school of practice; member of engineer boards.

Abbott (SAMUEL), b. at Andover, Mass., 1732; acquired wealth as a Boston merchant; was one of the founders of the Andover Theol. Sem., to which, in addition to previous gifts, he bequeathed \$100,000; also gave liberally for benevolent purposes. D. Apr. 30, 1812.

Abbotsford, an estate on the Tweed, 3 m. from Melrose Abbey, purchased in 1811 by Sir Walter Scott, upon which he expended large sums. (See **SCOTT**, Sir **WALTER**.) After the death of Scott it was occupied by his granddaughter, the wife of James Hogg Scott, until her death in 1858, when it was converted into a R. Cath. female school.

Ab'bot (AUSTIN), son of Jacob, b. in Boston Dec. 18, 1831; studied law; associated in practice with his elder brother, whom he assisted in compiling legal works.

Abbott (BENJAMIN), a Meth. preacher, b. in Pa. in 1732. His education was limited, but he possessed uncommon eloquence. He travelled and preached in Pa., N. J., Del., and Md., and was one of the chief founders of Methodism in those States. D. 1796.

Abbott (BENJAMIN VAUGHAN), son of Jacob, b. in Boston June 4, 1830; admitted to the bar 1851; has written or compiled many vols. of legal reports and digests.

Abbott (CHARLES, LORD TENTERDEN), b. at Canterbury 1762, the son of a barber; he studied law, and became lord chief-justice of the King's Bench (1818); in 1827 was raised to the peerage as Lord Tenterden. D. 1832.

Abbott (CHARLES CONRAD). See **APPENDIX**.

Abbott (EDWARD), son of Jacob, b. at Roxbury, Mass.,

July 15, 1841, is a contributor to periodicals and editor of a religious journal.

Abbott (JACOB), b. at Hallowell, Me., Nov. 14, 1803, grad. at Bowdoin; studied theol. at Andover; tutor and prof. of mathematics at Amherst 1825-29; taught a female school in Boston; and in 1838 devoted himself to authorship. His works number fully 200, mostly written for the young. D. at Farmington, Me., Oct. 31, 1879.

Abbott (JOHN C.), b. in Concord, N. H., July 15, 1825, became a lawyer and journalist; commanded a regiment during the c. war, and was brevetted brig.-gen. He removed to N. C. in 1865, and was U. S. Senator from N. C. 1865-71. D. Oct. 9, 1881.

Abbott (JOHN STEPHENS ABBOT), brother of Jacob, b. at Brunswick, Me., Sept. 18, 1805; grad. at Bowdoin and Andover; became a Congl. pastor, but after 1844 devoted himself mainly to authorship, writing chiefly upon historical subjects; his best known work is *The History of Napoleon Bonaparte*. D. at Fair Haven, Conn., June 17, 1877.

Abbott (LYMAN), D. D., son of Jacob, b. at Roxbury, Mass., Dec. 18, 1835, grad. at Univ. of N. Y.; studied law with his brothers, then theol. with his uncle, and was for several yrs. pastor of various churches; after 1869 devoted himself to literature. The three brothers jointly wrote *Cone-Cut Corners*, a temperance tale, under nom. de plume of "Benauly." Ed. *Christian Union* since 1881.

Abbott (ROBERT O.), M. D., b. 1824, became assistant surgeon in the U. S. army 1849; in 1862 became medical director of the dept. of Washington. D. June 10, 1867.

Abbreviations [Lat. *abbreviationes*, from *abbreviare*, *abbreviatum*, to "shorten" (from *brevis*, "short")], contractions of words and phrases used in writing, in order to save time and space. They are formed by the omission of some letters or words, or by the substitution of arbitrary signs. In medieval manuscripts A. are so numerous that special study and training are required to decipher them. Thus, Y^e, Y^t, The, That. This use of Y originated in the Anglo-Saxon character *þ*, which was equivalent to the modern *th*. In manuscripts this character degenerates into a form like a black-letter *y* (þ), which was retained after its origin and real sound had been lost sight of. In this work, when the title of an article is repeated, its initial only is used.

The following are the more important A. in common use, and also those used in making this work.

A. B., Bachelor of Arts.	Com., commodore, commissioner.
A. B. C. F. M., Amer. Board of Coms. for Foreign Missions.	Confed., Confederate.
Abp., Archbishop.	Cong., Congress.
A. C., <i>Ante Christum</i> , bef. Christ.	Congl., Congregational.
Acad., academy.	Conn., Connecticut.
A. D., <i>Anno Domini</i> , "in the year of our Lord."	Const., constitution.
Admr., administrator.	Cor., Corinthians.
Admx., administratrix.	C. S. A., Confederate States of C. war, civil war.
.Et. or etat., <i>ætatis</i> , "of age."	[America.] Cwt., hundred weight.
Afr., Africa, African.	Cyc., cyclopædia.
Ala., Alabama.	D. or d., died, five hundred.
A. M., <i>Anno Mundi</i> , "in the year of the world;" <i>Ante Meridiem</i> , "before noon."	Dak., Dakota.
A. M., Master of Arts.	Dan., Daniel.
Amer., America, American.	Dan., Danish.
Anat., anatomy.	D. C., District of Columbia.
Anc., ancient.	D. C. L., Doctor of Civil Law.
Apr., April.	D. D., Doctor of Divinity.
Ar., Arabia, Arabian.	D. D. S., Dental Surgery.
Arch., architect, architecture.	Dec., December.
Ari., Arizona.	Dec. of Ind., Declaration of Independence.
Arith., arithmetic.	Del., Delaware.
Ark., Arkansas.	Dem., democrat.
Artill., artillery.	Den., Denmark.
A.-S., Anglo-Saxon.	Dept., department.
Astron., astronomy, astronomer.	Deut., Deuteronomy.
Atty., attorney.	Dict., dictionary.
Aug., August.	Dist., district.
Aus., Austria, Austrian.	Dr., doctor; also debtor.
A. V., Authorized Version.	Dut., Dutch.
B. or b., born.	D. V., <i>Deo volente</i> , "God will."
B. A. or A. B., Bachelor of Arts.	Dwt., or pwt., pennyweight.
Bap., Baptist.	E. east, eastern.
Bart. or Bt., Baronet.	Eccl., Ecclesiastes.
B. C., before Christ.	Ed., editor, edition, educated.
B. C. L., Bachelor of Civil Law.	Eds., editions.
B. D., Bachelor of Divinity.	E. E., errors excepted.
Belg., Belgium.	e. g., "for example."
B. L., Bachelor of Laws.	E. I., East India or Indies.
Bot., botany.	Emp., emperor.
Bp., Bishop.	Encyc., encyclopædia.
Brig.-gen., brigadier-general.	E. N. E., east north-east.
Brit., British, Britain.	Eng., English or England.
C., <i>centum</i> , a "hundred," centigrade.	Eph., Ephesians.
Cal., California.	Epis., Episcopate.
Cap., capital.	E. S. E., east, south-east.
Capt., captain.	Esth., Esther.
Cav., cavalry.	Etc., <i>et cetera</i> , "and so forth."
C. E., civil engineer.	Ex., Exodus.
C. h., court-house.	Exr., executor.
Ch., church.	Exx., executrix.
Chap., chapter.	Ezek., Ezekiel.
Chem., chemistry.	F. or Fahr., Fahrenheit.
Chi., China, Chinese.	Feb., February.
Chr., Christ, Christian.	Fla., Florida.
Chron., Chronicles.	Fr., France or French.
Cin., Cincinnati.	F. R. S., Fellow of the Royal Society.
Co., company; also county.	Ft., feet, foot, or fort.
C. O. D., cash on delivery.	Ga., Georgia.
Col., colonel, or Colossians.	Gal., Galatians, gallon.
Col., Colorado.	G. Brit., Great Britain.
Coll., college.	Gen., general, Genesis.
	Geog., geography, geographer.

Geol., geology.
Geom., geometry.
Ger., German, Germany.
Gov., government.
Govt., government.
Grc., Greece, Grecian, Greek.
Grad., graduated.
Gram., grammar.
Hab., Habakkuk.
Hag., Haggai.
Heb., Hebrew, Hebrews.
Hist., history.
Hol., Holland.
Hos., Hosea.
Ia., Iowa.
Id., Idaho.
i. e., id est, "that is."
Ill., Illinois.
Ind., Indiana.
Ind. Terr., Indian Territory.
Inf., infantry.
Inhab., inhabitant.
Inst., institute, institution.
I. O. O. F., Independent Order of Odd Fellows.
Ire., Ireland.
Isa., Isaiah.
It., Italy, Italian.
Jan., January.
Jer., Jeremiah.
Jon., Jonah.
Josh., Joshua.
J.U.D., *Juris utriusque Doctor*, Doctor of both Canon and Civil Law.
Judg., Judges.
Kan., Kansas.
K. C., King's Counsel.
Ky., Kentucky.
La., Louisiana.
Lam., Lamentations.
Lang., language.
Lat., latitude, Latin.
Lev., Leviticus.
L. H. D., *Literarum Humanarum Doctor*, "Doctor of Literature."
L. I., Long Island.
Lib., *liber*, "book."
Lieut., lieutenant.
Lit., literature.
LL.B., Bachelor of Laws.
LL.D., *Legum Doctor*, "Doctor of Laws."
L. S., *Locus Sigilli*, "place of Lon., longitude, [the seal]."
Lond., London.
M., monsieur, *mille*, a "thousand"; a mile; noon.
M., one thousand.
M. A., Master of Arts.
Macc., Maccabees.
Maj.-gen., major-general.
Mal., Malachi.
Mar., March.
Mass., Massachusetts.
Math., mathematics or mathematician.
Matt., Matthew.
M. C., Member of Congress.
Md., Maryland.
M. D., *Medicine Doctor*, "Doctor of Medicine."
Me., Maine.
Mech., mechanic.
M. E. Ch., Methodist Episcopal Church.
Med., medicine, medical.
Meth., Methodist.
Mex., Mexico, Mexican.
Mic., Micah.
Mich., Michigan.
Mdpm., midshipman.
Minn., Minnesota.
Miss., Mississippi.
Mlle., mademoiselle.
Mme., madame.
M. N. A. S., Member of the National Academy of Sciences.
Mo., Missouri.
Mont., Montana.
M. P., Member of Parliament.
MS., manuscript; pl. MSS.
Mt., mount or mountain.
N., north, northern, noon.
N. Amer., North America.
Nab., Nahum.
Nap., Napoleon.
Nat. hist., natural history.
N. B., New Brunswick.
N. C., North Carolina.
N. E., north-east.
Neb., Nebraska.
Neh., Nehemiah.
N. Eng., New England.
Nev., Nevada.
N. H., New Hampshire.
N. J., New Jersey.
N. M., New Mexico.
N. N. E., north north-east.

N. N. W., north north-west.
Nor., Norway, Norwegian.
N. S., Nova Scotia, New Style.
N. T., New Testament.
Num., Numbers.
N. V., New Version.
N. W., north-west.
N. Y., New York.
O., Ohio.
Ob., Obadiah.
Oct., October.
Ont., Ontario.
Or., Oregon.
O. S., Old Style.
O. T., Old Testament.
Ox., Oxford.
p., page; pp., pages.
Pa., Pennsylvania.
Pal., Palestine.
Parl., Parliament.
P. E., Protestant Episcopal.
Per., Persia, Persian.
Per-ann., *Per annum*, "by the year."
Per cent., *Per centum*, "by the hundred."
Pet., Peter.
Ph. D., *Philosophie Doctor*, "Doctor of Philosophy."
Phil., Philipians.
Phila., Philadelphia.
Philan., philanthropist.
Phile., Philemon. [phy.
Philos., philosopher, philosophy.
Phys., physician, physical.
pl., plu., or plur., plural.
P. M., postmaster, "after P. O., Post-office. [noon]."
Pop., population.
Port., Portugal, Portuguese.
P. P. C., *poor preudre counseil*, "to take leave."
P.-tp., post-township.
P.-v., post-village.
Pres., President.
Presb., Presbyterian.
Prin., principal.
Prob., problem.
Prof., Professor. [ciation.
Prom., pronounced, prorun-
Prot., protestant.
Pro tem., "for the time."
Prov., Proverbs, province.
Prox., "in the next month."
Prus., Prussia, Prussian.
P. S., postscript.
Ps., Psalms.
Pt., port.
Pub., published, publisher.
Pub. Doc., public document.
Que., Quebec.
R. Cath., Roman Catholic.
Ref., Reformation, reference.
Rep., representative, republican.
Rev., Revelation, reverend.
R. I., Rhode Island.
R. N., Royal Navy.
Rom., Romans.
R. R., railroad.
R. R. junc., railroad junction.
R. R. sta., railroad station.
R. S. V. P., *Repondez s'il vous plait*, "Reply, if you please."
Rt. Hon., Right Honorable.
Rt. Rev., Right Reverend.
Rus., Russia, Russian.
S., south, southern, saint.
Sam., Samuel.
S. Amer., South America.
Sans., Sanskrit.
Sard., Sardinia, Sardinian.
Sax., Saxony, Saxon.
S. C., South Carolina.
Scot., Scotland, Scottish.
Script., Scripture.
S. E., south-east.
Sec., secretary.
Sem., seminary.
S. I., Sandwich Islands.
Sic., Sicily, Sicilian.
Song Sol. or Cant., The Song of Solomon.
Sp., Spain or Spanish.
S. S. E., south south-east.
S. S. W., south south-west.
St., saint or street.
S. T. D., *Sacrosanctae Theologie Doctor*, "Doctor of Theology."
Supt., superintendent.
S. W., south-west.
Swe., Sweden, Swedish.
Switz., Switzerland.
Syr., Syriac.
Tenn., Tennessee.
Terr., territory.
Tex., Texas, Texan.
Theol., theology or theologian.
Thess., Thessalonians.
Tim., Timothy.

Tit., Titus.
Tp., township.
Treas., treasurer, treasury.
Tur., Turkey, Turkish.
U., Union.
Unit., Unitarian.
Univ., university.
Univ., Universalist.
U. S., United States.
U. S. A., United States army, United States of America.
U. S. M. C., United States marine corps.
U. S. N., United States navy.
Ut., Utah.
V., village.
v. or ver., verse.
V. or vs., *versus*, "against."
Va., Virginia.
Viz., *videlicet*, "namely."

Vol., volume.
V.-P., Vice-President.
Vt., Vermont.
W., west, western.
W. I., West Indies.
Wash., Washington City.
Wash. Terr., Washington Territory.
Wis., Wisconsin.
W. N. W., west north-west.
W. Pt., West Point.
W. S. W., west south-west.
W. Va., West Virginia.
Wyo., Wyoming.
Xmas., Christmas.
Yr., year, your.
Zech., Zechariah.
Zeph., Zephaniah.
Zool., zoology.
Zoo., *et cetera*, "and so forth."

Abd, an Arabic word which signifies "servant" or slave, and forms the prefix of many Oriental names, as **ABD-ALLAH**, "servant of Allah," **ABD-ER-RAHMAN**, "servant of the Merciful" (*i. e.*, of God).

Abd-el-Kâder ("servant of the Powerful"), b. in Algeria, in 1807, of a noble family. Algeria having been invaded by the French in 1830, A. was chosen emir by the Arabs; defeated the French at Macta in 1835; peace was made in 1837. Hostilities were renewed in 1839. A. displayed great ability, but was overpowered, surrendering in 1847, and was sent prisoner to France, where he was detained until 1852. In 1860, when the Chrs. of Syria were threatened with massacre by the Mohammedans, A., at the risk of his own life, protected many thousands of them. He visited Egypt in 1864, Constantinople in 1865, and the French Universal Exhibition in 1867. D. at Damascus May 26, 1883.

Abd-el-Latif, an Arabian historian and physician, b. at Bagdad in 1162. He wrote a valuable work on the hist., antiquities, and geog. of Egypt, of which De Sacy published a Fr. version. D. about 1230.

Abd-el-Wahâb, the founder of the sect of Wahabites or Wahâbees, b. in Nejed, Ar., in 1691. He recognized the Koran, and endeavored to reform the Mohammedan religion, which he affirmed had become corrupted. D. in 1787. (See **WAHABEES**.)

Abde'ra [Gr. Ἀβδῆρα], an anc. city of Thrace, noted as the birthplace of the philosopher Democritus. The stupidity and ignorance of the people of A. were proverbial.

Abdication, or the resignation of his throne by a king, was in former times of very rare occurrence, and generally occasioned by mental exhaustion, not to say derangement, as in the cases of Diocletian, Charles V., and Christina of Swe. But in our century it has been frequently resorted to for political ends. Charles IV. of Spain abdicated in 1808; Gustavus Adolphus IV. of Sweden in 1809; Louis I. of Holland in 1810; Napoleon I. 1814 and 1815; Victor Emmanuel I. of Sardinia in 1821; Charles X. of France in 1830; Louis Philippe of France, Louis I. of Bavaria, and Ferdinand I. of Austria in 1848; Charles Albert of Sardinia in 1849; and Amadeus of Spain in 1873.

Abdomina'les [plu. of the Lat. adjective *abdominalis*, "belonging to the abdomen"], or **Abdominal Fishes**, in the Linnean classification, an order including all osseous fishes of which the ventral fins are beneath the abdomen; later, limited to the malacopterygian teleost fishes, so distinguished either in whole or in part. The salmonids, clupeids, etc. are examples.

Abduc'tion [from the Lat. *ab*, "away," and *duco, ductum*, to "lead"], in law, the forcible or fraudulent carrying away of a person. It is usually confined to females removed with a view to their marriage or seduction. It is allied to the word *kidnapping*, which would include the case of males. A. is an offence severely punished by statute law, both in Eng. and in this country.

Abd-ul-Aziz, a son of Mahmood II., b. Feb. 9, 1830, succeeded his brother, Abd-ul-Medjid, as sultan of Turkey, June 25, 1861. He reduced the imperial civil list from seventy-five million piasters to twelve millions, abolished, among other barbarous practices, that of assassinating the sons of the princesses, favored the introduction of Western manners and customs, and did much to destroy the old and cherished traditions of the Turks. Deposed May 29, 1876, and is supposed to have been assassinated June 4, 1876.

Abd-ul-Hamid II., padishah or sultan of the Turkish empire, thirty-fifth of the dynasty of Othman, b. in Constantinople Sept. 5, 1842; he is the second son and fourth child of **ABD-UL-MEDJID** (which see); he was adopted by his father's second wife, who was childless. He was brought up with his brother Murad in the harem, and received but little education. On the deposition of Abd-ul-Aziz (May 29, 1876), Murad, eldest son of Abd-ul-Medjid, succeeded, but, being insane, he was deposed Aug. 31, and Abd-ul-Hamid became sultan Aug. 31, 1876.

Abd-ul-Medjid, sultan of Turkey, the eldest son of Mahmood II., b. in 1823. He succeeded his father July 1, 1839, when his capital was menaced by Mehmet Ali, viceroy of Egypt. This danger was averted by the intervention of the great powers in July 1840. He favored religious liberty and the reforms which his father had initiated, but his goodwill was partly frustrated by the resistance of his fanatical subjects. D. June 25, 1861, and was succeeded by his brother, Abd-ul-Aziz.

Abeceda'rians, a sect founded in the 16th century by a person named Storck, who professed that learning was not necessary, not even the knowledge of the alphabet (A B C, hence their name), for the proper understanding of the Scriptures; and some went so far as to maintain that it was not desirable to know how to read.

A'Becket (THOMAS). See **BECKET**.
A'bel, the second son of Adam and Eve, was killed by his

brother Cain. He is regarded as a type of faith and as the first martyr. (See Gen. iv. and Heb. xi. 4.)

Abel (NIELS HENRIK), an eminent math., b. at Findö, Nor., in 1802. He gained distinction by his discoveries in the theory of elliptic functions, and was highly eulogized by Legendre. D. 1829.

Abelard, or **Abailard** (PIERRE), a Fr. philos. and dialectician, b. near Nantes in 1079. He studied dialectics and afterward theology; taught in Paris and elsewhere, drawing around him pupils from different parts of Europe. He had marvellous subtlety, and was as audacious in propounding his notions as he was ingenious in defending them. But he loved truth less than he thirsted for fame; and his treatment of Eloise, one of his pupils, whom he first seduced, afterward married, and then deserted, leaves upon his memory an indelible stain. He was one of the most prominent founders of Scholasticism, and exerted a larger influence upon the intellectual activity of his time than any other man. D. 1142.

A'belites, or **Abe'lians**, a sect of Christians who lived in N. Afr. in the fourth century. They enjoined marriage without carnal intercourse, in order not to propagate original sin, claiming in support of their practice the example of the patriarch Abel. They adopted children, who were brought up to the same kind of marriage. They were extinct before the time of Augustine.

Aben, Ebn, or Ibn, a prefix to many Arabic proper names, denoting "son of."

A'ben Ez'ra, a Sp. Jew and eminent commentator on the Bible, b. at Toledo about 1088. He excelled as a math., linguist, phys., and poet. D. at Culanorra, 1167.

Abercorn (JAMES HAMILTON), FIRST DUKE OF, b. Jan. 21, 1811, succeeded his grandfather as marquis of Hamilton in 1818, and became lord lieutenant of Ire. in 1866, which position he held until 1868, when he was created duke of Abercorn, and when the Derby ministry returned to power he was restored in 1874 lord lieutenant of Ire.

Abercrombie (JAMES), a British general, b. in 1706; in 1758 took command of near 50,000 men in New York, in order to recover the forts which the Fr. had taken. On the 8th of July he attacked Ticonderoga, but was repulsed by the Fr. with great loss, and was soon removed from the command. D. Apr. 28, 1781.

Abercrombie (JOHN), M. D., b. at Aberdeen in 1780. He grad. in 1803, practised in Edinburgh, and attained the reputation of being the first consulting physician in Scot.; wrote upon intellectual and moral philos. D. 1844.

Abercrombie (JOHN J.), b. in Tenn. 1798, grad. at W. Pt.; served on the W. frontier; in the Black Hawk war in 1832; in the Fla. war 1837-40; in the war with Mexico 1846-48; as supt. of recruiting service 1853-55. In the civil war served in the Shenandoah campaign 1861-62; in command of troops before Wash. 1864; was brevetted brig.-gen., and retired from active service 1865. D. Jan. 3, 1877.

Abercromby (SIR RALPH), b. 1734, entered the army 1758. After the peace of 1783 he passed ten years at home in retirement. He distinguished himself in the disastrous campaigns in Hol. in 1794 and 1795. In 1795 he took command of an expedition sent to the W. I., where he captured several islands from the Fr. He was the second in command of the army which the duke of York led to Hol. in 1799, and was appointed in 1800 commander-in-chief of the expedition to Egypt, which was then occupied by the Fr. under Bonaparte. The Brit. army was attacked near Alexandria Mar. 21, 1801. In this action the Fr. were defeated, but Sir Ralph was mortally wounded. D. Mar. 28, 1801.

Aberdeen, a seaport of Scot., on the N. Sea, at the mouth of the river Dee, 93 m. N. N. E. of Edinburgh. It has a good harbor, and is the seat of Marischal Coll., founded in 1538. Old A., 1 m. from the new city, is the seat of King's Coll. and Univ., founded in 1494. Pop. 105,189.

Aberdeen, Dak. See APPENDIX.

Aberdeen, on R. R., cap. of Monroe co., Miss., on the W. side of the Tombigbee River. It has a coll. It is but 18 m. from the Greenwood Springs. Pop. 1870, 2022; 1880, 2339.

Aberdeen (GEORGE HAMILTON GORDON), FOURTH EARL OF, b. in Edinburgh Jan. 24, 1784, grad. at Cambridge in 1804. He was sent as ambassador to Vienna in 1813, and was raised to the British peerage as Viscount Gordon in 1814. In 1828 he became sec. of state for foreign affairs in the cabinet of the duke of Wellington, with whom he resigned in Nov. 1830. He was reappointed to that office by Sir Robert Peel in 1841; in 1846 he resigned office with Sir Robert Peel, after whose death (1850) he was regarded as the chief of the Peel party. He became, in Jan. 1853, prime minister in a cabinet formed by a coalition of parties. In 1854 Eng. was involved in a war against Rus., to which measure Lord A. gave a reluctant support. Lord A. resigned in Feb. 1855, and was succeeded by Lord Palmerston. D. Dec. 14, 1860.

Ab'ernethy (JOHN), a surgeon b. about 1765, was a pupil of John Hunter; in 1786 was chosen assistant surgeon of St. Bartholomew's Hospital, and eventually chief surgeon of the same. As a lecturer on anatomy and surgery he gained immense popularity. He published in 1809 a valuable work on the Constitutional Origin and Treatment of Local Diseases. D. 1831.

Aberra'tion [Lat. *aberratio*, from *ab*, "from" and *erro*, *erratum*, to "wander"], a term variously employed: in optics it denotes the unequal deviation of rays of light when refracted by a lens or reflected from a concave mirror. There are two kinds of optical A.—viz. Chromatic (from the Gr. *χρῶμα*, "color"), A., or A. of Refrangibility, and Spherical A., or A. of Sphericity. In astron. also there is the A. of the Celestial Bodies, sometimes (but less correctly) termed the A. of Light. (For a fuller account of ABERRATION in its several forms, see art. in *J.'s Univ. Cyc.*, by F. A. P. BARNARD.)

Abert (JOHN J.), b. in Md. 1785, grad. at W. Pt. 1811; did not enter the army, but became a lawyer; was brevet maj. of topographical engineers in 1814; in charge of bureau in 1829, serving in that or similar capacities until 1861, when he

retired from active duty. He bore a prominent part in the development of our earlier national works of engineering, such as the canal around the falls of the Ohio at Louisville, the Chesapeake and Ohio Canal, and the Potomac aqueduct. His reports upon subjects belonging to his official work are of great value. D. at Wash. Jan. 27, 1863.

Abeyance [Nor. Fr. *abbaïance*, "expectation;" literally, "gaping" or waiting with open mouth], a legal term signifying "in expectation or suspense." It is used to indicate the condition of property where there is no person in whom its ownership is vested. In the law of real estate it is generally applied to a fee, which is said to be in A. when there is no particular owner of the inheritance. The term is also applied to personal property, as in case of captures at sea in time of war, as to the title after capture and before condemnation in the prize court.

A'bib (after the Babylonian captivity called **Nisan**), the first month of Heb. sacred year and seventh of civil year.

A'bies [Lat. *abies*, a "fir tree"], the name of a genus of coniferous trees which have leaves growing singly on the stem, as the fir and the spruce. The A. *excelsa* produces the valuable timber called "white deal," also Burgundy pitch and frankincense; the A. *balsamea* yields the Canadian balsam. Several are highly prized as evergreen ornamental trees. The anc. genus is now divided into 4—*Abies* for the fir; *Picea* for the spruces, such as the Norway and our black and white spruces (these two names have been used differently, but this is the anc. and recent scientific use); *Tsuga* for the hemlock spruces, and *Pseudotsuga* for the Douglas spruce.

Abile'ne, on R. R., cap. Dickinson co., Kan., 95 m. W. of Topeka. Pop. 1880, 2360.

Abilene, Tex. See APPENDIX.

Ab'ingdon, city and R. R. centre, Knox co., Ill., 85 m. N. E. of Quincy. It is the seat of Hedding Coll., controlled by the M. E. Ch., and of Abingdon Coll., sustained by the Christian denomination. Pop. in 1870, 948; 1880, 1511.

Abingdon, on R. R., cap. Wash. co., Va., 315 m. W. S. W. of Richmond. It has three female colleges of high grade. The co. was organized in 1776, and is the first spot of earth named in honor of the Father of his Country. Emory and Henry Coll. is in this co., and a large male acad. Immense deposits of salt and gypsum are found here. Pop. in 1870, 715; 1880, 1064.

Ab'inger (SIR JAMES SCARLETT), LORD, b. in Jamaica 1769, was educated at Cambridge and the Middle Temple, and was called to the bar in 1791. He became one of the most accomplished barristers of his time. In 1818 he entered Parl. as a Whig, but afterward became a decided Tory. In 1827, and again in 1829, he was atty.-gen. He was raised to the peerage in 1834, and was appointed chief baron of the exchequer. D. Apr. 7, 1844.

Abington, Mass. See APPENDIX.

Abiogen'esis [from a priv., *βίωv*, "life," and *γενέσις*, "generation"], a name proposed as a substitute for *spontaneous* or *equivocal* generation—i. e. the doctrine that certain animals or plants have spontaneously originated, and without birth from previous living beings.

Ab'lution [Lat. *ablutio*, from *ab*, "from," and *luo*, *lutum*, to "wash"], a religious ceremony of the R. Cath. Ch., signifies the washing of the sacramental cup and of the hands of the priest.

Ab'ner (the "enlightener"), the uncle of Saul the first king of Israel. A. became commander-in-chief of Saul's army, and for some time after the death of the king he was the chief support of Ishbosheth, his successor; but subsequently went over to the side of David, then king of Judah. With David he found such favor that the jealousy of Joab was aroused, and A. was slain by him B. C. 1046.

Äbo (Swe. pron., 5'boo), a Rus. city and seaport, on the Aurajoki, near its entrance into the Gulf of Bothnia; lat. 60° 26' 58" N., lon. 22° 17' E. It was built by Eric IX. of Swe. in 1157, was subsequently taken by the Rus., and in 1809 was, with the whole of Finland, ceded to Rus. It was the cap. of Finland until 1819, and is now the see of a Lutheran archbishop. The Univ. of A., having been destroyed by fire in 1827, was rebuilt at Helsingfors. Pop. 22,957.

Abolition of Sla'very. Ancient servitude of the constrained, involuntary kind appears to have risen and passed away without provoking any organized moral or religious opposition. So far at least as Europe was affected, it was irrespective of race or color; for, though the Egyptians and Arabs bought and held negro slaves, they were not known in Europe till introduced into Sp. by the Moorish invasion and conquest. After the slavery of negroes had been generally diffused over the New World, slaves began to be taken to Europe, and legal opinions for a time affirmed the validity of their bondage in countries where no law forbade it; but this was arrested, so far at least as G. Britain was concerned, by the famous decision of Lord Mansfield, who held that slavery can only exist by virtue of positive law.

The first systematic agitation for the overthrow of slavery began with Amer. Quakers—John Woolman and Anthony Benezet of Phila. being conspicuous among them—about the middle of the last century. Benezet pub. in 1762 a book in exposure and denunciation of the slave-trade. His friend William Dillwyn removed to Eng. some time afterward, and there enlisted Granville Sharpe and others in the cause. The agitation soon after arising in this country against the Stamp Act and other arbitrary measures of the Brit. govt. incited many Amers. to consider questions of natural right, and thus to condemn and oppose slavery. Hence, Thomas Jefferson, himself a slaveholder, yet opposed to slavery, had no difficulty in inducing a majority of the Cong. which met next after the acknowledgment of our independence to vote to exclude slavery (in Mar. 1784) absolutely and forever from all the Union not included in any State. The proposition did not then prevail, since the votes of a majority (7) of all the States were required to enact it, and the absence of a delegate from N. J. reduced the States voting yea to 6, against

three voting nay—N. C. being divided. The proposition, restricted to an inhibition of slavery in the territories already ceded by the States to the Confederation, was renewed in 1787, when it was unanimously passed, and it was reiterated with like unanimity by the first Cong. which assembled under the Federal constitution, when it received the approval of Pres. Washington. Meantime, the convention which formed that constitution had authorized Cong. to prohibit the importation of slaves after twenty years; and this was done—Cong. having forbidden, in 1794, our people to engage in carrying slaves to other lands, absolutely outlawing all participation in the slave-trade by our people, and all importation of slaves into this country, by an act passed Mar. 2, 1807—twenty-three days before the Brit. Parl., after a struggle which had lasted nearly a quarter of a century, did likewise.

A British society for the suppression of the slave-trade was organized by Dillwyn, Granville Sharpe, and Thomas Clarkson in 1787, to whom William Wilberforce, already in Parl., soon lent his powerful aid. William Pitt, then prime minister, admitted the justice of their cause, and gave them a cold and hesitating support; Charles James Fox, his great rival, was its hearty supporter; so was Edmund Burke. Yet bill after bill for the suppression was defeated, either directly or by postponement, until after Pitt's death and Fox's accession to the premiership, when in June, 1806 a resolve pledging the House to the measure passed the Commons by 100 yeas to 41 nays, and a bill founded thereon was next winter carried through both houses, and received the royal assent Mar. 25, 1807. G. Brit. was slowly followed in this step by Swe. Den., Hol., Fr., and several of the S. Amer. republics. Sp. and Port. reluctantly promised to do likewise, but were tardy in fulfilling their compact, even though they had accepted money or favor from G. Brit. as a consideration therefor. The slave-trade was first declared a felony by act of Parl. in 1811, while acts passed in 1824 and 1837 made it piracy, punishable by transportation for life.

So soon as the slave-trade had been placed under the ban of the law, its Brit. adversaries reorganized for a war upon slavery itself, against which they had hitherto put forth no combined or systematic efforts. Mr. Wilberforce presented their petition to the House of Commons in 1823, when it was defeated; Mr. Brougham took the lead in their behalf in 1830; and the struggle for parliamentary reform which followed the death of George IV. and the accession of William IV. brought a large adhesion of strength to their cause; so that in May, 1833, Mr. Stanley (afterward earl of Derby) introduced resolves which proposed the total (though gradual) emancipation of the slaves held in the Brit. colonies, and a payment to their owners of £20,000,000. These resolves passed both houses, and were followed by a bill of like tenor, which likewise passed and received the royal assent Aug. 2, 1833. It took effect Aug. 1, 1834, but an apprenticeship system was grafted upon the measure, whereby the slavery of some was virtually prolonged for four and that of others for six years. Experience proved this apprenticeship tainted with all the vices of slavery, relieved by scarcely any of its advantages; so the last traces of slavery were, by common consent, effaced from British soil Aug. 1, 1838.

The more northern of our States are entitled to the credit of having first in modern times discerned and proclaimed the wrong and mischief of slaveholding. Abolition received in G. Brit. powerful aid, for a time, commanding influence in ch. and state; but the slaveholders were distant colonists, not directly represented in Parl., and their defeat would not disturb the existing social order in the mother country. Not so in the original N. Eng. States, N. Y., N. J., and Pa. R. I., then emphatically commercial, was long the focus of an extensive slave-trade, and slaves were held as firmly in N. Y. and Pa. as in the South. Soon after the Dec. of Ind., Mass. adopted a bill of rights, which her highest court soon decided was incompatible with slavery, which was thereby outlawed. In Pa. an abolition society, whereof Dr. Franklin was a member, was organized in 1780, and did not cease its earnest efforts until it had seen that State made a home for freemen only. In N. Y. a similar organization was effected somewhat later, and the State was brought to decree the emancipation of her slaves by the const. of 1821, though, with regard to some who were then minors, the liberation did not take effect till about 1830. In N. J. the work was still more gradual. Slavery had ceased to be a power north of Del. and Md. as early as 1820, save through the political, commercial, and social ligaments which bound the North and the South closely together and made the wishes and supposed interests of the latter potent throughout the former.

As in Eng. the early efforts of the abolitionists were directed against the Afr. slave-trade exclusively, and a general crusade against slavery disclaimed, so in this country the anti-slavery spirit was long contented with resisting the extension of slavery into regions previously unscourged by it. There were, indeed, unconditional abolitionists, but they were limited in numbers, and had little immediate influence on legislation or govt., since a majority of those earnestly opposed to slavery held that the spirit, if not the letter of the Federal const. forbade all interference by Cong. with the internal polity of a State, and restricted to moral influence the efforts of the citizens of one State to subvert or modify the institutions of another State. But when, in 1818, the terr. of Mo. framed a const. and applied for admission into the Union as a State—said const. recognizing and upholding slavery—the reps. of the free States very generally resisted such admission until she should provide at least for gradual emancipation. The Senate opposed any such restrictions, but a compromise was ultimately effected whereby Mo. was admitted as a slave State on condition that slavery should never exist in any territory of the U. S. north of the parallel of 36° 30' N. lat. The House consented to this by barely three majority (90 to 87), nearly all the nays being cast by N. opponents of slavery. (See MISSOURI COMPROMISE.) On the admission of Tex. into the Union in 1845 the Mo. Compromise line of division was agreed upon and extended through all

the public domain then acquired. In 1846, pending the war with Mex., David Wilmot of Pa. introduced into the House, a proposition to prohibit slavery from all new terr. that might be acquired from Mex. at the termination of that war. This proposition, known as the Wilmot Proviso, gave rise to discussions in the House and the Senate until 1850, when another compromise was made in which Henry Clay was the pacificator. The agitation was renewed again in 1854, when a bill was introduced into the Senate by Stephen A. Douglas of Ill. for the organization of State governments in the terrs. of Kan. and Neb., and providing for the repeal of the Mo. Compromise act of 1820. The bill was adopted by the Senate by a large majority, but in the House it encountered strong opposition, passing by a vote of 113 to 100. The question whether slavery should exist within the States to be formed under this act was thus referred to the people of the terrs. themselves, and was left to be decided by what, in the popular parlance of that day, was called "squatter sovereignty." As the terrs. were thinly peopled, there consequently arose a rapid migration toward them, especially toward Kan., from both North and South, each section aiming to secure a predominance in the popular vote and in the constitutional convention. Collisions between these rival colonists occurred, attended in some instances with violence; and the struggle for power was protracted through several years. The election of Mr. Lincoln as Pres. in 1860 finally decided the controversy, and Kan. was admitted as a free State in 1861. The same event occasioned the withdrawal from their seats in Cong. of the Senators and members of the House from seven of the S. States, and gave the advocates of slavery restriction by Federal legislation a majority in the Senate for the first time since the govt. was organized. The House was still more decidedly anti-slavery. As the war went on, defeats, even more than victories, diffused and intensified among Unionists the hatred of slavery; so that, when Mr. Lincoln (Sept. 22, 1862) proclaimed that if the revolted States should still continue in rebellion he would, on the 1st of Jan. ensuing, declare free all who were held as slaves within those States, public sentiment was ripe for sustaining that policy. The Pres. issued his second proclamation on the day appointed; after which no Federal commander was at liberty to remand slaves who had fled from their masters to find protection within the U. lines. From that date the war for the Union became a struggle for freedom to all.

The 37th Cong. initiated the work of direct emancipation by an act proposed by Senator Wilson of Mass., abolishing slavery in the Federal District, and paying the owners an average compensation of \$300 for each slave liberated. This bill passed the Senate Apr. 3, 1862, by 29 yeas to 14 nays, and the House Apr. 10 by 92 yeas to 39 nays. This was followed by an attempt to proffer a like compensation to the border States if they would consent to emancipation; but it was strenuously opposed by their representatives, and ultimately failed in the House for lack of a two-third vote to take it up out of its order on the last day of the session. A bill prohibiting slaveholding in any Federal territory became a law, by the President's approval, June 19, 1862. A bill decreeing the freedom of all slaves of persistent rebels found in any place occupied by the forces of the Union, forbidding their rendition to their masters, and providing that negroes might be enlisted to fight for the Union, passed the House by 82 yeas to 42 nays, and the Senate by 27 yeas to 12 nays, and became a law, by the President's approval, July 17, 1862.

A const. amend. (the 13th), abolishing and prohibiting the enslavement of human beings, was proposed in the Senate by Mr. Henderson of Mo., at the former session, when it passed that branch, Apr. 8, 1864, by 38 yeas to 16 nays—six Senators not voting. When sent to the House, it failed to command the requisite two-thirds—yeas, 85; nays, 66; when Mr. Ashley of O. kept it alive by changing his vote to nay and then moving a reconsideration. When that Cong. assembled, Dec. 6, 1864, for its final session, Mr. Lincoln had been triumphantly re-elected and the e. war was plainly near its end. The Pres. in his annual message, recommended a reconsideration and passage of the amendment aforesaid; and this was accomplished Jan. 31, 1865, by 119 yeas to 57 nays. By the ratification of three-fourths of the States, and by the collapse of the e. war, this amendment became a part of the supreme law of the land. By its force slavery was banished from the U. S., as it had already been from every portion of this continent except Brazil and the Sp. islands of Cuba and Porto Rico. In Brazil an act was passed in Sept., 1871, freeing all the slaves belonging to the govt., and securing freedom to all those born after the date of the enactment.

Abolitionists, a name applied to those persons in the U. S. who advocated the abolition of slavery in the States by the legislation of Cong., and were distinguished by their zeal against that inst.

Abomey, an Afr. town, cap. of the kingdom of Dahomey. Pop. estimated 50,000 to 60,000.

Aborigines [a Lat. word derived from *ab*, "from," and *origo* (gen. *originis*), "source" or "origin"], the earliest original inhabitants of a country—that is, those who occupied it at the period when it began to be known, and who either were indigenous to the soil or had immigrated thither before the dawn of history. Some of the ancients supposed they had always inhabited the same soil, and sprang from it, as the Athenians, who thence called themselves *autochthonous* (from *auto*, "itself," and *gēnē*, "earth," "soil," "land"); i. e. sprung from the land or soil itself. But modern nations use the word *A.* to designate those inhabitants of a country of whose origin nothing certain is known.

Abortion [Lat. *abortio*], the premature birth or exclusion of the human fetus. It is doubtful whether the act of causing an *A.* is an offence at common law unless the mother is quick with child, on the ground that life does not begin until that period. The early statutes took the same distinction. Later legislation in Eng. makes it a felony to procure miscarriage at any period of pregnancy.

About (EDMOND). See APPENDIX.

A'braham, originally **Abram**, a Hebrew patriarch, called the "Father of the faithful," b. at Ur, in Chaldea. The date of his life is doubtful; Ussher assigns his birth to the year 1996 B. C.; Hales, 2153 B. C.; and Bunsen supposed that he lived about 2850 B. C. "Abraham" signifies "the father of a numerous people." He migrated to Canaan, where he led a nomadic life in tents, was greatly renowned for piety and wisdom, and was called a friend of God; and d. at the age of 175 yrs.

A'brahamites, the name of a sect of Bohemian deists, who are said to have rejected all parts of the Bible except the Ten Commandments and the Lord's Prayer. They were suppressed in 1783.

Abran'chia [a priv., and *bráχcia*, gill], a sub-order of docoglossate Gasteropods, distinguished by the atrophy of the gills, framed for the family Lepetidae.

Abbranchia'ta, **Ludwig**, a group of Echinoids, without gills to the buccal membrane, and with ambulacral and also interambulacral plates on the latter, including the family *Cidaridae*.

Abantes, DUKE OF. See JUNOT.

Abrax's Stones, a kind of gems found in Syria, Egypt, and Spain. They are of various forms, but all have the word A. engraved on them in connection with certain mystical symbols. The word A. was first used by the Egyptian gnostic Basilides, and denoted not the Supreme Being, but the assemblage of the 365 world-spirits; the letters composing the word expressing, according to the Gr. numeration, the number 365.

Ab'salom, the third son of King David. Having gained the favor of the people, he rebelled against his father and raised a large army, which was defeated by that of the king. Retreating from this battle, A. was killed by Joab, although David had given orders that his life should be spared.

Ab'scess [Lat. *abscessus* from *abs*, "away from," and *cedo*, to "go," because the pus separates itself from the rest of the body], in surgery, is a circumscribed collection of pus in any part of the animal organism. An "acute abscess" is one which is the result of active inflammation. "Cold abscess" is the result of chronic inflammation. The tendency of an acute abscess is to "point" or "come to a head"; that is, from the outward pressure of the accumulating pus the walls yield mechanically in the direction of least resistance. In favorable cases the evacuation of the pus, natural or artificial, is the initiation of recovery; but if the abscess be of the "cold" variety, or be deep-seated and extensive, or be associated with symptoms of blood-poisoning, the question of recovery becomes a much more complicated one. The general symptoms of abscess are fever and subsequent rigors; the local are "pain, heat, redness, and swelling," followed by softness and fluctuation of the fluid contents. Abscesses should be poulticed to hasten pointing and evacuation, and to relieve pain when mature may be evacuated by incision. E. DARWIN HEDSON, JR.

Ab'sinthe [Fr. for "wormwood"], a liqueur much used in Fr., prepared from alcohol mixed with volatile oil of wormwood, oil of anise, and other ingredients. It has peculiarly intoxicating effects. A. drinking is one of the most dangerous forms of stimulation.

Absorption [Lat. *absorptio*, from *ab*, "from," and *sorbeo*, *sorbum*, to "sip or suck"], is the function by which nutritive matter is absorbed into an animal or plant. Plants absorb carbonic acid gas by their leaves and other green parts. Plants also derive nourishment from their roots, and it is at the extremities of their fibrils that A. takes place most rapidly, by capillary attraction and a process called Endosmosis. A. in animals is largely by endosmosis.

Ab'stinance, Total, that is, abstaining from the use of intoxicating beverages, was practiced in early ages by the Nazarites and Rechabites, mentioned in Scripture. Some of the Hebrew prophets inveigh against the prevalence of drunkenness, yet hardly indicate T. A. The Essenes (which see) were a Jewish sect distinguished for temperance in eating and drinking. Mohammed forbade the use of wine as a beverage by his followers. In the feudal ages societies designed to prevent the evils of drunkenness were often formed, but not on the basis of absolute disuse of stimulants. The discovery of alcohol by an Arabian chemist about 1000 A. D. had greatly expanded and intensified the evils of intemperance, especially in Northern Europe, where beer had generally been the most potent stimulant attainable by the masses. The discovery and settlement of Amer. rendered intemperance more common, by increasing the ability of the people to purchase alcoholic stimulants.

The earliest known organization of a T. A. society in the U. S. was the Temperate Society of Milton and Northumberland (Saratoga co., N. Y.), founded in 1808. Distilled liquors and wines were prohibited by its rules, but not the moderate use of beer. In 1813 was formed the Massachusetts Society for the suppression of intemperance. In 1826 the American Temperance Society was organized. The evils resulting from the free use of ardent spirits were so general and glaring that kindred societies were soon formed in many places, the movement being aided by Lyman Beecher's *Nat. Sermons on Intemperance*. Eliphalet Nott, pres. of Union Coll., was also early distinguished as a pioneer in the temperance cause. It was not till 1833 that, at a national meeting of the friends of temperance held in Philadelphia, the principle of "T. A. from all that may intoxicate" was propounded, only to be voted down; but it was again proposed, and adopted, at a national convention held at Saratoga Springs in Aug. 1836, and became henceforth the basis of the temperance movement. The first State to prohibit the sale of intoxicating beverages was Me., in 1851. The other N. Eng. States soon followed her example. N. Y. had already (in 1846) authorized the voters of her several cities and townships to forbid such sale by a popular vote; but her court of appeals pronounced this unconstitutional, as it likewise did (in 1859) a law of absolute

prohibition enacted in 1855. Partial, if not general prohibition was enacted in several Western States, but here, as elsewhere, most imperfectly enforced.

The T. A. movement in G. Brit. first attracted public attention in 1831. The pledge to drink no intoxicating liquors was first adopted at Manchester in 1834. It has never yet become so influential in that as in this country, and its upholders have only ventured to ask of Parliament a "permissive" act—that is, one allowing any locality to forbid and outlaw the liquor traffic by a majority vote—and this has never been conceded. In Ire., T. A. was first effectively commended by Father Mathew, who persuaded millions of his countrymen and fellow Catholics to take the pledge. Since his death, in 1856, the reform has decidedly lost ground in Ireland, while it has as yet made little headway in any part of Continental Europe or South America.

HORACE GREELEY.

Ab'stinents, a Christian sect of Gaul and Sp. in the latter part of the third century A. D., who condemned marriage and the use of flesh-meats and wine, declaring that they were made by the devil, and not by God.

Ab'stract Science (metaphysics, logic, mathematics) starts from a proposition, not derived from experience, but found as an axiom in the human understanding; from which proposition a whole system is evolved by inference and deduction. All discoveries, as far as they are not incidental, are made by application of A. S. (experiment), as all inventions are made by application of knowledge of the real object (experience).

Abu (also written in English *Abou*), an Arabic word, signifying "father," is a prefix to many Oriental names.

Abul'fazi, an Oriental historian and statesman, who in 1574 became vizier of the great Mogul emperor Akbar. Among his works are a *History of Akbar* and *Institutes of Akbar*. D. by assassination, about 1600.

Abul'e'da, an Arabian prince, b. at Damascus about 1273. He fought for the sultan of Syria against the Tartars or Mongols, and was rewarded with the title of prince of Hamah. He wrote an *Abridgment of the History of Mankind* and a *Description of the Countries*, which is regarded as the best extant Arabic work on geography. D. in 1331.

Abu Sambul, **Abusimbal**, or **Ipsambul**, a ruined place in Nubia, on the W. bank of the Nile, 1014 miles above Cairo. It contains two of the best-preserved specimens of the great rock-hewn temples of ancient Egypt. It has also four sitting colossal statues, which are the largest and finest specimens of Egyptian plastic art.

Aby'dos, an ancient city of Upper Egypt, on the left bank of the Nile, about 100 miles below Thebes. Here are the ruins of a temple of Osiris and a temple of Memnon.

Aby'dus, or **Aby'dos** [Gr. *Ἀβύδος*], an anc. city on the Hellespont opposite Sestos, where Xerxes crossed over to Europe on a bridge of boats, 480 B. C. It was also celebrated for its connection with the story of Hero and Leander.

Abyssin'ia, in its widest sense, comprises the Ethiopic plateau, extending S. W. from the Red Sea, descending on the N. to the Nubian lowlands, and on the W. to the plains and valleys of Semnaar and Kordofan. It is not generally used in this sense, however, but as including the three former kingdoms of Tigre, Amhara, and Shoa. Its boundaries are the Red Sea on the N. E., the Galla country on the S., and Nubia on the W. and N. W. It lies between the parallels of 9° and 16° 20' N. lat., and the meridians of 34° 40' and 40° E. lon. Its area is 128,646 sq. m.

Topography.—A. consists of a series of plateaus, average elev. 5000-8000 ft., from which rise mountain groups, the loftiest of which are 15,200 ft. above the sea. Near the Red Sea the land is low, waterless, and unhealthy. The plateaus and mountains are fissured by rivers—viz., the Abai, passing through L. Dembea, the Atbara, and the Tacazze. The mts. are volcanic, but most of the volcanoes are now extinct.

Climate.—The valleys and lowlands are hot, subject to fevers, and ravaged by wild beasts; the mountains and hills have a healthy and temperate climate, and few wild animals.

Soil and Productions.—The soil of the valleys and lowlands is very rich, and the vegetation of a tropical character. In the hills and mountains the soil is fertile, but the vegetation is not tropical. There are few forests, and the mountain torrents carry the soil of the hills into the Nile valley on the W. All the cereals grow well and yield large crops. Cotton, sugar-cane, tobacco, and coffee are raised largely in the lowlands; coffee grows wild.

Industries.—The people are mostly farmers and herdsmen. There are some rude manufactures.

Education and Religion.—The Abyssinians are naturally intelligent and quick-witted, but there is very little education, few can read or write. The Copts are nominally Chrs., but their religion is very corrupt. Circumcision precedes baptism, communion is administered daily to the laity, and confession rigidly enforced, but morals are at a low ebb. The Falashas adhere to the Jewish ritual. The Gallas and some other tribes are Mohammedans, and there are some heathen. The R. Caths. have attempted repeatedly to gain a footing here, but have failed. There are some Prot. missionaries.

History.—The Copts of A. are a mixed race, originally, probably, from Yemen. They first became noted at Axum. Their rulers claimed to be lineal descendants of Solomon and the queen of Sheba, and governed them peacefully to the end of the 4th century. About A. D. 350 Christianity was introduced, and became the national religion. The first great advance of Mohammedanism cut them off from all connection with other Chr. nations, and great corruption and debasement ensued. The patriarch must be a Copt, and was generally an ignorant monk. The Mohammedans attempted to destroy the kingdom in the 16th century, but the Portuguese defeated them, and they and the Jesuits converted the royal family to Catholicism. The people, however, refused to be converted, and in 1630 severed

all connection with Rome. The power of the Hæzie or royal family continued to decline, and at the beginning of this century was only nominal, the governors of Amhara being the actual rulers. About 1850 Lij Kassa, of the royal blood but of poor parentage, became governor of the province of Kuara; he soon revolted, and after several failures and some successes dethroned Kas Ali, the Amhara ruler, and defeated Ubi, prince of Tigre, and in 1855 was crowned *negus negussie* (king of kings), under the title of Theodore II. He was at first a good ruler, having an able adviser in John Bell, an Englishman, who had been in A. since 1842; but after Bell's death, in 1860, he became a cruel tyrant, and so oppressed the people as to drive them to rebellion. He insulted the Brit. govt., and imprisoned its citizens and consuls, and in the autumn of 1867 an armed expedition with about 12,000 troops was sent to A., and landed at Mulkutto Jan. 3 1868, and on April 14 captured Theodore's last and strongest fortress, and Theodore killed himself. After the Brit. army withdrew, anarchy prevailed. The son of Theodore had been taken to Eng. to be educated, but died there some years later. Gobazie, prince of Amhara, proclaimed himself king, but in 1871 was defeated by prince Kassa of Tigre, who in 1872 was crowned emp. John II. of Ethiopia. There were several revolts, but in 1873 he had defeated all the insurrectionists, and continued to rule for many years, with a fair reputation for justice and ability.

Population, Etc.—There are numerous petty states and provinces occupied by distinct tribes and races; Tigre, Amhara, and Shoa are the largest. The pop. of Abyssinia is 3,000,000. The Coptic race predominates; there are also Falasha (a peculiar Jewish tribe), Negroes, Gallas, and Arabs. The principal towns are Gondar, in Amhara, the residence of the abuna, or bishop; Adowa, cap. of Tigre; Ankobar, cap. of Shoa; Antalo, Massowa, Angolola, Aliya, Amba, and Magdala. L. P. BROCKETT.

Abyssinian Church. See ABYSSINIA.

Acacia [from the Gr. *ἀκία*, a "sharp point," on account of the thorns on the tree], a genus of the order Leguminosæ, found in Asia, Afr., Amer., and Australia, comprising many beautiful trees, among which is *A. Arabica*, which produces some of the gum-arabic of commerce, but the most and best is yielded by *A. verek*. Catechu is an extract from the wood of *A. catechu* of India and Burmah; this and other species are much valued for timber, etc. The species with willow-like foliage, cultivated in conservatories, are nearly all Australian.

Academy [Gr. *Ἀκαδημία*; Lat. *academia*; Fr. *académie*], a word originally applied to an Athenian garden or grove and to the school of philo., which Plato founded there. The word is usually applied to a society founded for the improvement of lit., science, or art. The first inst. of which we read at all corresponding to this idea was the Museum, established at Alexandria by Ptolemy Soter in the third century B. C. In modern times Italy has been very prolific in acads., more than 500 being enumerated; the most noted of which is the Accademia della Crusca of Florence, founded in 1582, which by its famous dict. established the Tuscan dialect as the standard of the national lang. The first inst. of this kind in Fr., the Académie Française, was founded in 1635 for the purpose of refining the Fr. lang. and style, and became in time the most celebrated of all European literary societies. It published a dict. of the Fr. lang. in 1694. This, with several others, was in 1795 formed into the National Inst., which has been several times remodelled. The oldest Ger. A. was the Academia Naturæ Curiosæ, founded in 1662; afterward taken under imperial protection, when it received the name of the Academia Cæsareo-Leopoldina. In Rus. the Imperial Acad. at St. Petersburg was projected by Peter the Great, actually founded by Catharine I. in 1725, and munificently endowed by Catharine II. Insts. of this kind exist in almost every country of Europe. In G. Brit. the term A. is chiefly confined to associations for the promotion of the fine arts; those for scientific purposes being styled societies. A similar usage prevails to a more limited extent in Amer. The National A. of Sciences of the U. S., incorporated by the 37th Congress in 1863, was limited by the original charter to fifty members, citizens of the U. S., fifty foreign associates, and a variable number of honorary members.

The term is also used to denote a school of high grade, as the U. S. Military A. at W. Pt., and the Naval A., Annapolis. [From orig. art. in *J.'s Univ. Cyc.*, by J. THOMAS, LL.D.]

Acadia [Fr. *Acadie*], sometimes called **Arca'dia**, **Acadia**, or **Ca'die**, the peninsula now called **Nova Scotia**. It was settled by the Fr. in 1603, but was ceded to Eng. in 1713. The inhabs. having refused to take the oath of allegiance to the Brit. king and to bear arms against the Fr., it was resolved to remove them to the other Brit. provinces. The Fr. settlers, 8000 in number, were sent off in such haste that many families were separated.

Aculephs, or **Aculephæ** [Gr. *ἀκύνθη*, a "nettle"], or **Hydrozo'ans**, a class of Coelenterates, distinguished from the Polyps by the absence of differentiation of the stomach sac from the general body cavity, and from the Ctenophores by the want of vibratile locomotive lamellæ. The Medusæ, or so-called jelly-fishes, sea-nettles, and Hydraz, are representatives. The first and more conspicuous species have an umbrella-like disk, while the last have a bell-shaped body with a stalk attached to foreign substances. Between and co-ordinate with these are numerous modifications in form and structure as well as combination. Almost all, however, have tentacles radiating from the margin of the body, which are furnished with peculiar *netting* organs, to which they

owe their name. In some, as in Hydra, the generative elements are discharged externally, and of these most exhibit the uncomplicated hydriform or medusiform conditions (order Hydromedusa), but a number are distinguished by the union of the hydriform and medusiform stages in a natatory colony (order Siphonophora); in others those elements are discharged into the body cavity, the generative elements being sometimes combined in symmetrically disposed longitudinal band-like projections of the inner surface of the body cavity—the body attached—(order Lucernæle), and in others the generative elements are lodged in symmetrically disposed pouch-like dilatations of the body cavity, and the medusiform condition is developed (order Discophora, or Acraspeda). An additional order has been proposed by Prof. Allmann for a peculiar parasitic type (*Stephanocylus mirabilis*), under the name THECOMEDUSÆ.

THEODORE GILL.

Acanthurids, or **Acanthuri'dæ** [Gr. *ἀκανθα*, a "spine," and *οὔρα*, "tail"], a family of Acanthopterus teleocephalous fishes, with the post-temporal undivided and the caudal peduncle generally armed with lancet-like spines recumbent forward, (whence the name). The form is oval, but there is a tendency toward outgrowth of the anterior portion of the back and nape; the body compressed; the scales minute and diversiform (sometimes truly scale-like, and occasionally bristle-like); the head is short and diversiform, sometimes rounded in front, and at others with the forehead more or less produced forward; the opercula unarmed; the mouth terminal, and mostly transverse; the dorsal and anal fins, as far as they go, are similar and opposite, and almost exactly coterminous behind, and the soft portions are at least as long as, if not longer than, the spinous; both are very long, the dorsal commencing behind the nape, and the anal not far behind the ventrals (D. iii. ix. + 19-31. A. ii. iii. + 18-31); the ventrals inserted under the bases of the pectorals, and each provided with a spine, and, generally, with five (sometimes with only three) articulated rays. The vertebral column has mostly nine (or eight) abdominal and thirteen (or twelve) caudal vertebra. Scales are distributed in all tropical seas. Nearly 75 have been more or less satisfactorily made known. The species are herbivorous.

THEODORE GILL.

Acanthus [from the Gr. *ἀκανθα*, a "thorn"], a genus of herbaceous plants, natives of S. Europe, belonging to the natural order Acanthaceæ. The most remarkable species of this genus are the *A. mollis* and the *A. spinosus*, which have large white flowers and shining leaves of a beautiful form. This foliage is said to have suggested to the architect Callicmachus the first idea of the ornate and beautiful capital which forms the most striking feature in the Corinthian order of arch.

Acaridæ, or **Acar'idæ** [for etymology see ACARUS], a family of small animals, including the acarus or mite and other minute insects. Their food consists of both animal and vegetable substances. Some of them are free and lead a wandering life, while others are parasitic, living on other animals. A few species of the A. are aquatic, and have their legs furnished with hairs, by means of which they swim with facility. The A. are propagated by eggs, and are extremely prolific. When mature they usually have eight legs, the young or imperfectly developed animals having only six.

Acarus [from the Gr. *ἀκάρης*, "that which cannot be cut" on account of its smallness, (from *ἀ*, neg., and *καίρω*, to "cut"), a genus of minute animals, including the common mite found in figs and other dry provisions (the *A. domesticus*) and many other species. (See ACARIDÆ.) The itch is caused by an A. which was formerly known as the *A. scabiei*, but which is now usually called *Sarcoptes hominis*.

Acceleration [Lat. *acceleratio*, from *ad*, "to" (implying "addition"), and *celeritas*, "to hasten"], a continuous increase of the velocity or rate of motion of a moving body. The measure of velocity is, in general, the space through which that velocity, if unvarying, would carry a body in a unit of time (in mechanics, one second). When motion is uniform, the spaces passed over in successive units of time are equal. When it is accelerated or retarded, these spaces increase or diminish. The simplest case of a force producing a uniform A. is that afforded by the action of the earth on falling bodies. The increase of velocity in this case is proportional to the time, and nearly equal to 32.2 ft. per second.

A. OF THE FIXED STARS denotes the apparent greater diurnal motion of the stars than of the sun, the cause of which is that the sun's apparent yearly motion takes place though much more slowly in a direction contrary to that of its apparent daily motion. Compared with the sun, the stars thus seem to gain about three minutes fifty-six seconds each day, coming by that interval earlier each successive 24 hours, to the meridian.

A. OF THE MOON, or A. OF THE MOON'S MEAN MOTION, is one of the most remarkable peculiarities of the lunar motions.



Acacia Arabica.



Natural form of the leaf.



Leaves artistically modified.

It was noticed by Halley that when the ancient eclipses are compared with modern lunar observations, the moon is found to be moving faster now on her course round the earth than in former days. The explanation of this peculiarity was long sought for unsuccessfully by the leading profs. of the Newtonian system of astron. Indeed it may be said even now that the A. of the moon is a problem but partially solved. We owe to Laplace the first successful attempt to explain the difficulty. He showed that the moon's motion is accelerated through the slow process of diminution which the eccentricity of the earth's orbit is undergoing. Owing to this change there results (on the whole) a slight diminution of the sun's influence upon the moon's motions. The influence of the earth being thus increased, the same effect accrues as would follow from a slight increase in the earth's mass; in other words, a slight decrease in the moon's period of revolution. But it has been recently shown that Laplace's explanation accounts for only about one half of the moon's actual A. The remaining half remains still unexplained.

A. OF THE PLANETS. The motion of the planets in their orbits is variable, being quicker or slower accordingly as the planet is at a less or a greater distance from the sun. Hence, in moving from the apogee to the perigee of the orbit, the motion of a planet is accelerated, and on the contrary, in moving from the perigee to the apogee, that motion is retarded.

F. A. P. BARNARD.

Accentor [Lat. the "warbler"], a name variously applied; *e. g.*—1. A genus of warblers, including the hedge-accentor or sparrow (*A. modularis*), a familiar European bird with a fine but short song. 2. Employed also as the "common" name of species of the genus *Sciurus* by some Amer. ornithologists.

Accessary, or Accessory [from the Lat. *ad*, "to," and *cedo, cessum*, to "go"], in criminal law, a participant in a felony who is not the chief actor, and is not present at its commission, but yet in some way is connected with it, either before or after the fact (or act committed). An accessory before the fact is one who, though not present, procures, counsels, or commands another to commit it. An accessory after the fact is one who, knowing a felony to have been committed, receives, relieves, comforts, or assists the felon.

Accession [Lat. *accessio*, from *ad*, "to," and *cedo, cessum*, to "go"], in law, a species of title to property borrowed from the civil (or Roman) law, and defined to be the right to all which one's own property produces, whether that property be movable or immovable, and the right to that which is united to it by accession, either naturally or artificially. An important instance of the application of this doctrine is found in the manufacture by one person of materials belonging to another. The property in its manufactured state belongs, in general, to the owner of the materials. The word A. is also used to indicate the fact of succession in government, such as the A. of a new dynasty in monarchies, as in the case of the house of Hanover in Eng.

T. W. DWIGHT.

Accident. This is an important topic in equity jurisprudence. It has been defined to be such an unforeseen event, misfortune, loss, act, or omission as is not the result of any negligence or misconduct in a party. Some of the leading cases of interference by the court are—1. Where negotiable or other instruments have been lost, and there is no adequate remedy in a court of law. 2. Where a clause has been inadvertently omitted from or inserted in an instrument. The court makes the instrument conform to the intent of the parties. 3. Penalties and forfeitures. In these cases the court relieves against the penalty or forfeiture where the injury occasioned by the breach of duty admits of complete compensation, as in the case of an omission to pay rent on an appointed day. 4. Cases of omission, through inadvertence or want of knowledge of facts, to defend an action. The court has power to allow the necessary steps still to be taken. It is a general rule, in cases of accident, that relief will not be granted as against a purchaser who has acquired legal rights in good faith and for a valuable consideration.

In the law of torts, it is an important rule that no action for damages is maintainable for an injury occasioned by inevitable accident. But if the injury be due to negligence, damages are recoverable.

GEORGE CHASE.

Accipitres [from the Lat. *accipio*, to "take"], the plural of the Lat. *accipiter*, the name given by Linnaeus as an ordinal designation for carnivorous birds, including the eagle, vulture, hawk, and owl, distinguished by a hooked bill with a cere at base, and hooked claws. It includes the falconid, strigid, serpentariid, and cathartid families.



Head and Foot of the Osprey.

Head and Foot of Peregrine Falcon.

Head and Foot of American Sparrowhawk.

Accipitrines, or Accipitri-næ, a sub-family name for a division of the falconids, typified by the sparrow-hawk.

Acclimation [from the word *climate*], the adaptation of a human being to a climate different from that to which

he is accustomed. Such adaptation is accompanied by a change in the organism, assimilating it to those of natives of the country which the acclimatized person has adopted. Certain tropical climates, it would appear, can never be safely endured by any native of cold or temperate regions.

Acclimatization, the adapting an animal or plant to a foreign climate. Although many plants and animals have a remarkable capacity of adapting themselves to changes of climate, yet such changes are often attended with maladies called "diseases of acclimatization."

Accommodation Paper. See BILL OF EXCHANGE.

Accord and Satisfaction. In law. The word "accord" by itself denotes an agreement, but as used in this common phrase it denotes an agreement between the parties to a legal claim or demand that something different from a complete payment or discharge, according to the terms of the claims, shall be received in satisfaction thereof; and such accord, if it have the proper legal requisites and result in the satisfaction agreed upon, is a complete defence to a suit upon the original demand. This defence is available both in actions of contract and of tort. The subject is governed by well settled rules, such as that the thing to be done must not be uncertain, that it must be advantageous to the injured party, and that the agreement must be fully carried into effect. Thus it would not be a valid accord to give the injured party something to which he was already entitled, as, *e. g.*, to pay a portion of a debt when the whole became due. Sometimes a new agreement, though unperformed, amounts to a satisfaction of a prior claim, but this only happens when there is a positive agreement to this effect.

GEORGE CHASE.

Account' [remotely from the Lat. *ad*, "together," and *computo*, to "reckon"], a computation or calculation; a statement of the receipts and payments of one who acts in a fiduciary relation, as an executor or a trustee, or a statement showing in detail the transactions between merchants or others who have dealt together. An account current is one that is open, running, and unsettled. An account stated is one which has been adjusted between the parties, and a balance struck. An account may also become stated without any express agreement, and by implication, as where one of two merchants who have dealt together draws up a formal statement of their dealings and sends it to the other, and the latter receives it and retains it without objection for a reasonable time.

Account, or account render, is the name of a common-law action which lay against one who by virtue of his position or office ought to have rendered an account and refused to do so. This action is now almost obsolete. A court of equity has much more complete power to grant relief in all cases of mutual accounts, and in cases where the taking of an account is incidental to other matters over which that court has jurisdiction.

T. W. DWIGHT.

Accum (FRIEDRICH), a Ger. chemist, b. at Bückeburg in 1769. Having removed to Lond. in 1793, he became prof. of chem. in that city about 1802. He promoted the use of gas for illumination by a valuable work entitled *A Practical Treatise on Gas Light* (1815). D. 1838.

Accumulated [from the Lat. *ad*, "to," "up," and *cu'mulo, cumulatim*, to "heap"]. **Force** is the power of a moving body to overcome resistance. When a force acts on a body so as to produce its motion, the force must be in excess of the resistance to the motion, and, as power is imparted to the body at each instant, this is termed accumulated force.

Acetabulum [a "vinegar cup or cruet"], a term variously applied. (1) In anatomy, the cavity of the hip-joint; (2) in entomology, the socket in which the leg is planted; (3) also the suckers on the arms of the cuttle-fish and other dibranchiate cephalopods, which have been, hence, termed Acetabulifera.

Ac'etal [from the Lat. *ac'etum*, "vinegar"], a colorless, inflammable liquid obtained by the action of spongy platinum upon the vapor of alcohol. It is convertible by slow combustion into acetic acid.

Ac'etate [Lat. *ac'et'as, -atis*]. The acetates are a class of salts composed of acetic acid and various oxides. They are all soluble in water, and, for the most part, crystallize readily. Many of these are extensively used either in dyeing or for medical purposes. The following are among the most important: A. of Aluminium, A. of Ammonium, A. of Copper, Aceto-arsenite of Copper, A. of Iron, A. of Lead, A. of Potassium, and A. of Sodium.

Acetic Acid [Lat. *ac'idum ac'et'icum*] is the most common of the vegetable acids, and is the essential principle of vinegar. It is composed of carbon, oxygen, hydrogen, and water. It occurs in the juices of many plants, and in some animal secretions. It is produced by the decomposition and oxidation of many organic bodies. It is prepared from weak alcoholic liquids, as wine, cider, and beer, by oxidation, "acetous fermentation," and by the destructive distillation of wood, "pyroligneous acid."

Ac'etone, or Pyro-acetic Spirit, a limpid, mobile liquid of agreeable odor and biting taste, like that of pepper-mint. It mixes with water, alcohol, and ether, and dissolves many camphors, fats, and resins.

Acet'ylene, or E'thine, a hydrocarbon, produced (1) by the combination of hydrogen with the carbon of the electric arc; (2) by the action of heat on ethene, vapor of alcohol, ether, and wood naphtha; (3) by the action of electric sparks on marsh gas; (4) by passing chloroform vapor over ignited copper; (5) by the incomplete combustion of bodies containing carbon and hydrogen, especially coal gas, as when the flame burns in the Bunsen burner; (6) by passing a mixture of carbonic oxide and marsh gas through a red-hot tube. It is found in small quantities in coal gas. It is a colorless gas, has a very disagreeable odor, and forms an explosive compound with copper.

C. F. CHANDLER.

Acha'an [from ACHAIA] **League**, a confederation of Grecian cities formed about 280 B. C. In 191 B. C. the con-

federacy included Sparta, Athens, and nearly all the cities of the Peloponnesus, and for fifty years maintained the cause of Grecian independence against the Ætoliens and against the encroachments of Rome.

Achaïans [Gr. Ἀχαιοί], one of the four races of inhab. of ancient Greece. The name is often extended in the Homeric poems to the whole Greek people.

Achaïa [Gr. Ἀχαΐα], a state of ancient Greece, in the N. part of the Peloponnesus. It was about 65 miles long from E. to W. In the days of the N. T. writers, Achaïa signified the whole Peloponnesus.

Achard [FRANZ KARL]. See APPENDIX.

Acheen, an independent kingdom in the N. W. part of Sumatra; area about 25,500 sq. m. Pop. est. anywhere from 450,000 to 2,000,000. The E. coast has fertile plains; the W. coast is mts.; of the interior very little is known. The inhabs., partly Malays, are all Mohammedans. The nominal sultan has little real authority, the actual power being exercised by hereditary chiefs. Acheen was first visited by the Portuguese in 1506, afterward by the Dutch, and in 1612 by the Eng., each of whom seized some part of the territory. In 1818 the Eng. sold their possessions in Sumatra to the Dutch, who engaged to respect the independence of Acheen. In 1873 hostilities broke out between the Acheenese and the Dutch, in which the latter were successful. The capital, of the same name, formerly contained 30,000 inhabs.

Achenbach [HEINRICH], a Ger. statesman, b. Nov. 23, 1829; became in 1860 prof. at the Univ. of Bonn, in 1866 chief councillor in the Prus. ministry of commerce, in 1872 sec. of state, and in 1873 minister of commerce. He has published works on the agrarian relations of the Germans in ancient times, on Ger. and Fr. mining laws, and founded a periodical devoted to mining law.

Achenwall [GOTTFRIED], b. in 1719, said to have originated statistical tables. He became prof. of philos. at Göttingen about 1750. D. 1772.

Acherontia. See DEATH'S-HEAD MOTH.

Achilles [Gr. Ἀχιλλεύς], the hero of Homer's *Iliad*, was the son of Peleus, king of Thessaly, and the sea-nymph Thetis. From the name of his father, he was often called PELIDES. At the siege of Troy he was pre-eminent for courage, strength, and swiftness, but, having been offended by Agamemnon, he refused to fight. But when his friend Patroclus had been killed, he returned to the war to avenge his death, slaying Hector and many others. According to a poetic legend, his mother, by dipping him in the river Styx, had rendered him invulnerable except his heel, by which she held him. He was killed with an arrow by Paris, who shot him in the heel.

Achilles Tatius, a rhetorician of Alexandria, lived probably in the fifth or sixth century of our era, and wrote a love story, *History of Leucippe and Clitophon*, which contains much curious information on Greek life and taste at that time.

Achromatic ["without color," from *a*, priv., and *χρῶμα*, "color"], a term applied to lenses and telescopes through which objects appear colorless, or without the discoloration which arises from the unequal refrangibility of the rays of light. (See next article.)

Achromatism [for etymology, see preceding article]. When two or more lenses or prisms of unequal dispersive powers are so combined that the ray passing through them is bent without being colored, the effect is called achromatism. Absolute achromatism is perhaps unattainable by art, owing to the spectra from different dispersive media not having an exact proportionality to one another.

Acid [Lat. *acidus*, "sour"], in chemistry, a term applied to an important class of compounds. The various acids usually have the following properties: (1) solubility in water; (2) a sour taste; (3) the power of turning vegetable blues to red; (4) the power of decomposing carbonates, and displacing the carbonic acid with effervescence; (5) the power of neutralizing more or less the alkalies, at the same time losing most of their own characteristic properties, forming salts. A great number of acids are compounds of oxygen with various elements. Others contain chlorine, iodine, or other elements, instead of oxygen. Various theories have been advanced to account for the peculiar properties of acids. That of Dulong, proposed in 1816, is now generally accepted. It is known as the binary or hydrogen theory of acids. All acids are considered *salts of hydrogen* (Gerhardt)—i. e., compounds of hydrogen with simple or compound acid radicals.

Salts, according to this theory, are produced by replacing the hydrogen by metals or basic radicals. Acids are monobasic, bibasic, tribasic, etc., accordingly as they contain one, two, or three atoms of replaceable hydrogen. Acids may produce several classes of salts, accordingly as they contain more or less atoms of hydrogen.

C. F. CHANDLER.

Acidimeter [from the Lat. *acidum*, an "acid," and the Gr. μέτρον, "measure"], an instrument for determining the strength of an acid by its saturating power. It usually consists of a glass tube graduated into a hundred equal parts, and containing an alkaline liquor of known strength, the proportion of which requisite to saturate a given quantity of any acid is the equivalent of that acid.

Ackley, R. R. June, Hardin co., Ia., 132 miles W. of Dubuque. Pop. 1880, 1517.

Acknowledgment [from the English word *knowledge*], in law, the act by which one who has executed an instrument declares or acknowledges, before some authorized officer, that it is his act or deed. The term is also applied to the officer's certificate of this fact indorsed on the instrument. The general object of an acknowledgment is twofold: first, to comply with the recording acts, so that the instrument may be lawfully recorded; secondly, to give the instrument such authenticity that it may be put in evidence in courts of justice, without further proof of its execution.

Acknowledgments of conveyances of real estate should correspond in form with the requirements of the law of the

State where the land is situated, though that law sometimes permits them to be valid if they conform to the law of the place where they are executed.

T. W. DWIGHT.

Acônite [Lat. *Aconitum*], a plant of the genus *Aconitum* and the order Ranunculaceae. There are many species of this genus, some of them very poisonous. This plant abounds in the deadly alkaloid aconitine, but when administered in suitable doses is useful in rheumatism, neuralgia, and in fevers.

Acorus Calamus, a medicinal plant of the order Araceae. It is a native of both continents, and is known as "sweet flag."

Acoustics, a-kow'stiks. The term acoustics is derived from the Gr. ἀκουστικός, from ἀκούω, to "hear"—"belonging to the sense of hearing." Acoustics has for its object the study of the nature, the production, and the perception of sound.

Strictly speaking, sound is a sensation which is produced when vibrations of a certain character are excited in the auditory apparatus of the ear. These vibrations are generated by progressive tremors in the atmosphere, called sound-waves, the nature of which is explained in the larger edition of JOHNSON'S CYCLOPEDIA, article ACOUSTICS.

Velocity of the Propagation of the Sound-Waves in the Air.—This has been the subject of a considerable number of experiments, the best of which place it at 332 metres per second at a temperature of 0° Centigrade.

Recently several pieces of apparatus have been devised by which the velocity of sound can be measured when the distance travelled over is only a few feet: so that it is now possible to make this experiment in a small apartment. With apparatus of this kind, Dr. Seebeck* has proved that in small tubes sound travels slower than in the open air, partly, as it would seem, owing to friction, and partly to loss of heat developed by the sound-wave itself through conduction by the walls of the tube. He has also shown that in small tubes the velocity is less in the case of deep notes than with those which are higher.

Laplace's formula for the velocity of sound in gases and vapors is

$$v = \sqrt{\frac{gh}{d}} K;$$

v = the number of metres traversed by the sound-wave in a second of time; *g* = the accelerating force of gravity = 9.8088 metres; *h* = the height of the mercury in the barometer reduced to the height it would have at 0° C.; *d* = the specific gravity of the gas, mercury at 0° being taken as unity; *K* = the quotient of the specific heat of the gas at a constant pressure, divided by its specific heat at a constant volume = 1.42. The following is a convenient formula for calculating the velocity of sound in air at various temperatures:

$$v = 333. \text{ M } \sqrt{1 + at};$$

a = coefficient of expansion of air for 1° C. = 0.003665; *t* = the temperature in degrees of the Centigrade scale; *M* standing for metres. The velocity of sound in oxygen gas at 0° C. is 1040 ft.; in carbonic acid, 858 ft.; in hydrogen, 4164 ft.

In 1827, Colladon and Sturm determined experimentally the velocity of sound in fresh water. The experiment was made on Lake Geneva, and it was found to be 4714 ft. per second at a temperature of 15° C. Laplace has also given a formula for the velocity of sound in liquids:

$$v = \sqrt{\frac{g}{\lambda}};$$

g as before = 9.8088 metres, and *λ* is the amount which a column of the liquid one metre long shortens under a pressure equal to its own weight; it hence is necessary to determine the compressibility of the liquid in order to employ this formula, as the velocity is inversely proportional to the square root of the compressibility. The velocity of sound in alcohol at 20° C. is 4218 ft.; in ether, at 0°, 3801; in seawater, at 20° C., 4768.

The velocity of sound in solids can be calculated by this last formula, and can also be experimentally determined. Below are a few results:

	At 20° C.	At 100°.		At 20° C.	At 100°.
Gold.....	5,717	5,640	Copper.....	11,666	10,802
Lead.....	4,030	3,951	Iron.....	16,822	17,386

The Intensity of Sound varies inversely as the square of the distance of the sounding body from the ear; it is also proportional to the square of the amplitude of the sound-wave.

Reflection of Sound.—The waves of sound can be reflected like the waves of light, and obey the same law, the angle of incidence being equal to the angle of reflection. Echoes are due to reflected sound-waves reaching the ear. The author has recently contrived a new method by which the reflection of sound can be studied, and the relative reflecting powers of different substances examined. A circular disk with open and closed sectors, or with sectors of different materials, is made to revolve rather slowly near a sounding reed, in such a way that the sound is from time to time reinforced by reflection. The result is, that a sound resembling "the beats" is produced, these alternations of sound and comparative silence disappearing when the disk is made complete, or when its alternate sectors are composed of substances having the same power of reflection. The same apparatus can be used to determine the relative powers of different bodies for the transmission of sound. Echoes are cases of the reflection of sound, and the wonderful power of very long tubes in conveying sounds to a great distance is due to the same property.

* Pogg. Ann., CXXXIX., s. 104. Compare also the experiments of Regnault on this subject (*Compt. Rend.*, t. XXV., p. 200); also those of Kundt (Pogg. Ann., CXXX., s. 387); and finally those of Schmeisser (Pogg. Ann., CXXXI., s. 296).

The actinic properties of light have formed the basis of an art having an almost endless variety of useful applications. (For particulars in regard to this, see PHOTOGRAPHY.)

F. A. P. BARNARD.

Actinometer [from the Gr. *aktis* "ray," and *metron*, a "measure"], an instrument for measuring the actinic or chemical rays of light. (See ACTINISM.) Several methods of doing this have been proposed; thus, a sensitive surface of chloride of silver is found to darken, when exposed to the light, in proportion to the intensity of the light and the duration of exposure; and since this darkening is produced entirely by the actinic rays, the depth of tint produced by exposure for a few (say five) minutes will give an approximate idea of the intensity of the actinism present.

F. A. P. BARNARD.

Action [from the Lat. *ago, actum*, to "perform," to "move"], in law, means a proceeding before a court of justice by one person against another to obtain redress for the infringement of a right, in the manner prescribed by law. This definition would exclude such proceedings as mandamus and prohibition. The word is not properly applied to courts of equity, but the corresponding proceeding is there termed a suit. Actions are distinguished into civil and criminal. The distinctions between actions are sometimes subtle and perplexing. There is a marked tendency in this country to modify or to do away with them, and to establish a single form of civil action, embracing proceedings both in law and in equity.

T. W. DWIGHT.

Acupuncture [Lat. *acupunctura*, from *acus*, a "needle," and *punctio, punctum*, to "prick"], or **Acupuncture**, a term applied to the surgical operation of puncturing a diseased part with needles. This method is extensively used in Japan and China for the cure of many diseases, and has been successfully applied in the treatment of rheumatism.

Ada, Minn. See APPENDIX.

Ada, on R. R., Hardin co., O., 57 miles W. of Crestline. It has a coll. and N. W. O. Normal School. Pop. 1880, 1760.

Adair (JOHN), an Amer. gen., b. in S. C. in 1759. He commanded a body of Kentuckians at the battle of New Orleans in 1815; was gov. of Ky. 1820-24, U. S. Senator 1805-06, and rep. in Cong. 1831-33, D. May 19, 1840.

Adam [Heb. *אָדָם*, *ādām*, "man"], the first man, created, according to the Hebrew chronology, 4004 B. C., and according to the Greek chronology, 5411 B. C.

Adamant [Lat. *ad'antus*; Gr. *ἀδάμαντς*, "that cannot be subdued or broken," from *α*, negative, and *δαναιω*, to "subdue"], the ancient name of the diamond, is also used to denote any substance of extraordinary hardness.

Adamites, a sect said to have sprung up in the second century, who rejected marriage, and appeared in public naked. This name was also assumed by a sect of fanatics who arose in Bohemia in the fifteenth century and advocated a community of wives.

Adams (South Adams sta.), on R. R., Berkshire co., Mass. Pop. of tp. 1880, 5591.

Adams, on R. R., Jefferson co., N. Y., 156 m. W. N. W. of Albany. It is the seat of Hungerford Collegiate Inst. Pop. 1870, 1352; 1880, 1250.

Adams (CHARLES FRANCIS), LL.D., D. C. L., son of John Quincy Adams, b. in Boston Aug. 18, 1807; grad. at Harvard in 1825, studied law, and was admitted to the bar in 1828. In 1848 he was nominated for the office of V.-P. by the "Free-soilers," who supported Mr. Van Buren for the presidency. Having joined the Rep. party, he was elected a member of Cong. in 1858, and again in 1860. In the spring of 1861 he was appointed minister to Eng., the duties of which position were, during the Amer. civil war, very arduous and critical. He performed these duties with much ability and prudence, and returned home in 1868. In 1871 he was appointed one of the arbitrators on the Alabama claims. Edited the *Life and Works of John Adams*.—His eldest son, JOHN QUINCY ADAMS (b. 1833), graduated at Harvard, studied law, and was the Democratic candidate for governor of Mass. in 1867, 1868, and 1871.—His next son, CHARLES FRANCIS ADAMS, JR. (b. 1835), grad. at Harvard, and studied law. At the outbreak of the civil war he joined a cavalry regiment, served through the war, and in 1865 was mustered out of service, with the rank of brevet brig.-gen. He has since given special attention to railway affairs.—HENRY BROOKS ADAMS, brother of the two preceding (b. 1838), graduated at Harvard, was sec. to his father while U. S. minister at Lond., and in 1870 became ed. of the *North American Review* and asst. prof. of hist. at Harvard.

Adams (HANNAH), b. at Medfield, Mass., in 1755, was one of the first women of Amer. to engage in literary pursuits; wrote *Evidence of the Christian Religion*. D. Nov. 15, 1831.

Adams (JOHN), second Pres. of the U. S., b. at Braintree, Mass., Oct. 19, 1735, O. S.; grad. at Harvard 1755, and was admitted to the bar in 1758. He removed to Boston in 1768, and became one of the foremost opponents of the Brit. aggressions, and was elected to the general court in 1770. In 1774 was a delegate to the first Continental Cong., where he distinguished himself by capacity and eloquence. He was a member of the committee of five appointed June 11, 1776, to prepare a declaration of independence, in support of which he made an eloquent speech about July 2. He was the chairman of the board of war appointed in June, 1776, and was sent as commissioner to Fr. in 1778; in 1780 went to Lond. as commissioner to negotiate a treaty of peace with Gr. Brit., and was minister at Lond. 1785-88. In 1789 he was elected V.-P. of the U. S., and re-elected in 1792. In 1796 he was elected Pres., but in 1800 was defeated by Jefferson. He then retired to Quincy, Mass., where he gave special attention to agriculture. D. at Quincy July 4, 1826. [From orig. art. in *J.'s Univ. Cyc.*, by J. THOMAS, LL.D.]

Adams (JOHN), LL.D., eminent as a classical teacher, b. in Canterbury, Conn., 1772, and grad. at Yale Coll. 1795. After presiding over Plainfield Acad. and Bacon Acad. in Colchester, Conn., he was prin. of Phillips Acad., Andover, Mass., May, 1810; resigned that position after great success

in 1833, and d. 1863. Prof. Thomas C. Upham and many other distinguished scholars and philanthropists were among his pupils at Andover.

Adams (JOHN QUINCY), sixth Pres. of the U. S., b. at Braintree, Mass., July 11, 1767, being the eldest son of John Adams. From 1778 to 1785 he studied in Europe, then returning to America grad. at Harvard in 1788; studied law, and was admitted to the bar in 1791. He was appointed minister to Hol. in 1794, and to Prus. in 1797, being recalled in 1801, when the Federal party lost power. In 1803 he was elected U. S. Senator, as a Federalist, but gradually went over to the other side, supporting the general policy of Jefferson. In 1809 he was sent as minister to Rus.; was in 1814 one of the coms. to negotiate for peace with Gr. Brit., and in 1815 was appointed minister at Lond. Upon the accession of Monroe to the presidency he became sec. of state, retaining the position during Monroe's two terms. At the election of 1824 there were four candidates for the presidency—Adams, Jackson, Crawford, and Clay—all Democrats. Jackson received the largest electoral vote, but no one having a majority of the whole, the choice devolved upon the House of Reps.; voting by States, and Adams was elected. He was candidate for re-election in 1828, but was defeated by Jackson. In 1830 he was elected as rep. in Cong. from Mass., and was re-elected to each successive Cong. during the remaining seventeen years of his life. In Cong. he distinguished himself by close attention to legislative business, persistent maintenance of the right of petition, and resolute opposition to the extension of slavery. He was struck by paralysis Feb. 21, 1848, while in his seat in the House. D. in Washington Feb. 23, 1848. [From orig. art. in *J.'s Univ. Cyc.*, by J. THOMAS, LL.D.]

Adams (NEHEMIAH), D. D., b. at Salem, Mass., Feb. 19, 1806; grad. at Harvard and Andover; was pastor at Cambridge 1829-34, and of the Essex street church, Boston, 1834-70. He pub. *Southside View of Slavery*, and had a high reputation for scholarship and pulpit eloquence. D. Oct. 6, 1878.

Adams (SAMUEL), an American patriot, b. in Boston Sept. 27, 1722, being a cousin of John Adams. He grad. at Harvard in 1740. He bore a prominent part in the measures which preceded the Revolution; was a member of the first Continental Cong., and a signer of the Dec. of Ind.; was gov. of Mass. 1794-97, and held other State offices. D. Oct. 2, 1803.

Adams (WILLIAM), D. D., LL.D., b. at Colchester, Conn., Jan. 25, 1807; grad. at Yale in 1827, and Andover in 1830; was pastor of the Central Presb. ch., New York, 1834-53, and of the Madison Square Presb. ch. after 1853; in 1873 became pres. of the Union Theo. Sem. He was prominent in his denomination, and wrote *Conversations of Jesus Christ with Representative Men*. D. Aug. 31, 1880.

Adam's Peak, a mt. in Ceylon, 7000 ft. high, considered by the Buddhists the sacred centre of the world. Upon the summit are marks affirmed to be the footprints of Buddha, the last traces of him upon earth. The mountain is also held sacred by the Mohammedans, who affirm that Adam abode here for many centuries after his expulsion from Paradise.

Adanson (MICHAEL), a Fr. naturalist of Scot. descent, b. at Aix in 1727. At the age of 21 he set out to the Fr. colony of Senegal, where he remained 5 years, making valuable collections of plants and animals, and wrote *Adanson's History of Senegal and The Families of Plants*. D. Aug. 3, 1805.

Adanson'sia, a genus of plants of the natural order Sterculiaceæ, named in honor of M. Adanson. The *A. digitata*, or baobab, found in tropical Afr., is one of the largest trees in the world. It does not grow very high, but its trunk is often more than twenty feet in diameter.

Ada, the name of the sixth month in the civil year of the Jews, which included part of Feb. and Mar.

Ad'dax, the *Oryx* (or *Ad'dax nasomaculata*), a large antelope found in N. or N. Central Afr., with horns three to four ft. long, twisted into a spiral, having two turns and a half, color milk-white, and a half black patch of hair on the forehead, and a dark brown nose.

Ad'der, a common name of the viper, also popularly applied to several non-venomous snakes.

Addison, on R. R., Steuben co., N. Y. Pop. 1880, 1596.

Addison (JOSEPH), an Eng. author, b. in Wiltshire May 1, 1672. He was educated at Charter House school and Oxford, and became noted for scholarship, also taking an early part in political discussion, and gaining the favor of the leaders of the Whig party, from whom, in 1699, he obtained a travelling pension, which enabled him to pass some time upon the continent. After 1704 he held in succession several public offices, among which were member of Parl. and nominal sec. to the lord-lt. of Ire. He wrote poems, an opera, a tragedy, and books of travel, but his fame rests mainly upon the *Spectator*, a literary periodical begun in 1711 and discontinued in 1714. This work contained about 635 essays, of which 274 were written by



Adanson'sia.



Ad'dax.

Addison, and have gained for him the reputation of being the foremost essayist in our language. D. at Holland House, Kensington, June 17, 1719. [From orig. art. in *J. s. Univ. Cyc.*]

Adel, Iowa. See APPENDIX.

Adelphia [*i. e.* "brotherhood;" from the Gr. ἀδελφός, a "brother"], a collection of the stamens of a flower into a bundle. Linnaeus employed this term for those plants in which the stamens, instead of growing singly, combine into one or more parcels or brotherhoods; thus, *Monadelphia* signified stamens all connected into one parcel; *Diadelphia*, into two parcels, and so on.



Adelphia.

Adelung (JOHANN CHRISTOPH), a Ger. philologist, b. in Pomerania Aug. 8, 1733; studied at Halle, then took up his residence at Leipsic. His principal work is a dict. of the Ger. lang. In 1791 he became ducal librarian at Dresden, where he projected *Mithridates*, designed to give an account of all the known langs. of the earth, with the Lord's Prayer translated into each. D. at Dresden Sept. 10, 1806.—His nephew, FRIEDRICH ADELUNG (b. 1768, d. 1843), was private tutor to the sons of Alexander I. of Rus.; wrote works on the Sanscrit language, and aided in the completion of *Mithridates*.

Aden, an important seaport on the Arabian coast of the Red Sea, captured by Gr. Brit. in 1839; N. lat. 12° 46' 15"; E. lon. 45° 40'. Area, 70 sq. m., composed of a range of volcanic hills 1000 to 1775 ft. high. Land barren; climate healthy. It is under the govt. of Bombay; is strongly fortified, is the Gibraltar of the Red Sea, and is valuable as a coaling and supply depot between Europe and India. It has considerable trade. Pop. 35,165, including troops, etc.

Aden, Gulf of, that part of the sea lying between Arabia and Adel, and extending from the Strait of Bab-el-Mandeb to the Indian Ocean or Arabian Sea. On some maps this is marked as the Arabian Gulf. Length, about 500 miles.

Adiaphorites [Gr. ἀδιάφορος, "indifferent"], a name given to Melanchthon, and those who agreed with him in submitting, in things indifferent, to an imperial edict.

Adipocere [Lat. *adipocera*, from *adipos* (gen. *adipis*), "fat," and *cera*, "wax"], a substance which results, under certain conditions, from the decomposition of animal bodies, and resembles spermaceti.

Adipose [Lat. *adiposus*, from *adipos* (gen. *adipis*), "fat"], Adipose tissue is an animal membrane which contains the fatty matter, and presenting an aggregation of very small spherical pouches or vesicles filled with fat or oil. The adipose fin of the salmonids and cat-fishes is a fatty, pouch-like fin on the hinder part of the back.

Adiron-dac Mountains, a group in the N. E. part of the State of N. Y. Mount Marcy, the highest peak, is the most elevated point in the State, being 5370 ft. above the sea. Among the hills are numerous lakes, which abound in fish. The region is a favorite summer resort.

Adjutant [Lat. *adjutus*, from *adjuvo*, to "assist"], the title of a military officer who assists the superior officer of an army, regiment, etc.

Adjutant (*Ciconia arctica*), an East Indian stork, called also arala, about five feet high. It is useful as a scavenger, cleansing the streets, etc.

Adjutant-General, the principal organ of the commander of an army in publishing orders. The same organ of the commander of a division, brigade, geographical division, or dept. is styled assistant adjutant-gen.

Adler (FELIX). See APPENDIX.

Adlerberg (VLADIMIR FEODOROVITCH), COL. GEN., a Rus. gen. and minister of state, b. in 1793, served in the campaigns of 1812-14, was major-gen. in the Turkish campaign of 1828, and was made lieut.-gen. in 1833. Held high positions in the civil service, retiring, on account of old age, in 1866. One of his sons, Nicholas, was made gov.-gen. of Finland in 1866.

Adler Salvius (JOHAN), a Swe. diplomatist, b. 1590. He was sent by Gustavus Adolphus on various missions of importance, and during the Thirty Years' war he enjoyed the fullest confidence of that monarch and of his chancellor, Oxenstiern. D. 1652.

Admetus, [Gr. Ἀδμητος], son of Phereas, the mythical founder and first king of Phereas in Thessaly. The god Apollo procured from the Fates a grant that Admetus might be exempt from death if his father, mother, or wife should die for him. The story of Alcestis and her devotion, death, and restoration to life is the subject of one of the most celebrated tragedies of Euripides.

Administration [from the Lat. *ad*, "for," and *ministrare*, *ministratum*, to "be a servant to"]. This word literally signifies "management" or the conduct of business. It is often used to indicate the action of the executive dept. of govt., as distinguished from the legislative and judicial. It sometimes is employed with reference to trust funds, but its technical meaning is the management or disposition, according to law, of the personal estate of an intestate or of a testator having no executor.

When the deceased leaves a will, but there is no executor, the person to whom administration is granted is termed an administrator "with the will annexed" (*cum testamento annexo*). In this case the will is to guide the administrator in his duties. Should an administrator die before his duties are fulfilled, another is appointed to perform the residue of his functions, called "administrator de bonis non."

Letters of administration confer no power to bring actions in foreign states. Where there are assets in another state or country, a subordinate or ancillary administrator is appointed, who acts under the direction of the foreign court, and remits according to its order any funds which he may receive to the principal administrator. T. W. DWIGHT.

Administrator. See ADMINISTRATION.

Admiralty [from the word *admiral*], the tribunal which has cognizance of maritime causes. This court was

established in Eng. about the time of Edward III., and was at first held before the lord high admiral or his deputy. At present, admiralty jurisdiction is there exercised by the judge of the admiralty, who holds an instance or a prize court by separate commissions; the former being the ordinary admiralty court, and the latter being a special tribunal instituted in time of war to take cognizance of matters pertaining to prizes. In the U. S. exclusive admiralty jurisdiction is by the const. delegated to the Federal courts. It is now held in this country that this jurisdiction embraces not only cases occurring on tide-waters, but on navigable streams above tide-water, including the great lakes. No distinction is taken here between the instance and the prize court. The U. S. dist. courts hear admiralty causes in the first instance.

Admiralty jurisdiction is either civil or criminal. Its civil jurisdiction embraces cases of maritime contracts (such as affreightment, repairs of ships, bottomry bonds, pilotage, seamen's wages, and salvage), general average, collisions, and maritime trespasses in general.

Admissions, in the law of evidence, are acknowledgments by a person of the existence of certain facts. When they relate to the matter in dispute, they are admissible in evidence against the party making them. They may be made either by a party to an action or by some one identified with him, as by a partner. The admissions of an agent will affect his principal. Those made by a predecessor in interest will affect his successor. Thus, the admissions of an ancestor will charge an heir. In form, an admission may be either direct or implied from conduct, or in some instances even from silence. The effect of an admission is usually only to raise a presumption against the party, which he may rebut; but some admissions amount to estoppels and cannot be contradicted. (See ESTOPPEL.)

Adobe, the name of the sun-dried bricks of which houses are built in Mex., Ari., Cal., and C. Amer.

Adonai [an ancient plural of Heb. אֲדֹנָי, "Lord," with suffix denoting a pronoun of the first person; compare Fr. *monsieur*], a term applied in the Heb. Scriptures to God. Owing to the veneration of the Hebrews for the most sacred name of the Deity, Jehovah (or Yahveh) was not pronounced in reading the Scriptures; but Adonai was read instead of it wherever it occurred. When the Hebrew text came to be vocalized, the proper pointing of Adonai, אֲדֹנָי, was given to יהוה (Jehovah), so that the true pronunciation of the latter name has been lost. (See JEHOVAH.)

Adonis [Gr. Ἀδωνίς], a youth celebrated in ancient poetic legends as a model of youthful beauty and a favorite of Venus. Was killed by a wild boar. An annual festival was held in honor of him.

Adoptian Controversy, The, originated in Sp. near the end of the eighth century. Some Sp. divines advanced the doctrine that Chr. was by nature and generation the Son of God only as regards his divine nature, but as to his human nature he was merely the Son of God by adoption. Those who espoused these views were called Adoptionists (Lat. *Adoptiani*). The doctrine was a heresy in 794.

Adoption [from the Lat. *ad*, "to," "for," and *optio*, a "choice"], in law, is the taking a child of other parents as one's own. This practice was recognized by the civil law, and is found in countries and states where that law and its modifications still prevail. In some other states the matter is regulated by statute. The parents, guardians, next of kin, or other legal representative of the child, must in general give consent after notification of the intent to adopt. Adoption is usually authorized by a probate court or other established authority after due notice.

Adras-tus [Gr. Ἀδραστος], a king of Argos and a contemporary of Theseus, was the father-in-law of Polyneices. He commanded the famous expedition called the war of the "Seven against Thebes," to restore Polyneices to the throne of Thebes. This enterprise, which was not successful, was a favorite theme of ancient epic and tragic poets.

Adrian, city and R. R. centre, cap. of Lenawee co., Mich., is intersected by the S. branch of the river Raisin. Adrian Coll., a Meth. inst., is located here. Pop. 1880, 7849; 1884, 9350.

Adrian, emperor of Rome. See HADRIAN.

Adrian [Lat. *Adrianus*] I., a native of Rome, was elected pope in 772. His dominions were invaded by the king of the Longobards, against whom Adrian was defended by Charlemagne. D. 795.

Adrian IV. (NICHOLAS BREAKSPEAR), the only Englishman who ever attained the dignity of pope, was b. near St. Albans. He became cardinal-bishop of Albano in 1146, and was chosen pope in 1154. D. 1159.

Adrian VI., a native of Utrecht, and a preceptor of the emp. Charles V., succeeded Leo X. in 1522. D. 1523.

Adriano-ple [anciently *Hadrianopolis*; Turk. *Edirne*], a city of European Tur., on the river Maritza (the ancient Hebrus), 130 miles N. W. of Constantinople. The name is derived from the Roman emp. Hadrian, who founded a city here. It was the capital of the Ottoman empire from 1361 until 1453. Pop. in 1879, 62,000.

Adriatic Sea [Lat. *Adriaticum*], a portion of the Mediterranean, lying between Italy and Albania. It is about 500 m. long from N. W. to S. E. and has a mean width of about 100 miles. The N. W. part of it is called the Gulf of Venice, and at the S. E. end it is connected by the Strait of Otranto with the Ionian Sea.

Adultery, illicit sexual intercourse between a married person and one of the opposite sex, whether married or single. At common law this act is not treated as a crime, but a civil action for damages may be brought by a husband against one who has committed adultery with his wife. This is called an action "for criminal conversation." As a general rule also, adultery is the chief ground for which a total divorce is granted. In several States of this country, this act is declared a crime by statute.

Advancement [Old Fr.], in law, is a provision of money

or other property, made by a parent for a child in advance or anticipation of the estate or distributive share to which such child would be entitled on the parent's death. An advancement differs from a debt in that the latter can be recovered by action, while the former can only be deducted from a distributive share. In this country the subject is often governed by statute, sometimes establishing distinct rules for real and personal estate. The word "advancement" is also used in the law of trusts to indicate that a purchase of land made in the name of a wife or child or other person as to whom the purchaser stands in the place of a parent shall actually belong to such person, and shall not, by the fiction of a resulting trust, revert beneficially to the purchaser.

T. W. DWIGHT.

Adventists, a body of Christians found chiefly in the U. S., whose distinctive characteristic is a belief in the speedy advent or second coming of the Lord Jesus Christ. At present they do not pretend to fix the period of the second advent, but live in expectation of that event. They generally practice adult immersion, believe in the necessity of a change of heart and a godly life, in the ultimate annihilation of the wicked, and in the sleep of the dead until the final judgment.

Adverse Possession. See DISSEIZIN.

Advocate [from the Lat. *ad*, "to," and *voeo*, *vocatum*, to "call"], a word which in the ecclesiastical and civil-law courts corresponds to counsellor or counsel in common-law courts. In a popular sense, the word denotes a defender or protector generally, especially one who pleads for his client in open court.

Advocate, Lord, is in Scotland the title of the public prosecutor of criminals and the senior counsel for the crown in civil causes.

Advocate of the Church [Lat. *advocatus ecclesie*], in the Middle Ages one, usually a noble, who assumed the protection of a bishop's see, a monastery, or a particular church. Sometimes the office was hereditary, when it appears to have implied the duty of defending the Church's rights by force of arms. Oftener, perhaps, it was held by an *advocatus causarum*, a person appointed by a prince to defend the Church's temporalities in secular courts of law.

Advocatus Diaboli (the "devil's advocate"), a phrase applied in the R. Cath. Ch. to a person whose business is to magnify the faults or detract from the merit of those who are proposed to be canonized as saints. He is opposed by an *advocatus Dei*, or "God's advocate."

Adytum, ad'i-tum [Gr. *ἄδυτον*, "inaccessible"], the innermost shrine of a temple or sacred building, accessible only to those duly initiated. The adytum was the place where the deity worshipped was believed to be specially present.

Ædile [Lat. *ædilis*, from *ædes*, a "temple" or "building"], a Roman magistrate who superintended the temples and other public buildings, the public games and spectacles, and performed various other duties.

Ægean Sea [Lat. *Ægeum Mære*; Gr. *Ἀιγαῖον πελάγος*, perhaps from *αἰγίς*, a "squall," or **Grecian Archipelago**, the name given by the ancients to that part of the Mediterranean between Asia Minor and Greece. Its length from N. to S. is about 400 miles, and breadth about 200.

Ægina [Gr. *Ἄγινα*], **Ægina**, or **Engia**, an island of Greece, in the Gulf of

Ægina (*Saronicus Sinus*), 16 miles S. S. W. of Athens. It is 8 m. long, and nearly the same in width. The western half is a fertile plain; the remainder is diversified by mts., hills, and valleys, which produce almonds, wine, olive oil, etc. This island is celebrated for its architectural remains. Pop. 6000.

Ægira [Gr. *Ἄγιρα*], one of the twelve cities of the ancient Achaean confederation in Gr. It was chiefly famous for its temples of Zeus, Apollo, Artemis, and Aphrodite.

Ægium [Gr. *Ἀίγιον*; now *Vasiliza*], a city of ancient Greece, belonged to the Achaean League, and after 373 was the chief city in that confederation, of which it was long the capital. The modern town is a place of some importance. On Aug. 23, 1817, it was visited by an earthquake which destroyed two thirds of the houses. Pop. in 1879, 5311.

Ægospotami [Gr. *Αἰγὸς ποταμοί*], a small river and a town in the Thracian Chersonese, where the Spartan Lyander defeated the Athenian fleet in 405 B. C. This victory ended the Peloponnesian war.

Ægyptus [Gr. *Αἴγυπτος*], a son of Belus and a brother of Danaus, became king of Ar., and conquered the country which derived from him the name of Egypt. According to a legend, he had fifty sons, who were murdered (except one) by the daughters of Danaus.

Ælianus (CLAUDIUS), b. at Præneste; lived in Rome; flourished in the second century, and wrote several works in Gr.: *Varia Historia*, *De Natura Animalium*, and some *Epistola* still extant.

Æneas [Gr. *Αἰνείας*], the hero of Virgil's *Æneid*, was, according to tradition, the son of Anchises and the goddess Venus. He was one of the most valiant defenders of Troy against the Gr. According to Virgil, he, after many adventures and disasters, settled in It., and married Lavinia, the daughter of King Latinus. The origin of the Roman state is traditionally ascribed to him and his heirs. He is the hero of the *Æneid* of Virgil.

Æolia [Gr. *Αἰολία*], or **Æolis** [Gr. *Αἰολίς*], a region of

Asia Minor, so called from the Æolians, who settled there and founded several cities on different parts of the coast, which formed a confederation called the Æolian League.

Æolians [so named from Æolus, a son of Hellen], one of the primitive tribes of the ancient Gr. They were the dominant race of Thessaly and Boeotia. The Æolic dialect was harsh, and approached the character of the Doric. It preserved the digamma for a long time.

Æolus [Gr. *Αἰόλος*], in Greek mythology, the god who controlled the winds and reigned in the Æolian Islands.

Æra'rians [Lat. *æra'rii*], a class of inhabs. of ancient Rome who did not belong to any of the tribes or centuries, and who had no civic rights except the protection of the state. Any citizen might be degraded to this position by the censors. They paid a heavy tax, and were not liable to military duty.

Æra'rium, the public treasury in the temple of Saturn at Rome, in which money and the public accounts and archives were kept.

Ærated Bread [from the Lat. *aër*, "air"], an unfermented bread, the ingredients of which are wheat flour, salt, carbonic acid, and water. The carbonic acid is thoroughly mixed with the flour and water in air-tight vessels by means of machinery especially adapted to this purpose, so that it is as light as the best fermented bread. See BREAD.

Ærated Waters are extensively used to allay thirst in feverish conditions. The most common is *carbonic acid water*, incorrectly called soda water, for it seldom contains soda. It is made by placing chalk or marble in a vessel with water and sulphuric acid, when the carbonic acid is evolved in the form of gas. The latter is afterward forced into water under pressure, so that the water dissolves about five times its own volume of the gas. It forms a brisk, sparkling liquid, with a pungent but pleasant taste. The first soda fountain in Amer. was put up by Prof. B. Silliman, Sr., in New Haven, Conn. Lead reservoirs for aerated water are dangerous. When copper lined with silver or tin is used, safety requires the lining renewed at least once in two years. Carbonic acid water is, when iced, a most refreshing drink in sea-sickness and in many cases of disease. The effervescing draughts called *soda powders* and *seidlitz powders* are other forms of aerated beverages. In the former, bicarbonate of soda and tartaric acid are added to water in a tumbler, and a refreshing draught instantaneously prepared. *Seidlitz powders* contain tartrate of soda and potassa and bicarbonate of soda in one paper, and tartaric acid in the other; and when both are added to water, effervescence ensues, and the liquid is then taken. A more agreeable and useful *purgative* aerated water is the effervescing solution of citrate of magnesia in carbonic acid water, the invention of an Amer. pharmacist. Aerated waters are also produced naturally. Water, as it comes from a spring, tastes differently from the same water after being boiled; and this is due to the unboiled water's containing the gases oxygen, nitrogen, and carbonic acid—especially the latter—dissolved in it. Rain water has a mawkish taste, chiefly because of the impurities dissolved in it; but when that rain water trickles down through the earth, it is filtered and purified, and absorbs more or less air and gas. When it is dashed from ledge to ledge of rock, it becomes still more thoroughly aerated. Many spring waters are aerated in a peculiar way, which confers upon them important medicinal properties; these will be noticed under the head of MINERAL WATERS.

C. F. CHANDLER.

Ærial Perspective, in painting, is the art of giving due gradation to the strength of light and shade and the colors of objects, according to their distances.

Ærodynamics, æ'er-o-di-nam'iks [Lat. *æro'dinam'ica*, from the Gr. *ἄρπ*, "air," and *δύναμις*, "power"], the dynamics of the air, and of gaseous bodies generally; the phenomena exhibited by gaseous bodies, whether at rest or in motion under the action of forces.

Ærolites. See METEORITE, by PROF. J. L. SMITH, LL.D.

Æronautics, æ'er-o-naw'tiks [from the Gr. *ἄρπ*, "air," and *ναυγία*, a "sailor"], the credit of the invention of the balloon (1783) is conceded to Stephen

and Joseph Montgolfier, sons of a paper-maker at Annonay, near Lyons, Fr.; but the principles on which a balloon could be constructed were already pretty generally known to scientific men.

The Montgolfier balloon, by which

June 5, 1783, the first public ascent was made, was a spherical bag consisting of pieces of linen, merely buttoned together, suspended from cross poles; two men kindled a fire under it, and kept feeding the flames with small bundles of chopped straw; the loose bag gradually swelled, assuming a graceful form, and in the space of five minutes it was completely distended, and made such an effort to escape that eight men were required to hold it down. On a signal being given, the stays were slipped, and the balloon instantly arose with an accelerating motion till it reached some height, when its velocity continued uniform, and carried it to an elevation of more than a mile; but its buoyant force being soon spent, it remained suspended only ten minutes, and fell gently in a vineyard, at the distance of about a mile and a half from the place of its ascension.



Ruins in Ægina.



The substitution of hydrogen (the lightest of all gases, generated by the application of dilute sulphuric acid to iron filings) for smoke (or the heated products of combustion) was soon after tried by M. Charles of Paris, with ultimate success. But hydrogen is troublesome to make, and, moreover, expensive. Coal gas (carburetted hydrogen), easily obtained from gas-works, has almost superseded it in modern times, though much heavier (about two fifths the density of air). The balloon itself is made of varnished silk or calico or rubber cloth, and enveloped in a netting to which the suspending cords of the car are attached.

The balloon offered to scientific men a ready method of exploring, for scientific purposes, the higher regions of the atmosphere. Of the earlier ascents perhaps the most noteworthy are those made by Biot and Gay-Lussac. The latter (Sept. 15, 1804) ascended to the height of 23,040 ft. or nearly four and a half miles above the level of the sea. But this feat was surpassed by Messrs. Glaisher and Coxwell in an ascent from Wolverhampton in 1862. The precise elevation they reached could only be guessed, but it could scarcely be less than 35,000 ft., and might possibly extend to 37,000 ft., or seven miles, a height much exceeding that of any mountain on our globe.

Mr. Glaisher, who is the greatest authority on the phenomena of balloon ascension, having ascended higher than any other, and always for scientific purposes, has given the following table for the diminution of density of the air:

At the height of 1 mile the barometer reading is 24.7 in.			
" 2 miles "	"	"	20.3 "
" 3 " "	"	"	16.7 "
" 4 " "	"	"	13.5 "
" 5 " "	"	"	11.3 "
" 10 " "	"	"	4.2 "
" 15 " "	"	"	1.6 "
" 20 " "	"	"	1.0 " less.

Concerning temperature, the result of all his mid-day experiments is thus expressed:

"The change from the ground to 1000 ft. high was 4° 5' with a cloudy sky; and 6° 2' with a clear sky. At 10,000 ft. high it was 2° 2' with a cloudy sky, and 2° with a clear sky. At 20,000 ft. high the decline of temperature was 1° 1' with a cloudy sky, and 1° 2' with a clear sky. At 30,000 ft. the whole decline of temperature was found to be 62°. Within the first 1000 ft. the average space passed through for 1° was 223 ft. with a cloudy sky, and 162 ft. with a clear sky. At 10,000 ft. the space passed through for a like decline was 455 ft. for the former, and 417 ft. for the latter; and above 20,000 ft. high the space with both states of the sky was 1000 ft. nearly for a decline of 1°. As regards the law just indicated, it is far more natural and far more consistent than that of a uniform rate of decrease."

At the commencement of the Fr. revolutionary war, about ten years after the production of the Montgolfier balloons, an ærostatic inst. was formed by command of the Fr. Directory (at the suggestion of Guyton de Morveau) in the École Polytechnique, and under its superintendence reconnoitring war balloons were constructed by a M. Couté, and supplied to each republican army in the field.

We hear too of balloons at a battle near Liege and in the sieges of Mayence and Ehrenbreitstein in 1799. That we hear no longer of them during the Napoleonic wars is evidence that no adequate results were obtained from them.

An attempt was, however, made to revive them in the Afr. campaign of 1830, but there was no opportunity for making use of them. The Austrians are said to have employed reconnoitring balloons between Venice in 1849, and the Russians in observing from Sebastopol. The Fr. again made use of them in the late It. campaign of 1859, but this time the service was in charge of civilian aeronauts, the MM. Godard. Ascents were made from Milan, Gargonzola, Castenedolo, and the Castiglione Hills; and according to the Lond. *Times* Paris correspondent (in the letter dated Jan. 11, 1862), they proved great failures, as judged from a military point of view.

The balloon was tried for our service in the recent civil war. Ascents were made from our lines on the north of the Potomac, during the fall of 1861, with no material results. It formed a part of our equipment and *impedimenta* during the Va. peninsula campaign, including the siege of Yorktown and the operations before Richmond. The writer is not aware of a single official report recording any material service rendered by the balloon, but numerous newspaper paragraphs concerning it have been quoted, like the following referring to the battle of the Seven Pines, or Fair Oaks, of June 1, 1862: "During the whole of the engagement on Sunday morning, Prof. Lowe's balloon hovered over the Federal lines at an altitude of about 2000 ft., and maintained successful communication with Gen. McClellan, at his head-quarters. It is asserted that every movement of the Confederate armies was distinctly visible, and instantaneously reported." (*Times*, June 17, 1862.)

We hear of no use of the balloon for reconnoitring purposes during the recent Franco-German war; but it at least proved itself to have a kind of use. During the Ger. siege upward of fifty of these aerial packets sailed from the beleaguered metropolis with dispatches for the outer world. They conveyed about two and a half millions of letters, representing a total weight of about ten tons. Most of them took out a number of pigeons, which were intended to act as postmen from the provinces.

Another event so exceptional as the siege of Paris may again justify the use of balloons for similar services, and in open countries they may perhaps occasionally serve usefully for military reconnaissances. To science they do not appear (as now constructed) capable of adding much to the little (something indeed) they have already given, even though Sir John Leslie (*Encyc. Brit.*) directs us to "a skilful and judicious application of balloons for a more essential improvement of the infant science of meteorology." When the "balloon of the future"—that in short which M. Lambert confidently predicts—shall have appeared, then, indeed, science, commerce, social and business intercourse,

and the art of war, may all hail it as an important adjunct; till then we must wait.

J. G. BARNARD.

Ærophytes, or Aërial Plants [from the Gr. *ἀήρ*, the "atmosphere," and *φύον*, a "plant"], are plants which grow in air only, as distinguished from *terrestrial* plants, or those which grow in earth, and *hydrophytes*, or those which live under water.

Ærostatics. See **ÆRODYNAMICS**.

Æschines [Ἀἰσχίνης], a celebrated Gr. orator, b. at Athens 389 B. C., the greatest rival of Demosthenes. He served with distinction at the battle of Mantinea (362 B. C.); was sent on an embassy to the Macedonian court in 347 B. C.; was accused by Demosthenes of receiving a bribe from the king of Macedon. He was defeated in his contest with Demosthenes; exiled in 330 B. C., he retired to Rhodes, where he taught rhetoric. Three of his orations are still extant. D. 314 B. C.

Æschylus [Gr. Ἀἰσχύλος], an Athenian tragic poet, b. at Eleusis, in Attica, in 525 B. C. He fought with distinction at the battle of Marathon (490 B. C.), and again at the battle of Salamis. In 484 he gained his first prize in tragedy. He composed, it is said, about seventy tragedies, and gained thirteen prizes, but he was defeated by Sophocles in 468 B. C., soon after which he went to Syracuse, where he was honored by King Hiero. He d. at Gela, in Sicily, in 456 B. C. Only seven of his tragedies are extant—viz., *Prometheus Bound*, *The Seven against Thebes*, *The Persians*, *Agamemnon*, *The Female Suppliants*, *Choëphoræ*, and *Eumenides*.

Æsculapius [Gr. Ἀσκληπιός], in classic mythology, the god of medicine, was a son of Apollo. The poets feigned that he raised the dead to life: that he thus offended Pluto, who complained to Jupiter, who killed Æsculapius with a thunderbolt.

Æsculin, or **Esculin**, a crystalline fluorescent glucoside obtained from the bark of the horse-chestnut and other trees of the genera *Æsculus* and *Pavia*. It possesses a bitter taste, and is converted by boiling hydrochloric or dilute sulphuric acid into glucose and a bitter crystalline substance called *æsculetin*.

Æsir, *Asir* (the Norse plural of *As* or *Asa*), the general name of the beneficent deities of the Norsemen. The principal Æsir will be noticed under their respective heads.

Æsop [Lat. *Æsopus*; Gr. Αἰσώπος], a celebrated fabulist, b. about 620 B. C., is supposed to have been a native of Phrygia. He was a slave at Athens, but obtained his freedom in consideration of his wit.

Æsopus (CLONICUS), a famous Roman tragic actor, was a friend of Cicero, and flourished about 75 B. C.

Æsthetics, *es-thet'iks* (Gr. αἰσθητικός, "fitted for perception"). The word and its cognates were applied by the Greeks in relation to the philos. of perception. In modern philos. the term is used to denote the scientific classification of the faculties through which we apprehend the beautiful and the sublime, and which give us the experience of the resulting emotions. It involves also the statement and discussion of the laws which should preside over and condition all forms of artistic production, the application of these general laws to the special branches of the fine arts in respect to criticism, and the history of the development of these laws in practice. The term was first used in its modern sense in the eighteenth century by Baumgarten.

There may be said to be two distinct schools, which differ radically respecting the true principles of æsthetic development and culture. The one, starting with the standard works of art, or with the most perfect models which nature offers us, selects from each what appears most pleasing or graceful, and seeks, by means of these, either by direct imitation or indirect suggestion, to create a new work, which shall combine as many as possible of the elements of the original models. The other school assumes that it is possible for genius to create forms of beauty which shall excel anything that has been seen in nature. It uses the works of nature or the models of the great masters simply to improve the power to translate their ideal conceptions into forms which can be understood by the common mind.

Æsthetics cannot yet be considered a complete and systematically developed science, though nearly all works on psychology and art criticism have done something to explain its principles. (See KANT, *Kritik der Urtheilskraft*.)

M. B. ANDERSON.

Ætians, the followers of Ætius, who was considered a heretic by both orthodox and Arians. His doctrines were condemned in 359 A. D.

Ætius, incorrectly written *Ætrius*, a Roman general, b. before 400 A. D. In Gaul he gained important victories over the barbarians about 425-430 A. D. Ætius and Theodoric commanded the army which in 451 checked the hordes of Attila, and defeated him at Châlons. He was suspected of treachery by the emperor Valentinian III., who killed him with his own hand in 454 A. D.

Æto'lia (Gr. Αἰτωλία), a state of ancient Greece, bounded on the N. by Thessaly, on the S. by the Gulf of Corinth. The surface is partly mountainous, the range of Mt. Pindus extending along the northern part.

Affidavit [Late Lat., from *ad*, "to," *fides*, "faith," *dedi*, "he gave" (i. e. "he made oath")], an oath in writing made before some person who has authority to administer an oath; a statement in writing signed by the party making it, and sworn to before some authorized officer, who appends and signs an official statement to that effect, termed a "jurat." By an extension of its original meaning it is made to include also cases where an affirmation, authorized by law, is taken instead of an oath. An affidavit is made *ex parte* and without cross-examination. It is much used in making various motions in court, and in proving conveyances executed before subscribing witnesses, so as to have them recorded.

Affinity, a term used in biology to denote the resemblance which organisms bear to one another, based on essential similarity of structure, and generally used comparatively.

Thus, there is said to be a closer affinity between man and the apes than between the lemurs and the apes.

Affinity, Chemical, the attractive force which unites two or more chemical substances so as to form a compound which differs from either of them; or the mutual propensity which certain kinds of matter have to combine with each other exclusively or in preference to any other connection. "This term," says Liebig, "is decidedly fallacious if it be intended to convey the meaning that such substances are related to each other." This force or propensity acts only at insensible distances—that is, only when the two bodies are in contact. The action of affinity is often modified and increased by heat and light, as in the case of potash and sand, which will only unite when raised to a red or white heat; and the gases chlorine and hydrogen will not combine unless they are exposed to the light. Many surprising changes in the properties of matter are produced by affinity, as when the poisonous chlorine unites with sodium to form common table-salt. The poisonous prussic acid is composed of carbon, hydrogen, and nitrogen, neither of which is noxious by itself. Elements differ greatly in the strength and range of their affinities. Oxygen has an affinity for nearly all the other elements.

Affirmation [Lat. *affirmatio*, from *ad*, "to," and *firmo*, *firmatum*, to "make firm," to "bind"], in law, a declaration made by a witness as a substitute for an oath in a court of justice. This formula is used by Quakers and others who have conscientious scruples against oaths.

Adflatu [from the Lat. *ad*, "to," and *flatu*, from *fluo*, to "blow,"] a term sometimes used to signify inspiration or the gift of prophecy, especially in reference to those who uttered oracles at Delphi.

Afghanistan, af-ghan-is-tan' [Pers. "the land of the Afghans"], a country of Central Asia, specially important as being the connecting link between India and Western Asia and E. Europe. It is situated between the parallels of 29° and 36° N. lat. (about the lat. of Texas), and between the meridians of 62° and 72° E. lon. It is nearly quadrilateral in form, and has an area of 278,562 sq. m., of which 2/5 are waste and unutilized. The Hindu-Kush range, a continuation of the Himalaya Mts. westward, form the N. watershed, dividing the basin of the Oxus or Amu-Darya from that of the Indus, which skirts the E. border of A. from Peshawur S. and flows wholly E. of the Suliman Mts., which form the E. and S. E. boundary of A. Beloochistan forms the S. boundary, short ranges and desert plateaus stretching across to L. Seistan. The west is a desert, but the boundary is ill defined. The mts. vary in height from 1900 to 20,000 ft.

Climate, Soil, Productions.—The climate embraces the extremes of the arctic and torrid zones. The mts. are cold and barren, the valleys hot but fertile. There are two crops in a season in these valleys, and fruit, grain, cotton, tobacco, and silk are produced in large quantities.

Rivers.—Besides the Amu-Darya and the Indus, the Helmand, Cabul, and Harut are the principal rivers.

Minerals.—It has gold, sulphur, lead, and iron, in the mts.

Zoology.—The wild animals are lions, tigers, bears, wolves, foxes, and wild camels.

History.—The early history of A. is confused from the difficulty of identifying places reported by Gr. historians with those now existing; but Alexander was here, and some of his troops settled in the fertile valleys; later the country suffered from Bactrian, Parthian, Persian, and Arab rule and misrule, and the Moslem faith united warring and discordant tribes in the 7th and 8th centuries. Then came the era of Mongolian conquest, and Tamerlane and his successors ruled in Herat. The independent tribes are Mongolian and Persian, and their rule was a barbarous one. The Persian yoke was thrown off by the Durani princes 1747-1829, and the Baraksi dynasty, which succeeded under Dost Mohammed and his sons, was equally hostile to Persia. There was perpetual war, and in 1838 Lord Auckland, gov.-gen. of India, introduced a new element of discord by his claims; he succeeded at first, but in 1842, by treachery, snow, famine, cold, and battle, the entire Brit. army of 16,500 men and many camp followers were destroyed. This disaster was severely avenged, Cabul dismantled and almost destroyed, and then Afghanistan was left to itself for 35 years, while the frontier of Brit. India was extended through the Punjab and Sindh to the river Indus and the Suliman Mts. Fear of Rus. progress toward India led to Brit. interference in Afghanistan in 1878, but on the death of Shere Ali, the reigning Ameer, a liberal treaty was ratified. In Sept. 1879, however, the Brit. Resident and his officers and escort were massacred by the Afghans. A war ensued, which continued throughout 1880, but has now ceased, but matters are yet in an unsettled condition.

Population about 4,000,000, of whom nearly 1/2 are Afghans and Pathans; the rest Arabs, independent tribes, Persians, Jews, Sikhs, Kuzzilbashes, Jats, etc. Nearly all are bigoted Moslems. Persian is generally spoken, but their national language, Pushtu, is a conglomerate of Zend, Pehlvi, and many other tongues.

Principal Towns.—Cabul, 60,000 pop.; Ghazni or Ghuzni, about 2000; Candahar, 30,000; and Herat, 30,000—all at different times capitals of renowned chiefs, kings, or emperors. Cabul and Ghazni are elevated, Candahar and Herat are in the plains or valleys.

Afium, or **Afium-Kara-Hissar** ("black castle of opium"), a city of Asia Minor, in Anatolia, 53 miles S. E. of Kutaiah. It is on a mountain-side, is the residence of a pasha, and has a large trade in opium, whence its name. Here are numerous mosques, a citadel, and manufactures of carpets, arms, saddlery, etc. Pop. estimated at 50,000.

Afrago-la, an It. town, in the province of Naples, noted for its manufactures of straw bonnets. Pop. 16,129.

Afrancesados, a name given to those Spaniards who supported the Fr. cause, or recognized Joseph Bonaparte as king, in 1808-13. They were proscribed or treated with severity by Ferdinand VII. after he was restored to the throne.

Africa [from the Carthaginian *Afryghah*, "a colony"] was the Libya of the ancients, and is one of the four continents or great divisions of the globe. Until very modern times Afr. was a synonym for the unknown; while a narrow fringe around its borders had been explored, its vast and mysterious interior was untroubled by the foot of civilized man. Lying almost wholly in or near the equatorial regions, its torrid climate and enormous deserts render exploration perilous to Europeans; yet a long line of travellers, from Mungo Park in the last century to Stanley in the last decade, have persisted in pushing their explorations, until the great geographical features of Afr. are mapped out with some approach to accuracy.

Situation, Area, Etc.—Afr. extends from 38° N. to 35° S. lat., and reaches from 17° W. to 51° E. lon., its greatest breadth (about 4600 m.) being nearly equal to its extreme length (5100 m.). The Mediterranean Sea is its northern boundary, its whole W. coast is washed by the Atlantic, while on the E. it is bounded by the Red Sea and the Indian Ocean. Its entire area is roughly estimated at 11,500,000 sq. m. The isthmus of Suez connects it with Asia on the N. E. Its coastline, more regular than that of other continents, is broken by few bays, the Gulf of Guinea on the W. being the principal. The physical features are marked by the great plains and low plateaus in the tropical part of N. Afr., and the high plateau of Central and S. Afr., varied with mt. groups.

Deserts, Mountains, Rivers, Etc.—The great Desert of Sahara stretches almost across N. Afr., between 15° and 35° N. lat., with an area of 2,385,644 sq. m. It is not an unbroken sandy expanse, but full of variety, broken by great oases or green stretches of land, lying sometimes 100 ft. below sea-level, and marking areas of great depression. The plateaus of S. Afr., from 3000 to 5000 ft. high, are fertile and thickly populated. Near the equator in the E. are volcanic peaks, with snow-clad summits, 14,000 to 18,000 ft. high. The Atlas Mts. in N. W. Afr., between Barbary and Morocco, reach 12,800 ft., while the Cameroons Mts. (volcanic) in the Congo region reach 13,700 ft. Few geological changes and almost no earthquakes have occurred in this most conservative of all the continents. The useful metals are nowhere abundant; gold, copper, and diamonds are found in S. Afr. in considerable quantity. Dense forests, with the rankest vegetation, teeming with animal and insect life, pervade the equatorial regions. The rainfall is here excessive, while to the north and south of it thousands of miles are parched with perpetual drought. The climate is more equal in the distribution of heat than that of America or Asia.

The rivers of Afr., though vast and navigable in the interior, are obstructed near their mouths by bars or rapids. The Nile, a geographical enigma for centuries, drains over one million sq. m., its first appearance as a river being 4200 ft. above the sea at the lake of Victoria Nyanza. The Blue Nile and the E. Nile are great affluents of the Nile in E. Afr. It fertilizes immense regions by its annual overflow. The next largest rivers are the Senegal, the Niger, and the Congo, in W. Afr.; in S. E. Afr., the recently explored Zambesi, the fourth river, in point of size, on the continent, emptying into Mozambique Channel. The great lakes form a marked feature of this continent. The lately discovered Victoria Nyanza and Albert Nyanza, in the Upper Nile basin, are fresh-water seas of immense but unknown extent. Lake Chad, near the equator, measures 220 m. by 140. Lake Dembea lies in Abyssinia; Lake Nyassa, 9000 sq. m. Lake Tanganyika, 10,000 sq. m. in area, and Lake Ngami, 2900 ft. above sea-level, are in S. E. Afr. The Afr. climate is tempered at the equator by the thick forests and heavy rains. Extreme heat pervades the Sahara, as well as the regions S. of the equator, and most of the Afr. territory is free from snow except on mt. tops. The mean temperature of the year varies in regions where observed, from 57° to 98°; but the thermometer frequently shows 125° F. in the shade. Almost exempt from hurricanes, there are steadily prevailing monsoons, laden with heat. The most valuable productions of the vegetable kingdom are dates, oranges, olives, rice, cotton, indigo, bananas, and grains. The wild animals include the elephant, lion, tiger, zebra, hyena, rhinoceros, leopard, quagga, antelope, giraffe, crocodile, hippopotamus, monkey, ostrich, etc. The camel is used throughout N. Afr. as the principal beast of burden. Edible fish abound; the locust is the scourge of the continent, and flies and white ants are perpetual plagues.

Inhabitants.—The people of Afr. are chiefly of the Ethiopian, or darkest negro race, but the Caucasians, both dark and light, people Egypt and Abyssinia. The Copts, Nubians, and Berbers have little in common with the black race, and cultivate commerce, manufactures, and agriculture. The Kabyles of the Barbary States are miners and agriculturists. The Moors are a handsome race, mixed with the Arabs, and pursue trade and mechanics successfully. The negro nations of Middle and S. Afr., all uncivilized with slight exceptions, are divided into great kingdoms and smaller tribes. Some of them are warlike, others mild and social. The Hottentot race differs wholly from the rest, resembling the Mongols in their yellow complexion. The Soudan and the valleys of the great rivers are the most densely populated regions. The occupations of the natives in most parts of Afr. do not reach beyond satisfying the daily wants of life. The rudest agriculture, hunting, and cruel wars waged to capture slaves, divide the energies of these savages, millions of whom have no knowledge of the outer world. European colonies have done little to reclaim or civilize; industry and intelligence are at the lowest ebb, and education is unknown.

Religion and Language.—Northern Afr. having been conquered by the successors of Mohammed, is largely Ar. to this day, and the Mohammedan religion prevails, numbering perhaps one third of the entire Afr. pop. The Jews, who early made settlements in Afr., are numerous in the cities; their number is estimated at 700,000. Christianity prevails in Madagascar, Liberia, the Brit. possessions of S. Afr., Algeria, and parts of Abyssinia and Egypt. The mass of Africans are

heathen idolaters. In lang., the dialects are so mixed with one another that no accurate classification is possible, though Prof. Müller distinguishes five great classes—1. The Afr. negro languages. 2. Those of the Central Africans. 3. The Hottentot dialects. 4. The Caffre languages. 5. The Caucasian, comprising the Semitic and Hamitic groups, the former including Arabic and Ethiopic.

Commerce.—The commerce of Afr. is much the smallest of any territory of equal extent or population on the earth's surface. In 1880 the whole sea-going tonnage of Afr. nations comprised 22 vessels, the exports of the whole continent amounted to less than \$150,000,000, and these were chiefly from Brit. and Fr. colonies, and in foreign vessels. The slave trade used to be the principal commerce of the W. coast, but it is now nearly broken up by the concerted efforts of civilized nations, European and Amer. The chief exports are ivory, timber, palm oil, feathers, gold, etc. The inland trade is more extended, the circulating medium being chiefly cowries or small shells.

The Afr. continent, with so much rich and fertile soil lying uncultivated for centuries, may fitly be termed a land of vast undeveloped resources. Besides its enormous agricultural capabilities, there are found lead, copper, salt, and iron. As yet, however, the hand of enterprise has touched only a narrow fringe of this vast continent.

History and Discovery.—The only Afr. history worthy of note is the history of discovery. This began, according to curious antiquaries, in Roman voyages as far south as Abyssinia; the Arabs penetrated with the camel to the centre of the great desert. Afr. was first circumnavigated by the Portuguese Vasco da Gama in 1498, the Cape of Good Hope having been discovered by Diaz in 1486. The Eng. began expeditions for exploring Afr. in 1788, but for years the travels of Mungo Park, Hornemann, Tuckey, Bruce, Clapperton, etc., afford but a melancholy record of failure, disaster, and death. More recently Dr. Barth successfully explored N. Soudan, and Dr. Livingstone, whose discoveries mark an era in Afr. exploration, began in 1849 by finding Lake Ngami in S. Afr., passing through the continent to the mouth of the Zambesi. Later he explored Lake Nyassa, and in 1865 set out to find the source of the Nile. Lost and unheard from for years, the Stanley expedition was equipped by the N. Y. Herald, and Livingstone was found in 1872, sending his journal home by his adventurous discoverer. Livingstone died the next year. In 1857 Du Chaillu began his journeys on the W. coast, afterward exploring Ashango, and Capts. Burton and Speke, sent by the Royal Geographical Society, discovered Lake Tanganyika. In 1860-63 Speke and Grant penetrated to the White Nile, and named the great lake previously discovered the Victoria Nyanza. In 1864 Capt. Baker discovered Lake Albert Nyanza, which is, like the Victoria, another great reservoir of the Nile. In 1869-71 Dr. Schweinfurth explored the tributaries of the White Nile, and Sir Samuel Baker, with an Egyptian military expedition to suppress the slave trade, penetrated the upper Nile region, returning in 1873. The Ger. explorer Dr. Krapf in 1849 discovered new mts. in Central Afr., and in 1851 Galton explored and mapped out a large region in the S. W. In 1856 Moffat surveyed the Orange River; in 1857 Dr. Bastian explored interior Congo and Angola; in 1858 Petherick penetrated from Egypt to the upper waters of the White Nile, and the French savant Duveyrier explored Algerian Sahara. Very important journeys in Morocco were begun by G. Rohlfs in 1861, who traversed in 1865-67 the whole N. continent, reaching Lake Chad through the interior, and thence penetrating by a new route S. to the Bight of Benin. The Ger. Mauch found new gold fields in the mts. near the Zambesi in 1866-67, and discovered in 1872, in S. E. Afr., the ruins of a city. The same year a Ger. society for exploring Afr. was formed, which sent out Dr. Güssfeldt to explore the Congo. In 1869 Winwood Reade added to our knowledge of Afr. by a journey of observation from Sierra Leone to the head of the Niger. The Royal Geographical Society sent out Lieut. Cameron in 1872 from Zanzibar, to follow the footsteps of Livingstone, and another expedition from the W. to the interior, known as the Livingstone Congo expedition, both of which made valuable additions to the cartography of Afr. Stanley's second expedition to explore the lake region of Central Afr. started Nov. 1874, with 300 men, reaching Victoria Nyanza Feb. 1875, with the loss of 194 by death and desertion. They circumnavigated the lake, then marched across to the Albert Nyanza, from whence he explored the whole course of the Lualaba, literally fighting his way through hostile tribes, and emerged at the mouth of the Congo in Aug. 1877. This expedition of 1,800 miles cleared up many doubtful points in Afr. topography, notably proving the Lualaba to be the same as the Congo, of which it forms the great E. branch, instead of being, as Dr. Livingstone supposed, an affluent of the Nile. In 1874 Lieut. Cameron undertook to penetrate the continent from Lake Tanganyika to the W. coast nearly under the equator, travelling on foot from Zanzibar to Benguela, nearly 3000 m., one third of which was through a region utterly unknown before. His object was to explore the Congo for its sources, but this he was obliged to abandon from want of means. In 1878 Lieut. de Brazza explored the river Ogova, running the gantlet of savage tribes, and marching barefooted for 800 m.; like Du Chaillu he describes cannibals and their revolting habits, and the existence of the gorilla, long stoutly denied, has been established. Major Pinto, a Portuguese geographer, in 1877-79 explored the whole region from Benguela to the Zambesi, thence east to the Transvaal Republic. He established the courses of several rivers flowing through unknown regions, and underwent great hardships and privations. Dr. Holub in 1879 explored the interior of the Zambesi country, making the chart of the river, and discovering a new people, the Marutse, differing materially from the other tribes. Like Livingstone, Dr. Holub went unprotected and alone, and Du Chaillu has declared this to be the true way of exploring Africa. See SOUDAN and CONGO, in APPENDIX.

[Compiled and rearranged from BEHM and WAGNER, *Beislerung der Erde*, 6th issue, Gotha, 1880.]

	SQUARE MILES.	POPULATION.		SQUARE MILES.	POPULATION.
NORTH AFRICA.			TRANSVAAL REP.	113,708	315,000
Algeria.....	257,487	2,867,626	Portuguese poss.		
Egypt.....	284,242	5,586,280	E. Coast.....	282,584	350,000
Egyptian dependencies.....	758,706	11,823,700	W. Coast.....	30,288	2,000,000
Morocco.....	315,500	6,270,000	Native poss.....	1,970,042	23,050,168
Sahara.....	2,385,644	2,550,000	EQUATORIAL REGIONS.		
Tripoli (with Barca and Fezzan).....	398,970	1,010,000	ISLANDS IN THE ATLANTIC.		
Tunis.....	44,910	2,100,000	Ascension.....	34	27
MUHAMMADIAN STATES OF CENTRAL AFRICA.			Agassiz.....	2,943	280,000
Soudan.....	661,984	31,570,000	Cape Verde Is.	1,496	50,704
West Africa.....			Fernando Po, Annobon, etc.	812	25,000
Liberia.....	18,844	718,000	Madeira.....	314	132,221
Negambia (Fr.).....	96,520	138,182	St. Helena and St. Thomas and Principe.....	47	6,241
Soudan, W. line, Upper Guinea.....	769,316	43,600,000	Tristan da Cunha.....	45	85
EAST AFRICA.			ISLANDS IN INDIAN OCEAN.		
Abyssinia.....	128,646	3,000,000	Comoro Islands with Mayotta.....	761	62,600
Galla and Somali Land.....	702,256	15,500,000	Madagascar.....	228,498	2,500,000
SOUTH AFRICA.			Maflorus and dependencies.....	1,025	268,014
Basuto, etc.....	25,898	172,978	Reunion.....	764	182,130
Caffraria.....	12,569	400,500	Socotra.....	1,381	4,100
Cape Colony.....	199,890	720,984	Zanzibar.....	614	200,000
Natal.....	18,744	356,517	Other islands.....	2,513	10,000
Orange Free State.....	43,058	75,000			
				11,545,045	205,679,000

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African Methodist Episcopal Church, The, was organized in 1816 by colored Methodists, who had been down to that date under the care of the Meth. Epis. Ch. They elected Rev. Richard Allen their first bishop in 1816. Their doctrines are substantially the same as those of the parent ch. They report 1498 ministers and 215,000 members. They have four high acads., one univ., and two weekly journals. (See METHODISM, by REV. ABEL STEVENS, LL.D.)

African Methodist Episcopal Zion Church, The, was formed in 1820 by a secession of Afr. Meths. from a congregation of the Meth. Epis. Ch. in N. Y. city. They held their first annual conference in 1821; it was composed of 22 preachers, and reported 1426 ch. members. In 1838 the conference elected Rev. Christopher Rush its first bishop, with the title of supt. Its supts. are elected quadrennially by the general conference. Their doctrines and ecclesiastical system are mostly copied from those of the Meth. Epis. Ch. (See METHODISM, by REV. ABEL STEVENS, LL.D.)

Afton, on R. R., cap. Union co., Ia., 50 m. S. W. of Des Moines. Pop. 1870, 961; 1880, 1231.

Agamemnon (Gr. Ἀγαμέμνων), the son of Atreus, king of Mycenae, was a brother of Menelaus. He had the chief command of the Greeks at the siege of Troy. After his return from Troy to his own kingdom he was murdered by his wife Clytemnestra and Ægisthus.

Agape [from the Gr. ἀγάπη, "brotherly love"], love-feasts, or feasts of charity, in use among the early Chrs. After the celebration of the communion, the oblations which had been made in the ch., consisting of meat and bread, which the rich had brought from their houses, were consumed at a common feast.

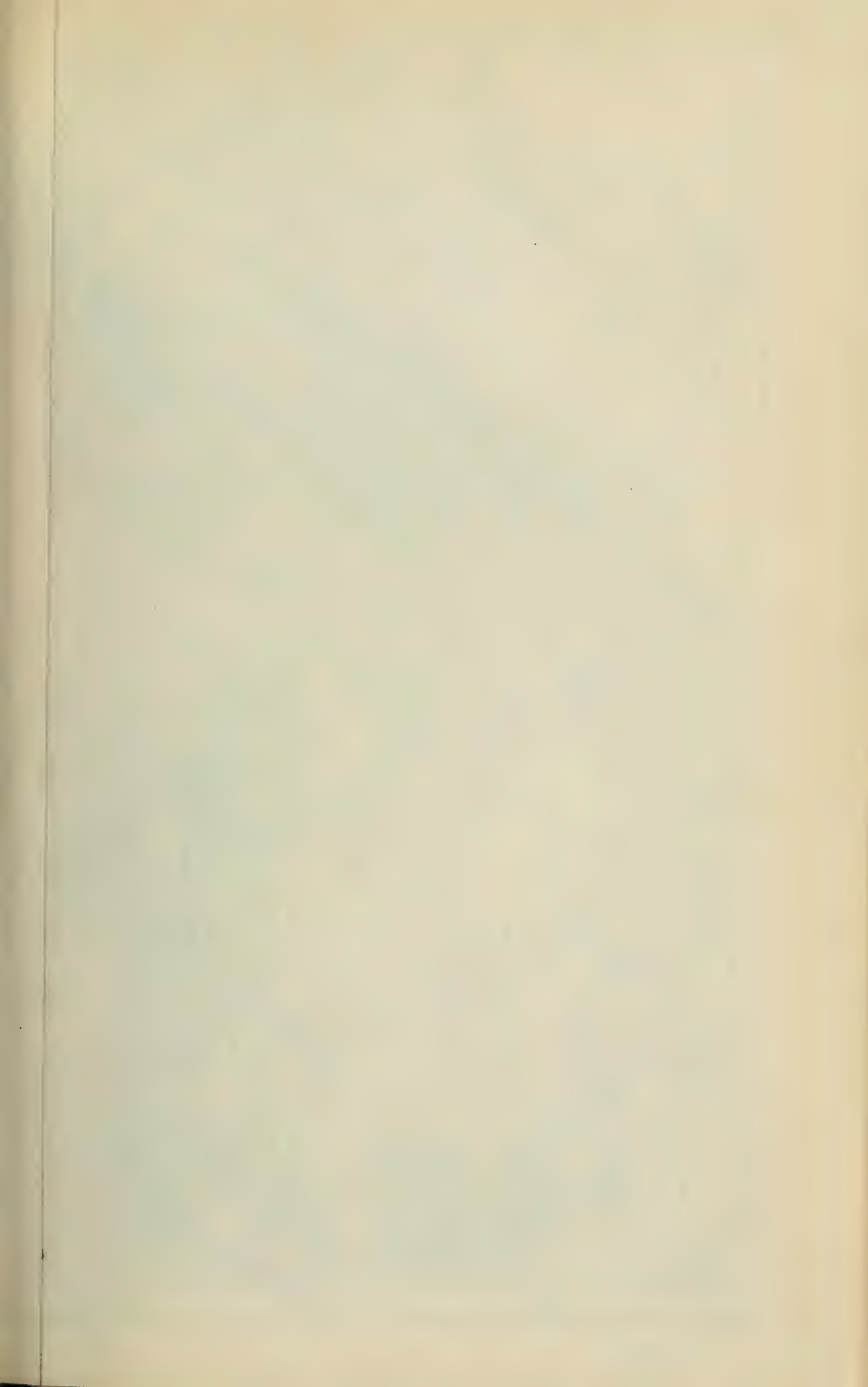
Agape'te [from the Gr. ἀγαπῆς, "beloved"], the title given to virgins and widows who among primitive Chrs. devoted their time to service of bishops and ministers.

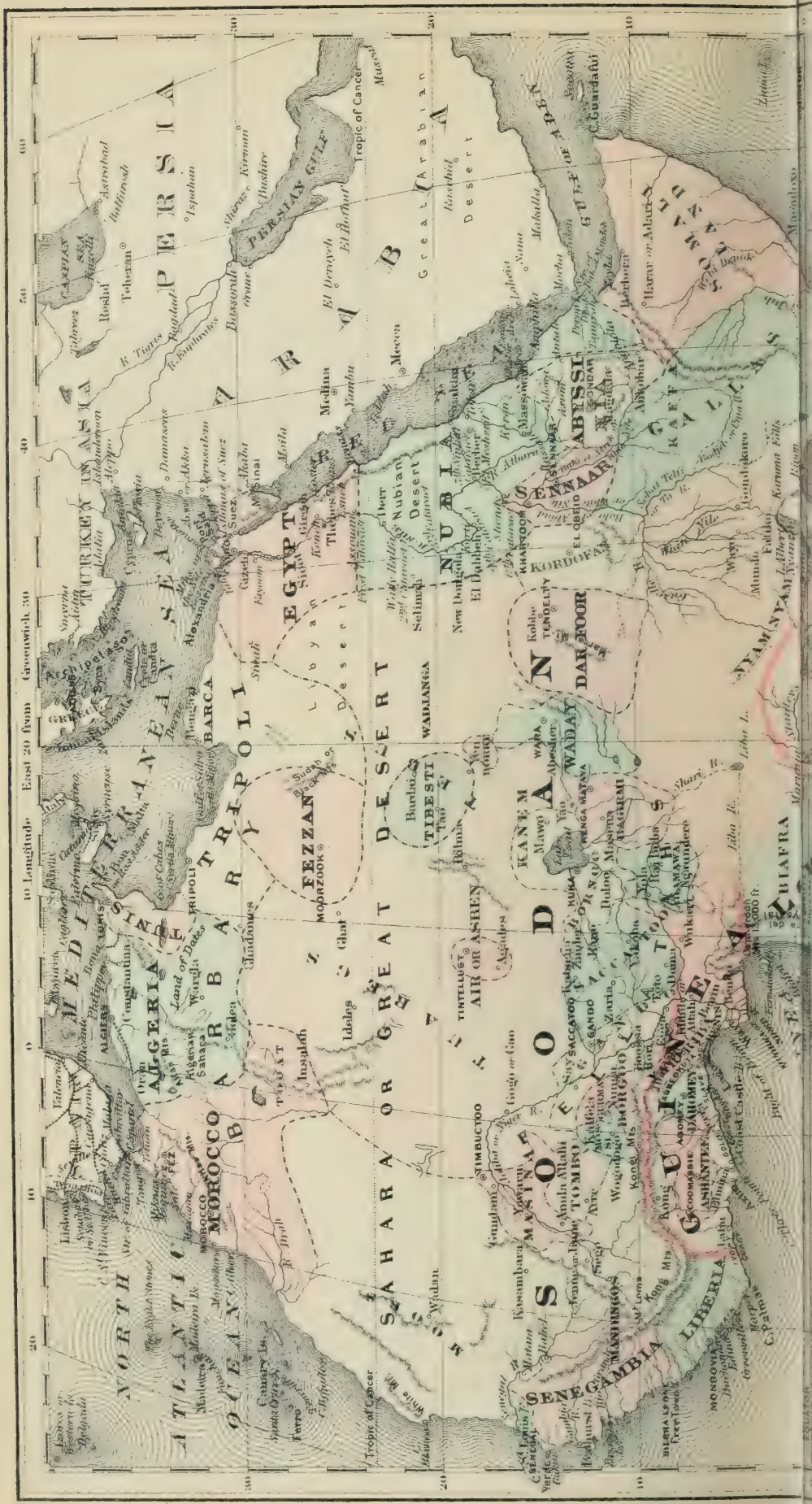
Agardh (KARL ADOLPH), a Swe. naturalist, b. in Scania 1785; was ordained a priest in 1816, and became bishop of Karlstad in 1834. He wrote *Systematic Arrangement of Seaweeds*. D. 1859, and was succeeded as bishop by his son.

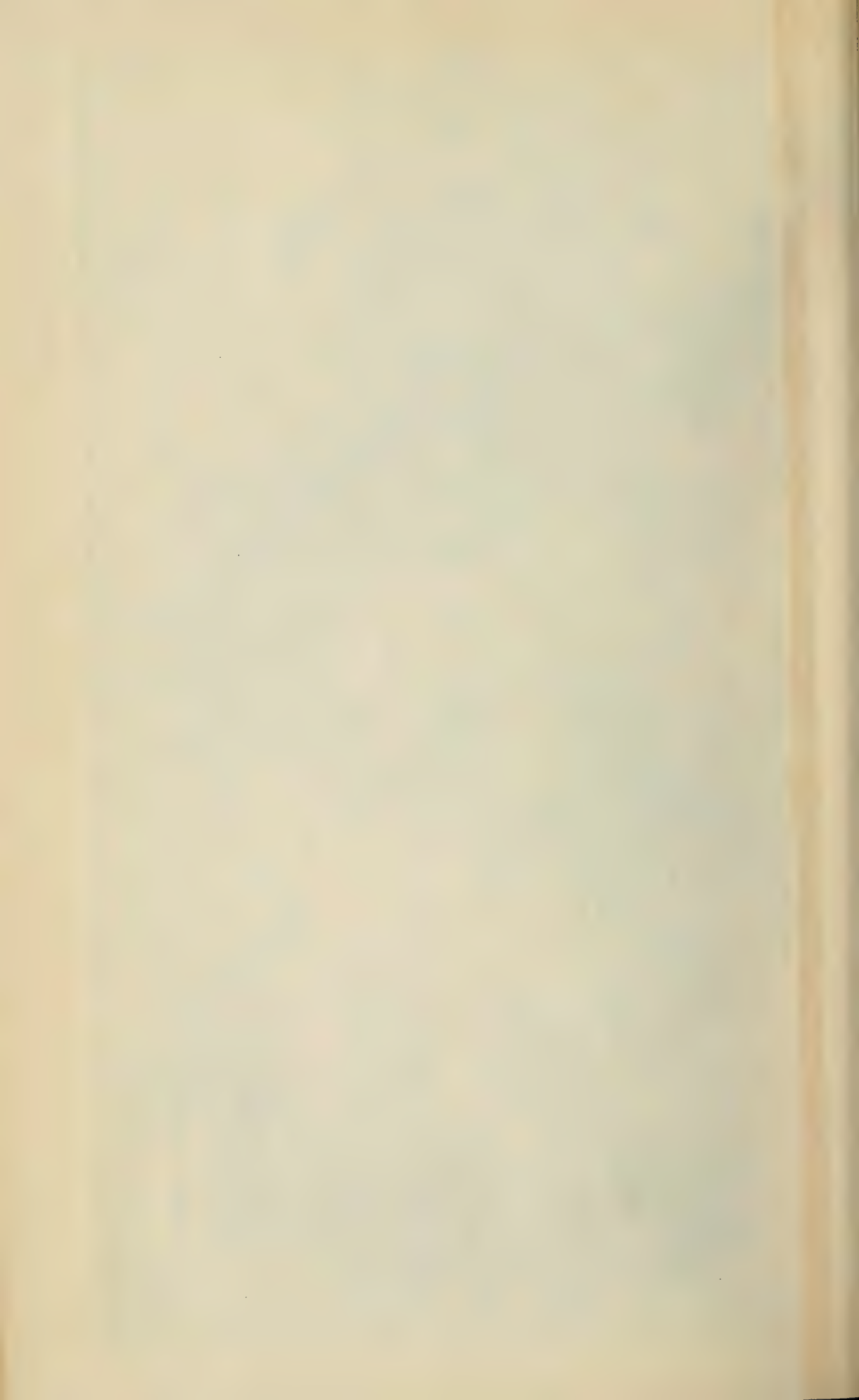
Agaric (Lat. *Agaricus*, from the Gr. ἀγάρικον), a genus of fungi, the species of which are very numerous. The *Agaricus campestris* or common mushroom and some others are delicate articles of food; the *Agaricus muscarius* and other species are dangerous poisons.

Agassiz (ALEXANDER). See APPENDIX.

Agassiz (LOUIS JOHN RUDOLF), M. D., LL.D., a Swiss naturalist, b. near Neuchâtel May 28, 1807. He studied at Zurich, Heidelberg, and graduated at Munich. In 1829-31 he published a description in Latin of the fishes brought from Brazil by Martius and Spix. In 1832-42 he published in Fr. *Researches on Fossil Fishes* (5 vols., with 300 drawings made by himself). In 1832 he became prof. of nat. hist. at Neuchâtel, and entered upon the study of glaciers, writing two elaborate works upon the subject. In 1846 he came to the U. S., and in 1848 was chosen prof. of nat. hist. at Har-







ward, where he gave fresh impulse to the study. In 1865 he conducted a scientific expedition to the river Amazon, and in 1871 accompanied a similar expedition to the S. Atlantic and Pacific oceans. D. Cambridge, Mass., Dec. 14, 1873.

Agassiz, Mount, a mt.-peak of Ari, an extinct volcano, 10,000 ft. or more above the level of the sea. Near it is the great cañon of Colorado.

Agate from *Achétes*, a river of Sicily, where they were first found) is a variety of quartz marked with veins or layers, which are different in color and often concentric. Agates are found in all countries, and are much used for ornaments and utensils. Many of the polished agates are very beautiful.

Agatharcus [*Ἀγαθαρχος*], a Gr. painter who lived about 480 B. C., is regarded as the inventor of scene-painting.

Agathias, a Gr. historian and poet, b. at Myrina, in Asia Minor; wrote a history of contemporary events, still extant. D. about 580 A. D.

Agave [from the Gr. *ἀγανός*, "illustrious," "noble"], a genus of plants of the order Amaryllidaceæ, mostly natives of tropical Amer. The most remarkable species of this genus is the *Agave Americana*, the maguey of the Mex. or Amer. Aloe. It is commonly called century plant, from the incorrect opinion that it bears no flowers until it is 100 years old. This age, or near it, is sometimes attained in temperate climates, but in hotter regions it often blossoms when less than ten years old. Just when the flower-stalk is ready to appear, the Mexicans cut away the bud and scoop out the centre; into this flows a sweet sap, which is fermented into *pulque*, the favorite beverage in Mex., from which a strong ardent spirit is obtained by distillation.

Age [Lat. *ætas*], a word used in various significations: 1, it denotes the whole duration of the life of a man or other creature; 2, a certain period or division of human life; 3, the time when a person is released from the control of his parents or guardians. According to the laws of Eng. and the U. S., a person becomes of age when he or she is twenty-one years old. Before this age one cannot vote or make a valid will. Age is also used to denote periods of time marked by some common characteristic, as the "Middle ages" in history, the "Augustan age" in literature, the "Devonian age" in geology, the "Golden age" in mythology, etc.

Agent [from the Lat. *ago*, to "act"], in law, one who acts for another. This is an extensive topic, and must be treated with a brevity scarcely admitting even a sketch of its rules. Agency may be created by express words or by implication. There are cases in which an express authority in writing is necessary by statutory law. It is a general rule that when an act is to be done under seal the agent's authority must be of the same grade. Should a person act as agent without authority, the subsequent ratification of the act will make it valid and binding on the person for whom it was done, in the same manner as if he had originally directed it. An agency is often implied from the course of business. A wife who sells goods in her husband's shop, or receives payment of a debt due him with his knowledge and without objection, may be deemed to be his agent, and may bind him in subsequent transactions of a similar kind. An agency is in general revocable either by the principal's own act, executed with sufficient notoriety, or by some event which renders the performance of the act impracticable. Thus, the death of the principal, in general, causes an instantaneous revocation. There is a class of powers, termed "powers coupled with an interest," which in their nature are irrevocable. There must be in this case an interest on the part of the agent in the property over which the power is to be exercised. The leading points in agency are the relations of principals to third persons, those of the agent to third persons, and the mutual relations between the principal and agent.

1. *The Relations of the Principal to Third Persons.*—It is a rule that when an agent acts within the scope of his employment he may bind his principal. This is on the principle of identity. There is another class of cases where the agent is not acting within the scope of his employment, but the principal has given him the appearance of authority, and the third person with whom he deals has no adequate means of distinguishing between his apparent and actual authority. In this case the principal is liable under a rule that where one of two innocent persons must suffer, that one should sustain the loss who has put it in the power of the wrong-doer to commit the wrong. It is in substance the doctrine of ESTOPPEL IN PAIS (which see). It is a general rule that when a power is conferred upon an agent, he has by implication such incidental authority as is necessary to carry his power into effect. An authority created by writing must be followed, and an act in excess of it is unauthorized and not binding on the principal. The mode of execution deserves notice. The agent should purport to bind his principal. This rule is particularly applicable to sealed instruments. Should an agent have a so called power of attorney to execute a conveyance of land, the deed should purport to be the act of the principal by the agent, and should be subscribed in that manner; otherwise it would be at most the agent's deed, and not that of the principal. Where there is no technical rule in the way, a principal may be liable even though undiscovered, as he must be deemed to be identified with the agent. On the general principles of the law of contracts, the principal can take advantage of a contract made in his behalf with a third person, and enforce it by action in his own name, even though he were not at the time disclosed, subject to the qualification that the rights of the other party to the contract are not prejudiced. A principal is liable for the fraudulent or wrongful acts of his agent acting within his employment. So complete is the identification of these parties that notice to an agent on the subject of his employment is legally notice to the principal, although it be not in fact communicated.

II. *The Relations of the Agent to Third Persons.*—If the agent having power to bind his principal does so expressly, he is not liable. But if he exceeds his authority, or, acting within it, fails to disclose his principal, he becomes personally responsible. The agent, in turn, may have a right of action upon a contract made in his own name with a third person, though in fact made for the benefit of his principal. It is a general rule that an action does not lie against an agent to test the right of the principal to a fund, but the action should be brought against the principal himself. But in the case of duress of goods, if payment is made to an agent under protest, an action may be brought against him to recover back the money. This doctrine assumes much importance in its application to duties collected upon imports; so that a law of Congress regulates the mode in which the protest should be made.

III. *The Relation of Principal and Agent as between Themselves.*—The rules governing this relation are quite different. The agent is bound to obey the instructions of the principal. If in violating them he binds the principal to third persons, he is personally liable to make compensation for his breach of duty. His relation is a fiduciary one. He is subject to the rule that he cannot deal in his principal's affairs for his own benefit. An agent having discretion to exercise cannot delegate his authority; he cannot substitute another in his place. Where the business requires it, he may employ subordinates in the execution of his duties. It is not uncommon to insert a clause in a written delegation of agency (power of attorney) allowing substitution; this is valid. An agent should keep separate accounts, and distinguish his principal's money from his own; otherwise he might become personally responsible for its loss. The measure of his liability ordinarily is reasonable care, which is determined by that diligence which prudent men usually exercise in the conduct of their own affairs. For his services he is in general entitled to a reasonable compensation. He is sometimes paid by commissions; this is usual in the case of a broker. He has earned his commissions when he has brought the purchaser and seller together. He cannot be deprived of them by a failure on the part of his employer, through wantonness or caprice, to enter into the contract which he has succeeded in negotiating for him.

The law of agency underlies to a considerable extent the law of partnership. (For information of more special nature concerning particular cases of agency, consult ATTORNEY, BROKER, FACTOR, PARTNERSHIP, etc.) T. W. DWIGHT.

Agessilaus [*Ἀγέσilaος*] II., a king of Sparta, b. about 440 B. C., succeeding his brother Agis in 398. War being made against the Persians, Agessilaus invaded Asia Minor, and gained some victories, but was recalled to Sparta to oppose a league formed against him by other Grecian states. War again broke out with the Thebans, and the Spartans were defeated at Leuctra (B. C. 371); Agessilaus, though not present at the battle, lost his influence. D. 360 B. C.

Agincourt, or **Azincourt**, a village of France, dept. of Pas de Calais, where Henry V. gained a great victory over the French, Oct. 25, 1415.

Agis IV., king of Sparta, b. about 264 B. C. Sparta was in a degenerate condition, and Agis endeavored to restore the ancient insts., to reform public morals, and to improve the condition of the poorer classes by an agrarian law. He was condemned upon charge of subverting the laws of Sparta, and was put to death in 240 B. C.

Agne'si (MARIA GAETANA), b. at Milan, It., 1718. At the age of twelve she could converse upon abstract subjects in Gr. and Lat. Her father having become prof. of math. at Bologna, she lectured in his place during his illness. She wrote *Analytical Institutions*. D. Jan. 9, 1799.

Agnes Sorel, mistress of King Charles VII. of Fr., b. 1409; became in 1431 lady of honor to the duchess of Anjou, and so fascinated the king that he appointed her lady of honor to the queen. She exercised a most beneficial influence over the king, whom she stimulated to action against the Eng., who then invaded Fr. D., as is said by poison, Feb. 9, 1450.

Agni, or **Agnis** [etymologically related to the Lat. *ignis*], in Hindoo mythology, the god of fire. He is sometimes represented with two faces, three legs, and seven arms, with his head surrounded by flames, and is generally painted of a deep red color. His two faces are supposed to be a type of fire in its two characters—beneficent and destructive—and his seven arms to indicate the seven prismatic colors.

Agnoë'tæ [from the Gr. *ἀγνοέω*, to "be ignorant"], a sect in the sixth century who maintained that Chr. in his human nature was ignorant of many things. Another and earlier sect of this name denied the omniscience of God.

Agnosticism. See APPENDIX.

Agnus Dei, the name applied to the fifth and last section of the R. Cath. mass, beginning with the words "Agnus Dei, qui tollis peccata mundi," "Lamb of God, who takest away the sins of the world." It is also applied to the figure of a lamb bearing a cross, which is stamped on a compound of balsam, chrism, and wax, or on silver.

Agon'ic [from the Gr. *α*, "without," and *γωνία*, an "angle,"] **Line** is the name applied to the line which joins all the places at which the magnetic needle points due N. and S. It is not fixed in position, but is now moving slowly westward on our continent. There is a second agonic line which has been observed near Chi. and Japan.

Agonis'tici, an ascetic sect of Chrs. who lived in N. Afr. in the fourth century. Their name, derived from the Gr. *αγωνιστής* (*agōnistēs*), a "wrestler," appears to have been given in allusion to their wrestling with "the world, the flesh, and the devil."

Agoua'ra (*Procyon cancrivorus*), the crab-eating raccoon of tropical Amer.; is larger than the common raccoon, has a shorter tail, and more variable colors. It is commonly of a blackish-gray, with six rings on the tail. It resembles the common raccoon.

Agouti, a-goo'tee (*Dasyprocta*), rodent mammals related to the porcupines; natives of tropical Amer., the size of a hare or rabbit, with long legs, round ears, bright black eyes, obsolete tail, and rump and thighs covered with long, coarse, bristly hair, whence the name *Dasyprocta* (from the Gr. *dasy*, "rough," and *prokto*, "buttocks"). The agoutis are omnivorous animals, quick, active, and easily domesticated, but little valued as pets. In some countries the flesh is eaten, but a prejudice generally prevails against it. There are several species; the best known is the *Dasyprocta aguti*.



Agouti.

Agra, or Akbarabad, a city of India, on the right bank of the river Jumna, 134 miles by rail S. S. E. of Delhi, and 754 miles by rail N. N. E. of Bombay. It was the capital of the Mogul and Mohammedan emps. of India from 1504 to 1647. Here are several magnificent edifices, the most celebrated of which is the Taj Mahal, a mausoleum erected by the emp. Shah Jehan (1627-66) in honor of his favorite queen. Agra suffered greatly during the Sepoy revolt (1857). Pop. 1881, 137,908.

Agrian Law [Lat. *lex agraria*, from *ager*, a "field"]. This term, in the ancient republic of Rome, signified a law enacted to distribute or regulate the public land, *ager publicus*. The consul Spurius Cassius first proposed to divide a portion of public land among the poor citizens, but the measure was defeated by the aristocrats. In 367 B. C. an agrarian law was originated by Licinius Stolo, ordaining that no man should possess more than 330 acres of the public domain. It soon fell into abeyance, but was renewed in substance by Tiberius Gracchus, 134 B. C.

Agreement. See CONTRACT, by PROF. T. W. DWIGHT.
Agricola (CNEIUS JULIUS), a Roman gen., b. in Gaul 37 A. D. He was appointed gov. of Aquitania in 73, and became consul in 77. About a year later he went as gov. to Britt., which he conquered, and governed with ability, but was recalled in 85. He erected a chain of forts from the Clyde to the Frith of Forth. D. Aug. 23, 93.

Agricola (JOHANN), originally SCHNEIDER or SCHNITZER, a Ger. theol., b. at Eisleben 1492, studied at Wittenberg, and became a friend of Luther, with whom he was afterward involved in a doctrinal controversy. Agricola and his followers were called Antinomians (opposers of the law), because they maintained that a Chr. is not bound to obey the Mosaic law. D. Sept. 22, 1566.

Agricultural Chemistry is the study of the chemical relations of those substances which compose the products of the farm. Since the chemistry of these is intimately connected with their physical, geological, and physiological aspects, the term agricultural chemistry embraces a wide range of natural science in its applications to vegetable and animal production. The object of agriculture is to develop the largest value of useful plants and animals at the smallest cost. Nothing is plainer than that the farmer should understand the nature of those materials and agencies which build up his crops and increase his herds. He should know whence the materials of his crops may be drawn, what ones are placed at his disposal naturally, and what must be provided by his own care. He should know how to control or work in harmony with the energies whose action is essential to his success.

Constituent Elements.—Agr. chem. inquires, first, what the plant and animal are made of. It finds that both, when living, consist of water, to the extent of 40 to 90 per cent., which is indispensable to their existence as a vehicle for the process of circulation or transfer of nutriment. The dry plant or animal may be divided into matter volatile by heat, 90 to 99 per cent., and 1 to 10 per cent. of ash. The volatile or combustible matter is either organized—i. e. possesses a structure, or is a tissue of organs, through whose mechanism the principle of vitality operates; or else it consists of substances which are the direct results of chemical changes in the organized matter. Muscle-fibre and wood-fibre are of the former, sugar and urea are of the latter kind. The volatile matters are thence termed organic; they consist of carbon compounds, most of which are highly complex in their atomic constitution.

Organic Elements.—The most important organic matters of our staple field crops are few—being, 1. The amyloids, compounds of carbon with hydrogen and oxygen, the last two being in the proportions in which they exist in water—viz., cellulose or wood-fibre, starch, the sugars and the gums; 2. The pectoids, also compounds of carbon, hydrogen, and oxygen, comprising pectose—the hard pulp of fruits and roots—and pectine, pectosic and pectic acids—the gummy or gelatinous matters of ripe and cooked fruits; 3. The fats and fixed oils; 4. The organic acids, oxalic, malic, citric, and tartaric; 5. The albuminoids, albumen, caseine, fibrine, and their analogues, which, besides carbon, hydrogen, and oxygen, contain 15 to 18 per cent. of nitrogen, with one half to one per cent. of sulphur. The ash of the plant consists of phosphates, sulphates, chlorides, silicates, and carbonates of potassium, sodium, calcium, magnesium, and iron.

Growth of Plants.—The growth of a plant is the development of a germ or seed when acted upon by the solar ray, with access of water, air, and soil. The organic matters above enumerated are exclusively generated and organized by the plant. Carbonic acid gas supplies carbon, water furnishes hydrogen and oxygen, while nitrogen is derived partially from minute quantities of ammonia mingled with the air. Nitrogen is, however, chiefly obtained from the nitrates of the soil. All the ash-elements come exclusively from the soil. The agriculturist cannot aid the nourishment of his crops except through the soil, and there he can only influence

the supplies of water, of nitrogen, and of ash-elements. Carbon, the most abundant ingredient of all crops, making up 44 to 48 per cent. of the dry matter, is furnished so fully by the atmospheric carbonic acid that additional supplies from the soil are not directly advantageous. The atmosphere contains, it is true, but a very small proportion of this gas—1-2500th of its bulk—but this is considerably in excess of the wants of the most luxuriant growth.

Conditions of Fertility.—The fertility of the soil depends, chemically—1, upon the presence in it of all the ash-elements and of nitrates in proper quantity; and 2, on their occurrence in such states of combination as give a constant and regulated supply. Experiments have demonstrated that a soil destitute of any one of the following substances—viz., phosphoric acid, sulphuric acid, potash, lime, magnesia, oxide of iron—is absolutely barren by virtue of such deficiency. A soil which contains the usual amount of potash, but only in the form of feldspar, or of phosphoric acid, but only as apatite, or of magnesia, but only as serpentine, is infertile, because these substances do not yield their elements to the solvent agencies of the soil or plant rapidly enough to serve as plant-food. Alumina is an abundant element of soils, but it is always absent from agricultural plants; and recent investigations also appear to show that silica, which is present in many plants, is an accidental ingredient, and in no manner essential to their growth or perfection. Soda appears to be unessential to most of the vegetative processes; for, although it is perhaps never entirely absent from cultivated plants, it often occurs in them in extremely minute quantity, so that the soda which is indispensable to the blood and milk of animals must be obtained, in part at least, directly from mineral sources. Nitrates and ammonia-salts—which are the natural supplies of nitrogen to crops—rarely are, and never need be, present in the soil in more than the minutest proportion. It is only requisite that they be generated or gathered there as rapidly as crops remove them. The process of nitrification, whereby inert or inassimilable nitrogen existing in the soil or in the air is converted into nitric acid, is one of the utmost agricultural importance.

Constituents of the Soil.—The great bulk of any soil is chemically indifferent in the nourishment of the present crop. The weight of an average loamy soil is about 4,000,000 lbs. per acre for each ft. of depth. A crop of grain of 33 bush. removes but 140 lbs. of ash-elements—viz., 40 lbs. in the seed and 100 lbs. in the straw. A hay-crop of two tons carries off but 260 lbs. of ash-ingredients. These quantities, if assumed to come from 2 ft. of depth, are respectively but 1-30,000th and 1-57,000th of the entire mass of soil. Hellriegel's experiments give results which warrant us in concluding that 55 lbs. of potash, 17 of soda, 17 of magnesia, 23 of lime, 55 of phosphoric acid, 11 of sulphuric acid, 8 of chlorine, and 54 of nitrogen (in the form of nitrates), are all that need be present, in soluble condition, in 1,000,000 lbs. of soil, in order to establish there a fertility equal to the production of 33 bush. of barley-grain and 2,000 lbs. of straw per acre. In other words, the 140 lbs. of ash-elements may be taken from 1,000,000 lbs. of a soil in which but 186 lbs. exist in soluble condition, and in which, therefore, the proportion of real plant-food—nitrogen, but not water, included—is but 1-4000th. Good soil, however, yields, and may contain, a larger proportion of immediately available plant-food than one part in 4000, but rarely more perhaps than ten times that amount. As cropping removes these substances from the soil, they are replaced more or less rapidly and completely by weathering, whereby, under the influence of moisture, carbonic acid, and oxygen, aided by heat and by the alternations of heat and cold, the rock-dust of the soil is gradually fluxed into soluble pabulum, and charged with nitrates.

Absorption.—The soil is endowed with absorptive qualities which enable it to retain in a state of comparative insolubility certain ash-elements, especially those which are in general the least abundant—viz., phosphoric acid and potash—even when applied to it from external sources in the most soluble form and in large quantity. This absorption of plant-food by the soil is accompanied by a corresponding liberation of other substances, especially of lime and sulphuric acid. The impalpable matter of the soil, consisting largely of aluminous and ferruginous silicates, is mainly the seat of these absorptions; sand, silica, carbonate of lime, humus, and even pure clay (kaolinite) being destitute of the power in question. Soils may be fully supplied with all the nutritive elements in proper quantity and form, and yet be infertile. This may happen on account of faults in physical condition, whereby they are rendered uncongenial to plants. A certain medium porosity, admitting of access and efflux of water, and a quality of being suitably warmed by the sun and of carrying heat through the cool of the night, are no less indispensable to high productive power than an appropriate chemical condition.

Manures.—Manures improve the soil by supplying one or several of those ingredients required by plants which are deficient either by reason of yearly removal of crops or from original poverty of composition. Practice has taught that phosphates and nitrogen in assimilable form are most commonly the substances which strikingly benefit land, and chemical analysis shows that of these the former is ordinarily the least abundant ingredient of soils, and the latter is one which is not only not abundant, but which rapidly wastes by solution in rain-water, being daily carried off in immense quantities, through springs and rivers, into the sea. The action of fertilizers is not, however, fully explained by their affording a direct supply of lacking nutritive elements; manures operate indirectly to feed crops, by their chemical effects upon the soil. It has been demonstrated that common salt, gypsum, and other saline matters may react on the soil to convert potash and magnesia, for instance, into soluble forms, and thus to give the same result as would follow an immediate application of the last-named substances. Certain manures which are used in large quantities, such as stable-dung, peat, marl, and lime, also influence the fertility

of the soil by amending its texture or otherwise modifying its physical character.

Rotation of Crops. It is theoretically possible to produce a maximum crop of any given kind, continuously and perpetually, upon the same plot of land. In practice it is easier and cheaper to alternate or rotate crops. A hoed crop implies surface-tillage, several times repeated during the growing season, thus effectually exposing the upper soil to the oxidizing influence of the air. A field put into grass or clover is to some extent under opposite conditions. In the one case, organic matters waste rapidly; in the other, they accumulate in the soil. In the first instance, the surface-soil tends to lose that porosity and attractiveness for moisture due to the presence of humus, which is a quality of the utmost significance in climates subject to drouth. In the second instance, the soil gains in these respects. On the other hand, the lower soil, which under hoed crops is yearly broken up by repeated ploughing, may settle down to injurious compactness in a pasture or meadow. Deep-rooted crops affect the soil very differently from those whose radication is confined to near the surface. The reasons for rotation thus become, to some extent, apparent.

Value of Clover.—Agri. chem. shows, further, that some plants, while occupying the soil, enrich it, and, though yielding the farmer a large and valuable harvest, yet actually manure the land for a subsequent crop. Clover is a plant of this kind. A good clover-crop, when made into hay, removes from the soil twice or thrice the ash-elements and nitrogen that are contained in a good wheat-crop, and yet the good clover-crop will develop in a soil where the good wheat-crop can only be raised by help of manure. The good clover-crop, also, not only grows on the unaided soil, but likewise fertilizes it, so that it can subsequently make the good wheat-crop. The enriching effects of clover are absolute in respect of nitrogen. The clover plant is able, in a given time and on a given surface, to assimilate nitrogen much more rapidly, or to a much greater amount, than the wheat plant can. It therefore flourishes better on a limited supply, or gives a full crop where wheat would make perhaps but half a crop; and, besides, leaves in the soil where it has grown more nitrogen in its roots and stubble than an entire wheat-crop contains. In respect of ash-elements, the clover plant can add nothing to the soil in the way of quantity, but it strongly influences their quality. It transmutes the insoluble matters into soluble, and collects largely, by its deep-penetrating roots, from stores of food which the wheat plant can scarcely reach. When its roots decay, these substances remain where a succeeding wheat-crop can at once utilize them. This enriching process has again its narrow limits. If we keep land in clover it becomes "clover-sick," probably from exhaustion of the deep-lying plant-food, and this disease is hard to cure, because of the inaccessibility of the subsoil to fertilizing applications.

Summary.—By judicious rotation of crops a soil of moderate quality may be made to yield fair harvests without loss of productive power. In order thus to economize in the fullest degree the resources of soil and crop, the farmer needs an accurate knowledge of their nature, such as can only be obtained by encouraging the study of agri. chem.

In studying the utilization of vegetable products for obtaining the various animal matters which are employed as food, etc., agri. chem. enters into a higher and more difficult field. Here it has been obliged, by numerous experiments, to test much of the empirical knowledge which agri. practice had too vaguely supplied, and also finds itself under the necessity of investigating the most purely scientific questions of physiology. Although many useful practical results have been obtained, this dept. of our knowledge is extremely incomplete, and, save in technical details, is too closely allied to the general subject of animal nutrition to require notice in these pages. (See JOHNSON, *Lectures on Agricultural Chemistry and Geology; How Crops Grow, and How Crops Feed*.) S. W. JOHNSON.

Agricultural Geology—geology applied to agriculture—embraces whatever can be learned in regard to the nature of the substructure of any dist. with reference to drainage and water-supply, the origin, physical structure, and mineral constituents of soils, the distribution and properties of mineral fertilizers, etc. It is chiefly valuable as teaching the probable resources of a dist. in soil, subsoil, mineral manures, etc.

Agriculture, ag're-kult-yur [Lat. *agricult'ra*, from *agri*, gen. *d'agri*, a "field" or "land," and *col'o*, *cultum*, to "till"; literally, the "tillage (or cultivation) of land"], is the art of producing or increasing by human labor the products of the soil. Its origin and progress nearly coincide with those of civilization. Savages and barbarians are rarely, and never to any considerable extent, agriculturists. Though the origin of agriculture is lost in the darkness which shrouds prehistoric times, it can hardly be doubted that men first sowed seeds in the annually inundated lower valleys of the Nile and other great rivers. But the area naturally inundated is small and limited, while, under favoring circumstances, pop. tends ever to increase. To cultivate more acres was indispensable; and the most accessible, rather than the most fertile, were first selected for such use. But here the earth required breaking up and pulverizing; so the aid of animals was soon invoked, and rude implements were devised to render their muscular strength serviceable. The yoke and the plough were thus called into existence.

The ruling classes in most nations of antiquity thought themselves degraded by labor; the Hebrews formed almost the sole exception among Semitic peoples. In ancient Greece the soil was mainly tilled by slaves. The Romans were originally a community of agriculturists, each citizen cultivating his little allotment. But when conquests filled it with slaves, rural as well as household labor devolved upon them; agriculture declined, and it was forced to draw her food from abroad. The barbarians who overran the Roman empire did nothing to improve agriculture,

which came to be so miserably conducted that five bushels of wheat, and a little more of other grains, was the full average product of an acre.

So long as Europe bent to the yoke of feudalism, agricultural improvement was scarcely possible. The tillers of the soil were mainly tenants at will, liable to be dispossessed at any moment. They usually paid their rents in kind, and one who grew unusually large crops would have been promptly required to increase his quota of rent. Leases for fixed terms, or for two or more lives, gradually replaced the older methods, the landlords at length discovering that their own interest required that the tenant should be incited to improve his processes and increase his crops. The condition of the masses under the feudal system precluded efficient cultivation. They had neither means nor will to improve their holdings and methods. Their scanty crops of wheat were required by their masters; rye, barley, and oats afforded their bread. It was not till the end of the reign of Henry VIII. that any edible roots were produced in Eng. The little of these vegetables that was used was formerly imported from Hol. and Flanders.

Jethro Tull, a farmer of Berkshire, whose *Horse-Hoeing Husbandry* appeared in 1731, seems to have been the first author who contemplated the farmer's calling with the eye of genius. He insisted on repeated ploughings, and of sowing in drills so wide apart as to admit of cultivation with a horse-hoe. He laid his land in ridges, with shallow ditches intervening; hoed his wheat in the fall, and again in the spring; and, making the ridges of this year on the ground allotted to the ditches of last year, he grew thirteen crops of wheat in succession on the same field. He sowed turnip seed in the same drills or ridges, at depths of one, two, and four inches respectively, calculating that the lowest would germinate in spite of any but the severest drouth.

The high price of grain, caused by the wars between Fr. and Eng. for twenty-five years prior to 1815, gave a great stimulus to Brit. agriculture, the progress of which has been very rapid since 1800. The use of ground bones as a fertilizer has increased the Brit. grain-harvest by millions of bushels a year. Guano, which was first introduced in 1841, is now imported at an annual cost of millions of dollars, all of which is profitably expended; and the use of steam power in ploughing and tilling, as well as in threshing and winnowing, is an advance of great importance.

In Amer., farmers have too generally been content to follow in the footsteps of their fathers. Underdraining, subsolling, irrigation, etc., have been left to a small but increasing number of intelligent cultivators. The advances in Amer. husbandry have been due to mechanical rather than to agricultural genius. Americans were foremost in improving the plough from an awkward, heavy implement, constructed mainly of wood, to one in which almost every part except the handles is of polished steel. Our axes, hoes, scythes, and spades are pre-eminent. The sickle was superseded by the cradle, and that by the mower. Horse-rakes, tedders, etc., have greatly diminished the cost of gathering the harvests. We are still, however, very backward in the application of steam to ploughing, for which our broad level prairies afford every facility.

The agriculture of the Romans in its best days appears to have been as good as that of Europe up to the beginning of the present century. The present superiority is due mainly to the study of the sciences related to husbandry, and to the use of machinery. The culture of the soil in every country depends partly upon the form of govt., partly upon the character of the pop., but to a very great extent upon climate. In tropical regions nature produces abundantly of herself, and little clothing is required; so that the inhabs. need labor little to procure the necessities of life. In arctic and sub-arctic regions cultivation is practically impossible. It is only in intermediate regions that A. is ever likely to attain a high degree of perfection. (See STEPHENS' *Book of the Farm* and MORTON'S *Cyclopedia of Agriculture*.) [From *orig. art. in J.'s Univ. Cyc.*, by HORACE GREELEY, LL.D.]

Agriculture, Department of, was established by Cong. in 1862. By means of reports it diffuses information respecting the agricultural interests of the country. Its monthly reports of the prospects of the staple crops are especially valuable. At the propagating gardens plants received from foreign govts. and botanic gardens are tested with a view to introducing new and useful plants.

Agrippa, King. See HEROD AGRIPPA.

Agrip'pa (MARCUS VIPSANIUS), a Roman gen., b. in 63 B. C. He became in his youth a friend of Octavius (afterward the emp. Augustus), to whom he rendered important military services. D. in 12 B. C.

Aguardiente, ah-gwar-de-en'tā, Spanish for BRANDY, which see.

A'gua, Volcan' de (i. e. "volcano of water"), a mountain of Central Amer., about 25 miles S. W. of Guatemala; so called from the fact that it sometimes pours forth torrents of water. The old town of Guatemala has been twice destroyed by it. Its crater is 15,000 ft. above sea-level.

Ague. See INTERMITTENT FEVER.

Ag'uas Calien'tes, a state of Mex., near the centre, bounded N., E., and W. by Zacatecas, and S. by Jalisco. Area, 2216 sq. m.; pop. 91,115. Capital, Aguas Calientes.

Agusti'na, called the "Maid of Saragossa," distinguished herself during the siege of Saragossa by the Fr. in 1809, was made a lieut. in the Sp. army, and received numerous decorations. In early life she was a seller of cooling drinks in the streets. D. 1857.

Agyn'ians [from the Gr. *a. neg.*, and *γυνή*, a "woman"], a Gnostic sect of the seventh century who condemned marriage and the use of certain kinds of meat.

A'hab [Heb. *Achab*], eighth king of Israel, who reigned B. C. 918-896. His wife was Jezebel, daughter of Ethbaal, king of Tyre. He dwelt at Jezreel, which he adorned with splendid buildings. He was killed in battle with Benhadad, king of Damascus.

Ahasuerus, the name of one Median and two Persians mentioned in the O. T. The Ahasuerus of Esther was probably Xerxes, the invader of Greece, who reigned from 486 to 465 B. C.

Ahaz (Heb. *Achaz*, "possessor"), twelfth king of Judah, B. C. 741-725. His reign was greatly disturbed by attacks of Rezin, king of Damascus, and Pekah, king of Israel, as well as those of the Edomites and Philistines. He called to his aid Tiglath-Pileser, king of Assyria, who overthrew the enemies of Judah, but made Ahaz his vassal, and carried off rich treasures from the temple and palaces of Jerusalem.

Ahlquist (August Engelbert), a Finnish philologist, b. Aug. 7, 1826. He endeavored to raise the Finnish language to a written speech, and to create a national lit. For this purpose he travelled through N. Rus. and Siberia to acquaint himself with the tribes of the Uralian-Altaic race. He is prof. of the Finnish lang. in the Univ. of Helsingfors. He wrote *Grammar of the Finnish Language*.

Ahmed IV., sometimes called **Abd-ul-Hamid**, a Tur. sultan, b. in 1725, succeeded to the throne in 1773. His reign is chiefly notable on account of the two disastrous wars with Rus., in which Tur. lost the Crimea, a portion of Circassia, with some other territories, and a number of important fortresses. D. 1789.

Ahmed Shah, founder of the Afghan monarchy, b. about 1724. Afghanistan was then subject to Pers., and he entered the Pers. army. At length he proclaimed himself shah of his native country, and commenced a career of conquest. D. 1773.

Ahmedabad (i. e. "the abode of Ahmed"), a city of India, in the presidency of Bombay, on the river Subhermuttee. It was once a large and magnificent cap., but is now much decayed. It has several beautiful mosques and other remains of ancient splendor. Pop. 116,873.

Ahn (JOHANN FRANZ), a Ger. grammarian, b. 1796. He wrote *Practical Course for the Quick and Easy Acquisition of the French Language*. D. Aug. 21, 1865.

Ahrens (HEINRICH), a Ger. jurist, b. July 14, 1808; lectured in Paris in 1833 on the hist. of Ger. philos. since the time of Kant, became in 1834 prof. of philos. in Brussels, in 1850 prof. of abstract law and political economy at Graz, in 1859 of practical philos. and political science at Leipzig. He wrote *Juristische Encycl.*

Ahriman, the principle of evil among the ancient Persians. See ORMUZD.

AI, the native name of the *Bradypus tridactylus*, or three-toed sloth of S. Amer. and so named from the loud cry it makes.

Aidan, SAINT, first bishop of Lindisfarne; b. in Ireland; was sent as missionary to Northumberland 635, and established Christianity there. D. Aug. 31, 651.

Aides-de-Camp, ad'e-kawng, confidential officers selected by gen. officers to assist them in their military duties, are *ex officio* assistant adjutants-gen. They are in the U. S. service attached to the person of the gen., and receive orders only from him.

Aigebelle, of PAUL ALEXANDRE NEVEUE, a Fr. naval officer, b. 1831. He entered the Chi. service against the Tai-Pings, took Hang Chow in 1864 and was made a mandarin. In 1869 he launched the first man-of-war in the new Chi. navy, and was made grand-admiral.

Aiken, on R. L. cap. Aiken co., S. C., is noted as a resort for invalids, especially those suffering from pulmonary complaints. Pop. 1880, 1817.

Aiken (CHARLES AUGUSTUS), D. D., LL.D., b. at Manchester, Vt., Oct. 30, 1827; grad. at Dartmouth and Andover, pastor of a Congl. ch., Yarmouth, Me., 1854-59, prof. of Lat. at Dartmouth 1859-66, at the Coll. of N. J. 1866-69, pres. of Union Coll. 1869-71, subsequently prof. of Chr. ethics in Princeton Theo. Sem.

Aiken (WILLIAM), b. at Charleston, S. C., 1806; grad. at S. C. Coll., was gov. of S. C. 1844-46, rep. in Cong. 1851-57, and was Democratic candidate for speaker of the House.

Aikin (JOHN), M. D., b. 1747; wrote *General Biography*, and in conjunction with his sister, Mrs. Barbauld, *Evenings at Home*. D. Dec. 7, 1822.—His daughter, LUCY AKIN (b. 1781, d. 1864), wrote a memoir of her father, and *Life of Joseph Addison*.

Ailanthus, or **Ailan'tus** (i. e. "tree of heaven"), a native of China, having large pinnate leaves. It grows rapidly, and is often planted as an ornamental tree in Europe and the U. S. The foliage is handsome, but it causes much annoyance by the rapid spread of suckers from the parent tree. The staminate flowers, which are borne on distinct trees, have an offensive odor. The female plants are free from this objection, and the clusters of winged fruit which they bear are quite ornamental.

Ailu'rus Fulgens, a rare animal of the class Mammalia, order Carnivora, family Ursidae, found in the mts. of Nepal. By the inhabs. of that country it is termed *panda*, *chitwa*, and *wah*, the last name having been given it on account of its peculiar cry. It is about the size of a large cat, and is remarkable for its beautiful fur. Its habits are arboreal, and its food consists of birds, eggs, and smaller animals.

Ainmüller (MAXIMILIAN EMANUEL), a Ger. painter, b. at Munich Feb. 14, 1807. Noted as the restorer of the art of painting on glass. D. Dec. 8, 1870.

Ainos, a race inhabiting the Kurile Islands and the N. Japanese islands. The men allow their abundant hair and beards to grow to full length, hence they have been called the "hairy Kuriles." They differ ethnologically from the other Mongolians, and consider themselves to be the original inhabs. of Japan. They are polygamists, subsist by hunting and fishing, and have a written language.

Ainsworth (WILLIAM HARRISON), an Eng. novelist, b. in Manchester Feb. 4, 1805. He wrote *Jack Sheppard* and *Tower of London*. In 1846 he became editor of the *New Monthly Magazine*. D. Jan. 3, 1882.

Air [Gr. *αἴρ*, from *ἀω*, to "breathe"; Lat. *aër*], was con-

sidered an element by the ancient philosophers, but it is now known to be a mixture of oxygen and nitrogen with some other gases. (For information respecting the properties and phenomena of the air, see Acoustics, by PROF. O. N. ROOD; BAROMETER, by PRES. F. A. P. BARNARD; and PNEUMATICS.)

Air-Bed, a sleeping apparatus made of air-tight cloth or vulcanized India rubber, divided into compartments and inflated with air.

Air-Bladder, or **Swimming-Bladder**, a viscus in fishes developed as a diverticulum from the anterior portion of the intestinal canal, and in the Ganoids and most abdominal Teleosts (Physostomi) connected by a pneumatic duct with the oesophagus or stomach, but independent thereof in the Acanthopterygians (Physoclysti) and Anacanthines. It is homologous with the lungs, and in some Ganoids performs to some extent the office of a lung, but in most its function is hydrostatic. An analogous organ is developed in chaetopod worms.

Air-Cells, in birds, are cavities connected with the respiratory system, penetrating even the bones, and diminishing the specific gravity. In plants they occur chiefly in aquatic species.

Air-Gun, an instrument for projecting bullets or other missiles by means of the elastic force of condensed air, which is contained in a reservoir communicating with the barrel. The force with which a projectile is propelled from an air-gun is much less than that produced by an ordinary discharge of gunpowder, but they may be so made as to be very formidable weapons.

Air-Plants are certain epiphytic tropical plants which hang in festoons from forest trees, and are able to live suspended in the air, without the presence of earth or water.

Air-Pump, a machine by which air is partially exhausted from a vessel, was invented by Otto Guericke in 1654, and subsequently improved by others. It is used to demonstrate the pressure of the atmosphere and various other properties of air.

Airy (GEORGE BIDDELL), LL.D., F. R. S., etc., b. at Alwick June 27, 1801; grad. at Trinity Coll., Cambridge, where in 1826 he became Lucasian prof. of philos., and in 1828 Plumian prof. of astron. In 1835 he was appointed astronomical, and placed in charge of the Greenwich Observatory. He has made many improvements in astronomical and scientific instruments, and has written largely upon philosophical subjects.

Aix-la-Chapelle [Lat. *Aquis Grænum*; Ger. *Aachen*], a city of Prus., on the frontier of Belgium. It was the cap. and favorite residence of Charlemagne. Its magnificent cathedral dates back to 796 A. D. Here are celebrated mineral springs, the warm waters of which are highly esteemed. The city has been the scene of several important treaties. Here, in 1668, was concluded a treaty between Louis XIV. of Fr., on the one hand, and Eng., Swe., and Hol. on the other, in virtue of which Louis surrendered some conquests which he had made in the Netherlands. In 1748 was here concluded the treaty which ended the war of the Sp. succession, which had lasted eight years, and in which nearly all the European powers were engaged. In 1818 was held here the Congress of Aix-la-Chapelle, in which all the allied powers were represented, and which led to the formation of the so called Holy Alliance. Pop. in 1880, 85,551.

Ajax [Gr. *Aias*], the name of two Gr. leaders at the siege of Troy—1. The son of Telamon, and king of Salamis, the tallest of the Grecian warriors, and styled The Greater. He was defeated by Ulysses in a competition for the armor of Achilles, became insane, and killed himself. 2. The son of Oileus, and king of Locris, styled The Lesser. According to legend he offended Minerva, and was drowned on his homeward voyage from Troy.

Ak'bar, or **Ak'ber** (written also **Aebar** and **Ack-bar**), **Moham'med**, surnamed JALAL-ED-DEEN, a Mogul emp., b. in 1542. He succeeded his father in 1556, and showed great military and political capacity; extended the boundaries of his dominions, of which he caused a statistical survey to be published; encouraged lit., art, and commerce, and gave protection to Christians and Jews. D. 1605.

Akenside (MARK), an Eng. poet, b. at Newcastle-on-Tyne Nov. 9, 1721. He studied medicine at Leyden, settled in Lond. in 1748, and practiced his profession. During the civil war he favored secession, but after its close advocated the reconstruction measures of Cong., and was for a short time atty.-gen. in Grant's administration. D. Dec. 22, 1880.

Ak'erman (AMOS T.), b. in N. H. in 1823; studied law, emigrated to Ga., and practiced his profession. During the civil war he favored secession, but after its close advocated the reconstruction measures of Cong., and was for a short time atty.-gen. in Grant's administration. D. Dec. 22, 1880.

Akers (BENJAMIN), commonly known as PAUL AKERS, an Amer. sculptor, b. in Me. July 10, 1825; went to Boston in 1840, made several busts there; went to It., where he executed many admirable portrait busts. D. May 21, 1861.

Ak'iba (BEN JOSEPH), a Jewish rabbi, pres. of the school of Bene Barak in the second century A. D. Having joined the rebellion of Barchochebas, he was flayed and burned by the Romans at the age, it is said, of 120 years.

Ak'ron, city, R. R. centre, and cap. Summit co., O., 36 m. S. of Cleveland, on the highest point of land between Lake Erie and the Ohio River. It is the seat of Buchtel Coll. Pop. 1870, 10,006; 1880, 16,512.

Al, **II**, or **III**, the Arabic definite article; it appears in many Oriental names, as Al-Mansoor, "the victorious," Al-Amin, "the faithful," etc.

Alaba'ma, a river of the U. S., formed by the junc. of the Coosa and the Tallapoosa, about 10 m. above Montgomery, Ala. It flows nearly westward to Selma, and afterward in a general S. W. direction, and unites with the Tombigbee to form the Mobile River. It is navigable for large steamboats through the whole extent, which is about 300 m., and traverses a fertile region, of which cotton and corn are the staple products.

Alabama (signifying, in the Creek lang., "Here we rest," one of the S. or Gulf States of the U. S., lying between the parallels of 30° 15' and 35° N. lat., and the meridians of 84° 56' and 88° 48' W. lon. from Greenwich. Length from N. to S., 336 m.; breadth, from 148 to 200 m. Bounded on the N. by Tenn., E. by Ga. and Fla., S. by Fla. and the Gulf of Mex., W. by Miss. Area, 52,250 sq. m. or 33,140,000 acres.



Soil, Rivers, Etc.—In the N. broken and hilly, from outlying hills of the Blue Ridge; S. of this almost level, but gently declining to the Gulf. Principal rivers are Tennessee, near N. line of the State; Mobile, Tombigbee, Alabama, Coosa, Black Warrior, Tensaw, Perdido, and Chattahoochee, and their affluents. Of these the Tennessee, Tombigbee, Black Warrior, Alabama, Tensaw, Chattahoochee, and Perdido are all navigable. Mobile Bay is the principal bay of the State, Grand, Bonsecours, and Perdido bays being shallow.

Soil.—The soil is divisible into three belts or sections—viz.: 1. The S. section, 1/2 of the State, a light but productive alluvial and diluvial soil, yielding moderate crops of corn, cotton, and fruits, with considerable forests of yellow pine. 2. The Cotton Belt, limestone and chalk lands, mostly prairie, producing good cotton and corn. 3. The N. section, a mineral region, yielding gold, coal, iron, etc., some of it poor and hilly land, but healthy and with good water-power. In this region also is the great Tenn. valley, with fine, fertile side valleys, yielding cotton, corn, cereals, and fruits, while the hill-sides are well adapted to grazing.

Minerals.—Of gold, discovered in Randolph co. 1836, there had been deposited in the Mint to June, 1880, \$219,873. There are also mined in the State, silver, copper, lead, iron ores of various kinds, and excellent bituminous coal: census of 1880 reports 322,934 tons of the latter. There are many rarer minerals, mineral earths, building-stones, and mineral springs.

Vegetation.—The forests in the N. belong to the temperate, in the S. to the semi-tropical zone. Five species of oak, hickory, chestnut, poplar, cedar, elm, mulberry, and white pine in the N. are replaced in the S. by cypress, live oak, yellow pine, magnolia, and loblolly, with brake or Amer. bamboo, saw palmetto, and other small trees and shrubs. The apple, pear, plum, and hardy peach give place to the fig, pomegranate, olive, apricot, Scuppernon grape, and orange.

Zoology.—The wild animals common to the W. and S. W. are found here. The alligator inhabits the rivers and bayous, and there are lizards, some venomous snakes, terrapin, turtles, and excellent fish; and most game birds, birds of prey, songsters, and birds of exquisite plumage.

Climate.—Temperature in N. Ala. delightful, frosts rare, and no intense heat. In Central Ala., greater heat, but cool nights; occasional frosts. In the S., protracted heat, but good breezes, cool nights, and heavy dew. Rainfall from 48 to 54 inches. Water in the N. excellent, in the S. poor.

Agricultural Productions.—Cotton is the largest crop, the State ranking, in 1880, 4th in cotton production, and 13th in the product per acre. Ala. was sixth among S. States in production of corn, but other cereal crops were small. She makes a little cane sugar and molasses, and more sorghum syrup. Ramie is grown in S. counties, and will be a good crop, as a machine for dressing it has been invented. The number of neat cattle in the State in 1880 was 751,190. The number of farms has doubled in the last decade, but nearly half are rented. Of the farms, 6/10 are under 100 acres.

Manufactures. are not large, but increasing; lumber, iron, machinery, and cotton goods are the principal articles produced. The production of iron and steel reached 62,986 tons in 1880.

Railways.—In Jan. 1880 there were 1852 m. of R. R. in operation, which are sufficient for the present commerce and passenger traffic of the State.

Finances.—State debt, net, in 1880, was \$9,071,765; local debt, net, \$5,656,780; total debt, State and local, net, \$14,728,545. The assessed valuation in 1880 was—real estate, \$7,374,008; personal \$45,493,220; total, \$122,867,228; total taxation, \$2,061,978.

Commerce.—Mobile is the only port of entry. Imports in 1880, \$743,890. Exports, mostly cotton, \$7,187,703; foreign exports, \$1037. Total imports and exports, \$7,932,630. The number of vessels entering the port in 1880 was 130; tonnage, 61,471 tons. The number which cleared was 156; tonnage, 69,181 tons.

Banks and Insurance.—There were, Nov. 1, 1880, 9 national banks in operation; capital, \$1,508,000, and outstanding circulation, \$1,443,895; 6 State banks and trust companies; capital, \$615,000. Private bankers and savings banks, 20; capital, \$425,241; deposits, \$1,257,221. The insurance, both life and fire, is mostly in the hands of foreign companies.

Education.—In 1879 Ala. had 4 univs. and colls., with 439 students; 59 sems., acads., and schools of secondary instruction, with 3784 students; a school pop. of 376,649, of whom 174,485 were enrolled in the public schools. The schools were kept nearly 4 months in the year; \$430,131 was expended for

school purposes in 1880; total number of public schools, 4629. There were also 7 scientific and professional schools.

Libraries and Newspapers.—The Educational Bureau's report on libraries, published in 1876, states that in that year there were 31 public libraries of over 300 vols., aggregating 60,000 volumes in all; and many private libraries, having in all nearly 600,000 vols. In 1880 there were in Ala. 125 newspapers and periodicals, including 6 dailies.

Churches.—The Baps. are the leading denomination, but are followed by the others in the following order: Meths., Presbs., Episcopalians, Disciples or Christians, R. Caths., Congregationalists, and minor denominations.

Population of Ala. in 1880 was 1,262,505 (white 662,185, colored 600,320, including 213 Indians and 4 Chbi.), an increase of 265,513 since 1870. In 1820 the State had 127,901 inhabs., an increase of nearly tenfold in 60 yrs.

Principal Towns and Pop., 1880.—Montgomery, the cap., 16,713; Mobile (present limits), 29,132; Selma, 7529; Huntsville, 4977; Eufaula, 3836; Opelika, 3245; Greenville, 2471; Troy, 2294; Marion, 2074, and Tuscaloosa, 2418.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Autauga...	2-D	11,626	15,108	Prattville	977
Baldwin...	3-B	6,064	8,603	Daphne	...
Barbour...	6-E	29,309	33,979	Clayton	761
Bibb...	4-C	7,469	9,487	Centerville	1,634
Blount...	2-D	9,945	15,369	Blountsville	232
Butler...	5-E	24,474	29,066	Union Springs	1,862
Butler...	6-D	14,981	19,549	Greenville	2,471
Calhoun...	3-E	13,880	19,591	Jacksonville	882
Chambers...	4-E	17,562	23,440	La Fayette	1,001
Chester...	2-E	11,132	19,108	Centre	144
Chilton...	4-D	...	10,793	Clanton	2,407
Chocoma...	4-E	12,826	15,731	Butler	184
Clarke...	6-B	14,663	17,988	Grove Hill	156
Clay...	4-E	9,609	12,938	Abland	...
Cleburne...	3-E	8,017	10,976	Edwardsville	267
Coffee...	7-E	6,171	8,119	Elba	222
Colbert...	1-B	12,537	16,153	Tusculum	1,305
Concord...	3-C	10,574	12,605	Evergreen	...
Coosa...	4-D	11,945	15,113	Rosdard	1,593
Covington...	7-D	4,868	5,639	Andalusia	...
Crenshaw...	6-D	11,156	11,726	Rutledge	275
Cullman...	1-C	...	6,355	Uniontown	426
Dale...	7-E	11,225	12,675	Oak	...
Dallas...	5-C	40,705	48,433	Selma	7,529
De Kalb...	2-E	7,126	12,675	Fort Payne	...
Elmore...	5-D	14,477	17,502	Wetumpka	816
Escambia...	7-C	4,041	5,719	Brewton	...
Etowah...	2-D	10,109	15,598	Gaylesville	1,097
Fayette...	3-B	8,136	10,135	Fayette C. H.	18
Franklin...	2-B	8,006	9,155	Bel Green	84
Geneva...	7-E	2,959	4,342	Geneva	...
Greene...	4-B	18,398	21,931	Eutaw	1,171
Hale...	4-B	21,792	26,553	Greensborough	1,862
Hart...	7-F	14,191	18,761	Abbeville	1,458
Jackson...	1-E	19,410	25,114	Scottsborough	702
Jefferson...	3-C	12,345	26,272	Birmingham	3,066
Lamar...	3-B	...	12,142	Verona	208
Lauderdale...	1-B	15,091	21,035	Florence	1,289
Lawrence...	2-C	16,458	21,392	Moulton	3,500
Lee...	5-E	21,750	27,262	Opelika	2,335
Limestone...	1-C	15,017	21,600	Athens	1,011
Lowndes...	5-D	25,719	31,176	Hayneville	2,152
Macon...	5-E	17,727	17,371	Tuskegee	2,550
Madison...	1-D	31,267	37,625	Huntsville	4,977
Marion...	6-B	20,851	30,801	Linden	1,355
Marshall...	2-B	6,059	9,364	Hamilton	...
Marshall...	2-D	9,871	14,585	Guntersville	395
Mobile...	3-A	49,311	48,653	Mobile	29,132
Monroe...	6-C	14,214	17,091	Monroeville	122
Montgomery...	6-D	41,594	52,556	Montgomery	16,713
Morgan...	2-C	12,187	16,426	Somerville	209
Perry...	5-C	24,975	30,741	Marion	2,074
Pickett...	4-B	17,680	21,479	Carrollton	349
Pike...	6-E	17,493	20,640	Troy	1,394
Randolph...	4-E	12,008	16,750	Wedgwood	238
Russell...	5-F	21,626	24,837	Seale	277
Saint Clair...	3-D	9,260	14,462	Ashtville	1,443
Shelby...	4-D	12,218	17,236	Columbiana	496
Sumter...	5-B	24,109	28,728	Langston	708
Talladega...	4-D	18,461	23,360	Talladega	1,281
Tallahassee...	4-E	16,963	23,401	Dadeville	540
Tuscaloosa...	4-B	20,081	24,957	Tuscaloosa	1,408
Walker...	2-C	6,343	9,479	Jasper	260
Washington...	1-A	3,912	4,538	St. Stephens	...
Wilcox...	5-A	28,577	31,828	Camden	290
Whitely...	5-A	4,155	4,253	Houston	106
Whitely...	2-C	4,155	4,253	Houston	106
Total		1,262,505	1,262,505		

* Reference for location of counties. See map of Alabama.

History.—First settlement in 1702, by Bienville; Mobile planted in 1711-13; terr. N. of 31° ceded by Fr. to G. Brit. in 1763, and in 1783 transferred to U. S.; first attached to Ga. and S. C., but in 1802 organized as Miss. Terr.; region S. of 31° belonged to Sp., but in war of 1812 seized and annexed to Miss. Terr.; this region and Fla. purchased from Sp. in 1819; Creek war in 1813-14; Gen. Jackson defeats the Creeks, who make peace and give up 34 of their terr.; immigration increases; Miss. set off as a State in 1817, and Ala. admitted to the Union in 1819; Ala. takes an active part in removal of Indians to Ind. Terr.; becomes largely interested in slaveholding, and takes strong S. ground; in 1860-61 one of the first of the S. States to declare for secession and a S. Confederacy; convention of all the S. States held at Montgomery Feb. 4, 1861, to organize a S. Confederacy; provisional gov. organized; Jeff. Davis elected pres., and Montgomery made cap. of Confederacy; Gov. Moore seized, in Jan. 1861, U. S. arsenal, arms, forts, and revenue cutter; July, 1861, cap. removed to Richmond, Va. Principal battles of war in Ala.: Capture of fts. in Mobile Bay, Aug. 1864; siege and capture of Mobile in Mar. and Apr. 1865; capture of Selma and other towns, in Apr. 1865, by Gen. Wilson, and several minor conflicts. Reconstruction measures: Provisional gov. appointed June 21, 1865, and State temporarily under military control; State convention met Sept. 25, 1865, and annulled ordinance of secession; military govt. very lenient; State convention called by Gen. Pope to meet Nov. 5, 1867, to form a new const. and State govt.; const. submitted to people Feb. 4, 1868; this const. rejected for technical reasons, but most of its provisions subsequently

adopted; State restored by Cong. June 27, 1868; some minor troubles and difficulties before a complete adjustment was effected, but the trouble was much less than in other States of the S., and has now all passed away.

Governors of the State.

William W. Bibb.....	1819-20	John Gill Shorter.....	1861-63
Thomas Bibb.....	1820-21	Thomas H. Watts.....	1863-65
Israel Pickens.....	1821-25	Lewis E. Parsons, <i>Prov.</i>	1865-65
John Murphy.....	1825-29	Robert M. Patton.....	1865-68
Gabriel Moore.....	1829-31	William H. Smith.....	1868-70
John Gayle.....	1831-35	Robert B. Lindsay.....	1870-72
Clement C. Clay.....	1835-37	David P. Lewis.....	1872-74
Arthur P. Bagby.....	1837-41	George S. Houston.....	1874-78
Benjamin Fitzpatrick	1841-45	Rufus W. Cobb.....	1878-82
Joshua L. Martin.....	1845-47	Edward A. O'Neal.....	1882-86
Reuben Chapman.....	1847-49		
Henry W. Collier.....	1849-53		
John A. Winston.....	1853-57		
Andrew B. Moore.....	1857-61		

L. P. BROCKETT.

Alabama Claims. The protracted negotiations, the treaty of Washington resulting therefrom, and the arbitration at Geneva by which this treaty was in part executed, may justly be deemed as forming the most important *cause célèbre* of modern diplomacy. The claims themselves were made by the govt. of the U. S. upon the govt. of G. Brit. The treaty of Wash. (May 8, 1871) describes them as "differences [which] have arisen between" [the two govts.], "and still exist, growing out of the acts committed by the several vessels which have given rise to the claims generically known as the A. claims." These claims were for damages to the U. S. and sundry citizens thereof, caused mainly by the Florida and Alabama, Confed. cruisers built and equipped in G. Brit., and suffered to enter Brit. ports for repairs, supplies, and disposing of their prizes, in violation of the laws of neutrality. The claims, amounting to many millions of dollars, were partly for direct damages in the actual loss of property, and partly for indirect damages, such as the interruption of commerce, and the cost to the U. S. of pursuing the cruisers. During the war the U. S. govt. vainly endeavored to induce that of G. Brit. to prevent the use of its ports as a basis of hostilities. After the war, claims were presented for damages thus inflicted. After protracted negotiations a treaty was concluded in Jan. 1869, which provided that the question should be submitted to a tribunal of arbitration, three members of which, by a subsequent agreement, were to be named respectively by the govts. of It., Switz., and Brazil, and one com. from each of the contesting powers. This tribunal assembled at Geneva, Switz. The essential points of the final decision, announced Sept. 14, 1872, were as follows:

Neutral powers should exercise due diligence to prevent violations of neutrality on the part of their subjects; G. Brit. had failed to do this, and could not justify herself on the plea of insufficiency of legal means of action. But the claim of the U. S. for the cost of pursuing the Confed. cruisers could not be distinguished from the general expenses of the war, and was therefore an indirect loss which should not be allowed. Prospective injuries to shippers and ship-owners, such as loss of future profits, are equally uncertain and indirect. All double claims for the same losses were rejected, but interest was allowed. Upon these principles the tribunal awarded, for actual losses of ships and cargoes, and interest, the sum of \$15,500,000. [From *orig. art. in J. s. Univ. Cyc.*, by PROF. J. N. POMEROY, LL.D.]

Alabaster [Lat. *alabastrites*, and *alabastrer*; Gr. *ἀλαβαστρος*], a name applied to two kinds of white mineral substances which are similar in appearance, but different in composition. The alabaster proper is a fine-grained variety of gypsum or sulphate of lime; the finest quality of this is found near Volterra, in Tuscany; the other is a crystalline carbonate of lime, and is harder than the first. Both are manufactured into ornaments.

Alameda, R. R. junc., Alameda co., Cal. Pop. of tp. 1870, 1557; 1880, 5708.

Alamo, *The* (*alamo* is the Sp. for "poplar" tree), a ft. at San Antonio, Tex., where a small body of Texans resisted a Mex. force of ten times their number from Feb. 11 to Mar. 5, 1836, and nearly all perished. The six who finally surrendered were murdered by the Mex. On account of this defence, Alamo has been styled the "Thermopylae of America." "Remember the Alamo!" became the war-cry of the Texans in their struggle for independence.

Alamo'sa, Conejos co., Col., on R. R. and the Rio Grande Del Norte, 130 miles S. W. of Pueblo, Col. Pop. 1880, 802.

Alarcon y Mendoza, de (Don JUAN RUIZ), a Sp. poet, b. in Mex. about 1590. He became a resident of Sp. in 1622, after which he obtained the office of reporter of the royal council of the Indies. D. 1639.

Alaric [Lat. *Alaricus*], a Visigoth conqueror, b. about 350 A. D. In 395 he invaded Thrace, Macedonia, and other provinces, took Athens, and entered the Peloponnesus, from which he was driven out by Stilicho. Hostilities were then suspended by a treaty, and the emp. Arcadius appointed Alaric gov. of Illyria in 396. He invaded N. It. in 402, but was defeated by Stilicho at Pollentia and Verona. Stilicho having been killed in 408, Alaric renewed the invasion of It., which the emp. Honorius was unable to defend. The army of the Visigoths invested Rome, but were induced to retire by the payment of 5000 lbs. of gold and 30,000 lbs. of silver. After unsuccessful efforts to negotiate, Honorius rejected the terms of Alaric, who in 410 took Rome, and permitted his soldiers to pillage it for six days. D. at Cosenza, It., in 410.

Alaric II., king of the Visigoths, began to reign in 484 A. D., at the death of his father Euric. His dominions included parts of Sp. and of Gaul. He was killed in battle by the hand of Clovis, king of the Franks, in 507.

Alaska, a Terr. belonging to the U. S., purchased from Rus. in 1867, and comprising the extreme N. W. portion of the N. Amer. continent and the islands adjacent thereto. It has been compared to the head and horns of a Texan

bull, to which it bears a slight resemblance, the mass of mainland forming the head, while the Sitkan peninsula and the Aleutian archipelago form the widely extended horns. Its breadth from N. to S. is 20° of lat., while the distance between the tips of the horns is nearly 60° of long., or about 3000 m. Its area is stated as 577,390 sq. m., or 369,529,600 acres. Its shore lines are estimated at 25,000 m.

Topography.—Mts. are a combination of Coast, Cascade, and Rocky mts., with outlying spurs. They range from 3084 ft. to 19,500 (Mt. St. Elias). Rivers: Yukon, 2000 m. long, nav. 1500 m.; Kouskoquim, 600 m.; Nushegagak, Atna or Copper, Chilcat, Takou, and Stickine. Extensive glaciers.

Minerals.—Gold, copper, iron, semi-anthracite and bituminous coal, petroleum, graphite, bismuth, etc.

Climate.—Nine months severe winter; a short and hot summer on the mainland; on the islands, cold less protracted, and warm weather longer.

Soil and Productions.—The lat. (52°-72° N.) precludes any great fertility, but the islands and the Sitkan peninsula produce wheat, barley, and the other cereals, and some root crops, and the forests on the larger islands and the mainland are extensive and the trees of great size. Its greatest products, however, are from the fisheries, in which, in 1880, 6130 persons were employed; capital invested, \$447,000; value of products, \$2,661,640. The fur-seal and the sea-otter abound, and yield to the U. S. govt. an annual revenue of \$300,000. Salmon, cod, halibut, sturgeon, and other fish swarm in the waters, and the salmon fisheries are growing. The furs and pelts of land animals also yield some revenue.

The Population in 1880 was 33,426, of which 430 were whites, and the remainder Creoles, Indians, and Esquimaux of various tribes. The Sitka Indians are somewhat intelligent, but drunken and depraved. The Aleuts on the islands are hardy, industrious, and honest. The Esquimaux toward the arctic coast do not differ from other Esquimaux tribes. There are mission stations at several points. Sitka, formerly called New Archangel, is the capital. Wrangel, Ft. Nicholas, and Ft. St. Michael are also important places. (See YUKON RIVER in APPENDIX.) L. P. BROCKETT.

Alauda. See LARK.

Albanen'ses [from *Alba*, a town of Piedmont], that division of Catharists who believed in absolute dualism. They taught that the world was created by the Evil Spirit.

Albania (called *Shkiperi* by the natives, and *Arnaoutlik* by the Turks), the S. W. part of European Tur., lies between lat 39° and 43° N., and is bounded on the W. by the Adriatic and Ionian seas. Its length N. and S. is about 290 m., and its width varies from 40 to 90 m. It nearly coincides with the ancient Epirus. The surface is mountainous, being occupied with nine ridges that are nearly parallel, the highest peaks rising about 8000 ft. above the level of the sea. The Albanians are rude and warlike mountaineers. They are sometimes called *Arnaouts* and *Skipekar*, and are probably descended from the ancient Illyrians and Epirotes. Their lang. has several strongly marked dialects, and is probably Indo-European. Pop. estimated 1,300,000.

Albano, a lake and mt. in It., about 14 m. S. E. of Rome. The lake, which is 6 m. in circumference, occupies the crater of an extinct volcano, and is 1000 ft. deep or more. It has no natural outlet, but discharges its waters through an artificial tunnel 6000 ft. long, cut through the rocks about 397 b. c. Mt. Albano, more than 3000 ft. high, rises from the E. shore of the lake.

Al'bany, or **Al'bainn**, an anc. name of the Highlands of Scot. It is supposed that Albany, or Albion (see ALBION), was the original name given to the whole island by its Celtic inhabs., and that it was afterward restricted to the N. W. part of Scot.

Albany, R. R. junc., cap. Dougherty co., Ga., on the right bank of Flint River, 106 m. S. S. W. of Macon. The river is navigable to this point only at high water. Pop. 1870, 2101; 1880, 3216.

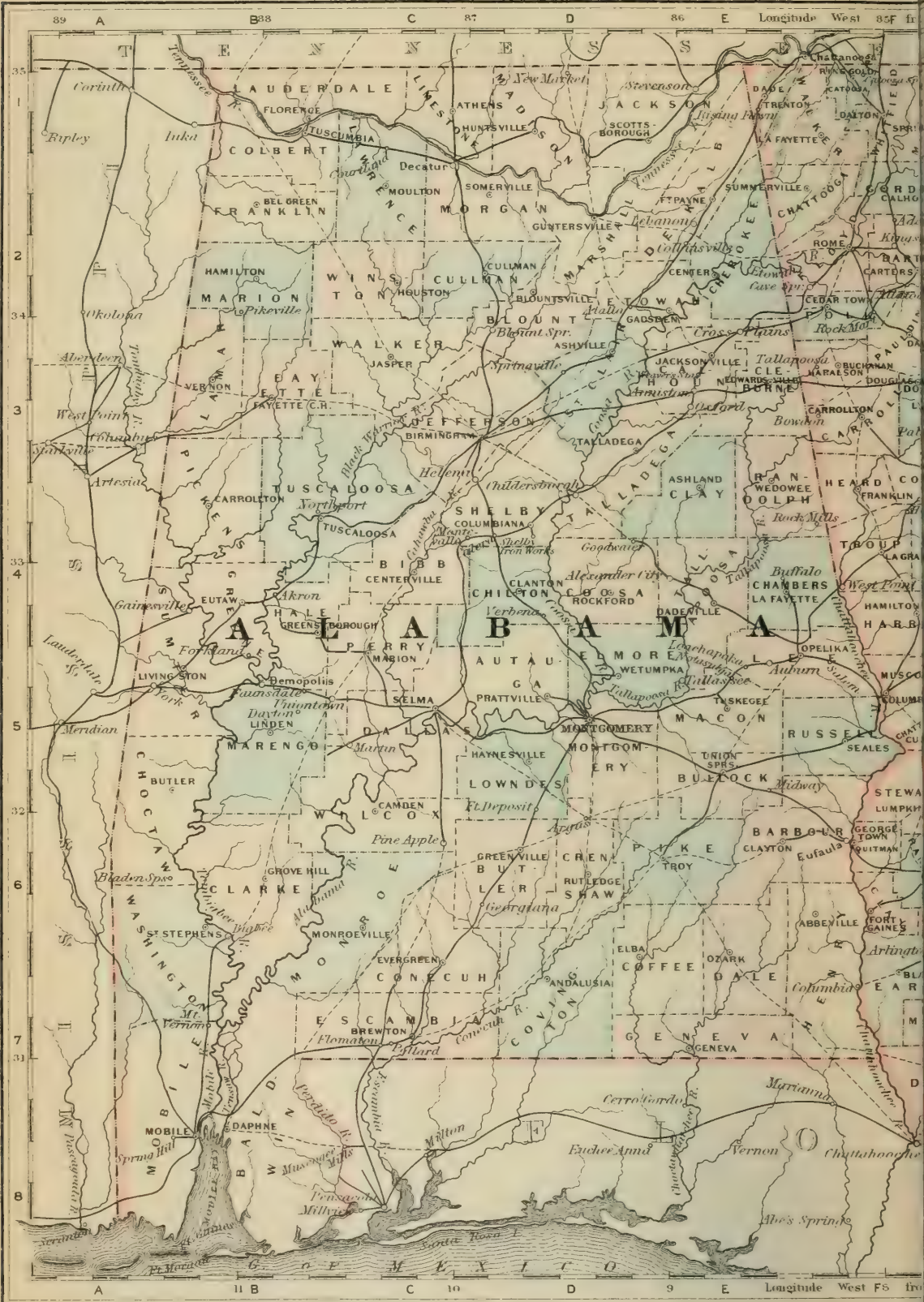
Albany, Mo. See APPENDIX.

Albany, city and important R. R. and commercial centre, cap. of N. Y. and of Albany co., on the W. bank of the Hudson River, 145 m. N. of New York, 164 m. (or 201 by R. R.) W. of Boston, lat. 42° 39' 49" N., lon. 73° 44' 33" W. It was first settled as a trading-post in 1614 by the Dutch, and was,

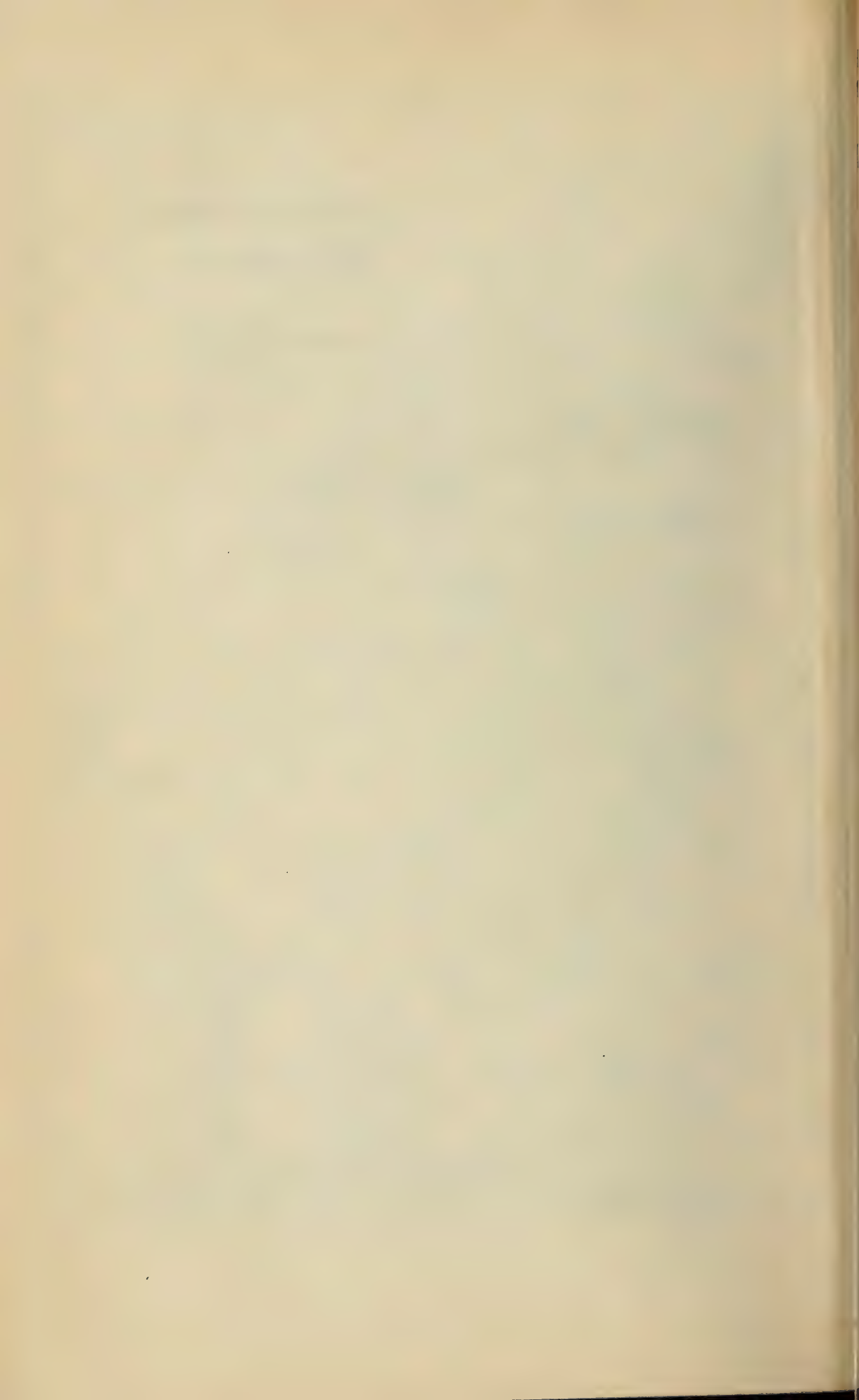


New State Capitol (Albany, N. Y.).

after Jamestown, the first place settled within the limits of the original thirteen States. Fort Orange, or Auranua, was built here in 1624. The village was called successively Beverwyck and Williamstadt. In 1664 it was called Albany, in honor of the Duke of York and Albany, afterward James II. It was incorporated as a city in 1886, and became cap. 1797.







Public Buildings and Institutions, Etc.—The prin. are the magnificent new capitol, commenced in 1871; will cost over \$10,000,000; the State museum of nat. hist. in the State hall, the new city hall, U. S. custom-house and P. O., a high school for both sexes, 1 boys' acad. and 3 for girls. State normal school, astronomical observatory, State agricultural museum, med. school and law school, and the penitentiary. A. contains Washington Park, 81 acres, and 4 m. N. is the beautiful Rural Cemetery, 281 acres. A. is near head of river navigation and at terminus of Erie and Champlain canals. The value of stoves manufactured in 1882 was \$3,500,000, and of the lumber trade, \$10,000,000. It is the central market for cattle from the W., for N. Y. and N. Eng. Pop. 1790, 3506; 1870 (new limits), 76,216; 1880, 90,758. [From orig. art. in *J. S. Life*, (ed. by H. A. Holmes, L.L.D.)

Albany, city, on R. R., cap. Linn co., Or., is situated on the right (E.) bank of the Willamette River, at the mouth of the Calapooya, 28 m. by rail S. of Salem. Pop. of precinct, 1870, 1892; of city in 1880, 1867.

Albany, Tex. See APPENDIX.

Albatross (*Diomedea*), a group of web-footed birds of the family Procellariidae, of great power of flight, and the largest of oceanic birds.

Albemarle (GEORGE MONK, DUKE OF, an Eng. gen., b. in Devonshire Dec. 6, 1608. He entered the army, served for many years in the Netherlands, and was afterward made gov. of Dublin. In 1644 he was committed to the Tower, but in two years was released, joined the Parliamentary army, and in reward for his services at the battle of Dunbar was made by Cromwell gen.-in-chief of the army in Scotland, of which he became gov. in 1654. After the death of Oliver Cromwell, Monk declared for Cromwell's son Richard. In Jan. 1660 he crossed the border at the head of 6000 men, and marched to Lond. He entered into negotiations with Charles II., whom he declared king May 8, and was rewarded by high offices, and created duke of Albemarle. In 1666 he commanded the fleet against the Dutch, was defeated by De Ruyter off Dunkirk, but gained a victory over him off North Foreland. D. 1670.

Albert I., king of Saxony, b. April 23, 1828; took part in the campaign in Schleswig-Holstein in 1849, was made lieutenant. In 1853 and general in 1857, commanded the Sax. army in the war against Prus. In 1866, received the command of the twelfth army corps after the admission of Sax. into the N. Ger. Union, took part in the battles of Rezonville, Gravelotte, and Sedan in the Ger.-Fr. war of 1870, and commanded the army of the Meuse. In July 1871 he became field-marshal of the empire, and soon after field-marshal of Rus. Succeeded to the throne Oct. 29, 1873.

Albert (in Ger., *Albrecht*) **I.**, archduke of Aust., b. 1248, was a son of the emp. Rudolf of Habsburg. He was elected emp. of Ger. in 1298, but his title was contested by Adolphus of Nassau, who had occupied the throne, and a battle was fought in which the latter was killed. Albert was assassinated May 1, 1308, by his nephew, John the Parricide.

Albert, archduke of Aus., a son of the emp. Maximilian II., b. 1559; was appointed gov. of the Netherlands in 1596 by Philip II. of Sp., whose daughter Isabella he married about 1598. In 1600 he was defeated by the Dutch under Maurice of Nassau. D. 1621.

Albert I., margrave of Brandenburg, surnamed THE BEAR, b. about 1106, was the founder of the House of Brandenburg. D. Nov. 18, 1170.

Albert (PRINCE), or more fully, **Albert Francis Augustus Charles Emmanuel**, prince of Saxe-Coburg-Gotha, and husband of Queen Victoria of G. Brit., b. near Coburg Aug. 26, 1819. He was carefully educated, and studied philosophy at Bonn; was married in 1840 to the queen, and in 1857 received the title of prince-consort. As the confidential adviser of the queen, he exercised great influence in public affairs. D. Dec. 14, 1861.

Albert Edward, prince of Wales, eldest son of Queen Victoria and heir-apparent to the Brit. throne, b. Nov. 9, 1841. He visited Amer. in 1860, and in 1878 made an extended tour in India. In 1863 he was married to the princess Alexandra of Den., who has borne to him three sons and three daughters.

Albert Lea, city, R. R. junc., and cap. Freeborn co., Minn. It is 128 m. W. of the Miss. River, and is beautifully situated between two lakes, one of which bears its name. Pop. 1880, 1966.

Alberti (LEON BATTISTA), an It. arch. and poet, b. 1404. He was employed as an arch. by Pope Nicholas V., completed the Pitti palace at Florence, and designed the ch. of St. Francis at Rimini. D. April, 1472.

Albert Nyan'za (written also **Albert N'Yanza**), a lake of equatorial Afr., about 300 m. long, and 92 m. wide where crossed by the equator. Somerset River, the outlet of Lake Victoria, falls into its N. extremity. The lake was discovered by Sir Samuel Baker in 1864, but has as yet been only partially explored.

Albertus Magnus (i. e. "Albert the Great"), sometimes called ALBERT DE BOLLSTADT, b. in Bavaria in 1193; in 1254 became provincial of the Dominican order, and in 1260 bishop of Ratisbon. He wrote many works on theol. and philos. D. 1280.

Albia, city and R. R. junc., cap. Monroe co., Ia., about 65 m. S. E. of Des Moines. The co. is mostly underlaid with coal of a good quality. Pop. 1870, 1621; 1880, 2435.

Albigen'ses [from *Albi'ga*, the Lat. name of Albi, a

town of Fr.], a name given to several sects of reformers in the S. of Fr. In 1208 Pope Innocent III. proclaimed a crusade against them. A war ensued, which lasted several years, in which they were subjected to great atrocities. The name disappeared early in the 14th century.

Albino [Port., from the Lat. *Albus*, "white"], a person who has a great deficiency or an absence of pigment in the hair, skin, and eyes. The complexion is very light, hair often snowy white, eyes red and usually weak. Albinism is frequently found in animals, and is often hereditary.

Albion, the ancient Celtic name of G. Brit. The name, said to signify "white island," is supposed by some to have been given on account of the chalky cliffs of Kent.

Albion, an important R. R. centre, Calhoun co., Mich., on the Kalamazoo River, 96 m. W. of Detroit. It is the seat of Albion Coll., under control of the M. E. Ch. Pop. tp. 1870, 3409; 1880, 2716; 1884, 3131.

Albion, Neb. See APPENDIX.

Albion, an important R. R. centre, cap. Orleans co., N. Y., 30 m. W. of Rochester. It is the seat of an acad. and Phipps Union Sem. Pop. 1870, 3322; 1880, 5147.

Albite [from the Lat. *albus*, "white," and the Gr. *lithos*, a "stone"], a silicate of alumina and soda, sometimes called soda feldspar. It is a constituent of granite, being associated with true feldspar. It also occurs in syenite and greenstone.

Albo'ni, (MARIETTA), an It. singer, b. at Cesena Mar. 10, 1824, was a pupil of Rossini. She performed with great applause in Paris and Lond. in 1846-47, and afterward visited the U. S. She was married to count de Pepoli.

Albrechtsberger (JOHANN GEORG), b. Feb. 3, 1736, became director of the choir of the Carmelites in Vienna, organist to the court in 1772, and musical director of St. Stephen's cathedral in Vienna in 1792. D. Mar. 7, 1809.

Albright (JACOB), an Amer. divine of the Luth. Ch., b. in Montgomery co., Pa., in 1759. He founded in 1808 the Evangelical Association. D. 1808.

Albumen [from *albus*, "white"], a Lat. term signifying the "white of an egg," denotes in chem. an organic compound of great importance, which, besides being the characteristic ingredient in the white of an egg, abounds in the serum of the blood, in chyle, lymph, the juice of flesh, and forms an important part of the skin, muscles, and brain. In Bright's disease it is found in considerable quantity in the urine. "It is obvious," says Liebig, "that A. is the foundation, the starting-point, of the whole series of peculiar tissues which constitute those organs which are the seat of all vital actions." A. is also found in small quantities in most vegetable juices. When heated to a temperature from 140° to 160°, it coagulates and becomes insoluble in water. It is also coagulated by alcohol and most of the acids.

Egg A. differs from serum A. by being precipitated by ether and by turpentine, and being almost insoluble in strong nitric acid. When injected into the veins of dogs or rabbits it passes into the urine unchanged, while serum A. injected in the same way does not appear in the urine at all.

Coagulated A. is white, opaque, and elastic. It dries to a brittle, translucent, horny mass, which when placed in cold water swells up to its original form.

The white of egg is recommended as an antidote to corrosive sublimate. A. is much used for clarifying syrups and other liquids. It is also used for preparing the surface of paper for photographic printing.

Egg and serum A. are now manufactured in large quantities by simply drying the natural fluids in thin layers in warm air, taking care that the temperature shall not be so high as to coagulate the A., and thus render it insoluble. The chief application of this A. in the arts is in calico-printing. It is employed in fastening certain colors upon the fibres of cotton cloth, especially pigments such as ultramarine and the aniline colors. C. F. CHANDLER.

Albuminoids, or **Pro'teids**, an extensive class of organic bodies found in animals and plants. They form the chief constituents of blood, muscles, nerves, glands, and other organs of animals; and though present in plants in much smaller proportions than cellulose, starch, sugar, etc., they still play a most important part in plant life. Their exact constitution has not been determined. Analysis shows them to contain carbon, hydrogen, nitrogen, oxygen, and sulphur. They are amorphous, more or less soluble in water, insoluble or nearly so in alcohol and in ether, soluble in excess of strong acetic acid, in alkalies, and in strong mineral acids. Nitric acid produces yellow xanthoproteic acid. From their solutions they are precipitated by excess of mineral acids, by potassic ferrocyanide with acetic or hydrochloric acid, by acetic acid in presence of a considerable quantity of alkaline or alkaline earthy salt, gum-arabic, or dextrine, by mercuric nitrate, Millon's reagent. The most important are albumen, globulin, caseine, fibrine, and the peptones. C. F. CHANDLER.

Albuminuria. See BRIGHT'S DISEASE.

Albuquerque, al-bo-ker'ka. **Albuquerque**, d' (AFONSO), surnamed THE GREAT and THE PORTUGUESE MARS, a Port. gen., b. near Lisbon in 1452. He was appointed viceroy of the Indies in 1509, took Goa in 1510, and conquered Malacca in 1511. In 1513 his fleet entered the Red Sea, which had never before been navigated by Europeans, and captured Ormuz in 1515. D. at Goa Dec. 16, 1515.

Albuquerque, New Mexico. See APPENDIX.

Albur'num [from the Lat. *albus*, "white"] or **Sapwood**, is that part of the wood of exogenous trees which is most recently formed and is contiguous to the bark. It consists partly of tubes through which the sap ascends, and is of a white or pale color, whence its name is derived. It gradually hardens with age, and is converted into duramen.

Alce'us [Gr. *Ἀλκαίος*], a celebrated Gr. lyric poet, b. at Mitylene, flourished about 600 B. C. He wrote in the Æolic dialect, and invented the metre called Alcaic. His poetry is impassioned and full of enthusiasm. His works are lost except small fragments.

Alca'ic Me'tre, in Gr. and Lat. poetry, so named from Alcaeus. The greater alcaic verse consists of two iambic ft., a long catalectic syllable, a choriambus, and an iambus. The lesser alcaic is two dactyls, followed by two trochees.

Alca'ntara, a town of Sp., situated on the left bank of the Tagus, near the Port. boundary. Here are ruins of a grand bridge built by the emp. Trajan in 103 A. D., of which a triumphal arch forty ft. high still remains. The duke of Alva here defeated the Port. in a great battle on Aug. 25, 1580. Pop. 4200.

Alcántara, Order of, also called the **Order of Saint Julian**, a religious order of Sp. knighthood, founded in 1156 at Alcántara for the defence of the Chrs. against the Moors. In 1493 the office of grand-master of this order was united to the Sp. crown. Their crest was a pear tree.

Alces'tis (Gr. Ἀλκίπυς), in classic mythology, a daughter of Pelias and the wife of Admetus, king of Phœre in Thessaly. The poets feigned that she prolonged the life of her husband by suffering voluntary death as his substitute, and was rescued from Hades by Hercules.

Al'chemy is commonly understood to mean the occult science or art of transmuting the baser metals into gold. The origin of A. seems to be connected with the notion that the manifold forms of matter have a common basis, and that the individual properties of material bodies are due to formative forces separable from this common substratum. Hence it followed that if this common substratum of all could be reached, and the special "form" of gold or other precious substances discovered and got under control, these could be produced at will. In like manner, if the vital principle or form of the bodily organization could be found and controlled, the tendencies to disease and decay in the bodily organization could be resisted. Hence the search after the elixir of life. Liebig says that "among the alchemists there was always to be found a nucleus of genuine philosophers, who were often deceived in their theoretical views; whereas the gold-makers, properly so called, knowingly deceived both themselves and others."

M. B. ANDERSON.

Alci'biades [Gr. Ἀλκιβιάδης], an Athenian politician, b. about 450 B. C. He was educated at the house of his relative, Pericles, and inherited a large estate. In 420 B. C. he became leader of the democratic party and an opponent of Nicias, who advocated peace with Sparta. Having induced the Athenians to send a great expedition (in 414 B. C.) against Syracuse, the ally of Sparta, he was chosen to command it, in conjunction with Nicias and Lamachus. Soon after the fleet had reached Sicily, A. was recalled to defend himself against a charge of sacrilege, but he escaped, and in his absence was condemned to death by the people of Athens. He finally took refuge with the Per., but in 411 B. C. again commanded an Athenian fleet, winning two victories over the Spartans, and regaining his popularity at Athens. He was removed from command, and went into exile in Phrygia, where he was assassinated 404 B. C.

Al'eiphron [Ἀλκιφρων], a Gr. epistolary writer, who is supposed to have lived 180-200 A. D.

Al'e'man, al'k'man [Ἀλκιμάν], a celebrated Spartan lyric poet, b. at Sardis, was originally a slave. He flourished about 650 B. C., and became a free citizen of Sparta. Only fragments of his works are extant.

Al'eo, a kind of dog, having a small head and pendulous ears, found wild in Mex. and Peru. It is not known whether it has escaped from domestication or is a native of these countries.

Al'cohol [from the Ar. definite article *al*, "the," and *kohol*, originally a "powder of antimony," used for painting the eyebrows, afterward applied to anything very subtle], a limpid, colorless liquid, which has a hot, pungent taste, and is the essential principle of all spirituous liquors and intoxicating drinks. It is the product of the fermentation of sugar or saccharine substances, and is extracted by distillation from spirituous liquors, such as whiskey and brandy, which contain nearly 50 per cent. of water. Pure A. is very inflammable, has a strong affinity for water, is a powerful solvent, boils at 173° F., and has never been congealed by the greatest degree of cold that could be produced. It is composed of carbon, oxygen, and hydrogen, the proportions being about 52 per cent. of the first, 35 of the second, and 13 of the last. In med., A. is used as a stimulant or excitant, mostly in the form of wine, brandy, or whiskey. In pharmacy, A. is extensively used as a solvent; its solutions are called tinctures. The strongest A. that can be procured is termed absolute A. or anhydrous A.; it is prepared by removing the last few per cent. of water by quicklime.

C. F. CHANDLER.

Al'cott (AMOS BRONSON), an Amer. philos., b. at Wolcott, Conn., Nov. 29, 1799. He has acquired reputation as an educational reformer, but is chiefly distinguished for his conversational powers. He wrote *Tablets* and *Concord Days*.—His daughter, LOUISA MAY ALCOCK (b. in 1833), wrote *The Old-Fashioned Girl*, *Little Women*, and *Work*.

Alcott (WILLIAM ALEXANDER), M. D., an Amer. author, b. at Wolcott, Conn., in 1798. He contributed to journals, lectured on education, hygiene, and other subjects, and wrote *Moral Reform*. D. Mar. 29, 1859.

Alcuin, or **Al'ewin**, al'kwin, an Eng. prelate and scholar, whose full name was FLACCUS ALBINUS ALCUINUS, b. at York about 735. He went in 782 to the court of Charlemagne, and became his confidential friend and adviser. He is said to have founded schools at Aix-la-Chapelle and Paris. In 796 he was appointed abbot of St. Martin at Tours. He is regarded as the most learned man of his age. D. 804.

Alde'baran [from the Ar. *al*, "the," and *dabaran*, "following," because this star follows the Pleiades], the name of a star of the first magnitude in the constellation of Taurus, otherwise called a Tauri. It is the brightest star of a group called the Hyades.

Al'dehyde [from *al*, first syllable of *alcohol*, and *dehyd*, first two of *de-hydrogenatus*, "deprived of hydrogen"],

compounds formed by depriving alcohols of hydrogen. The term A. was first applied to acetic A., produced from common alcohol by limited oxidation, effected by (1) imperfect combustion, as when a spirit-lamp burns out for want of alcohol; (2) by the action of potassic dichromate or ferrous sulphate; (3) by the action of chlorine and water.

A. possess three characteristic properties: (1) they unite with alkaline bisulphites; (2) they unite with aniline; (3) when fused with caustic potash they give off hydrogen, forming the potassic salt of the corresponding acid.

C. F. CHANDLER.

Al'den (JAMES), an Amer. naval officer, b. in Me. in 1810, entered the navy as midpn. in 1828; served in the Mex. war, and throughout the civil war, especially in the capture of New Orleans and the fight in Mobile Bay. In 1869 he was made chief of the bureau of navigation; in 1871 became rear-admiral, and was placed in command of the European station. D. Feb. 6, 1877.

Alden (JOHN), b. in 1599, one of the Pilgrim Fathers who came over in the Mayflower in 1620. He was a magistrate of Plymouth Colony for more than 50 years. D. Sept. 12, 1689.

Alden (JOSEPH), D. D., LL.D., b. at Cairo, N. Y., Jan. 4, 1807; grad. at Union Coll. and Princeton, was prof. in Williams Coll. 1835-52, in Lafayette Coll. 1852-57, pres. of Jeff. Coll. 1857-67, and prin. of the N. Y. State Normal School at Albany 1867-82.

Al'der [Lat. *Alnus*], a genus of trees and shrubs of the natural order of Betulaceæ or Amentaceæ. The wood of the common A. of Europe (*Alnus glutinosa*) is used by turners and joiners, affords good charcoal for the manufacture of gunpowder, and is valuable for mill-wheels and the piles of bridges. The *Alnus cordifolia*, a native of It., is a large and beautiful tree. The alders of the Eastern U. S. are shrubs or small trees, but *Alnus Oregona* of the W. coast grows to the height of 60 to 70 ft.

Alderney, al'der-ne, or **Aurigny**, an island in the Eng. Channel, 7 or 8 m. from Cape la Hague (Fr.), belongs to Eng. It is about 4 m. long, and less than 2 m. wide. Guernsey, another of the Channel Islands, is about 15 m. from this place. The people of A. are mostly of Fr. extraction. This island produces a celebrated breed of small cows. Pop. 2039.

Al'dine Editions, the name given to the editions of Gr. and Rom. classics issued by Aldus Manutius and his descendants in Venice.

Ald'rich (HENRY), D. D., an Eng. composer, b. at Westminster in 1647. He was one of the ablest champions of Protestantism in the reign of James II., and became dean of Christ ch., Oxford, in 1689. He composed anthems which are used in the Eng. cathedrals. D. Dec. 14, 1710.

Aldrich (NELSON W.). See APPENDIX.

Aldrich (THOMAS BAILEY), an Amer. author and journalist, b. at Portsmouth, N. H., Nov. 11, 1836. Wrote *Marjorie Daw*, and in 1881 became ed. of the *Atlantic Monthly*.

Aldrovan'dus (ULYSSES), an It. naturalist, b. at Bologna Sept. 11, 1522. He grad. as doctor of med. in 1553, and became prof. of nat. hist. at Bologna in 1560. D. Nov. 10, 1607.

Ale, a sort of beer, a fermented liquor produced from malt. (See BEER, by PROF. C. F. CHANDLER, LL.D.)

Ale'do, on R. R., cap. Mercer co., Ill., 120 m. N. W. by N. from Springfield. It is the seat of a coll. Coal is found in the vicinity. Pop. 1870, 1076; 1880, 1492.

Aleman'ni (i. e. "all men"), the name of certain Ger. tribes who formed a confederacy against the Rom. about 200 A. D., and at that time lived on the Main. They invaded Gaul in the reign of Julian the Apostate, who gained a victory over them in 357 A. D. Having been defeated by Clovis in 496, their confederacy was dissolved. From this word is derived the Fr. *Aleman*, signifying "German."

Alembert, d' (JEAN LE ROND), a Fr. math., b. in Paris Nov. 16, 1717. Being an illegitimate son of noble parents he was abandoned by his mother; he was nursed by the wife of a glazier, with whom he lived 40 years, receiving a moderate allowance from his father, entering Mazarin Coll. in 1730. He was admitted into the Acad. in 1741, and in 1743 pub. the *Traité de Dynamique*. He was associated with Diderot in editing the Fr. *Encyc.*, and in 1772 became sec. of the Fr. Acad. D. Oct. 29, 1783.

Alemb'ic [from the Arabic article *al*, and the Gr. ἀμβέξ, a "cup or pot"], an apparatus formerly used by alchemists and chemists in the process of distillation and sublimation. It has been superseded by the retort and receiver.

Alep'po, called by the Arabs **Ha'leb** (anc. *Chal'lybon* and *Bero'a*), a city of Syria, about 55 m. E. of Antioch. It is visited by numerous caravans. A large part of it was destroyed by earthquake in 1822. Pop. about 70,000.

Alessan'dria, a city of It., 46 m. S. E. of Turin; 2 m. S. E. is the battle-field of Marengo. The citadel is one of the strongest fortresses in Europe. Pop. of commune, 1881, 62,464.

Aleu'tian (or **Aleu'tan**) **Islands**, a group of 150 or more small islands, sometimes called the **Catharine Archipelago**, in the N. Pacific, extending from Alaska toward Kamchatka. They have some active volcanoes, and belong to the U. S. Pop. about 8000 Esquimaux.

Ale'wife [supposed to be a corruption of the Indian name *aloo'*] (the *Chupea*, or *Pomolobus pseudohorengus*), an anodorous Clupeid, allied to the herring and the shad; is found along the Atlantic coast of the U. S.

Alexan'der [Gr. Ἀλέξανδρος], surnamed the GREAT, king of Macedon, b. 356 B. C. His father was King Philip, and on the mother's side it was claimed he was descended from Achilles. He was a pupil of Aristotle. At 18 he distinguished himself at the battle of Charonea. In 336 he succeeded his father on the throne. War having broken out with Persia, he was in 334 B. C. made generalissimo of the Grecian army, defeating the Pers. at the battle of Granicus. In 333 he again defeated them on the river Issus, the Per. king Darius and his family being made prisoners. He laid siege to Tyre, which capitulated after a siege of 7 months, and in 331 invaded Egypt, where he founded the city of Alexandria. The Per. king had meanwhile collected an army said to have numbered more

than 1,000,000. Alexander, with not more than 50,000, utterly routed him (Oct. 331 B. C.) at Arbela. Having conquered Media and Bactria, he marched to India, where in 327 B. C. he defeated King Porus on the Hydaspes, and had advanced as far as the Hyphasis, when his troops refused to proceed farther. He sent his fleet back under command of Nearchus, while he with his army marched overland through what is now Beloochistan, suffering the utmost hardships. He was meditating fresh conquests when he died suddenly, in the 33d year of his age, at Babylon, 323 B. C. [From orig. art. in *J. S. Univ. Cyc.*, by J. THOMAS, LL.D.]

Alexander, the name of eight popes—I. SAINT ALEXANDER, became pope 108, d. 119.—II. ANSELMO BADAGIO, elected 1061; declared William of Normandy heir of the Eng. crown. D. 1073.—III. ROLANDO BANDINELLI, elected 1159; was engaged in contests with Frederick Barbarossa and others, was twice compelled to leave Rome, but in the end worsted all his enemies. He canonized Thomas à Becket, who had been murdered in Eng. D. Aug. 1, 1181.—IV. RINALDO DI ARNAGNI, elected 1254, had a troubled pontificate; caused the inquisition to be established in Fr., endeavored to unite the Gr. and Rom. churches, and to effect a new crusade. D. May 12, 1261.—V. PIETRO FILARGO, elected 1409; was originally a beggar, was educated by charity, resided at Bologna, not at Rome. D. May 3, 1410.—VI. RODERIGO LENZOLI, a Spaniard, took the name of BORGIA, elected 1492; was notorious for his vices, and was the father of several illegitimate children, among whom were Cæsar and Lucretia Borgia. D. Aug. 18, 1503.—VII. FABIO CHIGI, elected 1655; endeavored to effect reforms in ch. discipline, and adorned Rome with architectural works. D. May 22, 1667.—VIII. PIETRO ORTOMBONI, a Venetian, elected 1689; condemned the four articles of the Gallican assembly, and aided in the wars against the Turks. D. Feb. 1, 1691.

Alexander I., king of Scot., began to reign in 1107. D. in 1124, and was succeeded by his brother, David I.—ALEXANDER II., b. 1198, succeeded his father, William the Lion, in 1214. He married a sister of Henry III. of Eng. in 1221. D. 1249.—ALEXANDER III., b. 1241, son of the preceding, became king in 1249. He married, in 1251, Margaret, a daughter of Henry III. of Eng. He fell with his horse over a precipice, and was killed in 1286.

Alexander, the name of three emps. of Rus.—I. PAVLOVITCH ("son of Paul"), b. at St. Petersburg Dec. 23, 1777, succeeded his father, Paul I., who was murdered, Mar. 23, 1801. In 1805 he joined a coalition against Napoleon, by whom he was defeated at Austerlitz (Dec. 2). In 1807 peace was made by the treaty of Tilsit, and Alexander entered into alliance with Napoleon, afterward declaring war against G. Brit. In 1811 he broke with the Fr. emp., and joined the coalition against him. In 1812 Napoleon invaded Rus., took Moscow, but was compelled to retreat, his army being almost annihilated. In 1815 A., with the other allied sovereigns, entered Paris, and afterward joined Aus. and Prus. in forming the "Holy Alliance." His later years were passed in gloom and despondency, while he exerted himself to put down all liberal institutions in Europe. D. at Taganrog, in the Crimea, Dec. 21, 1825, and was succeeded by his brother Nicholas.—II. NICOLAEVITCH ("son of Nicholas"), b. Apr. 29, 1818, succeeded his father Mar. 2, 1855, during the Crimean war. Peace was concluded in Mar. 1856, and he set about various reforms, notable among which was the emancipation of more than 20,000,000 serfs. In 1876 he made war upon Tur., which was brought to a successful close in 1878. He became obnoxious to the "nihilists," and several attempts were made to assassinate him, previous to the successful one. D. in St. Petersburg Mar. 13, 1881.—III. ALEXANDROVITCH ("son of Alexander"), son of the preceding, b. Mar. 10, 1845, married in 1866 to the princess Dagmar of Den. Has three sons, of whom Nicholas (b. May 18, 1868) is heir-apparent to the crown.

Alexander (ARCHIBALD), D. D., b. near Lexington, Va. Apr. 17, 1772. He became pres. of Hampden-Sidney Coll. in 1796, and pastor of a Presb. ch. in Phila. in 1807. In 1812 he was chosen the first prof. of the Theol. Sem. of Princeton, N. J., then just founded. He was distinguished as a pulpit orator and as a writer on theol. He wrote *Outlines of the Evidences of Christianity*. D. Oct. 22, 1851.

Alexander (BARTON STONE), b. in Ky. in 1819, grad. at West Point; served as engineer at various places until 1861, and during the civil war in the peninsular campaign and in the defenses of Wash.; brig.-gen. in 1865. D. Dec. 16, 1878.

Alexander (JAMES WADDELL), D. D., b. near Gordonsville, Va., Mar. 13, 1804, grad. at Princeton in 1820, and became in 1833 prof. of rhetoric at the Coll. of N. J. From 1844 to 1849 he was pastor of the Duane street Presb. ch. in N. Y.; from 1849 to 1851 prof. of ch. hist. in Princeton Theol. Sem. In 1851 he took charge of the Fifth avenue Presb. ch. in N. Y. Wrote *Discourses on Christian Faith and Practice*, and contributed to reviews. D. July 31, 1859.

Alexander (JOSEPH ADDISON), D. D., b. in Phila. Apr. 24, 1809. Grad. at the Coll. of N. J. in 1826, was chosen adjunct prof. of Lat. in 1833. In 1838 he went into the Theol. Sem. as associate prof. of Oriental and biblical lit., subsequently filling other chairs. Wrote commentaries. D. Jan. 28, 1860.

Alexander (STEPHEN), LL.D., b. at Schenectady Sept. 1, 1806, grad. at Union Coll. in 1824; prof. of astron. at the Coll. of N. J. 1840-77. He acquired distinction as a writer on astron. D. June 26, 1883.

Alexander (WILLIAM), styled LORD STIRLING, an Amer. gen., b. in N. Y. in 1736. He claimed the Scottish earldom of Stirling, but did not succeed in obtaining the estate belonging to it. In the Revolution he served with distinction at L. I., Germantown, and Monmouth, and obtained the rank of maj.-gen. D. Jan. 15, 1783.

Alexander John I., prince of Roumania, b. Mar. 20, 1820; in 1859 was unanimously chosen prince of Moldavia and Wallachia, principalities which were in 1861 united as Roumania. He was forced to resign in 1866. D. 1873.

Alexander Karageorgevitch, the first prince of Servia, a son of CZERNY, GEORGE (see see), b. Oct. 11, 1806.

was elected prince of Servia in 1842. Rus. protested against his election, but Mar. 27, 1843, he was again elected by a unanimous vote. He became obnoxious to the people, and was deposed Dec. 11, 1858. In 1868 he was accused of complicity in the murder of Prince Michael, his successor, and was sentenced in 1871 by the authorities of Aus., where he had resided since his deposition, to eight years' imprisonment and the costs.

Alexander Nev'ski (or Nev'skoi), a Rus. prince, b. in 1219; gained in 1240 a signal victory over the Swedes on the Neva, hence his surname. On the death of his father, about 1246, he became grand duke of Vladimir. By the Russians he is regarded as a saint. The monastery founded by Peter the Great, in honor of him at St. Petersburg, is one of the most extensive insts. of the kind in the world, forming almost a city of itself. D. 1263.

Alexander of Aphrodisias, a celebrated Gr. commentator on Aristotle, lived about the close of the second century after Chr.

Alexander of Hales. See HALES.

Alexander Severus, a Roman emp., b. about 205 A. D. His original name was ALEXANDUS BASSIANUS, but he assumed the name M. AURELIUS ALEXANDER, and added SEVERUS afterward. In 222, upon the death of his cousin, the emp. Elagabalus, he was proclaimed emp. In 232 he gained a great victory over the Pers.; in 234 he marched into Gaul; was murdered in 235.

Alexandria [classical accentuation, *Alexandri'a*; Gr. Ἀλεξάνδρεια], a city of Egypt, named from Alexander the Great, by whom it was founded in 332 B. C. It was situated on a low and narrow tract which separates Lake Mareotis from the Mediterranean, near the western mouth of the Nile, and 117 m. N. W. of Cairo. It became the cap. of the Grecian kings who reigned in Egypt, and one of the most populous and magnificent cities in the world. Here was founded the greatest library of antiquity (see ALEXANDRIAN LIBRARY), and the celebrated Museum. It is supposed that during its greatest prosperity it had 600,000 inhabs., a majority of whom were Greeks and Jews. It was captured by the Saracen caliph Omâr about 640, and then its prosperity declined. The discovery of a passage to India by the Cape of Good Hope (1497) aided in its ruin, and the pop. in 1778 was only 6000. The modern city is built near the site of the anc., and is connected with Suez by a R. R. Some of the new streets present the aspect of a European city, but in the Turkish quarter the streets are narrow and dirty. In consequence of steam navigation, A. has again become a great emporium of the commerce between Europe and India. July 11 and 12, 1882, the city was bombarded by the Brit., and the best part of it was reduced to ruins. Pop. 208,775.

Alexandria, Dak. See APPENDIX.

Alexandria, on R. R. cap. Rapides parish, La., is on the S. bank of the Red River, 350 m. by water N. W. of N. O. Here is a convent of the Sisters of Mercy. It has two weekly packets to N. O.; Shreveport, Jefferson, Tex., and other boats stop here. Pop. 1870, 1218; 1880, 1800.

Alexandria, on R. R., cap. Douglas co., Minn., 140 m. W. N. W. of St. Paul. Pop. of tp. 1870, 503; 1880, 139, v. 1355.

Alexandria, city and important R. R. centre, cap. Alexandria co., Va., situated on the right bank of the Potomac, 7 m. below Wash. The river is here 1 m. wide, and forms a good harbor, which is deep enough for the largest ships. Pop. 1870, 13,570; 1880, 13,659.

Alexandrian Library, the largest and most celebrated library of antiquity, was founded by Ptolemy Philadelphus, king of Egypt, about 275 B. C. It is said to have been partially destroyed by fanatical Chrs. about 395 A. D. According to some authorities, it was burned in 642 A. D. by order of the caliph Omâr, who argued that if books agree with the Koran they are unnecessary, if they differ they should be destroyed.

Alexandrian (or **Alexandrine**) **School** is the name given to a certain type of thought and culture which began to prevail in Egypt about 300 B. C. The intercourse of the Jewish and Gr. colonists who had previously settled in that country had given rise to a blending of the peculiar religious ideas of each. The Gnostics, whose system was a mingling of Oriental with Chr. thought, originated chiefly in Alexandria; and Philo-Judeus, generally regarded as the founder of Neo-Platonism, was also a native of that city. Athanasius, Gregory of Nazianzus, and other eminent Chr. fathers favored the A. S., and adopted to a certain extent the doctrines of the Neo-Platonists. This school was likewise renowned for the culture of math. and physical science.

Alexis (or **Alexis**) **I.**, COMNENUS, emp. of Constantinople, b. in 1048. He was proclaimed emp. by his soldiers about 1080, in place of Nicephorus, who was then deposed. The first crusade occurred in his reign. D. 1118.

Alexis PETROVITCH, son of Peter the Great of Rus., b. Feb. 18, 1690. Having incurred the displeasure of his father he fled to Naples, was brought back and condemned to death. D. in prison, probably murdered, July 7, 1718.

Alfieri (VITTORIO), COUNT, an It. poet, b. at Asti Jan. 17, 1749; left school at 15, and entered upon a life of dissipation; travelled over Europe, and in 1775 put forth his tragedy of *Cleopatra*. His productions are very numerous, consisting of dramas, odes, and political essays. He wrote *Ottavia* and *Saul*. D. Oct. 8, 1803.

Alfonso (or **Alphon**) **sine** **Tables**, astronomical tables prepared by the order of Alfonso X. of Castile and Leon, at a cost of about \$800,000. They were pub. in 1252, were first printed in 1483, and were the first printed tables that ever appeared.

Alfonso, or **Alon** **zo**, the name of seventeen kings over portions of Sp. Among them are ALFONSO III. of Asturias, "the Great," began to reign in 866; made conquests from the Moors. D. 901.—ALFONSO I. of Castile and VI. of Leon, "the Brave," son of Fernando I., b. 1030; aided by the Cid, he won many victories over the Moors. D. 1109.—ALFONSO VIII. of Castile (also called ALFONSO III.),

b, about 1155; in 1212 won a great battle over the sultan Mohammed An-Nâsir. D. 1214.—**ALFONSO X.** "the Wise," king of Leon and Castile, b. 1221. His reign was a troubled one; in it the Bible was translated into Sp. D. Apr. 4, 1284.—**ALFONSO XI.** of Castile, b. 1311; defeated the Moors at Tarifa in 1340. D. 1350.—**ALFONSO I.** of Aragon and Navarre, claimed also the crowns of Leon and Castile in right of his wife, and is sometimes counted as Alfonso VII.; won victories over the Moors, but was finally defeated and slain in battle with them. D. 1314.—**ALFONSO XII.**, present king of Sp., son of Queen Isabel, b. Nov. 28, 1857, proclaimed king Dec. 31, 1874; married, 1878, to a daughter of Duc de Montpensier, and in 1879 to Archduchess Marie Christina of Aus.

Alfonso I. of Naples and Sicily, "the Magnanimous," son of Fernando I. of Aragon, b. 1390; became king of Aragon in 1416; Joanna II., queen of Naples, dying in 1435, the crown was claimed by Alfonso and by René of Anjou, the former succeeding in 1442. D. June 27, 1458.

Alfonso [Port. *Afonso*], the name of six kings of Port., among whom are **ALFONSO I.**, the first Port. king, a son of the count of Burgundy, b. about 1100; in 1139 he defeated the Moors at Ourique, and assumed the title of king. D. Dec. 6, 1185.—**ALFONSO VI.**, "the African," b. 1432. Guinea was discovered and colonized during his reign. He made pretensions to the crowns of Leon and Castile, but in 1476 was defeated by Ferdinand the Cath.; renounced his claim in 1479, and proposed to enter a monastery. D. 1481.

Alford (HENRY), D. D., an Eng. theol., b. in Lond. in 1810. He became a fellow of Trinity Coll., Cambridge, in 1834, incumbent of Que. street chapel, Lond., in 1853, and dean of Canterbury in 1856. He pub. a valuable ed. of the *Greek New Testament* and other works. D. Jan. 12, 1871.

Alfred, surnamed **THE GREAT**, written also **Elfred**, **Alured**, or **Alvred** [Lat. *Ælfredus*], king of the West Saxons in Eng., was b. in Berkshire in 848 or 849. He was a younger son of Ethelwolf, and succeeded his brother Ethelred in 871. In the preceding reign the kingdom had been invaded and ravaged by the Danes. After the accession of A. these incursions were continued, and nearly all of the kingdom was conquered. A. was forced to conceal himself in the hut of a cowherd. Having raised a small army, he routed the Danes at Eddington in 878. Soon after the Dan. king surrendered. A. founded or improved the Brit. navy, rebuilt cities and forts, established schools, compiled a code of laws, and reformed the administration of justice. He was distinguished as a scholar and patron of learning. About 886 he was recognized as the sovereign of all Eng. His kingdom was again invaded in 894 by an army of Northmen, who were defeated and driven away by him. D. 901.

Alfred Centre, N. Y. See APPENDIX.

Algae, al-jē [the plu. of Lat. *algæ*, "a sea-weed"], the scientific name of the sea-weeds, etc., a division of cryptogamous plants belonging to the class Thallophytes, and comprising many species which grow in salt or fresh water, and are greatly diversified in form, size, and structure. Some are too small to be seen by the naked eye, while the stem of the "giant kelp" of the W. coast of Amer. sometimes attains a length of from 1000 to 1500 ft. Having no true roots, they sometimes adhere to rocks or the sea bottom, and sometimes they float on the surface. Navigators sometimes meet with masses of gulf-weed (*Sargassum*) many m. in extent. An area of this kind in the Atlantic is said by Maury to be as large as the Miss. Valley. There are several such areas in the ocean, called **SARGASSO SEAS** (which see). **Algae** are cellular in structure, are useful as manure, and some species, like Irish moss, are used as food. Kelp or barilla, made by burning sea-weeds and other marine plants, yields soda and iodine. The **Algae** proper are divided into three groups, each containing many orders.

Algebra [Arabic, *al* and *gabran*, "reduction of parts to a whole"], a branch of analysis whose object is to investigate the properties and relations of numbers by means of symbols. The numbers to be considered are represented by letters, or by combinations of letters and figures, called *symbols of quantity*; the operations to be performed are represented by signs, called *symbols of operation*; and the relations between the numbers are expressed by conventional signs and combinations of signs, called *symbols of relation*. The symbols belonging to these three classes are the elements of the *algebraic language*. The relations between the numbers under consideration, when expressed in the algebraic language, give rise to equations, or to proportions which are but special forms of equations, and these are operated upon in accordance with the rigid rules of logic. The results, when properly interpreted, make known the required properties and relations. In consequence of its generality, this mode of treating numbers has sometimes been called *Universal Arithmetic*.

The operations that can be expressed by addition, subtraction, multiplication, division, raising to powers denoted by constant exponents, and extraction of roots indicated by constant indices, are called *algebraic*, and the corresponding branch of A. is called *Elementary A.* When the relations treated of cannot be so expressed, as for instance in the investigation of logarithms, the operations are said to be *transcendental*, and the corresponding branch of A. is called *Transcendental A.* W. G. PECK.

Alger (WILLIAM ROUNSEVILLE), a Unit. clergyman, b. at Freetown, Mass., Dec. 11, 1823; grad. at Harvard Theol. School in 1847, was pastor in Boston and N. Y., and subsequently in Denver, Col. Wrote *Hist. of the Doctrine of a Future Life* and other works.

Algeria, a Fr. colony in N. Afr. between the parallels of 30° and 37° N. lat. and the meridians of 2° W. and 10° E. lon. Area, 257,487 sq. m. Boundaries, Mediterranean on the N., Tunis and Tripoli on the E., Sahara S., Morocco W.

Topography.—Coast high and steep, with few good harbors; near the coast, Little Atlas Mts.; mountainous region with coast streams and deep, fertile valleys. Back of these mts. an extensive arid plateau 2000 to 3000 ft. high, declining

toward the Sahara. Between this plateau and the desert, main Atlas chain, with wooded slopes. No large rivers.

Climate warm, but very uniform. Rainy season from Sept. to Apr., but rains not constant. Summer almost rainless. Heat not as intense as in some countries, but protracted.

Soil and Vegetation.—The soil of the valleys and the Medjidjah, or N. plain, is very fertile. Near the coast market vegetables are grown largely and exported to Europe. The valleys and plain produce wheat, barley, and tropical fruits. The grasses and reeds of the Shott or great plateau afford rich pasture to the Arab or Berber horses, cattle, asses and mules, and sheep. The esparto grass, extensively used in paper-making in Eng. and Fr., grows all over this plateau. The forests are of different species of palm, cedar, and cork-oak. The date-palm ripens its fruit in the S. The wild beasts, except the hyena and jackal, are mostly exterminated. The minerals are iron, lead, copper, marble, sulphur, and salt.

Commerce.—In 1882 the imports were \$82,000,000, and the exports about \$30,000,000. Of the exports more than \$2,500,000 were esparto grass. In 1882 there were 951 m. of railway and 3624 m. of telegraph in A.

History.—Under the control of Carthage, and inhabited by Numidians and Moors, till the fall of Carthage, 146 B.C. A Roman colony and the granary of Rome thenceforward till its conquest by Vandals, and later by Saracens, and the suppression of Christianity by the Moslem sword in the 9th century. In 1505 the Ameer called in the pirates of Barbarossa to his help, and they became masters of the country, and acknowledged the suzerainty of Tur. For 3 centuries the Algerine pirates were the terror of S. Europe and the Mediterranean. In 1705 they renounced allegiance to Tur., and their piracies grew more audacious for the next hundred years. Partially checked by Napoleon I., they returned to their bloody deeds after the peace, but in 1815 were compelled to sue for peace by a U. S. squadron. After a time they became bolder than ever, and Fr. resolved to chastise them. After a three years' blockade of the ports of A. the Fr. bombarded and captured Algiers July 5, 1830. The country was under Fr. military control for 40 yrs., and there was constant fighting with the Arabs and Kabyles. It was generally believed that the Fr. rule had been a failure, and that the colony had cost much more than Fr. would ever receive for it, but in 1871, after the suppression of a serious rebellion, A. was put under a civil administration. There has been since that time some trouble with the native tribes, but as a whole the civil administration has proved a success. A standing army is still maintained there of 60,000 men, but half of them are native troops. In 1881 a war commenced with the native tribes of Tunis, which resulted in the establishment of a protectorate over that country by Fr.

Population in 1881, 3,310,412, of which 189,944 were foreigners, and 233,937 Fr.; the remainder were Arabs, Kabyles (a mt. tribe), and Jews. The Arabs and Kabyles are Mohammedans. L. P. BROCKETT.

Algiers, al-jeerz' [Ar. *Al-Jezair'*; Fr. *Alger*], a seaport and city of N. Afr. on the Mediterranean, lat. 36° 47' N., lon. 3° 4' E. It was formerly the cap. of the dey of A., but since 1830 the cap. of the Fr. colony of Algeria. Built upon the slope of a steep hill, it presents an imposing aspect when viewed from the sea. The old streets are mostly narrow and winding, but some broad and straight ones have been laid out by the Fr. A. was once the chief rendezvous of pirates, who for 3 centuries defied the maritime nations of Europe. In 1816 it was nearly destroyed by the Brit. admiral, Lord Exmouth. Pop. 64,714, exclusive of the military.

Algoa, n. R. R. junc., cap. Kossuth co., Ia., on the E. fork of the Des Moines River, about 120 m. N. by W. of Des Moines. Pop. 1870, 800; 1880, 1359.

Al-Hak'em - Ibn - At'tā (called **Al-Moken'na**, -**Mokanna**, or -**Mukanna**, i. e. "the veiled one"), an impostor who in 774 A. D. announced himself as a prophet and lawgiver in Khorassan. Having been attacked by the troops of the caliph Mahdi in 780, he set fire to his castle and consumed himself to ashes. His story is the subject of Moore's *Veiled Prophet of Khorassan*.

Alham'bra (the "red citadel"), a palace and citadel of the Moorish kings of Granada, built 1248-1314 in a suburb of the city of Granada. The interior of the palace is exceedingly gorgeous.

Ali, pasha of Yanina, b. in 1741, was the son of an Albanian chief who had been plundered by his neighbors. A., at the age of 16, headed the partisans of his family and overthrew their enemies. He at once murdered his brother and shut his mother up in the harem, where she died. The sultan made him pasha of Yanina, a town which he had seized by force, and in 1803 he was created gov. of Rumelia. In the Gr. war of independence he played a double part, but was made prisoner by the Turks and executed. D. 1822.

Ali, or **Ali-Ibn-A'bi-Ta'lib'**, surnamed **THE LION OF GOD**, an Ar. caliph, a cousin-ger. of Mohammed, b. at Mecca in 602 A. D. He married Fātimah, a daughter of Mohammed. In 632 his rival, Abu-Bekr, was chosen caliph, after a contest which caused a schism and the formation of the sects of Sunnites and Shiites. He succeeded Othmān as caliph in 655, and was assassinated about 661 A. D.

Ali-Bey, a chief of the Mamelukes, b. in 1728. He was taken to Egypt at an early age, raised himself from a servile condition, became bey of the Mamelukes, and in 1757 bey of Egypt, and succeeded in becoming independent of Tur. He had almost conquered Syria when his chief gen. was bribed by the Turks, and drove him from Egypt. He succeeded in getting up another army, but after a few victories was again defeated and captured. D. 1773.

Alien, al-yen (from the Lat. *alienus*, "belonging to another" (*alius*)). An A. by Eng. law is a person born out of the allegiance of the king. In this country he is one born out of the jurisdiction of the U. S., who has not been naturalized or made a citizen under their laws. By the common law the children of public ministers born abroad are citi-

zens, for their fathers owe allegiance to no foreign power. By the laws of Cong., children of Amer. fathers born abroad, where such fathers have resided in the U. S., are Amer. citizens. (See CITIZEN.) It has been claimed that, independent of this statute, such children are Amer. citizens. A. are subject to certain disabilities affecting their exercise of political rights. After naturalization they are ineligible to the office of Pres. and V.-P. of the U. S. The principal disability affecting A. concerns the acquisition of the title to real estate. There are two general modes of acquisition—by purchase and by descent. An A. may acquire title by purchase (including conveyance and devise) in the absence of statutes to the contrary, and can hold it subject to a proceeding by the state termed "office found." This is in substance an inquiry through an authorized officer into the fact of alienage; and if that be found, the land is adjudged to belong to the state. An A. can convey no better title to a citizen than he himself possesses. This defect in the title can be cured by a private act of the State Legislature. In the case of descent no title at all passes to the A., and no inquest of office is necessary. This disability is wholly removed in a number of the U. S., and modified in others. Where the disability is not removed, legislation is almost universal in favor of resident A., allowing them, if they intend to become citizens, to acquire land for a limited period, and to dispose of it and to transmit it to heirs. A. are capable of acquiring, holding, and transmitting personal property in the same manner as citizens, and may freely resort to courts of justice to maintain and protect their rights. Under the laws of Cong. they are not, however, entitled to take out a copyright. A. have been distinguished in time of war into friends and enemies. An A. enemy cannot make a contract with a citizen. It is illegal in its inception, and cannot be enforced even after peace. Nor can such an A. prosecute actions of any kind while the war lasts, though, if there be no illegality in the claim, the right to sue revives in time of peace. An A. becomes a citizen through naturalization. The difficulties growing out of this subject have led to the negotiation of various treaties between the U. S. and foreign powers.

Aliment. See FOOD, by EDWARD SMITH, LL.B. F. R. S.
Alimentary Canal, the cavity or tube in the body of an animal in which food enters to be digested before it is conveyed by the nutritive vessels into the system. In some animals it is a simple cavity, with only one opening, but in others it is a proper canal, with an outlet or anus distinct from the inlet or mouth, and is a continuous passage of variable dimensions from the mouth to the anus.

Alimony [Lat. *alimonia*], in law, an allowance granted by a court to a wife from the husband's estate, either during a litigation between them or at its termination. Originally, it was only granted in suits for separation, but now by statute it is usual to make the allowance in proceedings for divorce dissolving the bonds of matrimony. A. is of two sorts—*pendente lite*, and permanent. 1. The object of the first is to enable the wife to carry on a litigation with her husband, or to sustain herself during its pendency. It is immaterial whether the proceedings be instituted by or against her. Should the wife have sufficient means of her own, no allowance of this kind will be made. The amount rests in the sound discretion of the court, and is subject to increase or diminution. 2. *Permanent A.*—This is a periodical allowance given from the husband's estate as the result of the litigation in the wife's favor. The amount varies with the husband's wealth and position, and is commonly from one third to one half of his income. It is subject from time to time to variation by the action of the court, depending upon the circumstances of the case.

Al'ison (ARCHIBALD), a Scot. writer, b. in Edinburgh Nov. 13, 1757; was educated at Oxford, took orders in the Ch. of Eng. in 1778, was a curate till 1800, when he removed to Edinburgh. Wrote an *Essay on Taste*. D. May 17, 1829.

Alison (Sir ARCHIBALD), D. C. L., son of the preceding, b. in Shropshire Dec. 29, 1792; grad. in the Univ. of Edinburgh, studied law, and was called to the bar in 1814. Wrote a *History of Europe* from 1789 to 1832. D. May 23, 1867.

Alizarine, a-liz'a-rin [from *al-izari*, commercial name of madder in the Levant], is coloring-matter of madder (*Rubia tinctorum*). A. was discovered in 1824 by Robiquet and Colin.

Preparation.—Several processes have been employed for the extraction of A., more or less pure, from madder. Kopp's plan, which has been applied on a larger scale by Schaaf and Lauth of Strasburg, consisted in treating the madder with an aqueous solution of sulphurous acid, by which both A. and purpurine, another coloring-matter, were dissolved. On adding 3 per cent. of sulphuric acid to the solution, and heating to 95° or 104° F., the purpurine was precipitated. In the filtrate from the purpurine the A. was precipitated in an impure state. This was extensively sold under the name of "green A." From the washings a brown A. of inferior quality separated. The green A. was sometimes purified by dissolving it in rectified petroleum, withdrawing the A. by agitating with soda lye, and precipitating it by sulphuric acid. It was thus obtained comparatively pure in yellow flakes, which dried to a yellow powder. Another process for extracting A. was based upon the observation of Leitenberger that purpurine is soluble in water from 77° to 131° F., while A. requires a much higher temperature. A. is largely sold to the calico-printers in the form of a yellowish-brown paste, under the name of "madder-extract;" also in the form of a dry powder. It may be crystallized from solution in red prisms or by sublimation in yellow needles.

The annual consumption of madder in dyeing and calico-printing is estimated to exceed \$10,000,000. Large tracts in Hol., Alsace, It., and the Levant are devoted to its culture. It not only supplies dyestuffs, but in Alsace it yields a large proportion of the alcohol of commerce, the root containing sugar, which is extracted and subjected to fermentation.

This brilliant discovery of Graebe and Liebermann seems destined to effect a very serious change in the agricultural system of people as remote from each other as the shores of the North Sea and Asia Minor. In addition to A., an anthra-purpurine has been obtained from anthracene, and another color called flavo-purpurine. Theoretically, 1 lb. of A. would require 0.60 lb. anthracene, which would be obtained from 30 lbs. of coal-tar, requiring 660 lbs. of coal. In practice the yield is less than half this amount.

Alkali, al'ka-ly [from the Ar. definite article *al*, and *kali*, the plant from which soda was first obtained], a chemical term applied to an important class of bases which combine with acids to form salts, turn vegetable yellows to red, and vegetable blues to green, and unite with oil or fat to form soap. The proper A. are potash, soda, lithia, caesia, rubidia, and ammonia, which are extremely caustic. Potash is called vegetable A., soda is called mineral A., and ammonia, volatile A. Lime, magnesia, baryta, and strontia, having some properties of A., are called *alkaline earths*. The A. and alkaline earths are metallic oxides, except AMMONIA (which see). When an A. and an acid combine in due proportion they are said to neutralize each other; they really produce metallic salts. (See ACID, by PROF. C. F. CHANDLER, PH. D., LL.D.)

Alkalimeter (from *alkali*, and the Gr. μέτρον, a "measure"), an instrument used to ascertain the proportion of pure carbonate of potash or of soda in a commercial sample of those articles, and to test the strength and purity of soda-ash, potash, etc.

Alkalimetry. See preceding article.

Alkaloids [from *alkali*, and the Gr. εἶδος, "form"], an important class of substances of organic origin, having the qualities of alkalies more or less strongly marked, and being capable of forming salts with acids, like the inorganic bases. They are often substitution products of ammonia. They are divided into two classes—*natural* and *artificial*. The natural A. are found in plants and animals. They are composed essentially of carbon, hydrogen, and nitrogen; besides which a great number contain oxygen. The A. have generally an energetic action on the animal system, and hence are employed as medicine; in comparatively large doses they are often powerful poisons. They have generally a bitter taste, and form in many instances the active principles of the plants in which they are found. Such are morphine, found in opium; quinine and cinchonine, in cinchona bark; strychnine, in nux vomica; hyoscyamine, in henbane; atropine, in belladonna; caffeine or theine, in coffee and tea, etc. Coniine, the A. of hemlock, has been prepared artificially.

Alka'na, or Alkan'na [Sp. *alea'ña*], a coloring-matter obtained from the plant *Lavsonia inermis*, which is used by Oriental women to color their nails and teeth.

Al'kanet (*Anchu'sa*), a genus of herbaceous plants, belonging to the natural order Boraginaceæ. The root of the *Anchu'sa tinctoria* affords a resinous red coloring-matter, and is used to color pomades, lip-salves, hair-oils, etc.

Alkoran. See KORAN, by PROF. TAYLER LEWIS, LL.D.

Al'lah, the Arabic name of the Supreme Being, the only true God, as distinguished from the deities worshipped by idolaters.

Al'tahâbâd' (i. e. "the city of God"), a holy city of India, at the confluence of the Ganges and the Jumna, 498 m. N. by W. of Calcutta. Many thousand pilgrims annually resort to this place to bathe in the sacred rivers which here unite. It was partially destroyed during the Sepoy mutiny in 1857. Pop. 1881, 150,378.

Al'lan (DAVID), a Scot. painter of domestic and humorous subjects, b. at Alloa Feb. 13, 1744; went to Rome in 1764, remaining several years. He has been styled "the Scottish Hogarth." D. Aug. 6, 1796.

Allan (Sir WILLIAM), a Scot. historical painter, b. in Edinburgh in 1782. He worked some years in St. Petersburg, visited Circassia and Tur., and returned to Edinburgh in 1814. In 1835 he was elected academicien of the Royal Acad. of Lond., and in 1840 succeeded Wilkie as limner to her Majesty for Scot. D. Feb. 29, 1850.

Al'legan, R. R. June, cap. Allegan co., Mich., on the Kalamazoo River. Pop. 1870, 3374; 1880, 2305.

Allegany, on R. R. Cattaraugus co., N. Y. It contains a R. Cath. coll. and Franciscan convent. Pop. 1870, 746; 1880, 1049.

Allegha'ny, a river of Pa., makes a short circuit in N. Y. and then flows S. W., and at Pittsburgh unites with the Monongahela to form the Ohio. Total length, about 400 m., of which 150 are navigable.

Alleghany Mountains, or Alleghanies, a name sometimes used as synonymous with the Appalachian system of mts. (See APPALACHIAN MTS.) In a more restricted sense it is applied to the parallel ranges which traverse Pa., Md., and Va., and form the most prominent features in the physical geog. of those States. The general direction of these ridges is nearly N. E. and S. W., and their mean height about 2500 ft. Among their highest summits are the Peaks of Otter, in Va., rising to 4200 ft. above the sea.

Allegheny, city and important R. R. centre. Allegheny co., Pa., separated from Pittsburgh by the Allegheny River. A. has 3 theological sems. and the W. penitentiary. Pop. 1870, 53,180; 1880, 78,682.

Allegiance, al'le'jans [Fr. *allegiance*], in law, is the tie or obligation which binds a citizen or subject to a state. The common law distinguishes between natural and local A. The former is that which a citizen owes to the state of which he is a member; the latter is due from a person who is not bound by the rules of natural A., but who is temporarily subject to the laws of the state by which the A. is claimed. Under this theory a foreigner temporarily residing in a country is subject to its laws. When he departs his A. is at an end. Natural A., on the other hand, cannot be shaken off at the will of the citizen. Should he abandon the country to which he belongs, and engage in war on the part of a foreign

state against it, he might, in strictness, if taken prisoner, be treated as a traitor. The U. S. in their legislation upon naturalization have proceeded upon the theory that a citizen of a foreign country might, at his will, shake off his A. and become a citizen here. The European nations have quite uniformly denied that there is any such general rule of public law, whatever may be the opinion of individual jurists. The perplexing and irritating questions thus raised have been for the most part recently disposed of by treaties between the U. S. and the leading foreign nations. T. W. DWIGHT.

Allen (CHARLES), LL.D., b. at Worcester, Mass., Aug. 9, 1797; was admitted to the bar in 1818, was a judge of various State courts of Mass. between 1842 and 1859, and chief-justice of the Mass. superior court 1859-67. From 1849 to 1853 he was a Free-Soil M. C. D. Aug. 6, 1869.

Allen (ELISHA H.), b. at New Salem, Mass., Jan. 28, 1804, grad. at Williams Coll.; was admitted to the bar; removed to Brattleboro, Vt., and in 1830 to Bangor, Me.; member of Me. legislature 1836-41 and 1846; in 1838 was speaker; M. C. from Me. 1841-43; removed to Boston in 1847, and was elected to the Mass. legislature in 1849; U. S. consul at Honolulu 1852-56; then became Hawaiian Minister of Finance, and from 1857 was chief-justice and chancellor of S. I., holding that office 20 years, during which time he was several times minister plenipotentiary of S. I. to the U. S. He was resident minister of S. I. at Washington from 1876 till his death, Jan. 1, 1883.

Allen (ETHAN), b. at Litchfield, Conn., Jan. 10, 1737; in 1766 removed to Vt., where he became a leader in the popular resistance to the claims of N. Y. On the outbreak of the Revolution he joined the movement, and on the 10th of May 1775, with only 83 men, he surprised and captured the ft. at Ticonderoga. On the 25th of Sept. 1775 he attacked Montreal with a small force, but was captured, sent to Eng. as a prisoner and held until 1778. He wrote *Vindication of Vt. and Oracles of Reason*. D. Feb. 12, 1789.

Allen (HEMAN), LL.D., b. at Poultony, Vt., Feb. 23, 1779, grad. at Dartmouth 1795; became a lawyer, was chief-justice of a Vt. State court 1811-14, member of Cong. 1817-18, U. S. minister to Chili 1823-28. D. Apr. 9, 1852.

Allen (JOEL ASAPH). See APPENDIX.

Allen (PHILIP), b. in Providence, R. I., Sept. 1, 1785, grad. at Brown Univ. in 1803. He was a cotton manufacturer, and built first Watt steam-engine made in Providence; was gov. of R. I. 1851-53, U. S. Senator 1853-59. D. Dec. 16, 1865.

Allen (RICHARD), first bp. of the Afr. Meth. Epis. Ch. in the U. S. He was originally a preacher in Meth. Epis. Ch., ordained deacon by Bp. Asbury in 1799, and elected bp. of Afr. Meth. Epis. Ch. in 1816. D. 1831.

Allen (RICHARD L.), b. in Hampden co., Mass., Oct. 1803. With his brother, A. B. Allen, he established the *American Agriculturist* in 1842. He wrote the *American Farm Book* and the *Diseases of Domestic Animals*. D. Sept. 22, 1869.

Allen (WILLIAM), a lawyer, was chief-justice of Pa. before the Revolution, and a royalist after it began. He aided Dr. Franklin in founding the Coll. of Phila. D. 1780.

Allen (WILLIAM), D. D., b. at Pittsfield, Mass., Jan. 2, 1784, grad. at Harvard in 1802; was licensed to preach in 1804, in 1810 succeeded his father as pastor in Pittsfield, was chosen pres. of Dartmouth Univ. in 1817, and was pres. of Bowdoin Coll. from 1820 to 1839. He prepared a copious *Amer. Biographical Dict.* D. July 16, 1868.

Allen (WILLIAM), b. at Edenton, N. C., in 1806, was left an orphan at an early age; in 1822 went to Chillicothe, O., studied law and entered into politics; was rep. in Cong. 1833-35, U. S. Senator 1837-49, and gov. of O. 1874-75. D. July 11, 1879.

Allen (WILLIAM HENRY), M. D., LL.D., b. at Readfield, Me., Mar. 27, 1808, grad. at Bowdoin 1833; was prof. of Lat. and Gr. in the Cazenovia Meth. Sem. from 1833 to 1835, of chem. and nat. philos. in Dickinson Coll. from 1836 to 1846, of philos. and Eng. lit. at the same institution from 1846 to 1849, pres. of Girard Coll. from 1850 to 1863, pres. of the Agricultural Coll. of Pa. 1865-66, and was reappointed pres. of Girard Coll. in 1867. In 1872 he was elected pres. of the Amer. Bible Society. He wrote *A Manual of Devotion for Girard College Orphans*. D. Aug. 29, 1882.

Allentown, city, an important R. R. centre, cap. Lehigh co., Pa., on Lehigh River, 60 m. N. by W. of Phila.; is the seat of Muhlenberg Coll. Pop. 1870, 13,884; 1880, 18,063.

All-Hallows, the old Eng. name for All Saints' Day (the 1st of Nov.).

Alliance, R. R. junc., Stark co., O. It has a coll. Pop. 1870, 4063; 1880, 4636.

Alliance, Holy. See HOLY ALLIANCE.

Allibone (SAMUEL AUSTIN), LL.D., an author, b. in Phila. Apr. 17, 1816. His principal work is a *Critical Dictionary of Eng. Lit. and Authors*. In 1880 he became librarian of the Lenox Library, N. Y.

Alligator [corrupted from the Sp. *el lagarto*, "the lizard"], Amer. genus of crocodilian reptiles. They attain a length of 10 to 15 ft. Species inhabit almost all the warmer portion of N. and S. Amer. The common A. of the S. States is the *Alligator Mississippiensis*.

Alligator Pear. See AVOCADO PEAR.

Allopathy, al-lop'a-the [from the Gr. *ἄλλος*, "other," "different," and *πάθος*, an "affection"], a theory of med., according to which remedies are used whose effects are opposite to the symptoms of the diseases treated. The term A. was formed after that of homœopathy, and both terms were introduced by Hahnemann. The two are contrasted, the one teaching that medicines must produce a *similar affection* to the disease itself, the other a *different affection*.

Alloy [Fr. *alloyer*, to "mix" (as metals), probably from the Lat. *ad legem*—that is, "with legal tolerance;" Fr. *loi*, "law"], a mixture or compound of two or more metals fused together; sometimes a compound of precious metal with a metal of less value; thus, in coinage, the term A. is applied to a baser metal mixed with gold or silver in order to make it harder. Chemists apply this term to all combinations obtained by fusing metals together; thus,

brass is an A. of copper and zinc; bronze is an A. of copper and tin; pewter is an A. of tin and lead. In many cases the metals do not unite in definite or invariable proportions. The density—or, in other words, the specific gravity—of an A. is sometimes greater and sometimes less than the mean of its components. Most A. have greater cohesion than either of the metals of which they are composed, so that a bar of an A. will bear a greater longitudinal strain than a bar of either metal. Brit. gold coin contains 11 parts of pure gold and 1 of copper; the law of the U. S. requires that in 1000 parts of coin there must be 900 parts of gold; and the intent of the law is, that the A. shall be of copper only; but, as in parting silver from native gold it has been heretofore impossible to separate the whole, except at an expense too great to be economical, it has been permitted to allow the residual silver to be counted as part of the A., provided the proportion of silver be *not greater* than one half. The more effectual processes introduced of late years into the U. S. assay offices have made it possible to make the parting nearly complete; and it is now provided that the silver shall not exceed *one tenth* part of the whole A. A compound of mercury with another metal is an *amalgam*. C. F. CHANDLER.

All Saints' Day, or **All Hallows** [A.-S. *all*, and *hālig*, "holy"], a festival of the R. Cath., Anglican, Lutheran, and the various Oriental churches. Observed on the 1st of Nov., in honor of the saints in general.

All Souls' Day, a festival of the R. Cath. ch., observed on the 2d of Nov., in order to alleviate the sufferings of the souls in purgatory.

Allston (WASHINGTON), an Amer. painter of celebrity, b. Nov. 5, 1779, at Waccamaw, S. C.; d. at Cambridge, Mass., July 9, 1843. Was sent to school at Newport, R. I., at the age of seven; on graduating from Harvard in 1800 he went to Charleston, and at once began his art-life under the influence of Edward Malbone. In 1801 he was a student of the Royal Acad., whereof Benj. West was pres. West became his intimate friend, and so remained to the last. His three years there were full of improvement and delight. Then the Louvre prepared him for it, where he spent 4 years in close companionship with Thorwaldsen and Cole-ridge. In 1809 he returned to his native country, but soon went back to Lond. with his wife, a sister of Dr. Wm. E. Channing. There he produced his first great work, *The Dead Man Restored to Life by the Bones of Elisha*. Other great paintings followed: *St. Peter Liberated by the Angel*, *Uriel in the Centre of the Sun*, *Jacob's Dream*, with smaller things between—all eagerly sought by purchasers. But toil and sorrow from the death of his wife impaired his health. The next 12 years were passed in Boston, where he painted the *Jeremiah*, *Saul* and the *Witch of Endor*, *Miriam*, *Beatrice*, and other pieces. In 1830 Allston married a daughter of Chief-Justice Dana of Cambridge, Mass., and at Cambridge he thenceforth lived, writing and painting, in great seclusion, but enjoying the society of a few friends. To this period belong *Spaldro's Vision* and *Rosalie*. The work which he meant should be his masterpiece, *Belshazzar's Feast*, was never finished. It was after a week of steady, severe labor on it that the artist gently expired from an attack of heart disease.

If Allston had not been a painter he might have been distinguished as an author. The few writings from his pen that have been published indicate a rare penetration and refinement of mind. Some of his conceptions transcend any artist's power of execution, and much of the disappointment with his work arises probably from the sense of inadequacy of the performance. It is when he descends from his most ambitious flights and paints a *Rosalie*, a *Beatrice*, a *Lorenzo* and *Jessica*, that the exquisite quality of his art appears. The personal qualities of Allston were exceedingly attractive. He was chosen a member of the Royal Acad. soon after his return from his first long residence in Eng. For a more complete article on ALLSTON, see J.'s UNIV. CYC. O. B. FROTHINGHAM.

Alluvium [from the Lat. *ad*, "to," and *lvo*, to "wash"], the soil imperceptibly formed by the constant washing of the waters along the banks of a river or the sea.

Alluvium, the gravel, sand, and other matter washed down by rivers and floods, and spread over land that is not permanently submerged. Such deposits often accumulate at the mouths of large rivers and form deltas.

Allyn (ROBERT), D. D., b. at Ledyard, Conn., Jan. 25, 1817; grad. at the Wesleyan Univ., taught in various institutions 1841-48, was commissioner of public instruction in R. I. 1854, prof. of anc. lang. in Ohio Univ. 1857, pres. of Wesleyan Fem. Coll., Cincinnati, 1857, and of McKendree Coll., Ill., 1863-73.

Alma, a small river of the Crimea, enters the sea about 20 m. N. of Sevastopol. On its banks the allied armies of Eng. and Fr. defeated the Rus. Sept. 20, 1854.

Almaden, or **Almaden del Azogue** (i. e. "the mines of quicksilver"), a town of Sp., 50 m. S. W. of Ciudad Real. Here are rich mines of quicksilver, which were wrought by the Rom. Pop. 8645.

Almaden Quicksilver-Mines, The, of Santa Clara co., Cal., 65 m. S. of San Francisco, are named after those of Almaden in Sp. The ore (cinnabar) has from time immemorial been known to the Indians, who used it for making vermilion paint. The presence of this deposit has been of incalculable benefit to Cal., since enormous quantities are employed in gold and silver mining. The metallic mercury is separated from the ore by a simple process of distillation.

Almagro, de (DIEGO), a Sp. adventurer, b. in 1475; went to Amer. at an early age. In 1525 he joined Pizarro in the conquest of Peru. In 1535 he invaded Chili, but was unsuccessful. In 1536 he encroached upon the possessions of Pizarro, was defeated, made prisoner, and executed in Apr. 1538.—His son, DIEGO DE ALMAGRO, b. about 1520, headed the faction opposed to Pizarro, whom they assassinated

in 1541, and A. assumed the title of capt.-gen. of Peru; was defeated by the royal forces, and executed in 1542.

Al-Hansoor' (ARAB. جَاهَان), b. 712, caliph in 754; promoted arts and sciences, persecuted the Chrs. and Jews, won victories in Asia, but lost his Sp. dominions. D. 775.

Al'meh, or **Al'mah,** written also **Al'mé** (pln. **Awā-lim**), a name applied to the professional female singers and dancing-girls of Egypt.

Almeida, de (DOR FRANCISCO), a fortified town of Port., 83 m. N. E. of Coimbra. The Fr. under Massena were here defeated by the Eng. under Wellington, Aug. 5, 1811. Pop. 6580.

Almeida, de (DOR FRANCISCO), a Port. commander, b. at Lisbon about 1450; distinguished himself in wars with the Moors, and in 1505 was sent as viceroy to India, where he extended the Port. possessions, but was defeated in a naval expedition against Calicut. Albuquerque was sent out in 1507 to supersede him, but A. refused to acknowledge his successor until he had himself avenged his former defeat, and in 1508 he destroyed the fleet of the sultan of Egypt, who was an ally of the sultan of Calicut. He then resigned, and sailed for home, but was killed by the natives near the Cape of Good Hope in 1517.

Al'mohades, al'mo-hādiz [Arabic, *Al-Muwahhidoon*, i. e. "unitarians," or advocates of the unity of God, as taught by Mohammed], a Mohammedan dynasty that reigned in Sp. and N. Afr. from 1229 to 1269. It was founded by Abu-Abdillah Mohammed, surnamed **AL-MAHDI**, "the director." In all there were six rulers of this dynasty.

Al'mond, al'mund (*Amygdalus*), a genus of plants of the natural order Rosaceæ, composed of trees and shrubs nearly allied to the peach. The common almond, a tree from 25 to 30 ft. high, abounds in the S. of Europe. Bitter almonds yield a poisonous oil. The leaves contain prussic acid.

Almon'de, van (PHILIPUS), sometimes written **Almon'da**, a Dut. admiral, b. at Briel in 1646. He was the second in command under De Ruyter when the latter was killed in 1676, and contributed to the victory which Van Tromp gained over the Swedes in 1677. He commanded the Dut. fleet which, aided by the Eng., defeated the Fr. at La Hogne in 1692. D. 1711.

Almonds, Oil of. Both sweet and bitter almonds yield by pressure a fixed oil, which is of a light yellow color and odorless. It consists chiefly of olein; is soluble in 25 parts of alcohol. It is used in med., having a mild laxative property. It is sometimes given to new-born infants, mixed with syrup of roses. One hundred lbs. of A. yield about 50 lbs. of oil. Bitter A., macerated with cold water and distilled, yield a volatile oil known as the "oil of bitter A." or hydride of benzoyl. This does not pre-exist in the A., but is produced, together with hydrocyanic or prussic acid, from the glucoside amygdalin under the influence of the ferment emulsin. It is a colorless, limpid oil, smelling of bitter A. When freed from prussic acid it is not poisonous. It oxidizes to benzoic acid. It has been used to a considerable extent for flavoring confectionery and for scenting soap. For the former purpose the prussic acid which it usually contains makes it dangerous. For the latter purpose it has been entirely superseded by the much cheaper nitrobenzol or essence of mirbane, also called artificial oil of bitter A., which possesses the same odor.

C. F. CHANDLER.

Almon'te (DON JUAN NEPOMUCENO), a Mex. statesman, partly of Indian descent, b. in 1804. From 1820 onward he held various diplomatic positions in Lond., Paris, and Wash.; was captured at the battle of San Jacinto (1836), and after his release became minister of war under Bustamante. He was ambassador at Paris 1857-60, favored the Fr. invasion of Mex., and was prominent in the events which ensued. In 1866 he was sent by Maximilian as ambassador to Fr. D. Mar. 22, 1869.

Al'mug Tree, a name found in the O. T., is supposed to denote a species of sandal-wood.

Aln'wick Castle, the seat of the duke of Northumberland, is one of the most magnificent baronial castles in Eng. It is supposed to be 1200 yrs. old or more, and has belonged to the Percy family since the reign of Edward II. In 1830 it was repaired at a cost of £200,000.

Al'oe, a genus of endogenous plants of the order Liliaceæ, natives of Afr. and other warm regions, and chiefly valuable for their medicinal properties.

Aloe, American. See AGAVE.

Al'oes, a stimulating, purgative drug having a bitter taste, is the inspissated juice or extract obtained from the leaves of several species of the aloe. It is imported from Bombay, Socotra, the C. of Good Hope, the W. I., etc.

Aloes Wood, called also **Agila** or **Eagle-Wood**, is the inner part of the trunk of the *Aquila'ria ova'ta* and the *Aquila'ria agal'lochum*, trees which are natives of tropical Asia. It contains a fragrant resinous substance, which emits a pleasant odor when burned.

Al'o'dæ (i. e. "sons of Aloes"), in Gr. mythology, Otus and Ephialtes, two giants of extraordinary strength who attempted to storm Olympus, and were condemned to suffer in Tartarus.

Alosa. See SHAD.

Alpac'a (the *Auche'ria pa'co*), a species of the family Camelidae, nearly allied to the llama, native of the mts. of Peru and Chili; domesticated by the Peruvians, who export great quantities of its wool. This wool is remarkable for its length, fineness, silken texture, and a lustre almost metallic. The most extensive manufactures of A. cloth are in Eng. A great part of the so called A. goods of commerce are made of the wool of the Cotswold, Leicester, and other long-wooled breeds of sheep.

Alp-Ars'lan (i. e. "strong lion"), written also **Alp-Ars'elan**, a Per. sultan of the Seljookide dynasty, b. in Turkestan in 1029. He ascended the throne in 1063, and embraced Islamism. In 1071 he defeated and took prisoner Romanus Diogenes, emp. of Constantinople, whom he treated generously. D. by assassination Dec. 15, 1072.

Alpe'na, city, cap. Alpena co., Mich., at the head of Thunder Bay. It manufactures 125,000,000 ft. of lumber yearly; situated about 210 m. N. by W. from Detroit on Lake Huron. Pop. 1880, 6153; in 1881, 9210.

Al'pha and **O'mega**, the names of the first and last letters of the Gr. alphabet, A, Ω. These words occur in the book of Rev. as a title of the Lord Jesus Christ.

Al'phabet, a word formed of the first two Gr. letters (α, β, *alpha, beta*), and used to denote the entire series of letters with which any lang. is written. A. differ widely in the number of their letters, their power, the order in which they are arranged, and the form of the characters. (For detailed notices, especially of the Eng. A., see the initial articles under the separate letters.)

Al'pheus, in classic mythology, a river-god and a son of Oceanus. According to legend, he loved the nymph Arethusa, who fled from him to the island of Ortygia and was transformed into a fountain. Alpheus pursued her under the sea and was united to the fountain.

Alpi'nus, or **Al'pin** (PROSPER), M. D. [It. *Prospero Alpi'ni*], an It. botanist, b. near Venice Nov. 23, 1553. In 1593 he was made prof. of bot. at Padua, and wrote *On Exotic Plants*. D. Feb. 5, 1617.

Alps, a great system of mts. in Europe, stretching in a crescent-shaped chain over a part of Fr., Switz., N. It., and Aus., and covering an area of about 95,700 sq. m. They culminate in Mt. Blanc, and form the watershed between the rivers which flow into the Mediterranean and the Ger. Ocean. The Rhine, the Rhone, the Po, and the Inn, the main branch of the Danube, take their rise in Alpine valleys. The bases of the mts. are encircled by extensive lakes from 600 to 1500 ft. above the level of the sea, and smaller ones are found in the interior up to an elevation of 6000 ft. The average height of the central chain reaches 10,000 ft. and is within the region of perpetual snow, while several hundred peaks rise above it to 12,000 and 15,000 ft. At the head of the numerous valleys are collected immense quantities of snow, from which flow the long streams of ice called glaciers. (See GLACIERS.)

There are three grand divisions—the Western, in Fr.; the Middle or Central A., in Switz., and the Eastern A., in Ger. and Aus. The highest peaks are Mt. Blanc, 15,780 ft., and Monte Rosa, 15,217, both in the Central A. Passes, called in Fr. *cols*, are numerous. The principal ones, traversed by carriage-roads, are the Mt. Cenis, connecting Fr. with Piedmont; the Simplon, St. Gothard, and Splügen, between Switz. and Lombardy; the Stelvio, Brenner, and Semmering, connecting Ger. and Aus. with It. Mt. Cenis, St. Gothard, and the Semmering are now crossed by railroads, the first two by tunnels. The St. Gothard tunnel, 9 m. long, is the most extensive as yet attempted anywhere. The Great St. Bernard, which has only a bridle-path uniting the valley of the Rhone with Piedmont, was used by Napoleon and his army in 1800. The A. have a great variety of minerals, but are not rich in useful metals.

Alrau'nen, or **Alru'nae**, among the ancient Gers., certain women supposed to have magical powers. The term also designates small images, carved from mandrake roots, to which magical efficacy was attributed.

Alsace and **Alsace-Lorraine.** See ELSSASS-LOTHRINGEN.

Alsatia. See ELSSASS-LOTHRINGEN.

Al Sirat' (literally, the "road" or "passage"), a bridge as narrow as the edge of a razor, supposed by the Mohammedans to extend from this world over hell to paradise.

Al'ston (JOHN), the introducer of an improved system of printing books for the blind with embossed or raised Rom. capital letters, was a merchant of Glasgow, Scot. He was long a director of an asylum for the blind in that city. D. 1846.

Altai', or **Al'ta Yeen Ooo'la** (i. e. "the golden mt.") a range of mts. of Central Asia, near the S. border of Siberia. One branch, the Little A., forms the boundary between Siberia and Chi. Tartary. The Obi and other large rivers rise in the A. Mts., and flow northward. On the W. the range terminates in the Katoonsk or Katoonyu mts., a small isolated group, in which Mt. Belookha, or Beluka, rises to the height of 11,063 ft. A large portion of this system is covered with perpetual snow.

Al'tar [Lat. *altare*], a table or elevated place on which sacrifices were offered. The first A. mentioned in hist. was built by Noah immediately after the Flood. A. were sometimes erected as memorials of some great event. They were constructed of different materials and in various forms. The name is also applied to a part of the furniture of Chr. chs. The A. of Epis. chs. is the communion table.

Alt'dorfer (ALBRECHT), a Ger. painter and engraver, a pupil of Albert Dürer, b. at Altdorf, in Bavaria, in 1488. He is called by the Fr. "Le Petit Albert." A painting of the victory of Alexander over Darius is his masterpiece. He left many engravings on copper and on wood. D. 1538.

Altenburg, Saxe, Ger. duchy of. See Saxe-ALTENBURG.

Alterna'tion [Lat. *alternatus*, from *alter'no*, *alternat'im*, to "interchange"], of **Generations**, in zool., is that modification of generation in which (1) the organism gives origin, *agamogenetically*, to (2) a form more or less dissimilar, which acquires generative organs and gives birth to (3) a form similar to the first. This is the simplest series, but it is often more complicated. In fine, however, it is the A. of sexual and asexual forms in the line of descent of the species. The phenomenon is exhibited in a simple type in *Salpa* and other Tunicates, and with more or less complication in most Acalephs, many worms, the Aphidida, etc. **Therobore GILL.**

Althe'a [Gr. *ἀλθαία*, from *ἄλθεω*, to "heal"], a genus of plants of the natural order Malvaceæ, natives of Europe and naturalized in the U. S. It includes the hollyhock (*Althe'a rosea*) and the marshmallow (*Althe'a officina'tis*), which is used in medicine as a demulcent or emollient. A., or shrubby A., is also a common name of the *Hibiscus Syriacus*.

Althorp, LORD. See SPENCER.

Altitude of a Body, in astron., the angular distance of the body from the horizon measured on the arc of a vertical circle; in geog., height of a place above sea-level.

Alton, city, an important R. R. centre and port of entry, Madison co., Ill., on the Miss. River, 21 m. above St. Louis and 3 m. above the mouth of the Mo. It stands on a high limestone bluff, and contains a large R. Cath. cathedral and a female sem., and is connected by horse railroad with Upper A., 2 m. distant. Upper A. is the seat of Shurtleff Coll. Pop. 1870, 8665; 1880, 8975.

Altona, a city of Prus., on the right bank of the Elbe, just below and opposite Hamburg. It has a fine port, extensive trade, and considerable manufactures. Pop. 1880, 91,047.

Altoona, city, on R. R., Blair co., Pa., 237 m. W. of Phila., at the E. base of the Alleghany Mts. It contains the principal offices and extensive machine-shops of the P. R. R. Pop. 1870, 10,610; 1880, 19,710.

Alt'ort, or **Alt'dorf**, a town of Switz. near the S. extremity of Lake Lucerne. Here is an old tower, said to mark the place where William Tell shot the apple off his son's head. Pop. 2724.

Alt'rices, a name given by Sundevall in 1826 to those birds whose young are callow and incapable of taking care of themselves. Such are all the Passerine (song) birds, the parrots, birds of prey, pigeons, etc.

Al'udels (plu.), [a word of Arabic origin], pear-shaped glass or earthen vessels used as receivers in the distillation of certain substances, especially mercury and hydrochloric acid. They are generally arranged in the form of a chain on an inclined surface.

Al'um [Lat. *alumen*]. Common A. is a double salt of great importance, the chemical name of which is "sulphate of alumina and potash." It occurs in colorless octahedral crystals, having a sweet astringent taste. It is a powerful styptic, and is applied sometimes as a mild caustic. A. is largely manufactured, and is much used in preparing skins, as a mordant in calico-printing, and in glazing paper, and occasionally for the adulteration of bread.

Ammonia A., containing ammonium in place of potassium, has of late largely replaced potash A. in the arts, owing to the low cost of the ammoniac sulphate prepared from gas liquor. C. F. CHANDLER.

Alumina, the oxide of aluminium, is the most abundant of all the earths, and is the principal constituent of clay. In 100 lbs. of A. there are 52.94 of aluminium and 47.06 of oxygen. In its common state this earth is a soft white powder, without taste, and in the crystalline form it occurs as sapphire and ruby, two of the hardest and most valuable of the precious stones. An impure A., which is found in the islands of the Grecian Archipelago, Asia Minor, and Chester, Mass., is the emery used as a polishing-powder for glass and metals, on account of its hardness. The clay of arable land is mostly produced by the disintegration of feldspar, which is a compound of A., potash, and silica. A. has two properties which render it of great importance in the useful arts: one is that its silicate forms with water a plastic material adapted for pottery; the other is its strong affinity for coloring and extractive matter, by which it is useful as a mordant in printing calico and in dyeing.

Aluminium, or **Aluminum**, a white metal which is the base of alumina, was discovered by Wöhler in 1825. It is ductile, tenacious, and very malleable, and remarkable for its sonorosity and levity. As it is not found in nature in a separate or metallic state, it was formerly very rare, and cost as much as gold, but the price has been reduced to \$10 a lb. or less. It is not oxidized by exposure to air and moisture, and is not tarnished by sulphuretted hydrogen. Fused with copper, it forms useful alloys resembling fine brass, though much more beautiful, and specially adapted for gun-metal. An alloy with silver is much used.

Al'um Root, a name of two species of plants, natives of the U. S., the *Gera'nium maculatum* and the *Heu'che'ra Americana*. Their roots are astringent, and used in med.

Al'va, or **Al'ba** (FERNANDO ALVAREZ DE TOLEDO), DUKE OF, a Sp. gen., b. of a noble Castilian family in 1508. He entered the army in his youth, and accompanied Charles V. in his campaign against the Turks in 1530. In 1547 he gained a decisive victory over the Ger. Prots. at Mühlberg. In 1555-56 he defeated the Fr. and papal forces in It. In 1567 he was sent by Philip II. to suppress the revolt in the Netherlands, where he established the "Council of Blood," and commenced a reign of terror and sanguinary persecutions. William, prince of Orange, raised an army against him in 1568, but A. avoided a battle, and by delay compelled William to retire from the contest, because he could not pay his troops. Although A. defeated or outgeneraled the Dut. patriots in war, he failed to subdue or pacify them, and he was recalled in 1573. He boasted that he had put to death 18,000 persons in the Netherlands, besides those killed in battle. In 1580 he invaded and conquered Port. D. Jan. 12, 1583.

Alvado, de (PEDRO), a Sp. gen. and adventurer, b. at Badajoz, went to Amer. in 1518. He served with distinction under Cortez in the conquest of Mex., and in 1520 was selected by him to command in the city of Mex. during the absence of Cortez, who marched against Narvaez. He conducted a successful expedition against Tehuantepec and Guatemala in 1523, and was appointed gov. of Guatemala. After a voyage to Sp. he led an army across the Andes into the prov. of Quito, which he found already occupied by Pizarro. This chief induced A. to retire by the payment of a large sum of money. A. was killed in a fight with some natives in 1541.

Alvarez (JUAN), a Mex. gen., b. 1790. He was a leader of the insurgents who took arms against Santa Anna, and drove him from power in Aug. 1855. A. became pres. of Mex. in Oct., but resigned in Dec. of the same year. During the Fr. invasion of 1863-66 he was one of the most determined opponents of Maximilian and his party. D. 1863.

Al'vord (BENJAMIN), A. M., b. at Rutland, Vt., Aug. 18,

1813; grad. at W. Pt., served on the frontiers in Fla. and in the Mex. war. In 1854 was assigned to the pay dept. in Or., where he remained during the civil war, and became brig.-gen. He was paymaster-gen. 1876-80. Retired 1880. D. Oct. 17, 1884. He wrote *Tangencies of Circles and of Spheres*.

Alvord (THOMAS GOLD), b. at Onondaga, N. Y., Dec. 20, 1810; grad. at Yale Coll. in 1828, admitted to the bar in 1832; practised at Syracuse until 1846; elected to the legislature of 1844, and re-elected nine times; speaker in 1858 and 1864, lieutenant-gov. in 1865-66, member of the const. con. in 1867-68; resides at Syracuse.

Al'zog (JOHANNES BAPTIST), a Ger. Cath. theol., b. in Silesia in 1808; became in 1853 prof. of eccles. hist. at Freiburg. His *Manual of Univ. Ch. Hist.* has been translated into the principal European languages. D. Feb. 28, 1878.

Amade'us [It. *Amedeo* or *Amadeo*], the name of nine counts and dukes of Savoy, the first of whom lived in the 11th century.—**AMADEUS V.**, count of Savoy, b. in 1249, succeeded his uncle in 1295, increased his dominions by marriage, and was the first prince of Savoy that made any considerable figure in hist. D. 1323.—**AMADEUS VI.** was b. in 1324, and became count in 1343. He defeated the Fr. in 1354, and added a part of Piedmont to his dominions. D. 1383.—**AMADEUS VIII.**, grandson of the preceding, b. in 1383, succeeded his father in 1391, and in 1416 was made duke of Savoy by the emp. Sigismund. In 1434 he resigned his power to his son Louis, and retired to a monastery. He was chosen pope by the council of Bale in 1439, and took the name of Felix V. As Eugenius IV., who had been deposed by that council, was still recognized as pope by a strong party, a schism ensued in the Ch. Felix V. resigned the papacy in 1448, and d. 1451.

Amadeus [It. *Amedeo*; Fr. *Amédée*], king of Sp., a son of Victor Emmanuel, king of It., b. May 30, 1845. On the 16th of Nov. 1870, the Sp. Cortes elected him king of Sp., the throne of which had been vacant for 2 yrs. It had been offered to several foreign princes, who declined. A. accepted it, and arrived at Madrid Jan. 2, 1871. Feb. 11, 1873, he abdicated, and the republic was proclaimed.

Amadis of Gaul, or **Amadis de Gaul'a**, a legendary hero, son of the fabulous King Perion of Fr. The story of his adventures, entitled *Amadis de Gaula*, written by Vasco de Lobeira, a Port., in the 14th century, has been translated into several languages.

Amadou ("Ger. tinder"), a name given to several species of fungus called agarics, growing on oak and ash trees in Europe. The hard A. (*Polyporus ignarius*) and the soft A. (*Polyporus fomentarius*) are used for tinder, and applied to wounds as styptics. Some varieties are prepared for tinder by charging them with saltpetre.

Amalekites, a nomadic people occupying, at the time of the Exodus, the wilderness between Egypt and Palestine. Opposing the march of the Israelites, they were defeated at Rephidim, and centuries later destroyed by David.

Amalgam [perhaps from the Gr. *μαλαγμα*, a "poultice"], a combination or alloy of mercury with another metal. Some A. are definite chemical compounds. Glass plates are converted into mirrors or looking-glasses by covering one surface with an A. of tin. Gold and silver are dissolved in mercury, and form A. which are used in the processes of gilding and plating various objects.

Amalgamation, the act or process of combining mercury with another metal, applied especially to the process of separating gold and silver from the quartz rock in which they are found imbedded. The quartz is first crushed, and then shaken in a barrel or machine in contact with mercury, which unites with and collects the small particles of gold or silver. The precious metal is afterward easily separated from the amalgam by the application of heat.

Amalthea, or **Amaltheia** [Gr. *Ἀμαλθεία*], in classic mythology, the name of the nurse of Jupiter. She was supposed to have been a goat, whose horn became famous as the cornucopia, or the "horn of plenty."

Am'arapo'ra, or **Ummerapoora**, a city of Burmah, on the Irrawaddy River, formerly the cap. of the kingdom, having in 1819, 170,000 inhabs. Pop. about 90,000.

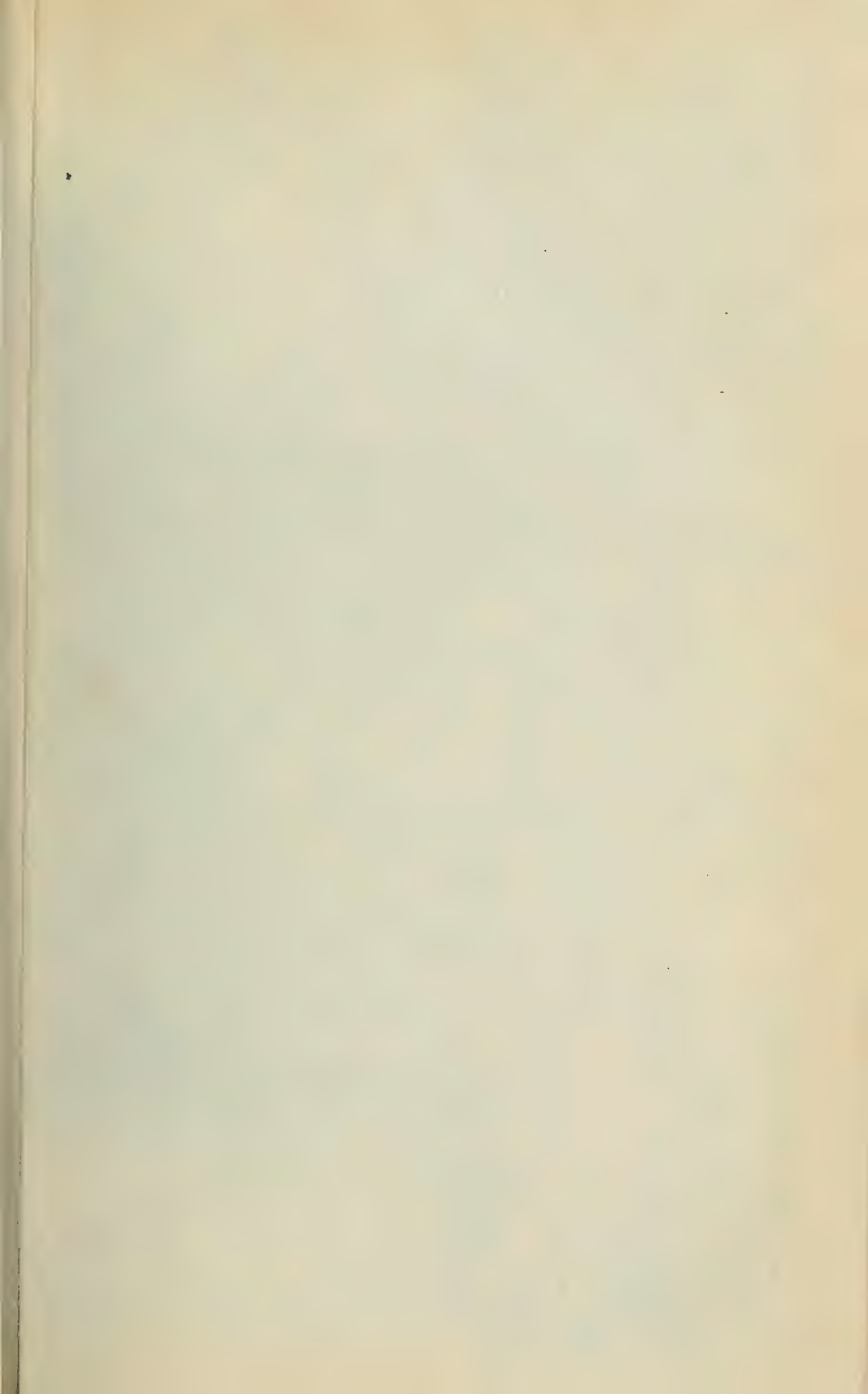
Amari (MICHELE), an It. historian, b. at Palermo in 1806. He bore a prominent part in the Sicilian revolution of 1848, and in 1859 was minister of foreign affairs under Garibaldi, and minister of public instruction in 1864. He wrote *History of the Mussulmans of Sicily*. D. Sept. 20, 1870.

Ama'sis, king of Egypt, succeeded Apries about 570 B. C., was more friendly to the Gr. and other foreigners than his predecessors. Under his reign Egypt prospered. He built magnificent monuments at Memphis. D. about 525 B. C.

Ama'ti, an It. family of Cremona, makers of violins. The earliest of these was ANDREA, who lived about 1550, several of whose sons almost equalled their father. His grandson NICOLÒ, b. Sept. 3, 1596, is most celebrated. D. Aug. 12, 1684.

Amauro'sis [Gr. *ἀμαυρωσις*, from *ἀμαυρόω*, to "darken"], a term formerly much employed to designate total or partial blindness dependent upon diseases of the optic nerve, either at its origin, in its course, or in the retina; the last-mentioned seat of the disease being by far the most frequent. If the local disease be temporary or functional, the sight will probably be regained; but in the majority of cases there is no such hope. It may arise from many causes, one of the most remarkable of these being the existence of Bright's disease; and in cases resulting from this cause there is an organic change in the structure of the retina, readily discernible by the aid of the ophthalmoscope. A. sometimes comes on at once, but is generally gradual in its attack. The treatment varies with the extremely various pathological conditions. Active treatment is seldom called for, and no item in the cure of this disease is more important than attention to the hygienic condition. E. D. HUDSON, JR.

Am'azon, **Amazo'nas**, **Solimões'**, or **Marañon'**, names bestowed in different parts of its course, upon the great river of S. Amer., the largest though possibly not the longest river in the world. Its upper waters, from Tabala-







MAP OF

NORTH AMERICA

Drawn and Engraved on Copper-Plate

EXPRESSLY

FOR

JOHNSON'S UNIVERSAL CYCLOPEDIA

Scale of Miles
0 100 200 300 400 500

Longitude West 20 from Washington

COAL FIELDS

Subterranean and Transic basins.

Lignite deposit.

tinga to its source in the Andes, bear the name of Marañon; its middle course, from Tabatinga to the mouth of the Rio Negro, is known as the Solimões; while the portion from the junction of the Rio Negro to the ocean is called Amazon, Amazonas, or Amazons. It rises from several sources in the Andes, the Tunzuragua being the most western. Its course is about 3500 m. nearly due E., varying not more than 2° or 3°, and discharges an immense volume of water into the Atlantic under the equator. It is nav. by way of its Ucayali and Madeira branches for 3300 m. from the ocean. The tide ascends 400 m. from its mouth. It is 4 m. wide where the Japura joins it, 1000 m. from the sea, and 40 m. wide at its mouth. A large island, Marajo or Joannes, 150 m. in diameter, is formed in the delta. At full moon the tidal wave meets the outflowing waters of the river and forms a watery wall 15 ft. high called a *bore*. Its largest affluents from the S. are the Ucayali, Yurua, Purus, Madeira, Tapajós, and Tocantins. The sources of the Madeira are in Bolivia, about 18° S. lat. The N. affluents are the Napo, Putumayo, Japura, and Rio Negro. The river abounds in turtles, the oil from whose eggs is in demand. Agassiz discovered 1163 new species of fish in the A. Its banks are lined with vast and often impassable forests, in which jaguars, pumas, monkeys, tapirs, and anacondas abound. The river was first explored by Orellana in 1539, and opened for trade with all nations in 1867.

L. P. BROCKETT.

Am'azons [Lat. *Amazones*; Gr. *Ἀμαζόνες*, perhaps meaning "without breasts;" they are said to have cut off the right breast, which interfered with their aim in archery], a semi-fabulous nation of martial women celebrated by the ancient Gr. poets. The battles of the A. were favorite subjects with ancient Gr. painters and sculptors.

Ambas'sador [perhaps connected with Goth. *and'baht*, Celt. *ambac'tus*, "servant"], a legate sent by a prince or state to another to manage special public affairs in international relations. His person is inviolable in ordinary cases; he is exempt from taxation, and otherwise not under control of municipal law. The word also denotes the highest in rank of the class of public representatives. T. D. WOOLSEY.

Am'ber [Lat. *succinum*; Fr. *ambre*; Gr. *ἄμβροτον*], a fossil resin, usually of a pale yellow color, sometimes nearly transparent, found in many parts of the world, and now known to be the resinous exudation from several species of extinct coniferous trees. It is used for ornaments, and especially for mouth-pieces of pipes. Most of the A. of commerce is found on the shores of the Baltic. A. exhales a fragrant odor when burned, and was formerly used as a med.

Ambergris, am'ber-grees [Fr. *ambregris*, i. e. "gray amber"], a gray substance generally found floating on the sea or lying on the sea-coast, and developed in the intestines of the spermaceti whale (*Physeter macrocephalus*). It is supposed to be a morbid secretion of this animal induced by wounds inflicted by cuttle-fish swallowed, etc. When heated or dissolved in alcohol it emits a peculiar and agreeable odor exceedingly diffusive. It also increases the odor of other perfumes.

Amblyop'side [from the Gr. *ἀμβλῖς*, "blunt," "dulled," and *ὤψ*, "vision"], a family of homöoteleosts, with the mouth bordered above only by the intermaxillary bones, the anus thoracic, and the head naked. It contains three



Amblyopsis spelæus.

genera: the largest and best known representative is the blind fish (*Amblyopsis spelæus*) of the great Mammoth Cave of Ky., of which the largest specimens reach 5 inches in length. Their sense of hearing is very acute, and at any noise they turn suddenly downward and hide beneath stones, etc., on the bottom.

Am'boy, city and R. R. junc., Lee co., Ill., 94 m. W. of Chicago. It has the Ill. Central shops, and is division headquarters of the Ill. Central road from Dunleith to Centralia. Pop. 1870, 2825; 1880, 2448.

Amboy'na, or **Amboi'na** [Malay, *Amboon'* or *Amboin*], one of the Moluccas or Spice Islands, belonging to the Dut., chiefly noted for its production of cloves, of which about 500,000 lbs. are annually produced. Area, 282 sq. m. Pop. 50,000.

Am'brose [Lat. *Ambrosius*], SAINT, a father of the Lat. Ch., b. about 340, in Gaul, where his father was Rom. prefect. He studied law, and was made gov. of Milan about 370. The bp. of Milan dying in 374, A. was elected to the see, although still a layman, and filled the position with great moderation and wisdom. The AMBROSIAN CHANT is ascribed to him. D. 397.

Ambo'sia [from the Gr. *ἄμβροτος*, "immortal"], in classic mythology, "the food of the gods," which was supposed to confer immortal youth even upon mortals, to whom it was sometimes imparted.

Ambrosian Chant, the choral music of the early Chr. Ch., derived its name from St. Ambrose, bp. of Milan, who introduced it into the Western Ch. about 386 A. D. The Ambrosian Chant is the foundation of ch. music.

Amen, Heb. "So let it be," used in N. T.; Gr. for "verily," a strong expression of assent.

Ameno'phis (or **Am'enoph**) [Gr. *Ἀμενώφης*], the name of three Egyptian kings of the 18th dynasty.—AMENOPHIS I., the second of the dynasty (reigned 1490-78 B. C.), restored the prosperity of the country which had been destroyed by the shepherd kings.—AMENOPHIS III., grandson of the preceding, the eighth of the dynasty, began to reign about 1400 B. C. He is supposed to have built the palace of Luxor. He reigned 36 yrs. with great prosperity, and is probably the Pharaoh whom the Grs. called Memnon.

Amer'ica [so named from Amerigo Vespucci, who discovered a portion of the continent in 1499] is one of the four great recognized divisions of the globe, which was first practically made known to Europeans by Columbus in 1492, although parts of it were visited by the Northmen in the 11th cent., but they made no permanent settlements.

Situation and Area.—Amer. appears to be separated into two continents, N. and S. A., connected by the Isthmus of Panama or Darien. It stretches from Boothia Felix, lat. 71° 55' N., to Cape Horn, 56° S. In its widest parts it measures over 3000 m., the extreme E. point being Cape St. Charles, in lat. 55° N., and the farthest W., Point Parina, lon. 81° W. from Greenwich. The narrowest part at the isthmus is 28 m. The N. boundary is the Arctic Ocean; the E., through its whole extent, the Atlantic; the Southern Ocean washes its coast on the S., and its W. shores are bounded by the Pacific. Amer. is about four times as large as Europe, and one third larger than Afr. While rather less than Asia in area, it embraces about three tenths of the land on the earth. In physical features it surpasses all other regions of the globe in the length and volume of its rivers, the area of its lakes, the extent of its valleys, and the number of its mt. ranges (inferior in height to the Himalayas alone), while its active volcanoes embrace more than two thirds of those known to exist. The continent stretches over about 126° of lat.—8280 m.—being much longer than any other. The area and political divisions are outlined in the following table, based upon the latest and most reliable authorities:

[Compiled (with additions of late discovery from BERRY and WAGNER, *Deutsche Zeitschrift der Erde*, 5th series, 3, 34, 1884.)]

NAMES OF COUNTRIES.	Square Miles.	Population.
North America	8,405,495	64,301,838
Bermuda Islands.....	19	13,812
Canada, Dominion of.....	3,204,381	4,352,080
Greenland.....	837,523	10,000
Mexico.....	741,598	9,389,461
Newfoundland.....	42,718	161,374
St. Pierre and Miquelon.....	91	5,338
United States.....	3,579,165	50,155,773
Do. Indians.....		214,000
Central America	179,677	2,534,586
Costa Rica.....	19,979	185,000
Guatemala.....	46,740	1,190,754
Honduras, British.....	7,560	24,710
Independent.....	46,505	351,700
Nicaragua.....	51,647	300,000
Salvador.....	7,226	482,422
West Indies	94,279	4,412,703
Spanish possessions.....	49,465	2,061,500
British possessions.....	13,317	1,126,062
San Domingo.....	20,591	250,000
Haiti.....	9,229	550,000
French possessions.....	1,103	345,095
Dutch possessions.....	496	42,506
Danish possessions.....	138	37,000
South America	6,420,029	28,168,397
Argentine Republic.....	827,117	2,400,000
Bolivia.....	500,740	2,325,000
Brazil.....	3,218,166	11,108,291
Chili.....	124,084	2,400,000
Colombia.....	289,056	2,774,000
Ecuador.....	248,312	1,146,000
Guiana, British.....	85,400	240,500
French.....	46,865	26,760
Dutch.....	46,058	68,351
Paraguay.....	91,080	293,844
Patagonia.....	350,781	93,000
Peru.....	72,413	3,050,000
Uruguay.....	72,151	447,000
Venezuela.....	439,119	1,784,197
Falkland Islands.....	4,837	1,394
Galapagos Islands.....	2,950	60
Total America	15,099,480	99,417,524

I. NORTH AMERICA extends from the Arctic Ocean to the Gulf of Mex. and Central Amer. on the S. With the general outline of a triangle, it is deeply indented by inlets, bays, and gulfs, and has a length of about 13,700 m. on the Atlantic, 10,500 on the Pacific, and 3500 on the Arctic; total, 27,700 m. of coast line. The continent approaches closely to Asia on the N. W. at Behring's Strait, 48 m. wide. In the N. E., Greenland is separated from the continent by Baffin Bay and Davis Strait.

Physical Features.—N. A. may be roughly stated as presenting—1. In the N. a vast series of plains, bleak and barren, and crowded with lakes, extending from about lat. 50° N. to the Frozen Ocean; 2. The region E. of the Appalachian range, consisting of lands mostly of low elevation and diversified soil; 3. The central valley of the Miss., reaching from the Alleghanies to the Rocky Mts., and embracing in its E. region the richest agricultural portion of N. A., in its W. the arid and sandy plains of the great Amer. Desert; 4. The W. plateau, stretching from the Rocky Mt. range to the Pacific, a region rich in minerals, with a varied soil and a generally equable climate; 5. The elevated table-lands of Mex., with their extensive mt. ranges, and narrow coast line of low lands on the E. and W.

Mountains.—The great characteristic ranges of mts. in N. A., creating marked divisions of its watersheds, and with broad valleys between, are the Rocky Mt. range in the W. and the Appalachian (sometimes called the Alleghanies) in the E. The Rocky Mts. may be said to begin in Brit.

Amer. terr., above lat. 60° N., stretching in a S. direction through Mont., Id., Wyo., and Col. until they meet the Sierra Madre range, which runs from New Mex. through the greater part of the Mex. republic. The highest Rocky Mt. peaks are the Holy Cross, Pike's, Long's, and Torrey's peaks, rising to a height of between 14,000 and 14,400 ft. They are, however, overtopped by Mt. Whitney, in the Sierra Nevada range, Cal., 14,887 ft. high. Numerous collateral ranges, frequently classified as part of the Rocky Mt. system, run in directions generally parallel. These comprise the Cascade Mts. in Or. and Wash., the Coast range and Sierra Nevada in Cal., the Wasatch Mts. in Ut., the Wind River Mts. and the Black Hills in Wyo. and Dak. The Cascade range extends along the coast as far N. as Alaska, its loftiest peak, Mt. St. Elias, about 60° N., being 19,500 ft. high. Southward the mt. ranges of Mex. have the volcanic peaks of Orizaba, 17,809 ft., and Popocatepetl, 17,744 ft. The Appalachian system stretches from western N. C. northward in Va. and Pa., terminating in isolated mts. of lesser elevation and the White Mt. range in the N. Eng. States. The highest summit of the White Mts. is Mt. Washington, 6288 ft. The highest peak in this range is Mitchell's Peak, in the Black Mts. of N. C., 6607 ft.

Rivers.—A marked feature of N. A. is its navigable rivers, affording means of interior communication to an extent unequalled on the other continents. The Miss, alone, with its branches, supplies more miles of inland navigation than all Europe possesses. The distance from the mouth of the Miss. to the farthest point navigable on the head-waters of the Mo. is 3900 m.; and this great river with its tributaries drains 16 States and 5 Terrs. The St. Lawrence affords a water transit (including the lakes with which it communicates) of 2200 m. The Mackenzie River in the N. flows through Brit. terr. into the Arctic Ocean, and the Saskatchewan into Hudson Bay, while Frazer's River runs through Brit. Columbia to the Pacific. The Yukon, of Alaska, is more than 2500 m. long. The Columbia rises in the Rocky Mts., flows through Wash. and Or., and reaches the Pacific. The Hudson, nav. for 150 m. above N. Y., is always crowded with commerce. The Rio Grande del Norte flows into the Gulf of Mex., and the Col. into the Gulf of Cal.

Lakes and Bays.—The inland seas of N. A. comprise Lake Superior, 31,400 sq. m.; Erie, 10,000; Ontario, 7300; Huron, 23,800, and Michigan, 25,600; Lake Champlain lies between N. Y. and Vt. All these are great avenues of commerce, while lakes Winnipeg, Athabasca, Great Slave, and Great Bear, lying in the bleak regions of the N., are little navigated. Many lesser lakes are scattered through the N. U. S. The Gulf of Mex. washes the S. boundary of the U. S.; the Gulf of Cal. is on the W. coast. Baffin Bay and Hudson Bay are large and almost land-locked bodies of water to the N. of Canada; and these, with the Gulf of St. Lawrence, form the most notable of the bays which indent the coast, but the smaller ones are almost innumerable.

Geology and Minerals.—It is impossible to analyze the diversified geological structure of the continent in a brief space. The Paleozoic rocks cover the greater portion, consisting of Silurian, Devonian, and carboniferous strata, the latter furnishing great coal-fields in Pa. and other border lands of the Appalachian chain, in Ill., Mich., and in Brit. Amer. Glacial drift and boulders are scattered profusely over many regions N. of about 40°. The Atlantic coast develops the cretaceous and tertiary strata, with gneiss beneath it, the latter covered partially by new red sandstone on the E. slope of the Alleghanies. Large areas of cretaceous, triassic, and oolitic rocks are found in the W.; and in Cal. the secondary strata and tertiary beds are most prominent. Brit. Amer. abounds in the Laurentian and Huronian rocks, being the most ancient yet found, and these extend S. to the Adirondack region in N. Y. The Rocky Mts. exhibit volcanic rocks and the upheaved strata of granite, slates, and carboniferous rocks. The great plateau running from Mex. to Brit. Amer., W. of the Rocky Mts., and bisected by the cañons of the Col. to the depth of several thousand ft., exhibits specimens of almost all the geological structures. N. A. has within the present generation been the richest part of the globe in the production of gold and silver. From the quartz veins and surface deposits in the Sierra Nevada have been taken more than \$1,000,000,000 of gold since 1848. The veins of silver in Nev., Col., and Ut. have yielded \$450,000,000 since their discovery in 1859. Mex. is also rich in silver. Copper is largely mined on the shores of Lake Superior in Mich., and in Mex. The upper Miss. affords lead ore in abundance. Quicksilver is found in Cal. and Mex. Iron abounds; salt is distributed widely; and the immense coal beds, both bituminous and anthracite, afford a practically inexhaustible supply of fuel.

Climate.—All the climates of the globe may be found in N. A. The N. Eng. regions are colder than the W. in the same parallels of lat., and 10 or 12° lower than the same lat. in W. Europe. Vast regions N. of the lakes are almost uninhabitable from the intense cold, while in the S. States and parts of Mex. the climate of the torrid zone prevails during a part of the year. The mean range of temperature for the year is as follows in the regions named: Alaska, 42° F.; Ala. 66°; Mass. 46°; Wash. (city) 56°; Greenland, 13°; Mex. (city) 61°; N. S. 44°; Que. 40°; Cal. 55°; Minn. 42°; Fla. 70°. Extremes of temperature and sudden changes occur in most regions remote from the seaboard. The rainfall is variable. Parts of Mex. and Cal. are dry almost throughout the year. The trade winds blowing from the Gulf of Mex. carry the moisture of the torrid zone up the Miss. valley, while the great plains directly E. of the Rocky Mts. present an almost rainless region.

Soil and Productions.—With the exception of the arid region near the Rocky Mts., the stony or sandy or exhausted lands along the Atlantic coast, and the vast bleak regions lying below the Arctic Ocean, the soil of N. A. is singularly fertile. The rich alluvium on the banks of the Ohio, Miss., and other rivers is almost inexhaustible. The W. prairies and the wooded regions of the N. and S. States have a productive soil. The table-land of Mex., with parts of Cal. and

the Great Amer. Desert, are without forests. Canada is rich in timber; so are some parts of the N. W. and S. States. The most valuable forest trees are the oak, maple, hickory, chestnut, pine, ash, beech, poplar, black walnut, tulip, and white cedar. Indian corn, or maize, is the most important grain crop; wheat, oats, rye, and barley come next. The hay crop is of great value, so are potatoes. Cotton ranks among the most important products. Large quantities of tobacco, rice, and sugar-cane are produced, although their area of production is limited. Fruit trees, including the apple, pear, peach, orange, etc., are widely raised. The grape is becoming an important crop.

Zoology.—The animals of N. A. include every important species known in Europe, and there are remains of several extinct mammals and birds. The bison, or buffaloes, are fast disappearing. The deer family embraces several varieties—reindeer in the Arctic region, the moose in Me. and Brit. Amer., and the *Cervus Americanus* among the forests and mts. of several States. Other wild animals are the bear, panther, lynx, wild-cat, wolf, dog, fox, beaver, otter, raccoon, badger, opossum, antelope, squirrel, muskrat, hedgehog, hare, weasel, and gopher. Among domesticated animals, horses, sheep, cattle, and swine are abundant. The birds of N. A., elsewhere described, number about 700 species, embracing the turkey, pheasant, buzzard, hawk, pigeon, eagle, vulture, owl, grouse, quail, wild goose, swan, duck, pelican, lark, thrush, mockingbird, robin, woodpecker, parrot, hummingbird, grosbeak, whip-poor-will, kingfisher, bluebird, jay, oriole, cedar-bird, etc. Serpents are numerous, the rattlesnake being the most venomous. Alligators abound in the S. rivers, and turtles, toads, and frogs everywhere. Fish are abundant and valuable, including salmon, shad, cod, mackerel, sturgeon, trout, white-fish, herring, sheephead, bass, perch, blue-fish, etc.

Population and Language.—What may have been the origin of the aborigines of N. A. is a problem still unsolved. There yet remain of the indigenous races between four and five millions, mostly in Mex. The Esquimaux appear to be a distinct race. All the native races are copper-colored, though of a different tinge, with black straight hair. They are in general a stationary, unprogressive race. The number of languages spoken nearly equals that of all the rest of the globe (about 450), and all attempts to trace these confused dialects to E. originals are more fanciful than scientific. The natives of Alaska are supposed to be of different origin from the other Amer. Indians. The Afr. race, originally introduced as slaves, now number 6,600,000, mostly in the S. States. The white pop. number about 75,000,000, of whom nearly two thirds inhabit the U. S. They are mostly of the Germanic branch of the Caucasian race, those of Lat. descent being chiefly in Mex. The A.-S. element peoples over two thirds of the settled regions, and the Eng. lang. is that of nearly nine tenths of the pop., the one considerable exception being the Mex. use of the Sp. tongue.

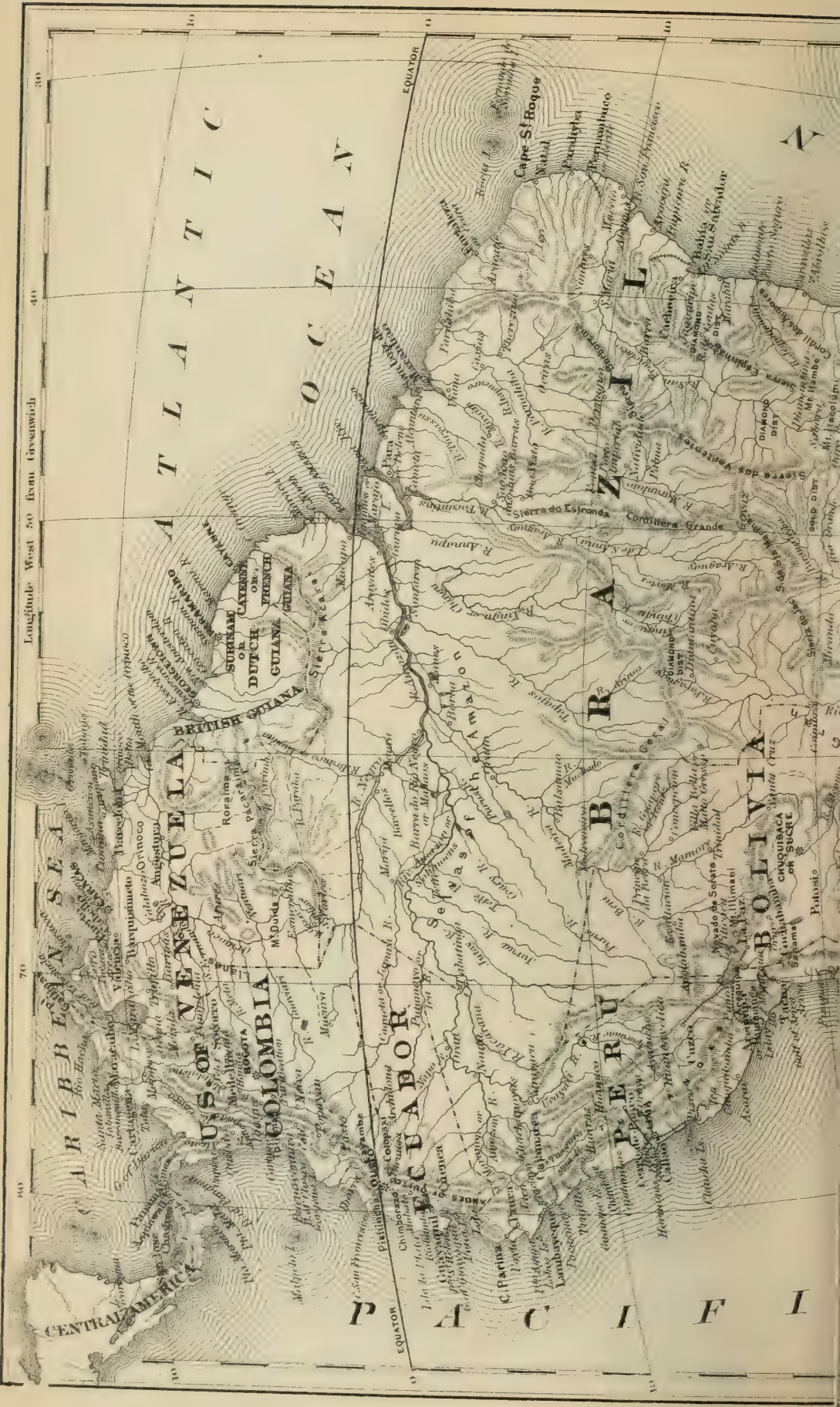
Religion, Education, Etc.—Prot. Christianity is the more prevalent religious belief in N. A. Methodism outnumbered any other, the Bap. coming next, and the Presb. third, followed by the Congl. and the Epis. The R. Cath. worship is widely prevalent in the U. S., and in Canada embraces more than one third of the pop. In Mex. the great majority are Caths. Mormonism has a foothold in Ut. alone. Education is widely diffused in the U. S. and Canada. The percentage of illiteracy, however, embraces one fifth of the pop. of 10 yrs. and upward. In Mex. there is a large ignorant native pop.

Discovery and Settlement.—As has already been said, Northmen landed in Greenland early in the 11th century, and undoubtedly went as far S. as what is now R. I. Columbus reached the W. I. Islands in 1492, and subsequently discovered the mainland of S. A. The mainland of N. A. was probably first touched by John Cabot in 1497. In 1500 the Port. Cortereal touched at Labrador; in 1513 Balboa crossed the Isthmus of Darien and found the S. Sea; in 1519 Cortez invaded Mex., and finished its conquest in 1521; in 1535 Cartier sailed through the Gulf of St. Lawrence; in 1537 Cortez discovered Cal., and took possession of it in the name of Sp.; in 1578 New Albion was discovered by Sir Francis Drake; in 1587 John Davis found the Cumberland Islands and Davis Strait; in 1604 De Monts made the first settlement in Acadie (N. S.). The first permanent Eng. settlement in N. A. was made in 1607 at Jamestown, Va. In 1608 the Fr. founded Que. in 1611 Newfoundland was colonized by the Eng., and the Dut. settled on the Hudson; in 1614 N. Y. was founded; in 1618 Baffin sailed N. to lat. 78°, and named Baffin Bay. In 1620 took place the settlement at Plymouth of the first Eng. colony in N. Eng. In 1682 William Penn founded a colony in Pa., and in the same yr. La Salle took possession of La. in the name of Fr.; in 1683 Ga. was colonized by the Eng.

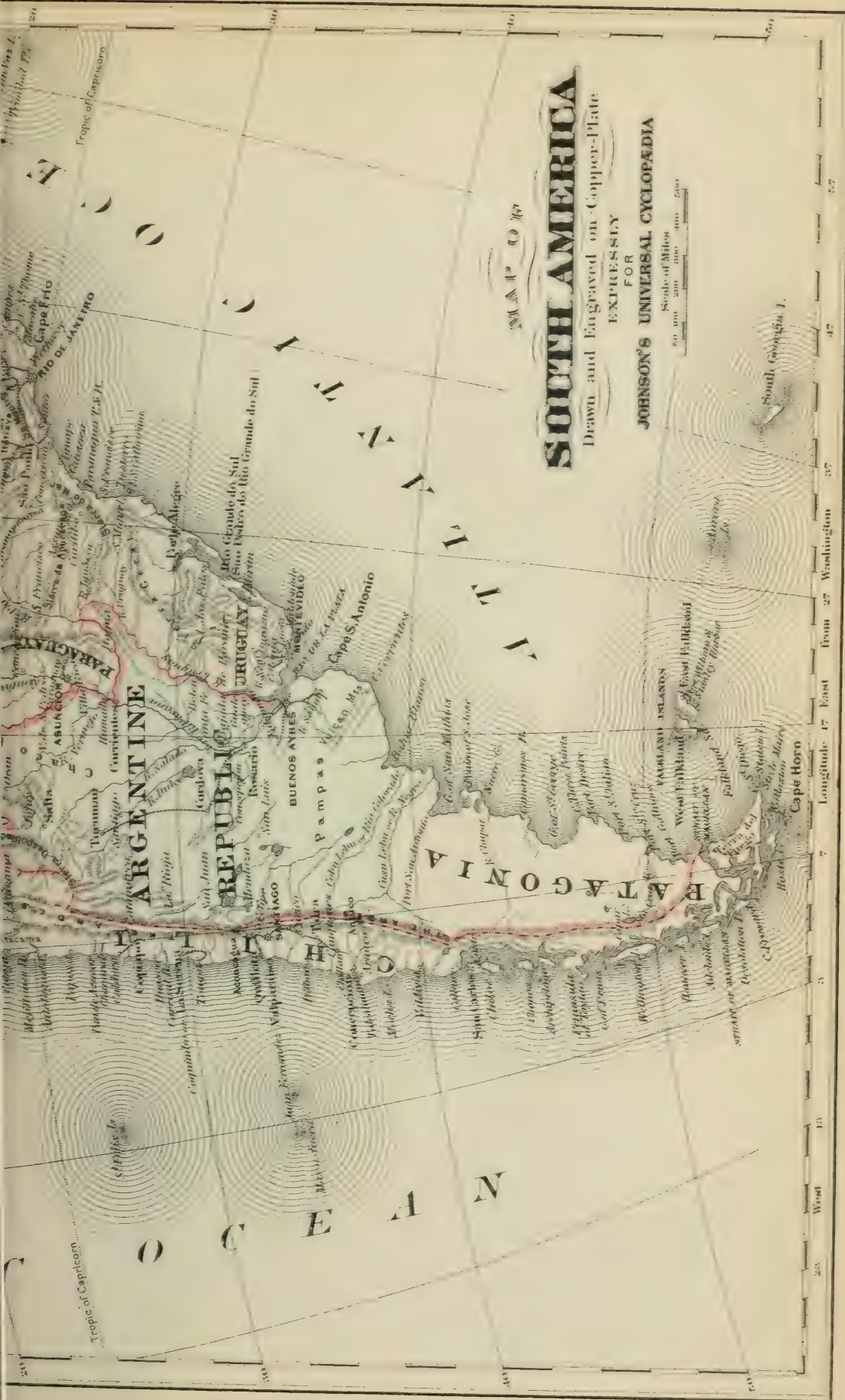
History.—The most marked historical events in the hist. of N. A. have been—1. The transfer of most of the Fr. colonies to G. Brit., after the Fr. war of 1756-63, by the treaty of Paris, in the latter year; 2. The Amer. Revolution, ending in the independence of Brit. rule of the U. S., 1775-83; 3. The independence of Mex. of Sp. rule, accomplished in 1821. The subsequent history of the various countries will be found under their respective headings.

II. CENTRAL AMERICA.—The region S. of Mex., and uniting N. and S. A. between lat. 7° and 18° N., is a mountainous district, interspersed with plains, as in Nicaragua, and table-lands, as in Honduras. Central Amer. has some mts. 15,000 ft. high, and its volcanic regions are extensive. Its geol. exhibits crystalline rocks with gold, silver, and lead, hitherto little worked. The products embrace all the tropical plants and fruits. The forests are extensive, abounding in birds, conspicuous among which are the toucan and the hummingbird. The rivers are all small, the San Juan, the outlet of Lake Nicaragua (which has an area of 3400 sq. m.), being the principal one. The most important bays are the Gulf of Honduras on the Caribbean Sea, the Bay of Panama, the gulfs of Fonseca and Nicoya, on the

Longitude West 50 from Greenwich



10000	10000	10000	10000
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Pacific coast. The inhabitants are more than half native Indians, one third Mestizos or mixed whites and Indians, and the remainder whites. Columbus was the first to visit the mainland of Central Amer. in 1502, and in 1522 it was conquered by Alvarado, continuing three centuries under Sp. rule, and becoming a federal republic in 1823. In 1833 this govt. dissolved, and five republics—Costa Rica, Guatemala, Honduras, Nicaragua, and Salvador—were formed.

III. THE WEST INDIES, so called from the belief of the early discoverers that the countries found in the 15th cent. were the western regions of India. They embrace about 900 islands, lying E. of the coast of N. and Central Amer. The name of Antilles is made to embrace all the W. I. except the Bahamas. Another designation divides the W. I. into the Leeward Islands, comprising those N. of lat. 15°, and the Windward Islands, embracing those S. of that parallel. The Windward Islands, or a part of them, were also named the Caribbees, and the sea which they separate from the Atlantic is called the Caribbean. The geological structure of these islands indicates either coral formation or volcanic origin. The whole submerged region is subject to earthquakes. The rocky coast of most of the islands abounds in reefs, although there are some good harbors. The Bahama Islands embrace the northernmost chain, stretching S. E. from a point near the coast of Fla. On one of this group Columbus made his first landing. The entire W. I. embrace about 95,000 sq. m., with about 4,000,000 inhabs. About half the area and pop. belong to Sp. G. Brit. holds the dominant share in the remainder, while Fr., Den., and the Netherlands have possessions in this archipelago.

IV. SOUTH AMERICA.—This portion of the Amer. continent is of triangular form, measuring 4550 m. from N. to S., and 3300 m. at its greatest breadth. Three fourths of it lie between the tropics. The great physical features of S. A. are—1. The valley of the Orinoco in the N., marked by extensive plains called llanos, resembling the prairies of N. A. in the absence of trees and the tall herbage; 2. The basin of the Amazon, just S. of the equatorial region, draining a country of 2,000,000 sq. m., covered with forests, and teeming with animal and vegetable life; 3. The S. plains or pampas of Buenos Ayres, watered by the Plata and other streams, covered with high grass, affording food for herds of cattle and horses; 4. The Brazilian country, of a mingled mountainous and valley formation, well wooded in the E., and with steppes or plains in the interior; 5. The shores of the Pacific, a narrow strip of low land between the mt. ranges and the ocean, from 50 to 150 m. broad, and 4000 m. long.

Mountains.—Ranges of mts. are scattered over the whole area of S. A. The Andes form a mt. chain with an average height of 11,000 ft., extending from the extreme S. W. coast to the Isthmus of Panama. Between the ridges lie lofty plains or valleys, and transverse chains run from the Andes eastward across the continent, inclosing the 3 great natural depressions that form the basins of the Orinoco, Amazon, and Plata. The cordillera (mt. chain) of the W. coast is 700 m. long, with a mean height of 4000 ft. and summits of 15,000 ft. The cordillera of the Orinoco, dividing the waters of that river from the basin of the Amazon, is forest-clad, with a mean height of 4000 ft., the chain being 1500 m. long. The Brazilian mts. are of moderate elevation, the highest peak being Itatiaia, 8900 ft. The highest peak in the Andes is 24,800 ft. There are more than 20 active volcanoes among the Andes of S. A., ranging from 13,000 to 23,000 ft.

Rivers and Lakes.—The Amazon, with its great tributaries, forms a body of water estimated to be greater than that of all the rivers of Asia, and the Plata is believed to discharge a greater volume of water than all the Afr. rivers combined. These rivers, as well as the Orinoco, have their estuaries on the Atlantic coast, and are nav. to the far interior. The Plata, with its great affluent, the Paraguay, is 1500 m. long, the Orinoco 1800, the Amazon 4000. Other rivers are the San Francisco, Essequibo, Rio Negro, etc.

The principal lake, Titicaca, on the borders of Peru and Bolivia, has 4000 sq. m. and a height of 12,200 ft. Many smaller lakes are scattered through the high plains and valleys. The coast of S. A. has few indentations, the gulfs of Maracaibo, San Antonio, and St. George being the principal on the Atlantic, and the G. of Guayaquil on the Pacific coast.

Geology.—Unusual uniformity pervades the geological structure of S. A. The pre-Silurian or oldest rocks are found on the coast, next to which come schists and quartz of the Silurian age. The transverse mt. ridges exhibit sandstones and limestones of the carboniferous period. Secondary and tertiary beds of rock are scattered through the great river valleys and mt. hollows. Bolivia has mts. of granite, which also occurs along the Chilean coast. Gneiss prevails along the shores of Peru, Ecuador, and Colombia, and in Brazil, where it is joined with granite. The Andes abound in porphyries, sandstones, and the schists. Agassiz found glacial formations in the Amazon valley and in the mts. of Brazil, and Orton found marine shells in Ecuador. The W. coast is the region of earthquakes. In the N. part are found emerald mines. Brazil and Venezuela furnish gold, and the diamond mines of Brazil are famous. Silver is found in Peru, Chili, Ecuador, and Bolivia, which have furnished more than \$2,400,000,000 of silver since the discovery of Amer. Iron and coal have not thus far been discovered in great quantities. Copper abounds in Chili.

Climate.—The chain of the Andes powerfully affects the climatic conditions of S. A. The trade winds blowing from the coast westward are arrested by the mt. ranges, intercepting the moisture of the atmosphere, and producing copious rains on the E. side of the Andes, while on the W. side long seasons of drought prevail. Farther N., where the mts. are more depressed, there is free passage for the trade winds, and the W. coast is well watered. So much of S. A. lies in the equatorial region that extreme sultriness prevails in the forests and the valleys, while the mt. ranges have a rarefied atmosphere and a cool climate.

Soil and Productions.—A notable feature of S. A. is its

vast forests, the area of which exceeds those of any other country. The growth of the native trees is amazing, and so luxuriant is vegetable life that they are covered all over with ferns, orchids, cactuses, and countless other plants, while the underwood is composed of thickets of palms, melastomaceae, myrtaceae, crotons, and tree-ferns. The most valuable forest trees are the mora, the cow-tree (yielding a juice like milk), and the greenheart. Of cultivated plants, wheat, maize, sugar-cane, coffee, indigo, cacao, etc., are abundantly raised, while oranges, lemons, limes, cocoa-nuts, bananas, mangoes, pineapples, etc., grow almost without care. The cinchona or Peruvian bark, the balsam of Peru and tolu, ipecacuanha, and copaiba are among the native medicinal plants. The ivory plant, the vanilla plant, the caoutchouc or India rubber tree grow in profusion. Gigantic palms and almost impenetrable forests brilliant with flowers show the richness of the botany.

Zoology.—The animals most abundant are the monkeys, or tree-climbers, which swarm in the forest regions; the jaguar, puma, dog, bear, llama, alpaca, tapir, etc. S. A. is the country of birds, of which more than 2300 species exist, while only 700 are described in N. A. The tropical regions produce innumerable birds, of bright plumage, cockatoos, toucans, parrots, humming-birds, etc., while the Andes witness the lofty flights of eagles, condors, falcons, and vultures. The serpent tribe infest almost every region, and alligators and electric eels swarm in the rivers. There are scorpions, mosquitoes, chigoes, ants, and insect pests innumerable. Horses and cattle are raised in prodigious numbers.

Population and Languages.—The native races of S. A. have been divided into the Brazilian, Patagonian, and the Appalachian, all distinguished by the large nose, broad skull, prominent cheek-bones, straight hair, and with brownish-yellow complexion. The Araucanians, the native tribes of Chili, are the best race, having many traits of civilization. The natives of Brazil are a mild race, living chiefly by rude agriculture. The equestrian tribes of Paraguay are a bolder and more active race. Cannibalism is still found in the interior of S. A., and the slave trade is still carried on. The Patagonians are tall and muscular, subsisting chiefly by hunting. Most of the S. A. countries have a mixed race of Sp. and native blood, and an extensive immigration from Europe (notably to the Argentine Republic and Brazil) forms a large and increasing element in the pop. Sp. is the spoken and written lang. of nearly all S. A., except in Brazil, which has the Port. Many native dialects exist.

Religion, Education, Etc.—The prevailing religion of S. A. is the R. Cath. Other worships are freely established wherever voluntary societies are formed. Education is neglected, although there is much intelligence, especially in the active commercial towns.

History.—Columbus was the first to set foot on S. A. soil, in 1498. He was followed by a long series of invaders from Sp. The anc. race which inhabited the W. coast were far superior to their descendants, possessing a knowledge of art, arch., etc., showing great advance in civilization. The coast of Brazil was discovered by Cabral in 1500; in 1508 Pinzon entered the Rio de la Plata; in 1531 Peru was conquered by Pizarro; Buenos Ayres was settled in 1535 by the Spaniards; in 1541 Chili was invaded and conquered, and Orellana sailed down the Amazon to the Atlantic in 1635; Guiana was settled by the Fr. Early in the present century the S. A. provinces of Sp. began to assert their independence. New Granada became a republic in 1811; Venezuela and Paraguay in 1813; the Argentine Confederation and Chili in 1818; Colombia in 1819; Peru in 1821; Bolivia in 1824, and Uruguay in 1825. Brazil was made an independent kingdom in 1825, being the only govt. on the Amer. continent which is not a republic or a colonial appendage to some foreign state.

Literature.—See HUMBOLDT, *Essai sur l'histoire de la géographie du Nouveau Continent*; MACREOR, *The Progress of America from the Discovery of Columbus to the year 1846*; SUTER, *The States of Central America*; WAPPAS, in the new edition of Stein's and Horschelmann's *Handbuch der Geographie und Statistik*; KOHL, *Geschichte der Entdeckung von Amerika*; *Naturalist's Directory of North America and the West Indies*; DR. D. G. BRINTON, *The Myths of the New World*; B. F. DE COSTA, *The pre-Columbian Discovery of America by the Northmen*, illustrated by translations from the Icelandic Sagas.

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American Antiquities, anti-k'wi-tiz. Although generally called the New World, Amer. is said by geologists to include the oldest portion of the earth's surface, and it also contains records of its occupation by civilized man which antedate all the venerable monuments of Europe. The most anc. and interesting of the traces of man form two categories—one, the monuments of the Miss. valley, which, consisting largely of tumuli, have given the name of the Mound Builders to the people by whom they were constructed; and the much more elaborate architectural monuments left by a civilization which once extended from Salt Lake on the N. to Chili on the S., and may be called the civilization of the table-lands. The monuments of the Mound Builders are confined to the valley of the Miss. and the basin of the great lakes. They extend from Lake Superior to the Gulf, and are usually mounds and walls of earth, but occasionally composed of rough stones laid up without mortar. They are often found overgrown by the primeval forest, and in the living and decaying trees which cover them we have evidence that these works have been abandoned at least 1000 years. As they are plainly the relics of a sedentary people, very different in their habits and modes of life from the Indians who occupied the country at the time of the advent of the whites, they have been generally regarded as the work of a distinct and now extinct race; but it is probable that some of the Indian tribes, such as the Mandans and the Natchez, were the more or less pure descendants of the Mound Builders.

Beside the earthworks left by these people, which in O.,

Ky., and other States are exceedingly numerous and indicate a dense pop., we have also proof that they worked the copper mines of Lake Superior, lead mines near Lexington, Ky., mica mines and serpentine quarries in N. C., and oil wells in O. and Pa. It would seem, however, that though sedentary and agricultural they were but partially civilized, since their implements were stone or native copper beaten out, not cast; and their structures, which must have been quite extensive, were apparently built of wood, since only their foundations remain. In the fortifications, which are found at many places, we have evidence that they had enemies against whom they were constantly defending themselves, and by whom it would seem they were ultimately for the most part destroyed. Following the migrations of the modern Indians, we learn that they have been for ages moving southward, and it seems altogether probable that to these nomadic invaders are due the abandonment of the towns and cities of the Mound Builders and their burial in the depths of the forest. Masses of galena, sheets of mica, copper and stone implements brought from distant localities, and marine shells in the interior, indicate some internal but no foreign commerce. Fragments of coarse cloth have been discovered, but all fine fabrics are wanting, perhaps from the lapse of time. No bones or other evidence indicating that they possessed domestic animals have been unearthed, and only a few tablets of doubtful authenticity could be cited as evidence that they had written lang. From all the facts in our possession we must conclude that the civilization of the Mound Builders was much less complete than that of the palace builders of Central Amer.; that their occupation of the Miss. valley dates back to the time of the earliest monuments of the human race, and that from most of the country they occupied they disappeared several thousand years ago.

The civilization of the table-lands seems to have been essentially that encountered by Cortez in Mex. Though differing in different localities, it had much in common throughout its range in S. and N. A. Its best monuments are now found in Peru, Central Amer., and Mex. They indicate a sedentary, agricultural, and peaceful people, far advanced in the arts. They specially excelled as workers in stone, and some of their masonry has never been surpassed. They also had a written lang., and have left numerous hieroglyphics, which seem about to yield their secrets to the translator. At the time of the Sp. conquest the civilization of Mex., Central Amer., and Peru was, though evidently in its decline, far from extinct, and a careful study of the Sp. historians and the monuments will ultimately give us a solution to the interesting problem of the origin and hist. of this Amer. civilization. At present we can only say that it seems to have been indigenous to this continent; that it grew from small beginnings in Central and Northern S. A., and gradually spread until its provinces reached to Chili and Utah. Its growth, maturity, and decadence would seem to have required some thousands of years.

The relations of the Mound Builders to the anc. Mexicans, though much discussed, are still uncertain. A small though increasing number of Mex. relics found in the mounds is gradually producing the conviction that they were at least for a time synchronous and had some intercourse, but this must have been by way of the Gulf, since a broad area unoccupied by either separated them. On the whole, there is no evidence of a genetic relationship. J. S. NEWBERRY.

American Indians. See APPENDIX.

Amer'icanism, a term applied to certain modes of expression which are, or are supposed to be, peculiar to the U. S., in distinction from Eng. usage. Not a few of these so-called "Americanisms" are really good old words, which have in Eng. lost their original signification, while it has been retained here. Again, there are words coined in Amer. to denote things which do not exist in Eng. The peculiar patois of the former slaves and the slang phrases of border-men should not be considered A. The proper use of A. is to indicate words often used by well educated persons in a peculiar transatlantic sense.

Amer'icus, city, on R. R., cap. Sumter co., Ga., 70 m. S. W. of Macon. Pop. 1870, 3259; 1880, 3635.

Ames, on R. R., Story co., Ia. It is the seat of the State Agri. Coll. Pop. 1870, 636; 1880, 1153.

Ames (ADELBERT), b. at Rockland, Me., Oct. 31, 1835; grad. at W. Pt. 1861, served in the campaigns in Va. to the close of the war, was breveted maj.-gen. 1865. In 1868 he was made provisional gov. of Miss., in 1869 commanded a military dist. in that dept., and when the State was reconstructed was U. S. Senator, 1870-73. Gov. of Miss. 1874-76.

Ames (EDWARD R.), D. D., LL.D., bishop of the Meth. Epis. Ch., b. at Athens, O., May 20, 1806. He was educated at O. Univ., was tutor at McKendree Coll. 1823-29, began to preach in 1830, and was appointed a bishop in 1852. D. at Baltimore, Md., Apr. 25, 1879.

Ames (FISHER), LL.D., an Amer. statesman, b. at Dedham, Mass., Apr. 9, 1758; grad. at Harvard, studied law, and was admitted to the bar in 1781. He distinguished himself as a political essayist and orator, was chosen rep. in Cong. in 1789, and re-elected until 1797, when he retired on account of impaired health. He was a Federalist and an ardent supporter of the administration of Washington. Two vols. of his *Orations and Essays* have been pub. D. July 4, 1808.

Ames (JOSEPH), b. in Roxbury, N. H., in 1816, became an artist, studied in Rome, painted portraits of Pius IX. and of Ristori at Meden. D. Oct. 30, 1872.

Amesbury, on R. R., Essex co., Mass., 40 m. N. of Boston, is the residence of the poet Whittier. The tp. has been divided since census of 1870. Pop. tp. 1870, 5581; 1880, 3355.

Am'ethyst [Gr. ἀμethystος, from α, priv., and μεθύσκω, to "make drunk"], a purple variety of rock-crystal or quartz; colored by manganese, so named from its reputed virtue of preventing intoxication.

Amhar'ic Language, now the lang. most spoken in

Abyssinia. After the extinction of the Ethiopic lang. the Amharic was reduced to writing, the old Ethiopic alphabet being retained, with the addition of some new characters. Many historical and other works have been written in Amharic, but only missionary records have been printed.

Am'herst, on R. R., Hampshire co., Mass., 85 m. W. of Boston. It is the seat of Amherst Coll. and of the Mass. Agri. Coll. Pop. of tp. 1870, 4035; 1880, 4298.

Amherst (JEFFERY), called **Lord Amherst**, b. 1717; entered the army in 1731, and became maj.-gen. in 1758; aided in the conquest of Canada, was made commander of the forces in Amer., afterward gov. of Va., and from 1776 to 1782 commander-in-chief of the Brit. army. D. Aug. 3, 1797.

Amherst (WILLIAM PITT), FIRST EARL OF, a nephew of the preceding, b. in 1773. In 1816 went as ambassador to Chi., but did not gain access to the emp. He was gov.-gen. of India 1823-26, and created earl in 1826. D. Mar. 13, 1857.

Amherst College, at Amherst, Hampshire co., Mass., was founded in 1821, under the auspices of the Congl. chs. of N. Eng. It has commodious buildings, valuable collections, and endowments for professorships, scholarships, and prizes, amounting in all to more than \$1,500,000, which, with the exception of \$50,000 granted by the State, has come from the donations and bequests of private individuals. Its collections and cabinets in ichnology, conchology, mineralogy, and meteorology, are unsurpassed. It has a gymnasium, in which the students are required to exercise under the direction of a medical prof.—The MASS. AGRI. COLL., opened in 1867, though located at the same place, and in a manner connected with A. Coll., has a separate faculty, and is governed by a board of trustees appointed by the State. Besides its real estate, its permanent endowment, derived from national and State grants and private benefactions, is about \$500,000. It has a farm of 300 acres, upon which the students labor under the supervision of the prof. of agri.; they are also regularly drilled in military exercise.

Amian'thus [Gr. ἀμῖαντος, "undefiled," from α, priv., and μῖαινω, to "defile"], a fibrous form of serpentine, so called because cloth made of it can be purified by fire.

Ami'dæ [Am'ia, anc. name of a Mediterranean fish], a family of cyclozanoid fishes, and the existing type of the order represented by a single living species, the *Amia Calva*, found in the fresh waters of N. Amer. It is known as the "dog-fish" or "lawyer," and is worthless as food.

Am'i'ci (GIOVANNI BATTISTA), an It. optician, b. at Modena Mar. 25, 1784. He constructed achromatic lenses for telescopes and microscopes, was for many years director of the observatory of Florence, and wrote upon astron. subjects. D. Apr. 10, 1863.

Amiens, am'ien-z (anc. *Samarobri'va* and *Ambia'nā*), a city of Fr., on the river Somme, 81 m. N. of Paris; has a strong citadel, a magnificent cathedral, completed in 1288, and many splendid public edifices. The noted "Peace of Amiens" was signed here in Mar. 1802. In Nov. 1870 the Ger. won here a great victory over the Fr. Pop. 74,170.

Am'man, or **Am'mon**, a ruined city of Syria, 55 m. E. N. E. of Jerusalem. It was an important city in anc. times, originally named Rabbah, which was besieged and taken by David. It was rebuilt by Ptolemy Philadelphus, and called Phila. As late as 300 A. D. it had a magnificent theatre and temples.

Amman (JOHANN CONRAD), M. D., a Swiss physician, b. at Schaffhausen in 1669, practised at Haarlem, in Hol. He acquired distinction by his successful efforts to teach the deaf and dumb to speak. D. 1730.

Ammana'ti, **Ammana'te**, or **Ammana'to** (BAR-TOLOMEO), an It. sculptor and arch., b. at Florence in 1511. Pope Julius III. employed him to adorn the Rom. cap. with sculptures. He completed the Pitti palace of Florence. D. about 1590.

Am'men (DANIEL), b. in O. May 15, 1820; entered the navy as mdpn. in 1836. During the c. war he served in many important actions along the Atlantic coast, was made capt. in 1866, com. in 1872, and rear-admiral in 1878, having been for some time chief of bureau of navigation; retired, 1878.

Am'men (JACOB), b. in Va. in 1808; grad. at W. Pt., resigned from the army in 1837, and until 1861 was prof. in various insts. and a C. E. During the c. war he served mainly in the W., rising to the rank of brig.-gen. of volunteers. He resigned Jan. 14, 1865.

Am'mergau' Mys'tery [Ger. *Ammergau Passions-spiel*], a representation of our Saviour's Passion, which since 1634 has taken place every 10 yrs. at the village of Ober-Ammergau, in Bavaria. The custom originated in a vow made by the inhabs., on their deliverance from the plague, to celebrate the Passion Tragedy every 10th yr.

Am'mian'us Marcellin'us, a Rom. historian of Gr. extraction, b. at Antioch about 330 A. D. He served as a soldier in youth and early manhood, afterward settled at Rome, where he wrote a *History of the Roman Emperors* from 96 to 378, of which only a part is extant. D. about 395.

Am'mira'to (SCIPIONE), an It. historian, b. at Lecce Sept. 27, 1531. He became a resident of Florence in 1569, and was patronized by the grand duke Cosimo. In 1596 he obtained a prebend in the cathedral of Florence, and wrote *History of Florence*. D. Jan. 30, 1601.

Am'mon, or **Ham'mon** [Gr. Ἄμμων], a deity worshipped in Egypt, Greece, and other countries, was called *Amun* by the Egyptians, and *Jupiter Ammon* by the Rom. There was a great temple of A. in an oasis of the Libyan Desert, and another at Thebes, which city was called No-Ammon by the anc. Heb.

Ammon, von (CHRISTOPH FRIEDRICH), a Ger. theol., b. at Baireuth Jan. 16, 1766. He was successively prof. of theol. at Göttingen and Erlangen; in 1813 removed to Dresden, where he became court-preacher, and wrote a *History of Christianity*. D. May 21, 1850.

Am'monia, or **Volatile Alkali**, an important chemical compound in the form of a transparent, colorless, and

pungent gas, is formed by the union of 1 atom of nitrogen and 2 atoms of hydrogen. Priestley, who first obtained it in a separate state, called it *azotic air*. The name *ammoniac* is derived from *sal ammoniac*, which was formerly procured near the temple of Ammon, in Libya, by burning camel's dung. It is now obtained as a by-product by the distillation of bituminous coal in making gas, and from refuse animal matter in preparing bone-black, etc. It combines with acids to form salts. As it supplies to plants the nitrogen they require, it is one of the most important ingredients in manures. A solution of this gas in water is used in med., and is called spirit of hartshorn or *liquor ammoniac*. One vol. of water will dissolve or absorb 500 vols. of A. The smelling salt, or volatile salt of hartshorn, used as a restorative in faintness, is a carbonate of A. Ammoniac sulphate is manufactured in large quantities, by boiling "gas-batter" with lime, and conducting the ammoniacal gas which is liberated into sulphuric acid. On evaporating the solution, the sulphate is obtained as a white salt. It is extensively used in the manufacture of alum in place of potassic sulphate, as a constituent of artificial fertilizers, and for the preparation of other ammoniacal salts.

Ammoniac [Lat. *ammoniacum*], a gum-resin used in med., is imported from Afr. and India. It is obtained from the *Dorema ammoniacum*, an umbelliferous plant containing a milky juice, which by drying is converted into this gum. It is used as an expectorant, and sometimes applied externally as a plaster.

Ammonites [from *Am'mon*, and the Gr. *λίθος*, a "stone," so named from their resemblance to the horns of Jupiter Ammon; Eng. *Am'monites*], an extinct genus of mollusks belonging to the order Cephalopoda, and one of the most striking features in the fauna of the mesozoic ages. The A. were discoid, chambered, spiral shells, sometimes 4 feet in diameter, and often beautifully ornamented exteriorly. The internal structure was similar to that of the *Nautilus*, except that the siphon was external, and the septa (partitions between the chambers) were arched outward, and were convoluted at their margins, so that their intersecting with the walls of the shell produced beautiful foliated figures. Beautiful A. occur in the cretaceous rocks of the country bordering the upper Mo., in the Ind. Terr., and in Tex.



Ammonites.

Ammonitidae, a family of cephalopodous mollusks, of which the genus *Ammonites* is the type. The genera of this group are all extinct, beginning with *Goniatites* in the Devonian and carboniferous, followed by *Ceratites* and *Ammonites* in the trias; *Ammonites* in great development in the Jurassic and cretaceous; *Baculites*, *Scaphites*, *Ancylloceras*, *Crioceras*, *Helicoceras*, *Helicoceras*, *Ptychoceras*, *Hamites*, *Turrillites*, etc., being exclusively cretaceous, and the family ending with them.

The shells of the A. are all chambered, and were generally, though not always, external; the animal inhabiting the last and largest, called the body-chamber. The series of smaller chambers are supposed to have served as a float, by which the specific gravity of the animal was harmonized with that of the surrounding medium, and the shell maintained in a position best suited to its movements.

The septa are arched outward at the centre, and ruffled at the margins; are nearly simple in the earliest stages of growth, most convoluted at full maturity, more simple again in old age. The ornamentation of the external surface, which consists of ridges, knobs, and spines, and is often very elaborate, follows the same law.

In most of the A. the shell is a discoid spiral, but the cretaceous genera exhibit great diversity of form; as *Ammonites*, with a symmetrical spiral coiled in the same plane; *Scaphites*, *Ancylloceras*, *Crioceras*, and *Toroceras*, showing a gradual unrolling of the coil, until in *Baculites* the shell is quite straight. In *Helicoceras* it forms an open elevated spiral; in *Turrillites*, an elongated conical closed spire, like that of a gastropod, but turned to the left. J. S. NEWBERRY.

Ammonium, a hypothetical metal which is supposed to exist in the salts of ammonia, and to be composed of 1 vol. of nitrogen and 4 of hydrogen. It is the analogue of potassium and sodium, but has never been obtained in a separate state; a supposed amalgam of A., however, may be formed by the action of the galvanic battery on a globe of mercury surrounded by a solution of ammonia, and by the action of sodium amalgam on a solution of A. chloride.

Ammonius, SUPREMIUS SACCAS, a Gr. philoso. b. in Alexandria, was the founder of the school called Neo-Platonism about 193 A. D.

Amnesty [from the Gr. *ἀμνηστία*, "non-remembrance"], an act of oblivion of past misconduct granted by the govt. to those who have been guilty of some offence. It is usually granted to whole communities or classes of individuals who have taken part, or are supposed to have participated in some movement against lawful authority; it may be granted either before or after conviction, and its effect is entirely to efface the crime and cause it to be forgotten by the law.

Amoo', or Amu', also called **Amoo Dar'ya** (anc. *Oxus*; Arab. *Gihon*), a river of W. Asia, rising at an elevation of nearly 15,000 ft. above the sea; receiving many affluents, it falls into the Sea of Aral after a course of 1610 m.

Amoor, Amur', or Saghalien, sag-hal'-ien, a river of E. Asia, formed near lat. 53° N. and lon. 122° E. by union of the Shilka and the Argoon. For a large part of its course the A. forms the boundary between Siberia and Chi., its lower course being entirely in Rus. After flowing 1800 m.

it falls into the Sea of Okhotsk. It is navigable by steamers, but navigation is obstructed by ice nearly half the year.

Amoy, a seaport town of Chi., on an island of the same name at the mouth of a river which passes the great city of Chang-Choo-Foo, of which A. is the port. It was taken by the Brit. in 1841, and since 1843 has been open to the trade of all nations. It is one of the chief centres of Prot. missions in Chi. Pop. 95,600.

Ampère, on-pair' (ANDRÉ MARIE), a Fr. savant, b. at Lyons Jan. 20, 1775. He became inspector-gen. of the univ. 1808, prof. in the Polytechnic School and chevalier of the Legion of Honor 1809, and member of the Inst. 1814. He made many discoveries in physical science, especially in electro-magnetism. D. June 10, 1836.

Ampère (JEAN JACQUES ANTOINE), a Fr. scholar, son of the preceding, b. in Lyons Aug. 12, 1800. He became prof. of Fr. lit. in the Coll. of Fr. 1833, member of the Acad. of Inscriptions 1842, and of the Fr. Acad. 1847. He was versed in Eng. and Ger. lit., and wrote *Roman History at Rome and Italy in the Fourteenth Century*, D. Mar. 27, 1864.

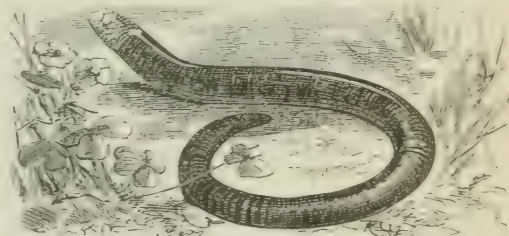
Amphibia [Gr. *ἀμφίβια*, from *ἀμφί*, "both," and *βίωω*, "to live"], a term applied to animals that live both on the land and in the water. Naturalists now divide the Reptilia of the older zoologists into two classes—viz., Reptilia, which includes the lizards, snakes, and turtles; and A., which comprises the serpent-like cecilians, salamanders, and batrachians (frogs and toads). Most amphibians pass through a metamorphosis like that of the frog, which emerges from the egg as a tadpole, when it is fishlike in form and breathes by gills, being truly aquatic; subsequently the tail and gills disappear, legs and lungs are developed, and the mature animal, though perhaps inhabiting the water, is an air-breather. In some amphibians the first or embryonic condition continues unchanged through life, as *Menobranchius*, *Menopoma*, etc., the water-puppies and young alligators of the W. rivers. The largest of these aquatic carnivorous salamanders is *Sieboldia*, which inhabits the lakes of Japan, and attains a length of 3 ft. Though now regarded as dull and disgusting creatures, this latter group of amphibians once stood at the head of all then existing members of the zoological series. The amphibians first appeared in the carboniferous age, and the lagoons in the coal-marshes swarmed with aquatic salamanders, some of which were 6 ft. in length, very active, and predaceous, and the monarchs of the animal world of that age. The amphibians had their golden age in the trias, when *Labyrinthodon*, with a body as large as that of an ox, and teeth 4 inches long, ruled the animal kingdom. In the succeeding age (Jurassic) the sceptre passed from the amphibians to the true reptiles.

J. S. NEWBERRY.

Amphictyonic (am-fik-ti-on'ik) **Coun'cil**, a celebrated cong. or politico-religious court of the confederated tribes of anc. Gr., which met twice every year at Thermopylae. It was composed of the deputies of 12 tribes—viz., Thessalians, Boeotians, Dorians (or Spartans), Ionians (or Athenians), Locrians, Dolopians, Magnesians, Malians, Achæans, Phocians, Eubœians, and Perrhæbians, who each sent one or two members. One great object of the council was the protection of the temple at Delphi.

Amphion [Gr. *Ἀμφίων*], in classic mythology, a Theban prince and musician, who by his skill in music built the walls of Thebes, the stones being attracted to their places by the sound of his lyre.

Amphisbani'dæ [Gr. *ἀμφίβανα*, from *ἀμφί*, "on both sides," quasi at both ends, and *βαίνω*, "to go"], a family of Lacertian reptiles with the pterygoid and quadrate bones united, no columella, and no interorbital septum, and an



Amphisbena Poliginosa.

elongated serpentine body with a blunt tail. The head and tail are sufficiently similar in appearance to have gained their scientific names. About two dozen species inhabit the warm portions of both hemispheres. They burrow in the earth, and have rudimentary eyes.

Amphitheatre, am-fi-thé'-a-ter [Gr. *ἀμφιθέατρον*, from *ἀμφί*, "around," and *θέατρον*, a "theatre"], a spacious and uncovered edifice in which the anc. Roms. witnessed the exhibition of public games, which were exhibited in an open space, called the arena, surrounded by seats rising tier above tier. The most famous A. was the Colosseum at Rome, which had seats for 80,000 spectators, and standing-room for 20,000 more.

Amphitherium [from *ἀμφί*, "on both sides," and *θηρίον*, "beast"], a genus of marsupial mammalia fossil in the oolitic strata in Oxfordshire. Eng.

Amphitrite, am-fi-tri'te [Gr. *Ἀμφιτρίτη*], in the Gr. mythology, the wife of Neptune.

Amphitryon, am-fi'tri-on [Gr. *Ἀμφιτρίων*], in classic mythology, husband of Alcmena, who was the mother of Hercules.

Ampullari'dæ [Lat. *ampulla* "a flask"], a family of tænioglossate, pectinibranchiate Gastropods, with the muzzle produced into two tentacular processes, tentacles elongated, and eyes in peduncles by the side of the ten-

tacles, and generally with a sub-globular shell. They are popularly known as apple-shells, idol-shells, pond-snails, etc. Fifty or more species inhabit the fresh waters of warm countries.

Amrit'sir, or **Amritsur**, written also **Umritsir**, the sacred city of Sikhs, in N. India, 40 m. E. of Lahore. Here is a magnificent temple, on an island in a large tank or reservoir, called "the Pool of Immortality." The fortress is very strong. Pop. 142,381.

Amrou (am'roo) **Ben el As**, an Ar., b. about 600 A. D., at first opposed Mohammed, but became a zealous proselyte; aided in the conquest of Syria, conquered Egypt, of which he became emir, taking Alexandria in 640 A. D., and Tripoli 3 yrs. later. He became an opponent of Ali. D. 663.

Ams'dorf, von (NIKOLAUS), b. in Sax. Dec. 3, 1483. He accompanied Luther to the Diet of Worms in 1521, but was afterward an opponent of Melancthon. In 1542 he was appointed bp. of Naumburg. D. May 14, 1565.

Amsterdam, formerly **Amstelredamme**, or **Amstel-damme** ("the dike or dam of the Amstel") [Lat. *Amstelodamum*], principal city and the cap. of the kingdom of the Netherlands, at the junct. of 2 small rivers, the Amstel and the Y (pron. *Ye*), in lat. 52° 22' N., lon. 4° 53' E. It is built upon a piece of marshy ground, where piles 50 ft. long, or more, have to be driven down in order to gain foundation for the buildings. The city is divided into 90 islands by canals, which are crossed by 280 bridges. Among the most important public buildings is the town-hall, 282 ft. long and 235 ft. wide, built of stone upon 13,659 piles, driven 70 ft. into the soil, and containing a grand hall 120 ft. long, 60 ft. wide, and 100 ft. high, lined with white It. marble. Previous to 1250 A. was the site of a poor fishing village. It was first fortified in 1482; in 1578 became a part of the United Provinces, and between 1630 and 1750 was the foremost commercial city in Europe. Its commercial advantage came to be greatly impaired by the gradual filling up of the Zuyder Zee, to remedy which a ship canal 51 m. long, navigable for vessels drawing 18 ft., was constructed to the Helder. This proving insufficient, a new canal 15 m. long, to the N. sea, was begun in 1863, which, as now completed, ranks among the great achievements of modern engineering. This has made A. practically a seaport. Diamond-cutting is almost exclusively carried on here. Pop. 1883, 361,326.

J. G. BARNARD.

Amsterdam, on R. R., Montgomery co., N. Y., is on the Mohawk River, 33 m. N. W. of Albany. Pop. 1870, 5426; 1880, 9466.

Am'urath, or **Mu'rad I.**, sultan of the Turks, b. in 1326, succeeded Orkhan, his father, in 1359, took Adrianople in 1361, and waged successful wars, chiefly with the Chrs. He was assassinated June 15, 1389.

Amurath II. succeeded his father, Mohammed I., in 1412, attacked Constantinople in 1423, contended with varying success for many years against the Hungarians under Hunyady, and against Scanderbeg. He gained a great victory at Kosovo in 1448. D. Feb. 9, 1451.

Amurath III., one of the most cruel of the Tur. sultans, b. in 1545, came to the sultanate in 1574. His reign was marked by long wars with Aus. and Per., and with the janizaries at home. D. Jan. 17, 1595.

Amurath (Murad) IV., sultan of Tur., b. about 1610, succeeded his uncle Mustafa in 1623. He had a passionate temper, which was rendered more violent and dangerous by habitual drunkenness. He amused himself by shooting from his palace windows at passengers in the streets. The most important event of his reign was the capture of Bagdad by his army in 1638. D. 1640.

Amygdalin, or **Amygdaline**, a-mig-da-lin, a white crystalline principle which is contained in the bitter almond, and under the influence of emulsine and water yields hydrocyanic acid and the volatile oil of bitter almonds.

Amygdaloid [from the Gr. *ἀμυγδαλον*, an "almond," and *ειδος*, a "form"], having the form of an almond; applied in geol. to certain volcanic rocks in which once existed oval cavities or cells now filled with nodules of some crystalline mineral deposited from an infiltrated solution. These nodules are composed of agate, chalcedony, calcareous spar, etc., and are commonly found in a basis of basalt, greenstone, or other trap rock. Empty cells often occur in the same rocks that contain these nodules, the cavities in each case having been originally formed and filled with gas or steam.

Amyot, ah-me-ō' (JOSEPH), a Jesuit missionary, b. at Toulon in 1718. He sailed to Chi. in 1750, was invited to Pekin by the emp., and passed the rest of his life there. He compiled a Tartar-Fr. dict., translated many Chi. works into Fr., and did much to illustrate the hist., customs, and arts of Chi. D. 1794.

Anabapt'ide [from *An'abas*, one of the genera], a family of acanthopterygian fishes, with the superior branchiyls of the gill-arches laminated and developed into a superbranchial organ which retains watersufficient to moisten the gills for a considerable time, and with more or less spines in the dorsal and anal fins. Species are found in S. E. Asia and Afr. One, the *An'abas scan'dens*, found in India, etc., is especially remarkable for a limited power of climbing.

Anabapt'ists [from the Gr. prep. *ἀνά*, "again," and *βαπτίζω*, to "baptize"], a name applied during the 16th cent. to various bodies of Swiss and Ger. Chrs., who, while differing widely in personal character, in social and political opinions, and religious faith, agreed in discarding infant baptism, and in rebaptizing (according to the popular notion) those

who personally accepted of Christianity. While in this respect the Ger. A. held a position similar to that of the Baps. of to-day, they did not, as a general thing, insist that immersion only is valid baptism. Indeed, they generally practised pouring or affusion.

Many of the early A. were men of irreproachable character and true Chr. devotion, and some believed it wrong, in any circumstances, to bear arms. Many of their leaders claimed to receive supernatural visions and revelations.

The word A. is sometimes applied, at the present day, to those who baptize by immersion, and on profession of their faith, persons who have been sprinkled in infancy; but the name is repudiated by modern Baps., since they regard the immersion of a believer as the only valid baptism, and maintain that they do not rebaptize. As no historical connection can be established between the Baps. and the fanatics of Münster, the name "A." ought not to be applied to them.

Anab'asis [from the Gr. *ἀνά*, "up," and *βαίω*, to "go"]. In med., it is sometimes applied to the increase of a disease or paroxysm.—Also the title of two Gr. historical works.

An'ableps [Gr. *ἀναβλέπω*, to "look up"], a genus of haplous fishes, characterized by a singular structure of the cornea and iris, in consequence of which it has two pupils on each side, and seems to have four eyes. Several species are found along the sandy coasts of tropical Amer.

Anacharsis an-ak-ar'sis, [Gr. *Ἀναχάρσις*], a celebrated Scythian philos. who lived about 600 B. C., and was a friend of Solon. He was the only "barbarian" admitted to the privilege of a citizen of Athens.

Anacle'tus, bp. of Rome, was a native of Athens. He was the successor (or, according to others, the predecessor) of St. Clement. D. about 100 A. D.

Anacle'tus, an antipope, was elected by a party of cardinals in 1130 as a rival pope to Innocent II., who was recognized by the majority of the European powers. D. 1138.

Anacon'da [*Eunectes murinus*, Bo'a *murina* of some naturalists], a large serpent allied to the *Boa constrictor*, is a native of tropical Amer., especially of Brazil and Guiana. It sometimes grows to the length of 40 ft., and is the largest serpent of Amer. It passes much of the time in the water, preferring the shallow parts of a lake or stream. Among the generic characters that distinguish it from the boa are the small size and position of its nostrils, which open at the upper part of the end of the muzzle, and are directed upward. It is not venomous.

Anac'reon [Ἀνακρέων], a famous Gr. lyric poet, b. at Teos, in Ionia, about 560 B. C.; passed many yrs. at Samos, and afterward became a resident of Athens, to which he was invited by Hipparchus. Sang chiefly of love and wine. D. 476 B. C.

Anadyomene, an-a-di-om'e-ne [Gr. *Ἀναδυομένη*], (the goddess "rising up out" of the sea), a surname given to Venus; also the name of a masterpiece of Apelles, representing Venus rising from the sea.

Anæmia, an-æ'mi-a [from the Gr. *ἀν*, priv., and *αἷμα*, "blood"], a morbid condition of the body in which the blood is of an abnormal composition there being usually a deficiency in the normal number of red corpuscles. This condition is not properly a disease, so much as a result of some disease or lesion, such as dyspepsia, hemorrhage, insufficient nutrition, defective aëration of the blood, consumption, cancer, malarial or other slow poisoning, excessive labor, or long-continued mental troubles. The symptoms are, first, great debility, paleness of face, lips, and tongue, wasting of the tissues, various cardiac, arterial, and venous murmurs, a small and often rapid pulse, clearness and low specific gravity of the urine. Late in the disease the feet swell, and sweating is observed. The treatment is, first, if possible, to remove the cause. Proper food, due exercise, good air, strychnia, quinia, and, above all, iron, are often extremely useful. The iron is generally thought to act as food, there being an actual deficiency of iron in the blood.

E. DARWIN HUDSON, JR.

Anæsthesia, an-es-thé'si-a [from 2 Gr. words signifying "not to feel or perceive"], a term used in medical lang. to express a partial or complete loss of sensation, either local or general. If both the sense of pain and of touch are absent, the term "anæsthesia" would better express the fact. But in popular use the term "anæsthesia" has come to be understood as a total or partial, local or general, suspension of consciousness by the application or inhalation of some chemical agent, which from its possessing this property is called an "anæsthetic." Local anæsthetics are often administered in the form of spray, and produce, by rapid evaporation, local insensibility by chilling the part affected; or they may produce a benumbing influence, as is the case with solution of aconitine, or even by tincture of aconite. But general A. is the condition most generally desired by surgeons, accoucheurs, and dentists for important operations. For many centuries this had been attempted by the use of narcotic and soporific drugs, as by the Chi., the Roms., and the Saracens and Moors. Preparations of hemp, opium, mandragora, and strong or spiced wines were all used for this purpose. Early in the present century the production of a magnetic, mesmeric, or hypnotic condition was found, in some subjects, to produce the same results. The modern anæsthetics are the nitrous oxide gas, common (ethylic) ether, often but incorrectly called sulphuric ether, chloroform, iodoform, and amylene. The 4th of these cannot be inhaled, but is an excellent local anæsthetic. Amylene is dangerous in its effects. Of these, nitrous oxide was first used by Horace Wells, a dentist of Hartford, Conn., Dec. 11, 1844, but was the result of long previous investigation. Sir H. Davy had proposed it in 1800, but it had not been tried, and Wells did not know of it. Ether was first used as an anæsthetic in surgical operations Mar. 30, 1842, and subsequently, by Dr. Crawford W. Long of Athens, Ga. Its use was suggested by Dr. Charles T. Jackson of Boston to W. T. G. Morton, a Boston dentist and former pupil of Wells, who



Anabasis scandens: Climbing Perch.

had asked him to prepare nitrous oxide that he might use it, as Wells had done, for the extraction of teeth. This was Sept. 30, 1846, but neither Morton nor Jackson probably knew of Long's experience in its use, nor, perhaps, of Marcy's successful trial of it at Hartford, in Jan. 1845. Morton's trial of ether was successful, and led to its further use. Both Morton and Jackson claimed its discovery. Chloroform was first announced as an anesthetic by Sir J. Y. Simpson of Edinburgh in Nov. 1847, though Florens had shown its anesthetic effect on the lower animals in Jan. 1847. Chloroform is most largely used for A., but is not as safe as ether, and much less so than nitrous oxide, the bulk of which is, however, an objection to its use.

L. P. BROCKETT.

Anaheim, an'-a-hime, on R. R., Los Angeles co., Cal., in the centre of the largest valley in Cal., 12 m. from the sea, and is a wine centre of S. Cal., producing over 1,000,000 gals. of wine annually. Pop. 1870, 881; 1880, 833.

Anakim, the anc. race of giants who lived in the S. of Pal. at the time of the exodus of the Israelites. They are called "the children of Anak" in Num. xiii. 28.

Analcime, an-al'sime, or **Analcite** [from the Gr. $\alpha\lambda\alpha\iota\mu\omicron\varsigma$, "strong"], a hydrated silicate of soda and alumina, generally occurring in 24-sided crystals, which are sometimes transparent. By friction it becomes feebly electrified, whence its name. It is found in the trap-rocks of Ire., Scot., N. S., and Lake Superior.

Analysis (Gr. $\alpha\lambda\alpha\iota\mu\omicron\varsigma$ and $\alpha\lambda\alpha\iota\mu\omicron\varsigma$, "loosening" or "resolving"). A distinction is to be drawn between what writers have termed the *anc.* and the *modern* A. The *anc. A.* is a kind of reasoning that stands opposed to the *synthetic* method. Certain propositions were assumed, and these were reasoned upon until a proposition was reached which was known to be either true or false. If true, the proposition assumed was regarded as true; if false, the assumed proposition was also false, and the method came under what is called the *reductio ad absurdum*. In case of a problem, the reasoning was carried on till a result was found, which was included among what the old geometers called *data*. The construction was then made by reversing the order of A. In the *modern* acceptance of the term, A. refers to the means of investigation rather than to the method. In this sense it embraces every branch of math. in which the properties and relations of quantities are investigated by means of algebra.

W. G. PECK.

Anam, or **Annam**, Empire of, called also **Cochin China**, an Oriental kingdom or empire of varying and uncertain extent. In its greatest extent, in the early part of the present century, it included the kingdoms of Tonquin, Cochin Chi., and most of the anc. kingdom of Cambodia, as well as the provinces of Champa or Tsiampa, Lower Cochin Chi., Saigon, Bienhoa, and Mytho, which form the S. W. portion of the Siamese peninsula, though its present area is less extensive from the loss of the portions ceded to Fr. The whole may properly be considered under this title. It lies between the parallels of 8° 40' and 23° 22' N. Its area is 170,035 sq. m.; length, about 800 m.; width ranges from 100 to 360 m.

Topography varied. High mts. through the centre from N. to S., shores sandy and low, the interior rolling and densely inhabited; one navigable river, the Me-Kong or Cambodia, dividing it from Laos and flowing S. into Chi. Sea. Sang-Koi, prin. river of Tonquin, flows into Gulf of T.

Provinces.—**Tonquin**, formerly a kingdom, is the N. portion of the empire, rich in minerals, gold, silver, copper, iron. Fertile, yielding rice, cotton, spices, varnish trees, and palms. **Cochin Chi.**, including several divisions or sub-provinces, a long, narrow strip bordering on Chi. Sea; mts. on the W., plains, mostly sandy and sterile, extending to the sea. Productions, eagle-wood, sugar, and cinnamon. **Lower Cochin Chi.**, now the Fr. colony of Saigon or Cochin Chi., includes 6 provs., 35,925 sq. m., and pop. 1,304,287. Land fertile but low, and sickly to strangers. Exports, sugar, spices, rice, etc. Commands the navigation of the Me-Kong River. **Prov. of Champa or Tsiampa**, between Cochin Chi. and Fr. colony; good harbors, land sterile, but produces eagle-wood in abundance. **Cambodia**, an anc. kingdom with ruins of temples and towers 2400 yrs. old, was seized by the emperors of A. in 1770 and held by them, but is now under the protection of Fr., and really an appanage of the Fr. colony. It has varied scenery, fertile and well-tilled lands, and farther inland, mts. covered with dense, impenetrable forests and jungles, inhabited by elephants, lions, tigers, and wild buffaloes. Gold, tin, iron, and precious stones are found: teak, cocoa, palm, sandal, and other woods, gamboge and other dyes, are abundant, and with pepper, rice, cardamoms, cotton, cocoa-nut oil, hides, and horns, are its prin. exports. Indigo and silk are also cultivated. The ruins and sculptures near Ang-Kor are very wonderful.

The **religion** of A. is Buddhism; but there are some adherents of Confucius, and the Caths., under Fr. protection, are making great progress.

The **government** is despotic, the emp. ruling his provs. and army through his mandarins.

The **language**, like that of Chi., is monosyllabic; the literature mostly imitations of Chi. works.

The **commerce**, which is somewhat large, is in the hands of Chi. merchants. Silk is the chief branch of industry in manufactures and the prin. export.

The **population** is very largely of Chi. origin, though mingled with aboriginal blood. It is estimated (including the pop. of Cambodia and the provs. now held by the Fr.) at 21,000,000.

History.—Cambodia and Tonquin are very old countries, and the ruins which abound may be those of a pre-historic race. The Chi. conquered much of the country about 214 B. C., and since that time A. has been part of the time under Chi. control and part independent. The successive dynasties were overthrown by their enemies, and the empire of A. was the first that extended over the whole country. Its power is now much diminished.

L. P. BROCKETT.

Anamo'sa, city and R. R. junc., cap. Jones co., Ia., on Wapsipinicon and Buffalo rivers, 50 m. S. W. of Dubuque. It has excellent quarries of building-stone and a State penitentiary. Pop. 1870, 2083; 1880, 2083.

Anas [from the Lat. *a'nas*, a "duck"], a Linnæan genus of web-footed birds belonging to the order Palmipedes, has been divided by recent ornithologists into many genera—namely, *Anas* (the duck), *Anser* (the geese), *Cygnus* (the swans), *Aythya* (red-head), *Somateria* (eiders), etc. The A. in this restricted sense has a flattened bill, the base of which has a greater breadth than depth, and the bill is as wide (or wider) at the extremity as at the base.

Anasarea. See **DROPSY**.

Anastasius I., emp. of Constantinople, b. at Durazzo about 430 A. D. He succeeded the emp. Zeno in 491. The orthodox, who considered him a heretic, revolted and defeated his army in 514. D. 518 A. D.

Anastasius II. became emp. of the E. in 713 A. D. Theodosius was chosen emp. by his army, which took Constantinople and deposed A. in 716. D. 720 A. D.

Anastatic Printing, a process by which printing and engravings may be transferred to metal, from which impressions exactly like the original can be taken. The printed sheet is moistened with dilute phosphoric or nitric acid, and pressed with great force upon a zinc plate, which is afterward washed with an acid solution of gum, and then inked with a roller.

Anatolia, an-a-tō'li-a, **Anadolia**, or **Anadoli** [Gr. $\alpha\nu\alpha\tau\omicron\lambda\iota\alpha$, "the rising," or "the orient"], a name given in modern times to the peninsula of Asia Minor, a part of Asiatic Tur., although it is now generally used as the name of the more limited pashalic of A., which comprises the W. half of that peninsula. In its larger sense, A. is bounded N. by the Black Sea and the Sea of Marmora, E. by the Euphrates and the Anti-Taurus range, S. by the Mediterranean, and W. by the Gr. Archipelago. It lies between 36° and 42° N. lat., and 26° and 41° E. lon. Length from E. to W. about 700 m.; area, 204,434 sq. m. **Topography**.—The W. and S. coasts have many gulfs and bays and some good harbors. Much of the shore line is forbidding, and composed of bold and precipitous cliffs; the interior is composed of an elevated plateau between the Taurus and Anti-Taurus ranges; some peaks of these ranges are from 10,000 to 13,000 ft. in height. The *climate* is variable; the W. shores mild and delightful, the central plateau subject to extremes of heat and cold, the N. shore temperate, the mts. cold and bleak. The *soil* mostly fertile; very rich on the W. and Black Sea coasts, heavy forests in the N., the plains arid and dry. The productions are sugar, wine, opium, tobacco, olives, figs, wheat, barley, and silk; shawls, carpets, oil, and wine are its manufactures. Its flowers are very beautiful. The mts. are infested with panthers, bears, wolves, etc. Its present divisions are the pashalics of A., Itchelee, Karamania, Adana, Marash, Sivas, and Trebizond. Its anc. divisions were the great provinces of Asia corresponding very nearly to the pashalic of A., Galatia, Ionia, Lycæonia, Lydia, Lycia, Mysia, Pamphylia, and Phrygia. Its anc. cities were Ephesus, Smyrna, Colosse, Philadelphia, Laodicea, Sardis, etc. Its present cities are Smyrna, Brusa, Sinope, Angora, Konieh, Kutaleh, and Trebizond. Its pop., which is estimated (not including Armenia) at 10,970,000, is composed of Ottoman Turks, Turcomans, Greeks, Koords, and Armenians. Its anc. history is deeply interesting, but it has gone to decay under Tur. rule. It was the field of much of the missionary labors of the Apostle Paul.

L. P. BROCKETT.

Anatomy [Gr. $\alpha\nu\alpha$, "up," or "distributively," and $\tau\omicron\mu\eta$, "section"] properly signifies dissection, but has come to include the study and knowledge of the forms, situation, and structure as well as all the characteristics of organized bodies. The term *Vegetable A.* is sometimes employed, but the term A. is understood to refer to animal structures, unless otherwise specified.

Comparative A. considers the relative structure of similar parts and organs in animals of different species, pointing to analogies of shape and function, as well as to divergences and modifications, whether generic and unvarying in all time, or the result either of evolution or of the habits and habitat of the particular species and individual.

Microscopic A. is termed **HISTOLOGY**.

Descriptive A. comprises a systematic and detailed description of all the parts. Its subdivisions are: Osteology, treating of the bones; Syndesmology, of the articulations; Myology, of the muscles; Neurology, of the nerves; Angiology, of the blood-vessels; Adenology, of the glands, and Splanchology, of the viscera.

Topographical A. gives the location of various internal parts relatively to the surface of the body; great exactitude has been attained by numerous sections of frozen bodies.

Pathological A. treats of the characteristics, as to size, location, and structural changes, of tissues and organs consequent upon disease. A. was carefully studied in the remote classical periods. The school of Herophilus and other anatomists of Alexandria was coeval with the great library. Gr. and Rome did less in human dissection, anatomical knowledge being acquired chiefly by observing the structure of lower animals. A. had its Renaissance coeval with that of Art and Letters; in it most of the great It. anatomists have their names perpetuated by structures named from them—e. g. Eustachius, Fallopius, Sylvius, etc. Noted Eng. anatomists are Harvey and Munroe. In Europe and the U. S. rigid restrictive laws formerly retarded anatomical knowledge by limiting opportunities for dissecting. At present, the bodies of criminals and the unclaimed paupers of hospitals supply the requisite material. E. D. Huxon, Jr.

Anaxagoras [$\alpha\nu\alpha\gamma\alpha\gamma\omicron\rho\alpha\varsigma$], a Gr. philos. of the Ionic school, b. at Clazomenæ, near Smyrna, about 500 B. C. He removed to Athens about 480, and enjoyed the friendship of Pericles. He wrote a *Treatise on Nature*, of which small fragments are extant. In 450 B. C. he was accused of im-

piety, and, though defended by Pericles, was condemned to death or banishment, and retired to Lampsacus, where he d. in 428 B. C.

Anaximander [*Ἀναξίμανδρος*], a Gr. philos., b. at Miletus about 610 B. C., was a disciple of Thales. D. about 546 B. C.

Ancelot, onss-lo' (JACQUES ARSENE FRANÇOIS POLYCARPE), a Fr. dramatic poet, b. at Havre Feb. 9, 1794, produced in 1819 a tragedy entitled *Louis IX.*, which procured for him a pension of 2000 francs. He wrote *Maria de Brabant*, and was admitted into the Fr. Acad. in 1841. D. 1854.

Anchises, an-ki-séz (Gr. *Ἀνχίσης*), a Trojan prince, the father of Æneas, with whom he escaped from Troy.

Anchitheriidae, a family of perissodactyle Ungulates with the upper molars provided with subequal crescentoid ridges, the lower molars also with crescentoid ridges and with internal tubercles or cusps, the premolars like the molars, and the upper with two internal lobes, without cementum in the teeth, and with the lateral digits and hoofs reduced and the middle hypertrophied. All the representatives are extinct, and lived in the lower and middle miocene periods. In age as in structure they were intermediate between the Equids (horses, etc.) and the Palæotheriids. *Anchitherium* is the best known genus. THEODORE GILL.

Anchorite, or **Anchor'et** [from the Gr. *ἄγκυρα*, from *ἀνά*, "up," "back," and *χωρέω*, "to retire"], a person who has retired from the world and devoted himself to ascetic religion in solitude. The term was first applied to Chrs. of the 3d cent. who retired to caves and solitary places in the deserts, to which, in some cases, they were driven by persecution. They often subjected themselves to painful privations and various forms of penance.

Ancho'vy, a name given to the *Engraulis encrasicolus*



Anchovy.

and related species; they are mostly small fishes, from 5 to 7 inches long, inhabiting almost all temperate and warm seas, and are distinguished by a sharp-pointed head, the upper jaw longer than the lower, and the deeply-cleft mouth extending behind the eyes. The European A. is salted and packed in small barrels for exportation, and used for sauces, pastes, etc.

Anchovy Pear (*Gri's cauliflora*), a tree which grows in the W. I. in moist ground or shallow water, and is allied to the Myrtaceæ. It bears a fruit (a drupe) which is pickled and used for food.

Ancle, an-s'le (plu. **Ancil'ia**), the shield of Mars, which, according to tradition, fell from heaven in the reign of Numa, when an oracle declared that Rome could never be taken while this shield remained in that city.

Ancillon, on-se-yon' (JOHANN PETER FRIEDRICH), a Ger. hist. and statesman of Fr. extraction, b. at Berlin Apr. 30, 1766. He was a Prot. pastor, until he was made a councillor of state and royal historiographer, about 1806; in 1831 he became minister of foreign affairs. D. Apr. 19, 1837.

Anco'na, a city of Central It., on the Adriatic, 132 m. N. E. of Rome. It has a triumphal arch of white marble, built by Trajan. Pop. of commune, 1881, 47,729.

An'cus Mart'ius, 4th king of Rome, a grandson of Numa, succeeded Tullius Hostilius about 640 B. C. He promoted the religious insts. of Numa, and is considered the founder of the plebeian order. He waged war against the Latins, whom he subdued, founded Ostia, and built the Pons Sublicius. D. about 616 B. C.

Andalus'ia [formerly called *Vandalusia*, from the Vandals: Sp. *Andalucía*], the S. portion of Sp., comprising 8 provs., and containing the important cities of Granada, Almería, Cadiz, Cordova, Malaga, and Seville. Area, 33,665 sq. m. Pop. 3,282,448.

Andersen (HANS CHRISTIAN), a Dan. poet and novelist, b. at Odense Apr. 2, 1805. In 1819 he went to Copenhagen to seek employment in the theatre, but was rejected. He passed several yrs. in adversity, until he found friends, who in 1828 placed him in the Univ. In 1830 he pub. a vol. of poems, and having received a gift of money from the king visited It., Fr., and Ger. in 1833; wrote *The Improvisatore* in 1834, and subsequently many vols. of prose and verse, fairy tales, dramas, etc. D. Aug. 4, 1875.

Anderson, city, R. R. junc., and cap. Madison co., Ind., on the W. fork of White River. It has a hydraulic canal with 44 ft. fall. Pop. 1870, 3136; 1880, 4126.

Anderson (C. H.), on R. R., cap. of Anderson co., S. C., is the seat of Carolina High School for boys and girls. Pop. 1870, 1432; 1880, 1850.

Anderson (HENRY JAMES), M. D., LL.D., b. in N. Y. Feb. 6, 1799; grad. at Columbia Coll. 1818, at the Coll. of Phys. and Surg. 1824, was prof. of math. and astron. at Columbia Coll. 1825, and emeritus prof. 1866; wrote *Geology of the Holy Land*. D. Oct. 19, 1875.

Anderson (Hugh J.), b. in Me. in 1801; was a rep. in Cong. 1837-41, gov. of Me. 1844-47, U. S. com. of customs 1853-58, and in 1866, 6th auditor U. S. treas. D. May 31, 1881.

Anderson (Rev. H. T.), b. in 1811, was an eminent scholar, of the denomination known as the "Disciples" and "Campbellites," and was the author of an interlinear translation of the N. T. D. Aug. 19, 1872.

Anderson (JAMES), LL.D., b. near Edinburgh in 1739. He was a practical as well as a scientific farmer, invented an improved form of plough, and wrote upon rural economy and agriculture. D. in Lond. Oct. 15, 1808.

Anderson (JOHN), F. R. S., b. in Scot. in 1726; was edu-

cated in the Univ. of Glasgow, and became in 1760 prof. of nat. philos. in that inst. He pub. *Institutes of Physics*, and for many yrs. gave free lectures to the working classes, founding also the Andersonian Univ., Glasgow. D. 1796.

Anderson (JOSEPH), b. in N. Y. Nov. 5, 1757; was an officer in the Revolutionary war, became a lawyer, was appointed a terr. judge 1791, was U. S. Senator from Tenn. 1797-1815, and 1st comp. of U. S. treas. 1815-36. D. Apr. 17, 1837.

Anderson (MARTIN BREWER), LL.D., b. in Brunswick, Me., Feb. 12, 1815; grad. at Waterville Coll. (now Colby Univ.), Waterville, Me., in 1840, was tutor in the coll. 2 yrs., and then prof. of rhetoric nearly 7 yrs. In 1850 he removed to N. Y. city, and became ed.-in-chief and in part proprietor of the N. Y. *Recorder*. In 1853 he was chosen pres. of the Rochester (N. Y.) Bap. Univ., which position he still holds. He has written numerous review articles, addresses, and educational papers, and was one of the Associate Editors of JOHNSON'S UNIV. CYC.

Anderson (ROBERT), b. near Louisville, Ky., in 1805; grad. at W. P. L., served on ordnance duty, etc., until 1837, was severely wounded at Molino del Rey, and in 1860 was placed in command of the forces in Charleston harbor; was attacked in Ft. Sumter by the Confeds. and surrendered. Was afterward in command in Ky. with the rank of brevet maj.-gen., retiring in 1863. D. Oct. 26, 1871.

Anderson (RUFUS), D. D., LL.D., b. in N. Yarmouth, Me., Aug. 17, 1796, grad. at Bowdoin and Andover; in 1824 became asst. sec. and in 1832 sec. of the A. B. C. F. M., holding that position for 34 yrs., during which he made tours to the missions abroad, and wrote *Hist. of the Missions of the A. B. C. F. M. to the Oriental Chrs.* He resigned in 1866, when he was presented with a sum of \$20,000, which he made over to the Board, reserving only the right to draw for what was necessary for his maintenance. D. May 30, 1880.

Andersonian University, an inst. of Glasgow, Scot., founded in 1795 by John Anderson. His design was to impart by popular lectures a knowledge of the sciences to mechanics. He bequeathed to it his valuable library and apparatus. It has a high reputation, especially in the med. dept.

Andersonville, Sumter co., Ga., near Anderson R. R. sta., 11 m. N. E. by N. of Americus. Near it was the Confed. military prison, where 12,926 U. prisoners d., mainly from neglect and ill treatment. The prison ground is now occupied by a national cemetery. Pop. 1880, 306.

Andersson (CHARLES JOHN), a Swe. traveller, b. in 1827; went to S. Afr. in 1850, and passed several yrs. in the exploration of the nat. hist. and geog. of that region; pub. *Lake Ngami and Okavango River*. D. in S. Afr. July 5, 1867.

Andes, an-déz [Sp. *Cordillera de los Andes*], the longest though not the loftiest chain of mts. in the world, extend along the W. border of S. A., about 100 to 200 m. from the coast, from the Strait of Magellan to the Isthmus of Darien, a distance of about 4500 m., without any complete break in their continuity. They also form a part of that still greater mt. chain which, beginning at the Arctic Ocean, follows the W. coast of N. A. under the names of Alaskan Mts., Cascade range, Sierra Nevada, Sierra las Sonora, Mexican Cordilleras, and falling to elevated table-lands with isolated peaks in Central Amer. These mts. also extend at the S. beyond the deep depression of the Magellan Straits, across Terra del Fuego and into the S. or Antarctic Ocean, where their presence is shown by volcanic islands. The A. of S. A. are divided geographically into the Patagonian A., lower than the rest of the chain, the highest summits being about 8000 ft.; the Chilian A., from lat. 42° to 24° S., 130 m. wide, and about 100 m. from the Pacific; the highest peaks, Aconcagua, 22,422 ft. high, and the volcanoes Tupungato, 20,270, and Maypay, 17,764 ft. high. At about 19° S. the Cordilleras divide into the Cordillera of the coast and the Cordillera Real (Royal). The 1st is about 100 m. from the coast, in Peru; the 2d, 250 m. further W., traversing Bolivia. The C. Real is the highest, Illampu peak, in Bolivia, being 24,800 ft. In the Peruvian A. the volcano of Arequipa, 55 m. from the Pacific, is 20,000 ft. high. Passing N., the A. of Ecuador extend from 5° S. to the table-land of Quito, under the equator. The highest summits are Chimborazo, 21,424 ft., and the volcano of Cotopaxi, a perfect cone, 19,498 ft. high. N. of Quito the chain subdivides into 3—the E. Cordillera, running N. E. past Lake Maracaibo, ending near Caracas; Quindiu, extending N. N. E. between the Cauca and Magdalena R.; and 3d, the coast or Choco chain, running along the coast to the Isthmus of Panama. The volcano of Tolima, in the E. Cordillera or chain, lat. 4° 46' N., is the highest, 18,270 ft. The coast chain does not rise above 9000 ft. There are many passes over the A., but the lowest, except in the Patagonian A. and the chain of Choco, is over 12,000 ft. and many about 15,000 ft. above the sea. The mineral wealth of the A. is very great; the most productive gold and silver mines in the world are here; platinum, mercury, copper, tin, and iron are also found. The earthquakes in countries adjacent to the A. and in the table-land of its ranges are frequent and destructive. There are about 50 volcanoes in the A., 36 of them active, the rest doubtful. The limit of perpetual snow ranges from 12,000 to 17,000 ft. The table-lands between the Bolivian and Peruvian A. have a temperate and delightful climate. The rainfall W. of the A. is very slight. Thunder-storms of terrific violence often occur in the mts. The geol. of the A. is imperfectly known. Palæozoic rocks form the summits, and carboniferous, triassic, Jurassic, and tertiary rocks on their flanks.

Andocides, an-dos'i-déz [Gr. *Ἀνδοκίδης*], an Athenian orator, b. about 467 B. C., to whom are ascribed 4 orations, still extant. D. about 390 B. C.

Andor'ra, a small republic among the E. Pyrenees. It has been independent since the time of Charlemagne, and is governed by 24 consuls. Area, 148 sq. m. Pop. about 12,000.

Andover, on R. R. Essex co., Mass., on the Shawheen River, 23 m. N. of Boston. Here are Abbot Fenn. Acad., founded in 1829, and Phillips Acad., founded in 1778. It is also the seat of Andover Theol. Sem., founded in 1807, and under the Conglts. It has a library of about 30,000 vols. Pop. of tp. 1870, 1873; 1880, 5169.

Andradá e Silva, or **Sylva** (JOZÉ BONIFACIO), b. at Santos, Brazil, June 13, 1765. He acted a prominent part in the revolution by which Brazil became independent in 1822, and was prime minister in 1822-33. He wrote some scientific treatises and poems. D. Apr. 3, 1838.

Andral, on-dral' (GABRIEL), M. D., a Fr. physician, b. in Paris Nov. 6, 1797. In 1839 he succeeded Broussais as prof. of pathology and therapeutics in Paris, and in 1842 became a member of the Inst.; wrote *Summary of Pathological Anatomy*. D. Feb. 1876.

Andrássy (JULIUS), COUNT, a Hungarian statesman, b. Mar. 8, 1823. He took a prominent part in the revolution of 1848; was condemned to death in 1849, but he escaped and went into exile. In 1867 he became premier of a new Hungarian ministry. From 1871-79 he was minister of foreign affairs in the common ministry of the whole empire.

André, an-dra, or an-dre (JOHN), a Brit. officer, b. in Lond. in 1751, entered the army in 1771, and was sent to Amer. in 1774, becoming major in 1779. Benedict Arnold having proposed to surrender W. Pt. to the Brit., André was appointed by Sir Henry Clinton to make the necessary arrangements; having done this, he was caught when returning to N. Y., tried as a spy, found guilty, and sentenced to be hanged. A monument to his memory has been erected in Westminster Abbey. D. by hanging at Tappan, N. Y., Oct. 2, 1780.

Andréa, an-dra' (JACOB), D. D., a German theol., b. in Württemberg Mar. 22, 1528; became prof. of theol. at Tübingen in 1562. He wrote against the Calvinists and R. Caths., and was a prin. author of the *Formula Concordia* which was adopted by the Lutherans in 1580. D. Jan. 7, 1590.

Andréa, or **Andréa** (JOHANN VALENTIN), a Ger. writer, b. in Württemberg Aug. 17, 1586, was a grandson of Jacob, noticed above. He became pastor at Calw in 1620, and chaplain or court preacher at Stuttgart in 1639. He wrote several mystical books, and is regarded by some as the founder of the order of the Rosicrucians. D. May 1, 1654.

Andréa (LAURENTIUS) (SW. LARS ANDERSON), a Swedish reformer, b. in 1482. He was converted to Protestantism, and in 1523 was appointed chancellor of Swe. He produced in 1526 a Swe. translation of the N. T. D. 1552.

Andréossy, on-dra-ose' (ANTOINE FRANÇOIS), COUNT, a Fr. military engineer, b. Mar. 6, 1761. He served in Egypt as gen. of brigade in 1798, and became a member of the Inst. of Egypt. He was the chief of Bonaparte's staff on the 18th of Brumaire, 1799, obtained the rank of gen. of div., and was sent as ambassador to Eng. in 1802. Between 1804 and 1814 he represented Fr. at the courts of Vienna and Constantinople. In 1826 he was chosen a member of the Acad. of Sciences. D. Sept. 10, 1828.

Andrew [Lat. *Andreas*], SAINT, one of the twelve apostles, a brother of Simon Peter. According to tradition, he preached the gospel in Gr. and Scythia, and suffered martyrdom in Achaia. He is the patron saint of Scot. the order of the Thistle being founded in his honor. A cross formed by oblique beams, thus, X, is called St. Andrew's cross.

Andrew (or **András**), I., king of Hungary, began to reign in 1046, and waged war against the emp. Henry III. D. 1058.

Andrew II. of Hungary, b. about 1176, and became king in 1205. He conducted an unsuccessful crusade against the Mohammedans in 1217. In 1222 he convoked a diet, to which he granted the Golden Bull, called the Magna Charta of Hungary. D. Mar. 7, 1236.

Andrew III. of Hungary, a grandson of the preceding, b. in Venice. He succeeded Ladislas III. in 1290, and was the last king of the dynasty of Arpad. His claim to the throne was opposed by the pope, who supported Charles Martel (son of Charles II. of Naples) as the rival of A. The latter defeated Charles Martel in battle in 1291. D. 1301.

Andrew (JAMES OSGOOD), D. D., bishop of the M. E. Ch. S., b. in Ga. May 3, 1794. He entered the itinerant ministry in 1812, and was consecrated bp. in 1832. Having become connected with slavery by marriage, the Gen. Conf. of 1844 took such action in his case as led to the organization of the M. E. Ch. S., in which he acted as bp. until 1866, when he was placed on the retired list. D. Mar. 2, 1871.

Andrew (JOHN ALBION), LL.D., b. at Windham, Me., May 31, 1818; grad. at Bowdoin, studied law, and in 1840 was admitted to the bar in Boston. In 1860 he was elected gov. of Mass., and was annually re-elected four times. In answer to Pres. Lincoln's first call for volunteers (Apr. 15, 1861), he dispatched five regiments in a week from that date, and afterward rendered important aid to the national cause. D. Oct. 30, 1867.

Andrews (CHARLES), b. at Whitestown, N. Y., May 27, 1827, was admitted to the bar in Syracuse Jan. 4, 1849; dist. atty. for Onondaga co. 3 yrs.; mayor of Syracuse 1861, 1862, and 1868; delegate at large to constitutional convention of 1867-68; became associate judge of N. Y. Court of Appeals July 1, 1870, and its chief judge 1881.

Andrews (EDWARD GAYER), D. D., bp. of the M. E. Ch., b. at New Hartford, N. Y., Aug. 7, 1825; grad. at the Wesleyan Univ.; entered the ministry, became pres. of Oneida Conf. Sem. in 1855; was afterward pastor in N. Y. East Conference, and was elected bp. in 1872.

Andrews or **Andrewes** (LANCELOT), an Eng. divine, b. in Lond. in 1535, became chaplain of Queen Elizabeth, who made him dean of Westminster. He was made bp. of Chichester in 1605, bp. of Ely in 1609, and bp. of Winchester in 1618. He was one of the translators of King James's version of the Bible, and was held to be one of the most learned of Eng. theols. He wrote a *Manual of Private Devotions* and other religious works. D. Sept. 25, 1626.

Andrews (REV. LORRIN), b. in E. Windsor, Conn., Apr. 29, 1795; grad. at Jeff. Coll. and Princeton. In 1827 went as missionary to the Sandwich Islands; became a judge and privy councillor; pub. parts of the Bible in the native tongue, and wrote a Hawaiian dict. D. Sept. 29, 1868.

An'drocles, or **An'droclous**, a legendary Rom. slave, who is said to have run away to Afr., where he encountered a lion, into whose paw a thorn had entered, which was extracted by A., who was afterward captured and condemned to fight a lion in the Rom. amphitheatre. The beast proved to be the one from whose paw A. had extracted the thorn. He recognized his benefactor, and fawned upon him. A. was thereupon set at liberty.

Andromache, an-drom'-a-ke [Gr. 'Ανδρομάχη], the wife of Hector, and one of the most admired characters of the *Iliad*.

Androm'eda [Gr. 'Ανδρομέδη], in classic mythology, was a daughter of Cepheus, king of Ethiopia, and of Cassiopeia. She was chained to a rock to be destroyed by a sea-monster, but rescued by Perseus; after death, transformed into a constellation.

Androni'cus I., COMNENUS, a Byzantine emp., grandson of Alexis I. In his youth he engaged in intrigues against the emp. Manuel, who confined him in prison many yrs. Having been appointed regent during the minority of Alexis II., he murdered that prince and usurped the throne in 1182; but his cruelties exasperated his subjects, who, in 1185, revolted and put him to death.

Andronicus II., PALEOLOGUS, a son of the emp. Michael, b. about 1260. He began to reign at Constantinople in 1283; waged indecisive wars with the Turks, and in 1328 was dethroned by his grandson. D. Feb. 13, 1332.

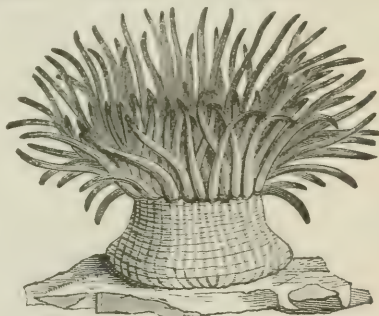
Andronicus III., PALEOLOGUS, a grandson of the preceding, became emp. of Constantinople in 1328, and was defeated by the Turks in 1330. D. June 15, 1341.

An'dros (SIR EDMUND), b. in Lond. in 1637. Was gov. of N. Y. 1674-82, and in 1686 was made gov. of N. Eng., where he became so odious that he was deposed, in 1689, by the people of Boston. He was afterward gov. of Va. (1692-98). D. Feb. 24, 1714.

Anemometer, an-e-mom'-e-ter [from the Gr. άνεμος, the "wind," and μετρον, a "measure"], an instrument for measuring the force or velocity of the wind. Several different kinds of anemometers have been invented.

Anemone, a-nem'-o-ne [from the Gr. άνεμος, "wind"], a genus of herbaceous plants of the natural order Ranunculaceae, natives of Europe, Asia, and N. and S. Amer. The species of A. are numerous, and mostly have beautiful flowers, the size of which is increased by cultivation. The *A. hortensis*, or garden A., is highly prized and is extensively cultivated in Hol. It prefers a light soil. Among the other beautiful species are the *A. coronaria*, sometimes called poppy A.; the *A. japonica*, a native of Japan; the *A. pratensis*, which has blue flowers; the *A. pulsatilla*, (pasque flower), which grows wild in Eng., and has purple flowers; and the *A. nemorosa* (wood A.), which has white flowers. In N. Amer. are found several species peculiar to this hemisphere, besides some which are common also in the Old World. Pulsatilla, a favorite remedy with homœopaths, is produced by a plant of this genus.

Anemone, Sea, a popular name of marine radiated animals belonging to the order Actinaria. They are polypes of a soft gelatinous texture, and have numerous tentacles disposed in circles and extending like rays around the mouth. When they are expanded in the water they resemble a polypetalous flower, and are admired for beauty of form and color. They abound on the shores of the sea, and are generally attached to rocks, stones, or shells, but have some power of locomotion. When they are left dry by the



Sea Anemone.

receding tide they contract into a mass of jelly. They are very voracious, and will seize by their tentacles and swallow animals as large as themselves. Some species of the Actinaria can be kept in an aquarium, and can be fed on fish or other animal food. Among the most beautiful of the sea A. are the *Actinia mesembryanthemum*, which is common on the Brit. shores, and has around the margin of its mouth a circle of azure tubercles; the *Actinia crassicornis*, which is also found on the Brit. shores, and displays a variety of colors; and the *Actinia dianthus*, which is found in deep water.

An'eurism [Gr. άνεύρυσμα, a "widening"], a pulsating tumor filled with blood, and communicating more or less directly with an artery, the tunics of which are wholly or partially destroyed. A "true" A. has one or more arterial coats in its wall. A "false" A. has a wall of condensed areolar tissue, the arterial coat having disappeared. A "traumatic" A. originates in a wound or other accidental injury. A "varicose" A. communicates with both an artery and a

vein. When the blood gets between the coats of an artery, and thus forms a tumor, it is a "dissecting" A.

In general, A. of the extremities may be treated with a fair prospect of success by long-continued compression, mechanical or digital. "Ligation," or tying the artery, sometimes succeeds. Galvano-puncture has its advocates as a means of cure. The injection of powerful astringents has succeeded in some cases, but is not to be regarded as a safe proceeding. The prospect, especially in A. of the aorta and its great branches, is that the disease will prove fatal.

Angel [from the Gr. ἄγγελος, a "messenger"], a ministering spirit employed by God to carry commands, etc. The anc. Hebs. believed in the existence of several orders of A., among which were the seraphim and cherubim, and archangels.—**ANGEL**, an anc. Eng. gold coin, so called from the figure of the archangel Michael piercing the dragon.

Angel-Fish (*Squallus*), called also **Monk-Fish** and **Shark-Ray**, a fish allied to the shark, is found on the coasts of Eng. and Fr. and the S. coasts of the U. S. It is about 7 ft. long, and is remarkable for its ugliness of form. The body is nearly 4 ft. wide, and is flattened horizontally.

Angelica, N. Y. See APPENDIX.

Angelico, Fra. See FIOLE.

Angell (JAMES BURRILL), LL.D., b. at Scituate, R. I., Jan. 7, 1829; grad. at Brown Univ., studied 2 yrs. in Europe, was prof. of mod. langs. and lit. at Brown Univ. 1853-60, ed. of the *Providence Daily Journal* 1860-66, pres. of the Univ. of Vt. 1866-71, and became pres. of the Univ. of Mich. 1871. He was U. S. minister to Chi. 1880-82.

Angelo, an-jä-lo (or Ag'nolo) **Buonarroti** (MICHAEL), a sculptor, b. probably at Settignano Mar. 6, 1475. The name is often found in connection with offices in the state. He began to draw as soon as he could use his hands. He gained little from teachers, preferring to lounge in the studios of the artists and try his hand at drawing. On Apr. 1, 1488, the lad was apprenticed for 3 yrs. to Domenico Ghirlandajo. While with him, Michael produced his first painting, a copy of a plate of Martin Schöngauer representing the temptation of St. Anthony. The copyist colored the animals from nature. Lorenzo di Medici took the young Michael into special favor, showed him his treasures, and introduced him to Poliziano, at whose suggestion the group of *Hercules and the Centaurs* was executed. At this time, too, he made a Madonna, after the manner of Donatello. On the death of his patron and the overthrow of the Medici, the artist hastened to Venice; thence to Bologna, where he stayed about a yr. In July, 1495, he was again in Florence, executing works for the Medici, a *Sleeping Cupid* among others, which became the occasion of his going to Rome. The first great work executed in Rome was the statue of the *Drunken Bacchus*. Next came a *pietà*, now placed in a side-chapel of St. Peter's, near the entrance. On the completion of the "*pietà*" in 1499, the artist was induced by a change in the govt. to return to Florence. Two yrs. later he received an order to cut a statue from an immense block of marble which had been brought from Carrara for a figure of colossal size designed for the ch. of Santa Maria del Fiore. From this block Michael A. evoked the *David* of the Piazza del Gran Duca. The statue was finished early in 1504. Owing to its enormous weight, 18,000 lbs., 3 days were required to transport it from the studio to the square in front of the Palazzo Vecchio, where it stood till 1873.

The fame of the great sculptor had by this time reached the ears of Pope Julius II., who was meditating the erection of a colossal mausoleum for himself in St. Peter's. A dispute arising between the pope and the sculptor, the high-spirited artist abruptly left Rome for Florence. It was there that he designed the great painting for the ducal palace, of which the cartoon only was finished, representing soldiers startled by the trumpet while bathing in the Arno. A reconciliation with the pope having been effected, his next work was a bronze statue of Julius II., placed at the prin. portal of San Petronio in Bologna. The unveiling took place Feb. 21, 1508. On All Saints' Day, 1509, all Rome was gazing at the ceiling of the Sistine Chapel, which he covered in 20 months with frescoes. In 1513 the pontiff d., mentioning the mausoleum in his will, with directions for its completion, and Michael resumed work on it. New plans were drawn on a reduced scale, and a new contract was made, with higher estimates of cost. For 3 yrs. the architect was completely absorbed in this task, which was left unfinished. The construction of the façade of San Lorenzo was the next task proposed to the sculptor by Leo X., the pope undertaking that the work should not interfere with the completion of the mausoleum. A. undertook the whole, discovered and opened marble-quarries, directed workmen, arranged for transportation, manufactured figures in wax; in a word, made himself felt in every dept. of the enterprise. The designing of the façade of San Lorenzo, the work at which he had toiled for yrs. as he had at no other, was brought to a stand-still finally by the disasters which befell the family of Medici. Instead of it, the construction of the Medicean chapel in Florence was assigned to him by Clement VII. But neither was this completed. The 2 statues of Lorenzo, duke of Urbino, and of Giuliano, duke of Nemours, attest the grandeur of the design. In a few months the colossal statues *Morning*, *Evening*, *Day*, and *Night*, which are regarded as his greatest conceptions, were placed in their niches.

In 1533 A. took up his brush to paint the *Last Judgment* on the altar-wall of the chapel whose ceiling had been covered with the creations of his hand. The artist wished to resume the mausoleum on the completion of the *Last Judgment*, but was again overruled by papal authority; a new chapel, the Capella Paolina, had been added to the Vatican, and no one but Michael A. must adorn it. The 2 vast paintings representing the *Crucifixion of Peter* and the *Conversion of Paul* were finished, but they no longer exist as he left them.

Michael A. was an old man when Antonio di San Gallo, the director of St. Peter's ch. d., and the responsible office was conferred on him. Bramante had laid the foundation of the present structure in 1506. After him several architects submitted plans and made alterations—Rafael, Fra Giocondo, Peruzzi. Antonio di San Gallo succeeded him. But A. took the work up as from the beginning; and though his designs were never carried out, the main credit for what was done afterward belongs to him. To him belongs the glory of the great dome, which he never saw suspended, but which he lived to model.

The touch of the mighty hands was felt on other Rom. buildings. It converted the Baths of Diocletian into the magnificent ch. Degli Angeli. His brain teemed with ideas. But yrs. impaired even his prodigious force. His last group, a Christ lying dead in his mother's lap, was unfinished.

The end came on Feb. 18, 1564, when he was 90 yrs. old. He sank exhausted under the weight of three laborious generations. (For a more complete article on ANGELO, see J.'s UNIV. CYC.) O. B. FROTHINGHAM.

Angers, an-jerz, formerly **Angiers**, a fortified city of Fr., cap. of the dept. of Maine-et-Loire. It has a famous military school, in which the Duke of Wellington was a pupil. Pop. of commune, 1881, 68,049.

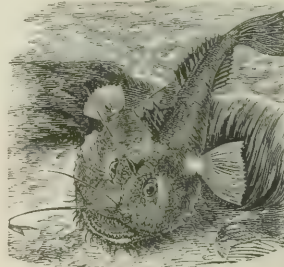
Angiera, an-ge-a'-ra-de (PIETRO MARTIRE), [Lat. *Petrus Martyr Angerianus*], an It. scholar and historian, b. at Arona, on Lake Maggiore, in 1455. He emigrated to Sp. in 1487, and became a priest. In 1501 he was sent by King Ferdinand on a mission to the sultan of Egypt, and in 1506 he was appointed prior of the ch. of Granada. He was also a member of the Council of the Indies. He wrote *De Rebus Oceanicis*, etc., treating of discoveries in the New World. D. 1526.

Angilbert, ang-gil-ber't, or **Engilbert** [Lat. *Angilbertus*], SAINT, b. in N. W. Gaul. He married a daughter of Charlemagne, and became a confidential minister of that monarch. In the latter part of his life he entered a monastery. D. Feb. 18, 814.

Angina Pectoris ("angina of the breast"), called also **Breast-Pang** and **Heart-Stroke**, an intense pain occurring in paroxysms, and usually commencing in the region of the heart or at the lower end of the breast-bone, and extending along the left arm, more rarely going toward the right side. It is characterized by a feeling of extreme constriction of the chest, as by a band or cincture, producing a sense of suffocation, faintness, and often apprehension of approaching death. A. pectoris may be due to organic or functional heart disease. The grave cases result from dilatation and aneurism of the heart or embolism of the arteries of the heart. Functional cases are due to emotional causes and debility. Men over 50 yrs. of age are most frequently attacked. Valerian, aromatic stimulants, morphine, and nitrite of amyl are useful in the attack, which is usually, not always, short. Between paroxysms the patient should lead a tranquil, retired life, and make use of a plain, nutritious diet. E. DARWIN HUDSON, JR.

Angle [Lat. *angulus*, a "corner"]. The difference of direction of two straight lines that meet in a point is called a *plane A*. The lines are the *sides*, and the point is the *vertex* of the A. If two planes intersect, they make an A. which is equal to a plane A. whose sides lie in the two planes, and both of which are perpendicular to the common intersection at the same point. If several planes intersect in a common point, the angular space which they include is called a *polyhedral A*.

Ang'ler (*Lo'phius America' nus*), a fish found on the Amer. coasts, and called the sea-devil or goose-fish. It belongs to a family of acanthopterygious fishes called Lophiade. It is from 3 to 5 ft. long, has an enormous head and a very large mouth, furnished with worm-like appendages. By means of these, and the filaments which rise from the top of its head, it is supposed to attract the fishes on which it preys. The Lophiade are remarkable for the elongation of the carpal bones, by which they are enabled to leap up suddenly



Angler, or Fishing-Frog.

and to seize fish that are above them.

Ang'les [Lat. *Angli*], an anc. Low Ger. tribe from which Eng. derives its name (*Angle-land*, England). They occupied a narrow dist. in the S. of Schleswig, whence some of them passed over, in the 5th cent., in conjunction with other Sax. tribes, into Brit., where they conquered the native Britons and established the A.-S. heptarchy.

Anglesey, or **Anglesea**, ang'-gl-se (anc. *Mo'no*), an island in the Irish Sea connected with the mainland by the Menai suspension bridge, and the Britannia tubular bridge. It is about 20 m. long and 17 m. wide. Pop. 50,964.

Anglesey (HENRY WILLIAM PAGET), MARQUIS OF, b. May 17, 1768, entered the army, was distinguished as a cav. officer, and became maj.-gen. in 1808; in 1812 succeeded his father as earl of Uxbridge; commanded the cav. at the battle of Waterloo (1815), where he lost a leg, and was soon afterward created marquis of A. In 1828-29 and 1831-33 was lord-lieut. of Ire., and was field-marshal in 1846. D. 1854.

Ang'lican Church, a name of the Established Ch. of Eng., sometimes called the Anglo-Cath. Ch. The creed of this ch. is legally defined in the Thirty-nine Articles, first adopted in 1562.

Ang'lo-Cath'olics, a party of High Ch. Anglicans, often called **Puseyites**, from one of their leaders, Dr. Pusey, otherwise known as **Tractarians**, from the series of 90 tracts issued by them between 1833 and 1841. They

emphasize these four "Catholic principles": Apostolic succession, baptismal regeneration, the real presence in the Eucharist, and the authority of tradition.

Anglo-Saxon, a name given to the people and lang. resulting from the consolidation of the different Low Ger. tribes which in the 5th century overran S. Brit. The name would seem to point to a blending of two distinct races, the Angles and the Saxons; but according to Latham (*Ethnology of the Brit. Islands*), there is no distinction to be made between the Angles and the Saxons on the ground of the difference in name. "If," says he, "the Saxons of A.-S. Eng. were other than Angles under a different name, they were N. Frisians." According to the *Saxon Chronicle*, which is, with reference to these events, a mere paraphrase of Bede's *Ecclesiastical Hist. of Brit.*—the latter work being written about 150 yrs. after the last of the Saxon invasions, which the *Chronicle* records as if it were contemporaneous with them—there were seven distinct Teutonic "invasions" of Brit., beginning A. D. 449, and including parties of Jutes, Frisians, Saxons, and Angles. That Jutes, in the sense of people from N. Den. or people of Scandinavian stock, were the first of Gothic invaders to land in S. Brit. is highly improbable; and the topographical nomenclature of Kent, where Hengist and Horsa, with their party of Jutes, are said to have settled, bears no traces of Dan. influence. By "Jutes" we are probably to understand, generically, Goths. Indeed, in Alfred's A.-S. translation of the passage in Bede which the *Chronicle* manifestly follows, the Lat. *Jutis* is rendered by *Geatun* (Goths), a term which is elsewhere applied to Alfred himself. The *Chronicle* itself, by the way, explicitly asserts (Bohn's ed., p. 341) that 787 was the first year when ships of Dan. men sought the land of the Eng. nation; one MS. of the *Chronicle* says that Hengist landed with a party of *Angles*, while tradition calls him a Frisian, which he probably was. The Saxon settlement of Brit. was probably participated in by all the Low Ger. tribes between the Elbe and the Schlei, although, on the ground of linguistic affinity, the Frisians would seem to have been most prominent. As soon as the Saxons had subjugated the Celtic inhabitants of Brit. (who resolutely opposed the invaders, and many of whom were driven before them into the fastnesses of Wales, and across the sea into Armorica, though most of them were, doubtless, amalgamated with the invading race), they began to contend with each other. The various kingdoms forming the famous "Heptarchy" (or, to speak more correctly, the "Octarchy") were at length, in 827, reduced by Egbert, king of Wessex, into a single monarchy, which attained its highest point of power and glory under Egbert's grandson, Alfred the Great (871-901). The Saxon power was completely overthrown by William the Conqueror at the battle of Hastings, in 1066. (See FREEMAN'S *Old Eng. Hist.*) J. H. GILMORE.

Anglo-Saxon Language and Literature. The Sax. conquerors of Eng. spoke several dialects, all of them Low Ger. About 597 A. D. missionaries were sent from Rome to convert them to Christianity. The Lat. alphabetic writing was introduced, and a homogeneous literary lang. was gradually developed, which was at its best during the reign of Alfred the Great (871-901). This lang. belongs to the Indo-European family, and was the best cultivated of the Ger. dialects of the time, having an original lit. well worthy of study. Its chief interest, however, rises from the fact that it forms the basis of the Eng. lang. From it come our grammatical forms and the names of objects and affections which lie nearest to our hearts; also the forms in which our poetry and eloquence, our humor, pathos, and wit find expression.

The A.-S. alphabet consists of 24 letters, most of them closely resembling the forms of the present Eng. alphabet, a few of them entirely different.

The consonants were sounded in general as in Eng.; *c* always having its *k* sound, and *g* as in *give*, never as in *gem*. The vowels were sounded in general as they are in Ger.

In inflection the noun has three genders; three numbers, although the dual is rare except in pronouns; and five cases, as in Lat., but the "instrumental" case is not common. There are four declensions, distinguished by the endings of the gen. sing. in *es*, *e*, *a*, and *an*; from the first of these comes our plu. and poss. sing. termination *-es* or *-s*. The pronouns are inflected essentially as in Eng., but with some variations approximating closely to the Ger.

The adjective, as in Gr. and Lat., is declined; and, as in Ger., has two sets of endings for each number. Comparison is made by adding to the positive *-ur*, *-er*, *-or* for the comparative; *-ist*, *-est*, *-ost*, for the superlative. The comparison by *more* and *most* does not occur. The cardinal numerals are as in Eng., and the ordinals nearly so.

In the verb the past tense is formed from the present by changing the root vowel, or by adding *-de*, very much as in Eng. The present in general serves also for the future; but the future is emphatically expressed by *shall* or *will*, and in other ways. For the passive voice, all moods and tenses are formed, as in Eng., by the aid of auxiliaries.

Syntax.—There is nothing in which A.-S. differs more from Eng. than in its syntax, which is that of a highly inflected lang. like Lat. or Gr. The most gen. laws are common to all speech; a much larger number are common to all Indo-European tongues. The frequency with which different combinations are used by each makes the great difference between them. Apparent anomalies of Eng. syntax may often be easily understood by study of the A.-S. from which they sprang.

The prose lit. of the A.-S. lang. comprises translations of the Gospels, portions of the O. T., and many homilies; several historical works, notable among which is Bede's *Ecclesiastical Hist.*, translated from the Lat. by King Alfred, and the A.-S. *Chronicle*. There are also some valuable codes of civil and ecclesiastical law.

The A.-S. lang. was rich in popular poetry. It was held to be disgraceful not to be able to chant the stirring national songs and ballads. By far the greater part of this poetry has perished. The early Chrs. looked with disfavor upon all

which savored of old pagan thought, and the Normans despised everything A.-S. Still there are many interesting remains of A.-S. verse. In *Beowulf* the old ballads are collected and fused into an epic poem, which has been compared with the *Iliad*. Considerable portions of the Bible were freely rendered into ballads, especially by Cædmon, who has been styled the "A.-S. Milton." There also remain versified lives of saints, translations of the Heb. Ps., a few Chrs. hymns, and a number of allegories and riddles. Quite noteworthy are King Alfred's metrical translations of portions of Boethius.

In metrical structure A.-S. poetry differs widely from Eng., and is akin to the Icelandic and early Ger. It is marked off into alliterative verses, the same or a similar initial sound recurring on the first accented syllables of words. In a perfect verse of the common narrative kind there are 3 alliterative syllables—2 in the first section, and 1 in the second, though frequently the first section has but 1 in many verses. The rhythm is highly artificial. Each section has 4 "beats" or metrical accents; every root syllable has its beat; so has the final syllable of each section; and, moreover, almost any syllable may have a beat, if the poet so chooses. For study of the lang. the Eng. books are MARCH'S *Comparative Gram. of the Anglo-Saxon*, and HADLEY'S *Brief Hist. of the Eng. Lang. in Webster's Dict.* [From orig. art. in *J.'s Univ. Cyc.*, by PROF. F. A. MARCH, LL.D.]

Angola (formerly **Dougo** or **Ambonde**), a country of S. W. Afr., bordering on the Atlantic, and bounded on the N. by Congo. It is subject to the Port., and a large part of the natives are nominally Chrs. Area, 25,500 sq. m. Pop. estimated at 600,000.

Angola, on R. R., cap. Steuben co., Ind., 42 m. N. of Ft. Wayne. Pop. 1870, 1073; 1880, 1280.

Angora (the anc. *Ancyra*; in Tur., *Engoor*), a town of Asiatic Tur., about 217 m. E. S. E. of Constantinople. In 1402 Bajazet was here defeated and made prisoner by Tamerlane. Pop. estimated at 20,000.

Angostura Bark, or **Angustura Bark**, the aromatic bitter B. of certain trees of the natural order Rubiaceæ, natives of the tropical parts of S. Amer. It is tonic and stimulant, and has been used in the cure of fever, dysentery, diarrhoea, etc.

Angoulême, d', don-goo-lem' (LOUIS ANTOINE DE BOURBON), DUKE, b. Aug. 6, 1775, eldest son of the Comte d'Artois, afterward Charles X. of Fr. He emigrated with his father in 1789, and lived in exile until the overthrow of Nap. in 1814. In 1799 he married his cousin, Marie Thérèse (b. 1778, d. 1851), daughter of Louis XVI., who had been imprisoned in the Temple with her father and mother from 1792 to 1795. In 1823 the duke was in nominal command of the Fr. army which reinstated Ferdinand of Sp. The Fr. revolution of 1830 drove him again into exile. D. June 3, 1844.

Anguilla (i. e., "little eel," from the Lat. *anguilla*, an "eel"), a genus of minute animals allied to the nematoid worms. Best known are those called "vinegar eels," found abundantly in cider vinegar. They are remarkable for tenacity of life. *A. fluviatilis*, after being dried until it becomes brittle, will recover its activity when placed in water. *A. tritici*, found on blighted wheat, has been known to revive after being kept dry for 5 yrs.

Angus, EARL OF. See DOUGLAS.

Angus (JOSEPH), D. D., b. Jan. 16, 1816, grad. at Edinburgh; became pres. of Regent's Park Coll. (Bap.), Lond.; has written *Hand-Book of the Eng. Tongue*, and was one of the committee for revising the translation of N. T.

Anhalt, a duchy and one of the states of the Ger. empire, almost surrounded by Sax., and traversed by the Saale, the Elbe, and the Selke. The E. part is level, the W. part mountainous and wooded; soil fertile, with mines of silver, copper, iron, and lead. Area, 869 sq. m. Pop. 1880, 232,747.

Anhalt-Bernburg (CHRISTIAN), PRINCE OF, a Ger. gen., b. in 1568; was the chief promoter of a league of Prot. princes formed against the emp. in 1608. He commanded the army of Frederick elector Palatine, which was defeated at Prague in 1620. D. 1630.

Anhalt-Des-sau (LEOPOLD), PRINCE OF, a Ger. gen., b. in 1676; commanded the Prus. troops under Prince Eugène in It. and Flanders in 1706-12, and was second in command of the Prus. army which opposed Charles XII. of Swe. in 1715. D. 1747.

Anhydrite [from the Lat. *anhydrous*, and the Gr. *λίθος*, a "stone"], a mineral composed of anhydrous sulphate of lime. It is harder and heavier than common sulphate of lime (gypsum), into which it is slowly converted by the absorption of water. It occurs in several varieties—viz. granular, fibrous, radiated, and translucent, sparry A. or cubenspar, and compact A.

Anhydrous [from the Gr. *ἀν*, priv., and *ὕδωρ*, "water"], "without water," a chemical term applied to a compound which contains no water, as pure and absolute alcohol, which is called *A. alcohol*; quicklime as it comes from the kiln is *A. lime*, but when it comes into contact with water, the lime and water combine and form *hydrated lime*.

Aniline, an'i-lin [from *anil*, "indigo"], **Phenyamine**, or **Am'ido-benzol**, discovered in 1826 by Unverdorben as a product of the distillation of indigo, and called by him *crystalline*, on account of the ready crystallization of its salts. It attracted much attention from chemists, and was made the subject of many researches, which contributed greatly to enlarge the facts and theories of modern chem. It did not acquire any commercial importance till 1856, when Perkin prepared from it the beautiful purple dye *mauve*. The brilliancy and intensity of this color attracted the attention of chemists and dyers, and in a short time an entirely new series of colors was discovered, by which the art of dyeing has been almost revolutionized.

A. is found among the products of the distillation of bituminous coal (in "coal-tar"), of peat, bones, etc. It is prepared, however, from benzol derived from the more volatile portions of coal-tar. The benzol is converted by the action

of nitric acid into nitrobenzol, and this compound is changed by the action of ferrous acetate, produced by iron filings and acetic acid, into A.

A. is a colorless, mobile, oily liquid, having a faint vinous odor and aromatic burning taste. Its specific gravity is 1.002; boiling-point, 182° C. It is very poisonous. It dissolves very slightly in water, in all proportions in ether, alcohol, wood-naphtha, bisulphide of carbon, and in oils, fixed and volatile. The aqueous solution is faintly alkaline, and precipitates many metallic bases from solutions of their salts. With bleaching-powder it produces a violet-blue color, with sulphuric acid and potassic bichromate, a bluish-black precipitate, and when treated with arsenic acid, etc., in company with toluidine forms rosaniline. When exposed to the air, A. acquires a yellow or red color, which is always noticed in commercial "A. oil." It forms a numerous class of salts, most of which crystallize readily.

A. is now manufactured in enormous quantities for the preparation of the different colors. C. F. CHANDLER.

Aniline Colors. In 1835 Runge noticed the violet-blue color produced by chloride of lime with A., and Fritzsche subsequently showed that chromic acid formed with A. a blackish-blue precipitate. In 1853 Beissenhirtz obtained a blue by acting upon A. with potassic dichromate and sulphuric acid. It remained for W. H. Perkin to develop this reaction, and to lay the foundations of the great A. industry which is now so extensive. In 1856 he isolated the color formed in the last-mentioned reaction, called it mauve, and showed that it could be used as a dye. Many chemists at once turned their attention to the subject, and a great number of new colors of almost every tint and shade were discovered, which have taken the place in dyeing, and to a considerable extent in calico-printing, of the animal and vegetable colors in previous use. The chemical composition of many of these colors has been established, and many chemical facts of great importance have been developed by their study. (See ANILINE COLORS, in J.'s UNIV. Cyc., for the different colors.) C. F. CHANDLER.

Animalcule [Lat. *animalculum*, the diminutive of *animal*], literally, a "minute animal." In popular lang. applied to the microscopic animals which zoologists call Infusoria, Protozoa, etc.

Animal Magnetism. See MESMERISM.

Animals, Legal Liability for. See FERE NATU-R.E.

Animals, Ownership of. See FERE NATURE.

Animé, a resin which exudes from *Hymenaea Cour'baril*, a tree or the natural order Leguminosæ, and a native of Brazil. It has been used as a med. and as incense.

Anio (the mod. *Teveo'ne*), a river of It., falling into the Tiber 4 m. N. of Rome. Anc. Rome was in part supplied with water from the A. by 2 aqueducts, 43 and 62 m. long. Its length is about 55 m.

Anise, Oil of, an essential oil obtained by distilling A. seeds or star A. with water. Oil of fennel, from *Anethum feniculum* and *Artemisia Dracunculus*, is of a similar chemical composition. Oil of A. and of fennel contain a hydrocarbon oil, said to be isomeric with oil of turpentine, and an oxidized oil, called anethol or A. camphor, which solidifies at temperatures below 10° C.

Anise Seed, the fruit of the *Pimpinella Ani'sum*, an annual herbaceous plant of the order Umbelliferae, is a native of Egypt. It is cultivated in Syria, Malta, Sp., and Ger., and is used in med. as a stimulant and a carminative. It is also used to flavor liqueurs and as a condiment. A seed contains a volatile oil which is employed for similar purposes. A large part of the A. oil of commerce is from star A., the fruit of *Illicium anisatum*, a small tree of the order Magnoliaceae. The whole plant is carminative, and is used by the Chi. as a spice. Its properties are those of the *Pimpinella*. It is imported from Anam and Chi.

Anise Tree [so named from the smell, which resembles that of A.], a name applied to two small trees or large shrubs of the order Magnoliaceae, growing in the Gulf States—the *Illicium Floridanum*, and the *Illicium parviflorum*. Both are evergreen, the former with dark purple and the latter with small yellow flowers, appearing in May and June. The star A. oil of commerce is the product of the *Illicium anisatum* of E. Asia; and it is believed that the same oil might be obtained from the *Illicium Floridanum*. The *Illicium parviflorum* has a taste and smell resembling those of sassafras. The *Illicium religiosum* of Chi. yields a fragrant incense for temple-worship.

Anjou, an'joo, a former prov. and duchy of Fr., now forming the dept. of Maine-et-Loire and parts of several others; was erected into a duchy about 1360; was finally annexed to the Fr. crown in 1480, after which the title of duke of A. was bestowed upon the younger sons of several Fr. kings. Pop. about 550,000.

Ank'arström (JOHAN JAKOB), a Swe. regicide, b. in 1761. He entered into a conspiracy against Gustavus III. of Swe., whom he assassinated at a masked ball Mar. 16, 1792; was publicly scourged and beheaded Apr. 29, 1792.

An'ker, an old liquid measure, varying in capacity in different countries, now used only in Den. and Nor. The present Copenhagen A. is about 9/16 U. S. gals.

An'na, on R. R. Union co., Ill., 37 m. N. of Cairo. Pop. 1870, 1269; 1880, 1494.

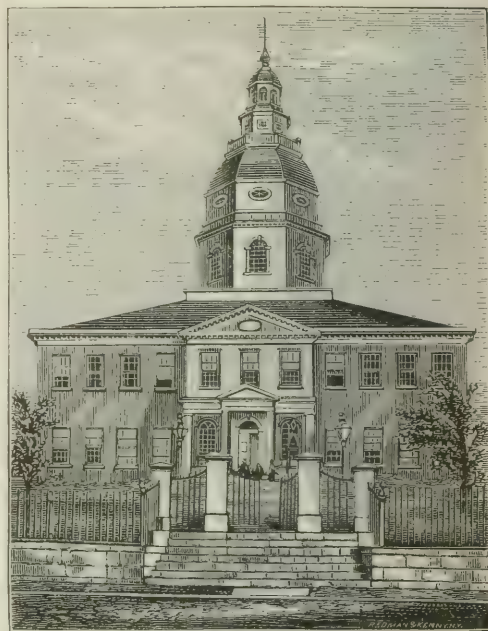
Anna, SAINT, supposed to have been the mother of the Virgin Mary, but not mentioned in the Bible. The R. Cath. Ch. in some countries celebrates a festival in her honor on the 26th of July.

An'na Carlov'na, b. in 1718, a daughter of the duke of Mecklenburg, and niece of A. Ivanovna, empress of Rus. She was married in 1739 to the duke of Brunswick-Wolfenbützel, and had a son, Ivan, whom A. Ivanovna designated as her successor. Soon after the death of that empress, in Oct. 1740, A. Carlovna assumed the office of regent. She was deprived of power by a conspiracy which raised Elizabeth to the throne in Dec. 1741. D. Mar. 18, 1746.

An'na Comne'na, a learned Byzantine princess and writer, b. Dec. 1, 1083, was a daughter of Alexis I., emp. of Constantinople. She wrote in Gr. a life of her father, entitled the *Alexiad*. D. 1148.

An'na Ivanov'na, empress of Rus., daughter of Ivan, a brother of Peter the Great, b. Jan. 25, 1693. In 1710 she married the duke of Courland, who died in 1711. In 1730 she succeeded Peter II., and permitted her favorite, Biren, to have supreme control, which he exercised with great cruelty. D. Oct. 28, 1740.

Annapolis, city, on R. R., cap. Anne Arundel co., Md., and of the State; port of entry on the Severn River, 2 m. from its entrance into Chesapeake Bay, 20 m. S. by E. of Baltimore



State Capitol (Annapolis, Md.).

and 22 m. E. by N. of Wash. Lat. 38° 58' 50" N., lon. 76° 29' W. It has a fine harbor, and is the seat of St. John's Coll. and of the U. S. Naval Acad. Pop. 1870, 5744; 1880, 6642.

Ann Arbor, city and important R. R. centre, cap. Washtenaw co., Mich., on the Huron River, 38 m. W. of Detroit. It is the seat of the Mich. State Univ., and has a valuable mineral spring. Pop. 1880, 8061; 1884, 7922.

Anatto. See ANXOTTO.

Anne of Cleves, 4th queen of Henry VIII. of Eng., b. Sept. 22, 1515; was married to Henry VIII. Jan. 1540, and divorced the same year. D. at Chelsea July 16, 1557.

Anne, queen of G. Brit. and Ire., the last sovereign of the house of Stuart, b. at Twickenham, near Lond., Feb. 6, 1664. She was the second daughter of James II. and Anne Hyde, daughter of the earl of Clarendon. She was brought up a Prot., and refused to comply with her father's urgency that she should become a Cath. In 1683 she was married to Prince George of Den., to whom she bore 17 children, all of whom d. in infancy or childhood. She succeeded (Mar. 8, 1702) William III. Her reign was marked by political intrigues at home, wars abroad, and by great literary activity. Toward the close of her reign she tried to secure the crown for her exiled brother, known as "the Pretender," being seconded by some of the ablest men of the kingdom. These intrigues were frustrated by her sudden death from apoplexy; and in accordance with the parliamentary act of settlement, she was succeeded by her distant cousin, George of Hanover, who reigned as George I. D. Aug. 1, 1714.

Anniston, Ala. See APPENDIX.

Annot'o, or **Annat'o**, a red coloring-matter, is the pulp of the seeds of the *Bixa orella'na*, an exogenous shrub which grows in S. Amer. and the W. I., and belongs to the natural order of Flacourtiaceae. It is soluble in alcohol, ether, and in potash and soda, either caustic or carbonated. It contains a yellow principle called bixin. It is used as a dye, but its colors are fugitive. The pulp is used to color cheese, is an ingredient in some varnishes, and is employed in med. to color ointments and plasters.

Annu'ity [Lat. *annuitas*, from *annus*, a "year"], in law, is a sum of money, payable every yr., and charged on the person or personal estate of the individual who is bound to pay it; thus differing from a rent-charge, which is charged on real estate. A. are often paid by a person who borrows money (who is called the grantor) to the person who lends the money (who is the grantee). An A. is for a term of yrs., for a life or lives, or in perpetuity; and the last, although charged on personal property, may descend as real estate.

Annun'ciation, Feast of, a festival of the Ch. in commemoration of the announcement of the conception of the Saviour to the Virgin Mary by the angel Gabriel. It is celebrated on the 25th of Mar., which is called Lady Day.

Ano'a, a species of ruminating animal of the genus *Bubalus*, and allied to the buffalo, living in Celebes.

An'ode, [from the Gr. *ανωδος*, a "way up"], a term used to denote the positive pole, or that surface by which the

galvanic current enters the body undergoing decomposition. The negative pole, or the surface by which the current goes out, is called *cathode*. The elements of electrolytes are called *ions*, and those which go to the *A.* *anions*.

Anoka, city, on R. R. cap. Anoka co., Minn., on left bank of the Miss., at the mouth of Rum River, 27 m. N. W. of St. Paul. Pop. 1880, 2,066.

Anolis [from a native name, *ano'li*], a group of iguanoid saurian reptiles, natives of the warm parts of Amer., most of which are remarkable for their power of inflating the skin of the throat. They move with great agility, and exhibit great brilliancy of color, which is susceptible of change, and has consequently caused them to be popularly called chameleons, from which, however, they are very distinct. About 60 species are known.

Anomalistic Year, the time required for the earth to revolve around the sun from perihelion back to perihelion again.

Anomaly [Gr. *an*, priv., and *isos*, "level"]. In astron., the angular distance of a planet from its perihelion. The *A.* as above defined is the *true A.* If we suppose a fictitious planet to set out from perihelion with the true planet, and to revolve uniformly about the sun at such a rate as to return to perihelion at the same time as the true planet, the *A.* of the fictitious planet is called the *mean A.* The difference between the true and the mean *A.* at any moment is the corresponding *equation of the centre*. W. G. PECK.

Anotto. See ANNOTTO.

Anquetil-Duperron, onk-tél 'du-pa-ron' (ABRAHAM HYACINTHE), a Fr. Orientalist, b. in Paris Dec. 7, 1731. Having studied Ar. and Per., he enlisted as a private soldier in an expedition sent to India in 1754. He traversed a great part of Hindostan, collected MSS. and sacred books, and returned to Fr. in 1762, becoming in the following yr. a member of the Acad. of Inscriptions. In 1771 he pub. a translation of the *Zend-Avesta*. D. Jan. 17, 1805.

Anselarius, or **Ansar**, SAINT, called the "Apostle of the North," b. in Picardy Sept. 8, 801. He propagated Christianity in Den. and Swe., and in 832 became the first abp. of Hamburg. D. Feb. 3, 865.

Anselm, SAINT [Lat. *Sancus Anselmus*], abp. of Canterbury, b. at Aosta, in Piedmont, in 1033. In 1060 he became a pupil of Lanfranc, and an inmate of the abbey of Bec in Normandy, of which he was chosen prior in 1063, and abbot in 1078. He was appointed abp. of Canterbury in 1093. He was noted as a philos., and is considered as the reviver of metaphysics. He wrote *Cur Deus Homo*. D. 1109.

Anson (GEORGE), LORD, b. in Staffordshire Apr. 23, 1697; in 1740 was appointed commander of an expedition to the S. Sea, circumnavigated the globe, and made some important discoveries. He defeated a Fr. fleet in May 1747, and was rewarded with the title of Baron A. of Soberton. He was first lord of the admiralty from 1751 to 1757, and admiral of the fleet in 1761. D. June 6, 1762.

Ansonia, R. R. centre, New Haven co., Conn., situated on the Naugatuck River, 10 m. W. N. W. of New Haven. Pop. 1870, 2,749; 1880, 3,855.

Ant [Lat. *formica*], a genus of hymenopterous insects remarkable for their industry, ingenuity, and muscular strength. It comprises numerous species, which are widely distributed in temperate and tropical countries. They live in societies composed of males, females, and neuters, the last of which are workers and are destitute of wings. The males and females have wings, and are larger than the neuters, but less numerous.

The habits of the different species of *A.* vary greatly, and in some cases are of extreme interest. The foundation of a new colony is accomplished by the escape from the parent community of an impregnated winged female, who, whenever she has reached a convenient location, strips off her wings, and thus disqualifies herself for further wandering. She then deposits and carefully guards her eggs, from which the new family are in due time produced.

Some species of *A.* are constitutionally and habitual robbers, living upon the proceeds of others' industry, and organizing predatory excursions for the acquisition of booty; with as much system and apparent intelligence as this is ever done by man. Other species are accomplished engineers, building archways and tunnelling under streams of considerable size, constructing with marvellous celerity works which rival in their relative magnitude the proudest achievements of human engineers. The leaf-cutting *A.* of the tropics strip trees of their foliage and fill subterranean chambers with clippings, as Belt says, not to be used for food, but to become hot-beds for the growth of fungi, which they eat; and among the most interesting of all are the honey *A.* of Mex. and the S. W. U. S., among which a portion of each colony serve as food for the rest. When their galleries are opened, many couches of silken threads are seen, which contain *A.* that, fed by their fellows, secrete honey in the abdomen until they become incapable of locomotion, and ultimately resemble small pellucid grapes. Later in the season, when food is scarce, these are sacrificed one after another to supply the wants of the colony. Still other species of *A.* keep slaves, and seem to be entirely dependent upon their services for the supply of every want. Others have herds of aphides which to them serve the purpose of milch cows, and others still are said to plant seeds and harvest crops of grasses which serve them for food. This is perhaps an exaggeration, but it is at least certain that in the clearing of the spaces around their nests the grasses which supply seeds eaten by them are permitted to remain, and are protected until the seed is gathered.

The social economy of the communities of *A.* is in many respects instructive as well as interesting. The benefits of a division of labor are fully appreciated and systematically practiced by them; and while they are apparently free from all sentiment, or even sympathy, doing their duty with inflexible and pitiless exactness, their industry, which is said to be sleepless; their skill, their temperance, their frugality,

their absolute forgetfulness of self in devotion to the common interests, their fidelity to friends and their perfect fearlessness in the face of foes, and many other of their characteristics, might be profitably imitated by human communities.

The limitations and characteristics of the intelligence of *A.* are now being made the subject of special investigation by Sir John Lubbock, and from the facts he has already brought to light we may infer that the final results will be of great and general interest. J. S. NEWBERRY.

Antæus, an-té'us, [Gr. *Ἀνταῖος*], a fabulous giant, son of Neptune and Terra. He was invincible as long as he was in contact with the earth, but was conquered by Hercules, who raised him into the air and strangled him to death.

Antanana rivo, or **Tananarivo**, the cap. and chief city of Madagascar, situated in a mountainous region in the middle of the island, 7,000 ft. above the sea. Pop. about 80,000.

An'tar, Au'tara, or An'tarah-Ibn-Sheddād, an Ar. prince and poet, who lived about 550 A. D. He was the author of one of the 7 poems which are called *Mo'allakat*, and were suspended in the Kaaba or temple at Mecca. His martial exploits were a favorite theme of Ar. poetry and romance.

Antarctic [from the Gr. *ἀντί*, "against," "opposite," and *ἀρκτικός*, "pertaining to the north"], opposite to Arctic. The Antarctic circle is one of the small circles of the sphere parallel to the equator, and 23° 27½' from S. pole.

Antarctic Current, a drift-current commencing on the shores of Victoria Land, in the region of perpetual frost. It carries vast quantities of ice and cold water toward the N. E. and E., and becomes converted into a coast-current, washing and cooling the W. shores of S. Amer.

Antarctic Ocean, or Southern Ocean, that body of water around the S. pole included within the *A.* circle; also a general term designating the vast sea S. of the Atlantic, Pacific, and Indian oceans.

Antarctic Researches. The first navigator who explored these regions was Capt. Cook, who in 1774 reached lat. 71° 10' S. In 1823 Capt. Weddell penetrated to lat. 74° 15' S., where he found an open sea. In 1840 Capt. Wilkes, U. S. N., discovered part of a large continent in lat. 61° 30' S., lon. 161° E.; he traced the coast W. to lon. 101° E., but was unable to land on account of the ice. In 1841 Capt. Ross of G. Brit. reached 78° S. See POLAR RESEARCH.

Antares [from the Gr. *ἀντί*, and *ἄρης*, "Mars," because this star was thought to resemble Mars], a ruddy double star, the most conspicuous in the constellation Scorpio.

Ant-Catcher and Ant-Thrush, names given to birds of tropical and sub-tropical countries that feed upon ants, and are nearly allied to the thrushes. They have very powerful voices, a straight, sub-cylindrical bill, hooked at the tip, slender legs, and short tail. Some of them belong to the genera *Pitta* and *Grallaria*. The giant *A.* of Sumatra (*Pitta gigas*) is of a fine green color.

Ant-Eater, a S. Amer. family of mammals, animals of the order Edentata. *A.* have no teeth, and feed on ants and other insects, which they catch by thrusting among them the long tongue covered with a viscid saliva. The head is much elongated, and the tail is about as long as the body, which is covered with long hair. The toes are united as far as the base of the claws, which are very large and strong, adapted for the purpose of tearing open ant-hills. The great *A.* (*Myrmecophaga jubata*), sometimes called the *A.-bear*, is about 4½ ft. long, exclusive of the tail, which is about 2½ ft. It has 4 toes on the fore feet, and 5 on the hind feet. It is a sluggish animal, whose movements are not much more rapid than those of a sloth. The little *A.* (*Cyclothylus didactylus*) is not more than 20 or 21 inches in entire length. It is remarkable for a peculiar structure of the skeleton. On a side view the cavity of the chest is completely hidden by the ribs, which are greatly flattened and overlap each other, so that on a hasty glance the ribs appear to be formed of one solid piece of bone. It has 2 claws on the fore feet and 4 on the hind feet; these claws are compressed, curved, and very sharp. The name *A.* is sometimes given to the aardvark (*Orycteropus* *Carpensis*) of S. Afr., to the pangolins, the *Echidna*, and other mammals which subsist on ants and other insects. One of the best known of these is the *Manis latucaudata*, or pangolin of Hindostan.

Antelope [Lat. *antilope* and *antelope*; Fr. *antilope*], a name given to numerous species of the family of Bovide, agreeing in a more or less slender form, uplifted head, and neck of moderate length, and slender legs, whose metacarpals and metatarsals are much longer than the phalanges and hoofs. They are mostly gregarious, inoffensive, and timid animals, and vary greatly in size as well as form. The greater numbers of them are found in S. and Central Afr., yet Asia produces numerous species. The chamois is a European type, and the Rocky Mt. goat is a N. Amer. one.

The "common" or bezoar *A.* (*Antelope bezartica*) is found in India and throughout S. Asia. Its flesh, like that of most *A.*, is dry and rather unpalatable. The Oriental bezoar, a phosphatic concretion prized in the E. for its supposed med. virtues, is derived from the intestines of this animal. The *A.* of the W. U. S. belongs to the group (*Antilocapridæ*).

Anthelmintics. See VERMIFUGES.

Anthemius [Ἀνθέμιος], an eminent Gr. arch. and math. of Tralles, in Lydia, designed the celebrated ch. of St. Sophia in Constantinople, which was finished about 537 A. D.

Anthemius, or Anthemius Procopius, a Rom. emp., who began to reign at Rome in 467. He was the father-in-law of Ricimer, who became his enemy, defeated him in battle, and put him to death in 472 A. D.

Anthology [from the Gr. *ἀνθολογία*, a "collection of flowers"], in anc. lit. a collection of short pieces of poetry on amatory, convivial, or moral subjects, or a selection of beautiful thoughts and sentences in prose or verse, mostly epigrams. Collections of poetry which may not inappropriately be termed anthologies are also found in the literatures of Ar., Tur., Per., and Chi.

An'thon (CHARLES), LL.D., an Amer. classical scholar, b. in N. Y. Nov. 19, 1797, grad. at Columbia Coll. in 1815. In 1820 he became adjunct prof., and in 1835 prin. prof. of anc. langs. in Columbia Coll. He published eds. of the prin. school classics, and a *Classical Dictionary*. D. July 29, 1867.

Anthou JOHN, LL.D., brother of the preceding, b. in Detroit in 1784, grad. at Columbia Coll. in 1801, a distinguished lawyer, pres. of Law Inst. of New York. D. Mar. 5, 1863.

Anthony, Kan. See APPENDIX.

Anthony (HENRY B.), an Amer. journalist and statesman, b. at Coventry, R. I., Apr. 1, 1815; grad. at Brown Univ. 1833; was ed. of the *Providence Journal* 1838-59, gov. of R. I. 1849-51. In 1859 became U. S. Senator, and has been four times re-elected. D. while Senator, Sept. 2, 1884.

Anthony (SUSAN BROWNELL), b. at S. Adams, Mass., Feb. 15, 1820, was the daughter of a Quaker. Since 1852 she has been an active leader of the woman's rights movement.

Anthony, SAINT. See ANTONY, SAINT.

Anthracene, or **Paranaphthaline**, a hydrocarbon existing in coal-tar, and extracted from the last portions of the distillate from this substance. The products of the distillation of coal-tar as ordinarily conducted are—1. Crude coal-tar naphtha, containing benzol, toluol, etc., lighter than water. 2. Heavy oil of coal-tar, or "dead oil," heavier than water, and containing about 10 per cent. of PHENOL (which see) and cresol, and much naphthaline. 3. Green oil, which becomes semi-solid on cooling, owing to the crystallization of A. 4. Pitch, which remains in the still. Versmann and Fenner have patented the further distillation of pitch till only coke remains in the still. They thus obtain a much larger yield of green oil, and increase the product of A. from one half of 1 per cent. to 2 per cent. of the original tar. The semi-solid green oil has been used in Eng. to some extent as a cheap lubricator or wheel-grease, under the name of "green grease." The A. is separated from the green oil by chilling and pressing. In its crude state it contains considerable oil, naphthaline, pyrene, chrysene, chrysogen, retene, anthracenic acid, etc. To purify the crude A. cake, it may be subjected to distillation, the first and last portions being rejected, the intermediate portion being recrystallized from benzol or coal-tar naphtha; or the crude cake may be washed with petroleum naphtha to remove oils, etc., and then recrystallized from benzol. Thus obtained, A. is always colored yellow by chrysogen, which may be destroyed by exposing its solution to the direct rays of the sun. Graebe and Liebermann prepared A. by the action of zinc-dust on alizarine, the coloring-matter of madder, and were from this led to devise a method for preparing alizarine from A.—an operation which is now the basis of a very important industry. (See ALIZARINE.) C. F. CHANDLER.

Anthracite [Lat. *anthracites*, from the Gr. *ανθραξ*, "coal"], an important fossil fuel, the hardest variety of stone coal, consisting, when pure, almost exclusively of carbon. It has a conchoidal fracture, a black color, and an imperfectly metallic lustre, from which it is sometimes called *gloss coal*. It burns slowly, with intense heat, without smoke, and with little flame. A., like all other varieties of coal, is of vegetable origin, and is, in fact, formed from softer and more bituminous coals by the action of subterranean heat, which has driven off most of their volatile matter. The composition of A. is the same as that of coke formed artificially from bituminous coal, and it is more dense than coke only because it has been heated under great pressure. A. has no definite composition, but shades imperceptibly into graphite on one hand, and into bituminous coal on the other. The A. beds of Pa. are all of carboniferous age, and were once connected with the bituminous coals of the Alleghany coal-field, having been separated and changed in character by the upheaval of the Alleghany Mts. The coals of that State show a regular gradation of composition in going from the E. to the W., and receding from the focus of metamorphic action in the Alleghanies. For example, the coal of the Lehigh basin is most baked, and contains the least amount of volatile matter—3 to 7 per cent.; the Scranton coal, from 9 to 12 per cent.; the semi-bituminous coal of Blossburg and Broad Top, from 17 to 25 per cent.; the bituminous coal of W. Pa., from 30 to 50 per cent. In R. I. a small basin of carboniferous rocks has been still more thoroughly calcined, and the coal is partially converted into graphite (graphitic A.). A. may be of any geological age. In Chi. the coals are mostly, if not altogether, of mesozoic age, and over large areas they are anthracitic. Near Richmond, Va., trap dikes bursting through the triassic coal-beds have changed some of them locally into a spongy A., a "natural coke." The triassic coal of Los Bronces, Sonora, has been extensively metamorphosed by the action of igneous rocks. Near Santa Fé, N. M., an outburst of volcanic rock has, over many sq. m., converted a cretaceous lignite into A. At Crested Buttes, Col., and on Queen Charlotte Island, local eruptions of trap have converted cretaceous lignites into compact and brilliant A.

The density and great heating power of A. make it the best of all fuels for metallurgical purposes, while its freedom from smoke specially commends it for combustion in cities. For the generation of steam, A. has no superiority over the best bituminous and semi-bituminous coals; and as a household fuel, canal is preferred for open fires from its cheerful flame and the facility with which it is kindled; but the steadiness, cleanliness, and economy of an A. fire will always make it the staple fuel of the communities which can obtain it.

A. occurs and is largely mined in Wales, Ire., and other parts of Europe, but the most extensive and productive beds of A. are those of Pa. These form several detached basins lying between the folds of the Alleghany Mts. Their aggregate area is only about 500 sq. m., but in 1879, 26,142,689 tons were produced from them. (See MCFARLANE'S *Coal Formations of Amer.*) J. S. NEWBERRY.

Anthraquinone. See ANTHRACENE AND ALIZARINE.

Anthrenus Scrophularia. See CARPET-BUG.

Anthropology [from the Gr. *ανθρωπος*, "man," and *λογος*, a "treatise"] is a term used in several senses: (1) It signifies the science of man as an object of nat. hist., and as compared with other animals; (2) the science which treats of man's whole nature, as distinguished from psychology, which treats of the mind or spirit of man; (3) in a theological sense it denotes the study of man in his relations to God. (For A. in the former sense, see the article MAN, by PRES. M. B. ANDERSON, LL.D.)

Anthropomorphites, or **Anthropomorphists**, persons who conceive that the Deity has naturally a human form, as the anc. Grs. and other pagans. This error has been also entertained by some Chr. sects.

Antichlore, a name given by paper-makers to substances which are employed to remove from the pulp the chlorine which, in the form of chloride of lime, had been used to bleach it, and which, if allowed to remain in the pulp, would not only damage the machinery, but injure the strength of the paper. Sulphite and bisulphite of soda were first employed, but at present hyposulphite of soda is almost invariably used. Sulphite of calcium, proto-chloride of tin, and coal-gas have been used.

Antichrist [Gr. *αντιχριστος*, from *αντι*, "against," and *χριστος*, "Christ"], a name which has been variously applied by Chr. writers to some individual or inst. destined to arise in opposition to Christianity, and to obtain a partial or temporary triumph over it. The word A. occurs in the Scriptures only in the First and Second Epistles of John. Many writers have made the pope, or the papacy, A.

Anticleia, an-ti-kl'e-a [*Ἀντικλεία*], a daughter of Antolycus, wife of Laertes, and mother of Odysseus. According to Homer, she d. of grief at the long absence of her son.

Anticleides, an-ti-kl' d'ez [*Ἀντικλείδης*], a Gr. historian; wrote a history of Alexander the Great, an account of Delos, and *Ἡπειρωτικόν*.

Anti-Corn Law League. See LEAGUE, ANTI-CORN LAW, by G. J. HOLYOAKE, Eng.

Antietam Creek, a small river in Md., which falls into the Potomac about 6 m. above Harper's Ferry. Upon its bank a battle was fought, Sept. 17, 1862, between the U. army under McClellan and the Confeds. under Lee. The action itself was indecisive, but it put an end to the Confed. invasion of Md., and encouraged Pres. Lincoln to issue his emancipation proclamation.

Antigo, Wis. See APPENDIX.

Antigone [Gr. *Ἀντιγόνη*], a daughter of Oedipus, king of Thebes, and Jocasta. She attended her father in his exile, and buried her brother Polyneices in defiance of the edict of Creon, who, for her disobedience, immured her alive. Her story is the subject of one of the tragedies of Sophocles.

Antigonus [Gr. *Ἀντιγονος*], surnamed Cyclops (*ἰ. e.* "one-eyed"), a Macedonian gen., b. about 382 B. C. He took part in Alexander's campaign against Per., and in the division of the empire which followed the death of Alexander, received the provs. of Lycia, Pamphylia, and Greater Phrygia. He engaged in many wars with other sovereigns, and gained several provs. A league was formed against him in 315 B. C. In 306 the fleet of A. defeated that of Ptolemy of Egypt, and he assumed the title of king, but was defeated and slain in the battle of Ipsus. D. 301 B. C.

Antigonus, king of the Jews, a son of Aristobulus II., b. about 80 B. C. After the death of his father he was expelled from Judea by Antipater and Herod. He was restored to the throne by the Parthians about 39 B. C., but the Rom. senate refused to recognize him as king. Mark Antony took Jerusalem and put A. to death about 36 B. C.

Antigonus Do'son [Gr. *Ἀντιγονος Δώρων*], a descendant of A., surnamed Cyclops, and a nephew of A. Gonatas. He became regent in 229 B. C., during the minority of Philip V., who was heir to the throne. He was an ally of the Achæan League in a war against the Spartans, whom he defeated in 221. D. 221 B. C.

Antigonus Gona'tas (Gr. *Ἀντιγονος Γονατᾶς*), son of Demetrius Poliorcetes, b. at Gona in Thessaly (whence his surname) about 320 B. C. He defeated the Gauls, who had invaded Gr., and became king of Macedonia in 277 B. C. He was driven from his dominions by Pyrrhus, king of Epirus, 273, but regained his throne 2 yrs. after. D. about 240 B. C.

Anti-Libanus, or **Anti-Lebanon**, a mt. range of Pal. and Syria, extending about 90 m. in a N. E. and S. W. direction nearly parallel with Lebanon, from which it is separated by the valley of Coele-Syria. The summit of this range is Mt. Hermon, which has an altitude of about 10,000 ft.

Antilles, an-teel', **The**, a name applied to all the W. I. islands except the Bahamas. They are divided into 2 groups. The GREATER A. include Cuba, Hayti, Jamaica, and Porto Rico. The LESSER A. are small, and divided into 2 subordinate groups—the Windward and the Leeward Islands.

Antimachus [*Ἀντίμαχος*], a distinguished Gr. epic and elegiac poet, a native of Colophon or Claros, lived about 400-360 B. C.

Anti-Masonry, a term properly denoting a repugnance to the secret society known as Free Masons, but specially indicating a political party which existed for a short period in the U. S. In the summer of 1826 it was reported that William Morgan, a tailor living in the v. of Batavia, in Western N. Y., was engaged in preparing a revelation of the secrets of the Masonic order, of which he was a member. Other Masons, including the ed. of the v. gazette, were understood to be engaged with him in the enterprise. Morgan suddenly disappeared, and it was soon proved that he had been forcibly abducted. Excitement arose, committees of vigilance and safety were organized, and he was traced westward to Ft. Niagara, near Lewiston, N. Y., where he was temporarily imprisoned, and whence it was ultimately testified, he was taken out into deep water in Lake Ont. and there sunk, though this was strenuously denied, and stories from time to time affirmed that he was subsequently seen alive in various places. Such reports did not allay the excitement, which deepened and diffused itself, finding vent in a political party,

which cast 33,000 votes in the State of N. Y. in 1828, about 70,000 in 1829, and 128,000 in 1830; but of this last a fraction were not Anti-Masons, but only Anti-Jackson. The party spread into other States, and nominated William Wirt for Pres. and Amos Ellmaker for V.-P. in 1832, when they were heartily supported in several States, but carried Vermont only. They probably diverted votes enough from Clay to give the states of O. and N. J. to Jackson. They nearly elected Joseph Ritner gov. of Pa. in 1832, and did elect him in 1835, through a split in the Dem. ranks. The excitement gradually died out, and absorbing questions of finance and political economy soon dissolved the Anti-Masonic party.

HORACE GREELEY.

Anti-Mission Baptists, called by themselves **Old-School Baptists**, a denomination in the U. S. who have no Sunday-schools, missions, colls., or theol. schools, holding that these things make the salvation of men to depend on human effort, and not upon divine grace.

Antimony [etymology uncertain; Lat. *stibium*, from which is derived the chemical symbol, Sb], a brittle metal of a silver-white color and of a peculiar taste. It occurs in nature native, combined with other metals, as nickel, silver, etc., with oxygen and with sulphur. The sulphide, "stibnite" or "gray A.," is the source of all the A. of commerce. The most abundant supplies of this ore are obtained from Borneo. It also occurs in considerable quantities in Hungary, Cornwall, N. B. Cal., and Nev. The metal, called in commerce "regulus of A.," is separated from the sulphide in various ways, such as heating with metallic iron, sodic carbonate, and charcoal, or cream of tartar and nitre.

Owing to the extensive use of A. preparations in medicine, the removal of arsenic is of special importance. This can be effected by mixing 4 parts of powdered A. with 5 parts nitre and 2 parts dry sodic carbonate, projecting the mixture into a red-hot crucible. The semi-fused mass is boiled with water, and the insoluble potassic antimoniate is reduced to metal by fusion with cream of tartar. Several successive fusions of pulverized A. with one eighth of nitre are said to completely remove the arsenic.

A. is a brilliant metal of a bluish-white color and highly crystalline or laminated structure. Its density is 6.7 to 6.86. It is extremely brittle, and may be easily pulverized in a mortar. Its melting-point is 450° C. (842° F.). It may be distilled in an atmosphere of hydrogen at a white heat. Heated in the open air, it burns with a bluish-white flame, and forms copious fumes of antimonious oxide, or "flowers of A." A. is oxidized by nitric acid, with the formation of antimonious oxide, antimonie oxide, or antimonoso-antimonie oxide. A. forms with acids or chlorous radicals two classes of compounds—(1) antimonious or tri-compounds, as the trichloride, trioxide, or antimonious oxide, trisulphide; (2) antimonie or penta-compounds, as pentachloride, pentoxide or antimonie oxide, pentasulphide.

Antimonious chloride, or **trichloride**, called **butter of A.**, is obtained by dissolving antimonie sulphide in hydrochloric acid. In its concentrated form it appears as a yellow oily liquid of the consistence of melted butter. Poured into water, it produces a buttery white precipitate of oxychloride (*powder of algaroth*). Mixed with olive oil, butter of A. is used for bronzing gun-barrels. Powdered A. poured into a jar of chlorine takes fire.

Antimonie chloride, or **pentachloride**, is a colorless volatile liquid, prepared by heating A. in an excess of chlorine. By the action of water it is changed to antimonie acid and hydrochloric acid.

Antimonious hydride, or **antimonized hydrogen**, a colorless gas produced by the action of zinc and sulphuric acid on a solution of A. It burns with a greenish flame. Passed through a red-hot tube, it is decomposed, with the formation of a black deposit. A similar deposit is formed on cold porcelain held in the flame. When the gas is passed into a solution of argentic nitrate, a black precipitate of antimonide of silver is formed.

Antimonious, or **trioxide**, found native in beautiful crystals, as *valentinite* and *senarmontite*. Boiled with cream of tartar, antimonious oxide dissolves, with the formation of *potassio-antimonious tartrate*, or *tartar emetic*. An impure oxide is manufactured for the preparation of this salt, by roasting the powdered sulphide, and fusing the product at the end of the process. It is known as *glass of A.*

Antimonie, or **pentoxide**, is formed by heating powdered A. with excess of strong nitric acid, by decomposing the pentachloride with water, or by fusing powdered A. with nitre. Potassic antimoniate is the only reagent for the precipitation of soda. There are two modifications of this acid, known as antimonie acid, and metantimonie acid.

Tetroxide, or **antimonoso-antimonie acid**, occurs native as *cervantite*. It is the ultimate product of the action of heat and air on the metal.

Trisulphide, or **antimonious sulphide**, the ore *stibnite*, or *gray A.*, prepared artificially by fusing A. with sulphur, or as an orange precipitate by passing sulphuretted hydrogen through a solution of tartar emetic.

Kermes is an oxysulphide which occurs native as the beautiful cherry-red *kermesite*.

Alloys of A.—**Type-metal** is composed of A. 1, lead 4 parts, and when used for stereotype plates receives an addition of one eightieth to one fiftieth of tin. This alloy is not only hard, but, owing to the fact that it expands at the moment of solidification, it takes a very sharp impression of the mould. **Britannia** is composed of A. 1, tin 9 parts. **Pewter** is another alloy of A. and tin. A. also enters into the composition of some of the *anti-friction* alloys. Tartar emetic is the most important preparation of A. used in medicine; in large doses it is very poisonous. The old-fashioned "family pill" was a small bullet of metallic A., which was swallowed for certain difficulties, and carefully preserved for future occasions.

C. F. CHANDLER.

Antinomians [from the Gr. *anti*, "against," and *nomos*, "law"], a name applied to those who maintained that the

law is of no obligation under the gospel dispensation. They took their rise from John Agricola, originally a disciple and friend of Luther, and who contended that his views were the legitimate deductions from the principles taught by Luther himself. He taught that good works do not promote our salvation, nor evil ones hinder it. Luther attacked these doctrines, and Agricola retracted the more obnoxious of them. Antinomianism subsequently made its appearance in Eng. during the Commonwealth; some fanatics averring that nothing the elect could do was displeasing to God.

Antioch [Lat. *Antiochi'a*; Gr. *Ἀντιόχεια*], a city of Syria, on the Orontes, 57 m. W. of Aleppo, founded 301 B. C. by Seleucus Nicator, who named it in honor of his father, Antiochus. It became the most splendid city of Asia Minor, having a pop. of not less than 400,000. During the crusades it was a place of great importance, but subsequently declined. It has at different times suffered from earthquakes, one occurring in 115 A. D., and one in 1872, which destroyed many of its houses and inhabs. It was at A. that the name of Christians was first given to the followers of Jesus. The modern *Antakia*, occupying a part of the site of the anc. A., is a meanly built town, of about 12,000 inhabs. There were several other cities bearing the name of A., among which was A. of Pisidia, visited by the apostle Paul, who planted a ch. there.

Antioch College, at Yellow Springs, Green co., O., was founded in 1852. Though under the patronage of Units., it is designed to be free from sectarian influences, and to develop good character as well as mental excellence in its pupils. The sexes are educated together with the best results. It has a music school and a preparatory dept.

Antiochus I. [Gr. *Ἀντίοχος*], surnamed *Soter* (i. e. "saviour"), a king of Syria, b. about 324 B. C. Having succeeded his father in 280, he gained a victory over the Gauls, whence his surname. D. 261 B. C.

Antiochus II., *Theos*, king of Syria, son of the preceding, began to reign in 261 B. C. A war which he waged against Ptolemy of Egypt was ended in 252 by a treaty, in accordance with which he married Berenice, a daughter of Ptolemy. D. by poison 246 B. C.

Antiochus III., surnamed *THE GREAT*, a grandson of the preceding, b. about 288 B. C. He succeeded his brother in 223 B. C. His kingdom comprised Syria Proper, Babylonia, Media, and a part of Asia Minor. For the possession of Pal. he waged war against Ptolemy of Egypt, by whom he was defeated in 217. In 214 the Parthians occupied Media, but were driven out in 212. He afterward made an expedition into India, where he remained 7 yrs.; conquered Pal. in 198, and in 196 invaded Thrace, which brought him into conflict with the Romans, by whom he was defeated at Magnesia. They imposed upon him a heavy fine, to raise which he plundered a temple in Elymais, and was killed by the people, 187 B. C.

Antiochus IV., surnamed *ΕΠΙΦΑΝΕΣ* ("the illustrious"), a son of the preceding. He passed about 12 yrs. in captivity in Rome, whither he was sent as a hostage in 188 B. C.; became king on the death of his brother, Seleucus Philopator, in 175; invaded Egypt in 170, but was constrained by the Rom. senate to retire in 168. About this date he plundered the temple of Jerusalem and persecuted the Jews, who rose in arms and were led by Judas Maccabæus, who defeated the Syrian armies in several battles. D. 164 B. C.

Antiochus VII., surnamed *SIDETES*, b. about 164 B. C. He became king of Syria in 137, and defeated the Parthians in many battles, but was killed in battle by them, 129 B. C.

Antiochus VIII., second son of Cleopatra, consort of A. VII., reigned over Syria with his mother from 126 to 122 B. C., and then alone till 114 B. C. He was assassinated 96 B. C.

Antiochus IX., surnamed *ΚΥΖΙΚΕΝΣ*, half-brother of the preceding, son of Cleopatra by A. VII., survived A. VIII., and committed suicide 95 B. C.

Antiochus X., surnamed *ΕΥΣΕΒΗΣ*, son of the preceding, succeeded his father in 95 B. C., but was soon after expelled, and d. in obscurity.

Antiochus XI., surnamed *ΑΣΙΑΤΙΚΟΣ*, 20th and last king of the dynasty of the Seleucidae, began to reign about 69 B. C., and was deposed by Pompey in 65 B. C., when Syria became a Rom. province.

Antipater [Gr. *Ἀντίπατρος*], a Macedonian gen., who was made regent of the kingdom by Alexander the Great, when, in 334 B. C., he set out upon his Per. expedition. After the death of Alexander his gens. divided the empire between them, Macedonia and Gr. falling to A. In 322 the Athenians and other Gr. states endeavored to regain their independence, but were defeated. Upon the death of Perdicas, 321, A. became regent. D. 319 or 318 B. C.

Antiphon, or **Antipho** [Gr. *Ἀντίφων*], one of the ten Attic orators, b. at Rhamnus in Attica about 480 B. C.; opened a school of rhetoric at Athens, had among his pupils Thucydides. He composed orations for politicians and for persons accused. He was an adversary of Alcibiades in politics, and was the chief promoter of the revolution which abolished democracy. He was tried for treason, was convicted and executed in 411 B. C. Fifteen of his orations are still extant.

Antipope, one who assumes the office of pope, but is not regularly elected or generally recognized as such. Sometimes two rival popes have been elected by different parties of cardinals, as in 1578, when the Its. chose Urban VI., and the Fr. Clement VII. The last A. was Felix V., who was elected in 1439, and abdicated in 1449.

Antiquities, an-tik-wi-tiz [Lat. *antiquitates*, from *antiquus*, "ancient"; a dept. of learning, comprising all memorable facts which illustrate the origin, early insts., and development of nations. In a more restricted sense, the study of A. is limited to the discovery, collection, verification, description, and explanation of the relics of antiquity, such as medals, statues, inscriptions, MSS., ruined buildings, bas-reliefs, and hieroglyphics.

Antiquity of the Human Race. See MAX, by PRES. I. B. ANDERSON, LL.D.

Anti-Rent'ers, a name formerly given to the inhabs. of several counties in E. N. Y., who refused to pay the rents and feudal services required of them by the so called lord-patrons, the owners of the land. This disturbance, which at one time nearly amounted to insurrection, was at length ended by the triumph of the A. party in the constitutional convention of 1846, in which a clause was inserted abolishing thenceforth all feudal tenures and incidents.

Anti-Sabbatar'ians, a sect of Chrs. who hold that the N. T. does not call for the observance of the Sabbath or any other day.

Antiseptic [from the Gr. *ἀντι*, "against," and *σηπω*, to "putrefy"], opposed to or preventing putrefaction. A. are substances which prevent or check the decay and putrefaction of organic matters. As air, moisture, and heat are necessary conditions of putrefaction, the exclusion of one of these from the animal or vegetable matter is an A. process. The common practice of preserving fruit in air-tight cans of tin or glass is an illustration of this principle. Generally speaking, so long as the air is excluded, no decomposition or decay can take place. Cold is a powerful A.: intense cold will prevent change even in those substances which putrefy most readily. To render timber more durable and less liable to decay, corrosive sublimate, chloride of zinc, and heavy oil of tar are sometimes used. For this purpose the wood is placed in a steam-box, its pores are filled with steam, and a vacuum is formed in the pores by the condensation of the steam. The pores are then filled with the A. substance.

The more important chemical A. are: Alcohol, wood-spirit (or pyroxylic acid), creosote, carbolic acid, heavy oil of tar, sugar, glycerine, sulphurous acid, common salt, charcoal, nitre, alum, chloride of zinc, sulphate of copper (blue vitriol), cresylic acid, sulphate of iron, aluminum chloride and acetate, and other aluminum compounds, corrosive sublimate, and arsenic.

C. F. CHANDLER.

Anti-Slavery, a term which originated during the long agitation that resulted in the overthrow of slavery in the U. S. It was used nearly synonymously with "abolition," but was preferred by many as being more definite.

Anti-Slavery Society, American. This society was organized in Dec. 1833, in Phila., by a convention of delegates from a few A. societies already in existence in the U. S., and of other persons who were friends of emancipation. The preamble and 2d and 3d articles of its const. express the character and purposes of the society. The preamble asserts that, "Whereas slavery is contrary to the principles of natural justice, of our republican form of govt., and of the Chr. religion, and is destructive of the prosperity of the country, while it is endangering the peace, union, and liberties of the States; and whereas we believe it the duty and interest of the masters immediately to emancipate their slaves, and that no scheme of expatriation, either voluntary or by compulsion, can remove this great and increasing evil; . . . we do hereby agree to form ourselves into a society," etc. The 2d and 3d articles declare that "the object of this society is the entire abolition of slavery in the U. S.;" that the society "shall aim to elevate the character and condition of the people of color, by encouraging their intellectual, moral, and religious improvement, and by removing public prejudice, that thus they may, according to their intellectual and moral worth, share an equality with the whites of civil and religious privileges; but this society will never, in any way, countenance the oppressed in vindicating their rights by resorting to physical force."

The society adopted and published a *Declaration of Sentiments*, in which they declared: "The right to enjoy liberty is inalienable. Every man has a right to his own body, to the products of his own labor, to the protection of law, and to the common advantages of society. It is piracy to buy or steal a native Afr., and subject him to servitude. Surely the sin is as great to enslave an Amer. as an Afr. Therefore we believe and affirm that there is no difference in principle between the Afr. slave-trade and Amer. slavery; that every Amer. citizen who retains a human being in involuntary bondage as his property is, according to Scripture, a man-stealer; that the slaves ought instantly to be set free, and brought under the protection of law; that all those laws which are now in force, admitting the right of slavery, are therefore, before God, utterly null and void, and that therefore they ought instantly to be abrogated. We further believe and affirm that all persons of color who possess the qualifications which are demanded of others, ought to be admitted forthwith to the enjoyment of the same privileges, and the exercise of the same prerogatives, as others; and that the paths of preferment, of wealth, and of intelligence should be opened as widely to them as to persons of a white complexion."

Respecting the measures by which the society would seek the accomplishment of its purpose, the Declaration asserts: "Our principles lead us to reject, and to entreat the oppressed to reject, the use of all carnal weapons for deliverance from bondage; relying solely upon those which are spiritual, and mighty through God to the pulling down of strongholds." The specific measures to be employed were of warding out agents "to lift up the voice of remonstrance, of warning, of entreaty, of rebuke;"; to circulate A. tracts and periodicals; to aim at a purification of the chrs. from the guilt of slavery, and to encourage the labor of freemen rather than that of slaves, by giving a preference to their productions.

Arthur Tappan, Lindley Coates, William Lloyd Garrison, and Wendell Phillips successively presided over this society from the time of its organization to that of its disbandment. Its organization was the signal for the concentration of the resistance of slaveholders and their allies, N. and S., against the A. sentiment which had always existed, and which had, from time to time, found expression in the community. Numerous A. societies, of States, counties, and cities, were soon organized throughout the N.; and these, with those which had been founded prior to the Amer. Society, became

its auxiliaries. Besides this organized aid, it received cordial sympathy and substantial help from men and women not enrolled as its members, who welcomed it as a mighty instrumentality for the overthrow of slavery. It represented the moral sentiment of the country, which was actively warring against Amer. slavery. During its existence it adhered to its original const., and carried on its work in accordance with its Declaration of Sentiments. At its 10th annual meeting, held in N. Y. in May 1844, it adopted a resolution declaring that, whereas the const. of the U. S. contained provisions requiring the rendition of the fugitive slave to his master, therefore fidelity to the cause of freedom required the dissolution of the national compact, and forbade abolitionists to hold office or vote under that const. During a long period of yrs. this society and its adherents were opposed by a large portion of the press and of the pulpits of the nation, and were frequently the victims of the violence of mobs, who disturbed their meetings, assaulted their persons, destroyed their property, and imperilled their lives. In May 1838, Pa. Hall, a large building erected in Phila. for the use of public meetings, and especially for A. meetings (against which nearly all the chrs. and halls of the country were then closed), was burned to the ground by a furious mob on the 4th day after its opening and dedication. The purpose of this society—namely, the creation of a public sentiment which should overthrow Amer. slavery—was at last accomplished. This moral force, which had been steadily increasing for more than a quarter of a century, and which had called into existence a small and earnest political party, at length pervaded the Republican party to the extent necessary for a successful resistance, first, to the extension of slavery, and then to its extinction. When the 13th amendment of the U. S. const. was ratified, abolishing slavery within the jurisdiction of the U. S., and the 14th and 15th amendments had secured to the emancipated slave his personal freedom, by endowing him with the ballot of a citizen, the Amer. A. Society (the work for which it was organized being finished) disbanded its members and ceased to exist on the 9th day of Apr. 1870.

HORACE GREELEY.

Antisthenes [*Ἀντισθένης*], an eminent Gr. Cynic philos., called the founder of the Cynic sect or school, was b. at Athens, and flourished about 400 B. C. He was a pupil and friend of Socrates, whose death he witnessed. After this event he opened a school at Athens in the gymnasium of Cynosarges.

Anti-Trinitarians. See UNITARIANISM, by ORVILLE DEWEY, S. T. D., LL.D.

Ant-lion, the larva of *Myrmelon*, and other cognate genera of the order Neuroptera, found in sandy tracts in different parts of the world. The perfect insect is similar in appearance to the dragon-fly. The larva is remarkable for the curious and insidious mode in which it catches the ants and other insects on which it feeds. It excavates a funnel-shaped cavity in the sandy soil, and lies in wait at the bottom until an insect comes so near to the edge of the pit that the loose sand gives way and the insect falls down the slope.

Antommar'chi (FRANCESCO), an It. anatomist, b. in 1780 in Corsica. In 1819 he was sent to attend Napoleon, at St. Helena, who left him a legacy of 100,000 francs. He pub. *The Last Moments of Napoleon*. In 1836 he settled in New Orleans. D. Apr. 3, 1838.

Antonello (GIACOMO), an It. cardinal and politician, b. at Sonnino Apr. 2, 1806. In 1847 he was made cardinal-deacon. He opposed the liberal movement of 1848. In 1849 he was appointed papal sec. of foreign affairs (*i. e.* prime minister), which place he occupied when Rome, in 1870, was incorporated with the kingdom of It. He opposed the cause of It. unity. D. Nov. 6, 1876.

Antonello, or **Antonelli** (ANTONIO), surnamed DA MESSINA, from the place of his birth, an It. painter, b. at Messina in 1414. He is reputed to be the first It. who painted in oil, having visited Bruges and obtained from J. van Eyck the secret of oil-painting. D. 1475.

Antoninus (MARCUS AURELIUS), usually called **Marcus Aurelius**, surnamed the PHILOSOPHER, a Rom. emp., b. in Rome Apr. 121. His original name was MARCUS ANNIUS VERUS. He was adopted as a son by the emp. A. Pius, and assumed the name of M. *Julius* Aurelius Verus Caesar; was chosen consul in 140, and married Faustina, a daughter of A. Pius, whom he succeeded in 161; he was involved in frequent wars by the aggressions of N. barbarians and the revolts of his subjects; he drove the Marcomanni out of Pannonia, suppressed a formidable insurrection in Egypt, founded at Athens a chair of philos. for each of the four sects, Platonic, Stoic, Peripatetic, and Epicurean, and persecuted the Chrs. Succeeded by his son Commodus. Wrote in Gr. an ethical work called *Meditations*, recently translated into Eng. D. 180 A. D.

Antoninus, Itinerary of [*Lat. Antonini Itinerarium*], a valuable geographical work, containing the names of all places and stations on the roads of the Rom. empire, with their distances in Rom. m.

Antoninus Pius (or, more fully, **Titus Aurelius Fulvus Boionius Arrius Antoninus**), a Rom. emp., b. at Lanuvium Sept. 19, 86 A. D., was a son of Aurelius Fulvus. He was chosen consul in 120, was adopted by Hadrian in 138, and ascended the throne on the death of Hadrian, in July of that yr. He adopted as his successor Marcus Aurelius. A. treated the Chrs. with mildness. The name of "Pater Patrie" (Father of his Country) was given to him by the vote of the Rom. senate. Survived his two sons. D. Mar. 7, 161.

Antoninus, Wall of, of an intrenchment, 36 m. long, erected in Scot. by the Romans. 139 A. D.

Antoninus (MARCUS), called the ORATOR, a Rom. orator and lawyer, b. 143 B. C., was grandfather of the famous Mark Antony. Became praetor in 104, and consul in 99 B. C. Having become an adherent of Sulla in the civil war, he was assassinated by the order of Marius in 87 B. C.

Antonius (MAIUS), surnamed the TRIMURVIR, commonly called in Eng. **Mark Antony**, a Rom. gen. and politician, b. 83 B. C. In 62 B. C. he showed talents in Gaul as legate of Julius Cæsar, through whose influence he was chosen tribune of the people in 59 B. C. In this capacity he vetoed a decree of the senate by which Cæsar was ordered to disband his army. When the civil war broke out A. was made the commander of Cæsar's force in It. in 48 he commanded the cav. at the battle of Pharsalia. In 44 he was chosen consul together with Cæsar, who was assassinated by Brutus and others. About 43 he became a triumvirate with Octavius and Lepidus, putting many senators to death, among whom was Cicero. After the final defeat, in 42, of Brutus and Cassius at Philippi, A. became gov. of Asia and Egypt, where he became enamored with Cleopatra. A quarrel at length broke out between him and Octavius, which finally came to an issue at the naval battle of Actium, 31 B. C., where A. was defeated and fled to Egypt; and being reduced to desperation he killed himself, 30 B. C.

Antony, or Anthony (Lat. *Antónius*), SAINT, surnamed ABBAS, an anchorite, b. in Upper Egypt in 250 A. D. He retired to a desert, where he passed many yrs. in devotion and solitude. About 305 he founded a monastery near Faioum. During the persecution in 311 he went to Alexandria in the hope of obtaining the crown of martyrdom, but he was disappointed, and returned to the desert. D. 356.

Antony, or Anthony (SAINT), of Padua (It. *António*), b. at Lisbon Aug. 15, 1195. He became a Franciscan monk, and preached at Toulouse, Bologna, and Padua. D. June 13, 1231, and was canonized in 1232.

Antony of Bourbon (Fr. *Antoine de Bourbon*), duke of Vendôme and king of Navarre, b. in Picardy Apr. 22, 1518. He married, in 1548, Jeanne d'Albret, the only child of the king of Navarre. In 1560 he was appointed lieutenant of the crown, and commanded the royal army for a short time in the c. war; was mortally wounded at Rouen, and d. Nov. 17, 1582. He was the father of Henry IV. of Fr.

Antwerp (Dut. *Antwerpen*; Fr. *Anvers*, on-vair'; Sp. *Amberes*), the chief commercial city of Belg., and the principal commercial port of the European continent, on the Scheldt. It is strongly fortified, and has among its defences a citadel built by the duke of Alva in 1567. Foremost among the public buildings is the cathedral, 500 ft. long and 240 ft. wide, containing the principal masterpieces of Rubens. It has a fine harbor and extensive commerce. In the 16th century it was the great centre of European commerce, with 200,000 inhabs. In 1585 it was taken by the Sp., after which most of its commerce went to Amsterdam. By the treaty of Paris, A., with the rest of Belg., was annexed to Hol. in 1814. In 1830 it was taken from the Dut. by a Fr. force auxiliary to Belg. Pop. 1885, 180,447.

Anubis, or Anepu, an idol of the Egyptians, was represented as a son of Osiris, and as having the form of a dog, or a man with a dog's head.

Anville, d', don-veel' (JEAN BAPTISTE BOURGIGNON), a Fr. geog., b. in Paris July 11, 1697; recognized as the first who raised geog. to the rank of an exact science. He was appointed geog. to the king, and became a member of the Acad. of Sciences. He wrote *Compendium of Anc. Geog.* D. Jan. 28, 1782.

Aorist [from the Gr. *a*, priv., and *ōpos*, a "limit"], a form of the Gr. verb which represents an action as taking place in an indefinite (past) time.

Apatite [from the Gr. *ἀπάτη*, "deceit," so called because it deceives the observer by its resemblance to other minerals], the native phosphate of lime, which is extensively used as a manure in Eng. and the U. S. It usually occurs in crystalline rocks, such as granite and greenstone, but is also found in granular limestone and serpentine. The most abundant supplies, however, are derived from beds of animal remains, bones, etc. Before it is applied to the soil it is ground to powder and subjected to the action of sulphuric acid, which renders the phosphoric acid of the A. soluble in water. The efficacy of A. as a fertilizer of the soil depends on the presence of phosphoric acid, which is essential to the growth of such plants as wheat, barley, and oats. It is often mixed with guano, bones, and other manures to make a complex fertilizer, which is better than the simple mineral phosphate.

Ape, a term applied to the large Primates having no tail, and comprising the chimpanzee, orang-outang, gorilla, gibbon, etc. Also used sometimes for all the Primates except Man.

Apelles, a-pel'lez [Gr. *Ἀπελλῆς*], a Gr. painter, lived between 352 and 308 B. C. We do not know when or where he was b., nor when or where he d., and not one of his pictures remains; yet his name stands for supreme excellence in the art of painting. He painted many portraits of Philip, and also of Alexander, who would sit to no other painter. He probably accompanied Alexander to Asia, and after his death went to Egypt, from which time we hear no more of him. A. was generous to other painters and devoted to his art. He admitted that in some things he was excelled by other artists, but he claimed to surpass all others in grace. His industry gave rise to the proverb, "No day without a line." He knew when to stop correcting, declaring that "Too much labor is sometimes hurtful to a piece." To a cobbler, who, having rightly criticised the painting of a shoe in one of his pictures, went on to blame the leg, he said, "Let the cobbler stick to his last." His most famous picture was that of *Venus Rising from the Sea* (*Venus Anadyomene*), painted for the temple of Æsculapius in Cos.

CLARENCE COOK.

Apennines [It. *Apennino*], (anc. *mons. Apenninus*), a chain of mts. extending through the whole length of the It. peninsula, and forming the watershed between the Adriatic and the Mediterranean. Its entire length is about 800 m., with an average height of 4000 ft. Mt. Corno, the highest summit, has an elevation of 9546 ft.

Aphanip'tera, or Aphanop'tera [Gr. *ἀφανής*, "invisible," and *πτερον*, a "wing," the term applied to a group or order (sub-order) of wingless haustellate insects (bees), forming the family Puleiidae, and closely allied to the flies.

Aphasia, a-fā'zhe-a [from the Gr. *a*, priv., and *φῆμι*, to "speak"], a loss of speech, which is a symptom of brain disease, as distinguished from *aphonia*, loss of speech from disease of the larynx or direct paralysis of that organ. A. may coexist with the ability to utter words, the patient sometimes persisting in giving things names which do not belong to them. At other times, though he can utter words he cannot clothe his thought in articulate language, but manifests by signs, etc., a normal condition as regards intelligence.

Aphelion, a-fē'le-on [from the Gr. *ἀπὸ*, "from," and *ἥλιος*, the "sun"], that part of a planet's orbit which is the most distant from the sun, and is opposite to the perihelion, or the point nearest the sun.

Aphides, af'i-dēz (sing. *a'phis*, gen. *aph'idia*, a "plant-louse"), the name applied to numerous homopterous insects of the family Aphidæ, and commonly known as plant-lice. They inhabit trees and plants, on the juices of which they feed. The A. are remarkable for their saccharine secretion, but more especially for a peculiarity in their generative economy which consists in the first fecundation of the female influencing not only the ova developed immediately afterward, but those of the females resulting from that development, even to the 9th generation, which are successively impregnated, and continue to produce without any intercourse with the male. In autumn the males are produced, when the last set of females are impregnated, and the fecundated eggs brought forth for the ensuing year. The body of these insects is generally flask-like, being furnished with 6 legs, a pair of antennæ, and 2 small tubes not far from the extremity of the abdomen, through which the saccharine fluid is exuded. In some of the A. wings are present, but in others they are not. The sweet fluid which they throw out is known as *honey-dew*, and is sometimes produced in such quantities as to fall in drops from the leaves of the trees to



Aphides.

the earth. Ants have a special fondness for this substance, and often frequent plants on which it is deposited. They may sometimes be seen milking the A., as it is termed—that is, stroking these sugartubes with their antennæ, to induce them to furnish them the saccharine fluid more abundantly. Hence the A. have been termed the milch-cows of the ants. Some species of this genus are very destructive to vegetation, as the hop-fly (*A'phis humuli*), and the aphid of the turnip cabbage (*A. brassicæ*), which have sometimes destroyed whole crops. The A. are often infested by certain minute parasites, which, by laying their eggs in the bodies of those insects, cause the death of great numbers. It is remarkable that one of these parasites (*Aphidius*) has itself still more minute ichneumon parasites, whose eggs are deposited in its body.

THEODORE GILL.

Aphonia, a-fō'ne-a (loss of voice), may be

(1) nervous A., temporary and cured by time, rest, tonics, and electricity, or (2) A. due to disease of the vocal cords.

(SEE THROAT, DISEASES OF.)

Aphrodite. See VENUS.

Apian [Lat. *Apianus*], or **Appian** (PETER), a Ger. astron., whose proper name was BIENEWITZ, b. 1495; was prof. of math. at Ingolstadt; wrote a *Cosmography*, and was the first to propose to ascertain the lon. by lunar observations. D. Apr. 21, 1552.

Apicius, a-pish'-e-us (MARCUS GABITUS), a celebrated epicure who lived at Rome in the reigns of Augustus and Tiberius. His name became proverbial for gluttony and luxury in eating.

Apion (Ἀπίων), a Gr. gram. and hist., b. in the Great Oasis, Egypt, lived about 20-50 A. D. He opened a school of rhetoric in Rome about 45 A. D., and wrote several works, among which were a *History of Egypt* and a lexicon to Homer's poems.

A'pis (Gr. Ἀπῖς), the chief object of anc. Egyptian worship, represented by a bull, which was kept in the temple at Memphis.

Apocalypse, a-pok'a-lips [Gr. *ἀποκάλυψις*, from *ἀποκαλύπτω*, to "reveal"], a word signifying "revelation," and usually applied to the last book of the N. T.

Apocalyptic Number, the mystical number 666 spoken of in the book of Rev. Some critics interpret this to be an enigmatical expression of the word *Latinus*, the Gr. characters of which, taken as numerals, amount to 666.

Apocrypha, a-pok'ri-fa [Gr. ἀπόκρυφος, "hidden"], a term applied by Prot. theols. to 14 books, or portions of books, all but 3 of which were pronounced canonical by the Council of Trent in 1546. The R. Cath. Ch. calls these books deuterocanonical, and applies the name "apocryphal" to other books which Prot. generally call PSEUDEPIGRAPHA (which see). The apocryphal books are entirely rejected from public worship by Prot. in Amer., and by the dissenting chs. in G. Brit. R. D. HITCHCOCK.

Apollina'ris (or **Apollina'rius**) the YOUNGER, became bp. of Laodicea 362; was an orator and author, and an opponent of Arianism. He founded a sect, called after his name, which denied that there was a human soul in Chr. D. 390.

Apollina'ris Sido'nus (CAIUS SOLLIUS), a Lat. poet and ecclesiastic, b. at Lugdunum (Lyons), in Gaul, about 430 A. D. In 471 he was elected bp. of Clermont (Augustonemetum). He wrote *Carmina* and *Epistola*, which are extant. D. in 482 A. D.

Apoll'o [Gr. Ἀπόλλων], in Gr. mythology, the god of light or day, of poetry, music, archery, etc., was a son of Jupiter and Latona. He was often called Delius, because he was b. on the island of Delos; and Phœbus, which signifies "shining." As the god of light (the presence of which is necessary to the existence of beauty) he presides over poetry, the arts, etc. According to the later poets, he was the god of the sun, and was identified with Helios, but Homer represents them as distinct deities. A. may be considered the ideal representative of the Hellenic people, and the impersonation of Hellenic life in its most noble and beautiful forms. He was recognized as the author of the healing art, and as the god of prophetic inspiration as especially manifested in the oracle of Delphi. Under the name of Pæan he was invoked as a healer of disease and as a destroyer, for his arrows were believed to deal out pestilence.

Apoll'o Bel'vedere, a beautiful antique marble statue of A. which was discovered at Antium about 1503, and was placed in the Belvedere of the Vatican. The name and date of the artist are unknown. This statue, which is about 7 ft. high, is considered the most perfect model of manly beauty. The attitude of the statue is generally supposed to represent A. as he appeared after he had discharged the arrow that killed the Python. (See BYRON'S *Child Harold*, canto iv., stanzas cxi., cxlii., and cxliii.) But another opinion is gaining ground that it represents the god with the ægis in his hand, as he appeared to the Goths who were invading his sanctuary at Delphi. (See *Apollon Boëdromios*; bronze statue in Besitz des Grafen Sergei Stroganoff; erwähnt von LUDOLF STEPHANI, mit einer Kupfertafel.) CLARENCE COOK.

Apollodorus [Gr. Ἀπολλόδορος], a Gr. painter, b. at Athens about 440 B. C. He was a rival of Zeuxis, and the reputed inventor of chiaroscuro.

Apollodorus of Athens, a celebrated grammarian and historian who lived about 140 B. C. He wrote a manual of Gr. mythology entitled *Bibliotheca*, a large part of which is extant.

Apollodorus of Damascus, a distinguished arch., b. at Damascus, lived about 100 A. D.; erected in Rome numerous works, among which were the Forum of Trajan and the Column of Trajan. His capital work was a noble bridge over the Danube.

Apollonius, a grammarian of Alexandria, lived in the time of Augustus. His lexicon to Homer is extant.

Apollonius, surnamed DYSCOLUS (the "Morose"), an eminent Gr. grammarian of Alexandria. He lived about 120-160 A. D.; wrote a *Treatise on the Syntax of the Parts of Speech* and other works.

Apollonius, a Gr. geometer, b. at Perga, in Pamphylia, about 250 B. C.; resided in Alexandria in the reign of Ptolemy Philopator (222-205 B. C.); author of *Treatise on Conic Sections*, in 8 books, which is extant except 1 book.

Apollonius Rhodius [Ἀπολλώνιος ῥόδιος], a Gr. poet, b. at Alexandria (or at Naucratis) about 235 B. C., was a pupil of the poet Callimachus; taught rhetoric at Rhodes for many years; about 194 B. C. he was appointed keeper of the great Alexandrian library. Wrote the epic poem entitled *Argonautica*, on the expedition of the Argonauts.

Apollonius Tyaneus (or **Apollonius of Tyana**) [Gr. Ἀπολλώνιος Τυανεύς], a Pythagorean philos., b. at Tyana, in Cappadocia, lived about 30-70 A. D. He performed a journey to India in order to learn the doctrines of the Brahmans, and after his return gained a high reputation as a sage, an oracle, and a worker of miracles.

Apologetic Fathers, a name given to those early writers who put forth defences of the Chr. religion against the accusations of pagans and Jews.

Ap'oplexy [Lat. *apoplexia*, from the Gr. ἀπό, "away," and πλῆσσω, to "strike," as we speak of a stroke of A. or of paralysis], a disease marked by the sudden failure of volition, sensation, motion, and mental action, the symptoms being caused by a pressure upon the brain originating within the cranium. The typical form is characterized by an escape of blood into the substance of the brain from a ruptured vessel. The apoplectic stroke may end in partial recovery or in speedy death. Cases not fatal generally result in permanent or temporary paralysis of one side of the body (hemiplegia), usually on the side opposite that in which the mischief has occurred.

The symptoms of A. are often unexpected. The patient falls suddenly (with or without an outcry), his respirations are long, slow, and stertorous, the pulse is slow, one or both the pupils usually small. If the patient does not die during the attack, a secondary inflammation follows which may destroy life. Bleeding may be resorted to if the pulse be strong and the heart and lungs in good condition, but it is often injurious. Mustard to the extremities and frictions of the skin should be resorted to, and, the bowels should be moved by enema. Persons having reason to fear A. should avoid excesses of all kinds, yet live upon nutritious food, paying special attention to hygienic conditions. E. D. HUDSON, JR.

A posteriori and **A priori**. Before the time of Kant the former of these terms denoted a reasoning from effect to cause, and the latter a reasoning from cause to effect. Since Kant's time, these terms are generally used more in relation to the doctrine of knowledge; a *posteriori* knowledge being knowledge through experience, while a *priori* knowledge is knowledge, through the reason, of that which is prior to experience.

Apos'tles' Creed [Lat. *Sym'bolum Apostol'icum*], called also the Creed or Confession of Faith, is the most universal creed of the Chr. Ch.

Appala'chian Moun'tains, a general term for the numerous ranges of mts. traversing the E. part of the U. S., mostly parallel to each other, and in the main parallel to the Atlantic coast. This mt.-system is about 1300 m. long, extending, under various names, from the N. part of Ala. to Me., and occupying, with the valleys which it forms, a space nearly 100 m. wide. The portion of this chain in N. H. is called the White Mts., the highest summit of which, named Mt. Washington, rises 6288 ft. above the level of the sea. In N. Y. the system takes the name of the Adirondacs, the Catskill Mts., and the Highlands. In Pa. and the S. States they are called the Alleghany Mts., and the name of Blue Ridge is applied to the range in Va. which is nearest to the Atlantic Ocean. These ranges are remarkable for the uniformity of their outline, and for the parallelism of their ridges and long narrow intervening valleys of limestone formation. Among the latter is the Great Valley of Va., which is bounded on the S. E. by the Blue Ridge, and extends across the whole State. The ridges are remarkable for their near approach to a rectilinear direction, and the comparative uniformity of their height. The highest summit of the system is the Black Dome, or Mitchell's High Peak, in N. C., which rises to 6707 ft.

The geological formations of this chain include all those from the metamorphic rocks to the coal-measures, including the latter, and the strata belong entirely to the oldest or palæozoic division of the fossiliferous rocks. The aggregate thickness of these, measured in Pa. as they appear in succession at the surface, is about 7 m. The chain was mostly formed at the close of the carboniferous age, but the Blue Ridge is much older. J. S. NEWBERRY.

Appa'rent [Lat. *appa'rens*, from *appa'reo*, to "appear"], that which appears to the eye in distinction from true or real. This term is used in astron. to express several important distinctions, as A. time, A. magnitude, and A. diurnal motion.—An her-A. to a throne is a person whose title is better than any other except the actual occupant of the throne, and whose succession does not depend on any contingency if he survive the reigning monarch.

Appeal [from the Lat. *appello*, to "call"], in modern law, denotes the removal of a cause from an inferior to a superior court for the purpose of obtaining a review and retrial of the case. Codes of procedure in a number of States abolish writs of error in civil cases, and establish a review by A. in all actions, whether of a common-law or equity nature. The procedure is different from that upon writ of error, but the substantial effect is the same. Sometimes questions both of law and of fact are reviewed by the superior court, in other cases questions of law only; in the latter case an A. corresponds most closely with the former writ of error.

Appearance [from the Lat. *appa'reo*, to "be seen"], in law, the act by which a party to an action brings himself, or is brought, into court, usually applied to the defendant. A. is either voluntary or compulsory. It is said to be voluntary when no process has been served. It is also special or general. It is said to be special when made for special purposes, not extending to the entire subject of litigation. It is general when absolute and unconditional. A notice of A. will suffice, or the performance of some act from which an A. can be inferred, such as serving a pleading. In civil cases it may be made by an attorney as well as by a party. In criminal cases personal A. of the accused is frequently requisite, particularly in cases of felony.

App'ian Gr. Ἀππιανός; Lat. *App'ianus*), an historian, b. at Alexandria, in Egypt, flourished about 120-160 A. D. He wrote in Gr. a valuable work on Roman hist. (*Ἱστορία*) in 24 books, of which 11 are extant.

App'ian (ANDREA), an It. painter, b. May 23, 1754, imitated the style of Correggio, and is thought to have excelled all the artists of his time in fresco-painting. About 1805 he was appointed court-painter to Nap. D. Nov. 8, 1817.

App'ian Way [Lat. *Via App'ia*], the most celebrated of the anc. Rom. roads, was constructed by Appius Claudius Cæcus about 313 B. C. It extended originally from Rome to Capua, 125 m., but was continued to Brundisium.

Apple (*Pyrus malus*), a fruit of a tree of the natural order Rosaceæ, which is native or naturalized in the temperate regions of Europe and Asia. It was cultivated by the anc. Roms., who called it *pomum*. The wild crab-A. of the Old World is the parent of almost all the varieties of A. which are cultivated, and which have been much improved by cultivation. Among the best varieties of A. are the Baldwin, Spitzenberg, Rhode Island Greening, Northern Spy, Roxbury Russet, Belmont, and Nonsuch. The finest quality of this fruit is produced in N. Y. and other States in the same lat. The Siberian crab (*Pyrus baccata* or *Pyrus prunifolia*), a native of Siberia, is cultivated in Europe and the U. S. for preserves. An important distinction among A. is expressed by the terms natural fruit and grafted fruit. The former, which is raised from the seed, is mostly inferior. [See FRUIT CULTURE.]

Apple Blight, a disease of A. trees, caused by a species of aphid (the *Aphis lanigera*). This little insect penetrates the chinks in the bark, extracting the sap, causing diseased excrescences, and ultimately the death of the tree.

Apple Oil (artificial), a solution of valerianate of amyl in 6 parts of alcohol.

Apples of Sod'om, a fruit mentioned by Josephus and

other and writers as growing near the Dead Sea, fair in appearance, but when grasped collapsing into dust.

Appleton, city and important R. R. centre, cap. of Outagamie co., Wis., on the Lower Fox River, 30 m. S. of Green Bay. The river is navigable for steamboats, and is the route of the Green Bay and Miss. Improvement Co. The river has here a constant fall of 49 ft., furnishing inexhaustible water-power. The city is the seat of Appleton Coll. Inst. and of Lawrence Univ. Pop. 1870, 4518; 1880, 8005.

Appleton (Jesse), D. D., b. at New Ipswich, N. H., Nov. 17, 1772, and settled over the Congl. ch. in Hampton, N. H., in 1797. In 1809 he was a candidate for the chair of theol. in Harvard Univ., and in 1807 became pres. of Bowdoin Coll. D. Nov. 12, 1819.

Appleton (John), LL.D., was b. in 1804, grad. at Bowdoin in 1822, became a judge of the supreme court of Me. in 1832, and chief justice in 1842.

Appleton (John), b. at Beverly, Mass., Feb. 11, 1815, grad. at Bowdoin, became a lawyer and ed. in Portland, Me.; was made chief clerk of the U. S. treas. 1845, and afterward of the dept. of state; *chargé d'affaires* to Bolivia 1848-49, rep. in Cong. 1850-59, sec. of legation in Lond. 1855-59, U. S. minister to Russ. 1860-61. D. Aug. 22, 1864.

Appleton (Nathan), LL.D., b. at New Ipswich, N. H., Oct. 6, 1773, became a partner of his brother Samuel in Boston; was one of the founders of Lowell; rep. in Cong. 1831, and again 1842. D. July 14, 1861.

Appleton City, on R. R., St. Clair co., Mo., 59 m. S. W. by S. of Sedalia. Pop. 1880, 1624.

Appomattox Court-House, cap. of Appomattox co., Va., was the scene of the surrender of Gen. R. E. Lee, with the Confed. army of N. Va., to Gen. Grant, Apr. 9, 1865.

Apportionment [from the Lat. *ad*, "to," and *portio*, a "share"], in law, the division of a thing into parts; the distribution of a claim or charge among different persons in proportion to their interests in the subject-matter to which it attaches. The leading cases concern—1. Incorporeal rights in land, such as commons and rents; 2. Encumbrances upon land; 3. Contracts. 1. The principal case under this division is that of rents. The question of A. may arise as to the rights of different owners either of the rent or of the land to which the burden of the payment of the rent attaches, or it may occur in case of a partial failure of the title as to the territorial extent of the land rented, or because the right of the tenant to hold the land ceases before the time agreed upon, on account of the expiration of the landlord's estate. By the common law there was no A. where there was a failure as to time. This case is illustrated by a lease made by a life tenant for a specified period—e. g. a year. Should he die before the time expired, the lease would of course instantly terminate, and the tenant would pay no rent for the time intervening since the last payment of rent fell due. This defect in the law has been remedied. It should be added that there is by common law no A. where the property leased is simply diminished in value. This rule may be obviated by agreement of the parties. 2. *Encumbrances*.—It is a general rule that several owners of land must bear the burden of an encumbrance upon it in proportion to their respective interests. Accordingly, if mortgaged lands be sold in parcels, the duty to pay the mortgage is apportioned among the owners of the respective parcels. This is clearly the rule where the sales are contemporaneous; but if successive in point of time, the better opinion is that there is no A., but that the lots must be taken to satisfy the mortgage in "the inverse order of alienation." By this is meant that the lands last sold by the proprietor must be first resorted to as a means of paying the mortgage. As soon as enough money is thus realized the remaining lots are discharged. 3. *Contracts*.—As a general rule, there is no A. of contracts. In other words, a party to a contract must completely fulfil his own obligation before he can enforce the agreement against the other party. The rule is subject to exceptions. One is where, after it has been partly performed, it is dissolved by mutual consent. So also in a contract for personal service there is an implied understanding that the contract is not to be completely fulfilled unless life should continue. Accordingly, if the servant should die before the expiration of the time specified in the contract, his wages would be apportioned according to the time of actual service. Some jurists have objected to the severity of the general rule, and would allow an A., even where a contract is deliberately broken by a party, corresponding to the benefit received by the other party. T. W. DWIGHT.

Apprentice [remotely from the Lat. *apprehendere*, to "comprehend," to "learn"], a person, ordinarily a minor, bound in due form of law, usually by indenture, to another for a certain time to learn some art, trade, or business. In most of the States of this country statutes borrowed from Eng. legislation allow minors, with their own consent, and with that of their father, mother, or guardian, to be bound out to service—if males, till the age of 21; if females, till the age of 18, or for a shorter time. When the child is a pauper, he may be bound without his consent by public officers or by orphan asylums, houses of refuge, or of industry. The same rule is followed in the case of children charged with petty crimes. Apprenticeship is thus to some extent a mode of penal discipline, and is reformatory in its nature, particularly where some central authority oversees from time to time the conduct both of the A. and the master. This relation is not regulated by the ordinary rules governing master and servant, but depends upon special grounds of public policy. The contract of apprenticeship is of a personal nature, and is not assignable. T. W. DWIGHT.

Appurtenances [remotely from the Lat. *appertinere*, to "belong to"]. In law, this word signifies something belonging or appertaining to another thing as principal, as a right of way appurtenant to land. In a conveyance of land with the "appurtenances," all easements and privileges in use and necessary to the enjoyment of the estate granted will be in-

cluded. Land itself will not be considered as appurtenant to land. It is often a difficult question of construction to determine whether land can be regarded as a part or parcel of the thing granted; in which case it will pass, while it would not be embraced in the word "appurtenances." Thus, in the conveyance of a "mill" or a "mansion-house," land which in the narrow acceptation of the term "mill" or "mansion-house" would not be included, might be in a comprehensive sense, since there could be no complete enjoyment of the mill or mansion-house without it.

Apricot [from the Lat. *apricus*, "sunny"], (*Prunus Armeniaca*), a fruit tree of the natural order Rosaceae, is a native of Armenia, and is extensively cultivated in Europe and the U. S. It is nearly related to the plum. The blossoms appear before the leaves, which are ovate, subcordate, and acuminate. The fruit, a velvety drupe, ripens earlier than the peach, which it resembles in some respects. The color of the A. is mostly yellow, with a red-brown or ruddy cheek on the side which is most exposed to the sun. It is propagated by budding on plum, peach, or wild-cherry stocks. Among the numerous varieties of the A., the Moorpark is by many persons the most esteemed. A variety called Breda is preferred for standards in some places.

April [Lat. *Aprilis*], the name of the 4th month of the yr., was derived from the Romans, but in the early age of the Rom. republic it was the 2d month.

April Fool's Day, the name given to the 1st of Apr., from the prevailing custom of playing tricks upon people or sending them upon bootless errands on that day.

Apriori. See A. POSTERIORI.

Ap'tera [Gr. *a*, priv., and *πτερόν*, a "wing"], in the Linnean system, an order of insects without wings, but not recognized by recent entomologists.

Apterygidae [Gr. *a*, priv., and *πτερός*, a "wing"], a



Apteryx.

family of ratite birds with rudimentary wings, very short humerus, only one ungual phalanx, with a hallux, a long bill, and pilose plumage. Three species inhabit New Zealand, where they are called *kiwi*. They feed upon insects and worms. The skin is very tough but flexible, and prized by the chiefs for the manufacture of their state mantles.

Apule'us (AULUS LUCIUS), a celebrated Lat. Platonic philo., and satirical writer, b. at Maduza, in Afr. He lived

about 150 A. D., wrote in his own defence an *Apology*, which is still extant, and a romance entitled the *Metamorphoses*, or the *Golden Ass*, which is supposed to be intended as a satire on priests, quacks, magicians, etc.

A'qua, plu. **A'quæ**, the Lat. name for water; the pharmacopoeial name for spring water, or natural water in its purest attainable state. It is a compound of oxygen and hydrogen. The principal varieties of water are distilled water (*A. destillata*), river water (*A. ex flumine*, or *A. fluvialis*), sea water (*A. marina*), rain water (*A. pluvialis*), and spring water (*A. fontana*). These terms are used in pharmacy, in which various watery solutions are also called *aqua*.

Aqua Fortis (i. e. "strong water"), a name given to nitric acid by the alchemists, is still the common commercial name of that compound. (See NITRIC ACID.)

Aqua Re'gia (i. e. "royal water"), a name given to a mixture of nitric acid with hydrochloric (muriatic) acid. The usual proportion is one of the former and two of the latter acid. This is remarkable for its power of dissolving gold, regarded as the king of metals.

Aqua Re'gine (i. e. "queen's water") is a mixture of concentrated sulphuric acid and nitric acid, or of sulphuric acid and nitre. It has been used as a disinfectant.

Aqua'rians (from the Lat. *a'qua*, "water"), a name given to certain ascetics who used water in the sacrament instead of wine.

Aqua'rium (plu. **Aquaria**), or **Aquaviva'rium**, a Lat. term commonly applied to a glass tank or vessel containing either salt or fresh water, in which living aquatic animals and plants are kept. It must contain both animals and plants in something like a due proportion, as the animals depend for breath on the oxygen which is given out by the plants, and the plants are nourished by the carbonic acid gas which the animals exhale.

Aqua'rius, "the Water-Bearer," a sign of the Zodiac; also the name of a constellation.

Aquat'ic Plants, or **Water Plants**, a term applied to various vegetable organisms that grow either partially or entirely immersed in water. The latter mode of life is mostly confined to cryptogamous plants, of which the great family of *Algae* is almost exclusively A., making the greater part of the vegetation of salt water. Quite as many species live in fresh water, but they are less conspicuous, being individually small, or even microscopic. Oceanic or even marine phenogamous plants are few, but as to fresh water there is hardly a family of herbaceous plants which has not some A. reps. Most of these, however, are either partly emersed or floating, or bring their foliage to the surface, or at least the blossoms. In texture they are soft, loose, and cellular, and generally they abound in air-passages, the presence of air being essential to their well-being, as it is to ordinary plants. ASA GRAY.

A'qua Tofa'na, a secret poison, the invention of which is ascribed to a Sicilian woman, a notorious poisoner, named Tofana. She lived about 1650-1730. It is said that there

was, about 1660, a society of young married women in Rome who used this A. T. to poison their husbands. It was sold in vials marked "Manna of St. Nicholas of Bari." Some suppose it to have been a solution of arsenic.

Aqueduct, ak'we-duk't (*ap'quid'us*, a "channel for conducting water"). The name is applied more especially to artificial constructions for bringing water from a distance for the supply of cities, and to those bridges which serve to convey water at an elevation across valleys or streams. As water is essential to life, great cities must have a large supply, often attainable only by artificial means; hence A. are of very anc. date.

Anc. Rome was supplied with water by 9 A., as follows: 1. The Appian A., 6 m. long, built 311 B. C., mostly underground, bringing its water from a copious spring. 2. The Anio Vetus, 43 m. long, built 372 B. C., mostly underground, bringing its water from the River Anio. 3. The Aqua Marcia, 37 m. long, built 145 B. C.; 6 m. were upon arches, some of which remain. 4. The Aqua Tepula, built 126 B. C., 10 m. long. 5. The Aqua Julia, built 34 B. C., 12 m. long, crossing the Campagna on the same row of arches as the two preceding, being built over them. 6. Aqua Virgo, built 30 B. C., almost wholly underground. It has been restored, and now forms one of the sources of supply. 7. The Aqua Alsietina, built 20 B. C. by Augustus, restored by Trajan, and afterward by Pope Paul V., about 1560; 30 m. long, drawing its water from lakes. The water is not pure, but is very copious, supplying the fountains of St. Peter's, and also several flour-mills. 8. The Aqua Claudia, built 36-50 A. D., 46 m. long, of which 10 m. were on arches, some of which remain, and are among the most striking remains of anc. Rome. 9. The Anio Novus, built about 40 A. D., 62 m. long, of which 48 were underground. Its channel is now choked up. It is estimated that these A. brought 377,000,000 gals. of water daily into Rome; those which remain supply 160,000,000 gals.

During the Middle Ages numerous A. were constructed, notable among which are those of Lyons, Segovia, Spoleto, Metz, and Tarentum. In modern times the New River of Lond. and the Canal de l'Oureq of Paris are true A. The A. of Roquefavour brings water from the River Durance to Marseilles, and Glasgow is supplied by an A. with water from Loch Katrine. An A. has been recently constructed at Vienna, which brings water from two springs, 59 m. distant, the supply being 24,000,000 gals. a day, or 24 gals. for each inhab.

In the U. S. there has been great activity in the construction of A., nearly every considerable city being thus supplied. N. Y. has the Croton A., Boston the Cochituate, Baltimore the Jones's Falls, Wash. the Wash. A. Fig. 1

Fig. 1.

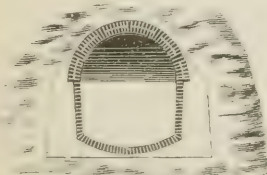


High Bridge, Harlem River.

shows the High Bridge over which the Croton water pipes cross the Harlem River. The bridge is 1460 ft. long and 116 ft. above the high-water level. It has 15 arches, of 80 and

Fig. 2.

Fig. 3.



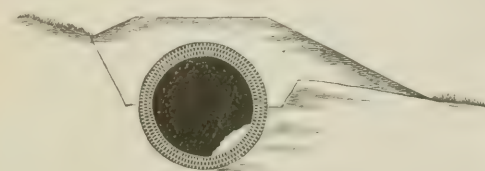
Croton Aqueduct.



Cochituate Aqueduct.

50 ft. span. Figs. 2 and 3 present cross sections of the conduits of the Croton and Cochituate A. Fig. 4 shows a cross section of a circular conduit, built of brick.

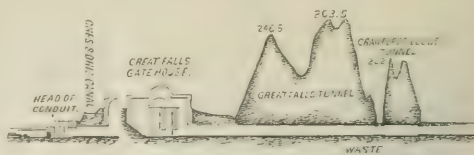
Fig. 4.



We select the Wash. A. for more detailed information. It is a circular conduit, built of brick or rubble masonry, laid in hydraulic cement, either material being used as it could be most conveniently or cheaply obtained. Its clear internal diameter is 9 ft. Its descent or inclination is 9 1/4 inches to the m. The length of the conduit from the Great Falls of the Potomac to the distributing reservoir is

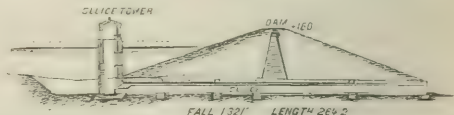
11 m.; from the latter the A. is continued by large iron pipes to the capitol, 5 m. Its capacity is 70,000,000 gals. per day. Its construction is shown in ordinary ground (side-hill) by Fig. 4. It takes its water at an elevation of 150 ft. above tide-water by a rock-cut passing under the Chesapeake and O. Canal (Fig. 5), to a gate-house furnished with gates and

Fig. 5.



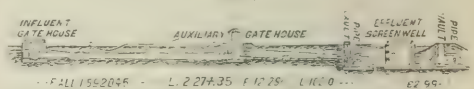
screens. Its course is generally subterranean, embankments having been avoided wherever possible. The water is delivered into the receiving reservoir, of about 56 acres, made by damming up the valley of Little Falls Branch. (Fig. 6.)

Fig. 6.



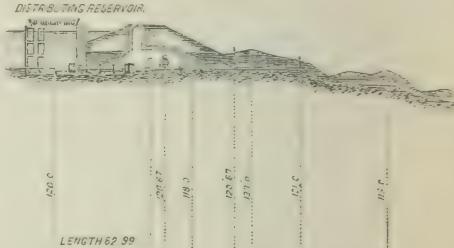
Two m. farther on the A. enters the distributing reservoir of 40 acres by a gate-house. There are 4 bridges under the conduit, one of which, the Union Arch, is of granite, with a span of 220 ft., being the longest stone arch in existence. In Fig. 7 is a section of the tower, in which the branch ter-

Fig. 7.



minates in a 4-ft. iron pipe. Fig. 8 is a profile of the outlet

Fig. 8.



gate-house and screen-well, and of the subterranean vault in which are the stop-cocks and connections of the iron mains which convey the water into the cities.

At College Branch two 30-inch mains, braced as in Fig. 9,

Fig. 9.



cross a small inlet and valley by an arch of 120 ft. span. Rock Creek is crossed by an iron bridge (Fig. 10), composed of

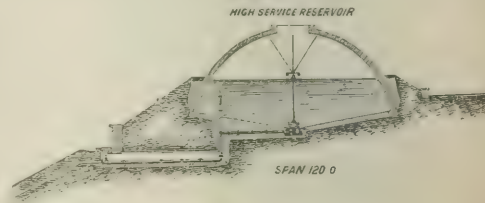
Fig. 10.



2 cast-iron pipes of 4 ft. diameter, which serve as the ribs of an arch of 200 ft. span. These pipes convey the water, and also support a platform bearing a road and railway track.

The highest portion of the streets of Wash. is 45 ft. below the level of the reservoir; but a part of Georgetown is at a greater height than any part of the A. To supply this a

Fig. 11.



circular reservoir covered by a brick dome (Fig. 11) has been constructed. It is supplied with water by a water-

press and engine, capable of pumping 10,000 gals. per hour into this reservoir, at a height of 226 ft. above tide.

It has been estimated in America to estimate 28 to 30 gals. per day for each inhab., old and young, as a sufficient supply for a great city. But the experience of all those in which A. have been in use for 20 yrs. show that in the U. S. the supply should not be less than 100 gals. per head per day.

The cross-sections of the *qanats* or channels of the Rom. A. were generally rectangular. In modern times a great variety of forms have been used—rectangular, two-side walls with flat floor and roof; curved floor and arched roof, with vertical sides; oval, or egg-shaped, with the smaller end of the oval at the bottom; and finally circular. As the circle is that geometrical figure which with the least circumference incloses the greatest area, it follows that, in lining with masonry a channel cut through the earth, the circular form will convey the most water with the least masonry. In building a covered channel for conveyance of water, this form will generally be found the best and cheapest. Bricks or flat rubble stones are laid with great rapidity into the form of a circular conduit. As the cost of the excavation and construction of the conduit is but a part of the aggregate cost of an A., it is wise to at first make the conduit itself large enough to convey all the water of the source. The conduit should also in any case be large enough for a man to pass through conveniently, for the purposes of cleaning and repairing it. When the source of supply is a great river or lake, the conduit should be built to convey more water even than 100 gals. a day for each inhab. [From orig. art. in *J. S. L. Soc. Rep.*, by GEN. M. C. MERRIS.]

Aquila, ak'we-la ("the Eagle"), a constellation of stars near the equator, and on its N. side.

Aquinas, THOMAS, SAINT, a scholastic theologian, SUPREMACY OF THE ANGELS. Doctor, b. in the kingdom of Naples in 1225, being a grand-nephew of the emp. Frederick I. Barbarossa. About 1243 he joined the order of Dominican monks, and became a pupil of Albertus Magnus. After he had studied theol. and scholastic philos., he began to teach and preach at Paris. Having acquired a European reputation, he left Paris in 1261, and was induced by Pope Urban IV. to remove to Rome, where he taught philos. He refused a bishopric. His *Summa Theologie* was regarded as the most complete compendium of scholastic divinity. D. 1274.

Arabesque, ar-a-besk', signifies "in the Arabian style or manner." It is applied to the fantastic decoration which was profusely employed in the arch. of the Arabs or Moors in Spain. As employed by the Arabs, it consisted of infinitely diversified combinations of curved and straight lines, and imaginary foliage and flowers, curiously interwined with other vegetable forms. The Moors are supposed to have derived this kind of ornament from the Romans, by whom it was extensively used. Among the most beautiful specimens of Moorish A. are the decorations of the famous palace of the Alhambra. The name of A. was applied to this mode of decoration because it had been long known and admired in the works of the Arabs before the discovery of the beautiful paintings in the Baths of Titus, by Raphael and his pupil Giovanni da Udine, made the world acquainted with a magnificent specimen of the original. CLARENCE COOK.

Arabia. See ARABIA PARS.
Arabia [Ar. *Jazīrat al Arab*, "the peninsula of the Arabs"] a peninsula forming the S. W. part of Asia, and having Asiatic Tur. for its boundary on the N., the Per. Gulf, Gulf of Oman, and Ar. Sea on the E., Ar. Sea and Gulf of Aden on the S., and the Red Sea, Suez Canal, and Mediterranean on the W. It extends from 12° 35' to 34° N. lat., and from 32° 10' to 59° 40' E. lon. Its area is 967,856 sq. m.

Topography.—A. has a singular conformation. Surrounded on three sides and for $\frac{1}{2}$ of its boundary lines by the sea, it has in all this distance a narrow, sandy, though sometimes fertile belt, from 12 to 60 m. in breadth, of low lands; and immediately behind these a lofty wall of mts., at some points 8000 ft. high; the interior, between the mts., is an elevated plateau with mt. spurs crossing it, and forests on the mts., but except oases, mostly composed of sandy plains; the whole declining toward the N., where the Syro-Ar. desert extends far up toward Damascus. There are no considerable rivers, and the few streams lose themselves in the sands. There are some salt lakes in the interior.

The climate of the coast is intensely hot, especially in the S. and S. E. Muscat and Mocha are two of the hottest places on the globe. It is very dry. On the Red Sea rain falls moderately in summer, but in many parts of A. there is no rain, nor even clouds. The elevated table-lands and the mts. are very dry, hot in summer, and intensely cold in winter. The *Sinook*, a hot S. wind, and the *Sirocco*, an E. wind, prevail sometimes.

Minerals.—Gold, copper, iron, lead, coal, emeralds, carnelian, agate, onyx, alabaster, marble, sulphur, and saltpetre.

Soil and Vegetation.—The soil, where it can be irrigated, is rich and fertile, and yields many aromatic plants. The wild shrubs and trees are the *Mimosa*, the *Euphorbiaceae*, lavender, jasmine, the aloe, the acacia, which yields gum-arabic, and the oilbanyan; the cultivated crops are cotton, coffee, indigo, tobacco, tamarinds, dates, barley, rice, sugar, and many aromatic plants.

The exports are dates, coffee, gum-arabic, myrrh, aloes, pearls, balsam and other drugs; there is also a large carrying trade by caravans between India and N. Afr.

Animals.—The finest horses in the world, camels, antelopes, the ibex, hyena, wolf, jackal, wild ass, wild boar, jerboa, monkey, ostrich, eagle, etc.

Political Divisions.—The anc. divisions were A. *Felix*, or the Happy, the coast region; A. *Petrea*, the N. W., so called either from *Petra*, or from its stony character; and A. *Deserta*, or the Desert, which included the central and N. portions. It has now 7 or 8 divisions, occupied by different tribes and races, but a preliminary division is into A. *Proper*, or the true Ar. peninsula; N. A., or *El Badieh*, properly the N. part of the old A. *Deserta*, bounded S. by the peninsula, E.

by the Euphrates, N. by Syria, and W. by the Desert of Petra; and W. A., comprising the Desert of Petra and the peninsula of Sinai, known as the Desert of the Exodus. A. *Proper* only concerns us, and its divisions are differently stated by different writers. The latest give them as—1. *Hijaz*, or *El Hijaz*, along the Red Sea from 12° to 20° N. lat., towns, Mecca and Medina; inhabs., mainly Arabs of Ishmaelitic descent and Moslem faith. 2. *Yemen*, extending along the Red Sea, the Strait of Bab-el-Mandeb, and the Gulf of Aden to Hadramaut, the most fertile portion of A.; cap., Mocha; inhabs., descendants of Joktan, with perhaps a Hamitic mixture—largest Moslems. 3. *Haram*, lying on the Indian Ocean, of uncertain extent, perhaps reaching to Oman; mountainous, and taking in a large tract of the desert at the N.; only small villages, great heat, sterile soil, nomadic pop. 4. *Oman*, part of the domain of the sultan of Muscat, lying on the Straits of Ormuz or Gulf of Oman; cap., Muscat; soil fertile, many products, copper and other mines; inhabs., village and agricultural Arabs; considerable foreign trade. 5. *El Achaah*, *El Hadjar*, or *El Bahrein*, a tract along the coast of the Per. Gulf; mountainous, and with few villages. 6. *El Yemaneh*, the S. part of the interior region, possibly a part of Nedj'd, but having a fertile valley or oasis of its own, called "The Garden of A." 7. *El Nedj'd*, or the *Nedjed*, occupying an extensive region in the centre of the peninsula, with wooded mts., fertile valleys, and extensive deserts. It is a kingdom, and the ruling race are the Wahabites, fanatic Ar. reformers. It has excellent pasturage and many villages. 8. *Jebel Shanmar*, or *Shamir*, a mountainous region, connected with the Syro-Ar. desert, and inhabited by Bedouins.

History.—The country was never conquered, and no European or Asiatic power has ever been able to maintain control over more than a very small portion of its terr. The tribes are mostly nomadic and independent of each other. They were generally united under Mohammed and his successors, and founded empires in 3 continents, but these have been overthrown. In the 16th century the Turks conquered Yemen, but were driven back in the 17th, though holding nominal authority over Hijaz and the holy cities. The Port. held Muscat 1585-1609. The Wahabites—fanatical Moslem reformers from the interior of A.—overran the country 1770-1811, but were defeated and driven back by Mehmet Ali in 1811. Aden is held by G. Brit. since 1838, and Jiddah was bombarded in 1858.

Population.—Probably not more than 4,000,000; of two classes, the wandering Arabs or Bedouins, and the village or agricultural Arabs. These are of different races or families: the 1st Ishmaelite, the 2d Joktanite. Besides the towns named already, there are Loheia, Yembo, and Rostak.

L. P. BROCKETT.

Arabian Architecture, a style sometimes called Moorish, originated almost simultaneously with the Mohammedan religion, and followed the progress of that religion into E. Europe, Sp., and Afr. The early temples or mosques of the Moslem Arabs were modifications of Byzantine arch. The most peculiar and original feature of the A. arch. is the horseshoe arch. The pointed arch was also very extensively used by the Moors. Among the finest specimens of A. style is the Alhambra. CLARENCE COOK.

Arabic Language and Literature. The Arabic belongs to what is termed the Semitic family of langs., and is closely related to the Heb., which it resembles in grammatical structure, as well as in the form of many of its words. Like the Heb., it is written from right to left, and like it, also, the vowels are not written in the body of a word or name, but are indicated (if indicated at all) by certain marks placed above or below the consonants to which they belong. The alphabet consists of 28 letters, several of which have no equivalents in any European tongue, and most of them have a different form, according as they are initial, medial, or final. There are only 3 vowels corresponding in general to the It. *a*, *i*, and *u*; they are usually omitted in Arabic MSS. The characters are supposed to have been introduced into Ar. from Syria, before the time of Mohammed. Their anc. form, called the *Cufic*, was rude and imperfect, the number of letters being only 16. These were in the 10th century replaced by the present characters.

The Ar. lang. is widely diffused, being spoken not only in Ar. and Syria, but with more or less corruption over a large part of N. Afr., and with great purity in Egypt. From the 9th century to the 12th it was the prevailing lang. in a large part of Sp. peninsula. In Ar. itself there are 2 principal dialects—the N. one, in which the Koran is written, and the S., including the Himyaritic, originally spoken in Yemen and the extreme S. portion of Ar.

Ar. lit. is rich in poetry and other works of fancy and imagination. Even before the time of Mohammed, there were poets who contended for prizes at the great annual fairs in Mecca, the productions which gained prizes being, it is said, written in golden characters and hung up in the famous temple of the Kaaba, said to have been built by Ishmael, the son of Abraham and Hagar. Mohammed is the great Ar. classic, and his followers claim that the beauty and sublimity of the Koran are unanswerable proofs of its divine inspiration. It may be said that, with perhaps the exception of Mohammed, the Arabs have had no poet of the highest class, nor produced any drama of a high order. Lyric and romantic compositions are the great characteristic of Arabic poetry. Arabic lit. is also very rich in prose romance. Notable among works of this class is the collection entitled the *Arabian Nights*.

The flourishing period of Ar. lit. extended from about 750 to 1300 A. D. The great Abbasside caliphs ruled at Bagdad; in the far E. reigned Mahmoud of Gazneh, and his successors. In Sp. the Omeiyade dynasty held sway. The best scholars of Christendom frequented the Moslem schools at Cordova, in order to study philos., math., and med. under Ar. teachers.

To the Arabs we owe the preservation of many classical

works which would otherwise have perished during the dark ages of Christendom. In philos., med., and math. the Arabs stood pre-eminent in their age.

Following are a few of the Arabic writers: Alfarabi of Damascus flourished about 950; Avicenna, philos. and phys. (980-1037); Averroes of Cordova, phys., who is said to upon Aristotle (1120-98); Razes (or Rhazes), and commentator have first accurately described the small-pox (870-930); Abulcasis, supposed to have practised in Cordova, author of the best early work upon surgery (1050-1110); Mohammed Ibn Moosa is said to have been the earliest Arabic writer upon algebra (810-833); Albategnius of Bagdad wrote on astron. (d. 929); Masoodi of Cairo wrote on geog. and hist. (d. 956). Of a later date are Abulfeda, geog. and hist. (1273-1331); Ibn Khaldoun (1332-1406) wrote a hist. of the Arabs, etc.; Makreeze (1360-1442) of Cairo wrote historical works; Makreeze (1585-1631) wrote a hist. of the Mohammedans in Sp., which has been translated into Eng. For a general view of Ar. lit., see HAMMER-PUGSTALL'S *Literaturgeschichte der Araber*. [From orig. art. in *J.'s Unit. Cyc.*, by Prof. J. THOMAS, LL.D.]

Arabin, the essential principle of gum-arabic, is obtained pure by adding alcohol to a solution of gum-arabic in water. It dissolves readily in cold water, forming a gummy solution, and is precipitated by alcohol. It appears to be a weak acid, and to exist in the natural gum in combination with lime, magnesia, and potash.

Arabi Pasha, b. about 1835 at Tantah, Egypt; had no education, and was private soldier in the Egyptian army 12 yrs.; became lieut.; was said to be inspired by the Prophet; was afterward col., minister of war, and then pasha. A revolution, of which A. was the leader, broke out in 1882, with the motto "Egypt for the Egyptians," the govt. offices being mainly filled by foreigners; the Eng. intervened; the forts at Alexandria were bombarded and dismantled by their fleet July 11 and 12, 1882; the war lasted but a few months, and A.'s army was totally defeated, Sept. 13, 1882, at Tel-el-Kebir by the Eng. under Gen. Wolsey. A. soon after surrendered himself to them. He was sentenced to death, but was exiled for life to Ceylon, Dec. 3, 1882.

Arago, ar'a-go (DOMINIQUE FRANÇOIS), an eminent Fr. astron. and savant, b. at Estagel in 1786; was sec. to the bureau of lon., was engaged in the measurement of the arc of the meridian which formed the basis of the metric system, and in 1809 was elected a member of the Inst., and soon after appointed prof. of analysis in the Polytechnic School. In 1830 he became director of the observatory of Paris and perpetual sec. of the Acad. of Sciences. He displayed a remarkable faculty for popularizing science; he took a prominent part in Fr. politics between 1830 and 1848, was opposed to the election of Louis Nap., and refused the oath of allegiance after the *coup d'état*. D. Oct. 2, 1853. W. G. PECK.

Arago (EMMANUEL), son of the preceding, b. at Paris Aug. 2, 1812. He studied law, and gained distinction as an advocate for the defence in political trials, taking an active part in the revolution of 1848. He was sent as minister to Berlin in May 1848, but resigned in Dec. 1848, in consequence of the election as pres. of Louis Nap. The *coup d'état* of Dec. 1851 excluded him from the public service. On the formation of a provisional govt. by the republicans in Sept. 1870, he became a member of the same. He was elected a member of the National Assembly in 1871.

Arago (ÉTIENNE), brother of D. F. A., b. at Estagel Feb. 9, 1802, has produced a number of comedies and vaudevilles. He fought for the popular cause in the revolution of 1830, and founded the *Reform*, a republican journal, in 1834. As a member of the National Assembly he opposed the policy of Louis Nap., and was exiled in June 1849. After the proclamation of the republic, in Sept. 1870, he was appointed maire of Paris, which position he held until Nov. In Feb. 1871 he was elected a member of the National Assembly, but soon resigned on account of his age.

Arago (JACQUES ÉTIENNE VICTOR), brother of the preceding, b. at Estagel Mar. 10, 1790. He accompanied the exploring expedition of Freycinet, as draughtsman, in 1817. D. 1855.

Aragon, a former kingdom of Sp., bounded N. by Fr., E. by Catalonia, S. by Valencia, and W. by Navarre and the Castiles. It is divided into two nearly equal parts by the Ebro; the Pyrenees, which extend along the N. border, rise to an altitude of 11,000 ft. It is now divided into 3 provs. Area, 17,980 sq. m.; pop. in 1877, 894,727.

Aral, Sea of, a large inland sea in Tartary, about 150 m. E. of the Caspian, next to which it is the largest body of inland water in Asia; length, about 262 m.; breadth, about 184 m.; area, 26,900 sq. m. It has no outlet.

Aram (EUGENE), b. in Yorkshire in 1704. He acquired a knowledge of the Lat., Gr., Heb., Chaldee, Ar., and Welsh langs.; became a schoolmaster at Knaresborough, where he was intimate with a shoemaker named Daniel Clarke. The latter, having purchased some goods on credit, suddenly disappeared, leaving his debts unpaid. In 1759 a man named Houseman having confessed that he was accessory to the death of Clarke, A. was tried for the murder, and made an elaborate argument in his own defence, but was convicted, and confessed his guilt. He was hanged Aug. 6, 1759.

Aran'da (DON PEDRO ABRARCA DE BOLEA), COUNT OF, a Sp. statesman, b. at Saragossa Dec. 21, 1718. He rose to the rank of gen., and in 1765 became pres. of the council of Castile and prime minister. He procured the expulsion of the Jesuits from Sp. in 1767. In 1773 he was removed from power by the intrigues of the clergy. He was again prime minister for a short time in 1792. D. 1799.

Ararat, a volcanic mt., of which an eruption occurred in July 1840, called by the Persians *Koh-i-Nooh*, the "Mt. of Noah." It rises from the plain of the Aras, about 33 m. S. W. of Erivan, and on the boundary between Pers., Tur., and Rus. There are 2 prin. peaks, the summits being about 7 m. apart. The GREATER ARARAT has an altitude of 17,000 ft. above the sea, and is covered with perpetual snow. The LESSER ARARAT forms a perfect cone, with an elevation of 12,840 ft.

Ara'tus [Ἀρατος], an eminent Gr. poet and astron., b. at Soli, in Cilicia, flourished about 290-260 B. C. He wrote an astronomical poem entitled *Phenomena*, which is the oldest extant poem on that subject, and was translated into Lat. by Cicero. A. also wrote a poem on the weather, called *Dioseneia*, or *Prognostica*.

Arauca'nia, or **Arauca'na**, an independent state in S. part of Chili. Area, 120,000 sq. m.; pop. 70,000.

Araujo d'Azevedo, a-rôw'zho da-za-vá'do (ANTONIO), COUNT DA BARCA, a Port. statesman, b. at Ponte de Lima May 14, 1754. He negotiated at Paris a treaty of peace with Fr. in 1797, but the Fr. Directory annulled it; became minister of foreign affairs in 1806. After Nap. had invaded Port. and captured Lisbon, A. accompanied the king, John VI., to Brazil in 1808. D. June 21, 1817.

Arbitration [from the Lat. *arbitror*, to "act as judge"], a submission of some matter in dispute to the decision of a person called an "arbitrator." It applies to civil cases only, and may be either oral or written. It is voluntary in its nature, as any party has a legal right to have an adjudication upon his case by a court of justice. Statute law sometimes makes A. compulsory, as where the investigation of a long account is necessary. Even after parties have agreed to submit a controversy to A., one of them may withdraw his consent against the will of the other at any time before the hearing is closed. The only remedy of the other party is to bring an action for damages, which would usually be nominal. The result of the A. is termed an *award*. It is not, however, equivalent to a judgment of a court, and, if not performed, the regular course of the successful party would be to bring an action upon the award, and thus make it a judgment of a court. To avoid this inconvenience statute law frequently provides that on reducing the submission to writing a clause may be inserted that the award may be entered on the records of a specified court as a judgment, whereupon it shall have the like force and effect. As a general rule, there is no review of the result of an A. There are no methods of appeal provided, as the theory of the proceeding is that the arbitrator is to be the judge of the difference between the parties. This rule does not prevent the rectification of mistakes in matters of fact, nor does it include the case of fraud or the violation of the first principles of justice; as, for example, the act of hearing one party and not the other. GEORGE CHASE.

Arboriculture, ar-bor-i-kult'yur [from the Lat. *arbor*, a "tree," and *cultúra*, "culture" or "cultivation"], the art of cultivating trees, includes the raising of plantations of forest trees for timber and fuel, and ornamental trees for landscape gardening; but the culture of fruit trees is commonly assigned to a separate head, or to horticulture and pomology. This is a subject of growing importance in the U. S., and one which is year by year gaining increased attention. Unless measures are taken to restore our forests, it will not be many decades before our supply of timber trees will become wholly exhausted; and apart from this evil, it is certain that the destruction of forests will sooner or later reduce a country to desolation. We can here do little more than hint at some of the general principles by which A. must be governed.

We cannot ask owners of land to keep their original forests untouched, but new timber should be restored to supply that which has been cut away. It is more profitable to renew a dense growth of young wood and to clear it off about once in 20 yrs., than to allow the trees to grow 150 yrs. One mode of renewal is to clear away the old trees entirely, allowing the new ones to spring up spontaneously from the stumps. The other mode is to form new plantations on well cultivated land.

In the first case, care should be taken to give the young trees a good start by wholly removing the old ones, so that they may have the full benefit of light and air, and this cutting should be done at a season when the trees are not in full foliage—that is, in autumn, winter, or early spring. Cattle must be carefully excluded, and in a few years thinning will be necessary. This may profitably be done when the trees are large enough for hoop-poles.

Raising trees from the seed, though requiring more labor and cost at first, will in the end be the more profitable method. In general, it may be said that the land should be as well prepared as for corn; the seed should be sown in drills, and the young plants must be carefully attended to until they are large enough to shade the ground. A general rule is that the seed should be buried at a depth of not less than 3 nor more than 5 times its diameter. Transplanting the young trees from nursery beds is best done when they have attained a height of 3 or 4 ft.

Woodland belts, for protection against winds, are found of much utility both in the E. States and on the vast plains of the W. Where the face of the country has become denuded, and wintry winds and summer storms sweep farms with more fury than formerly, belts of this character are found to protect young crops and to increase the product of the land. They should be placed at intervals of from 60 to 80 rods. Where rising land faces prevailing winds they should be nearer, but where it falls they may be more remote. If the belts are evergreen, a rod wide will be sufficient; if deciduous, they should be 3 or 4 rods, or more. When cut, one half in breadth may be taken at a time. Or the belts may be planted 30 or 40 rods apart, and these narrow ones removed for timber. If the planting of these timber-belts were generally adopted, they would occupy about one twenty-fifth part of the 200,000,000 improved acres of the U., would possess a money value when grown of at least \$800,000,000, afford a yearly revenue in wood and timber of more than \$80,000,000, and render the land they shelter more valuable than before. [From orig. art. in *J.'s Unit. Cyc.*, by JOHN J. THOMAS.]

Arbor Vitæ (*Thu'ya*), a genus of plants of the natural order Coniferae, consisting of evergreen trees or shrubs, with compressed or flattened branchlets, and small, scale-

like, and imbricated leaves. The *Thuja occidentalis* is a native of the U. S., and is often planted as an ornamental tree in the parks and pleasure-grounds of Amer. and Europe. It is one of the trees known as white cedar. The Chi. A. V. *Thuja orientalis*, a native of Chi., has larger strobiles and more upright branches than the preceding.

Arbuthnot (JOHN), M. D., F. R. S., a Scot. phys., b. near Montrose in 1660; grad. at Aberdeen, and settled in Lond. He was appointed phys. to the queen in 1709, and obtained an extensive practice. In 1712 he pub. a political allegory entitled a *History of John Bull*. His other works are numerous, partly scientific and partly satirical. In 1723 he was chosen second censor of the Royal Coll. of Phys., and in 1727 was made an elect of the coll. D. Feb. 27, 1735.

Arbutus, a genus of plants of the order Ericaceæ, mostly natives of Amer. and S. Europe. They are evergreen shrubs, bearing a fleshy fruit which has five cells and many seeds. The A. mentioned by Virgil was the *A. unedo* or strawberry tree, which bears bright red and yellow berries, with beautiful foliage, and is cultivated as an ornamental evergreen. The fruit has narcotic properties, and is used for making wine in Corsica. Another species, the *A. Andryane*, a native of the Levant, is admired as an ornamental plant, and bears an esculent fruit. The *Madroña* of Cal. is a species of this genus; but the *Manzanita* and also the bearberry (or *Uva ursi*), a trailing shrub of the N. hemisphere, the leaves used as an astrigent tonic in medicine) belong to the related genus *Arctostaphylos*, although formerly included in A.

Area'dia [Gr. Ἀρκαδία], a central state of anc. Gr., surrounded by mt. ridges, which enclosed numerous fertile valleys. The people were agriculturists and shepherds, and their country was a favorite theme of the pastoral poets.

Area'dius [Gr. Ἀρκάδιος], emp. of the E., the eldest son of Theodosius the Great, b. in Sp. in 383 A. D. In 395 he succeeded his father to the E. portion of the empire, of which Byzantium was the cap., including Thrace, Asia Minor, and Syria, and extending from the Adriatic to the Tigris. Honorius took the W. portion. A. was a feeble and indolent prince. He was succeeded by his son, Theodosius II. D. 408.

Area'ni Disciplina (i. e. the "Discipline of Secrecy"), a term used to denote the secrecy observed in the early Ch. with respect to certain doctrines; as, for example, those of baptism, the Eucharist, and some others, which were withheld from candidates until after they had been received into full communion with the Ch.

Arce, ar'sa (MANUEL JOSÉ), a gen. who in 1824 was chosen pres. of the republic of Central Amer. He favored the clerical party. His arrest of Barrundia, gov. of Guatemala, in 1826, provoked a c. war, in which A. was defeated in 1827. Expelled in 1829.

Arcesilaus [Ἀρκεσίλαος], a Gr. philos., b. at Pitane, in Eolis, in 316 B. C., was the founder of the New (or, as it is sometimes called, the Middle) Acad. He was a pupil of Theophrastus, and was an admirer of Plato, but taught a modified form of Platonic philos., D. 241 B. C.

Arch [Lat. *arcus*, "a bow," "an arch,"], a curved structure of stone or brick supported by the mutual pressure of its component parts, intended to cover the space between two piers or two columns, and to support at the same time a superincumbent weight. The wedge-shaped pieces of which the A. is composed are called *vousoirs*. The middle stone of the A. is called the *key-stone*, and the lowest stone on either side is the *springer*. The highest part is the *crown*, the sides are termed *haunches*, the inner curve is the *intrados*, and the exterior or upper curve is the *extrados*; while the base which supports the lowest *vousoir* or *springer* on each side is the *impet*. A. are of various shapes, but the principal distinction is into *round* and *pointed*. All other shapes are merely described in one of these, and the principle of construction is the same for all. The A. was known to the Egyptians, the Ethiopians, the Assyrians, the Grs., and the Etruscans, though no one of these peoples made any extensive use of it, since the post-and-lintel system met all their wants. Its first considerable use was by the Roms., who employed exclusively the round form. They used it in doors and windows, in their aqueducts, bridges, and triumphal arches, and they early developed from it a complete system of vaulting. Among the oldest A. known is the Cloaca Maxima, a great sewer built in Rome in the time of the Tarquins, and still in good condition. The pointed A. came into use later. It was at first sparingly employed, but lending itself more easily than the round A. to the increasing desire for height in buildings it gradually superseded the round A., and became so inherent a feature of the Gothic style that the name of Pointed Arch. is often applied to the works of the mediæval builders.

CLARENCE COOK.

Arch, Trium'phal [Lat. *arcus triumphalis*; Fr. *arc de triomphe* or *arc triumphal*], a monumental structure erected in honor of a victorious gen. or in commemoration of some important event or victory. It was usually placed at the entrance of a city or over a grand avenue. The anc. Roms. built numerous T. A. at Rome and elsewhere. The most magnificent of modern T. A. are those of Paris, and the finest among these is the Arc de l'Étoile, erected by Nap. I. at the Barrière de Neuilly.

Arch (JOSEPH), pres. of the Eng. National Agricultural Laborers' U., was b. in Barford, Warwickshire, Eng., Nov. 10, 1826. He was the child of laboring people, and was brought up a laborer, with no education but what he has picked up by himself. He has learned from the newspapers all he knows about the important questions of the day, and has taught himself to read and write. He was a total abstinence man, and a "local preacher" in the Meth. Ch. When a young man, A. felt that he and his kind were badly treated, and he rebelled against it. When the Warwickshire farm-laborers struck they appealed to A. to be their leader. The strike began for an advance of 4 shillings (\$1) per week.

Their leader was one John Lewis, who proposed that they should form a U., but it was necessary to have for leader a better-taught man; so Joseph A., the local preacher, was sent for. After much opposition the U. was fairly started by the active assistance of rich Radicals in Birmingham, with Mr. Auberón Herbert, Mr. Edward Jenkins (the author of *Gin's Baby*), Dr. Langford, and other reformers. A. travelled through all parts of Eng., organizing branches of the U. wherever he went. In 2 months such progress was made that on the 29th and 30th of May a meeting was held at Leamington of delegates from all parts of the country, presided over by Mr. G. Dixon, M. P. for Birmingham. At this meeting A. was unanimously elected pres. of the U. The movement, which at first was only a demand for a few more shillings a week, became one of political importance, and the laborers demanded a vote in the counties, as the artisans had already done in the cities. CLARENCE COOK.

Archæology, ar-ke-o'-lo-je [from the Gr. ἀρχαίος, "ancient," and λόγος "discourse"], a term which in its widest sense includes the knowledge of the origin, lang., religion, laws, insts., lit., art, science, manners, and customs of anc. times. It may therefore be made to comprise many diverse depts. of human knowledge. In its strictest sense it has reference to the *materials* from which a knowledge of the anc. condition of a country or people may be attained. As to the application of the words Archæology and Antiquities, it may be remarked that the latter refers immediately to the objects studied, the former to the study itself.

Archæopteryx, ar-ke-op'te-riks [from the Gr. ἀρχαίος, "old," and πτερυξ, "wing"], a remarkable fossil bird found in the lithographic limestones (Jurassic) of Solenhofen, Bavaria. This bird exhibits some peculiarities of anatomical structure which have led zoologists to consider it as a kind of connecting link between birds and reptiles. The jaws are provided with distinct teeth. The tail is long, and composed of a large number of vertebrae, from which feathers diverge on either side. The wings are short, but provided with long plumes spread somewhat like a fan. The feet are similar to those of birds.

Archang'el, a town of Rus., on the Dwina, 20 m. from its entrance into the White Sea, lat. 64° 32' N., lon. 40° 33' E. Founded in 1584, it was long the only seaport of Rus. The harbor is closed by ice except from July to Sept. inclusive. Pop. 19,540.

Archegosaurius, ar-ke-go-saw'rus [from the Gr. ἀρχηγός, a "leader" or "beginner," and σαῦρος, a "lizard" or "saurian"], a fossil animal, so named because it was supposed to have been the beginning of reptilian life. It is found in the Bavarian coal-measures. Prof. Owen considers this animal as a remarkable connecting link between reptiles and fishes. Agassiz and Dana regard it as a ganoid fish, while others class it with salamandroid batrachians.

Archelaus, ar-ke-la'us, a Gr. philos., a native of Miletus, or, as some say, of Athens. He was a pupil of Anaxagoras, and flourished about 450 B. C.

Archelaus [Gr. Ἀρχέλαος], king of Macedonia, son of Perdiccas II., whom he succeeded 413 B. C.; was a patron of art and lit. D. 399 B. C.

Archelaus, b. in Cappadocia, a gen. of Mithridates the Great. He commanded an army which king sent to oppose the Roms. in Gr. in 87 B. C. At Athens he was besieged by Sulla. Evacuating Athens, he retired to Thessaly in 86 B. C., and was defeated by Sulla at Charonea and Orchomenus, with whom he signed a treaty of peace; deserted to the Roms. in 81 B. C.

Archelaus, a son of the preceding, became high priest of Comana about 63 B. C. He pretended to be a son of King Mithridates, and by that imposture induced Berenice, queen of Egypt, to marry him. Six months afterward he was defeated and killed by the Roms. in 55 B. C.

Archelaus, a son of Herod the Great by Malthace, a Samaritan woman. On the death of his father (4 B. C.) he became ethnarch of Judea, Samaria, and Idumea. Fear of him sent the parents of Jesus into Galilee. In 7 A. D. he was banished by Augustus to Gaul, where probably he d.

Arch'er [from the Lat. *arcus*, a "bow," Fr. *archer*] and **Archery**.

An A. is one who shoots with a bow. In anc. times A. formed an important portion of the armies of most Oriental and of all barbarous or semi-barbarous nations. The Eng. A. decided the fate of the day in the important battles of Crécy, Poitiers, and Agincourt. Among the Asiatic Turks, the Pers., the Tartars, and other nations of the E. as well as certain native Afr. tribes and some Amer. Indians, the bow and arrow are still used in war.

Archer (JOHN), M. D., b. in Harford co., Md., in 1741, grad. at Princeton in 1760, was the first person who received the degree of M. D. in Amer. It was conferred by the Phila. Med. Coll. in 1768. Was an officer in the Revolutionary war, and an M. C. from Md. (1801-07). D. 1810.

Archer (STEVENSON), LL.D., a son of the preceding, b. in Harford co., Md., grad. at Princeton 1805. Was an M. C. from Md. (1811-17 and 1819-21), and judge in the State court of appeals, and for a time U. S. judge in Miss. Terr. D. 1848.

Archetype, ar-ke'tip [from the Gr. ἀρχή, a "beginning," "origin," and τύπος, "a type"], the original pattern or model of a work; the original type on which others are formed. Among Platonic philos. the term A. was applied to the original patterns or ideas existing in the Divine mind before the creation.—In zoology, applied (1) to a supposititious ideal "type" or "pattern" in conformity with which the animals of a given group have been "constructed" or "developed," or to (2) the ideal type whence a certain stock is supposed to have been derived.

Archias (AULUS LICINIUS), a Gr. poet, b. at Antioch, became a resident of Rome in 102 B. C., and obtained the right of citizenship. He was intimate with Cicero and Lucullus. Having been accused of being an alien, he was defended by Cicero in an able oration (*Pro Archia*) about 60 B. C. Among the works of A. which are lost was a poem on the Mithridatic war.

Archidamus II., of Sparta, became king about 470 B. C. Commanded the army which invaded Attica in 431 B. C., but the Athenians declined a battle. He was the father of the famous Agesilaus. D. 455 B. C.

Archidamus III., king of Sparta, grandson of the preceding and son of Agesilaus II. He defeated the Arcadians and Argives in 367 B. C. in a battle which was called the "searless" or "tearless," because no Spartan was killed in it. He began to reign on the death of his father, 361 B. C. Having led an army to It. to aid the Tarentines, he was killed in battle 335 B. C.

Archil., ar-chil, or ar-kil. **Or'chil**, or **Orscille** (perhaps a corruption of *oreocila*, a "little rock," so named because the plant grows on rocks), a reddish-purple dye obtained from various species of lichens, among which are the *Lichen canadensis*, *Roccella tinctoria*, *Roccella fuciformis*, and *Lecanora tartarea*. These are gathered from rocks near the shores of the Canaries, the Azores, the Cape de Verde Isles, Sardinia, Corsica, Ceylon, Madeira, Lower Cal., Auvergne, the Pyrenees, Sw., and coloring-matter readily formed, but they contain colorless acids, *orchilic*, *hecatonic*, *oreochilic*, *oreochilic*, etc., which readily change to orchil. By the action of air and ammonia the colorless orchil changes to purple *oreochil*, which is the coloring principle of A. To produce the A., the weeds are reduced to pulp, a little putrid urine or ammoniac carbonate is added, and the whole is allowed to putrefy or ferment. In a week or 10 days the color is fully developed. By adding potassic or sodic carbonate, instead of ammonia, a blue color, litmus, is obtained, instead of A. *Cudbear* is a variety of A. made at Glasgow. A. produces beautiful shades of purple, violet, mauve, red, etc., but unfortunately they are not, as generally employed, permanent.

C. F. CHANDLER.

Archilochus, ar-kil-o-kus [Gr. Ἀρχιλόχους], a Gr. poet, b. in the island of Paros. He flourished about 710-670 B. C. He wrote odes, elegies, and satires, which were extremely severe and personal, was regarded as the inventor of iambic verse, and was ranked by anc. critics as second to Homer. According to tradition, he was killed in a battle between the Parians and the people of Naxos.

Archimedes, ar-ki-mē-dēs [Gr. Ἀρχιμήδης], one of the greatest of anc. geometers, b. at Syracuse about 287 B. C. He made important discoveries in math. and mechanics, and is said to have invented many useful and important machines. He was killed at the capture of Syracuse in 212 B. C. Prof. Dunkin of Ox. says "he possessed, in a degree never exceeded, except by Newton, the inventive genius which discovers new provinces of inquiry, and finds new points of view for old and familiar objects, and the power and habit of intense and persevering thought, without which other intellectual gifts are comparatively fruitless."

W. G. PECK.

Archipelago, ar-ki-pe-la-go [from the Gr. ἀρχή, "first," "chief," and πέλαγος, "sea"], a name originally applied to a part of the Mediterranean called the Egean Sea, which lies between Gr. and Asia Minor and incloses numerous islands. In modern times the term is applied to any sea or expanse of water which contains many islands, or to a group of islands, as the Malay or E. Archipelago.

Architecture, ar-ke-tek-tur [Gr. ἀρχιτεκτονική, "chief art," Lat. *architectura*; It. *architettura*; Fr. *architecture*; Ger. *Baukunst*, the "building art." In its widest sense the term A. includes every structure which man has reared for purposes of comfort, convenience, or religious worship. It includes everything from the snow-hut of the Esquimaux to the stately palaces, elaborate civic structures, and magnificent temples which have been reared during the long ages of recorded hist. The present paper relates mainly to structures in which the religious element is the predominant feature. We take these up mainly in their chronological order, beginning with those of Egypt.

Egyptian A.—The A. of Egypt consists of temples, palaces, and tombs. The Pyramids, whatever may have been their secondary purpose, were primarily built as sepulchres for the monarchs by whom they were erected. They are undoubtedly the most anc. of all the existing remains of man's works. There are about 100 of them; that of Cheops originally covered about 13 acres, and was 480 feet high. To the earliest of them a date of not less than 3000 B. C. must be assigned. Next in antiquity are the ruins near Thebes, consisting mainly of the great palace temple, 1200 ft. long, and the temple of Luxor, 820 ft. long, originally connected by the avenue of sphinxes, about 2 m. long. The striking features of the monumental A. of Egypt were its magnitude, massiveness of construction, and its harmony with the stern and monotonous character of the country. It lacked in all the finer elements of grace and harmony, which were the characteristics of Gr. A.

Grecian A. We pass by those earlier remains of Gr. A. which are styled Cyclopean, and begin with the Doric, the oldest examples of which cannot be assigned to an earlier period than 650 B. C. The Parthenon, at Athens, is conceded to be the masterpiece of Gr. A. It was erected by Pericles about 440 B. C., the architect being Ictinus and Callicrates, Phidias having charge of the sculptures which adorned the pediments and metopes. The Parthenon was not imposing from its magnitude, being only 228 ft. long and 101 ft. wide. Its charm consisted in the matchless harmony of its several parts. It was built of white marble, but color entered largely into its ornamentation. The roof and mouldings were certainly painted, and the sculpture was relieved by a colored background. Doric was the prevailing order of Gr. A., although the lighter Ionic order came in time to be largely employed. The more florid Corinthian order belongs to the Romans, rather than to the Grs.

Roman A.—In religious A., the Romans invented little, but borrowed much, and not infrequently improved upon their originals, their improvements often assuming a practical form. Thus the Gr. A. consisted of open-air temples, for the

Grs. lived mainly out of doors. But the more rigorous It. climate rendered shelter desirable, and their temples were built measurably so as to afford this. The same idea was developed in other respects, so that while the Grs. built only ornamental temples, the Romans constructed palaces, basilicas, amphitheatres, baths, bridges, and aqueducts. The A. of the Grs. was mainly aesthetic, that of the Romans mainly practical.

Christian A.—As the world began to revive after the fall of the Rom. empire, the rapid growth of the new religion called for new modifications of A. The E. or Byzantine empire erected structures borrowed in design from Oriental nations. The Byzantine A. attained its highest point in the erection of the ch. (now mosque) of St. Sophia, at Constantinople (532-563 A. D.). N. of the Alps, and under the influence of the so called Gothic races, sprang up a mixed style of A., styled Romanesque.

Gothic A.—This style which, more or less modified, has come to be the prevailing order of ch. A., grew out of the Chr. feeling, influenced by the requisitions imposed by climate. A Chr. temple was an edifice in which assemblages were to meet for worship. It had to be inclosed by walls for protection from the weather. The open-air porticoes, which formed the distinguishing features of Gr. A., were done away with, and the inclosed structure was the ch. Towers and buttresses took the place of columns on the exterior, while light was demanded for the interior. Ample windows were thus required. These windows came to be a prominent feature in ch. A. Glass, not at all used by the Grs., and only sparingly by the Romans, lent itself easily to staining with lovely colors, so that the Gothic builders found a delight in using it, and enlarged and multiplied the windows of the chs. merely for the pleasure of filling them with stained glass; and these windows came to be among the chief beauties of their structures.

The Renaissance.—Gothic A., after crowding Europe with its wonderful works, was struck by decay, and d. in the 15th century. Then, after a pause, in which much interesting, much picturesque, and very much ugly building went on, there came slowly another great change in A., known as the Renaissance. Just as in the growth of the Gothic style the old Rom. forms were slowly displaced by the new, so the new forms were displaced by the old elements which had once given place to them. The pointed Gothic arch was gradually dropped, the stained-glass windows faded out of sight, and the old A. of Rome was revived in principle, though shorn of much of its grandeur, in those buildings crowned by domes, and with their surfaces marked by the old screens of columns and entablatures. The ch. of St. Peter at Rome is in the Renaissance style. For nearly 3 centuries not a single notable ecclesiastical structure has been built in Europe or elsewhere. But we may hope that in the near future the building instinct in man will once more take up the task, and A. be born again. See FERGUSON'S *Hist. of Arch., Anc. and Modern*.

CLARENCE COOK.

Archon, ar-kon [Gr. ἀρχων, from ἀρχω, to "be first"], the title of the highest magistrates or rulers of Athens. The office, created in 1068 B. C., when the title of king was abolished, was at first hereditary, and held for life, but in 752 the term was limited to 10 yrs., and in 714 it was made open to all patricians. In 683 B. C. the number of A. having distinctive functions was increased to 9, elected for only 1 yr. In the N. T. the word archon, translated "ruler," is applied to several persons among the Jews.

Archytas, ar-kī-tas [Ἀρχύτας], a celebrated Gr. philos., gen., and math., was b. at Tarentum. He flourished about 400-350 B. C., was a Pythagorean in philos., and an intimate friend of Plato, whose life he is said to have saved when the tyrant Dionysius was about to put him to death. As gen. of Tarentum, to which office he was elected 7 times, he commanded with success in several campaigns. He was also employed in important civil affairs. He is reputed the first that applied geom. to practical mechanics. He was drowned on the coast of Apulia. Only fragments of his works are extant.

Arco'la, a village of N. It., 15 m. E. S. E. of Verona. Here Bonaparte defeated the Aus., Nov. 14-17, 1796.

Arcola, city, on R. R., Douglas co., Ill., 158 m. S. of Chicago. Pop. 1880, 1515.

Arco't, or **Aruca'ti**, a city of Brit. India, on the River Palaur, 71 m. W. S. W. of Madras. In 1801 it was ceded to the Eng., having previously been the cap. of the Carnatic. Pop. 1878, 53,474.

Arctic [Lat. *arcticus*; Gr. ἀρκτικός, "belonging to [the constellation of] the Bear" (ἀρκτος), which is near the N. pole], a term signifying "northern," or rather, "far to the north," "near the N. pole."—A. CIRCLE, a circle drawn around the N. pole of the earth, 23° 28' from the pole and 66° 32' from the equator. A. CURRENT, so called because it is supposed to originate in the A. seas, whence it runs along the E. shore of Greenland and round Cape Farewell to the W. shore of Greenland, where it turns southward forming the *Hudson's Bay Current*; thence it passes near the Bank of Newfoundland, and meeting the Gulf Stream, crosses it as an undercurrent, flowing into the Caribbean Sea.

Arctic Discovery.—See POLAR RESEARCH.

Arctic Ocean, or Sea, the ocean which surrounds the N. pole and washes the N. shores of Europe, Asia, and Amer. It communicates with the Pacific by Bering's Strait, and with the Atlantic by a wide passage between Greenland and Nor. The navigation of this ocean is obstructed by perpetual congelation, but it is supposed that a portion N. of 80° is an open polar sea. Those parts of this sea which have been explored are occupied by large fields of floating ice and icebergs in almost perpetual motion. Fogs, storms, and almost endless night add to the dangers which beset the explorer.

Arcturus [from the Gr. ἀρκτος, a "bear," and οὐρα, a "tail"], a fixed star of the first magnitude in the constella-

tion Boötes, so called because it is near the tail of the Great Bear. It is designated in catalogues as a Boötes.

Ardenne, ar-den' (anc. *Arduenna Sylva*), a hilly and densely wooded tract which includes a part of Belg. and of Fr., and is situated on both sides of the river Meuse. Many important military events have occurred among the A. at Rocroi, Sedan, Mézières, etc.

Are, ar' [Fr., from the Lat. *area*, a "space of ground"]. In the metric system of weights and measures the A. is the unit of measure of surface. It is the square of 10 metres = 119.6332 sq. yds.

Areca, a genus of palm trees having pinnate leaves and double spathe, a fruit which is a one-seeded drupe, or nut with an outer fibrous husk. The A. *Catechu*, called pinang palm or betel-nut palm, is a native of the E. I., and grows to the height of 40 or 50 ft. It bears a fruit called A.-nut or betel-nut, which is astringent and tonic, and is extensively used in the E. as a masticatory. It also yields a part of the catechu of commerce. The A. *obovata* (the cabbage-palm) grows in the W. I., and is more than 100 ft. high, but has a very slender stem. The terminal leaf-bud is nutritious, and is used for food. It also bears nuts with sweet kernels.

Areometer, a-re-om'e-ter, or **Aræometer** [from the Gr. *ἀραιος*, "thin," and *μέτρον*, a "measure"], an instrument used to measure the specific gravity of fluids, and ascertain the strength of spirituous liquors; usually called Hydrometer.

Areopagus [Gr. *Ἀρειος πάγος*], (*i. e.* "hill of Mars"), a hill in Athens W. of the Acropolis, also a celebrated court of justice which held its sessions there. This court, organized earlier than 740 B. C., was merely a criminal tribunal before the time of Solon, who extended its jurisdiction to political and moral affairs. Its political power was much reduced by Pericles about 458 B. C., but it maintained a high reputation long after that date.

Arequipa, ar-e-k'e'pa, a city of Peru, about 40 m. from the Pacific, on the river Chili, 7850 ft. above the sea. Until the war with Chili it had an extensive commerce. It has been frequently visited by earthquakes; one in Aug. 1868 is said to have caused the death of more than 500 persons. About 14 m. to the E. is the volcano of A., 20,300 ft. in height. Pop. 29,237.

Ares, a-réz ['Ἄρης], the god of war in the Gr. mythology, corresponded to the Rom. Mars.

Arætaeus [Gr. *Ἀρεταῖος*], an able Gr. med. writer of Cappadocia, is supposed to have lived between 50 and 150 A. D. He wrote a work in 8 books on the causes, symptoms, and cure of acute and chronic diseases, which is still extant and is highly esteemed.

Arcthu'sa [Gr. *Ἀρθεύουσα*], in classic mythology, one of the Nereids. Also the name of a fountain near Syracuse, into which it is said she was transformed.

Are'tino (PIETRO), [Lat. *Aræti'nus*], an It. writer, b. at Arezzo in 1492. He became a resident of Venice in 1527, and found several powerful patrons. Among his works were comedies, dialogues, sonnets, and letters. His satires, which were personal and bitter, procured for him the surname of THE SCOURGE OF PRINCES. D. 1557.

Are'tino (SPINELLO), an It. painter, b. at Arezzo about 1315. He painted frescoes at Florence and other towns. His invention and coloring are highly commended. His best extant work is *Hist. of Pope Alexander III.* D. about 1400.

Arezzo, a-ret'so (anc. *Arretium*), an anc. city of It., on the Chiana, 55 m. S. E. of Florence; and notable for the many eminent men b. there. Ancient Arretium was celebrated for the manufacture of terra-cotta vases. The cathedral contains rich sculptures and some of the finest glass windows in It. Pop. of commune, 38,950.

Argali [*Ovis ar'gali*], a large wild sheep of central Asia and Siberia, related to the big-horn or Rocky Mt. sheep. It is about 4 ft. high, has coarse hair, and moves with great agility. (See SHEEP.)

Argand, ar-gon' (AIME), a Swiss chemist, b. at Geneva about 1750. He lived in Eng., and produced the model of the A. lamp in 1782. D. 1803.

Argand Lamp, a lamp invented in 1782 by Argand, designed for burning oil. He invented a wick in the form of a hollow cylinder, through which a current of air ascends, so that the supply of oxygen is increased. This contrivance prevented the waste of carbon, which in the old lamps escaped in the form of smoke, and it greatly increased the amount of light. He also added the glass chimney, by which a draft is created and the flame is rendered more steady. This lamp was patented in 1787.

Argelander, ar-jel-an-der (FRIEDRICH WILHELM AUGUST), a Ger. astron., b. at Memel 1799; became director of the Observatory of Albo 1823; in 1832 prof. at Helsingfors, and in 1837 prof. of astron. at Bonn. He pub. a celestial atlas and *Astronomical Observations*, and demonstrated that the solar system has motion in space. D. Feb. 17, 1875.

Argensola de (BARTOLOME LEONARDO), a Sp. historian and poet, b. 1566; became canon of Saragossa, and historiographer of Aragon. D. 1631.—His brother, LUPERCIO LEONARDO DE A. (b. 1565, d. 1613) was in 1610 made sec. of state by the viceroy of Naples. The two brothers wrote histories, dramas, and poems, and were called "the Horaces of Sp."

Argenson, d', dar-zhon-son', a Fr. family which has produced many men eminent in letters and in public affairs.—MARC RENÉ DE VOYER D'A. (1652-1721) was an academicien and public officer.—His son, RENÉ LOUIS, marquis d'A. (1694-1757), was a foreign minister and author.—MARC PIERRE,

count d'A. (1696-1764), a brother of the foregoing, was a statesman and patron of letters.—MARC ANTOINE RENÉ DE PAULMY D'A. (1722-87), a son of the marquis René Louis, was an academicien and the collector of a famous library.—MARC RENÉ (1771-1842) was adjutant of La Fayette and a firm republican.

Argen'teus Co'dex, an uncial MS. of the 4 Gospels, supposed to belong to the 6th century, in the Mæso-Gothic dialect. It is written on vellum, the letters, except the initials, being of silver, whence its designation.

Argentine Confederation, or **Argentine Republic**, a S. Amer. republic, or rather confederation, of 14 states and several terrs., formerly known as *La Plata* (silver), from the river of that name which drains most of the republic. It is bounded N. by Bolivia and Paraguay, E. by Brazil, Uruguay, and the Atlantic, S. by the Atlantic Ocean, W. by the Andes, which separate it from Chili. Lat. 22°-56° S., lon. 53° 30'-73° W. Area, including additions in 1881 of most of Patagonia and a small part of Terra del Fuego, over 1,200,000 sq. m. The 14 states or provs. are: Buenos Ayres, cap. Buenos Ayres; Santa Fé, cap. Santa Fé; Entre Rios, cap. Concepcion; Corrientes, cap. Corrientes; La Rioja, cap. La Rioja; Catamarca, cap. Catamarca; San Juan, cap. San Juan; Mendoza, cap. Mendoza; Cordova, cap. Cordova; San Luis, cap. San Luis; Santiago del Estero, cap. Santiago; Tucuman, cap. Tucuman; Salta, cap. Salta, and Jujuy, cap. Jujuy. The terrs. are Gran Chaco, Pampas Argentinas, Misiones, and Patagonia.

Topography.—Four regions.—1. Andean, in W. and N. W., hilly and mountainous. 2. True Pampas or S. Plains, between the R. Negro and R. Salado; elevated plateaus, mostly treeless and dry, but good pastoral lands. 3. Gran Chaco, the N. Plains; hot, elevated plains, dusty and sterile, but with some pasturage; part of the land strewn with meteorites. 4. The Argentine Mesopotamia, between the R. Parana and the Uruguay; fertile alluvial lowlands, well watered and with forests of great extent. The A. R. is drained by the Rio de la Plata and its affluents—the Uruguay, Parana, Salado, Vermejo, etc.—and the S. and S. W. by the R. Negro, R. Colorado, and R. Salado. The R. de la Plata is the widest though not the longest river in the world—170 m. at its mouth, 75 m. at Montevideo, 50 at Buenos Ayres; obstructed by sand-banks in its lower course, but its greatest affluent, the Parana, navigable for 1000 m. Swamps, lagoons, and salines in the plains and lowlands.

Fossils.—Marine in the lowlands and some of the mts., mammals, mostly of S. Amer. genera, in the upper diluvium.

Minerals.—In the Andes, gold, silver, copper, sulphur, alum, etc.; in the S. W. provs. extensive coal-fields, salt, sulphur, magnesia, and soda; in the Gran Chaco, meteoric iron and nickel.

Climate and Vegetation.—In the S. E., tropical and semi-tropical; abundant rains; at Buenos Ayres (34° S. lat.), annual mean temp. 64° F., summer mean 72°, winter mean 52°; moist, warm N. winds. In the N. and W., dry and hot, with scorching N. winds; nights cool. In the Andes, dry, but with intense cold in winter and heat in summer. The forests on the Parana and Uruguay are of palms, cypress, live oak, and other tropical and semi-tropical forest trees; the swamps and lagoons have lianas and bamboos, and other jungle shrubs and trees; the plains have some willows, but more mimosas and cacti; the Andean region, forests of oak and pine, and apple trees in great abundance. The peach tree is largely cultivated on the islands at the mouth of the Parana, the grape in the Andean hills.

Animals.—The llama family, including the guanaco, vicuña, and alpaca, on the plains and hills; of beasts of prey, the jaguar and puma (both numerous in the islands of the La Plata), the ounce, a species of lynx, the tapir, capibara, and several rodents; of birds, the caracara, vulture, and condor, the Amer. ostrich, and many species of parrots and humming-birds. Wild horses and half-wild cattle roam over the plains, and immense flocks of sheep and goats find pasturage on the pampas.

Industries.—In agriculture, large crops of wheat, wine, and fruits of all kinds in the Andean provs., and now wheat, corn, oats, market vegetables, sugar-cane, tobacco, cocoa, cotton, madder, Paraguay tea, peanuts, and flax in the littoral provs. of the E. But the rearing of cattle, horses, mules, sheep, and goats is the great industry of the plains. The exports are mainly of hides of cattle and horses, horns, jerked beef, Liebig's extract of beef, pemmican, skins of sheep, goats, and other animals, and wool. The manufactures are few; tanning, soap-making, the manufacture of harness, ponchos, serapes, horse-blankets, saddle-cloths, belts, goat and sheep skins, artificial guano, wine, clothing, and some flour and lumber are the principal.

Principal Cities and Towns.—Buenos Ayres, 295,000; Cordova, 39,627; Tucuman, 24,237; Salta, 11,716; Corrientes, 11,218; Santa Fé, 10,670, and San Juan, Mendoza, and Santiago, about 10,000 each.

Railways and Telegraphs.—Jan. 1882, 1617 m. of R. R. in operation; 165 m. more in progress. In June 1882, 8466 m. of telegraphic lines in operation.

Finances.—Total debt, Jan. 1, 1884, of all kinds, \$225,000,000, exclusive of state, provincial, or city debts. Income annually less than expenditure. Exports in 1882, \$58,441,000; imports, \$59,270,000.

Religion and Morals.—R. Cath. the prevalent religion of the states; some of the colonies Prot. State of morals low. Education in low condition, but improving. The Gauchos are very ignorant. Only 28,000 people could write in 1870. Pres. Sarmiento (1868-74) established many schools and some colls. and univs.

History.—Country discovered 1516 by Juan Diaz de Solis; Buenos Ayres founded 1535 by Don Pedro de Mendoza; rebuilt for 3d time in 1580; subject to viceroy of Peru till 1778, thence till 1821 to viceroy of the La Plata; after 14 years' c. war, independence acknowledged in 1821, but in disturbed condition till 1825, when Rosas became pres. and was



Argali.

dictator till 1852; there was c. war almost constantly for these 27 yrs., and at last war with adjacent countries; Rosas fled in 1852, and Buenos Ayres seceded the same yr., but returned in 1859; Urquiza was pres. till 1861, but with constant *émeutes*; another revolution in 1861, and Gen. Mitre pres.; c. war in 1866, put down in 1867; from 1868 to 1874 Don D. F. Sarmiento pres., an able and good ruler, but rebellions still continued, and in 1870 Urquiza, former pres., murdered by his son-in-law, Lopez Jordan, who headed a rebellion against Sarmiento; the republic prospered, notwithstanding c. war and desolating epidemics of yellow fever. In 1874 Dr. Avellaneda became pres. and served for 6 yrs. In 1880 a new rebellion arose which resulted in the establishment of Gen. Roca as pres. By treaty with Chili in 1881 all the country E. of the eastern crest of the Andes, including most of Patagonia and a portion of Terra del Fuego, was conceded to the Argentine Confederation.

Population.—Total, including additions from Patagonia, etc., in 1881, 2,942,000. Immigration averaging 40,000 a year from It. and Sp., Ger. and Fr. Many colonies of these nationalities. The Indians, of several tribes, and the mixed races are now about equal in number to those of European birth or descent.

Argillaceous, ar-jil-lā'shus [from the Lat. *argilla*, "clay"], clayey; having the properties of clay, or partly composed of clay. Limestones are called A. if they contain as much as 10 per cent. of clay. The term A. Rocks designates rocks or strata of which clay is the principal ingredient. Pure clay is derived from the decomposition of felspar; common clay contains sand and other impurities. Among the A. rocks are shales and slates.

Argives, or **Argivi**. See ARGOLIS.

Argo, a S. constellation, so called from the mythical ship of the Argonautæ. Canopus, a star of the first magnitude, belongs to this constellation.

Argol, crude tartar, a salt which is deposited by wine in crystalline crusts on the interior of vats, barrels, and bottles. Being less soluble in alcohol than in water, the increasing proportion of alcohol during fermentation causes it to separate. It consists chiefly of potassic bitartrate, but contains also variable quantities of calcic tartrate, coloring and mucilaginous matter. It is purified by solution in hot water, clarification by the addition of clay, and recrystallization. By repeating the process it becomes white, and is then sold under the name of *cream of tartar*, and extensively used in connection with sodic bicarbonate for raising bread. Cream of tartar is adulterated with gypsum, flour, etc. A. is used for the preparation of tartaric acid, Rochelle salt, and potassic carbonate, the latter being often called *salt of tartar*.

Argolis [*Ἀργολίς*], a state of anc. Gr., in the N. E. part of the Peloponnesus, and bordering upon the sea. It was the scene of many notable events or myths in the heroic ages. Agamemnon, the leader of the Grs. at the siege of Troy, was king of A. The inhabs. were called Argives, a term used by Homer as a generic appellation for all Grs.

Argonaut (*Argonauta*), a genus of mollusks of the class Cephalopoda, is commonly called "paper nautilus." The latter name is derived from the fragile nature of the boat-like shell in which the A. floats on the surface of tranquil seas. The shell is not chambered like that of the true nautilus, but has one spiral cavity, into which the animal can retire and be completely hidden. There is no muscular attachment of this animal to the shell, which is said to be peculiar to the female, who uses it for incubation as a nest. Several species are known. They have 8 arms, 2 of which are expanded into broad membranaceous disks, which were formerly believed to be sails, and the other arms were regarded as oars; but, though the fable is perpetuated by the poets, it has long been known that the animal really propels itself by ejecting water from its funnel. It can fold its arms, retire into its shell, and sink to the bottom.

Argonautæ (Gr. *Ἀργοναῦται*, *l. e.* "the sailors of the Argo"), in Eng. **Argonauts**, the famous Gr. heroes who, according to tradition, lived before the Trojan war, and acquired celebrity by an adventurous navigation of unknown seas. This is the most ancient voyage of discovery mentioned by classic poets or historians. They derived their name from the ship Argo, in which, under the command of Jason, they performed the expedition to Colchis, on the Euxine, in order to recover the Golden Fleece, which was guarded by a sleepless dragon. Among the A. were Hercules, Theseus, Castor, Pollux, and Orpheus.

Argos [*Ἄργος*], a city of anc. Gr., supposed to have been founded as early as 1500 b. c. It was the residence of Pelops and Agamemnon; subsequently became the head of a league of Doric cities, before Sparta rose to prominence. The site is now occupied by a modern town of the same name. Pop. 9861.

Argot, a word applied in Fr. to a gibberish invented for purposes of concealment by those whose pursuits make them dread the arm of the law. In all the countries of Europe a language of this kind prevails, and has prevailed perhaps to some extent from immemorial time. In Eng. it is called "thieves' Latin," "St. Giles's Greek," "peddler's French," "flash," and other names. Considerable attention has of late years been paid to the study of A. Several novelists have introduced specimens of this lang. into their works.

Arguelles, ar-gwel'yez (Augustin), a Sp. statesman, b. 1775. He was a member of the committee of the Cortes which produced the liberal constitution of 1812. On the restoration of Ferdinand VII. in 1814, he was imprisoned, but was released by the revolution of 1820. He was minister of the interior that year, and was an exile from 1823 to 1832. Became a leader of the moderate party in the Cortes, and in 1841 was appointed tutor to queen Isabel. D. 1844.

Argus (Gr. *Ἄργος*), a fabulous personage having a hundred eyes, some of which were always awake. He was set by Juno to guard the heifer into which Io was transformed, but

was killed by Mercury. Juno is said to have transferred his eyes to the tail of her favorite bird, the peacock.

Argus [named in allusion to the A. of the Gr. mythology, having a hundred eyes; for a more particular explanation see above], a genus of gallinaceous birds remarkable for rich and brilliant plumage. The typical species is the *A. giganteus*, formerly called *Phasianus A.* and now commonly called A. pheasant. It is a native of Sumatra and other parts of the E. I., and is about equal in size to a common barn-door fowl. Two of the tail feathers of the male are about 4 ft. long. The name A. is given in reference to the beautiful circular, eye-like markings which adorn the plumage of the male, especially on the secondaries of the wings.

Argyle, ar-jil' (ARCHIBALD CAMPBELL), MARQUIS OF, b. 1598, son of the seventh earl of A. was a leader of the Scot. Covenanters, but afterward became an adherent of Charles II. in opposition to Cromwell. After the restoration of Charles he was convicted of submission to the usurpation of Cromwell, and was beheaded May 27, 1661.

Argyle (ARCHIBALD CAMPBELL), NINTH EARL OF, eldest son of the preceding. He fought for Charles II. at Dunbar in 1650. The estate of his father was restored to him, with the title of earl, in 1663. When he took the test-oath in 1681, he added the phrase, "So far as is consistent with the Prot. faith." For this offence he was condemned to death, but fled to Hol.; returned with a small body of armed men, was captured, and executed June 30, 1685.

Argyle, or **Argyll** (GEORGE DOUGLAS CAMPBELL), THE EIGHTH DUKE OF, b. April 30, 1823, succeeded his father, the seventh duke, in 1847, before which he was styled the marquis of Lorne. He has pub. several works of a religious character. He became lord privy seal in 1852, an post-master-gen. in 1855. When the Tories obtained power in 1858, he resigned office, but he was reappointed in 1860. He resigned with his colleagues in June 1866, but was sec. for India 1868-74. His son, the marquis of Lorne, married H. R. H. the princess Louise, daughter of Queen Victoria, and was gov.-gen. of Canada 1879-88.

Argyropoulos (JOHANNES), b. in Constantinople in 1416; went early to It., taught Gr. and the Aristotelian philos. at Padua, Florence and Rome, where he d. in 1486. He translated the works of Aristotle into Lat.

Ariadne [Gr. *Ἀριάδνη*], a daughter of Minos, king of Crete, became enamored of Theseus when he visited Crete. She gave him a clew of thread by which he was enabled to find his way out of the labyrinth. Her name is given to the 43d asteroid.

Arian (nations.) See ARYA.

Aria'na, the anc. name of a region in the W. central part of Asia, inhabited by the Aryan or Arian race. It probably comprised anc. Per. and Bactriana. (See ARYA.)

Arians. See ARYAS.

Arias Montano (BENEDICTUS) [Sp. *Bonito Arias Montano*], a Sp. biblical scholar and Orientalist, b. in Estremadura in 1527. Under the auspices of Philip II. he edited a Polyglot Bible, pub. at Antwerp (1568-72). He wrote, besides other works, *Jewish Antiquities* (1598). D. at Seville 1598.

Ariel, a word signifying "lion of God" or "ark of God," was sometimes applied to the city of Jerusalem. Among the Jews of a more recent date the name was given to a water-spirit.—A. is also the name of a character in Shakespeare's *Tempest*.

Ariel gazelle (*Gazella dorcas*, var. *Arabica*) is the gazelle of W. Asia, the true gazelle belonging to N. Afr. The A. G. is one of the most beautiful of antelopes, is 21 inches high at the shoulder, of a dark-fawn color, the belly white, with a black or brown band running along the flanks. It is a variety of the species to which the Afr. G. belongs. It is hunted both for sport (by falconry) and for its flesh and skin, both highly prized. G. are often hunted in *battue*, for they cannot be successfully followed in the chase, their speed excelling that of the greyhound. They are great favorites in the E. when tamed, and the beauty of their eyes is proverbial.

Aries, a-ri-éz [the Lat. of "ram"], the name of a sign of the Zodiac; that is, the first 30 degrees of the Zodiac measured from the point at which the equator intersects the ecliptic—i. e. the vernal equinox. Lions (celestial) are reckoned from this point. A. is also the name of a constellation of the Zodiac which once coincided with that sign, but which now occupies the same place as the sign *Pisces*.

Arion [*Ἀρίων* or *Ἀρείων*], an anc. Gr. musician and poet, a native of Lesbos, lived probably about 700 b. c. When going to Corinth by sea with much treasure, the mariners compelled him to throw himself into the sea, but he was received on the back of a dolphin, which had been charmed by the music, and carried to land.

Ariosto (Lopovico), an It. poet, b. at Reggio Sept. 8, 1474; was educated at Ferrara, and began the study of law; in 1503 entered the service of Cardinal Ippolito d'Este, and in 1516 pub. the poem *Orlando Furioso*, which became very popular. In 1517 he entered the service of Alfonso, duke of Ferrara, and held some ecclesiastical preferments and civil offices. D. June 6, 1533.

Ariovistus (Ger. *Ariovist* or *Ehrenvest*), a chief of the anc. Suevi or Marcomanni. He marched (72 b. c.) with an army into Gaul, and took possession of that part which was afterward Burgundy. On the application of the Gauls, A. was defeated by Cæsar near Vesontion (Besançon) in 58 b. c., and fled across the Rhine.

Arista (MARIANO), a Mex. gen., b. July 16, 1802; entered the army, rose to the rank of brig.-gen., and in 1833 was banished by Santa Anna. He returned in 1835, was made gen. of div. in 1841, and in May 1846 was defeated by Gen. Taylor at Palo Alto. In 1848 he became minister of war; in 1850 was elected pres. of Mex., but was driven from power by Santa Anna in 1853. D. Aug. 9, 1855.

Aristenetus [*Ἀριστῆνους*], a Gr. rhetorician of Bithynia, was killed by an earthquake at Nicomedia in 358 A. D. Is the reputed author of some 50 erotic letters.

Aristæus (Gr. Ἀρισταῖος), in classic mythology, represented as a son of Apollo and Cyrene. He was worshipped as a divinity who presided over flocks and herds, and taught men the art of raising or managing bees.

Aristarchus, ar-is-tar'kus (Gr. Ἀριστάρχος, of Samos, an eminent Gr. astron., supposed to have flourished about 275 B. C. His writings are lost except a short treatise on the *Magnitudes and Distances of the Sun and Moon*.

Aristarchus, a Gr. grammarian and critic, b. in Samothrace, a pupil of Aristophanes of Byzantium. He flourished about 150 B. C., and founded a school of gram. at Alexandria in Egypt, where he passed the greater part of his life. His life was chiefly devoted to the critical study, explanation, and restoration of the works of Homer and other Gr. poets. He is regarded by some persons as the greatest critic and philologist of antiquity. Of his works only fragments are extant. D. at the age of 72.

Aristides, or **Aristides** (Gr. Ἀριστίδης), surnamed THE JUST, an Athenian statesman, a son of Lysimachus, was b. in Allopeke, a demos of Attica. His political tendencies were conservative or aristocratic. He was one of the 10 gens, who had the command of the army when the Pers. invaded Gr. in 490 B. C. Each gen. had a right to the chief command for one day, but A. persuaded his colleagues to resign or waive their claims, so that Miltiades commanded at Marathon when it was not his turn. A. became chief archon in 489, and a political adversary of Themistocles, the leader of the democracy. He was ostracized in 483 B. C. On the invasion of Xerxes, in 480 B. C., A. sought an interview with Themistocles, took a prominent part in the battle of Salamis, and recovered his popularity. He commanded the Athenian troops at Plataea in 479. In 477 B. C., A., with Cimon, commanded the Athenian forces which co-operated with other Gr. armies against the Pers. A., by mildness and prudence, gained general favor, and promoted the supremacy or predominance of Athens among the states of Gr. D. 467 B. C.

Aristides (ELICS), a Gr. Sophist and rhetorician, b. in Bithynia about 124 A. D. D. 189. About 50 of his orations and treatises are extant.

Aristippus (Gr. Ἀριστίππος), a Gr. philos., the founder of the Cyrenaic school, was b. at Cyrene, in Afr., about 425 B. C. He was a pupil of Socrates, but did not adopt his principles or imitate his mode of life. Though he recognized pleasure as a proper subject of pursuit, he appears to have been remarkable for self-control and equanimity, and readily adapted himself to the vicissitudes of fortune. Plato is reported to have said that "A. was the only man he knew who could wear with equal grace fine clothes and rags." He was celebrated for his witty sayings and repartees, some of which are recorded by Diogenes Laertius. His works, if he wrote any, have not come down to us. He despised or neglected math. and phys. sciences. D. after 366 B. C.

Aristo, or **Ariston** (Gr. Ἀριστοῦ), a Gr. philos., surnamed THE SIREN, a Stoic philos. who lived about 275 B. C., was a disciple of Zeno. He taught at Athens, and confined his attention to moral philos.

Aristobulus, a Jew who lived at Alexandria about 175-150 B. C.; reputed author of a commentary on the Books of Moses, aimed to show that the anc. Gr. writers had borrowed much from the sacred books of the Hebs.

Aristobulus I., high priest of the Jews, a son of Joannes Hyrcanus, assumed the title of king in 107 B. C., and was succeeded by his brother, Alexander Jannæus. D. 105.

Aristobulus II., nephew of Aristobulus I. and son of Alexander Jannæus, became king of the Jews about 70 B. C. In 63 Pompey captured Jerusalem, and gave the throne to Hyrcanus, a brother of Aristobulus. D., a captive at Rome, about 48 B. C.

Aristocracy (Gr. ἀριστοκρατία, from ἀριστος, the "best," and κράτος, to "govern") signifies ideally a form of govt. controlled and administered by the best or noblest citizens. The word may be defined as a govt. controlled by the nobility or privileged class, or a govt. in which a minority of adult males constitutes the ruling class. In modern lang., this word is used to denote nobility, or the higher class of society, without reference to govt.

Aristophanes, ar-is-tof'a-nēz [Ἀριστοφάνης], the greatest comic poet of Gr., b. about 444 B. C., and is supposed to have been a native of Athens. Considering his celebrity, the materials for writing his biography are surprisingly meagre. His first work was *The Feasters* (427 B. C.), which is not extant. His *Babylonians* aimed to satirize the demagogue Cleon, who was his personal enemy. His *Acharnians* obtained the first prize in 425. In *The Knights* he attacked and caricatured Cleon with great wit and virulence. In the performance of this play, which gained the first prize, the author acted the part of Cleon, as no other actor would venture to incur the resentment of that powerful popular favorite. A. was a conservative. He was more distinguished for his ability to expose the depravity of human nature than for his capacity to appreciate its noble attributes and manifestations. *The Clouds* (423 B. C.) is an ingenious and powerful satire directed against the Sophists, of whom he represented Socrates as the head and master-spirit. He excited the popular prejudice against Socrates as a septic and corrupter of youth. Only 11 of his comedies are extant. He died about 380 B. C.

Aristotle, ar-is-tof'l, was b. at Stagira, a city of Thrace, but a Gr. colony, in the first year of the 99th Olympiad, or 384 B. C. His father was Nicomachus, a phys., and friend of Amyntas, king of Macedon and father of Philip. Left an orphan at an early age, he was brought up by Proxenus of Atarneus, in Mysia, to whose guardianship he seems to have been intrusted by his father. In his 17th yr. he went to Athens, and became a pupil of Plato, with whom he continued 20 yrs., and upon the death of Plato (348 B. C.) he accepted an invitation of Hermæus, tyrant of Atarneus, his former fellow-pupil in the school of Plato, to take up his residence with him. He afterward became the preceptor of Alexander of Macedon, and after his royal pu-

pil had ascended the throne, and had undertaken the conquest of the E., A. returned to Athens, and taught philos. in the Lyceum, a temple dedicated to the Lycian Apollo, with walks ornamented by trees, fountains, and colonnades. From these shady walks (περιπατοῖς), his school received the name of Peripatetic. He here abode and taught 13 yrs., when, after the death of Alexander, he was accused by the Athenians of impiety, and fled to Chalcis in Euboea, the present Negropont, where he d. (B. C. 322), in his 63d yr.

A. was one of the most highly gifted intellects of all the ages. All agree that his wealth of scientific knowledge, his unbiassed judgment, his constructive power, and his depth and breadth of speculative insight are unsurpassed in anc. or modern times. His writings were very numerous, though only a small part, perhaps a fourth, remain, all of which probably differ more or less from the state in which A. left them. His philosophical method is exactly the reverse of Plato's. He is as analytic and discursive as Plato is synthetic and intuitive. While Plato finds in the universal the only light in which the particular can be seen, A. sees the particular to be necessary in order that we may have any knowledge of the universal. So he gathers particulars from all quarters. History, the human mind, and all departments of nature furnish him contributions. He has no rival in the variety and extent of the facts which he has collected, and has never been surpassed in the patient industry of his investigations. The living principle and rational explanation of individual things A. found in a true Final Cause or sufficient reason, a principle which it is his immeasurable merit to have introduced into philos. Our modern physicists would gain a profounder view of nature and a more successful pursuit of science if they could know this principle as A. taught it. They would find him, as the ancients called him, "the father of those who know."

J. H. SEELYE

Aristoxenus [Gr. Ἀριστοξένος] of Tarentum, a Gr. philos., a pupil of Aristotle, lived about 350-320 B. C. He wrote numerous works, which are lost, and a treatise on music (*Elements of Harmony*) which is extant and is accounted valuable.

Arithmetic (Gr. ἀριθμῆσις, to "number"), a branch of math. which treats of the properties and relations of numbers represented by figures and combinations of figures. The first or scientific part explains the methods of representing and reading numbers, together with the processes of operating on them by addition, subtraction, multiplication, division, involution, and evolution. It also treats of the methods of transforming numbers from one scale to another. The second or practical part consists in applying these principles to the wants of life. Among the subjects treated of in this part are *percentage, alligation, equation of payments, and the like*.

W. G. PECK.

Arius (classical pron. Ari'us), or **Arei'us** [Gr. Ἀρειος], b. at Cyrene, in Afr., near the middle of the 3d century. He was made a deacon by the patriarch Peter at Alexandria, and was placed in the highest rank in the clergy by the patriarch Alexander. About 318 a controversy arose between A. and Alexander, which caused Constantine to summon a general council at Nicea (Nice). This council pron. the doctrines of A. (who denied that the Son was coessential and coeternal with the Father) to be heretical, and A. was exiled to Illyricum. This sentence, however, was soon after revoked. Arianism was approved by the synods of Tyre and Jerusalem in 335 A. D., soon after which A. returned to Alexandria, where his presence created such a disturbance that he was obliged to retire to Constantinople. D. 336.

Ariz'ona, a S. W. Terr. of the U. S. between lat. 31° 20' and 37° N., and lon. 109° and 114° 35' W. Bounded by Nev. and Ut. on the N., N. M. on the E., Mex. on the S., Cal. and Nev. on the W. Area, 113,020 sq. m.; 72,332,800 acres, about equal to that of N. Y., N. J., Pa., Del., and Md. combined. (See map of Ariz., Cal., N. Mex., Ut., and Nev. in CALIFORNIA.)

Topography.—Surface generally elevated, and composed of wide plateaus, descending gradually from 7500 ft. above the sea in the N. to 80 or 100 ft. in the S. These plateaus are crossed by ranges of mts. with towering peaks rising to the height of 12,000 or 14,000 ft. They are also given by streams and rivers, which have cut for themselves beds varying from 1000 to 6000 ft. below the surface. The mts. have many local names; the longer and more important ranges are the Mogollon and Zuni Mts. in the E., the Finaleno and Santa Catarina in the S. E., the Santa Ana and the Dragon Mts. in the S., the Gila range, the Black Mesa, and the San Francisco Mts. in the centre, the Gerbat and Black Mts. in the W., and the great mass rising above the Col. plateau, the Northside Mts. in the N. W. Some of these mts. are volcanic. Extensive *mesas* or table-lands rise above the plains, with perpendicular sides, often 1000 ft. or more in height. The whole of A. is drained by the Col. River and its tributaries. It is the most remarkable river in the world. Its own course in A. for 400 m. is through the Grand Cañon, from 5000 ft. to 400 ft. below the surface of the plateau, and its actual fall in the 400 m. is over 3000 ft. Nearly all its affluents, and particularly the San Juan, Little Col., Zuni, Salt, and Upper Gila rivers, pass through similar and perhaps deeper cañons. These cañons are among the greatest wonders of the world. It is said they expose to view geological strata of all the formations in their regular places to the thickness of 25,000 ft. The Col. is navigable for about 550 m.

Minerals.—Gold, silver, platinum, quicksilver, copper, tin, lead, nickel, iron ores of all sorts, bituminous coal and perhaps anthracite; salt, sulphur, gypsum, load-stones, opals, garnets, sapphires, chalcedony.

Soil and Vegetation.—The lava-covered and granitic sides of the mts. are sterile. Aside from these the soil is fertile, where irrigation is possible, and yields large crops. Elsewhere it is dry and barren. There are forests, generally of pine and spruce, in the mts., but protracted drought kills many of the trees. Wherever there is water, flowers and shrubs are profuse and beautiful. On the dry and hot plains, mimosas and cacti of many forms are the only vegetation.

Zoology.—The buffalo and elk are found, though not abundant; 2 species of deer, antelope, the big horn, wild horses or mustangs, pumas, jaguars, ocelots, black and cinnamon bears, wild cats, lynxes, the red or gray wolves, the true coyotes, foxes, raccoons, opossums, and skunks are more numerous. Birds of prey, game birds, and birds of fine plumage abound.

Climate.—In the mts. and on the plateaus, a warm but healthy and very uniform temperature. At Prescott, lat. 34° 29', the mean of the year, 65.49° F.; summer mean, 84°; only 2 days above 100°. In S. A., very hot and dry. Yuma (lat. 32° 43', but low) had in 1877 106 days of summer above 100° F., 30 days above 108°, and 12 days above 110°; the maximum is 126° F. Tucson is not quite so hot; only 51 days were above 100°. But the whole Gila valley is very hot, yet the air is dry and invigorating, and sunstrokes are rare. The lack of rain is very general. Yuma has but 2 or 3 inches in the year, Prescott about 10 inches, and Tucson not over 6 or 7. Most of the rain comes in July and Aug., though at long intervals there is rain in Dec. or Jan.

Industries.—Mining is the most important of these. Gold is found both in placers* and in quartz lodes, at various points, and the latter are often very rich; silver in galena, and combined with both lead and copper as sulphides and carbonates; copper as gray sulphuret; quicksilver as cinnabar, etc.; platinum and nickel nearly pure; iron in all kinds of ores, and coal where it is easily accessible. The mines of both gold and silver are very numerous in S. A., near and below the S. Pacific R. R.; copper, gold, some silver and iron, as well as the other metals, in central and W. A., between lat. 33° and 35°. In both sections the scarcity of wood and water renders mining very expensive, and the transportation has hitherto been very costly. The Castle Dome in Yuma co., the Tip Top in Maricopa, the Silver King, Globe, and Alice in Pinal, the Tombstone, Western, Toughnut, Grand Central, and others in Pima, and the copper mines in Mohave and Yavapai are the most promising. The estimated value of products of gold and silver for census year 1880 was \$2,537,790. There are good pasture lands in central A., and in Apache co. in the N. E., where the Navajo Indians keep a great many sheep. The irrigable lands yield under irrigation immense grain and root crops, and the semi-tropical fruits are plentiful and of good quality.

Railroads.—The S. Pacific crosses A. from W. to E. between the 32d and 33d parallels. Another crosses from E. to W. near the 35th parallel, and 1 or 2 others are projected. Silver, copper, lead, and iron ores, wheat and cattle, are the principal freights.

Education.—A. in 1880 had 101 public schools, with 4212 pupils; expenditure for the yr. \$61,172.

Population in 1880.—The white and colored population, except tribal Indians, in 1880, was 40,440 (including 3493 Indians, 1630 Chi., and 2 Japanese).

COUNTIES.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Apache.....	4-H	5,284	St. John's.....	746
*Cochise.....	8-H	764	Tombstone.....	955
*Gila.....	4-H	764	Globe.....	764
*Graham.....	7-H	157	Solomonville.....	157
Maricopa.....	7-G	5,680	Phoenix.....	1,708
Mohave.....	5-F	129	Mineral Park.....	318
Pinal.....	5-G	5,716	Tucson.....	5,005
*Pima.....	7-G	3,041	Florence.....	902
Yavapai.....	6-G	2,142	Prescott.....	1,826
Yuma.....	7-F	1,621	Yuma.....	1,290
		9,058		40,440

* Reference for location of counties. See map of Ariz., Cal., N. Mex., U. S., and New, in *Illustrated California*.

* Organized since census of 1880.

The number of tribal Indians in 1879 was 21,092. These are of various tribes, the Apaches, the most turbulent and treacherous, numbering about 5000, the more peaceful tribes about 13,000, and the Moquis about 1800. The last are of a different race from the others, probably Aztec; they live in villages, have many manufactures and a civilization of their own. Their religious rites are peculiar, but very interesting.

History.—Indian tribes originally Aztec or Toltec; these occupied the country long, and reared walled towns, of which there are now ruins; mostly dispossessed by more N. tribes; Spaniards and Jesuit missionaries here before 1600 and established many settlements in 17th century. A., as well as N. M., belonged to Mex. till 1848, when all N. of the Gila was ceded to the U. S.; the Gadsden Purchase made in 1853; A. made a separate Terr. in Feb. 1863.

Governors.

John A. Gurley.....	1862-63	John P. Hoyt.....	1877-78
John N. Goodwin.....	1863-66	John C. Fremont.....	1878-82
Rich. C. McCormick.....	1866-69	Frederick A. Tittle.....	1882-86
A. P. K. Safford.....	1869-76		
Charles E. G. French.....	1876-77		

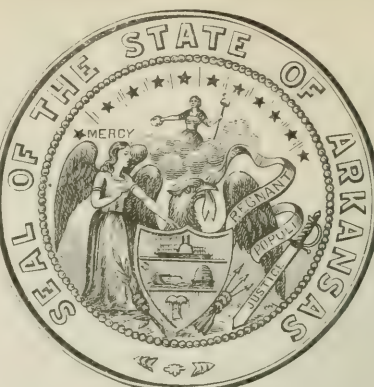
L. P. BROCKETT.

Ark [Lat. *ar'ca*], a chest, a coffer, a large vessel. The term is principally used in a scriptural signification. The A. of the COVENANT [Heb. *aron*; Gr. *skafos*] was a wooden chest overlaid within and without with gold, in which were deposited the stone tables upon which was inscribed the law or "covenant" made by God with the Hebrews. The A. contained also the pot of manna and Aaron's rod. On its lid was the mercy-seat with the cherubim. It occupied the most holy spot (the "Holy of Holies") of the whole sanctuary, and thus excluded any idol from the centre of worship.

Arkadelphia, on R. R., cap. of Clark co., Ark. It is situated at head of steam navigation on right bank of Ouachita River, 65 m. S. W. of Little Rock. It has water-power and a State normal school. Pop. 1870, 948; 1880, 1506.

Arkansas, a river of the U. S., rises in Col., flows first E., then S. E., and after a course of 2170 m. falls into the Miss., of which it is the longest affluent except the Mo. It is navigable by steamers 800 m. from its mouth.

Arkansas, one of the S. W. States of the



Miss. Valley, bounded N. by Mo., E. by Mo. and the Miss. River, S. by La., W. by Tex. and the Ind. Terr. It is between 33° and 36° 30' N. lat., and 89° 40' and 94° 42' W. lon. Area, 53,850 sq. m.; about the size of Eng. without Wales.

Topography.—E. part of the State from 30 to 100 m. W. of the Miss., low, with lakes, bayous, and

swamps; subject to overflow, except occasional bluffs. W. of this, land rises by stages to the table-lands and hills of Ozark, Ouachita, and Black Hills, in N. W., W., and S. W. These rise 1500 to 2000 ft., and knobs 500 to 800 ft. higher. The rivers are: Miss., E. boundary; Ark., crossing diagonally; White, St. Francis, Ouachita, Red, and their affluents; 3000 m. of navigable rivers in the State.

Minerals.—Gold, argentiferous galena, zinc, copper, manganese, iron (various ores), semi-bituminous coal, lignite, marble, novaculite or oil-stone, millstone, kaolin, mineral paints, salt, and remarkable hot and other mineral springs.

Soil and Vegetation.—A. has much good soil, and some which is not productive. The lowlands are alluvial and highly fertile. Some of the table-lands are sterile, but are covered with scattered pines. The river valleys and some of the mt.-slopes have a good and productive soil, and are largely covered with heavy forests. Oak, black walnut, hickory, red elm, maple, tupelo, gum trees (black and sweet), yellow poplar, Amer. elm, white and blue ash, hornbeam, ironwood, Osage orange, red cedar, beech, pecan, sycamore, buttonwood, sassafras, persimmon, locust, wild cherry, pine, cypress, and cottonwood are the prin. forest trees. Wild and cultivated fruits of all kinds abound.

Zoology.—Wild game: Bears, deer of two species, rarely the buffalo and elk, peccaries and wild hogs, rabbits or hares, several species of squirrels and other rodents; cougars or panthers rarely, wolves, foxes, raccoons, opossums, skunks, Texan coyotes. Game birds: Turkeys, ducks, partridges, quails, prairie-hens, etc.; eagles, vultures, hawks, owls, and many song-birds. The rivers, lakes, and bayous abound in fish, with an occasional alligator, serpents, and other reptiles.

Climate.—In the lowlands, mean annual temp., 60.6°; summer mean, 81.4°; winter, average minimum, 9°; summer maximum, 98°; annual rainfall, 63.42 inches. On the table-lands (Little Rock), annual mean, 62.66°; maximum, summer, 96°; winter minimum, 4°; annual range, 92°; rainfall, 55 to 60 inches. Mts. in the W., annual mean, 60° F.; rainfall about 58 inches. As a whole, the climate is very fine, and it has a high reputation for the cure of pulmonary diseases.

Productions.—Agricultural: Cotton, 608,256 bales in 1880; tobacco, 970,220 lbs.; wheat, 1,269,715 bush.; Indian corn, 24,156,417 bush.; oats, 2,219,822 bush.; small quantities of barley, rye, and buckwheat; Irish potatoes, 402,027 bush.; sweet potatoes, 881,290 bush.; hay, 23,295 tons. Value of all principal crops, about \$88,000,000. Live stock: Horses and mules, 238,415; neat cattle, including milch cows, 708,243; sheep, 236,757; swine, 1,565,098; total value of live stock, \$20,472,425. Manufactures: Principally of cottonseed oil, flour and meal, lumber, leather, cotton and woollen goods, wagons, tobacco and cigars, and hones of novaculite; amount moderate, but increasing.

Railroads.—There were 948 m. in operation in 1880, and about 200 more projected. The railway system of the State connects with the Tex. and S. Pacific lines.

Finances. The State debt, net, in 1880, was \$4,039,737; local debt, net, \$3,899,047; total debt, State and local, net, \$7,938,784. The assessed valuation in 1880 was: Real estate, \$55,760,388; personal, \$30,648,976; total, \$86,409,364; total taxation, State, co., and local, \$1,839,090. The revenues of the State are not always equal to the expenditure. The valuation of the State is increasing, though not rapidly. Its commerce is wholly internal, having no ports of entry.

Education.—Pop. of school age, 1879 (6-21 yrs.), 236,601; enrolled in public schools, 53,049; number of school-houses, 708; value, \$151,565; number of teachers, 1458; average monthly pay of men, \$50; of women, \$40; receipts for public schools, \$261,088; expenditure, 205,449; amount of available school fund, \$136,070. There are normal depts. in connection with colls. at Fayetteville, Pine Bluff, Judsonia, and Little Rock. There are 5 univs. and colls. with 20 instructors, 908 students, and \$145,000 property. There was also 1 school of science, with 59 students; and 1 of med., with 15 teachers and 32 students. In 1880 there were 2768 public schools in Ark. with 108,236 pupils; expenditures for the year, \$382,637.

Newspapers and Periodicals.—The number of these in 1880 was 117, of which 6 were dailies; the total circulation per issue was 103,501.

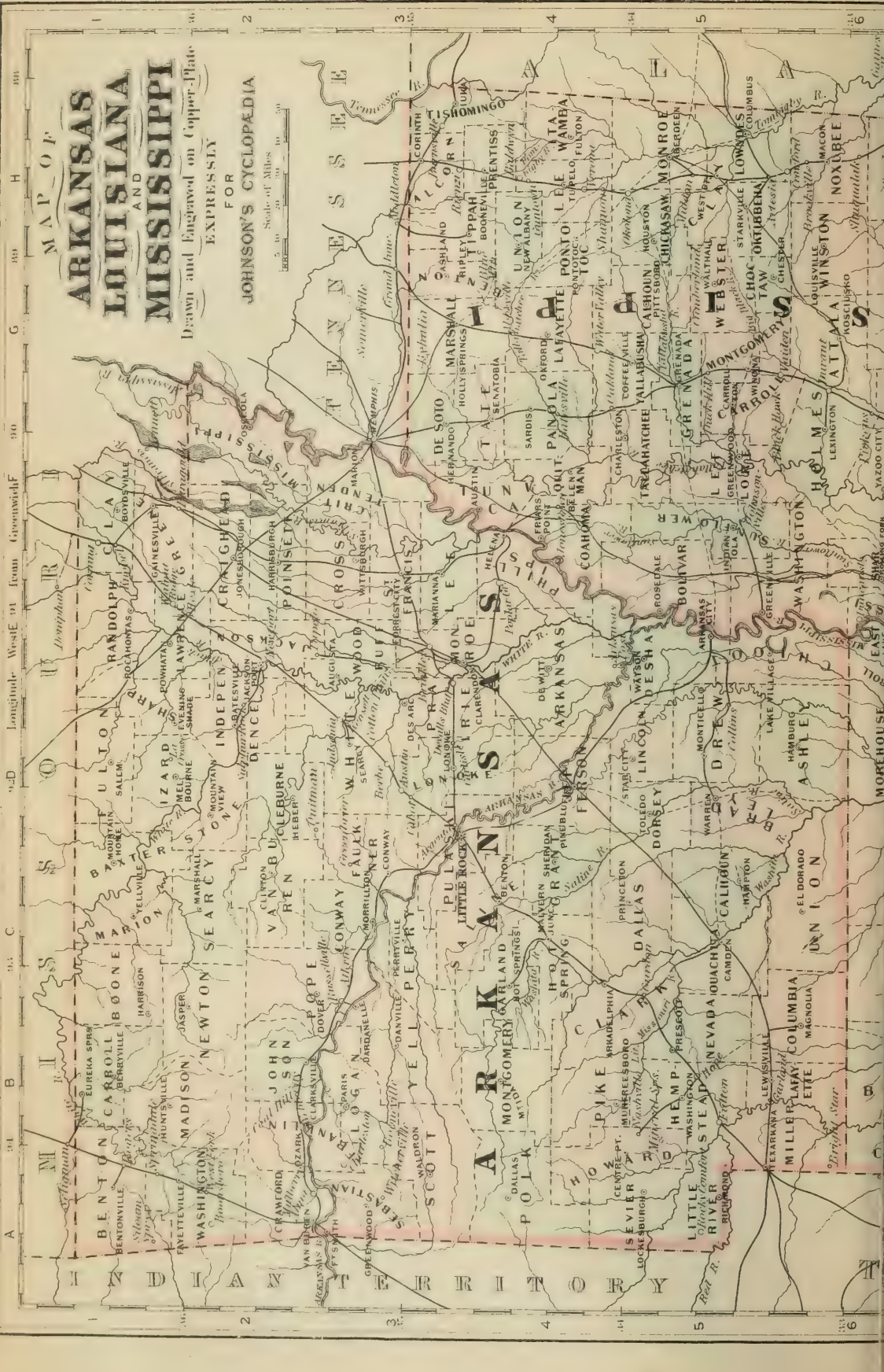
Churches.—The Meth. and Bap. denominations are the most numerous, and, taking the various organizations of each, are of about equal numbers, having between 750 and

MAP OF

ARKANSAS
LOUISIANA
AND
MISSISSIPPI

Drawn and Engraved on Copper Plate
EXPRESSLY
FOR
JOHNSON'S CYCLOPEDIA

Scale of Miles
5 10 20 30 40





Roms, and was defeated about 63 B. C. The Armenians became Chris. about 300 A. D., and still adhere to that faith. Since the Chr. era the Roms., Pers., Byzantine Grs., Saracens, Turks, etc., have successively conquered it, not without great bloodshed. The Armenians are now widely dispersed throughout Europe and Asia. Rus., Per., and Tur. each claim a portion of A.

L. P. BROCKETT.

Armenian Church. King Tiridates was baptized in 280, and Gregory the Illuminator made "hierarchy" in 302. The separate national ch., misnamed Monophysite, dates from 491. The United or R. Cath. Armenians date from 1316-34. In 1830 a successful Prot. mission was organized under the auspices of the Amer. Board of Coms. for Foreign Missions. The whole number of Armenians is supposed to be about 4,000,000, more than half of whom are in Tur. (See *The Life and Times of St. Gregory the Illuminator*, translated by S. C. Maban; *The Divine Liturgy of the A. C.*, translated by S. C. Maban.)

R. D. HITCHCOCK.

Armenian Language and Literature. The A. lang. belongs to the Iranian branch of the Indo-European stock. It has an alphabet consisting of 36 letters. The old A. lit. has been supplanted by the modern A., which is mixed with many Tur. elements. Except a few old songs or ballads, no remains of the lit. of Armenia exist of a date earlier than the introduction of Christianity into that country, after which the Gr. lang. and lit. became objects of study. The most flourishing period of A. lit. extended from the 4th to the 14th century.

Arm-felt (GUSTAF MATRITZ), a Swed. gen., b. in 1757. He became a favorite of Gustavus III., who, after he was mortally wounded by an assassin in Mar. 1792, appointed A. gov. of Stockholm. This appointment was nullified by the duke of Sudermania, who acted as regent during the minority of Gustavus IV. The regent sent him on a mission to Naples, and during his absence charged him with treason. When Gustavus IV. began to reign in 1799 he restored A. to honor and office. He became gov.-gen. of Finland in 1805, commanded the army in a war against Nor. in 1808, and afterward entered the Rus. service. D. 1814.

Arminianism, ar-min'yan-izm, a system of theol. formulated by and deriving its name from JAMES ARMINIUS (which see). The term is used as an antithesis to Calvinism, and may best be explained by stating the distinguishing dogmas of Calvinism, as represented by Arminians, and their replies thereto. These points of difference relate to the whole scheme of the Divine govt., and the relations between God and man, and may be conveniently grouped under several heads:

1. **Foreordination.**—Calvinism affirms that God has eternally foreordained all events, including the volitions of responsible beings. Arminians affirm that this doctrine destroys all voluntary action of the creature, and makes the Creator the direct willer of sin; makes him first decree the sin, and then punish the sinner for the sin thus decreed.

2. **Divine Sovereignty.**—Calvinism affirms that if man is free, God is not sovereign; that so far as man is free to will either one way or the other, God's power is limited. Arminians reply that if man is not free, God is not a sovereign, but only a mere mechanist, and that the higher man's freedom of will is exalted, so much higher is God elevated as the sovereign ruler of the universe.

3. **Imputation of Adam's Sin.**—Calvinism affirms that Adam's posterity are guilty of Adam's sin, and justly punishable therefor without a remedy. Arminians hold that this doctrine contravenes every principle of right and justice; that guilt can rightly be attributed only to the actual wrongdoer, and for deeds actually performed by him.

4. **Reprobation.**—Calvinism affirms that while God has graciously provided a means for the remission of the penalty for sin, whether imputed or actual, he yet "passes by" a large portion of the human race, confining his grace to the elect, and this merely at his own good pleasure. Arminians hold that such a proceeding is wrong and unjust, but that election and reprobation are conditioned upon the voluntary acts of the subjects.

5. **Necessity.**—Calvinism holds that all choice is governed by "the strongest motive;" so that a man cannot, under given circumstances, choose otherwise than he actually does choose. Arminians reply that if a man cannot will otherwise than he does will, there is no justice in requiring of him a different volition.

6. **Infant Damnation.**—Calvinism necessarily maintains, according to Arminians, that as infants are guilty of Adam's sin, they may be justly eternally punished therefor, even though they may never themselves have performed any moral act. Arminians hold that all infants who die before volition will be saved.

7. **Pagan Damnation.**—Calvinism affirms that pagans, who have never even heard of Chr., are rightly damned for want of faith in him. Arminians hold that no one is damned who has not had a full chance for salvation; believing that there are many pagans who have been and who will be saved; and trust that, in the great result, a vast majority of the human race will be found among the saved.

8. **Doctrines of Grace.**—Calvinism affirms that the death of Chr. is an expiation for man's sin, whether actual or imputed, so that it is possible for God to forgive through grace, but that this grace is reserved for the elect only. Arminians, while holding that salvation is by grace, also hold that this grace is offered to all, in such a way that grace and the opportunity for salvation are given to every man; but that this grace, so far from being irresistible, is accepted, if at all, with the full power of rejection.

9. **Justifying and Saving Faith.**—Calvinism affirms that faith is an acceptance of Chr. wrought absolutely as an act of creation in the man, so that one of the elect can no more help believing than an infant can help being born; and that this faith is so resistlessly enforced that the elect must of necessity persevere to the end. Arminians hold that although faith is the gift of God, it is yet a gift that may be re-

jected; that it is a voluntary act, whereby the individual surrenders to Chr. for time and for eternity. But as this faith was rejectable in the beginning, it so continues to the end; so that the believer is as able to renounce his faith and apostatize at any time as he was to reject it at first.

10. **Extent of the Atonement.**—Calvinism, in its earlier forms of presentation, affirmed that Chr. died for the elect alone. In its later form of statement it affirms that Chr. died for all, and so salvation is offered to all upon the condition of faith; still, however, maintaining that this gift of saving faith is vouchsafed only to the elect. Arminians maintain that this is a distinction without a real difference. They ask, How can this atonement be said to be for all when it is foreordained by God that a large part of mankind shall be excluded from its benefits? How can it be for all when none have the power to accept it except by efficacious grace, which grace is predeterminately withheld from a large part? How can it be for all when God has so constituted the human being that he can only will in accordance with the strongest motive, and has so arranged the chain of motives that this ultimate strongest motive compels a great part of mankind to reject the atonement nominally provided for them?

11. **Extent of the Offers of Salvation.**—Calvinism, in the view of Arminians, limits the offers of salvation to the elect. They ask, How can salvation be rightly said to be offered to those whom God has by eternal and immutable decree excluded from the possibility of salvation? By what right can a preacher exhort those men to repent, whom, as he believes, God has determined shall not repent? Of what use, moreover, to exhort those men to repent, who, as he believes, must of necessity repent? What right has he to exhort men to do otherwise than God has foreordained that they shall do? If God has decreed a thing, is not that thing right? If a man does as God decrees, ought he not to be approved by God, and saved? They argue that Calvinism, carried to its logical result, ends in Universalism, thus: Since all men do as God decrees, determines, and wills that they shall do, ought not all men to be saved?

12. **Analogy of Temporal Superiorities.**—Calvinism argues that as in this life God rightly distributes temporal good—such as health, wealth, physical power, and intellectual capacity—arbitrarily and as an absolute sovereign, so he may alike arbitrarily bestow upon one person faith and life everlasting, and devolve upon another unbelief and eternal death. To which Arminians reply, that the analogy demonstrates the very reverse. In this probationary life advantages and disadvantages are professedly distributed without regard to judicial rectitude. Men are not here rewarded or punished according to their works or voluntary character. And herein lies the very difference between the dispensation in this world and that of the kingdom of God, where blessedness is placed at every man's choice, and the result is judicially according to voluntary faith and works.

13. **Basis of Morality.**—Calvinism maintains that its system tends to produce a profound piety. Arminians reply that it misses the true ideal of piety; making God to will and predetermine the sin, and then damn the sinner; making him impute guilt to the innocent, and so damn the innocent as guilty—acts which they declare to be fundamentally unrighteous. Calvinism, in the view of Arminians, makes God intrinsically and absolutely bad, and then requires us to ascribe holiness and goodness to him. It makes him something which we are bound to abhor, and then requires us to love and adore him.

History of A.—Arminians maintain that their doctrines are those held by the entire primitive ch. up to the 4th century, when Pelagianism made its appearance, in opposition to which Augustine set up his dogma of predestination; that both Pelagianism and Augustinism were heresies, both inventing dogmas never before recognized in the Ch.; that, upon the whole, even the W. Ch. never became Augustinian, while the E. Ch., where the lang. of the N. T. was vernacular, all inherited and still retain the essential features of A. But it so came to pass that at the period of the Ref. the great leaders of that movement, from one reason or another, adopted the Augustinian theory, and in some cases exaggerated it into the system generally denominated Calvinism, which in the circumstances of the times came to be predominant, and, mainly for political reasons, undertook to suppress A., especially in Hol.

A. proper and Protestantism came into recognized existence just before and during the severe persecution which Arminius and his followers underwent in Hol., especially after the decision of the Calvinistic Synod of Dort. Wesleyan Methodism is the more modern development of A. Beginning most humbly as the half-unconscious awakening of a new devotional feeling, it quickened the religious life of the Prot. world, and has gathered, it is said, 12,000,000 worshippers into its fold throughout the world. The theological doctrines of Wesley are almost identical in substance and statement with those of Arminius. But the Meths. form only a small part of those who may properly be styled Arminians. If all the evangelic church were to be divided into two classes upon this subject, probably one half might properly be styled Arminians, and one half Calvinists. (See CALVINISM AND METHODISM.) (See WILBUR FISK'S *Calvinistic Controversy* and WHEDON'S *Freedom of the Will*.) [From orig. art. in *J. S. Unit. Cyclopedia*, by D. D. WHEDON, D. D., LL. D.]

Armin'ius, JAMES (originally JACOBUS HERMANS), a Dut. theol., b. at Oudewater, Hol., 1560. When he was 15 his native town was sacked by the Spaniards, and all his family were massacred. His early promise was so great that the people of Marburg, where he had studied, sent him to the Univ. of Leyden, where he studied 6 yrs. with such success that the city of Amsterdam adopted him as its foster-child, he binding himself to be at the command of the city during life. He studied at Geneva and Bale, visited It., and returned to Amsterdam, where he was installed minister at the age of 28. Soon after, a book against Calvinism was put forth.

which A. undertook to answer, but in doing this he became a convert to the doctrine which he had intended to refute, and in time formulated the system called ARMINIANISM (which see). In 1663 he was made prof. of theol. in the Univ. of Leyden. Violent disputes followed, in which politics and theol. were intermixed. The Calvinists or "Gomarists," as they were called from their theological leader, gained the upper hand, and A. was harassed by the clergy, and his pupils were excluded from the ministry; but he retained the support of most of the laity and magistracy. (D. Oct. 19, 1669. *From orig. act. in J. S. Univ. Cyc.*, by D. D. WHEATON, D. D., L.L.D.)

Armitage (THOMAS), D. D., b. at Pontefract, Eng., Aug. 2, 1819, and became in his youth a Meth. preacher. In 1838 he came to N. Y., and entered the ministry of the M. E. Ch. In 1848 he became a Bap. He warmly advocated the movement for Bible revision, which led in 1850 to the formation of the Amer. Bible U., of which organization he became the pres.

Armitage (WILLIAM EDMOND), D. D., a bp. of the P. E. Ch., b. in N. Y. city Sept. 6, 1830; grad. at Columbia Coll. in 1849, and at the Gen. Theol. Sem. in 1852, and became a rector of the Epis. Ch. In 1866 he was appointed assistant bp. of Wis., and in 1870 bp. of that diocese. D. Dec. 7, 1873.

Armor (Lat. *armaturæ*), the defensive covering or coat-of-mail worn by a soldier; the apparatus which in former times men used for personal defence in war, and was often called *harness*. Since the invention of gunpowder, A. has fallen into disuse. The principal parts of the anc. A. were the helmet, breastplate, and shield. The term is also applied to iron-plate covering applied to modern war-vessels and fortifications.

Arms (Lat. *arma*), weapons of war; offensive weapons or instruments, which are divisible into two great classes—firearms, and A. which are used without gunpowder or any explosive substance. (See FIREARMS.)

Arms, or Armorial Bearings, the name given in heraldry to devices borne on shields; ensigns armorial. Hereditary A. were scarcely used by private families before the beginning of the 13th century, after which they became very general.

Armstrong (JAMES), U. S. N., b. at Shelbyville, Ky., Jan. 17, 1794, entered the navy as a midpn. in 1809, was captured by the Brit. while serving in the Frolic in 1814, received the regular promotions, becoming capt. in 1841, commanding the E. I. squadron 1855-58, and captured the Barrier fts. in the Canton River in 1857. Jan. 12, 1861, he was compelled to surrender Pensacola navy-yard to the Confeds. He became a com. in 1866. D. Aug. 27, 1868.

Armstrong (JOHN), a gen., b. at Carlisle, Pa., Nov. 25, 1758. He served in the Revolutionary war with the rank of major, and was the author of the anonymous *Newburg Addresses*, written in Mar. 1783 in order to obtain from Cong. a payment due to the officers of the army. Was an M. C.; was sent as a minister to Fr. in 1804, and was appointed sec. of war in Jan. 1813. He was censured because he failed to defend Wash. in 1814, and resigned in Sept. of that year. D. Apr. 1, 1843.

Armstrong (JOHN), M. D., b. in Durham co., Eng., in 1784, grad. as M. D. in the Univ. of Edinburgh in 1807. In 1816 he pub. a work on *Typhus Fever*. He removed in 1818 to Lond., where he practised and lectured with great success. D. Dec. 12, 1829.

Armstrong (JOHN), a native of Pa., commanded in 1756 an expedition against the Indian allies of the Fr. at Kittanning, served as brig.-gen. in the Revolutionary army at Ft. Moultrie, and commanded the militia at Brandywine and Germantown; was an M. C. D. Mar. 9, 1795.

Armstrong (RICHARD), D. D., b. in Northumberland co., Pa., in 1805, grad. at Dickinson Coll. in 1827, studied theol. at Princeton, and went in 1832 as a missionary to the S. I., where he served as minister of instruction, privy councillor, and pres. of the board of education. D. Sept. 23, 1860.

Armstrong (SIR WILLIAM GEORGE), F. R. S., LL.D., D. C. L., b. at Newcastle-upon-Tyne in 1810, became proprietor of an establishment for the manufacture of hydraulic cranes, engines, and bridges. Invented, in 1854, a wrought-iron rifled cannon, which bears his name. (See ARTILLERY.)

Armstrong (WILLIAM JESSUP), D. D., b. at Mendham, N. J., Oct. 29, 1796; was a Presb. pastor in Richmond, Va., from 1824 to 1834, when he became sec. of the A. B. C. F. M. D. Nov. 27, 1846.

Army [Fr. *armée*, "armed men"], a large body of men armed, equipped, and organized under suitable officers for military purposes. Nearly every nation maintains a large A., somewhat, though not entirely, proportioned to its pop. The following, from the *Amer. Almanac* for 1884, compiled from official sources, gives the present numbers of the A. of the prin. military nations of the world, upon a "war-footing" and a "peace-footing": Aus.-Hungary, peace-footing 269,190, war-f. 1,125,835; Belg., peace-f. 46,383, war-f. 165,877; Chi., peace-f. 300,000, war-f. 1,000,000; Egypt, peace-f. 15,000, war-f. 43,000; Fr., peace-f. 502,764, war-f. 3,753,164; Ger., peace-f. 445,702, war-f. 1,492,674; G. Brit., peace-f. 137,626, war-f. 570,906, besides which are the forces in India, peace-f. 189,597, war-f. 380,000—in all, peace-f. 321,295, war-f. 957,906; It., peace-f. 786,502, war-f. 1,718,933; Netherlands, peace-f. 65,113, war-f. 163,098; Per., peace-f. 57,600, war-f. 108,500; Roumania, peace-f. 170,817, war-f. 200,000; Rus., peace-f. 974,700, war-f. 2,733,505; Servia, peace-f. 50,000, war-f. 265,000; Sp., peace-f. 430,000, war-f. 450,000; Swe., peace-f. 41,280, war-f. 202,783; Switz., peace-f. 117,500, war-f. 210,495; Tur., peace-f. 350,000, war-f. 610,300; U. S., peace-f. 25,745, war-f. (including the militia) 3,165,000.

Army-Worm, in the N. States the larva or grub of a night-flying moth (*Leuca nia unipuncta*). It varies considerably in color and size with age and locality, but its markings are characteristic. It is usually from less than an inch to an inch and three quarters in length; dark gray, with 3 narrow yellowish stripes above, and a broader one

of nearly the same color on each side; thinly clothed with short hairs, especially about the head, which is of a dull yellow color. The ravages of these worms, which sometimes march over grain-fields in great numbers, are best prevented by ploughing a double furrow around or across the field on which they are moving. Then they may be killed by setting fire to straw in the furrows or by turning pigs and fowls (after removal of the crop) into the field. Crows and blackbirds will also destroy them rapidly.

Arnaldo, or Arnold of Brescia, an It. reformer, b. at Brescia about 1105. He was a pupil of Abelard, and adopted the monastic life. He reformed the prevalent corruptions of the clergy, and affirmed that they ought not to possess temporal power or property. The second Council of the Lateran, in 1139, banished him from It. He retired first to Fr. and next to Switz., where he gained many adherents. In the mean time there was formed in Rome a party which favored the principles of A.; it rose, in 1143, against the pope, who was driven out of the city. A. in 1146 returned to Rome and endeavored to organize a republic. A reaction ensued, and Pope Adrian IV. reduced the Romans to submission by laying the city under an interdict in 1154. A. was arrested by the aid of the emp. Frederick Barbarossa, and was hanged in 1155.

Arnatto. See ANNOTTO.

Arnaut, ar-nó' (HENRI), a pastor of the Waldenses, b. in Piedmont in 1641. He commanded the Waldenses, who in 1689 defeated the Fr. in several actions, and recovered their native valleys, from which they had been driven by persecution, and afterward served as col. in the allied army during the war of the succession, 1702-13. D. 1721.

Arnauld, formerly written **Arnaud** (ANTOINE), sur-named L'Avocat, b. in Paris in 1560, was the most eloquent Fr. advocate of his time, and distinguished by his probity. His most memorable performance was his defence of the Univ. of Paris against the Jesuits in 1594. He was the father of the eminent Arnaulds of Pt. Royal. D. 1619.

Arnauld (ANTOINE), called LE GRAND ARNAULD, a Jansenist theol. and philos., a son of the preceding, b. in Paris on the 6th of Feb. 1612. He was educated in the Sorbonne, and ordained a priest in 1641. He became a Dr. of the Sorbonne in 1641, and engaged in the controversy between Jansenius and his opponents on the subject of grace. Having retired to Pt. Royal, a convent near Paris, he passed there many yrs. in seclusion, and wrote numerous works on theol. and philos. He was expelled from the Society of the Sorbonne in 1656, after which the Jansenists were generally proscribed and persecuted, both by the civil and ecclesiastical powers. To escape the persecution which the Jesuits instigated, he became an exile in 1679, and passed the remainder of his life in Flanders and Hol. D. Aug. 8, 1694.

Arnauld d'Andilly (ROBERT), b. in Paris in 1589, was a brother of Antoine A. (1612-94), and the father of Angélique (de Saint-Jean). He was appointed intendant of the army in 1634, and retired to the monastery of Pt. Royal about 1645. D. Sept. 27, 1674.

Arnold, arnt (ERNEST MORITZ), a Ger. patriot and popular political writer, b. in the island of Rügen Dec. 26, 1769, was appointed prof. of hist. at Greifswalde in 1806. He animated the Gers. to resistance against Nap., and promoted the patriotic cause by poems and prose-writings. His national song, *What is the German's Fatherland?* is, perhaps, the most popular of all the patriotic songs of Ger. In 1818 he was appointed prof. of hist. at the Univ. of Bonn; was suspended in 1819, but restored in 1840. He was a member of the national assembly which met at Frankfurt in 1848, but he seceded with the constitutional party in 1849. D. 1860.

Arne (THOMAS AUGUSTINE), Mus. Dr., b. in Lond. May 28, 1710, was a skilful performer on the violin. He set to music Addison's *Rosamond* in 1731, and composed the music for Milton's *Comus* 1738. This formed an era in hist. of Eng. music. He composed the national air *Rule Britannia*, and excelled especially as a composer of songs. D. Mar. 5, 1778. His sister Susanna was a noted performer.

Arnee, or Arna (*Bos Arnee*), a large animal of the family *Bovidae*, a native of India, is nearly allied to the ox, and congeneric. It is larger than an ox, and in the full-grown animal one of the horns measures sometimes more than 6 ft. in length.

Arnica [from the Gr. *ἀρνός*, a "lamb," on account of the softness of its leaf], a genus of herbs of the order Compositæ, sub-order Tubulifloræ. The flowers of the ray are pistillate and ligulate, those of the disk hermaphrodite and tubular. The receptacle is naked, the pappus bristly. The root, leaves, and flowers of *A. montana*, or leopard's bane of Europe, are poisonous when swallowed, and are even irritant to the skin, but are administered as a stimulant in paralytic affections, fevers, and other diseases. They are also applied with benefit to bruises. They contain a volatile oil, a resin, and an alkaloid, arnicine.

Arno [Lat. *Arnus*], a river of It., which rises in the Apennines, and after a course of 150 m. falls into the sea 7 m. below Pisa, which city, like Florence, is intersected by this stream. Its valley (Val d'A.) is one of the most beautiful regions in It.

Arnobius (AFER), an Afr. rhetorician, b. probably near Carthage. He flourished about 300 A. D. Having been converted to Christianity, he wrote an eloquent work called *Disputationes contra Gentes*, in which he exposes the absurdities of Paganism.

Arnold (ALBERT NICHOLAS), D. D., b. at Cranston, R. I., Feb. 12, 1814, grad. at Brown Univ. 1838, and Newton Theol. Inst. 1841; ordained pastor of the Bap. ch. at Newburyport, Mass., Sept. 14, 1841; missionary to Gr.: prof. of ch. hist. in Newton Theol. Inst.; pastor at Westborough, Mass.; prof. of biblical interpretation and pastoral theol. in Hamilton (N. Y.) Theol. Sem.; prof. of N. T. Gr. in the Bap. U. Theol. Sem. at Chicago, and author of *Prerequisites to Communion*, 1860, and *One Woman's Mission*, 1871. D. Oct. 11, 1883.

Arnold (BENEDICT), traitor, was b. at Norwich, Conn.,

Jan. 3, 1740. He was apprenticed to an apothecary, from whom he ran away and enlisted in the army, but soon deserted. In his boyhood he was noted for his audacity and unruly disposition. He became a merchant at New Haven, where he failed in business, incurring a suspicion of fraudulent dealing. Soon after the war broke out, in Apr. 1775, he became a col. in the service of Mass., and commanded a force sent to capture Que. At the St. Lawrence River he effected a junction with Gen. Montgomery, who had the chief command. They attacked Que. in Dec. 1775, but failed to take it. He was raised to the rank of brig.-gen. for his service in this campaign, and commanded a small flotilla which encountered a superior force on Lake Champlain, Oct. 11, 1776. In 1777 he was appointed a maj.-gen. He took part in the battle of Bemus Heights, Sept. 19, 1777. At the battle of Stillwater, Oct. 7, he entered the field without permission from Gates, and rushed into the hottest part of the action, acting like a madman. In June 1778 he was appointed to the command of Phila., where he lived in an extravagant style and ran into debt. His official acts here were so rapacious that a court-martial sentenced him (Jan. 1780) to be reprimanded by the gen.-in-chief. Before this date he had made overtures to the enemy. He now solicited and obtained (in Aug. 1780) command of W. Pt., which he offered to betray into the possession of Sir Henry Clinton. A. and Major André, the agent of the Brit. gen., had an interview on the 21st of Sept., and made the final arrangements for the surrender of W. Pt., but in consequence of the capture of André, Sept. 23, 1780, the plot was detected, but A. escaped in the Brit. sloop Vulture Sept. 25. Having joined the Brit. army and issued an address to the Amer. people in vindication of his course, he obtained command of an expedition against Va., which sailed from N. Y. in Dec. 1780, passed up the James River, and burned and pillaged a considerable amount of property. He went to Eng. about the end of the war, where he was generally despised and shunned. D. in Lond. June 14, 1801.

Arnold (EDWIN). See APPENDIX.

Arnold (ISAAC N.), b. in Otsego co., N. Y., in 1815, called to the bar in 1835, went to Chicago in 1836; M. C. from Ill. 1861-65, 6th auditor of the U. S. treas. 1865-66. Wrote *Life of Abraham Lincoln*. D. April 24, 1884.

Arnold (DR. JONATHAN), b. at Providence, R. I., Dec. 14, 1741, brought forward in the colonial assembly in 1776 a bill repealing the oath of allegiance to G. Brit.; was a surgeon in the Revolution, an M. C. 1782-84. Removing to Vt., became a judge of the Orange co. court. D. Feb. 2, 1798.

Arnold (MATTHEW), LL.D., an Eng. author, a son of Thomas Arnold of Rugby, b. at Laleham, Dec. 24, 1822. A fellow of Oriel Coll. in 1845. In 1847 private sec. to Lord Lansdowne. Prof. of poetry at Ox. in 1857. Published many critical and philosophical works.

Arnold of Brescia. See ARNALDO.

Arnold (PELEG), delegate to Cong. from R. I. 1787-88, then chief-justice of supreme court of R. I. D. Feb. 13, 1820.

Arnold (SAMUEL), Mus. Dr., b. in Lond. Aug. 10, 1740, became composer to the Covent Garden theatre about 1762; was author of several successful operas, and in 1783 was appointed organist to the king. His *Cathedral Music* is still popular. D. Oct. 22, 1802.

Arnold (SAMUEL GREENE), b. at Providence, R. I., Apr. 12, 1821, grad. at Brown Univ. in 1841, and at Cambridge Law School in 1845; was lieut.-gov. of R. I., pub. a *Hist. of R. I.*, served as a volunteer in the c. war, became U. S. Senator in 1863. D. Feb. 13, 1880.

Arnold (THOMAS), D. D., an Eng. teacher and historian, b. in the Isle of Wight June 13, 1795; entered the Univ. of Ox. in 1811, grad. in 1814, became a fellow of Oriel Coll. in 1815. He gained the chancellor's prize for Lat. and Eng. essays in 1815 and 1817. In 1828 he was ordained a priest, and became head-master of Rugby School, which he conducted with eminent wisdom and decided success. He cultivated among the students a sense of duty and a high moral and religious tone, and enforced by his example and personal qualities the influence of Chr. principles. He was a Whig or Liberal in politics, and a strenuous opponent of the High Ch. and new school of theol. represented by Pusey. He would not recognize in the clergy any peculiar sacredness or any trace of mediatorial function. His capital work is a *Hist. of Rome*, which he did not live to finish. He was made Regius prof. of modern hist. at Ox. in 1841. D. June 12, 1842.

Arnold (THOMAS KERCHER), an Eng. clergyman, b. in 1800. He pub. manuals for the Gr., Lat., Fr., and Ger. langs. D. Mar. 9, 1853.

Arnott (NEIL), M. D., F. R. S., b. in 1788, near Montrose, Scot., ed. at Aberdeen and Lond.; became a surgeon; settled in Lond. in 1811, as a phys. Wrote *Survey of Human Progress*, and was a benefactor of insts. of learning and an inventor. D. Mar. 2, 1874.

Arnotto. See ANNOTTO.

Arnulf [Lat. *Arnulfus*], emp. of Ger. son of Carloman of Bavaria, grandson of Charlemagne. A. was elected king of Ger. 897 A. D., invaded It. about 894, and captured Rome in 896. Was crowned emp. by the pope at Rome. D. 899.

Aromatic Vin'egar is a compound or mixture of ordinary V. with A. essential oils, and is a powerful perfume.

Arpád, the national hero of Hungary and the chief of the Magyars, who in 899 A. D. migrated from Galicia and conquered the Slavonic people of Croatia and Transylvania. He is called the founder of the kingdom of Hungary. D. 907 A. D.

Ar'quebus, Arquebuse, or Harquebus, a hand-gun used by infantry before the invention of the musket. It was originally discharged by a match applied to the touchhole. It was at first so heavy that it had to be supported on a forked rest planted in the ground.

Arauca'cha, the native name of an umbelliferous S. Amer. plant (*A. esculenta*). It is indigenous in Colombia and neighboring countries, and is cultivated for its roots, which are large and sweet and are eaten after being boiled

or roasted. The taste is described as between that of a parsnip and a sweet chestnut. This plant was recommended as a substitute for the potato, and attempts were made to cultivate it in Eng., but that climate was found to be unfavorable.

Ar'rack, or Rack, a liquor distilled from fermented rice, a common intoxicating drink in Oriental countries. Also a strong drink obtained from the fermented sap of the palm tree, and often called palm wine or toddy.

Arrest' [Old Fr.], the apprehension or seizure of a person by lawful authority, usually by the command or direction of some court or officer of justice. It may take place either in civil or criminal cases.

1. *In Civil Cases*.—In this instance it may be either on *mesne* or final process. The object of the first is to make it certain that the defendant will answer the order of the court. He may either remain in custody or give bail, according to the rules of practice, as security for his appearance. On final process the A. is in the nature of an execution. The defendant is to be kept in confinement, either in jail or within prescribed limits, until the judgment is satisfied, or until he is discharged by order of the court. There are certain persons privileged from A. by rules of general prevalence, such as members of legislatures, or witnesses while attending the sessions of the legislature or courts, and while going to and returning from the same. This privilege is secured to members of Cong. by the U. S. const. An original A. cannot be made on Sunday, nor is it lawful to break into a house for this purpose, owing to the legal rule that "a man's house is his castle."

2. *In Criminal Cases*.—The power to arrest in this class of cases is much less restricted. None are privileged (except ambassadors and their servants), outer doors may be broken open, Sunday is not regarded, and a warrant is not in all cases essential. Such an A. is made either under a warrant, or by an officer without a warrant, or by a private person without a warrant. A warrant is granted by a magistrate on information in writing supported by oath, and is executed by the person to whom it is addressed, usually a sheriff or constable. An A. may be made without a warrant by a peace officer, such as a sheriff or constable, when a felony or breach of the peace is committed in his presence, or where a felony has been committed, or he has reasonable ground to suspect that it has been, though not in his presence, and he has also reasonable ground to suspect the party arrested. The right of a private person to make an A. without a warrant is much more restricted. He must be prepared to show that a felony has been *actually* committed, as well as reasonable grounds of suspicion that the party arrested was the wrong-doer. In making an A., necessary force may be used, and in case of felony even life may be taken where A. is enjoined.

The word A. is also used in law in connection with judgment. This means that judgment is not to be entered, although a verdict has been given, on account of some reason appearing upon the record, as where the allegations in the pleadings are not a sufficient basis for an action.

T. W. DWIGHT.

Arrhida'us (PHILIP), an illegitimate son of Philip II. of Macedon. He accompanied his half-brother Alexander the Great during his Asiatic campaigns, upon whose death he was proclaimed king by the army. Although an imbecile, A. married Eurydice, half-sister to himself and Alexander, an able and ambitious woman, who aimed at dominion by getting rid of the family and gens. of Alexander. After the death of Antipater (319 B. C.), she collected an army to assail Polysperchon, with whom was Olympia, mother of Alexander, against whom the troops of Eurydice would not fight. She, with her husband, was made prisoner, and offered the choice of dying by the sword, the rope, or poison. Eurydice compelled A. to drink the poison, and then hanged herself 317 B. C.

Arrian [Gr. Ἀρριανός; Lat. *Arrianus Flav'ius*], a distinguished Gr. historian, b. at Nicomedia, in Bithynia, about 100 A. D., was a pupil and friend of Epictetus. He was a Stoic in philos., edited his master's *Manual of Ethics* (*Enchiridion*), and wrote the *Lectures of Epictetus* in 8 books, of which 4 are now extant. In 136 A. D. he was appointed gov. of Cappadocia by Hadrian. He chose Xenophon as his model in composition. His most important work is a *History of the Expedition of Alexander the Great*, Ἀλεξάνδρου Ἀλεξάνδρου (The Ascent of Alexander), which is the chief authority on that subject. Among his extant works is *Indica*.

Arro'ba, a Sp. weight and measure, used also in Brazil and the Sp. colonies. There are 10 kinds of A. for weight, ranging between 21⁸²/₁₀₀ lbs. avoirdupois and 32⁵²/₁₀₀ lbs. avoirdupois. Only 2 of the number are as great as 28 lbs. There are 11 kinds of A. for liquid measure, ranging from 2²/₁₀₀ gals. to 9¹/₁₀₀ gals.

Arrow-root, the starch or fecula from the root of the *Maranta arundinacea* and other species of *Maranta*. It is much esteemed as an easily digestible diet for infants and invalids. Large quantities of it are imported into the U. S. and Europe from Bermuda and Jamaica, where it is cultivated. It is also raised in Ga. and Fla. The roots, or rather rhizomes, yield about 25 per cent. of this starch, which is in the form of a light, opaque white powder. It is often adulterated with potato-starch and other substances. In preparing A., the rhizomes of the plant, when a yr. old, are washed, carefully peeled, and beaten in a wooden mortar or by a mill or wheel-rasp to a milky pulp. The pulp is then diluted with water, passed through a sieve of coarse cloth or hair to separate the fibres, and the starch is allowed to settle. Albumen and salts are held in solution, while the starch settles down as an insoluble powder, which is finally dried in the sun.

The prepared A. is almost pure starch. It has a peculiar firm feel between the fingers, and when rubbed produces a peculiar crackling sound, like that of dry snow in very cold weather. Like starch from other sources, it is insoluble in

cold water, but forms on boiling a gelatinous solution. For use, A. should be rubbed to a paste with a little cold water, and while this is stirred a considerable quantity of boiling water should be added. It may be sweetened with sugar and flavored with lemon-juice or with wines and spices. For infants it may be prepared with milk. A table-spoonful is sufficient for a pint of water or milk. C. F. CHANDLER.

Arsaces I. (Gr. Ἀρσάκης), founder of the Arsacide and of the kingdom of Parthia, lived about 250 B. C. He is said to have been the chief of a nomadic tribe of Scythians or Bactrians. His successors assumed the name of Arsaces.

Arsaces III., king of Armenia, was a son of Tiridates III, whom he succeeded about 340 A. D. He waged war against Sapor, king of Pers., and formed an alliance with Julian the Apostate about 360.

Arsaces VI., or **Mithridates I.**, king of Parthia, conquered Bactria and extended his conquests to the Indus. In 138 B. C. he defeated Demetrius Nicator of Syria. D. about 135 B. C.

Arsacide, ar-sas'e-dē, the name of a dynasty of Parthian kings founded 250 B. C., and continued until 226 A. D. Artabanus IV. (Arsaces XXIX.) was the last.

Arsenals, public establishments designed for the manufacture and storage of arms and military equipments. The name is derived from the Latin *ars*, applied to the citadel or central tower of a fortified place, as the part best capable of defence. This became the storehouse for spare arms and warlike material, and hence like depositories were called A.

Weapons of war used more than 1700 yrs. before the Chr. era are known to us from sculptures upon old monuments and from arms found in catacombs and tombs of that period.

It was near the close of the 17th century before all the nations of Europe were supplied with firearms which could be handled with facility and aimed from the shoulder. At this period the Dut., Sp., Fr., and Eng. were the most efficient in war; soon Prus. became distinguished in discipline and organization, and Fr. surpassed others in systematizing its military manufactures and improving its weapons. Each nation sought by drill in the field and skill in the workshop to devise and adopt a special system of military organization and of war-material. The Fr., Prus., Spaniards, and Eng. established A., armories, foundries, and powder-works, many of which have been improved and extended to our day.

At the time of the Revolutionary war the U. S. had few arms and no armories or A. The arms used at first were gathered from citizens; soon after, supplies were obtained by purchase in Fr. The earliest manufacture of war-material mentioned is that of powder in Va. in 1776. Springfield (Mass.) was selected by Gen. Washington as a site for a foundry and laboratory in 1777, and supplies were sent from there to Gen. Schuyler's army in W. N. Y. in July of that yr. Brass cannon (chiefly howitzers) were cast in Phila. in 1777 (some of which are now at Watervliet A.), and an A. was established about this yr. in Carlisle, Pa. Small-arms were manufactured at Springfield Armory prior to 1787. An armory was commenced at Harper's Ferry (Va.) in 1795, and "three or four additional A. and magazines" authorized by Cong. at the same time, and others in 1808.

During the war of 1812 small-arms were procured from Springfield and Harper's Ferry, and other ordnance stores, by purchase in the country, or manufacture at the A. After that war, with the policy apparently of having U. S. arsenals in each State, several more were authorized, so that in 1847 there were 2 armories and 17 A. in operation. Of the A., 5 were "A. of construction," and the others "A. for repairs and deposit."

In 1838 Cong. authorized a new organization of the Ordnance Corps, and in 1842 placed the armories (previously under civil superintendence) under the charge of its officers. The advantages of the change were soon apparent in the publication of a regular *System of Construction, with Drawings*, and the *Ordnance Manual*, descriptive of the material and dimensions for every article of war-material, and the adoption of patterns which proved efficient and satisfactory during our next war. The siege and field guns, carriages and mortars, percussion-primers for cannon, and harness of U. S. models, used in Mex. *the first time in war*, differed in important details from other systems. The mortar-firing and siege-equipage were especially satisfactory. The advantage of the U. S. system of small-arms (made chiefly by machinery, and of interchangeable parts) was very great. They were promptly repaired in the field, using spare parts ready fitted. The arms, as well as other articles of equipment in the hands of the troops, were kept in serviceable order by ordnance soldiers, who, serving siege-guns in action, also opened shops after each day's halt, and established an active A. at the citadel of Mex. during the occupation of the city, where many supplies were manufactured as well as repaired.

In 1860 there were 23 A. and armories, and during the c. war 9 of the N. and W. A. were enlarged and employed as "A. of construction," and the working capacity of the Springfield Armory was extended to complete 1000 muskets per day. There are now 35 arsenals, many of them not used. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. P. V. HAGNER.]

Arsenic [Lat. *arsenicum*, from the Gr. ἄρσεν, "masculine," "strong," so named on account of its power as a poison], the common name of arsenious acid or white oxide of A., a virulent poison. The name A. is limited in scientific lang. to the metal. A. is found native to a limited extent, but occurs usually in combination with metals or with sulphur, or both. The most important arsenical minerals are those in which A. is combined with iron, cobalt, and nickel. A. also occurs in small quantities in many other minerals, specially in antimony ores, iron pyrites, etc., hematite iron ores, the soil, mineral waters, etc. A. is in fact one of the most widely diffused elements in nature.

Owing to its occurrence in antimony ores and iron pyrites, it is liable to find its way into the various preparations of antimony, into sulphuric acid, and the various chemical

products of which this acid is the basis, as sodic sulphate and carbonate, hydrochloric acid, superphosphates, etc. In the chemical examination of the bodies of persons supposed to have been poisoned, the greatest care is necessary to procure reagents entirely free from A.

Metallic A. is prepared by sublimation—(1) from arsenical pyrites; (2) from a mixture of arsenious acid and charcoal. It is a brittle metal of a steel-gray color. On the fresh fracture it exhibits a bright metallic lustre, which soon tarnishes. Its specific gravity varies from 5.62 to 5.96. Its atomic weight is 75. Its vapor density is 10.3995 (air = 1) or 150 (hydrogen = 1); this is double the atomic weight. Hence the atomic volume is anomalous, being only half that of hydrogen. It crystallizes in rhombohedra. It volatilizes at a dull red heat without previous fusion, with a peculiar odor, described as resembling that of garlic. When heated in the open air it burns with a bluish flame.

A. belongs to the group of elements which includes nitrogen, antimony, and phosphorus.

Metallic A. is rarely used in the arts. Lead containing a small proportion of A. is used for the manufacture of shot, and iron containing a little A. is very fluid when melted, and better adapted for fine castings for which strength is not essential. (For further information, see ARSENIC, ARSENIC OXIDE, and ARSENIOUS OXIDE, in *J.'s Univ. Cyc.*)

C. F. CHANDLER.

Arsinoë, ar-sin'o-e, an Egyptian princess, was a daughter of Ptolemy Auletes, and a sister of Cleopatra. Caesar (48 B. C.) took her as a captive to Rome, but soon released her. Assassinated by Mark Antony in 41 B. C.

Arsinoë, an anc. city of Egypt, near Lake Mœris, about 50 m. S. S. W. of Cairo. It was originally called Crocodiopolis ("the city of crocodiles"). Ptolemy Philadelphus gave it the name of A. in honor of his queen.—A. was the name of another city of Egypt, on the Red Sea, near the modern Suez.

Ar'son [from the Lat. *ardeo*, *arsum*, to "burn"], the wilful and malicious burning of the house of another. There must be an actual burning—an unexecuted attempt to fire a house does not constitute the offence. If the act be negligent instead of wilful, the crime is not committed, and the wrong-doer is only liable to a civil action. The Eng. law on this subject has been modified in this country. A. is in some instances divided into degrees, and cases included in it which were not offences at common law. It is sometimes made a crime by statute to set fire to one's own house with intent to injure another—as, for example, to defraud insurers. The punishment of A. is severe, and in some of its degrees capital.

Artaphernes [Gr. Ἀρταφέρνης], a Per. satrap and a half-brother of King Darius Hystaspis; satrap of the W. part of Asia Minor in 506 B. C. Restored Hippias, who had been expelled from Athens. About 488 B. C. he subdued the Ionians, who had revolted against the king of Per.

Artaphernes, son of the preceding, was associated with Datis in the command of the Per. army which invaded Gr. in 490 B. C., and was defeated at Marathon.

Artaxerxes (ar-taks-erks'ez), LONGIMANUS [Gr. Ἀρταξέρξης Μακρόχειρ; Per. *Artashēr Dādāzāb*], a king of Per., was a son of Xerxes I., whom he succeeded in 465 B. C. He was called Longimanus ("long-handed") because his right hand was longer than his left. He subdued a revolt of the Egyptians about 455 B. C.; in 449 his forces were defeated near Salamis by the Athenians. D. 425 B. C.

Artaxerxes II., surnamed ΜΝΕΜΟΝ, because he had a good memory, was the eldest son of Darius II. of Per. He became king in 405 B. C. His younger brother, Cyrus, who was gov. of Asia Minor, revolted and raised a large army, in which were 10,000 Grs. The king, commanding in person, defeated this army at Cunaxa in 401. Cyrus was killed. Then followed the famous retreat of the Ten Thousand. D. in 362 B. C., aged about 94.

Artaxerxes III. (or **Ochus**), king of Per., son of the preceding. He began to reign in 358 B. C. Subjugated Egypt about 350. D. 338 B. C.

Artemis ['Apreus], the Gr. name of the goddess Diana.

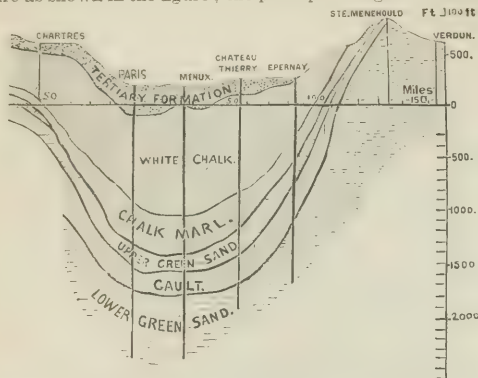
Artemisia, ar-te-mish'e-a (Gr. *Ἀρτεμισία*), a queen of Halicarnassus. She commanded in person her fleet, which fought for Xerxes against the Grs., displaying skill and courage at the battle of Salamis (480 B. C.). Said to have drowned herself because she was disappointed in love.

Artemisia, an Oriental princess celebrated for her conjugal affection and her grief for the loss of her husband, Mausolus, prince of Caria, who d. in 352 B. C. She erected to his memory at Halicarnassus a mausoleum (so called in honor of Mausolus), which was considered one of the 7 wonders of the world. Remains of it still exist.

Artesian Wells are holes of small diameter (usually between 3 and 6, and rarely exceeding 12 inches) sunk into the earth, through which the water of subterranean reservoirs or streams rises near to or above the surface. Their name is derived from the prov. of Artois in Fr. (anc. *Artestum*), where they have long been used; but they were known to the anc., by some of whose writers they are occasionally mentioned. They were also used in Chi. at a very early period, not only as sources of water, but also of combustible gas and petroleum. A well at Lillers, Pas-de-Calais, bored in 1126, still flows undiminished.

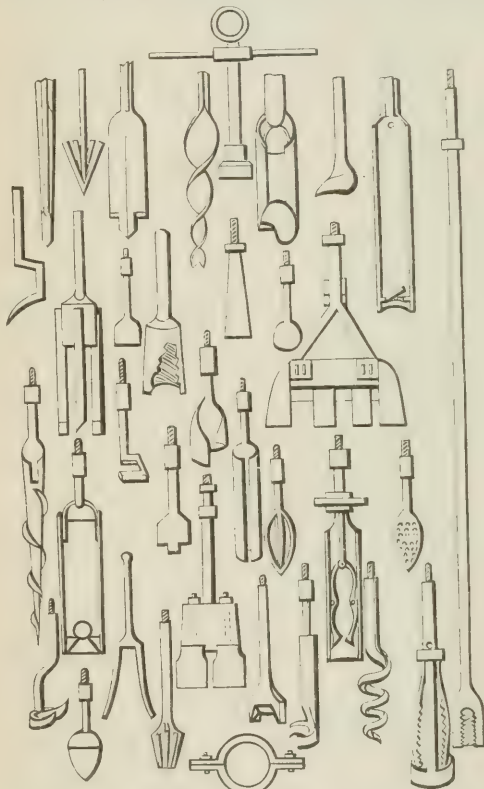
A. W. are most readily obtained where the geological formations possess a moderate inclination or "dip," and are composed of strata of materials impervious to water (rock or clay), alternating with such as, like sand or gravel, allow it to pass more or less freely. The rain-water falling where such strata approach to or reach the surface will in great part accumulate in the pervious strata, rendering them "water-bearing." Thus are formed sheets of water confined between two inclined, impervious walls of rock or clay, above as well as below, and exerting great pressure at their lower portions. Where water so circumstanced finds or forces for itself natural outlets, we shall have

springs; when tapped artificially by means of a bore-hole, we have an A. W., from whose mouth the water may overflow if its surface-level be below that of the head of pressure as shown in the figure; the principle being substantially



Geological section from Chartres to Verdun through the Paris basin. Horizontal scale, 90 m. to the inch; vertical scale, 1500 ft. to the inch.

the same as that upon which artificial fountains are constructed. Even in the absence of properly water-bearing pervious strata, accumulation of water may take place or subterranean streams may exist in crevices and fissures. These occur with especial frequency in limestone beds, whose material is more or less dissolved by water; thus very commonly caves and subterranean channels are formed in such regions, and if the beds be sufficiently inclined, head for the rise of water in A. bores may thus be furnished. The boring tools are of very various shapes, adapted to



Boring Tools.

the different kinds of rock, clay, or sand of various degrees of consolidation. For hard rock the most generally useful tool is a flat chisel; for clay and soft rock, a long, scoop-shaped bit with a slanting cutter, or with a tapering, twisted, spiral band (somewhat like a "gimlet-screw") at the lower end; for sand, the same, or should it be very clean and damp, a bit resembling a common wood auger, with broad spiral flanges.

When boring in rock by hand the upper end of the rope or pole bearing the drill is attached to a spring pole or bar, vibrated by the workmen, who at the same time give a slight turn to the cross-bar at each stroke, so as to complete the circle in from 20 to 30 strokes, varying with the kind of rock and the diameter of the hole. The lift varies, usually, between 10 and 20 inches.

When boring by steam-power the boring-rope is connected with a walking-beam vibrated by the engine, which also works the winch or windlass (the "bull-wheel") when

required. To obviate the necessity of too frequently lengthening the rope as the bore deepens, it is attached to the walking-beam by means of a long screw working in a stirrup-shaped nut, by turning which the rope can be let out to the extent of 15 to 18 inches.

The drill, also, is not directly attached to the rope's lower end, but first to a long and heavy stem of iron, connecting at its upper end with a long stirrup-shaped piece, which can be made to slide upward into another similar one, attached to the rope in the reverse position. This arrangement, expressively called the "jars," serves to facilitate the loosening of the tools when they get fast by the jarring motion that can thus be given. At the Pa. oil-wells the entire length of such a set of tools is about 30 ft.; its weight, 800 to 1000 lbs.

A most valuable improvement made of late years in the boring of hard rock is the diamond-pointed drill of Leschot. In this implement diamonds are firmly set into the conical, concave, or annular end of a steel bar, so as to present cutting edges to the rock when turned right-handed. It is usually worked by steam or compressed air, and by its means the hardest granite may be bored at the rate of several inches per minute. It is, of course, equally applicable to the boring of A. W. in hard rock as to mining and tunnelling operations, in which it is now extensively employed. When an annular bit is used, sample cores of the rock penetrated may be brought to the surface and examined. As in most labor-saving implements, its somewhat considerable prime cost is soon covered by the gain in time and cost of repairing other drilling tools.

Among the noted deep A. W. of Europe is that of Kissingen in Bavaria, completed in 1850. It is 1878½ ft. in depth, the last 138½ ft. being sunk in pure rock-salt. Hence the water is strongly salt; its temperature is 66° F., and the discharge is 100 cubic ft. per minute; it will rise to the height of 58 ft. above the surface. Wells have been sunk to greater depths in Ger. since then; the deepest of all, and doubtless the deepest in the world, being that lately sunk at Sprenburg in Prus., to a depth of 4183 ft.

In the U. S. and A. W. are numerous, especially in N. Y., Pa., Va., Ala., and Miss. In the latter 2 States they alone furnish the supply of water without which the fertile prairie regions would suffer severely in summer. It has frequently happened here, as elsewhere, that the discharge from the wells first sunk has been seriously diminished or altogether stopped by the opening of other bores in the same neighborhood or at a lower level. A 9-inch bore made at the foot of the hill on which the city of Columbus, Miss., is situated caused the sudden cessation of the discharge from the numerous wells in the town, while itself emitting a stream copious enough to run a mill. On the partial closing of the orifice the wells above resumed their flow.

The numerous bored wells of W. Pa., W. Va., and adjoining parts of O. are chiefly remarkable as the source of the world's largest supply of petroleum, which flows or is pumped from them, accompanied by salt water and combustible gas. Their spontaneous flow seems frequently to be caused not so much by water-pressure as by that of the combustible gas, which is sometimes emitted by them in vast volumes, spouting to the height of 60 to 100 ft. a mixture of water and petroleum. Disastrous conflagrations have at times resulted from such inordinate manifestations of energy. These wells rarely exceed 500 ft. in depth. At Cleveland, O., as well as at a few other points, the natural gas is used both for lighting and heating purposes by the proprietors.

The oil-region of Pa., with its numerous wells, has its parallel in N. E. Chi., where there are said to be tens of thousands of wells, some approaching a depth of 3000 ft. They are not, however, as productive of petroleum as those of the U. S.

Among the deepest bored wells in this country are 2 at St. Louis, Mo. The first was bored by the Messrs. Belcher, sugar-refiners, between 1849 and 1854, 300 ft. from the river-bank, and 420 ft. above the sea-level, down to 2199 ft., discharging per minute 75 gals. of water at 73.4° F. The other well, at the Insane Asylum, 180 ft. above the former, was sunk at the expense of the county, to the depth of 3843.5 ft. (the last 40 ft. in granite), in the course of 3 yrs. 5½ months from Mar. 31, 1866, and working day and night, excepting Sundays. Diameter of bore, 4½ inches from 1022 ft. to bottom.

One of the deepest bores in the U. S. is the well sunk at the State-House, Columbus, O. Its depth is 2773½ ft., but the water struck (which is salt) does not rise above the surface; its temperature at the bottom is 91° F., or that of hot summer weather.

In the vicinity of Chicago artesian water of great purity is readily obtained at a moderate depth and in great abundance, rising to convenient heights above the surface. It is of material importance as furnishing a supply both fit for domestic use and adequate for manufacturing purposes.

Among the A. W. which have encountered great difficulties in their construction we may mention those sunk at Charleston, S. C., to the depth of 1250 ft., and at New Orleans to that of 630. The strata penetrated here being but little consolidated, and alternating with quicksand layers, the auger had to be closely followed by tubing, which itself was very liable to sidewise displacement and collapse. At New Orleans no satisfactory result was obtained at the depth mentioned; at Charleston, a somewhat saline yet soft water, of a temperature of 87°, rises 10 ft. above the surface at the rate of 20 gals. per minute; it is used for steam-boilers.

In Cal. A. W. are largely used in providing water for irrigation. The same is being done in the Sahara desert of Afr., where such wells have been sunk to the depth of 1200 ft., each one creating around itself an oasis. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. E. W. HILGARD, PH. D.]

Artevelde, ar'feh-veld (or **Artevelde**, van (JACOB), a Flemish brewer and demagogue, b. at Ghent. The people

of Ghent, who had revolted against the count of Flanders, chase A. as their commander. As an ally of Edward III. of Eng., he waged war against Fr. Designing to give the sovereignty of Flanders to the Eng. Black Prince, the Flemings revolted and killed him July 9, 1345.

Arteveld, van (Philip, son of the preceding, b. at Ghent in 1340. When Ghent was besieged by the count of Flanders in 1381, A. was appointed to the chief command. In May 1382 he defeated the count, and then assumed the title of regent. Charles VI. of Fr. intervened, and A. was defeated and killed Nov. 27, 1382.

Arthritis (from the Gr. *arthros*, a "joint"; literally, "inflammation of a joint," a term inclusive of gout and rheumatism, though properly applicable to inflammations of the joints of whatever character.

Arthur, Artur, or Artus, a semi-fabulous Brit. hero and king of the Silures, is supposed to have flourished about 500 or 550 A. D., after the Romans evacuated the island of Brit., and was the hero of the romances of the Round Table. He is said to have defeated the Sax. invaders in several battles, and defended the independence of the Britons, but was finally killed in a battle fought at Camlan against his rebellious nephew Modred. Some writers affirm that his residence was at Caerleon, on the Usk, in Wales, where he lived, surrounded by multitudes of knights and ladies; 12 knights of eminent valor formed the centre of this retinue, and sat with the king at a round table.

Arthur (CHESTER A.), b. in Franklin Co., Vt., Oct. 5, 1830, grad. at U. Coll., N. Y., in 1849; taught school for 2 yrs. in Vt., studied law in N. Y. city, and was admitted to the bar; delegate to the convention at Saratoga which founded the Rep. party. Before the c. war he was judge-advocate of the second brigade of N. Y. State militia, and afterward engineer-in-chief on staff of Gov. Morgan. In 1861 inspector-gen. of N. Y., and subsequently quartermaster-gen. of N. Y. until expiration of Gov. Morgan's term of office; then resumed practice of law. Collector of pt. of N. Y. under Pres. Grant from 1871 to July 12, 1878, and was chairman of the Rep. State committee of N. Y. He was nominated for V.-P. of the U. S. by the Rep. convention at Chicago, June 8, 1880, and was elected to that office Nov. 2, 1880. Upon the death of Pres. Garfield, Sept. 19, 1881, he became the 21st Pres. of the U. S.

Arthur (TIMOTHY SHAY), a writer, b. near Newburg, N. Y., in 1809. He became a resident of Phila. in 1841, and wrote *Lights and Shadows of Real Life*. D. Mar. 6, 1885.

Artichoke (supposed to be a corruption of *al-kharciof*, the Arabic name of the plant), (*Cynara scolymus*), a perennial herbaceous plant of the natural order Compositae, is nearly allied to the thistle. It is a native of S. Europe, and is cultivated for food. The part eaten is the succulent receptacle and bracts of the flower-head, gathered before the flowers expand, and boiled. The Jerusalem A. of the same natural order, a kind of sunflower (*Helianthus tuberosus*), of N. Amer., also cultivated for food, the edible part being the tubers, like potatoes, is an entirely different plant. The popular name is a corruption of *girasola*, It. for sunflower.

Articles of Faith designate the particular points of doctrine which together make up the sum of Chr. belief. The various chs., not being agreed upon all these points, have for the most part set forth their several expositions of them, and it is to these creeds, symbols, or confessions that this term is commonly applied.

Articles of War, a name applied to an act of Cong. approved Apr. 10, 1806, to establish rules for the govt. of the U. S. A. Separate A., approved in 1864, establish rules for the govt. of the navy. Also applied to the code of military law in the Mutiny act annually passed in the Brit. Parl.

Articulata [the plu. neuter of the Lat. past part. *articulatus*, "jointed" or "furnished with joints," from *articulus*, a "joint"], or **Articulated Animals**, one of the 4 primary or grand divisions of the animal kingdom according to the system of Cuvier, which is generally adopted by naturalists. The A. are characterized by bilateral symmetry and an external skeleton composed of a series of rings or segments. These rings in some cases appear externally as mere transverse folds in a soft skin, but are often covered with a bony or horny substance. They are also characterized by an internal ganglionic nervous system, the ganglia being arranged symmetrically along the ventral aspect of the central or median line of the body. By most recent naturalists they are divided into 3 classes—Insects, Crustaceans, and Worms. Huxley subordinates the A. under the name of Arthropoda, and introduces the divisions Annulosa and Annuloida, to include some classes of animals otherwise placed by Cuvier.

Artificial Butter. See BUTTER.

Artificial (ar-te-fish'al) Horizon, a horizontal mirror used to determine the altitude of a star or other object when the sensible horizon is ill defined.

Artificial Limbs, formerly of crude structure, chiefly the "peg-leg," enabled the patient to walk and work. By successive steps of improvement they have come to simulate the natural limb so fully that the form and gait may baffle detection or observation. Lightness is secured without loss of strength by use of wooden cylinders properly shaped, artificial joints correspond to the natural ones, and the functions of many muscles are imitated by tendinous cords and springs. It is a fallacy to suppose that A. L. are made of cork. E. D. HUDSON.

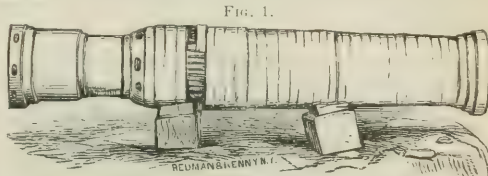
Artificial Stone. See STONE, ARTIFICIAL.

Artigas (JOSÉ) a S. Amer. gen., b. at Montevideo in 1755, became in early life a leader of the Gauchos, a class of outlaws. In 1811 he entered the service of the Junta of Buenos Ayres, fought against the Spaniards or royalists, and became in 1815 master of the Banda Oriental; conquered Buenos Ayres in 1820, but was removed from power about the end of that year. D. 1851.

Artillery [Fr. *artillerie*, remotely from the Lat. *ars*, *artis*, "art," "ingenuity," implying that it is the product of

skill]. The term A. was in early times used to designate all kinds of missiles employed in warfare, and the machines by which they were propelled. In modern times, however, and especially since the introduction of gunpowder for military purposes, the term is understood to denote cannon of all sizes and varieties, their carriages, projectiles, implements, and equipments, the machines necessary to transport, serve, and manœuvre them, and lastly the troops specially instructed and employed in their service. The birth of A., as we of to-day understand it, must date from that of gunpowder. Its uses for A. or projectile purposes did not seem to be understood until demonstrated in the early part of the 14th century by the Friburg monk Berthold Schwartz, to whom this important attribute was made known by an accident.

The earliest record of the construction of cannon is about the middle of the 14th century. The earliest cannon were constructed of iron bars joined together longitudinally, and strengthened by exterior hoops of iron. Wood, wound with rope, and sometimes with wire, was also used upon the exterior to strengthen them. One of the most interesting of anc. monster cannon still extant is the "Mons Meg," made in 1486 at Mons, Brittany, and now in the castle of Edinburgh. An inscription on the carriage states that it was employed at the siege of Norham Castle in 1513. It burst in 1682 in firing a salute. It is made of iron bars hooped together, and its bore is 20 inches in diameter. (Fig. 1.)



Anc. cannon were in some instances made of leather, and as so made were used to some extent by Charles XII. of Swe., A. D. 1697.

The plating of vessels of war with iron, and the increasing thickness of this armor, have led of late yrs. to a very great increase in the size, weight, and calibres of sea-coast and naval cannon, and this in turn has necessitated very radical changes in the material and methods of gun construction. In Eng. the lead in this direction was taken by Sir William Armstrong, whose method is to form the barrel or body of the gun by welding at their ends several wrought-iron tubes, each of which is 2 or 3 ft. in length, and is formed by winding a square bar of iron around a mandrel and welding the edges. The part of the gun in rear of the trunnions is strengthened first by an enveloping tube composed of a plate of iron bent in a circular form and its edges welded, and secondly by another enveloping tube made, as in the body of the gun, of spiral coils. As at first constructed, the Armstrong guns were all breech-loaders, the movable breech arrangement consisting of a hollow screw, through which the charge was passed into the bore, and a wedge which fitted into a slot cut in the breech of the gun closing the rear end of the bore. This wedge was slipped into its place by a hand, and kept there by a few turns of the screw. The breech-loading principle having proved unsatisfactory in practice, it was abandoned, and all Armstrong guns were subsequently constructed as muzzle-loaders.

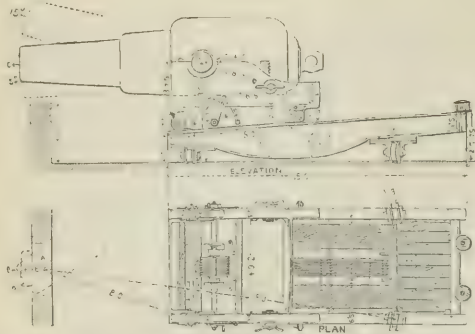
Armstrong's method of construction has been considerably modified by the suggestions of Mr. Fraser, a leading employé in the royal arsenal at Woolwich. These modifications consisted, in brief, in reducing the number of coils, shrinking on the outer coils and trunnion-block together, introducing offsets or shoulders for hooking or securing the different parts to each other, and in using a cheaper iron for the outer coils. These modifications, while they did not improve the strength of Armstrong's original invention, reduced the cost of the gun nearly 50 per cent. As thus reduced the cost of Woolwich guns is about double that of cast-iron guns in the U. S. of equal weight. Early in 1867 Fraser still further modified his method by constructing his guns, up to those of 9-inch calibre or 250-pounds, of 4 separate parts: 1st, the inner tube, a solid steel forging, tempered in oil, roughly bored out to a calibre slightly less than the proper one; 2d, an outer tube, composed of 2 single and slightly taper coils of wrought iron, united together endways, rough turned and shrunk on to the inner tube, which is accurately turned down to receive it, the process being easier to turn down the inner tube than to bore the outer one; 3d, a breech-coil or jacket, composed of a triple coil, a double coil, and a trunnion-ring made and welded together; and 4th, the cascabel. Guns of this character have been constructed of 7-inch (115-pounder), 8-inch (180-pounder), 9-inch (250-pounder), 10-inch (350-pounder), and, more lately, 12-inch (600-pounder) calibres.

Fig. 2 shows the Woolwich 25-ton (12-inch) gun on its carriage. Still more recently, a gun of 11.6 calibre, of greater weight and throwing a projectile weighing 700 lbs., has been made. This last gun is what is popularly known as the 35-ton gun, or "the Woolwich Infant" (Fig. 3). In the calibres of the Fraser system above 9-inch, one or two additional exterior coils are used. For its size and weight, the 9-inch Fraser gun is probably the most efficient gun in the world.

Whitworth's method is to construct the gun of a low steel, the hoops cast hollow, hammered over a steel mandrel, annealed, and forced together (or the gun built up) by hydraulic pressure. The breech-pin, which is made of harder steel than the body of the gun, is screwed into its place. The striking peculiarity of Whitworth's gun is the cross-section of its bore, which is hexagonal.

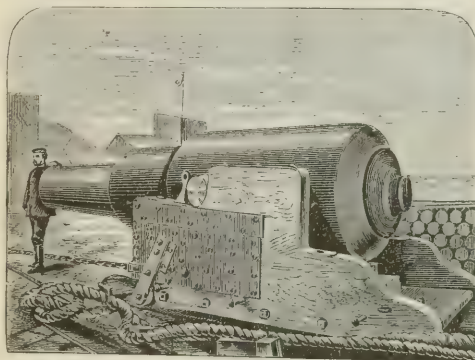
The Blakely gun is composed of a barrel of low steel, over which is shrunk a tube of less elastic steel, and over all a cast-iron tube or jacket, to which the trunnions are attached.

FIG. 2.



The two steel tubes are cast hollow, hammered over mandrels, and annealed. The projectiles for these guns are on the expanding principle.

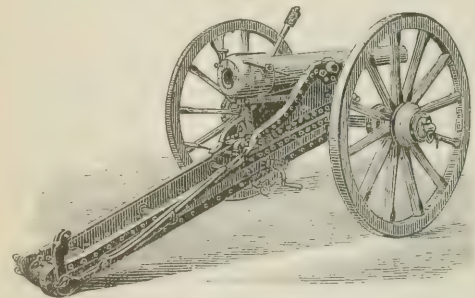
FIG. 3.



The Palliser method is to insert a steel tube in the bore of a cast-iron gun, either from the muzzle, where it is secured by one or more steel screw-washers, or from the breech, in which case the steel tube only extends a short distance beyond the seat of the charge, and is secured in its place by a screw breech-plug. This method affords the opportunity of utilizing smooth-bore guns of older systems by their conversion into rifle guns of considerable power and endurance.

The method of Mr. Francis Krupp of Essen, Prus., is to fabricate the body of his gun from a solid ingot of low steel worked under heavy steam-hammers. The gun is strengthened by three or more steel tubes, which are shrunk upon the central tube or mass of the gun, the last ring or tube inclosing the breech being forged in one piece with the trunnions, and made without any weld. The rings are of different lengths, as is usual with built-up guns, and the whole gun is diminished in thickness toward the muzzle, not by tapering, but by being turned with concentric steps of diminished heights. Fig. 4 shows one of Krupp's field-

FIG. 4.

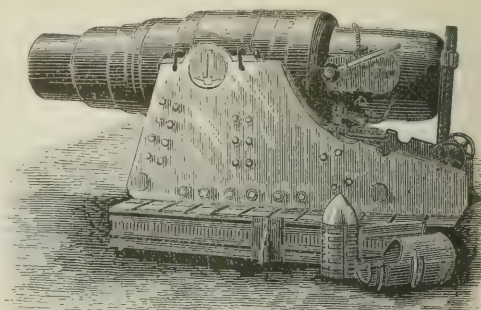


guns on its carriage. Besides several thousand field-guns, Krupp has fabricated nearly 2000 of 6-inch, 7-inch, 8-inch, 9-inch, 11-inch, 12-inch and 14-inch calibres. Of the last-named monsters (of which 2 have been made), both have successfully stood the proof of nearly 170 lbs. of prismatic powder and a 1200 lb. projectile. The 14-inch Krupp gun weighs 50 tons. (Fig. 5.) The first of its kind required the continuous labor, night and day, of 16 months, and, with its carriage and the turn-table (both of steel) on which it is mounted, cost \$110,000. gold. Krupp's partiality for steel induces him to make all of his projectiles and gun-carriages of that material.

In the Parrott method the body of the piece, or rather the gun itself, is of cast iron, cast hollow, and cooled from the inside (after the plan of Rodman) for the larger calibres, and strengthened about the seat of the charge by an exterior tube of wrought-iron bars spirally coiled and shrunk on.

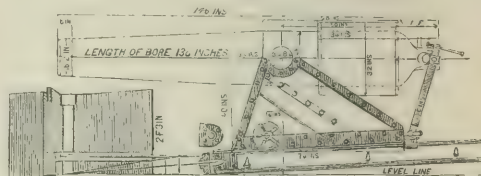
For this purpose this portion of the gun is turned down to a cylindrical form. Besides his field-guns of 3 inches (10-pounder), and 3.62 inches (20-pounder), and his siege-gun of 4.2 (30-pounder), Capt. Parrott has constructed sea-coast and ship guns of 6.4 inches (100-pounder), 8 inches (200-pounder), and 10 inches (300-pounder). His mode of rifling

FIG. 5.



is the increasing or gaining twist. The Parrott gun is serviceable, of considerable endurance, and, when Parrott projectiles are used, of most excellent accuracy. The 10-pounder, 30-pounder, and 100-pounder seem to give better results than the other calibres. Fig. 6 shows the Parrott 200-pounder.

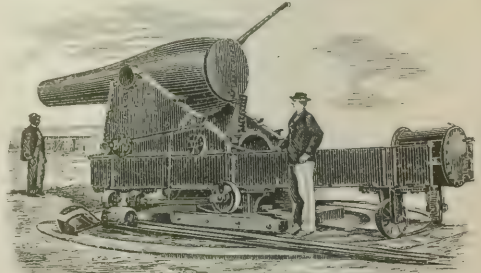
FIG. 6.



The method of Admiral Dahlgren of the U. S. N. has been illustrated only in guns for naval uses. His guns are of cast iron cast solid, and cooled from the exterior; they are of great thickness at the breech and as far forward as the trunnions, and from thence to the muzzle rapidly diminishing in thickness, so that their external configuration is not unlike that of a champagne-bottle. Dahlgren guns are chiefly of 9-inch and 11-inch calibres, and are adapted exclusively for hollow projectiles. A 10-inch Dahlgren gun for firing solid shot has, however, been put in service. The 15-inch and 20-inch naval guns, although they have in great degree the exterior form of the Dahlgren, are cast hollow, cooled from the inside, and have the elliptical bottom of the bore, which are characteristic features of the Rodman plan. The 9-inch, 10-inch, and 11-inch Dahlgren guns have the bottom of bore in the conical form of what is known as "the Gomer chamber."

The guns of Gen. Rodman of the U. S. Ordnance Corps are all of cast iron, and are cast hollow and cooled from the inside, the exterior being meantime kept from rapid cooling by fires built around the gun in the casting-pit. Rodman guns are further distinguished by great thickness of metal at the breech, by graceful curves of their exterior lines, by the absence of all exterior ornamentations, sharp angles or edges, and of the cascabel and swell of the muzzle, and by having the trunnions at the centre of gravity, thus doing away with preponderance and greatly facilitating the service of the gun. Rodman guns are both smooth-bore and rifled. The calibres of the smooth-bore guns are 8 inches, 10 inches, 13 inches, 15 inches, and 20 inches, and of the rifle, 8 inches (corresponding exteriorly to 10-inch smooth-bore), 10 inches (to 13-inch smooth-bore), and 12 inches (to 15-inch smooth-bore), 3 dimensions of carriage thus answering for 6 guns. All Rodman guns are adapted to the use of solid as well as hollow projectiles. The 15-inch Rodman gun weighs 25 tons, the solid shot 450 lbs., and the powder-charge 100 lbs. mammoth powder. The 20-inch Rodman weighs 58 tons, its solid shot 1060 lbs., and its powder-charge 180 lbs. mammoth powder. Fig. 7 shows the Rodman 15-inch gun.

FIG. 7.



In the U. S., in 1856, the systems of A. in use for the land service were as follows:

Field A.—6-pounder and 12-pounder guns and 12, 24, 32-pounder howitzers—6 different pieces of ordnance, and 7

different kinds of carriages; the 12-pounder howitzer mounting on 4 different kinds of carriage.

Scops 1.—12-pounder, 18-pounder, and 24-pounder guns; 8-inch howitzer; and coehorn, 8-inch and 10-inch mortars, 6 different pieces of ordnance, and as many different carriages.

Scops 2.—1.—25-pounder, 32-pounder, and 42-pounder guns; 8-inch and 10-inch columbiads; and 10-inch and 12-inch mortars, 7 different pieces of ordnance, and as many different carriages.

The system of field A. for use in the U. S. in 1873 was as follows:

Field A.—3-inch rifle and 12-pounder smooth-bore—2 guns and 2 carriages. Fig. 8 is the 3-inch rifled field-gun, model 1861.

Fig. 8.

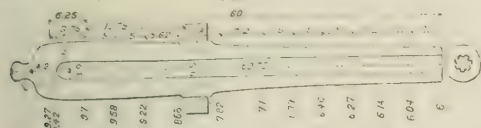
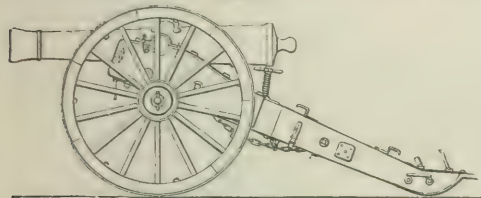


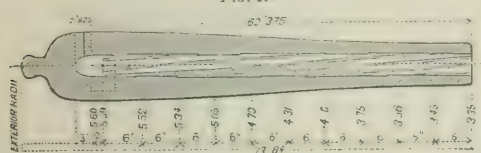
Fig. 9 shows the 12-pounder smooth-bore on its carriage.

Fig. 9.



The 3-inch rifle (Fig. 8) gun has been superseded by a new 3½-inch (Rodman) rifle, model of 1870, shown in Fig. 10.

Fig. 10.



This has been mounted on the same carriage as the 12-pounder smooth-bore (Fig. 9), the weight being about the same. Larger and more effective guns have been made recently, but embodying the essential principles stated.

The organization of the A. of the armies of the U. S. during the c. war was designed and executed by the writer. [From orig. art. in *J. Soc. Univ. Cyc.*, by GEN. W. F. BARRY.]

Artotype. See PHOTOGRAPHS IN PRINTING-INK.

Arundel (or **Arunde/ian**) **Marbles**, a collection of anc. Gr. sculptures purchased in Smyrna and elsewhere for Thomas, earl of Arundel. They were sent to Eng. in 1627, and given in 1667 to the Univ. of Ox. by his grandson.

Aruspices, or **Haruspices**, [probably from *haru* (= *hira*, "entrails"), and *specio*, to "see" or "examine"], were Rom. soothsayers, who foretold future events from the inspection of the entrails of sacrificial victims.

Ar'ya, or **Ar'yan**. *Ar'ya*, a Sans. word, supposed to have originally signified an agriculturist, but afterward coming to mean "honorable," has been applied to that Sanscrit-speaking people who emigrated from central Asia to India, probably between 2000 and 1600 B. C., conquering the aborigines. All those races whose langs. bear an affinity with the Sans. are conveniently grouped together under the name of A. As they inhabit India and most of Europe, they are also styled Indo-European.

As (gen. **As'sis**), a Rom. weight, also called **Libra**. It was divided into 12 uncia, "ounces," and was equal to 10 ounces 18 pennyweights 13½ grains Troy. A. was also the name of a brass Rom. coin which originally weighed a lb., but in consequence of the increase of the value of metal, it was gradually reduced to half an ounce.

Asagra'a (named in honor of Asa Gray, the botanist), a Mex. plant which has bulbous stems, linear, grass-like leaves, and spikes of whitish flowers. The *A. officinalis*, which is said to be the only species of this genus, produces the cebadilla-seeds from which the poison veratrum is prepared.

Asbes'tos, or **Asbestos** [from the Gr. ἀσβεστός, "indestructible"], a fibrous mineral composed of fine, flexible, and easily separable filaments of a silky lustre. The fibres of a very silky variety of A. are called amianthus. A. may be woven into cloth which is incombustible, and if soiled may be cleansed by fire.

As'both (ALEXANDER SANDOR), a Hungarian officer, b. Dec. 13, 1811, fought in the revolution of 1848, and in 1851 visited the U. S.; entered the U. army in 1861, and was made a maj.-gen. in 1864; was minister to the Argentine Republic in 1866. D. Jan. 21, 1868.

As'bury (FRANCIS), b. at Handsworth, Staffordshire, Eng., Aug. 20, 1745, of Meth. parents, was converted at the age of 13, became a local preacher at 16, an itinerant under Wesley at 22, came to Amer. in 1771 as missionary; in 1772 became Wesley's "gen. assistant" in Amer. In 1784 he was elected bp. of the new M. E. Ch. He was very successful in establishing Meth. chs. D. Mar. 21, 1816.

As'bury Park, on R. R., a summer resort on Atlantic coast of N. J., about 5 m. S. of Long Branch, Monmouth co., N. J. Pop. 1880, 1640.

As'calon [Ἀσκαλον, of the Grs.], called *Ash kelon* in the Bible, one of the 5 Philistine caps. in Pal., on the Mediterranean. It was an important seaport up to and during the crusades; but was ruined in 1270 by the Sultan Bibars, who filled up its harbor with stones.

As'caris (Gr. ἀσκαρίς) (phi. **Ascar'ides**), a genus of intestinal parasites, of which the most common is the round worm, *A. lumbricoides*, found in the intestines of man. Children frequently have them, principally in the small intestines. Sometimes, especially in young and weakly children, their accumulation may cause serious disturbance; even convulsions may be thus produced. There are no symptoms (apart from the passage of the worms from the bowels) invariably connected with their presence. Itching of the nose, capricious appetite, swelling of the abdomen, and grinding the teeth when asleep, may all occur, but they may also be produced by other causes. *A. vermicularis* is the small white thread-worm or seat-worm, which, although called ἀσκαρίς by Hippocrates, is by most recent writers called *Oxyuris vermicularis*. Its length is from ½ to ⅞ of an inch, the female being larger than the male. Seat-worms, by the itching they produce, often distress children very much; they are less frequently met with in adults. (For treatment of worms, see VERMIFUGES.) E. DARWIN HUDSON, JR.

Ascen'sion [from the Lat. *ascen'sio*, an "ascent"]. In astron. the right A. of a star is the arc of the equator intercepted between the first point of Aries and that point of the equator which comes to the meridian at the same instant with the star. Measured always from W. to E. the right A. of a star corresponds or is analogous to the lon. of a place on the earth.

Ascension Day, or **Holy Thursday**, one of the great religious festivals of the R. Cath. and Epis. chs., is held on the 40th day after Easter, to commemorate the ascension of Chr. into heaven.

Ascet'icism and **Ascet'ics** [from the Gr. ἀσκήω, to "discipline"], a voluntary retirement from the world and the practice of acts tending to mortify the body; so called from the rigid discipline to which the devotees subject themselves, whence they are called A. Early in the 2d century zealous members of the Chr. Ch. devoted themselves to lives of poverty, celibacy, and abstinence from all sensual gratification. Some of these remained in society, others dwelt apart as hermits. The union of numbers of hermits into one body was first made by Pachomius, A. D. 340, and was the virtual origin of monasticism.

Ascet'ics [for etymology see preceding article], a name commonly given to those who in the early ages of Christianity devoted themselves to a solitary and contemplative life, practising great austerities, with a view to mortify the flesh and withdraw the mind from worldly objects; also applied to those persons in India and other countries who lead a life of asceticism. The A. of India are especially celebrated on account of the severe and even terrible austerities which they practice. One man will stand all day in one position exposed to the rays of a burning sun; another will hold his hands clenched till his finger-nails grow through them.

Ascham, as'kam (ROGER), an Eng. scholar, b. in Yorkshire in 1515, grad. at St. John's Coll., Cambridge, in 1534, and distinguished himself as a classical scholar. In 1544 he pub. a work in defence of archery, entitled *Tetrachordus*, which is remarkable as a specimen of pure Eng. style. He instructed the Princess Elizabeth in Gr. and Lat.; was sent as sec. of embassy to the court of the emp. Charles V. Although he was a Prot., he was appointed Lat. sec. to Queen Mary in 1553, and after her death (in 1558) he was retained at court in the double capacity of sec. and tutor to Queen Elizabeth, who again took lessons in Gr. and Lat. D. Dec. 30, 1588.

Ascid'ia, or **Ascid'ians** [from the Gr. ἀσκήδιον (dimin. of ἀσκός), a "leathern bottle"], a group of molluscoids of the class Tunicata. They have no shell, but are enclosed in an elastic tunic with two orifices, and resemble a bottle or jar. Within the external tunic is a muscular membrane, regarded as corresponding to the mantle of the other Mollusca. The greater part of the cavity of the mantle forms a branchial sac, the folded lining of which constitutes the gills (branchiae). The movements of numerous cilia around the mouth bring into it a current of sea-water, which passes out at the vent or anal orifice. They have no eyes or other organs of special sense, but they have hearts and a circulation of blood, with the remarkable peculiarity that its direction is sometimes reversed.

Asclepi'adæ [Gr. Ἀσκληπιάδαι]. This term was first applied to those who were reputed to be the descendants of Æsculapius, the god of med.; afterward, to those who were trained in his temples (Asclepiens) in the science and art of healing.

Ash (*Fraxinus*), an important genus of trees belonging to the family Oleaceæ, distinguished by imperfect flowers, sometimes destitute of corolla, and leaves unequally pinnate. The fruit is a *samara*, a winged pericarp. It comprises about 50 species, mostly natives of Europe and N. Amer., and valuable for timber, for fuel, and shade trees. The *Fraxinus excelsior*, the common A. of Eng., is a beautiful ornamental tree, and the timber is much esteemed by carpenters, joiners, coachmakers, and wheelwrights. It grows to the height of 100 ft. or more. Cultivation has produced several varieties of it, among which is the weeping A., the branches of which droop nearly to the ground. The *Fraxinus ornus*, or flowering A., a native of S. Europe, has more perfect flowers than the other species. A saccharine substance called manna is obtained from it by making incisions in the bark, and sometimes exudes spontaneously. Among the noblest trees of the genus is the *Fraxinus Americana*, or white A., which is abundant in the N. and Middle U. S. Its leaflets are petiolate, ovate, or lance-oblong, entire, acuminate, and in autumn are changed to a dark-brown or purple tint. The timber is tough, and valuable for the same purposes as the *Fraxinus excelsior*. In the forests of

the U. S. occur also the *Fraxinus pubescens* (black or red A.) and *Fraxinus quadrangulata* (blue A.), and others. The black A. (*Fraxinus sambucifolia*) is used for baskets and hoops. The mt. A. is noted for its clusters of red berries, is a species of *Pyrus*, having no affinity with the genus *Fraxinus*.

Ashan'tee, written also **Asiente**, a kingdom of W. Afr., bounded N. by the Kong Mts., E. by Dahomey, S. by the Atlantic, W. by Liberia. The country is generally wooded; soil fertile; people fierce, warlike, and much addicted to human sacrifices. The Brit. have a ft. on the coast, at Cape Coast Castle, and in a war with the Ashantees in 1873, took and burned Coomassie, their cap. Area, 75,000 sq. m. Pop. estimated between one and three millions.

Ashburton (ALEXANDER Baring), LORD, an Eng. diplomatist, b. in 1774, was a son of Sir Francis Baring, an eminent merchant. He was employed in his youth in mercantile affairs in the U. S., and married a daughter of Senator William Bingham of Pa.; became the head of the firm of Baring Brothers & Co. of Lond.; was created Baron Ashburton in 1835. In 1842 he was sent as a special ambassador to the U. S. to settle a dispute in relation to the N. E. boundary. He was selected because he was acquainted with the Amer. people and insts., and was inclined to a pacific policy. He and Mr. Webster concluded the A. treaty at Wash. in Aug. 1842. D. May 1848. His son, William Bingham Baring, inherited the title.

Ash'dod, or **Azo'tus**, an anc. city of the Philistines in Pal., about 3 m. from the Mediterranean. It was an important city and stronghold of the Philistines, who, after defeating the people of Israel in the time of Samuel, captured their ark and carried it to the temple of Dagon in A.

Ash'e, **Ashi**, or **As'ser** (RAB OF RAV), a Jewish Rabbi of Babylon, b. in 353 A. D.; the reputed compiler of the *Babylonian Talmud*, a vast collection of traditions and legal documents, which is regarded among the Jews as a high authority. D. 427 A. D.

Ash'er, a tribe of anc. Israelites descended from Asher, 8th son of Jacob by the handmaid Zilpah. They were assigned land in the N. W. of Pal., but never dispossessed the Canaanites and Phœnicians who dwelt there.

Ash'es, the solid or earthy residuum left after the combustion of wood, coal, or other organic substances. The most important ingredient of the A. of land-plants is potash, or a salt of potash, with a portion of lime and silica. The potash is extracted from A. by lixiviation. By dissolving the salt contained in the A. the water is converted into lye, which is afterward evaporated by boiling. The insoluble part of the A. remaining after lixiviation is called leached A., which is composed of carbonate of lime, phosphate of lime, oxide of iron, etc. The A. of marine plants, and those that grow near the sea, contain soda instead of potash, with a small portion of iodine. The soda is also separated from the insoluble mass by lixiviation. Wood A. are extensively used in the manufacture of soap, and are useful as manure. The salts obtained from them by lixiviation are called potash and pearl-ash, which latter is a carbonate of potassa. Bone A. consist mostly of phosphate of lime, which is a valuable manure.

Ashville, R. R. centre, cap. of Buncombe co., N. C., is 1 m. E. of French Broad River and 255 m. W. of Raleigh. It has a female coll. and 3 acads. Pop. 1870, 1400; 1880, 2616.

Ashland, R. R. junc., Boyd co., Ky., on O. River, 13 m. below Catlettsburg. It has 2 of the largest blast pig-iron furnaces on the O. River, and also one of the largest rolling-mills in the country. Pop. 1870, 1459; 1880, 3280.

Ashland, R. R. junc., Middlesex co., Mass., 24 m. S. W. of Boston. Pop. of tp. 1870, 2186; 1880, 2394.

Ashland, on R. R., Saunders co., Neb., 24 m. N. E. of Lincoln. Superior magnesian limestone is found here. Pop. 1870, 653; 1880, 978.

Ashland, on R. R., cap. Ashland co., O., 85 m. N. N. E. from Columbus. Pop. 1870, 2601; 1880, 3004.

Ashland, Oregon. See APPENDIX.

Ashland, an important R. R. centre in the Mahanoy Valley, in the centre of the anthracite coal-fields of Schuylkill co., Pa., 97 m. N. W. of Phila. and 13 m. from Pottsville, the co-seat. Pop. 1870, 5714; 1880, 6052.

Ashland, Wis. See APPENDIX.

Ash'ley (JAMES M.), b. in Pa. Nov. 14, 1824, removed to O. in 1849; was an M. C. from 1860 until 1868, when he was appointed gov. of Mont. Terr.

Ashley, LORD. See SHAFTESBURY.

Ash'mole (ELIAS), F. R. S., b. at Lichfield, Eng., May 23, 1617, was educated at Ox., and served under Charles I. in the c. wars. In 1646 he turned his attention to the study of judicial astrology and Rosicrucianism, and became a brother of the Free and Accepted Masons; was Windsor herald (1660-75). In 1659 the younger John Tradescant gave him his collection of curiosities, which A. presented in 1693 to Ox. Univ. It was the basis of the Ashmolean Museum. He wrote *History of the Order of the Garter*. D. May 18, 1692.

Ashmun (GEORGE), b. at Bradford, Mass., Dec. 25, 1804, grad. at Yale in 1823; became a lawyer at Springfield, Mass., in 1828, was a Whig M. C. 1845-51, pres. of Chic. Rep. convention of 1860, and was a patriotic and able man. D. 1870.

Ashmun (JOHN HOOKER), a jurist, b. at Blandford, Mass., July 3, 1800. He grad. at Harvard in 1818, and became prof. of law there in 1829. He acquired a high reputation as a jurist. D. Apr. 1, 1832.

Ashtabula, an important R. R. centre, Ashtabula co., O., 58 m. N. E. of Cleveland. Its harbor is one of the best on Lake Erie. Pop. 1870, 1999; 1880, 4445.

Ash'toreth, or **Ash'taroth**, a Syrian goddess, worshipped by the anc. Israelites and other nations of W. Asia, a personification of the moon; called Queen of Heaven; commonly identified with Astarte.

Ash Wednesday [Lat. *Dies Cin'rum*; literally, "day of ashes"], the first day in Lent, so called because in anc. times it was the custom for penitents to appear in the ch. covered with sackcloth and ashes.

Asia, á'she-a, the largest continent on the globe, is also commonly supposed to be the oldest habitat of the human race. It comprises nearly one third of the land surface of the earth, having between 16,000,000 and 17,000,000 sq. m., and about 804,000,000 inhabs., or nearly two thirds of the entire pop. of the earth. A. is bounded N. by the Arctic Ocean, touching the 78th parallel N. lat.; on the E. by the Pacific, S. by the Indian Ocean, S. W. by the Red Sea, lying between it and Afr., and W. by Europe and the Mediterranean, Black, and Caspian seas. The coast line exceeds 33,000 m., and is indented by great bays and gulfs, forming the great peninsulas of A. Minor, Ar., India, Siam, Anam, Corea, and Kamtchatka. Connected with Afr. by the narrow Isthmus of Suez, this has been penetrated by the Suez Canal, uniting the Red Sea with the Mediterranean. On the N. E. the narrow Bering's Strait divides it from Amer.

Mountains, Rivers, Etc.—The mts. of A. surpass in height those of all other parts of the globe, the loftiest summit being Mt. Everest, in the Himalayas, 29,002 ft. while the mean height of the range (running in S. Asia between India and Tibet) is 18,000 ft. The long chain of Altai Mts. stretches 3000 m. across N. Asia; the Ural Mts. divide A. from Europe. The mts. of the Caucasus are 10,000 to 18,000 ft. high; Mt. Ararat, in Armenia, is 17,212 ft. The Taurus Mts. in A. Minor, the Kamtchatka range in N. E. A., and many other heights diversify the whole face of the country. Immense plains or steppes (the plain of Siberia being larger than all Europe) lie between the mt. ranges. The table-land of Tibet (nearly 15,000 ft. high), of Afghanistan and adjacent countries, of Per. (2000 to 6000 ft.), of Hindostan, etc., represents other great natural features of A. A. has great rivers flowing hundreds of m. through fertile regions, the Indus, Ganges, Euphrates, Tigris, Hoang-Ho, Amoor, Obi, Yenisei, and Yang-tse-kiang being the chief. Lakes abound, and the great Caspian Sea and Aral Lake are the prin. inland bodies of water. Geologists find evidence of great structural changes, indicating the very recent formation of large portions of A. Vast areas of dry land were once covered by water. No active volcanoes exist in the interior, but several are found on the E. coast. Traces of glacial action abound on the Himalayas.

Climate, Soil, and Productions.—The extremes of heat and cold are found in N. and S. Asia, the mean temperature of upper Siberia being near zero, and the highest mean temperature of India about 82°, with continuous heat, at some seasons, much nearer 100°. A large part of A. lies in the temperate zone, and has a mild climate. The bleak regions of N. Asia have a sterile soil, with very little rainfall, the earth being frozen constantly to a depth of 300 ft. The hotter regions near the Indian Ocean and Chi. Sea are subject to violent cyclones or typhoons, and the heated air blown over S. Asia by the S. W. monsoon brings watery vapor and heavy falls of summer rain. The annual rainfall varies from 5 to 100 inches. The great diversities of climate, water distribution, and soil yield a corresponding variety of natural productions. In forestry, while vast regions of terr. have been wholly stripped of trees, pines, birches, and willows abound in the N., balsams, palms, acacias, banyans, bread-fruit, mangolia, cedars, etc., in S. and Central A. Medicinal plants, dye-woods, and spices grow in profusion. Chi. and Japan are the great cultivators of the tea-plant and the camellia. Rice is of Asiatic origin, and in the cooler regions wheat, oats, barley, rye, buckwheat, maize, and millet are grown. Bananas, plantains, yams, sugar-cane, pepper, tobacco, indigo, cotton, hemp, flax, and that baneful plant the opium poppy, are largely cultivated. The orange, lemon, olive, peach, fig, mulberry, vine, etc., all are natives of A. Among the animals are the ox, buffalo, sheep, goat, horse, camel, elephant, yak, reindeer, dog, ape, bear, fox, lion, tiger, leopard, boar, rhinoceros, etc. Among birds are the eagle, vulture, raven, owl, heron, swan, goose, duck, flamingo, albatross, pigeon, nightingale, bird of paradise, parrot, ostrich, etc. The cobra and other serpents infest the tropical regions. Fish are abundant in the inland and ocean waters. Insect life is rampant in the warmer regions, and the locust in innumerable swarms often devastates wide areas. The great fertile districts cultivated by native industry sustain the enormous population and yield surplus productions for export, roughly estimated at \$450,000,000 per annum. Gold is found in Siberia and Japan; silver in Chi., Asiatic Rus., Anam, etc.; mercury, tin, lead, copper, and iron in Japan, Siberia, India, Per., and Tur.; coal has been mined in Chi. and Siberia, and salt is abundant. A. is also rich in various precious gems.

Civilization, Religion, Etc.—Asiatic civilization, although differing widely from that of Europe and Amer., has its own peculiar development. Oriental culture reaches to a certain point, after which civilization is stationary, instead of obeying the law of progress as in the W. nations. In W. A. are the seats not only of Heb. civilization, but of those great Oriental monarchies of the Babylonians, Assyrians, and Pers., among whom arch., road-building, and the useful and decorative arts were carried to a high degree of perfection. In India likewise are the magnificent remains of an arch. far superior to anything erected by the modern Hindoos. In the N. half of A. the people live almost wholly by hunting or by keeping flocks in the great grazing regions. They are of a low order of intelligence, but in Siberia are peaceful tribes. The great Tartar race, embracing the Mongols, Manchus, and Turks, are divided into Booddhists and Mohammedans, and are gradually losing their nomadic and predatory habits, becoming more assimilated to Chi. civilization. The Chi. and Japanese are very little migratory, but are a settled people of traders and cultivators of the soil. They are partially Booddhist, though mostly followers of Confucius and Lao-tse. Brahmanism is the religion of India, but in certain regions the Mohammedans are in the majority, while W. of India A. is almost wholly Mohammedan, except some small districts of Syria and A. Minor, where there is a pop. of Chrs. The Gr. Ch. has many ad-

MAP OF ASIA

Drawn and Engraved on Copper-Plate

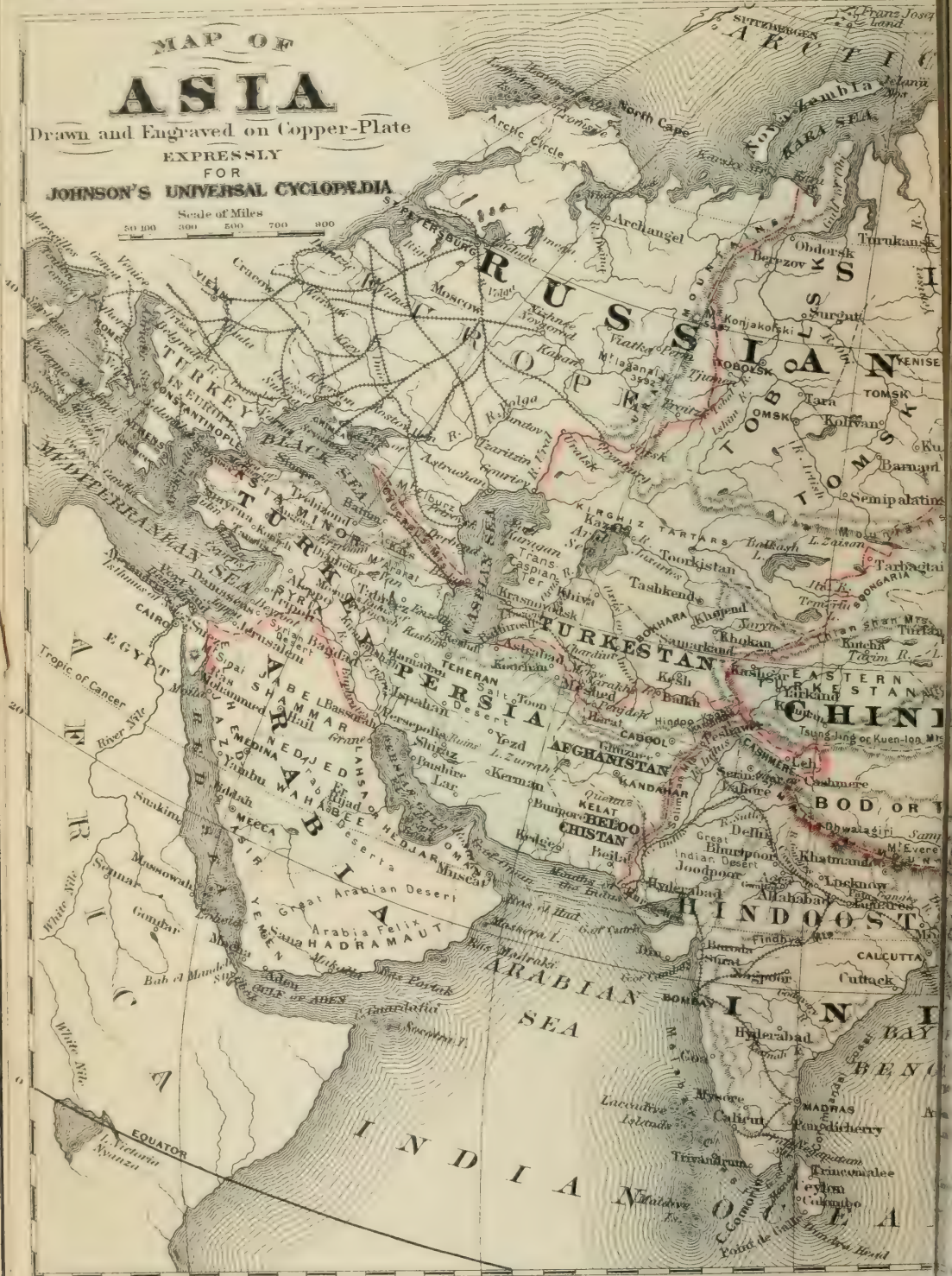
EXPRESSLY

FOR

JOHNSON'S UNIVERSAL CYCLOPEDIA

Scale of Miles

50 100 200 300 400 500 600 700 800







represents in Rus. A., while the Armenians and Nestorians are numerous in Tur. and Per. Vague estimates place the adherents of the native religions of A. at 600,000,000, the Mohammedans at 20,000,000, the Chrs. at 32,000,000, 4,000,000 R. Cath., 7,000,000 Gr. Ch., and 400,000 Prots., etc.), and the Jews at 350,000. Of savages, properly speaking, A. holds few, and these in the remote hyperborean regions or in the S. *Asiaticus*.

Populations, Languages, Etc. The inhabs. of A. are of the Mongolian, Aryan, and Semitic races, and their ancestry runs the gamut in the recorded history. The Mongols include the whole of E. and S. E. Asia—viz., the Chi., Japanese, Tartars, Siamese, Turcomans, Kamtchatkans, Malays, etc. The langs. used by this great division are very various, including the Arabic alphabet employed by all the Turkish varieties, the monosyllabic lang. of the Indo-Chi., the rude dialects of the Arctic regions, and the Cingalese, Tamil, and Carnatic in S. Asia. The Aryan race embraces the people of Afghanistan, Beloochistan, Per., and N. India. These use the Indo-Germanic langs.—viz., Sanscrit, Per., and Armenian. The third great group includes the Syrian, Heb., and Ar. races, speaking the Semitic tongues. Among these various races and langs. between 30 and 40 distinct nations are distributed.

ASIA—POLITICAL DIVISIONS, AREA, AND POPULATION.

[Compiled from FARMAN WAGNER, *Revue des Et. Asiatiques*, GENÈVE, 1883, with later statistics of Brit. India, 1882.]

COUNTRIES.	Square miles.	Population.	COUNTRIES.	Square miles.	Population.
Asia.....	8	22,707	Hyderabad....	126,674	9,167,789
Algeria.....	278,402	4,400,000	Madr....	138,674	8,000,000
Arabia.....	170,033	21,000,000	Managat....	7,944	500,000
Africa.....	967,406	100,000,000	Myat....	29,400	4,186,399
Bombay.....	108,700	300,000	N. W. Provs....	80,848	33,445,111
Burma.....	92,254	25,000,000	Orissa.....	26,900	11,407,625
Canton.....	100,000	800,000	Panagat....	218,474	22,487,442
Ceylon.....	10,000	800,000	Rajasthan....	130,889	11,000,000
China proper.....	1,100,000	400,000,000	Siam.....	50,000	2,000,000
China proper.....	3,000,000	250,000,000	Travancor....	6,700	2,401,158
France.....	483,000	35,000,000	India—British.....	1,470,207	252,541,210
Germany.....	287,000	15,000,000	Assam.....	15,711	300,000
Greece.....	28,000	1,000,000	Asham.....	45,000	4,000,000
Holland.....	16,000	1,000,000	Bengal.....	194,188	65,000,000
India—British.....	1,470,207	252,541,210	Bihar.....	17,711	2,000,000
Japan.....	37,711	30,000,000	Bombay.....	100,000	20,000,000
Korea.....	100,000	20,000,000	Burma.....	92,254	25,000,000
Malacca.....	100,000	20,000,000	Canton.....	100,000	800,000
Managat.....	7,944	500,000	Ceylon.....	10,000	800,000
Myat.....	29,400	4,186,399	China proper.....	1,100,000	400,000,000
N. W. Provs.....	80,848	33,445,111	China proper.....	3,000,000	250,000,000
Orissa.....	26,900	11,407,625	France.....	483,000	35,000,000
Panagat.....	218,474	22,487,442	Germany.....	287,000	15,000,000
Rajasthan.....	130,889	11,000,000	Greece.....	28,000	1,000,000
Siam.....	50,000	2,000,000	Holland.....	16,000	1,000,000
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Asham.....	45,000	4,000,000	Malacca.....	100,000	20,000,000
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Siam.....	50,000	2,000,000	Holland.....	16,000	1,000,000
Travancor.....	6,700	2,401,158	India—British.....	1,470,207	252,541,210
India—British.....	1,470,207	252,541,210	Japan.....	37,711	30,000,000
Assam.....	15,711	300,000	Korea.....	100,000	20,000,000
Asham.....	45,000	4,000,000	Malacca.....	100,000	20,000,000
Bengal.....	194,188	65,000,000	Managat.....	7,944	500,000
Bihar.....	17,711	2,000,000	Myat.....	29,400	4,186,399
Bombay.....	100,000	20,000,000	N. W. Provs.....	80,848	33,445,111
Burma.....	92,254	25,000,000	Orissa.....	26,900	11,407,625
Canton.....	100,000	800,000	Panagat.....	218,474	22,487,442
Ceylon.....	10,000	800,000	Rajasthan.....	130,889	11,000,000
China proper.....	1,100,000	400,000,000	Siam.....	50,000	2,000,000
China proper.....	3,000,000	250,000,000	Travancor.....	6,700	2,401,158
France.....	483,000	35,000,000	India—British.....	1,470,207	252,541,210
Germany.....	287,000	15,000,000	Assam.....	15,711	300,000
Greece.....	28,000	1,000,000	Asham.....	45,000	4,000,000
Holland.....	16,000	1,000,000	Bengal.....	194,188	65,000,000
India—British.....	1,470,207	252,541,210	Bihar.....	17,711	2,000,000
Japan.....	37,711	30,000,000	Bombay.....	100,000	20,000,000
Korea.....	100,000	20,000,000	Burma.....	92,254	25,000,000
Malacca.....	100,000	20,000,000	Canton.....	100,000	800,000
Managat.....	7,944	500,000	Ceylon.....	10,000	800,000
Myat.....	29,400	4,186,399	China proper.....	1,100,000	400,000,000
N. W. Provs.....	80,848	33,445,111	China proper.....	3,000,000	250,000,000
Orissa.....	26,900	11,407,625	France.....	483,000	35,000,000
Panagat.....	218,474	22,487,442	Germany.....	287,000	15,000,000
Rajasthan.....	130,889	11,000,000	Greece.....	28,000	1,000,000
Siam.....	50,000	2,000,000	Holland.....	16,000	1,000,000
Travancor.....	6,700	2,401,158	India—British.....	1,470,207	252,541,210
India—British.....	1,470,207	252,541,210	Japan.....	37,711	30,000,000
Assam.....	15,711	300,000	Korea.....	100,000	20,000,000
Asham.....	45,000	4,000,000	Malacca.....	100,000	20,000,000
Bengal.....	194,188	65,000,000	Managat.....	7,944	500,000
Bihar.....	17,711	2,000,000	Myat.....	29,400	4,186,399
Bombay.....	100,000	20,000,000	N. W. Provs.....	80,848	33,445,111
Burma.....	92,254	25,000,000	Orissa.....	26,900	11,407,625
Canton.....	100,000	800,000	Panagat.....	218,474	22,487,442
Ceylon.....	10,000	800,000	Rajasthan.....	130,889	11,000,000
China proper.....	1,100,000	400,000,000	Siam.....	50,000	2,000,000
China proper.....	3,000,000	250,000,000	Travancor.....	6,700	2,401,158
France.....	483,000	35,000,000	India—British.....	1,470,207	252,541,210
Germany.....	287,000	15,000,000	Assam.....	15,711	300,000
Greece.....	28,000	1,000,000	Asham.....	45,000	4,000,000
Holland.....	16,000	1,000,000	Bengal.....	194,188	65,000,000
India—British.....	1,470,207	252,541,210	Bihar.....	17,711	2,000,000
Japan.....	37,711	30,000,000	Bombay.....	100,000	20,000,000
Korea.....	100,000	20,000,000	Burma.....	92,254	25,000,000
Malacca.....	100,000	20,000,000	Canton.....	100,000	800,000
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Myat.....	29,400	4,186,399	China proper.....	1,100,000	400,000,000
N. W. Provs.....	80,848	33,445,111	China proper.....	3,000,000	250,000,000
Orissa.....	26,900	11,407,625	France.....	483,000	35,

power of endurance, and has been the domesticated drudge of man from time immemorial. The A. is probably a native of Central Asia, as it is now found wild in that region.

Assafetida, *asa-fet-e-da*, or **Asafetida** [from *asa*, an Oriental word said to signify "gum," and the Lat. *foetidus*, "fetid"], a gum-resin or the concrete juice of the root of *Narthex A.* (the *Ferula A.* of Linnaeus). It has a peculiar and disagreeable odor, and is extensively used in med. as an antispasmodic.

Assai, *as-sah'-e*, a beverage commonly used on the Amazon, prepared from the fruit of several species of palm.

Assam, a presidency of Farther India, bordering upon Chi., ceded in 1826 by Burmah to the Brit. Area, 45,302 sq. m. Pop. 1880, 4,815,157.

Assassins, one who attacks and kills by treachery or surprise a person who is unprepared for defence. The word was originally the name of a fanatical sect or order which originated in Per. about 1080 A. D., and afterward spread into the Lebanon Mts. Their distinguishing tenet was unhesitating obedience to their chief, who was styled "the Old Man of the Mts." The name "assassins" is said to come from their custom of exciting themselves with hashish when about to undertake any murderous enterprise. In the later periods of the crusades they are said to have numbered 50,000 armed men, their most famous leader being Alo-ed-Deen, b. about 1210. The order is said to have been exterminated by the Saracen sultan Bibars.

Assault and Battery. An A. is an offer or attempt to inflict corporal injury upon another, accompanied by circumstances which indicate an intent, coupled with a present ability, to do actual violence. If violence be actually inflicted, the act amounts to a B.; but the offer or attempt to do violence is alone sufficient to constitute an A. It is not necessary that an actual intention to do violence exist; it is enough that there be a sufficiently indicated intent, so that it would appear to a reasonable mind that the apparent purpose was the true one. Moreover, if threats or offers of violence be made, but there is an apparent present inability to carry them into effect, there is no A. committed. Thus, one might vehemently threaten actual violence, but if an impassable barrier, as a ditch or wall, intervened between him and the person menaced, the act would not be an A. A B. is really the consummation of an A., and therefore requires that the offer or attempt to do violence be carried into effect by the actual use of violence. An A. and B. is sometimes justifiable, as when it is committed in the reasonable defence of one's person or his real or personal property. And in exercising this right of defence the person threatened is justified in acting upon reasonable appearances; but in no case should the force used be greater than is properly adequate to repel the A. or avert or prevent the injury apprehended. An A. and B. is also sometimes justifiable when committed in the course of rightful discipline, as where a father or schoolmaster inflicts moderate punishment upon a child, or the master of a vessel upon a seaman; but in these cases also there must be no excess of violence. An A. and B. is both a civil and criminal wrong, and there may be a civil action for damages by the person injured, and also a criminal prosecution instituted. In criminal law there are also recognized certain forms of aggravated A., which receive severer punishments than common A., as an A. with intent to kill, with intent to commit rape, etc.

GEORGE CHASE.

Assay, or **Assaying**, [from the Fr. *assayer*, to "try"]. This term, which is applied to metals or metallic compounds, is sometimes employed as synonymous with analysis, but more generally restricted to the process of ascertaining the proportion of gold or silver in an alloy, or of pure metal in a metallic ore. Silver plate and manufactured articles of gold and silver generally contain an alloy of copper or other metal. In G. Brit., each article, before it is sold, is assayed at Goldsmiths' Hall, so as to determine the proportion of precious metal in its composition. The process of A. gold and silver depends on the principle that those metals cannot be converted into oxides by union with the oxygen of the air, while the baser metals with which they are alloyed can be oxidized if raised to a high temperature. The apparatus employed in this process consists of a *cupel*, a small shallow vessel made of bone-ash, and a *muffle*.

Assaman'ni (GIUSEPPE SIMONE), bp. of Tyre *in partibus*, a learned Maronite, b. at Tripoli, in Syria, in 1687. He pub. a valuable work on Syrian lit., entitled *Bibliotheca Orientalis Clementino-Vaticana*. D. Jan. 11, 1768. His nephew, STEFANO EYDRO, an Orientalist, b. at Tripoli in 1707, was ed. at Rome. He was abp. of Apamea *in partibus*. He pub. several catalogues of Oriental MSS. D. 1782.

Assembly, in politics, a convention or body of men associated for civil or legislative business, and possessing more or less political power. In some of the U. S. the term is applied to the lower branch of the legislature, and the other house is called the senate. In the Presb. ch. the highest tribunal is styled the Gen. Assembly.

Assets [from the Fr. *assez*, "enough"], in law, denotes the property in the possession of an heir or under the control of an exr., admr., or trustee, applicable to the payment of debts and charges against the estate which they represent. It is mainly applied to the case of heirs, exrs., and admrs. A. are either real or personal. Real estate is A. in the hands of an heir; personal property, in like manner, in those of an exr. or admr. A. are also distinguished into legal and equitable, the first being under the control of a court of law, and the second administered by a court of equity; and the two courts are not governed by the same rules. In the U. S. this last distinction is, by reason of statute law, of little consequence, as all the estate of a deceased person becomes a fund for the liquidation of his debts, according to a prescribed statutory order. It is a general rule that real estate is not to be taken for the payment of debts until the personal property is exhausted, but a testator may direct differently in his will.

As'shur, or **Ash'ur**, an anc. city, cap. of Assyria, on the Tigris, 60 m. S. of Nineveh. Its site is marked by extensive ruins at Kileh-Sherghat, among which many cuneiform inscriptions have been found. A son of Shem was also called A., from whom the name of the city was derived.

Assignat, *as-in-yah'*, paper money issued by the Fr. govt. in 1790, and at subsequent periods of the revolutionary régime. It was based on the security of the national domains, which consisted of the confiscated estates of the Ch. and wealthy *émigrés*. Their value soon declined until, in Mar. 1796, one franc in gold was worth 300 francs in paper, shortly after which the A. were called in, the total amount issued having been 45,578,000,000 francs.

Assignment [from the Lat. *assigno*, to "appoint"], in law, the act of making over to another one's estate or interest. The person making the A. is an *assignor*; the recipient is an *assignee*. The word is mainly used in reference to transfers of leases, incorporeal rights, such as copyrights and patents, and rights of action. It is a rule of *common law* that a thing in action is not assignable, though this doctrine is not followed in a court of *equity*, an A. being regarded in that court as in the nature of a declaration of trust, so that the assignor becomes a trustee for the assignee. There are some exceptions to this rule, as in the case of mere personal causes of action and cases where public policy intervenes. The word A. is also used to indicate the act of setting apart dower for a widow in the real estate of her husband. It is also employed, in case of bankruptcy or insolvency, to indicate the act of transfer of a failing debtor's property to a person called an assignee, who is substantially a trustee for the benefit of the creditors. A failing debtor by the laws of some States is permitted to make a voluntary and even preferential transfer to an assignee acting in the same gen. manner, though such laws are substantially superseded for the time being when there is a U. S. bankruptcy law in operation. T. W. DWIGHT.

Assistance [from the Lat. *ad*, "near," and *sisto*, to "stand"], **Writ of**, a direction by the court of chancery to the sheriff to put a party in whose favor a decree has been rendered in possession of land to which the decree has declared him to be entitled.

Associate Presbytery, in Scot., dating from 1739, founded in opposition to aristocratic dictation in the settlement of ministers. In 1747 a split occurred, resulting in the formation of the A. Synod and the Gen. A. Synod. In 1820 this schism was healed, only a few ministers, belonging to the Gen. A. Synod, protesting against the union.

Association of Ideas, a principle or law in mental philos. exercising an important influence upon the operations of the mind. Under this power arises what is called the A. of *ideas*. A. may connect ideas by a simple link or by a multitude of links. The laws of A. have been variously enumerated. Some of the most obvious and important are: 1. Simultaneity and succession, synchronism and chronology. 2. Contiguity and remoteness between ourselves and the things, or between the things themselves. 3. Resemblance and contrast to the eye in works of art, which recall the original to the mind. 4. The logical relations involve A. of ideas, *e. g.* cause and effect, father and child, the universe and God. The relations of phys., mechanical, and cosmoical order are of the same kind, and hence A. is the mother of invention and discovery. 5. The A. of the verbal sign with the thing signified, which is the essence of language and the necessary preliminary to reasoning. A well regulated A. of ideas on our own part, and a delicate perception of what is likely to be the A. in the minds of others with particular words or things, are essential to the charm of conversation and of social intercourse. The A. of ideas has been observed by thinkers from an early period. Aristotle speaks of it in his *Treatise of Reminiscence* very briefly, but in a manner worthy of his wonderful acuteness. It is to Locke, however, in his *Human Understanding*, we owe the first discussion of the subject with a fulness at all commensurate with its importance; and no system worthy of the name, since Locke, has failed to devote a large space to it. C. P. KRAUTH.

Assumption [Sp. *Asuncion*], the cap. of Paraguay, S. Amer., on the left (E.) bank of the river Paraguay, 645 m. N. of Buenos Ayres, was founded by Spaniards in 1536. Pop. 19,463.

Assumption of the Virgin, a festival of the Gr. and Rom. chs. in commemoration of the resurrection and ascent of the Virgin Mary to heaven. It is held on the 15th of Aug.

As'sye, or **As'saye**, a v. in Hindostan, near which Sir Arthur Wellesley, with 4500 men, defeated 30,000 or more Mahrattas, Sept. 23, 1803.

Assy'ria [Gr. *Assyria*], in W. Asia, now comprised in the Tur. empire. It derives its name from Asshur, a son of Shem, probably a leader in one of the early migrations. In its earlier state it was a narrow strip, mainly on the E. bank of the Tigris. Afterward it came to include the whole of Mesopotamia, and still later the name A. denoted the entire plain watered by the Euphrates and the Tigris, together with tributary regions on the W., N., and E.

The mythical hist. of A. goes back many thousand yrs. before the Chr. era. Its authentic hist. begins about 2458 B. C., when, as related in Gen., "went forth Asshur, and builded Nineveh," and other great cities, upon or near the upper Tigris. From this time for nearly 1000 yrs. the Heb. Scripts. contain no mention of A. It was not until about 1850, when Botta, Layard, and others had unearthed and deciphered the inscriptions at Nineveh, Calah, and elsewhere, that the real hist. of this great empire, which lasted more than 1000 yrs., has come to be at all known. [For the hist. of A., see NINEVEH.]

The Assyrians were undoubtedly of Semitic stock, while the Babylonians were of mixed race. (See BABYLON and BABYLONIA.) Their religion was similar to that of the Babylonians, except their main object of worship was Asshur,

their deified ancestor, who came to be considered the creator and supreme ruler of all things, and was styled the "King of all the gods." Then came 2 triads of secondary gods, each of whom existed in 2 persons, male and female, and a pentad of 5 planetary gods, the whole 12 composing the Assyrian pantheon. Below these were a host of subordinate deities, prominent among whom was Nisroch, the eagle-headed and winged god whose figure is very frequent in the bas-reliefs.

In some branches of art and science the Assyrians made considerable advances. Their arch, was peculiar and very ornate. Bas-reliefs supplied the place of painting, and were used to illustrate every kind of subject. A favorite form was the colossal winged bull with a human head. Their



Winged Bull with a human head.

astron. was in advance of that of the Egyptians. They knew the true length of the yr., the synodical period of the moon, and, though not accurately, the precession of the equinoxes. They ascribed the solar eclipse to its true cause, and calculated lunar eclipses with great accuracy; so that they must have been acquainted with the golden cycle of 28 lunations; fixing the period at 18 yrs. and 10 days, which is within less than 8 hours of the true period.

That the Assyrians were a cruel and blood-thirsty people is evinced by their sculptured records and inscriptions, in which the burning of cities and torturing of captives form a prominent feature, more than justifying the bitter invectives of the Heb. prophets, who characterized Nineveh as "the bloody city, . . . full of lies and robbery," with "a multitude of slain, and "no end of corpses." (See G. RAWLINSON, *The Five Great Monarchies of the Anc. E. World*.)

A. H. GUERNSEY.

Astar'te [Gr. Ἀστάρτη] or **Ash'taroth**, the chief god-

dess worshipped by the Phœnicians, Syrians, and Carthaginians. She is considered by some as the original of the Gr. Aphrodite (Venus). Others identify her with Cybele, and others again with Juno. As Baal was the god of the sun, so A. was the goddess of the moon. She is usually represented with 4 wings (the 2 uppermost of which are intended to symbolize the horns of the moon), wearing a pointed cap, and holding a dove in her hand.

Astar'te [Lat. *astaticus*; from the Gr. *a*, priv., and *statis*, to "stand"], a term applied to the magnetic needle when it is withdrawn from the action of the earth's magnetism, and has no longer the statical position in which it is in equilibrium with the influence of this force.

Aster [from the Gr. ἄστρον, a "star"], a genus of plants of the natural order Compositæ, which, on account of this large and characteristic genus, Lindley proposes to call *Asteraceæ*. This genus comprises a great number of species, all herbaceous, mostly perennials, natives of the U. S. Many of them are cultivated in the gardens of Europe for the beauty of the flowers, which bloom in autumn. The Chi. A. is an annual, of a related but not the same genus.

Asteroids [Gr. ἄστρον, a "star," and εἶδος, "like"], also called *Planetoids*, a group of small planets whose orbits lie between those of Mars and Jupiter. The first of the group was discovered by Piazzi Jan. 1, 1801—that is, the first day of the present century; a second was discovered by Olbers in 1802; a third by Harding in 1804, and a fourth by Olbers in 1807. These were named in the order of discovery, Ceres, Pallas, Juno, and Vesta. No other member of the group was known to exist till 1845, when a fifth was discovered by Hencke. From that time new discoveries have added to the list from yr. to yr. until, at the time of writing, it numbers 245. These bodies have all received proper names,

derived mostly from Gr. and Rom. mythology, but they are usually designated by numbers denoting the order of discovery. Their mean distances from the sun vary from about 200,000,000 to a little more than 300,000,000 m., the average corresponding fairly with that of an hypothetical planet between Mars and Jupiter, whose existence was suggested to some of the early astron. by Bode's law. The A. differ from the other planets of the solar system in these respects: 1. They are much smaller, the largest being not more than from 200 to 300 m. in diameter; 2. Their orbits, as a rule, are more eccentric, that of Polyhymnia, or No. 33, for example, having an eccentricity of 0.339119; and 3. The inclinations of their orbits to the ecliptic, as a rule, are greater, that of Pallas, for example, being 34° 43'. [From, orig. art. in *J. S. Univ. Cyc.*, by Prof. J. C. WATSON, LL.D.]

Asthma, *az ma* [Gr. ἀσθμα, a "gasping for breath"], a difficulty of breathing occurring in paroxysms. True A. is due to irritation, either at the origin of the pneumogastric nerve or in some remote part of its course. True or nervous A. consists in a paroxysmal spasm of longer or shorter duration, attacking the muscular elements of the bronchial tubes, diminishing temporarily their calibre, and thereby obstructing respiration. Notwithstanding the great distress which may accompany the attack, the immediate danger is not great. The smoking of saltpetre paper or of stramonium leaves, the administration of opiates, coffee, belladonna, conium, cannabis, chloral, vapor of chloroform, etc., may or may not relieve the paroxysm. Iodide of potassium benefits many cases, permanently or temporarily. Quinia, Fowler's solution, iron, and other tonics are often useful. A nutritious diet, with careful regulation of the bowels, is important. A. in many cases is accompanied by a bronchial catarrh.

E. DARWIN HUDSON, JR.

Astigmatism. See EYE, DISEASES OF.

Astolphus, or **Astulphus** [Fr. *Astolphe*; Ger. *Aistulf*], king of the Lombards, obtained the throne in 749 or 750 A. D. About 752 he threatened Rome, and the pope then applied for help to Pepin, king of the Franks, who defeated A. in 754, and forced him to cede Ravenna and the Pentapolis to the pope. D. 756.

Astor (JOHN JACOB), b. at Waldorf, near Heidelberg, Ger., July 17, 1763, emigrated to the U. S. in 1783; learned the fur trade, and with a cap. of a few hundred dollars commenced dealing in furs, which he exported to Europe, and amassed a fortune in that and other mercantile business. In 1811 he founded Astoria on the W. coast of N. Amer., near the mouth of the Columbia, as a depot for the fur trade. His sagacious purchases of real estate in New York added largely to his wealth, which at his death was estimated at \$20,000,000. He bequeathed \$400,000 to found the A. Library, to which his son, William B. Astor, added nearly as much, and his grandsons, in 1880, made a large gift to enlarge the building. D. Mar. 29, 1848.

Astoria, Ill. See APPENDIX.

Astoria, Queens co., N. Y., on the E. River, opposite New York, is now a part of L. I. City. Pop. 1870, 5204.

Astoria, city, pt. of entry and cap. Clatsop co., Or., on the S. bank of the Columbia River, 9 m. from its mouth. It was once an important depot of the fur trade. Pop. 1870, 639; 1880, 2803.

Astræ'a [Gr. Ἀστραία], goddess of justice, in classic mythology was said to be a daughter of Jupiter and Themis. A. is also the name of an asteroid whose mean distance from the sun is 2.577 times that of the earth.

Astræa, a genus of radiated animals of the class Poly-
pes, order Madreporaria. They live in the sea, and form calcareous skeletons (star-corals), which are characterized by sessile, star-shaped, lamellate cells, crowded on the upper surface. The polyps are often an inch in diameter. They form large hemispherical masses of coral.

Astrakhan, or **Astrachan**, a city of Rus., on an island of the river Volga, 40 m. from its entrance into the Caspian Sea. It has a large trade in fish and leather, and is the seat of Gr. and Armenian archbishops. Pop. 57,704.

Astrol'ogy [from the Gr. ἄστρον, a "star," and λόγος, a "discourse," also "science"], literally, the "science of the stars." This term was originally synonymous with astron., but was subsequently applied to a spurious science which professed to explain the events of human life by the influence of the stars or planets. A., which is a very anc. form of superstition, may be defined as the attempt to predict the fortunes of men by the positions and aspects of the stars. The Jews, after their captivity in Babylon, were much addicted to it, and the same delusion has prevailed among all the nations of Europe. In anc. Rome, during the empire, astrologers were a numerous and influential class. In the Middle Ages astron. proper was chiefly studied as subsidiary to A., which was considered as the more important of the two sciences. The relation between A. and astron. was like that between alchemy and chem. The notion of Aristotle, set forth in the 12th book of the *Metaphysics*, that the heavenly bodies were "ensouled," and that each moved in its orbit by a conscious volition, gave currency to similar ideas among the students of the Peripatetic system. The power of these heavenly beings was supposed to flow out from their dwelling places, and affect beings on the earth for good or evil. Astrological predictions are founded on the relative positions and aspects of the sun, moon, and planets at the moment of birth, and on certain arbitrary influences supposed to belong to each of these bodies.

M. B. ANDERSON.

Astron'omy [from the Gr. ἄστρον, a "star," and νόμος, a "rule"], the science which treats of the heavenly bodies. It may be divided into three branches—DESCRIPTIVE or PHYSICAL, THEORETICAL, and PRACTICAL. We shall treat mainly of the first of these branches.

The material universe, as revealed by the telescope, is formed of a vast collection of stars and nebulae, the number of which no definite limit can be set. Of the stars, about 5000 are usually visible to the naked eye, but very



Astarte.

keen observers can detect as many as 8000. The number visible is greatly increased when a small telescope is pointed at the heavens, and continues to increase with every increase in the power of the instrument, rising, in the case of the most powerful telescopes, to 40,000,000 or 50,000,000. Even then there is no evidence that the smallest stars are seen, but every reason to believe that larger instruments would show millions more in every direction.

Until near the middle of the present century the distances even of the nearest stars eluded measurement, and even now there are not a dozen of which the parallax is known with anything like certainty. But these are sufficient to enable us to form a gen. idea of the scale on which the universe is constructed. It is roughly estimated that the stars of the first magnitude have an average distance of about a million times that of the earth from the sun. This distance may be expressed by saying that light, moving around the earth 8 times in a second, would require 15 yrs. to traverse it. Now, supposing that, on an average, the more distant stars are of the same real magnitude with the nearer ones, but look smaller owing to their distance, we may conclude that the smallest stars visible to the naked eye are 10 times as far as the nearest ones; and we may infer with considerable probability that they lie at distances which light traverses in from 50 to 200 yrs.

Of the form and boundaries of this agglomeration of stars nothing certain is known, but it is certain that there is a great tendency to aggregation near the plane of the Milky Way, which consists of telescopic stars, too small to be separately visible to the naked eye, and led Herschel to the theory that all the visible stars form a comparatively thin stratum, near the centre of which our sun is placed. Nothing indicating growth or decay has been actually observed in the stellar universe. There is no established instance either of a known star's disappearing from the heavens, or of a really new one's coming into view. The supposed cases of the latter kind are found to be due to extraordinary variability; a small star, perhaps invisible to the naked eye, suddenly bursting forth into brilliancy, and after a time subsiding to its former magnitude. Several instances of this kind are on record.

Besides stars, we have nebulae as component parts of the telescopic universe. They are cloud-like patches of light scattered all over the heavens, but less numerous in the Milky Way than at a distance from it. Two of them, Orion and Andromeda, in the N. hemisphere are clearly visible to the naked eye. Before the discovery of spectral analysis, it was not possible to draw the line between nebulae and clusters of stars, because large numbers of objects which look like nebulae through small telescopes are found, with large ones, to be clusters of stars, and every increase in the power of the instrument was found to change objects from the former to the latter class. It was therefore doubtful whether all nebulae were not really clusters of stars too small or too distant to be resolved with the telescope. But, as soon as the spectroscopic was turned upon such of these objects as could give a visible spectrum, it was found that many of them were not solid bodies at all, but masses of incandescent gas, generally hydrogen or nitrogen.

Our description of the stellar universe may be summed up by saying that it is composed of an unknown host of stars, certainly more than 50,000,000, mostly scattered in irregular aggregations forming the Milky Way, while many are aggregated in yet closer clusters, some of which are situated within the Milky Way and some without it, and of a number of enormous masses of incandescent gases situated at unknown distances. Our sun is simply one of these 50,000,000 of stars, without, so far as we know, any mark to distinguish him among his fellows. He is probably rather smaller than the average.

The physical const. of the sun and stars is a subject which has greatly occupied investigators in recent times, without leading them to an entirely certain and complete conclusion; but in some respects there is a substantial agreement. The photosphere—that is, the shining surface of the sun—is composed of cloud-like matter, apparently floating in some kind of fluid, the whole being at an extremely high temperature. The spots are known to be dark depressions in the photosphere, as to the cause of which investigators are not yet agreed. Of the interior of the sun we can see nothing, but there is good reason for holding that it is mostly formed of materials similar to those which compose the crust of the earth, heated to so high a temperature as to be completely vaporized. At the same time, the pressure to which this vaporized interior is subjected by the weight of its outer layers is so great that it is compressed into the smallest possible space, so that the mean density of the sun is not much less than that of water. On the outside, this mass is continually cooling off by radiation, and hence condensing to the solid or liquid state. The matter thus condensed forms the photosphere, which seems to be in a state of continual change.

Immediately above the photosphere lies a shallow but complex incandescent atmosphere, which is styled the chromosphere, and consists of hydrogen gas, mixed with the vapors of many of the metals. This atmosphere shines with a red light, and has been frequently seen during total eclipses of the sun. It is agitated by storms of fire, the velocity of the wind sometimes rising to 100 m. per second, and masses of fiery vapor many times the size of our earth shooting up to the height of 20,000, 50,000, or even 80,000 m. These masses constitute the red "protuberances" always visible during total eclipses of the sun. Outside the chromosphere lies an appendage the nature of which is still involved in mystery, as it can be studied only during the rare moments afforded by total eclipses of the sun. It is seen in the glow of light which then surrounds the whole sun, extending to a height greater than the semi-diameter of that body, and is known as the solar corona. By the motion of the spots it is found that the sun rotates on his axis in about 25 days.

The sun is accompanied by 8 major planets, of which our

earth is one, and by a large group of minor planets. The major planets may be divided into 2 groups of 4 each, the inner and smaller ones being Mercury, Venus, the Earth, and Mars, and the outer and larger ones being Jupiter, Saturn, Uranus, and Neptune. Uranus, the smallest of the outer group, has more than 10 times the mass of the Earth, and is more than 50 times its size. Between the 2 groups is a wide gap in which the minor planets are found.

Mercury, the nearest to the sun, and the smallest of the major planets, shines with a light exceeding that of any of the fixed stars, with the possible exception of Sirius. Owing to its proximity to the sun, it can be seen by the naked eye only when near its greatest elongation, which occurs about once in 4 months on each side of the sun. The same circumstance, together with its intense brilliancy, has prevented the certain discovery of any peculiarities of physical const. This planet is quite often seen to pass between us and the sun, the transits usually occurring at intervals of 3, 7, 10, or 13 yrs.

Venus, the 2d planet from the sun, is, at times, next to the sun and moon, the most brilliant object in the heavens. When E. of the sun it is seen in the W., after sunset, as the evening star, and when W. of him it rises before him as the morning star. It gives strong evidence of being surrounded by an atmosphere more dense than that of the earth. Twice in every 120 yrs. Venus passes between us and the sun.

The Earth is the first planet known to be accompanied by a moon. Its equator is inclined to the ecliptic, or the plane in which it moves round the sun, at an angle which in 1850 amounted to $23^{\circ} 27' 31''$, and which is now diminishing at the rate of about $47''$ per century, to increase again in the course of ages, as it fluctuates between comparatively narrow limits. The earth's axis at the same time changes its direction very slowly in the heavens, describing a complete circle around the pole of the ecliptic in about 26,000 yrs., the time varying somewhat in consequence of the motion of the ecliptic itself. The change of seasons is due to the inclination of these 2 planes, the earth's N. hemisphere being turned toward the sun from Mar. 21 till Sept. 21, and its S. hemisphere being so turned during the remainder of the yr. About these 2 dates the plane of the earth's equator passes through the sun, and day and night are consequently equal all over the globe, whence the term *equinox*. The civil year has always been measured by the interval between the returns of the earth to the same equinox, because this return brings round the change of the seasons.

The Moon, being the nearest of the heavenly bodies, is that one with the physical peculiarities of which we are best acquainted. She has the appearance of an arid desert, on which the most careful scrutiny has failed to reveal a trace of air, water, or life. Her surface is broken up by great inequalities, entirely different in character from those on the surface of the earth. Instead of undulating hill and valley, with chains of mts., we find saucer-shaped depressions, generally of considerable regularity, with flat bottoms, and mounds or hillocks scattered over nearly the entire surface. Large regions are comparatively smooth, and, from their dark color, were supposed by the first users of the telescope to be seas. The moon's revolution on her axis coincides exactly with her mean motion around the earth, and consequently she always presents the same face to us; her farther hemisphere is forever hid from view. The size of the moon is such that her dark shadow, cast by the sun, is about 240,000 m. in length, narrowing down to a point at this distance. Whenever the earth is in the line of this shadow we have an eclipse of the sun.

Mars, the 4th planet from the sun, has always been scrutinized by astrons. with the greatest interest, owing to the variegated character of its surface, and its seeming resemblance to the earth. The whole disk is clearly divided into light and dark portions, which have been supposed to be seas and continents. The supposed seas present a dull greenish hue, while the continents are reddish and give rise to the characteristic color of the planet. Near each pole a brilliant white patch is seen, which is attributed to arctic snows and ice. Two satellites have lately been discovered. Outside of Mars we have the group of minor planets, or asteroids, of which 219 are now known. As a gen. rule, their orbits are much more eccentric and inclined to the ecliptic than those of the major planets. Their diameters are supposed to range from 30 or 40 m. to 300 or 400.

Jupiter is the largest of the system, so that, notwithstanding its great distance, it is brighter than any other star or planet except Venus. Its appearance through the telescope is peculiar, a dark band or belt being always visible on each side of its equator, and sometimes another near each pole. When closely scrutinized these belts are found to be of irregular shape and ragged, cloud-like formation. Jupiter is accompanied by 4 satellites, which are about as bright as the smallest stars visible to the naked eye, and could be seen without a telescope if they were not overpowered by the brilliancy of the planet. Most of the satellites pass through the shadow of the planet, and suffer a consequent eclipse in every revolution. These eclipses, being visible at the same time all over the globe, furnish one of the easiest methods of roughly determining the lon., but very little accuracy can be thus attained. By these eclipses the progressive motion of light was first determined by Roemer.

Saturn, the 6th planet from the sun, with his rings and satellites, is perhaps the most striking telescopic object in the heavens. He has belts like Jupiter, but much fainter. His rings are very broad and thin, their edges being turned toward the planet. Nothing like these rings has been seen anywhere else in our system, and the question, What keeps them from falling upon the planet? is one which has occupied maths. and astrons., without being definitely solved. The corpuscular or cloud theory is that now most generally admitted. This theory is that the rings are not solid or liquid masses at all, but only vast swarms of minute satellites, too small to be seen separately, but so numerous

that they present the appearance of a continuous body, Saturn is accompanied by 8 satellites, but none of them present any characters of especial interest.

Uranus was discovered by Sir William Herschel in 1781. It had frequently been observed before that time, but was not known to be a planet. It is accompanied by 4 satellites, 2 of which were discovered by Herschel.

Neptune was discovered in 1846 by one of the most remarkable achievements in the list of A., its position in the heavens having been calculated by Leverrier and Adams before its existence was known. It is attended by 1 satellite.

Comets.—Besides the planets, a number of comets are known to be members of the solar system, and a great number of others are suspected to be such, even though their time of revolution is so great that they have never been recorded as seen but once. The phys. const. of comets is still one of the enigmas of A. Large comets are generally found to consist of three distinct formations: (1) a small bright but ill-defined nucleus; (2) a round mass of nebulous matter surrounding this nucleus; and (3) a tail of extremely rare matter, but of enormous length, extending off from the comet in a direction opposed to the sun, growing wider and fainter as it extends, until it gradually becomes invisible. But the smaller telescopic comets often exhibit neither nucleus nor tail, but consist only of an ill-defined, nebulous mass. It is now generally considered that the tail of a comet is a stream of finely divided matter continually driven off from the comet into space by some repulsive force in the sun.

The foregoing description of the material universe as revealed by the telescope may be considered as an epitome of *Descriptive A.* Of *Practical A.* we merely say that it teaches the construction and use of such instruments as the telescope, the transit instrument, the meridian circle, and the zenith telescope, and the calculation of the observations made with them. The usefulness of *Practical A.* may be judged from this consideration: take an astron., blindfolded, to any part of the globe, give him the instruments we have mentioned, a chronometer regulated to Greenwich or Wash. time, and the necessary tables, and if he can see the stars he can tell where he is in lat. and lon. within a hundred yards.

For *Theoretical A.*, though scientifically the most important branch of the subject, we can here do no more than give the reader a gen. idea of what it has been and now is. Its progress may be conveniently divided into 3 eras. The first era is that of the anc. system, in which the earth was considered as the centre of the universe, and all the heavenly bodies were believed to revolve about it in the course of 24 hours. The second era was that of Copernicus and Kepler, in which the sun was assigned to its true place as the centre of the solar system; the earth was classified as one of the planets moving around it; and all the orbits of these bodies were found to be ellipses having the sun in one focus. The third era is that of gravitation, in which all the heavenly bodies are considered as flying through space with perfect freedom, but each gravitating toward all the others. The sun, being 700 times as heavy as all the planets, keeps them moving in orbits around him by his own gravitation, while the motion of each planet is affected with small irregularities caused by the attraction of all the others. The Copernican system and the theory of gravitation have reduced *Theoretical A.* almost to branches of pure math.—mechanics, geom., and trigonometry. The system is quite simple in its conception, but very complex when we descend to details. A number of imaginary planes are conceived of as passing through the earth or sun, and extending out into infinity in every direction. The positions of the heavenly bodies are defined by their distances from these planes, and the angles which the line drawn from the sun or the earth to the body makes with different lines drawn in the planes.

ASTURIA or *ASTURIAS*, a former kingdom in N. of Sp., bounded N. by the Bay of Biscay, S. by the Cantabrian mts. The Asturians made a long and brave resistance to the Goths and Vandals who invaded Sp. about 500 A. D., but were finally subdued. A. was the only part of Sp. that was not conquered by the Moors. The anc. kingdom now forms the prov. of Oviedo. Area, 4094 sq. m. Pop. in 1877, 576,352.

ASTYAGES, as-ti'a-jéz [Gr. Ἀστύγης], king of Media, was a son of Cyaxares I., and reigned from 593 to 569 B. C. His daughter, Mandane, was married to Cambyse, a noble Per., and bore a son who was Cyrus the Great.

ATACAMITE, an ore of copper, abundant in the desert of Atacama (whence its name), and found also as a crust on the lavas of Vesuvius and Etna. It may be defined as a combination of protoxide of copper with chloride of copper.

ATAHUALPA, or *ATABALIPA*, the last inca of Peru, was a son of Huayna Capac, who d. in 1532. By his will he divided his dominions between his 2 sons, Huascar and A., who obtained the kingdom of Quito. Five yrs. afterward Huascar required A. to render homage for the kingdom of Quito. That inca refused, invaded Peru, defeated Huascar, and took him prisoner in 1532. He spared the life of Huascar, but deprived him of his throne and liberty. In the same yr. Peru was invaded by Pizarro and a small army of Spaniards. The inca, with an unarmed retinue, approached the camp of Pizarro. In Nov. 1532, for a friendly interview, and was informed that the pope had given Peru to the king of Sp. As A. rejected this claim, the Spaniards seized him and massacred his attendants. The inca offered to ransom himself. The Spaniards accepted the gold, but refused him liberty. Accusing A. of plotting against him, Pizarro ordered him to be tried by a court-martial, which condemned him to be burned alive. After he had consented to be baptized, his sentence was commuted, and he was strangled Aug. 29, 1533.

ATALANTA [Gr. Ἀταλάντη], according to anc. Gr. legend, the most swift-footed of mortals, was renowned for martial courage. She took part in the Argonautic expedition and the Calydonian hunt. Having many suitors, she offered to

marry any man who should defeat her in a foot-race, with the condition that if he lost he must be put to death. Milanion, who had received from Venus three golden apples, became the successful competitor by dropping them one by one before Atalanta, who could not resist the temptation to stop and pick them up.

ATAVISM [from the Lat. *at'avus*, a "great-grandfather" or "ancestor"] is a word of recent introduction, with two modifications of meaning: 1. In nat. hist. A. is the reappearance in animals or plants of traits belonging to their remote progenitors which their immediate parents did not present. *Reversion* is a term nearly synonymous, indicating not only the occasional or individual appearance of such remotely descended traits, but the actual returning to them of a variety or species. 2. In human pathology A. is a reversion (similar to the above) to morbid traits existing in ancestors, but not in immediate parents.

ATBA'RA [*Asiab'oras*], a river of Afr., rising in Abyssinia, flowing N. W., and after a course of 550 m. falling into the Nile, of which it is the last tributary. Its annual rise is the main cause of the inundation of Egypt.

ATCHISON, city and important R. R. centre, cap. of Atchison co., Kan., at the extreme W. point of the "Great Bend" of the Mo. River, is one of the principal commercial cities in the State. Here is St. Benedict's Coll. Pop. 1870, 7054; 1880, 15,105.

ATCHISON (DAVID R.), a politician, b. in Fayette co., Ky., Aug. 11, 1807, emigrated to Mo. in 1830; was U. S. senator 1843-55. He advocated the repeal of the Mo. Compromise, and was a leader in conflicts with Free-State party in Kan.

A'TE [Gr. Ἄτη], a goddess in classic mythology, supposed to avenge crimes, and also to stir up mischief.

AT'ELES [from the Gr. ἀτελής, "imperfect"], a genus of S. Amer. monkeys, characterized by the absence or rudimentary condition of the thumb of the anterior hands. They have long, prehensile tails. The genus comprises the marimonda (*A. beelzebub*), which is very numerous on the Orinoco, besides a dozen other species.

ATHABAS'CA, or *ATHAPES'CO*, a lake and river of Brit. N. Amer. The lake lies in about lat. 59° N., is about 230 m. long and 20 m. wide, discharging its waters through Slave River, a tributary of the Mackenzie, which falls into the Arctic Ocean. The river rises in the Rocky Mts., flows N. E., and enters the lake near its W. extremity.

ATHALI'AH, a daughter of Ahab, king of Israel, and Jezebel; wife of Jehoram, king of Judah, whom she survived, and became an idolater. After the death of her son Ahaziah, about 884 B. C., she usurped the royal power and murdered all the males of the royal family except Joash. In 878 the partisans of Joash killed her.

ATHANASIAN CREED [Lat. *Symbolum Athanasianum*], the sharpest and most rigid of the 3 Cath. symbols, did not appear in Greek till the 11th or 12th century, and was then evidently a translation. It consists of two parts, the first treating of the Trinity, the second of the Person of Christ. Much of its substance belongs to the 5th century, but its present form was probably not assumed earlier than about 800 A. D.

R. D. HITCHCOCK.

ATHANAS'US [Gr. Ἀθανάσιος], SAINT, a Gr. Father of the Ch., b. at Alexandria about 296 A. D. After he had been ordained as a deacon he was appointed a member of the gen. Council of Nice (325), in which he distinguished himself by his eloquence, learning, and zeal against Arianism. In 328 he was elected abp. of Alexandria by the clergy and the people. He was deposed by the Council of Tyre in 335, but the emp. Constantius, on the death of Constantine, restored him (338) to his see. In 339 about 90 Arian bps. assembled at the Council of Antioch, condemned A., and their decision being approved by the emp., he was suspended. He recovered his office in 346. The Arians prevailed in the Council of Arles (353) and the Council of Milan, which, under the influence of the emp. Constantius, condemned A. in 355. Again driven out of Alexandria, he took refuge in Upper Egypt, where he passed 6 yrs. On the accession of Julian the Apostate (361) he returned to Alexandria, but he was exiled in 362. In 367 he was restored by Jovian, was once more exiled by the Arian emp. Valens, but after a few months was allowed to return, and continued in peaceable possession of his office until his death. Among his works are *Five Books against Arius* and an *Oration against the Gentiles*. D. 373.

ATHEISM [Lat. *atheismus*; from the Gr. *a*, neg., and *theos*, a "god"], the denial of the existence of God, or the doctrine that there is no God. A. may be either speculative or practical; the former consists in denying the existence of God; the latter in living as if there were no God. Speculative A. is, strictly speaking, impossible, for the denial of the Divine existence necessarily affirms it. For if one deny God's being, his denial is worthless unless it rests upon some reason; but this reason must be absolute, or it can be no sufficient warrant for his denial, and this will only be to adduce absolute reason to declare that the Absolute Reason cannot be, which is the very absurdity of all absurdities.

J. H. SELBY.

ATH'ELSTAN, or *ETHELSTAN*, an A.-S. king of Eng., b. about 835 A. D., was the natural son of Edward the Elder, and a grandson of Alfred the Great. He began to reign in 925, and was the first actual sovereign of all Eng. He defeated a league against him of the Welsh, Scots, and Picts, in a great battle at Brunenburg in 937. Promoted learning and civilization. D. Oct. 27, 940.

ATHE'NA [Gr. Ἀθηνᾶ or Ἀθηνᾶ], sometimes called *Pallas Athena*, the goddess of wisdom, and one of the prin. divinities of the Gr. mythology. According to an anc. legend, she was the daughter of Jupiter, from whose head she issued in full armor. The Athenians named their capital in her honor.

ATHENÆ'US, an eminent Gr. *littérateur* and antiquary, b. at Naucratis, in Egypt, lived about 200 A. D. The events of his life are mostly unknown. He resided for some yrs. at Rome. He wrote, in the form of a dialogue, a very interest-

ing work called *Δειπνοσοφισται: The Banquet of the Learned*, which is extant. It is an account of an imaginary banquet given by a noble Rom. to a number of eminent men, and contains a rich fund of anecdotes, criticisms, and extracts from the works of about 700 poets and historians.

Athenag'oras [Gr. Ἀθηνάγ'ρας], a Gr. philos. and Chr. writer, b. at Athens, flourished about 170. Said to have been the first prin. of the catechetical school at Alexandria (161-180 A. D.). He wrote an elaborate treatise on the *Resurrection*.

Ath'ens [Gr. Ἀθῆναι; Lat. *Athēnæ*; Turk. *Soliman*] is situated about 5 m. N. E. of the Saronic Gulf, in the plain of Attica, which is inclosed by mts. on every side except the S., and forms a grand natural amphitheatre; lat. 37° 56' N., lon. 23° 38' E. The city stands on a bed of hard limestone, partly covered by a thin, light, and rather sterile soil. It has a delightful climate, and an atmosphere of almost matchless purity and transparency.

History.—According to an anc. legend, A. was founded by Cecrops, and was originally called Cecropia. Homer in the *Iliad* mentions A. and its temple of Athena. The last king of A. was Codrus, who sacrificed himself for his country, about 1068 B. C. The state then became a republic or oligarchy, ruled by an archon or archons, the first of whom was Medon, a son of Codrus. The great legislator and statesman who laid the foundations of the glory and prosperity of A. was Solon, who became archon in 594 B. C., when many of the poor were reduced to slavery and violent party dissensions tended to civil war. Pisistratus usurped the chief power in 560 B. C., ruled as a mild and liberal tyrant for many yrs., and left his power to his sons Hippias and Hipparchus. The state was liberated from the mild tyranny of the Pisistratidæ by Harmodius and Aristogiton, who killed Hipparchus in 514. Hippias was expelled in 510 B. C. About 500 B. C. the Gr. colonies of Ionia revolted against the king of Pers., and were aided by the Athenians. Provoked by this affront, Darius resolved to subjugate Gr., and to punish the Athenians in an especial manner, for which purpose he sent a large army in 490 B. C. The Gr. and Pers. armies met on the plain of Marathon, where Miltiades gained a decisive victory, which was one of the most momentous events of universal hist. Having spent several yrs. in preparation for another invasion of Gr., Xerxes crossed the Hellespont with an immense army in 480 B. C. The Pers. forced the pass of Thermopylae July 6, and were defeated in the great naval battle of Salamis, Sept. 20 of the same yr. The most brilliant period in Athenian hist. was the age of Pericles, who became the most powerful statesman of A. about 469 B. C. In 431 B. C. a long war broke out between the Athenians and the Spartans, who were the aggressors. This was called the Peloponnesian war, which lasted about 27 yrs., and was disastrous to the Athenians. By the battle of Cheronea, 338 B. C., A. and the other Gr. states became subject to Macedon. In 146 B. C. Gr. was reduced to a Rom. prov. A. under the Rom. power enjoyed much prosperity, and was the centre of Gr. philos., lit., and art. Toward the end of the 6th century of the Chr. era A. began to decline. In 1204 it became the cap. of a duchy which during the 14th century belonged to Naples. In 1394 the Florentine Nerio Acciajuoli became duke of A., and his family held this position until 1456, in which year it was taken by the Turks. The Gr. war of independence was the cause of great destruction to the city, so that when in 1830 Attica was incorporated with Gr., the city was a heap of ruins. But when in 1834 it became the cap. of the new kingdom of Gr., it rapidly changed, and was greatly improved. Among the finest modern buildings are the palace, univ., cathedral, mint, theatre, and the chamber of reps.

Monuments and Antiquities.—At the W. end of the Acropolis stood the Propylæa, one of the masterpieces of Athenian art, which was finished in 432 B. C. Passing through the Propylæa, we come to the Parthenon, regarded as the most perfect specimen of arch. ever executed. It was completed in 438 B. C. It remained almost entire, except the roof, until 1687, when A. was besieged by the Venetians. A quantity of powder which the Turks had placed in the cella exploded, and reduced the centre of the Parthenon to a heap of ruins. The Erechtheum was a beautiful temple of the Ionic order, and the most revered of all the sanctuaries of A. Among the finest edifices of A. was the Thesæum, which was built about 463 B. C., and is the best preserved of all the anc. monuments. The site of the Olympæum is indicated by 16 gigantic Corinthian columns of marble standing S. E. of the Acropolis. Among the interesting places in the suburbs of A. were the Acad., in which Plato taught, and the Lyceum, over which Aristotle presided.

A. has a good harbor, the anc. Piræus, now Drako. Pop. in 1884, 84,903, and of the Piræus, 21,055. R. D. HITCHCOCK.

Ath'ens, Alb. See APPENDIX.

Ath'ens, city, R. R. junc., and cap. of Clarke co., Ga., on Oconee River. It is the seat of the Univ. of Ga., the State Coll. of Agriculture, and the Lucy Cobb Inst., and has cotton mills. Pop. 1870, 4251; 1880, 6090.

Ath'ens, R. R. junc., cap. of Athens co., O., is on the Hockhocking River, 41 m. W. S. W. of Marietta. Here are the O. Univ., founded in 1804, and a State lunatic asylum. Pop. 1870, 16,066; 1881, 2457.

Ath'ens, on R. R., Bradford co., Pa. The borough is 15 m. N. of Towanda, the co. seat. A. has the oldest acad. in the section. Joshua R. Giddings was b. at Queen Esther's Flats, below the borough, during the migration of his parents to O. "Spanish Hill" had a fortification, the origin of which is unknown. Pop. 1870, 965; 1880, 1392.

Ath'ens, Tenn. See APPENDIX.

Ath'erton (CHARLES GORDON), a politician, b. at Amherst, N. H., July 4, 1804, grad. at Harvard in 1829; was an M. C. 1837-43. He procured in 1838 the passage of a resolution that all petitions or papers relating to slavery should be laid on the table without being debated, printed, or referred. Was subsequently U. S. Senator. D. Nov. 13, 1853.

Ath'l'ete, plu. **Ath'l'etes**, or **Ath'l'etæ** [Gr. ἀθλητής,

plu. ἀθληται], a person among the Grs. who contended for a prize in public games, the victor being held in the utmost honor.

Ath'ol, R. R. junc., Worcester co., Mass. Pop. of tp. 1870, 3517; 1880, 4307.

Athor, **Athyr**, or **Het-her**, an Egyptian goddess, the daughter of Ra, supposed to correspond to the Aphrodite of the Grs. The cow was regarded as her symbol.

At'kins (JOHN D. C.), b. in Henry co., Tenn., June 4, 1825; ed. at Univ. of E. Tenn., and grad. in 1846; was elected to the lower branch of the legislature in 1849 and 1851, and to the State senate in 1855; was a Presidential elector on the Buchanan ticket in 1856, and an M. C. from Tenn. from 1857 to 1861; then resigned and espoused the cause of the Confeds., serving in the field as well as in the public councils. He was a member of the Confed. Cong. at the time of the gen. surrender in 1865; was again returned to the Federal Cong. 1872-74, and was re-elected to the 45th Cong.

ALEXANDER H. STEPHENS.

Atlan'ta, cap. of Ga. and of Fulton co., is the largest city in the State, and the great R. R. centre of the S. Its R. R. lines, opening connection with every quarter of the country, have caused to be given to A. the name of the *Gale City*. Lat. a little S. of 34° N., on the ridge dividing the waters of the Gulf from those of the S. Atlantic slope. The plane of elevation is 1100 ft. above the level of the sea; its atmosphere is dry, pure, and healthy, and its climate comparatively mild and delightful at all seasons; the mercury seldom rises in summer above 93°, or falls below 15° in winter. In 1843 its present site was an uncleared forest, but its growth and development since have been rapid. It was Gen. Sherman's objective point in the late c. war. In 1859 its pop. was 17,000. It was burned by Sherman, as he set off on his march to the sea in 1864, but since the war A. has, phoenix-like, arisen from her ashes. Her trade is immense, and her manufactures of every kind are extensive and increasing rapidly. Her great International Cotton Exposition in the fall of 1881 exhibited the marvellous energies of her people, and every indication shows that at no distant day she will be the largest city S. of the Ohio. Pop. 1870, 21,789; 1880, 37,409.

ALEXANDER H. STEPHENS.

Atlanta, city, and R. R. junc., Logan co., Ill., 39 m. N. E. from Springfield. Pop. 1880, 1368.

Atlan'tic, city, R. R. junc., cap. of Cass co., Ia., on the E. Nishnabotona River, 79 m. W. by S. from Des Moines. Pop. 1870, 1200; 1880, 3662.

Atlantic City, R. R. centre, a watering-place of Atlantic co., N. J., on the A. Ocean, 60 m. S. E. of Phila. Pop. 1870, 1043; 1880, 5477.

Atlantic Ocean, one of the 5 great oceans of the world; the one separating Amer. from Europe and Afr., and extending from the Arctic to the Antarctic circle. Greatest breadth, about 5000 m.; area, about half that of the Pacific. The part N. of the equator is called the N. A., S. of that line the S. A. To the A. O. belong the Ger. Ocean or N. Sea, the Baltic, the Gulfs of Bothnia and Finland, the Irish Sea, the St. George's and Eng. channels, the Bay of Biscay, the Mediterranean Sea, the Gulf of Guinea, and the Bay of Benin; and on the Amer. side the great estuaries of the Amazon and La Plata, the Carriibbean Sea, the Gulf of Mex., the Gulf of St. Lawrence, the Greenland Sea, Davis Strait, Hudson Strait, and Hudson's Bay. Its chief rivers are the St. Lawrence, Miss., Orinoco, Amazon, and La Plata, and from the E. the Orange, Congo, Niger, and Senegal; Tagus, Loire, Seine, Rhine, and Elbe. The average depth of the A. is about 20,000 ft., less than 4 m.; its greatest depth about 5 m. The so called telegraphic plateau between Ire. and Newfoundland averages 12,000 ft.; it is 400 m. wide from N. to S., and 1640 m. long from E. to W. The A. has 2 great currents—the Gulf Stream and the Equatorial Current. The latter moves from the Bay of Benin W. along both sides of the equator; average velocity, 30 m. a day, but at some points exceeding this, breadth, 200 to 400 m. It divides at Cape St. Roque, the Brazil current going S. and the Guiana current N. to the Caribbean Sea. The Gulf Stream begins in the Gulf of Mex., passes between Fla. and Cuba, and flows along the coast of the U. S. at the rate of about 80 m. a day, having a mean width of 350 m. From about lat. 42° N. it gradually turns E., widening as it turns, crosses the A. to the Azores, where it divides; the N. branch flows past the Brit. Isles to Ireland; the S. is in its course swept back to the Gulf of Mex. by the N. equatorial current forming a great eddy in the N. A. known as the Sargasso Sea (*Mer de Sargasso*), said to be 260,000 sq. m. in extent, and covered with floating sea-weed (*Fucus nularis*). The water of the Gulf Stream is from 10° to 25° F. warmer than other portions of the ocean; it elevates the temperature of the Brit. Isles. In the N. A. the prevailing winds are S. W.; between the tropics the trade winds prevail, blowing W. with great regularity.

L. F. BROCKETT.

At'las [Gr. Ἀτλας], a mythical personage, brother of Prometheus. He was represented by the anc. Gr. legends as supporting the vault of heaven on his head or shoulders.

At'las Moun'tains, a mt.-system of Afr., extending from Cape Gher on the Atlantic to Cape Bon on the Mediterranean. The highest point of the system is in Morocco, and is estimated at 13,000 ft. above the sea.

Atmosphere, at'mos-fēr [from the Gr. ἀτμός, "vapor," and σφαῖρα, a "sphere"], the gaseous envelope which surrounds the earth or any celestial body. The earth's A. weighs about 15 lbs. avoirdupois on every square inch of the surface, equal to 2160 lbs. per square ft. It supports a column of mercury in the barometer averaging 30 inches or 760 millimetres high, and a column of water 34 ft. high. At 60° F., with the barometer at 30 inches, 100 cubic inches of air weigh 30.935 grains; 1 cubic ft. = 536.96 grains, and 1000 cubic ft. = 76,708 lbs. avoirdupois; 1 litre at 0° C., under a pressure of 760 millimetres = 1.2932 grammes. It is 14.45 times heavier than hydrogen. If the air were not elastic, and possessed the same density at all heights that it has at

the sea-level, it would extend to a height of 5,204 m. only; but its density diminishes with the height; at 2,705 m. it is $\frac{1}{2}$, at 5,411 m. $\frac{1}{4}$, etc. It is impossible to determine the outer limit of the A. The composition of the A. was discovered between the yrs. 1772 and 1775 by Rutherford, Priestley, Schae, and Lavoisier. The first accurate determination of its percentage composition was made by Cavendish in 1781. It consists chiefly of nitrogen and oxygen, mixed, not combined. The proportions of these gases vary slightly, ranging, in air freed from all other constituents, from 20.84 to 21 per cent. of oxygen, and 79.16 to 79 of nitrogen. In badly ventilated rooms the oxygen sometimes falls to 20.5. Aqueous vapor is always present. The quantity which air can take up varies with the temperature. At 0° C. a cubic metre of air can take up 4.871 grammes, at 15° C. 12.746 grammes. The air is rarely saturated; it varies from 40 to 90 per cent. of saturation, according as it is dry or moist. Carbonic acid varies in quantity from 0.03 to 0.07 vols. in 100 in the open air, but larger quantities occur in the air of occupied rooms. Ammonia occurs in the air, in minute quantity, in the form of carbonate, nitrate, and nitrite. Ozone is also present, especially in the country and over the ocean. Minute quantities of other gases, such as marsh gas, sulphur compounds, etc., are present, either given off from plants or resulting from the putrefaction or decay of vegetable and animal substances, or from factories. The air is never free from solids in the form of dust, consisting of cosmical or meteoric dust, fine sand, clay, etc.; salt (near the sea-shore), due to the spray of sea-water; particles of vegetable, and in cities, of animal matter; pollen in its season, the germs of mould fungi, yeast, bacteria, etc., and in the neighborhood of persons suffering from certain diseases, the germs of contagion. The oxygen supports animal life and combustion; the carbonic acid, carbonate and nitrate of ammonia constitute the chief food of plants, either by direct absorption by the leaves or by the roots after they have been carried into the soil by the rain; the germs of the mould fungi, yeast, and bacteria cause mould, mildew, blight, fermentation, putrefaction, etc., and certain bacteria cause malarial fevers and contagious diseases. The aqueous vapor is the source of clouds, rain, hail, snow, fog, and dew. The air of cities is liable to contamination by factories and by animal and vegetable refuse. The air of houses is rendered unwholesome by human exhalations, products of combustion, sewer gas, and sometimes by contagious diseases. Its purity can be maintained by ventilation, proper plumbing and drainage, and the isolation of the sick. C. F. CHANDLER.

Atmospheric Engine. See HOT-AIR ENGINE.

Atoll, or Atolin, the native name for a kind of island that occurs in the Indian and Pacific oceans. It is a low circular reef of coral, inclosing a lagoon, which in many instances communicates with the ocean by a narrow inlet, or by more than one. (See CORAL ISLANDS.)

Atom [Lat. *atomus*; Gr. *ἄτομος*, "that which cannot be cut," from *a*, priv., and *τέμνω*, "to cut"], a minute, indivisible particle of matter. According to one theory, matter is infinitely divisible. On the other hand, many modern chemists maintain that all matter consists of ultimate indivisible and indestructible particles. The tendency of recent scientific research has been to prove that the chemical A. and phys. A. are not identical.

Atomic Theory. See CHEMISTRY.

Atomic Weights, the proportions by weight in which chemical elements unite. One element must be selected as the starting-point of the series, and an arbitrary value affixed to it, and thereafter all the other elements can have their values awarded to them according to the proportional amounts in which they combine. Hydrogen is taken as 1, and all the other elements are represented by a quantity which is the minimum amount in which they unite with 1 of hydrogen.

Atone-ment. I. THE WORD.—1. The etymology and usage of the Eng. word. (1) Supposed to be derived from "at-one-ment," and its earlier signification, "reconciliation;" (2) at present universally used in the sense of "satisfaction for an offence," "expiation." (Webster and Worcester.) 2. In the authorized Eng. version the word occurs only once in the N. T. (Rom. v. 11), and there represents *καταλλαγή*, "reconciliation." In the O. T. it occurs frequently, translating *כָּפַר*, "to cover with sacrificial blood," and hence to "expiate," to "appease," to "purge away." 3. The biblical equivalents of the word in the O. T., *כָּפַר*, "expiation."

In the N. T.: (1) As it respects God, *ἱλασκεσθαι*, to "propitiate" (1 John ii. 2 and iv. 10); (2) as it respects sin, to "expiate" (Heb. ii. 11); (3) as it respects the sinner, *ἀγοράζειν*, to "redeem" (by blood, Rev. v. 9), and *λυτροῦν*, to "ransom by substitution" (1 Pet. i. 18; 1 Tim. ii. 6).

II. THE DOCTRINE. 1. *Patriotic*.—The biblical view above presented has always prevailed in the Ch. as the basis of religious experience. It was, however, but imperfectly discriminated as a logical conception by the early teachers. From an exaggerated conception of the independence and power of the kingdom of Satan, many of the Fathers, as Irenaeus, Origen, and even Augustine and Jerome, etc., founded on such texts as Col. ii. 15 and Heb. ii. 14 the notion that Chr. by his sufferings rendered satisfaction to Satan, who had acquired rights of conquest over the human race.

2. *The Anselmic*.—The doctrine which was from the beginning the living principle of the devotional writings of all Ch. teachers and of all liturgies and hymns, and which since his time has been taught in the authorized creeds of all sections of the Ch., was first systematically unfolded by Anselm, abp. of Canterbury (1093-1109), in his tract, *Cur Deus Homo*. He teaches that the essential moral perfection of the divine nature, which is immutable, necessarily demands the punishment of sin; that sin is an intrinsic and infinite evil. The law is consequently unrelaxable, and the penalty must be executed upon the sinner unless a substitute (1) personally free of all legal demands and (2) of sufficient dignity is will-

ing to be punished in his stead. This condition is answered only by a Person at once divine and human—i. e. a divine Person who has assumed a human nature. (Chr. made atonement for the sins of men by vicariously suffering the legal penalty of death to which they were condemned, and thus expiated the guilt of sin and propitiated the justice of God. (See PROF. ED. PARKS'S *Atonement*; DR. SHEDD'S *Hist. of Chr. Doctrine*; SCHAEFF'S *Hist. Chr. Ch.* From orig. aut. in J. S. *Univ. Cyc.*, by PROF. A. A. HODGE, LL.D.)

Atreus (Gr. *Ἀτρεΐς*), king of Mycenae, was called a son of Pelops. He was the father of the famous *Atrida*—i. e. Agamemnon and Menelaus. The story of A. and his family formed the subject of many tragedies, involving horrible crimes and calamities.

Atropine, at'ro-pin, or *Atro'pia*, a peculiar alkaline principle obtained from the *Atropa Belladonna*, is very poisonous. It exists in all parts of the plant. A very minute portion of it has the power to dilate the pupil of the eye.

Attachment [Fr. *attachement*], the apprehension of a person or seizure of a thing by virtue of a writ or order issued by a court or judge under authority of law. The word is sometimes used to denote the process itself. In respect to property, the term is usually applied to seizure on *mesne* process. An A. is said to be foreign where a creditor attaches property in the hands of a third person belonging to his debtor, or a debt due from a third person to such debtor. The name is said to arise from the fact that the proceeding is often resorted to for the purpose of collecting a debt against a non-resident. In some of the E. States this proceeding is called "trustee process;" in other States it is generally known as "garnishment," meaning a warning. *Against the Person*.—This is issued against officers of the court for any misconduct or neglect of duty, and against any one who has been guilty of contempt of court. The object of the A. is to bring the guilty party actually before the court. He has then an opportunity to show cause why he should not be found guilty, or, in legal lang., to "purge himself of the contempt." If he cannot do this, he is subject to such punishment as the law permits and the court may award. T. W. DWIGHT.

Attain'der (Old Fr. *attaindre*, to "stain"), in law, is the extinction of civil rights as the consequence of a judicial sentence of death for a capital crime. From this moment the criminal was deemed to be legally dead, incapable of bringing an action except to reverse the A., or of appearing in court as a witness. Its two most important consequences were forfeiture of property and corruption of blood. The consequence of corruption of blood was that the person attainted was incapable of inheriting himself or of transmitting an estate by inheritance to another. A. was abolished in Eng. in 1870. By the U. S. const. no A. of treason shall work corruption of blood or forfeiture, except during the life of the person attainted.

Attalea, a genus of palms of numerous species, natives of tropical S. Amer. They generally have lofty, cylindrical, and smooth stems, but some are stemless. Their large pinnate leaves are used for thatching, mats, etc. The fruit is a nut inclosed in a dry fibrous husk. The *A. compta* bears an eatable fruit about as large as a goose-egg. The leaf-stalks of *A. funifera*, which grows in the maritime parts of Brazil, and is there called piassaba, yield a fibre much used to make cordage which is very strong and durable in salt water.

Attalus (FLAVIUS PRISCUS), a Rom. emp., b. probably in Ionia, was converted from paganism to Arianism. He was prefect of Rome when that city was captured by Alaric in 409 A. D., and was proclaimed emp. by that conqueror in the same yr. He was deposed by Alaric in 410.

Attar of Roses [from the Ar. *itr*, "perfume"], the oil or essence of several species of roses; sometimes called otto of R. It is prepared by distillation of the petals in E. countries, whence it is exported in small vials. It is very costly, and is often adulterated.

Atterbury (FRANCIS), an Eng. prelate. b. Mar. 6, 1662. He entered Chr. Ch., Ox., in 1680, grad. in 1687, and became lecturer in St. Bride's ch., Lond., in 1691; he was a Jacobite in politics, and a zealous defender of High Ch. doctrines. He was appointed chaplain to Queen Anne in 1702, dean of Carlisle in 1704, and bp. of Rochester in 1713. In Aug. 1722 he was committed to the Tower on a charge of treason as an accomplice in plots for the restoration of the Stuarts. He was convicted by the House of Lords in May 1723, and was condemned to perpetual banishment. D. Feb. 15, 1732.

Attica [Gr. *Ἀττική*], a state of anc. Gr., bounded N. by Boeotia, E. by the Aegean Sea, S. W. by the Saronic Gulf, W. by Megaris. It occupied a triangular peninsula, at the S. E. extremity of which is the promontory of Sunium. The surface is diversified, the soil light and unproductive, the climate agreeable. The inhabs. were foremost in culture, and were famous colonizers and traders. The cap. was Athens. The anc. pop. was about 500,000. The modern A. (which includes Boeotia) has 247,284 in. Pop. 1874, 285,364.

Attica, city and R. R. junc., Fountain co., Ind., on the Wabash River and Canal. 21 m. W. S. W. of Lafayette. Pop. 1870, 2472; 1880, 3150.

Attica, on R. R., Wyoming co., N. Y., on Tonawanda Creek, 31 m. E. of Buffalo. Pop. 1870, 1333; 1880, 1335.

Atticus (TITUS POMPONIUS), an accomplished Rom. of the equestrian order, b. in 109 B. C. During the war between Sulla and Marius he remained neutral, and passed many yrs (86-65) in Athens, to which city he rendered important services. He was an intimate friend of Cicero. Having returned to Rome in 65 B. C., he took no part in political affairs. He wrote, beside other books, an epitome of Rom. hist. called *Annales*, but all his works are lost. D. 32 B. C.

Attila (Gr. *Ἀττίλας*; Ger. *Attila* or *Attila*; Hung. *Felak*), a king of the Huns, who began to reign 434 A. D. He conquered Ger. and Scythia, and obtained the surname of THE SCOURGE OF GOD. In 457 A. D. he invaded the Rom. empire of the E., and defeated the armies of Theodosius II., who obtained peace by the payment of an annual tribute. Mar-

cian, who succeeded Theodosius, refused to pay the tribute. In 451 A. invaded Gaul and besieged Orleans, which was relieved by the approach of a Rom. army commanded by Aëtius. A. retired to Champagne and awaited the enemy near the site now occupied by Châlons-sur-Marne, where he was defeated by the combined armies of Aëtius and Theodoric, king of the Visigoths, in June 451 A. D. and retreated into Ger. In 452 he led an army into N. It. and threatened Rome. The emp. Valentinian III. invoked the mediation of Pope Leo I., who persuaded A. to grant the Roms. a truce. A. retired into Pannonia, and d. on the night after his marriage with Ildico. He was buried by night, and the prisoners who dug his grave were killed, in order that the place of his burial might be kept secret. D. 453 A. D.

Attleborough, R. R. June, Bristol co., Mass., 30 m. S. S. W. of Boston. Pop. of tp. 1870, 6769; 1880, 11,111.

Attorney (Old Fr. *attorner*, to "prepare," to "direct"), one who acts for or on behalf of another. A. are of two kinds—in fact and at law. An A. in fact is an agent, though the term is commonly applied to one who is authorized to act for another by a writing called a power of A. An A. at law is one who is authorized by law to act in the place of another in the management or conduct of law proceedings. In Eng. the term is employed to denote a class of legal practitioners whose duties are preliminary to those of the barrister, who conducts the cause in court. In the U. S. the same person is in general admitted both as counsellor (answering to barrister) and A. An A. is an officer of the court, and liable to be punished for a breach of duty, and in aggravated cases to have his name stricken from the roll, and thus lose his right to practise.

Attorney-General is an officer under the Eng. govt. whose duty it is to prosecute for the king in criminal matters, and to manage certain civil actions. The U. S. and the respective States have a public officer of the same name, with similar duties.

Attorney, Power of. See POWER OF ATTORNEY.
Atwater (JEREMIAH), D. D., b. at New Haven, Conn., in 1774, grad. at Yale in 1793, first pres. of Middlebury Coll., Vt., 1800-09, and pres. of Dickinson Coll., Pa., 1809-15. D. July 29, 1858.

Atwater (LYMAN HOTCHKISS), D. D., LL.D., b. at Hamden, Conn., Feb. 23, 1813, grad. at Yale 1831; pastor of a Congl. ch. 1835-54, became in 1854 prof. of mental and moral philos., and afterward of logic and moral and political science, at Princeton. Pub. a *Manual of Logic*, and became ed. of the *Princeton Review*. D. Feb. 17, 1883.

Auber, o-bair' (DANIEL FRANÇOIS ESPRIT), a Fr. composer, b. at Caen Jan. 29, 1782, a pupil of Cherubini. His works are remarkable for grace, originality, and ingenious combinations. D. May 13, 1871.

Aubert du Bayet, o-bair' du bah-yā' (JEAN BAPTISTE ANNIBAL), a Fr. gen., b. in La. Aug. 29, 1759. He fought for the U. S. under Rochambeau, and was chosen in 1791 a member of the Fr. Legislative Assembly, in which he supported the same principles as La Fayette. He commanded at the siege of Mentz, taken by the Prus. in 1793, and was minister of war for several months in 1795, and afterward minister to Tur. D. Dec. 17, 1797.

Aubigné, d' (MERLE). See D'AUBIGNÉ.

Aubigné, d', do-been-yā' (THÉODORE AGRIPPA), a Fr. Prot. historian and soldier, b. in Saintonge Feb. 8, 1550; at an early age joined the Huguenot army, afterward entered the service of Henry of Navarre. He fought for Henry against the Catholic League. He wrote a *Universal Hist.* of his own times. D. Apr. 29, 1630.

Auburn, on R. R., cap. Placer co., Cal., 36 m. N. E. of Sacramento. There are near the town very rich quartz and gravel mines and 11 quartz mills. Pop. 1870, 800; 1880, 12,259.

Auburn, on R. R., Sangamon co., Ill., 15 m. S. W. of Springfield. Pop. 1880, 788.

Auburn, R. R. June, cap. of De Kalb co., Ind. Pop. 1870, 677; 1880, 1542.

Auburn, city, on R. R., cap. Androscoggin co., Me., 34 m. from Portland, on the Androscoggin and Little Androscoggin rivers. Pop. 1870, 6169; 1880, 9555.

Auburn, a city and important R. R. centre, cap. Cayuga co., N. Y., 174 m. W. of Albany, on the outlet of Owasco Lake. It has a Presb. theol. sem., a State prison, and a State insane asylum. Pop. 1870, 17,225; 1880, 21,924; 1885, about 25,000.

Auburndale, on R. R., in city of Newton, Middlesex co., Mass., 10 m. W. of Boston. It is the seat of Laselle Sem.

Auburn Theological Seminary occupies large and commodious buildings, with transept and wings, on elevated ground in the N. part of the city of Auburn. It was founded in 1820. In 1873 its removal was contemplated, but the friends of the sem. having by great exertions raised funds for its endowment and enlargement, the inst. will permanently remain in Auburn. It is sustained by the Presbs.

Aubusson, d', do-bu-son' (PIERRE), grand-master of the order of St. John of Jerusalem, b. in 1423. In 1458 he formed a league between the kings of Fr. and Hungary against the sultan Mahomet II. He fortified Rhodes, the head-quarters of the order, as an advanced post for the defence of Christendom against the victorious Turks. Early in 1480 Mahomet II. commenced the siege of Rhodes with an army of about 100,000 men. The Turks were forced to abandon the enterprise in July 1480. In 1501 he was chosen gen.-in-chief of the armies of the Ger. emp., the king of Fr., and the pope, who had formed a league against the Turks. D. 1503.

Auck'land, a seaport, former cap. of the Brit. colony of New Zealand, situated on the N. E. coast of the island of New Ulster. It has two fine harbors and considerable trade. It is the see of an Anglican bp. The mean temperature of the coldest month is about 50° F., and that of the warmest about 68°. Pop. 1881, with suburbs, 39,966.

Auction [from the Lat. *augeo*, *auctum*, to "increase"],

in law, the act of exposing property for sale by open competition to the highest bidder, by a person called an auctioneer. Every bid is deemed to be an offer, which is accepted by the auctioneer when his hammer falls. The offer may be withdrawn by the bidder at any time before acceptance. The acceptance of a higher offer is the rejection of the lower one. Such a sale must be fairly conducted, both on the part of the seller and buyer. The secret employment of "puffers" or fictitious bidders by the owner to unduly enhance the price is a fraud on the purchaser, who may avoid such a sale. The same rule applies to secret agreements between purchasers to stifle competition. Such sales frequently take place under conditions made known at the time of sale. These must be followed by the party to whom they are applicable. An auctioneer is to some extent an agent for both parties—as, for example, to sign on their behalf a written memorandum of sales, where that is required by law. The conduct of auctioneers is sometimes regulated by statute.

Audebert, ôd-bair' (JEAN BAPTISTE), a Fr. artist and naturalist, b. at Rochefort in 1759. He first acquired distinction as a miniature-painter, and subsequently applied himself to nat. hist. He pub. *Nat. Hist. of Apes, Lemurs, and Galeopithecii*, with plates printed in oil-colors, by a process of his own invention. D. 1800.

Audiphone, for the deaf, is shaped like a large fan, and made of a sheet of vulcanized rubber about $\frac{1}{2}$ of an inch thick, fastened to a handle of the same substance. This sheet is curved at the farther end, when used, by pulling a cord which is put through holes in the upper edge and passes along the inner side of the sheet into a slot in the handle. The curve required is very small, but the more deaf the person using the instrument the tighter must the rubber be drawn. When in use the straight or lower end of the sheet is kept in contact with the upper jaw-teeth, and any sound striking against the rubber sheet is communicated to the nerve of the ear through the teeth and bones of the head, so that ordinary conversation can be heard. The result is the same with artificial teeth if well fitted.

Audley (THOMAS), LORD AUDLEY OF WALDEN, an Eng. lawyer, b. in Essex in 1488; became speaker of the House of Commons in 1529, keeper of the great seal in 1532, and lord chancellor of Eng. in 1533. He presided at the trial of Sir Thomas More. D. Apr. 30, 1544.

Audouin, ô-doo-an' (JEAN VICTOR), a Fr. naturalist, b. in Paris April 27, 1797; was one of the founders of the *Annales des Sciences Naturelles*, commenced in 1824, and co-operated with Milne-Edwards in researches into the Crustacea and Annelida. D. Nov. 9, 1841.

Audran, ô-dron' (GÉRARD), a Fr. engraver, b. at Lyons Aug. 2, 1640. He studied under Carlo Maratta at Rome, and returned to Paris about 1670. He engraved the masterpieces of Le Brun, *The Battles of Alexander*, and 2 of the cartoons of Raphael. D. Feb. 8, 1691.

Audubon, Iowa. See APPENDIX.

Audubon (JOHN JAMES), a naturalist, b. in La. May 4, 1780. He was the son of a Fr. naval officer who owned a plantation in La. In his childhood he became deeply interested in the study of birds and their habits. He was ed. partly in Paris, whither he was sent about 1794, and he studied design under David. He returned to the U. S. about 1798, and settled on a farm in E. Pa., where he found time and opportunity for his favorite study. In 1808 he became a merchant at Louisville, Ky. About 1810 he began to make extensive excursions through the forests of the S. and S. W. States, making colored drawings of all the species of birds that he found. In 1826 he went to Lond. and began the publication of his *Birds of Amer.*, with 448 colored plates. In 1829 he commenced explorations from Canada to Fla., to collect materials for his *Ornithological Biography*, which he pub. In 1831 he again visited Eng.; returning to the U. S. in 1839, he took up his residence on the Hudson, near N. Y. D. Jan. 27, 1851.

Auerbach, ow'er-bak (BERTHOLD), a Ger. novelist, b. in Württemberg Feb. 28, 1812. Among his numerous works translated into Eng. are *Village Tales of the Black Forest* and *Country House on the Rhine*. D. Feb. 8, 1882.

Auerstädt, ow'er-stet, a v. of Prus. Sax., where the Fr. under Davoust defeated the Prus., who were commanded by the old duke of Brunswick, Oct. 14, 1806, the same day on which the battle of Jena was fought.

Augeas, au'-ge-as [Gr. *Aúyeas* or *Aúyeias*], a mythical king of Elis, who is said to have owned 3000 oxen. One of the 12 labors imposed on Hercules by Eurystheus was to cleanse the Augean stables, in which the dung of these oxen had accumulated for many yrs. Hercules turned the rivers Alpheus and Peneus through the stables, and killed A. because he refused to pay his wages.

Augereau, ôzh-rô' (PIERRE FRANÇOIS CHARLES), DUC DE CASTIGLIONE, a Fr. marshal, b. in Paris Oct. 21, 1757, became a fencing-master at Naples before the Revolution, enlisted as a private in the Fr. army in 1792, and gained the rank of gen. of division in 1796; became marshal 1804 and duke 1805; in 1814 went over to Louis XVIII. D. June 12, 1815.

Augsburg (anc. *Augusta Vindelicorum*), a city of Bavaria, at the junction of the Lech and Wertach, 39 m. W. N. W. of Munich. It was founded by the Roms. 12 B. C., became a free imperial city in 1276 A. D., and until about 1500 was a great commercial centre. It is now one of the prin. money-markets on the Continent, and has considerable commerce. Pop. 1880, 61,408.

Augsburg Confession, the first Prot. Confession of Faith, drawn up in 1530 by Melancthon. This Confession, with its subsequent Apology, became a standard for the Reformers, and to this day is regarded as authoritative among the Lutheran chs.

Augur, a Lat. word used by the anc. Roms. to denote one who professed to foretell events by the flight of birds or other omens. The A. were supposed to be divinely gifted with special qualifications for this service, no public enter-

prise being undertaken unless they declared the omens favorable. Their divinations were called auguries or auspices. The A. held office for life, and had the power of filling vacancies that occurred in their college. Originally their number was 3, but was raised to 9, and afterward to 16.

Augur (CHRISTOPHER C.), b. in New York, 1821; grad. at W. Pt. in 1843, served on the frontiers, in the war with Mex. and on the Pacific; in 1861 was commandant of cadets at W. Pt. During the c. war he served in Va. and on the Miss.; was made brevet maj.-gen. 1865, brig.-gen. U. S. A. 1869, commander of the dept. of Wash. 1863-66, of the Platte 1867-71, of Tex. 1871.

August [Lat. *Augustus*; Fr. *Août*], the 8th month of the yr., was so named in honor of Augustus Cæsar. Before his time it was called *Sextilis*—that is, the sixth month, because the Rom. yr. once began on the 1st of Mar. It originally consisted of 30 days, but to gratify Augustus one day was taken from Feb. and added to Aug.

Augusta, city and important R. R. and commercial centre, cap. Richmond co., Ga., at the head of steamboat navigation on the Savannah River, 231 m. from its mouth, 120 m. N. N. W. of Savannah, 136 m. N. W. of Charleston, Lat. 33° 28' N., lon. 81° 54' W. A canal 9 m. long brings water from the river, with a head of 33 ft., furnishing abundant water-power. A. has the Med. Coll. of Ga., founded in 1830, and Richmond Acad. Pop. 1870, 15,389; 1880, 21,891.

Augusta, Kan. See APPENDIX.

Augusta, city, on R. R., cap. of Me. and of Kennebec co., on the Kennebec River, at the head of tidal navigation, 43 m. from its mouth, and 63 m. N. N. E. of Portland. It has abundant water-power. Among the public insts. are the U. S.



State Capitol (Augusta, Me.).

arsenal, the National Military Asylum just outside the city, the Me. State Library, a hospital for the insane, and St. Catherine's school for young ladies. The State capitol is a handsome granite building on an eminence. Pop. 1870, 7808; 1880, 8665. [From orig. art. in *J.'s Univ. Cyc.*, by A. SPRAGUE. Ed. of "KENNEBEC JOURNAL".]

Augusta, on R. R., Eau Claire co., Wis., 22 m. E. S. E. of Eau Claire. Pop. 1870, 761; 1880, 1116.

Augusta College and Theological Seminary was founded in 1860, and held its sessions in the basement of the Swe. Lutheran ch. in Chicago, Ill. In 1863 it was removed to Paxton, Ford co., Ill. Its primary object is the education of candidates for the gospel ministry of the Evangelical Lutheran ch. among Scandinavians of the U. S.

Augustin (CHRISTIAN JOHANN WILHELM), b. Oct. 27, 1772, at Eschenburg, near Gotha, Ger., studied at Jena. Became a prof. there, and subsequently at Breslau and at Bonn. In 1833 he became director of the conservatory at Coblenz. His best-known work is *Denkwürdigkeiten aus der Christlichen Archæologie*. D. Apr. 28, 1841.

Augustine [Lat. *Aurelius Augustinus*], SAINT, was b. at Tagaste, in Numidia, Nov. 13, 353 A. D., of a pagan father and a Chr. mother (Monica or Monnica). When 17 yrs. of age he went to Carthage, and led a dissolute life. About the age of 19 he embraced the doctrines of the Manicheans, and returned to Tagaste, where he taught rhetoric and grammar. Much perplexed with doubts, he removed in 383 A. D. to Rome, and thence to Milan, where he was appointed prof. of rhetoric in 384. The sermons of Ambrose, then bp. of Milan, made a deep impression on him, and after severe spiritual conflicts he became a Chr., and was baptized on Easter Eve, 387. In 388 he went back to Tagaste, was ordained presbyter at Hippo in 391, associate bp. in 395, and bp. in 396. He d. at Hippo, while that city was besieged by the Vandals, Aug. 28, 430 A. D. The best ed. of his works is that of the Benedictines. R. D. HITCHCOCK.

Augustine, or Austin, SAINT, the "apostle of Eng." and first abp. of Canterbury. Was a Benedictine monk in Rome, when he was sent by Pope Gregory I. to convert the A.-S., in 596 A. D. He was received amicably by King Ethelbert, whose wife Bertha was already a Chr. He converted Ethelbert, and is said to have baptized 10,000 of his subjects. A. was appointed abp. of Canterbury by the pope. D. in 604 or 605.

Augustinian Monks, an order of the R. Cath. Ch., formerly divided into three classes—1. *Canons Regular*, which originated at Avignon in 1088, and assumed the name and rule of Augustine in 1139. 2. The *Hermits of St. Augustine*, one of the 4 great mendicant orders of the Ch., claiming to have been founded by St. Augustine, but in fact by Pope Alexander IV. in 1256; there were *Special Congregations* of this order, who practised a severer discipline; Martin Luther was a member of one of these congregations. 3. The *Barefoot A.*, which originated in Sp. in 1582, and have a very severe rule.—The A. Nuns are divided into four classes: 1. Those under the guidance of the A. M.; 2. Those under the control of the diocesan bishops; 3. Barefoot nuns; 4. Augustines of the order of the Interior of Mary.

Augustus, a Lat. word equivalent to the Gr. *Σεβαστός*, signifies "majestic," "sacred," "venerable." It was a name or surname conferred on Cains Julius Cæsar Octavianus by the Rom. senate, 27 B. C.

Augustus (or **August**) I., elector of Sax., a son of Henry the Pious, b. at Freiberg in 1526, and succeeded his brother Maurice in 1553. He was a promoter of Lutheranism, and persecuted the Calvinists; a patron of learning, and promoted manufactures, agriculture, and commerce. He was prominent in negotiating the peace of Augsburg (1555). D. in 1586, and was succeeded by his son, Christian I.

Augustus II., of Sax. (and **Augustus I.** of Poland), b. at Dresden in 1670, was the 2d son of John George III., elector of Sax., and Anna Sophia of Den. He possessed extraordinary physical strength. He became elector of Sax. on the death of his brother in 1694, and was elected king of Poland in 1697, having, for the sake of the crown, adopted the R. Cath. religion. A. formed about 1700 an alliance with Peter the Great against Charles XII. of Swe., by whom he was defeated in several battles; in 1706 he renounced the crown of Poland, which Charles XII. gave to Stanislas Lesczynski. In consequence of the defeat of Charles XII. by the Rus. in 1709, A. recovered the throne of Poland, and as an ally of Peter the Great waged war against Swe. for several yrs. He had many illegitimate children, among whom was Maurice of Sax. (Marshal Saxe). D. Feb. 1733.

Augustus III. (FREDERICK), king of Poland, son of the preceding, b. at Dresden in 1696. He married, in 1719, Maria Josephine, a daughter of Joseph, emp. of Aus. In 1733 he became elector of Sax., and was chosen King of Poland by a party of the Diet. In 1742 he formed an alliance with the empress Maria Theresa against Frederick the Great, who defeated the Sax. in 1745 and captured Dresden. This war was ended in 1746, but A. was soon involved in the Seven Years war, which began in 1755, and his army was again defeated by the Prus. D. 1763.

Augustus (WILLIAM), prince of Prus., a younger brother of Frederick the Great, was b. at Berlin in 1722. His son became King Frederick William II. D. 1758.

Augustus Cæsar (often called simply **Augustus**), called in his youth CAIUS OCTAVIUS, and, after he became the heir of Cæsar the dictator, CAIUS JULIUS CÆSAR OCTAVIANUS, the first Rom. emp., was b. at Velitra in 63 B. C. He was the son of Caius Octavius, a senator, and Atia, who was a niece of Julius Cæsar. He was adopted as a son by Julius Cæsar. When Cæsar was killed, in Mar. 44 B. C., he claimed his inheritance. Mark Antony opposed him, but Octavius gained the favor of the senate, which in Jan. 43 B. C. gave him the command of an army which defeated that of Antony near Mutina (Módena). He then defied the senate and marched to Rome, was elected consul in Aug. 43, and formed a triumvirate with Antony and Lepidus against Brutus, Cassius, and the senate. Antony and Octavius defeated Brutus and Cassius in the decisive battle of Philippi in 42 B. C. A. then obtained control of It. by a new division of the provs. In the year 36 he defeated Sextus Pompey, and was chosen consul for the second time in 33. By the defeat of Antony, in 31 B. C., at the naval battle of Actium, he made himself sole master of the Rom. empire. He was subsequently chosen consul several times, and professed an intention to restore the republic, but he usurped absolute power, partly disguised under republican forms. In 27 B. C. the title of A. was conferred on him by the obsequious senate, which retained the shadow of its former power. He had an only child, Julia. In 23 B. C. he accepted the *tribunitia potestas* (tribunitian power) for life. He governed men with artful policy, skillfully using their passions and talents to promote his own designs; and the peace, order, and prosperity which his subjects enjoyed reconciled them to the loss of their anc. liberty. He made such improvements in Rome that it was said that he found it a city of brick and left it a city of marble. His adopted sons, Caius and Lucius Cæsar, to whom he intended to leave the throne, died young. His step-son Tiberius was his successor. D. in Aug. 14 A. D. [From orig. art. in *J.'s Univ. Cyc.*, by ABEL STEVENS, LL.D.]

Auk (*Alca*), a genus of web-footed oceanic birds of the family Alcæde. The A. are remarkable for the shortness of their wings, which in some species are used as paddles or fins in swimming under water, while in others they are used in flight. These birds are adapted solely for an aquatic life, and swim with wonderful rapidity; they pass their lives mostly in the sea and on the shore near the water's edge. They are found only in the N. hemisphere, and are most abundant in the Arctic regions.

Aulic [from the Lat. *aula*, "hall," Ger. *Reichshofrath*] **Council**, one of the two highest councils or courts of the former Ger. empire, originating in 1495, the members being appointed by the emp. It had gen. jurisdiction over all matters in which the emp. was directly concerned. After the dissolution of the Ger. empire, 1806, the term was often applied to the Council of State of the emp. of Aus.

Aulick (COM. JOHN H.), b. in Va. in 1787, entered the U. S. N. in 1809. He was promoted to be a lieut. in 1814 for bravery in the fight between the Enterprise and Boxer. Became capt. in 1841 and com. in 1862. D. Apr. 27, 1873.

Aulus Gellius, a Lat. author who lived during the

reigns of Hadrian and the Antonines. Little is known of the events of his life. He resided much at Athens, where he composed his *Nactus Afflict*, a work of curious information upon a great variety of subjects.

Aumale, d', *de-mahl* (CLAUDE DE DUC, a Fr. gen., b. in 1523, was a brother of the famous duke of Guise. He fought against the Huguenots at St. Denis and Moncontour, and was one of the chief instigators of the massacre of St. Bartholomew. He was killed in battle Mar. 14, 1573.—His son, CHARLES DE LORRAINE, duc d'A., b. about 1555, was an ardent partisan of the Cath. League. He and the duke of Mayenne commanded the armies that fought against Henry IV. Having plotted treason with the king of Sp., he was condemned to death by Parl. in 1595, but escaped. D. 1631.

Aumale, d', (ALEXIS EUGENE PHILIPPE LOUIS D'ORLÉANS), Duc, the 4th son of Louis Philippe, king of the Fr., b. in Paris in 1832. He entered the army in 1839 and served in Algeria. In May 1843, having defeated Abd-el-Kader, he was raised to the rank of lieut. gen. In Sept. 1847 he was appointed gov.-gen. of Algeria. On the abdication of his father he went into exile, residing many yrs. in Eng. He was chosen a member of National Assembly Feb. 1871, and elected to Fr. Acad. in winter of 1871-72.

Aurelian, au-ré-li-an, or Aurelia-nus (CLAUDIUS DOMITIUS), a Rom. emp. of humble origin, b. about 212 A. D. at Sirmium, in Pannonia, or, as some say, in Lower Dacia. He raised himself by his merit to the highest rank in the army of Valerian. On the death of Claudius (270 A. D.) A. was elected emp. by the army. He abandoned Dacia to the Goths and Vandals, in order that the Danube might become the boundary of the empire. He sent an expedition against Zenobia, queen of Palmyra, defeated her army near Emesa, and captured Palmyra and its queen in 273 A. D. He recovered Gaul from Tetricus, who had usurped royal power, and obtained the title of "Restorer of the empire." He was assassinated by his own officers between Byzantium and Heraclea in 275 A. D.

Aurelius Victor (SEXTUS), a Rom. historian who flourished about 330 A. D. He was prefect of Rome under Theodosius I. The following works are ascribed to him—namely, *De Caesaribus Historiæ*, *De Viris Illustribus Urbis Romæ*, and *Aurelii Victoris Epitome*.

Auricula (*Primula Auricula*), a plant of the order Primulaceæ, nearly related to the primrose, is much cultivated in flower-gardens. It is a native of the Alps and other mts. of Europe and Asia. The size and color of the flowers have been much improved by cultivation.—Also a species of shell-fish, having a spiral shell covered with a horny epidermis.

Aurifaber [the Latinized form of GOLDSCHMIDT] (JOHANN), b. in 1519; studied theol., became amanuensis to Luther in 1545, court-chaplain at Weimar in 1551, and minister at Erfurt in 1566; edited several MSS. of Luther's, and his *Epistole* and *Table-Talk*. D. 1579.

Auriga, a Lat. word signifying "charioteer," is the name of a N. constellation, sometimes called THE WAGONER.

Aurine. See ROSOLIC ACID.

Aurochs, au-roks [Ger. pron. owr'oks], a contraction of the Ger. *Auer-Ochs* (i. e. "wild-ox"), the *Bos urus* of some naturalists, and *Bison bonassus* of others, is a European species of Bison. Though once found in great numbers in many parts of Europe, it is now chiefly, if not wholly, limited to the forests of Lithuania, Moldavia, Wallachia, and the Caucasus. It bears many points of similarity to the Amer. bison. It is a very powerful animal, being somewhat larger than an ordinary ox, and, though clumsy in appearance, can run rapidly for a short distance. The body of this animal exhales a strong odor, somewhat resembling musk. The A. is a good swimmer, and delights in dabbling in the water and rolling in the mud. Its food consists in a great part of lichens, of which it is especially fond.



Aurochs.

Auro-ra, a Lat. word signifying "morning" or the "goddess of morning," corresponding to the Gr. *Eos*. The poetical legends represent her as the daughter of Hyperion, the wife of the Titan Astræus, the mother of Hesperus, Boreas, Zephyrus, and Emonon. She was sometimes represented as dressed in a saffron-colored robe, with a torch in her right hand.

Aurora, city and important R. R. centre, Kane co., Ill., on Fox River, 39 m. W. S. W. of Chicago. It is the seat of Jennings Sem. Pop. 1870, 11,162; 1880, 11,873.

Aurora, city, on R. R. and Ohio river, Dearborn co., Ind., 25 m. W. by S. from Cin. Pop. 1870, 3,301; 1880, 4,435.

Aurora, on R. R., cap. of Hamilton co., Neb. Pop. of precinct 1880, 1,232.

Auro-ra Bore-alis, a luminous phenomenon which often appears in the N. sky, and for this reason called "the N. lights." It is most frequent as well as most brilliant in high latitudes. It usually consists of an arched, cloud-like base, luminous above and dark beneath, from which streams of light shoot up, reaching sometimes only a few degrees, and at other times extending to or beyond the zenith. These streamers, which are often colored, frequently appear to have a tremulous motion, and when close together resemble waves of light following one another. These appearances, which are undoubtedly electrical, are sometimes visible over a large extent of terr.; during their continuance the wires of telegraphic lines are so much affected as to render it impossible to send messages from station to station. Recent investigations seem to indicate that auroras, like sun-spots,

are subject to a law of periodicity, the cycle in each case being between 10 and 11 yrs. It is said that periods of remarkable brilliancy occur at intervals of about 60 yrs.

Aurangâbâd, a city of India, on the Doodna, 68 m. N. E. of Ahmednuggur, was the favorite residence of Aurang-Zeb, in whose honor it was named, and contained the ruins of a magnificent palace, built by him in memory of his daughter. Pop. 1880, about 60,000.

Aurang-Zeb, or **Aurang-Zebe** (i. e. the "ornament of the throne"), afterward called **Alum-Geer** or **Alam-Gir** ("conqueror of the world"), a Mogul emp. of Hindostan, b. Oct. 22, 1618. He was a younger son of Shah Jehân, who was deposed in 1657, when his two elder sons contended for the crown. A-Z. procured the assassination of his brothers, and ascended the throne in 1658. He shut his father in prison (where he d. in 1666), and began a vigorous reign of apparent prosperity, persecuting the Hindoos, and adding Benajoor and Golconda to his dominions. D. 1707.

Auso-nius (DECI-MUS MAGNUS), an eminent Lat. poet, b. at Burdigala (Bordeaux) about 309 A. D. He practised law in early life, and gained distinction as a prof. of rhetoric at Burdigala. In 367 A. D. he was appointed tutor to Gratian, by whom he was raised in 379 to the dignity of consul. D. about 394 A. D.

Auspices, aw'spi-sez [from the Lat. *auspicium*, i. e. *avispicium*, the "observing of birds"], a term applied by the anc. Roms. to divinations founded on the flight of birds, by which the augurs professed that they could ascertain the will of the gods and predict events. (See *Augur*.) In performing this ceremony the augur with a wand marked out a portion of the sky for his observations, which portion, called a *templum*, was divided into right and left. If the birds appeared on the right hand the omen was favorable; if they flew toward the left, it was unfavorable. The commander of the army in time of war had the exclusive power of taking the A. If a victory was gained by his legate or lieutenant, it was said to be won under the A. of the gen.-in-chief. Thus originated the common Eng. phrase, "under the A." of some one. In such cases "auspices" signify influence, patronage.

Austerlitz, a small town in Moravia, on the Littawa, 12 m. E. S. E. of Brünn. It is noted as the scene of a great victory gained Dec. 2, 1805, by Nap. over the combined armies of Rus. and Aus., commanded by their respective emps. The Fr. loss was 12,000, that of the allies 30,000.

Austin, city and R. R. junc., cap. of Mower co., Minn., on the Red Cedar River. Pop. 1870, 2039; 1880, 2305.

Austin, on R. R., city, and cap. of Lander co., Nev., 96 m. S. of Battle Mt. station, and 6 m. E. of Reese River; has quartz-mills and silver-mines. Pop. 1870, 1324; 1880, 1679.

Austin, city and important R. R. centre, cap. of Tex. and of Travis co., on the Col. River. It was named in honor of Stephen F. Austin, one of the pioneers of Tex. It became



State Capitol (Austin, Tex.).

cap. of republic of Tex. in 1839, in 1850 was selected as cap. of the State, and in 1872 was made permanent cap. by popular vote. A State capitol is now in progress, for the cost of which 3,000,000 acres State land have been appropriated; the State Univ. is being built, and there are asylums for lunatics, mutes, and the blind. Pop. 1880, 11,013; 1885, about 15,000.

Austin (SAMUEL), D. D., a Congl. clergyman, b. at New Haven, Conn., Oct. 7, 1760, grad. at Yale in 1783, was pastor at Fair Haven, Conn., 1786-89, and afterward at Worcester, Mass., for nearly 25 yrs.; pres. of Univ. of Vt. from 1815 about 6 yrs. D. Dec. 4, 1830.

Austin (STEPHEN F.) was son of Moses Austin. About 1821 he conducted a company of emigrants from New Orleans, and planted a colony where the city of Austin now stands. The grant made to his father, who emigrated to Tex. about 1820, was confirmed to the son in 1822 or 1823. Early in 1833 the Texan colonists formed a const., to obtain a ratification of which A. and other delegates went to the city of Mex. In consequence of the frequent revolutions and anarchy of Mex. they did not obtain the admission of Tex. into the confederacy. In 1835 A. was chosen commander of Tex. army, and joined in the movement for the liberation of Tex. He was a com. to the U. S. to obtain recognition of Tex. as an independent state. D. Dec. 27, 1836.

Australasia, aw-stral-â'she-a (i. e. "Southern Asia"), a part of Oceania, extending between the equator and lat. 47° S., comprises Australia, Van Diemen's Land (Tasmania), New Zealand, and those parts of the Malay Archipelago and Polynesia between lon. 130° and 170° E.—viz., Papua, the Ar-ru Islands, New Britain, Timor-Laut, New Ire., New Caledonia, and the Admiralty, Solomon, New Hebrides, and Queen Charlotte's Islands. Its area is estimated by Behm and Wagner at 3,425,000 sq. m., and its pop. at 4,365,000.





Australia, aws-tri-ah (formerly New Holland), the largest island on the globe, sometimes reckoned as a 5th continent, derives its name from its geographical location *antipodical*, "southern," lying to the S. of Asia, between lat. 10° 45' and 39° 11' S., and 113° and 153° E. lon. Its area is about 2,900,000 sq. m., somewhat less than the U. S. without Alaska. From E. to W. it is 3500 m., and from N. to S. 1600 m. The coast line is indented by singularly few bays, except on the N. shore, where the Gulf of Carpentaria forms an inlet of about 300 m. diameter.

Geology and Physical Features.—The peculiar features of A. suggest the probability of its having been at no remote period the bed of an ocean. Its few mt. ranges are of insignificant height, the Australian Alps, Grampians, etc., rising to an average of 1500 ft. only above the sea, though there are occasional summits in the S. E. of near 5000 ft. The vast plain lying between the coast ranges is a lowland surrounded by plateaus of sandstone formation, 1000 to 3000 ft. in height. Tertiary deposits are found in Victoria and on the W. coast, while wholly absent in E. A. Granite occurs largely along the coast and in the E. drift, and igneous rocks are found with fragments of paleozoic strata. In the interior occur great deposits of animal bones. A's prin. river, the Murray, 1100 m. long, is navigable in the interior, but its outlet is a shallow lagoon. The Victoria runs in a deep channel through cliffs 300 ft. high. Other rivers are the Glenelg, flowing through a fertile country and partially navigable; the Prince Regent, Brisbane, Richmond, Clarence, Swan, etc.

Climate.—The vast dry plains of A. becoming heated by the sun have been compared to an oven, very little of the moist sea air penetrating inland. S. A. gets little rain, while Victoria and New S. Wales have from 32 to 44 inches annually. Here the seasons of Amer. and Europe are reversed, Jan. and Feb. being the hottest months of summer, and July the coldest of winter. Inland the heat rises to the almost incredible height of 100° to 140° in the shade, while the coast regions are quite temperate, with a mean annual temperature of 58° to 62°. Protracted droughts and violent floods characterize A., which has a marked poverty of fresh-water reservoirs of a permanent kind.

Soil and Productions.—The part of A. lying in the tropical regions has forest products of great luxuriance, while the highlands, almost bare of trees, abound in pasture grass and herbaceous vegetation. The dry climate in the N. favors evergreen growth, while there is a marked absence of mosses and lichens. Of the eucalyptus, or gum-tree, 400 species are found, some being 150 to 200 ft. high, with stately trunks. About 10,000 species of indigenous Australian plants are described, but none of the cereals and few of the esculent fruits or roots are natives of the soil. Cattle are abundantly raised by herdsmen. The marsupial animals predominate among the Australian mammals. There are found the kangaroo, opossum, flying squirrel, bear, wild dog, etc., but no ruminant beasts. The birds embrace near 700 species, among which are the white eagle, black swan, parrot, emu, lyre-bird, honey-eater, etc. Saurians or lizards are numerous. Food fish abound, several species being peculiar to A. Gold was discovered in 1851 in Victoria and New S. Wales, and later in Queensland. The annual value of gold exports was \$50,000,000 for several yrs. Victoria alone has produced an aggregate of \$900,000,000 in gold. Large coal-fields exist, also profitable copper, iron, and lead mines. Wool is a great staple of A., sheep-farming being easy and profitable. Wheat, cotton, sugar, and tobacco are produced, and the grape flourishes. Aggregate exports reach nearly \$170,000,000 annually.

Inhabitants.—The aborigines of A., though similar to the Afr. in thick lips, flat noses, etc., are lighter in color, being dusky brown, and having well-shaped limbs and straight or curly black hair. Their intelligence is of a low order, their knowledge of mech. arts very slight. They build no permanent dwellings, but only hovels. The sole dress is a single garment, the skin being tattooed. Their hatchets are of stone, with spears and axes of hard wood, as is their peculiar weapon the boomerang. The tribal relation exists, and cannibalism prevails. They have no religion beyond believing in the god *Budda*, a giant sleeping for ages, whom they expect some day to awake and eat up the world. The native Australians are computed at about 80,000. The rapidly increasing European pop. is almost wholly Brit., who have founded thriving settlements, advanced in civilization and all the arts of life.

History.—A. was first discovered by the Dut. and Spaniards in 1606. Capt. Cook in 1770 explored the E. coast. In 1788 the first settlement of New S. Wales began, Botany Bay following as a penal colony. W. A. was set apart in 1829. S. A. in 1834, Victoria in 1851, and Queensland in 1859. Explorations of the almost unknown interior were conducted by Sturt in 1845, Leichart in 1847 (who never returned), Stuart 1858, Waterhouse 1860, Burke 1860, Howitt 1861, McKinlay 1861, Gosse and Warburton 1873, Giles 1876, and Barclay in 1878, developing the fact that the unexplored interior is more fertile than was previously believed. (See SMITH, *Gold Fields and Mineral Dists. of Victoria*; CHRISTMANN, *Australia*, and PETERMANN, *Australia in Mittheilungen*.)

Political Divisions.—Australia is thus divided:

COLONIES.	Square miles.	Population.
New South Wales, 1881.....	308,467	750,000
Queensland, 1879.....	668,038	217,851
South Australia, 1881.....	903,690	277,000
Victoria, 1879.....	88,424	399,393
Western Australia, 1879.....	975,531	28,668
Total.....	2,941,170	2,172,892

A. R. SPENCER.

Austria-Hungary, aws-tri-a-hung-gary (Ger. *Oesterreich-Ungarn*, etc., as it is generally called in non-official style, *Austria*, is situated in the S. E. part of Central Europe, between lat. 42° and 51° N., and bounded by It., Switz., Bavaria, Sax., Prus., Rus., the Danubian principalities, Tur., and the Adriatic Sea.

Divisions and General Statistics.—The Aus. empire is composed of 5 kingdoms (Hungary, Bohemia, Galicia, Illyria, and Dalmatia), 1 archduchy (Austria), 2 principalities (Transylvania and Bosnia), 1 margraviate (Moravia), 1 county (Tyrol), and some countries without any definite title (Croatia, Slavonia, Herzegovina, etc.). As these provs., or, as they are called, crown-lands, were gathered originally around 2 different centres—the archduchy of A. and the kingdom of H., which afterward were united in the possession of the house of Hapsburg—the A.-H. monarchy consists of 2 distinct states—the Cisleithan or Ger. or Aus., and the Transleithan or Magyar or Hungarian—the river Leitha forming the dividing line, the Gers. and the Magyars the 2 most prominent nationalities. To the former of these divisions belong the 14 first crown-lands mentioned in the list below; to the latter the 4 next. But to these 2 divisions must further be added Bosnia and Herzegovina, which were acquired by the treaty of Berlin of July 13, 1878, which decided that they should be occupied and administered by A.-H. which decision was carried out in the course of the year.

PROVINCES OF THE EMPIRE, OF CROWN-LANDS.	Sq. miles.	Population.
Lower Austria.....	7,954	2,330,621
Upper Austria.....	4,431	759,620
Salzburg.....	2,767	163,570
Styria.....	8,670	1,213,597
Carinthia.....	4,005	348,730
Carniola.....	3,856	481,243
Littoral.....	3,084	647,834
Tyrol.....	11,324	912,549
Bohemia.....	20,060	5,560,849
Moravia.....	8,583	2,153,406
Silesia.....	1,087	565,475
Galicia.....	30,397	5,958,907
Bukovina.....	4,035	571,671
Dalmatia.....	4,940	476,101
Hungary.....	87,043	11,744,471
Transylvania.....	21,215	2,116,132
Croatia and Slavonia.....	16,773	1,732,261
Town of Fiume.....	8	17,865
Total.....	240,942	37,754,972

As Bosnia comprises 16,417 sq. m. with 862,202 inhabs., Herzegovina, 4308 sq. m. with 207,970 inhabs., and the additional portion of the sanjak of Novi-Bazar, 3522 sq. m. with 142,000 inhabs., the whole Aus. empire comprises an area of 265,189 sq. m. with 38,967,144 inhabs. Practically belonging to A.-H., though not incorporated by any treaty, is the small principality of Liechtenstein, area, 68 sq. m., pop. 8320.

Configuration, Products, Industry, and Commerce.—A. is, next to Switz., the most mountainous country in Europe, resting S. on the E. continuations of the Alps, and N. on the easternmost ranges of the mt.-system of Central Europe. The Alps enter the country from the Swiss canton of the Grisons; form in Tyrol, under the name of the Rhaetian or Tyrolean Alps, a confused mass of mts. whose highest peak, the Orteler Spitze, rises 12,814 ft. above the level of the sea, and separate then into 4 distinct though not parallel ranges, of which the Noric Alps, 12,000 ft. high, fill Salzburg, Styria, and A. proper; the Cornic Alps, 9000 ft. high, Carinthia, Carniola, and Croatia, and the Julian and Dinaric Alps, 5000 ft. high, Dalmatia and Bosnia, where they connect with the Balkan. To the N., the Bohemian Forest, not much more than a range of wooded hills, the Riesengebirge rising in the Schneekoppe 5330 ft. above the sea; the Erzgebirge and the Sudetes inclose the Bohemian table-land, and connect eastward with the Carpathians, which in the Eisthaler Thurm rise 8378 ft. above the sea, form in a large arch the boundary between H. and Galicia, and fill the whole of Transylvania. Between these 2 systems of mt.-ranges the intermediate country is occupied by the various basins of the Danube; in A. proper they approach each other very closely; farther to the E. they separate widely and give room for the extensive Hungarian plain. The Galician plain, N. of the Carpathians, is by no natural boundary separated from the plains of Poland and Rus. The prin. river is the Danube, next the Volga the greatest river in Europe, and navigable in its whole course through A., about 820 m. Where it enters the country it is 898 ft. above the sea; where it leaves it and passes through the Iron Gate into the Wallachian plains, only 132 ft. It receives from the Alps the Inn, the Drave, the Save, etc., and from the Carpathians the great river Theiss. To the N. Sea runs the Elbe, to the Baltic the Oder and the Vistula, to the Black Sea the Dniester; but none of these rivers have any mercantile or military importance to the country.

The mts. abound in metals and useful minerals, well wooded with oak, ash, elm, and fir, and present excellent grazing grounds. The valleys are fertile; in the S. part covered with vineyards, olive and mulberry groves, and orchards producing the choicest fruits. The plains are the granaries of Europe. Though one third of the productive area, about 66,000 sq. m., is covered with forests, and though agriculture, the principal industry of the country, is in a somewhat backward state, 400,000,000 bushels of grain are annually raised—rye, oats, wheat, barley, maize, and millet—especially in H. and Galicia; 375,000,000 gals. of wine are annually produced, 72 per cent. of it in H., and some of these wines are very celebrated, as for instance the Tokay. Flax and hemp are extensively cultivated in Moravia.

Silesia, Bohemia, etc., and many kinds of very fine linen are manufactured. The tobacco plant and the beet-root are also grown; the former, both its cultivation and its manufacture, is a govt. monopoly. An immense quantity of beer is manufactured—no less than 186,000,000 gals. a yr.; there are 3200 breweries in the country, of which about 1000 are in Bohemia. Next to agriculture, cattle raising and horse breeding are the most important industries. Austria-Hungary contains 12,705,404 head of cattle, of which 5,279,193 are in H., and 3,525,842 horses, of which 2,158,819 are in H.; the latter enjoy a high reputation. Leather is annually manufactured to the value of about £10,000,000. The number of sheep in the country is about 20,000,000, of which about 15,000,000 are in H. They are raised principally for the sake of the wool, and woollen manufactures flourish, especially in Bohemia. Finally must be mentioned the highly developed mining industry. Inexhaustible stores of coal are found at various places in the country, and about 6,000,000 tons are annually raised from the mines. Gold and silver are found in H. and Transylvania, iron in Silesia, Styria, etc., copper in Tyrol, rock-salt in Galicia; 73,451 persons are employed in the mines, and 13,857 in the smelting and casting works. The commerce of A. is of course much impeded by its inland position and the mountainous character of its terr.; its only seaports are Trieste and Fiume. Nevertheless, the value of its imports of merchandise amounts to 579,547,828 florins, and of its exports to 698,302,513 florins; and the value of its imports of bullion amounts to 28,300,000 florins, and of its exports to 15,100,000 florins.

Population, Religion, Education, and Military Organization.—The inhabs. of A.-H. belong to 3 distinct races—Slavs, Gers., and Magyars—different in blood, lang., manners and customs, religion, etc. The Slavs number 16,540,000, and would thus form the dominant nationality in the empire, if they were not cut up into several minor divisions which have nothing in common but the mere descent: 4,480,000 Czechs in Bohemia, 3,360,000 Ruthens and 2,370,000 Poles in Galicia, 1,230,000 Slavens, 1,940,000 Slovaks, 1,520,000 Croats, etc. The Gers. number about 9,000,000; the Magyars about 5,600,000. Beside these 3 large groups there are in A.-H. 2,940,000 Rumani or Wallachians, 1,105,000 Jews, 515,000 Its., 140,000 Gypsies, etc. The majority of the pop., about 24,000,000, belong to the R. Cath. Ch., about 7,000,000 to the Gr. Cath. Ch., about 4,000,000 to the Prot. chs. There are in all about 34,000 ecclesiastics, and 950 convents with 8500 monks and 5700 nuns. Popular education has of late received much attention from the govt., and every child of the proper age is now compelled to attend the common schools, if school-education is not provided for it in some other way. There are in A. 15,054 common schools, with 32,137 male and 2814 female teachers, of whom 12,235 are ecclesiastics and 1036 nuns; the common schools of H. number about 16,000, with about 28,000 teachers. The univs., of which there are 6 in A. (Vienna, Grätz, Innsbrück, Prague, Cracow, and Lemberg), and 1 in H. (Pesth), are in a flourishing condition, numbering 707 profs. and 10,900 students. The middle schools or gymnasiums, and the special schools for mining, military science, etc., are best developed. Military service is compulsory on all citizens capable of bearing arms, and the service lasts for 12 yrs.—3 in the standing army, 7 in the reserve, and 2 in the so called *Länderwehr*. The standing army numbers in peace 268,204 men, in war 1,031,621. The navy consisted in 1882 of 62 steam vessels. The largest ship is the *Custoza*, 302 ft. long.

History and Government.—The hist. of A. is the hist. of the house of Hapsburg. When Rudolph of Hapsburg became emp. of Ger., and Ottokar, king of Bohemia and duke of A., Styria, and Carinthia, refused to take the oath of allegiance, the emp. succeeded in dispossessing him of his fiefs (1278), and subsequently conferred them, with the consent of the electors of the Ger. empire, on his son (1283). Thus the dynasty of Hapsburg was founded. In the first half of the 16th century Duke Ferdinand of A. was elected king of H. by one party, while John Zapolya of Transylvania was chosen by another. After several wars, in which John was supported by the Turks, Ferdinand finally came out victorious and united H. to A. Thus possessed of a large terr., fertile and densely peopled, and regularly elected emps. of Ger., the house of Hapsburg was for several centuries the richest and most powerful family in Europe. But humiliations came, thick and heavy, with Nap. Driven out of Ger., the emp. Francis assumed, Aug. 11, 1804, for himself and his successors, the title of emp. of A. But besides Ger. he also lost his possessions in It., and was completely shut out from the sea. After the fall of Nap. A. was restored to its former size, and under the administration of Metternich it also regained its former prestige in European politics. But it was internally weak, and its weakness became surprisingly apparent, first by the revolution of 1848, when only the support of Rus. prevented the whole fabric from falling to pieces, and then after the battle of Sadowa, 1866, when for the second time it was driven out of Ger., and lost its hold on It. Since that time the Aus. govt. has been principally occupied with the internal reconstruction of the empire, and it is now constituted as a double state—A. and H.—each with a representation of its own, out of which is formed a common representation, in which all common affairs—army and navy, foreign policy, etc.—are treated. In 1882 the budget of A. showed 448,155,793 florins receipts and 487,720,951 expenditure; that of H. 301,967,214 receipts and 328,235,311 expenditure; and that of the common affairs of both states, 117,149,549 receipts and expenditure. CLEMENS PETERSEN.

Autumn, a'w'tum [Lat. *autumnus*; originally *auctumnus*, from *au'geo*, to "increase," because in A. the earth yields its increase], the season of the yr. which follows summer, sometimes in the U. S. called fall, in reference to the fall of the leaves. In a popular sense it comprises Sept., Oct., and Nov. In astron. it is the time which elapses between the autumnal equinox and winter solstice.

Average, in law, is a term employed in maritime commerce, and is used in different senses when preceded by the words gen., particular, or petty. 1. *Gen. A.*—This means the case where several interests connected together, as being engaged in a common adventure at sea, such as ship and cargo, are exposed to a marine peril, and one of these interests is voluntarily sacrificed, either in whole or in part, as the price of the safety of the residue of the property at risk; or expense is incurred for the same reason, and the amount of such sacrifice or expenditure is charged by law upon the respective interests in proportion to their value. The act of voluntarily casting away property under such circumstances is termed a "jettison." The elements of a gen. A. case are said to be these: There must be a sacrifice of property, it must be voluntary, and must be successful. There is no gen. A. allowed in cases of goods laden on deck, unless it is usual to place the goods there on a voyage such as the one in which this question arises. The master of the ship by the maritime law is intrusted with the power to order a jettison when the circumstances justify it. The property upon which the contribution is assessed is the ship, cargo, and freight. The property lost contributes as well as that which is saved. The values are estimated by rule: the ship and appurtenances are valued as at the end of the voyage, and the cargo at its value at the time and place of discharge. Practically, gen. A. is closely connected with the business of marine insurance, as the insurance on ship, cargo, and freight may be made by different underwriters, and under the law of abandonment the rights to claim gen. A., as well as the burden of its assessment, may vest in and rest upon the respective insurers. 2. *Particular A.*—This signifies damage happening to interest (ship, cargo, and freight) at risk as sea in consequence of pure accident. The loss in such a case rests upon the owner of the property injured or upon his insurer. 3. *Petty A.*—This term refers to certain petty charges in pt. for pilotage, lights, towage, anchorage, and the like, which were formerly apportioned upon the owners of the ship and cargo. The modern practice is to include these charges in the freight. T. W. DWIGHT.

Averell (WILLIAM W.), b. in N. Y. 1830, grad. at W. P. t., and was assigned to the cav.; served on the frontiers till 1859, when he was wounded. During the c. war he held cav. commands in the Army of the Potomac and elsewhere, receiving various brevets, lastly that of maj.-gen. U. S. A. He resigned his commission at the close of the war, was made consul-gen. to Canada in 1866, and subsequently became pres. of a manufacturing co. in New York.

Avernus [Gr. *Aopros*, from *a*, priv., and *opros*, a "bird"], a small lake of It., 10 m. W. of Naples, occupying the crater of an extinct volcano. It was believed that no bird could fly over it on account of its mephitic vapors, whence its name "the birdless." It was supposed to be an entrance to the infernal regions.

Averroës, a-ver-ro-ëz, or **Averrhoes**, originally **Ibn-Roshd**, an Ar. philos. and phys., b. at Cordova, in Sp., 1126. He rose to great dignity, but was accused of heretical opinions and deprived of his office, until the accession of the caliph Al-Mansur-Billah, whom he followed to Morocco. He wrote a commentary on Aristotle, whom, however, he could not read in the original. D. 1198.

Avery'sboro', a v. of N. C., on Cape Fear River, about 40 m. S. of Raleigh. On Mar. 16 and 17, 1865, a severe conflict occurred here between the U. forces of Gen. Sherman and the Confeds. The latter were defeated with loss of many prisoners. The U. loss was about 600 killed and wounded, that of the Confeds. probably less, except in prisoners.

Avezana, a-vet-zā'na (GIUSEPPE), the Lat. form of **Ibn-Sinā**, the most eminent of Ar. phys., b. near Bokhara in 980 A. D. He was well versed in math., astron., philos., and other sciences. Before he was 20 he was reputed the most learned man of his time. He resided at Ispahan and Hamadân. Wrote in Arabic his *System of Medicine*, which, translated into Lat. 1595, was for 5 centuries a standard book of the highest authority in the schools of Europe. D. 1037. (See S. KLEIN, *Dissertation de Avicennâ Medico*.)

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Avicennia, a genus of plants of the natural order Verbenaceæ, consists of trees or shrubs resembling mangroves, and growing in salt swamps in tropical regions and extending N. to Fla. The bark of *A. tomentosa*, called white mangrove, is used for tanning in Brazil. The gum of another species is used as food in New Zealand, and its seeds in India.

Avignon, ah-yën-yôn' (anc. *Ave'nio*), a city of Fr., on the Rhone, 74 m. N. W. of Marseille. It was taken by the Saracens 730 A. D.; after many changes was purchased in 1348 by Pope Clement VI., the 4th of the 7 popes who resided here from 1309 to 1376. Its pop. was then 100,000, and its dissoluteness proverbial. A. is the seat of an archbishopric, and has numerous anc. edifices; was annexed to Fr. in 1791. Pop. 1881, 37,657.

Avitus (MARCUS MÆCILIUS), a Rom. emp. b. in Auvergne about 400; became prefect of Gaul, and succeeded Maximus as emp. of the W. in 455 A. D. He was deposed by Ricimer in 456. D. 457.

Avoca, on R. R., Pottawattamie co., Ia., 35 m. N. E. of Council Bluffs. Pop. 1880, 1600.

Avocado Pear, or **Aligator Pear**, the fruit of *Persea gratissima*, a tree of the order Lauraceæ, a native of the warm parts of Amer., having leaves like the laurel. The fruit is like a pear in shape, and has a soft pulp of delicate flavor, which dissolves like butter in the mouth, and is

called "vegetable butter." It is much esteemed in the W. I., and grows in S. Fla.

Avocet, or Avoset (*Recurvirostra*), a genus of web-footed birds, of the order Ciconiiformes, having long legs, and very long, slender bills. They are easily distinguished from other wading birds by the upward curvature of the bill, which is like elastic whalebone, and is adapted to seeking in the mud for its food, which consists almost wholly of worms, insects, and little crustaceans. They are birds of powerful wing, and better adapted for flying and walking than swimming. The *Recurvirostra americana* abounds in the U. S.



Avocet.

Avoldupois, av-er-du-pois', or **Averdupois**, the common system of weights for all commodities except medals, gems, and precious metals. A lb. A. contains 7000 grains, the legal standard being that a cubic inch of water weighs 252.458 grains; a cubic ft. of water weighs 997.17 ounces.

Avon, R. R. June., Livingston co., N. Y., on the right bank of the Genesee River, 18 m. S. S. W. of Rochester. Here are sulphur springs, with hotels which are much frequented in summer by invalids. Pop. 1870, 900; 1880, 1617.

Avon, the name of several rivers of Eng., among which is the Upper A., a tributary of the Severn, 100 m. long, upon whose bank is Stratford-upon-A., the place where Shakespeare was b. and d.

Awyaw' (Aga-Ojo or Oyo), the cap. of Yoruba, in Central Afr. Pop. about 70,000.

Axis [Lat. *axis*, "an axle"], in math., a straight line with reference to which the parts of a magnitude are symmetrically arranged. In analysis, the A. of co-ordinates are straight lines to which the points of magnitudes are referred. In astron., an A. is a straight line around which a body revolves, or it is a line around which a system of bodies revolves. Thus, the A. of a planet is the line around which it turns; the A. of the heavens is a line around which all the heavenly bodies seem to revolve.

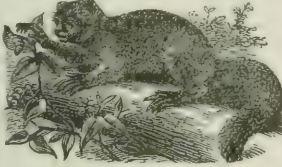
Axis (*Axis maculatus*), a species of deer found in India and in many of the E. I. islands, is sometimes called *chittura* by the natives; A. is the anc. name of a kind of deer or antelope mentioned by Pliny. It resembles in size and color the European fallow-deer, but its horns are slender, pointed, and little branched. The female has no horns. It is easily domesticated, and is kept in parks in Europe. The horns are brought to Europe and used for knife-handles.

Axisminster Carpets. See APPENDIX.

Ax'olotl (*Siredon tichenoides*), a remarkable batrachian found in the Mex. lakes, is a permanent larva of the Amblystoma type of salamanders. It resembles a fish in its form, has 4 legs, and a long, compressed, and tapering tail. On each side of the neck the gills form 3 long feather-like processes, which give it a remarkable appearance. Length, about 10 inches. It is much used as food by the Mexs.

Ayacu'cho, a town of Peru, where the Peruvian army under Gen. Sucre defeated the Spaniards Dec. 9, 1824. This victory put an end to the Sp. rule on the Amer. continent. Pop. about 25,000.

Aye-Aye (*Chiromys Madagascariensis*), a very singular quadruped of Madagascar, ranked by Cuvier among the Rodentia, but placed by other naturalists in the family of lemurs. It has a long, bushy tail, and is about as large as a hare. Each of its 4 extremities has an opposable thumb, and the digits are armed with pointed nails, which it sometimes uses to pick kernels out of nuts. It sleeps during the day, and is very active in the night, feeding on insects and fruits.



Aye-Aye.

Ayer, an important R. R. centre and tp., Middlesex co., Mass., 35 m. N. W. of Boston. Pop. of tp. 1880, 1881.

Ayeshah, or Aieshah, the favorite wife of Mohammed, b. at Medina about 610 A. D., was a daughter of Abu-Bekr, who afterward became caliph. After Mohammed's death she opposed the caliph Othman and his successor Ali, who defeated her in battle. D. 677 A. D.

Aylmer, or Elmer (JOHN), an Eng. Prot. bp., b. in 1521; was tutor to Lady Jane Grey, and became an exile on the accession of Queen Mary. He was appointed bp. of Lond. in 1576, after which he treated the Caths. and Puritans with severity. D. June 3, 1594.

Ayres (ROMEY B.), b. in New York in 1825; grad. at W. P. L., served in the Mex. war, and subsequently at various posts. During the c. war he served in the army of the Potomac, taking part in many important actions; in 1865 was brevetted as maj.-gen. U. S. A.; in 1865-66 commanded a division in dist. of the Shenandoah, and in 1867-69 was member of tactics board. Col. of 2d art. July 28, 1879.

Aytoun, a'ton (WILLIAM EDMONDSTONE), a Brit. poet and essayist, b. in Edinburgh in 1813; was ed. in the univ. of that city, became a lawyer, then prof. of rhetoric in the Univ. of Edinburgh in 1845. His best work is *Lays of the Scottish Cavaliers*. D. Aug. 4, 1865.

Azalca, a-zá-le-a [from the Gr. *ἀζάλεος*, "parched,"] probably so called because it is usually found in dry situations, a genus of plants of the order Ericaceæ, comprising 100

species or more, natives of N. Amer., Chi., and other countries. Many of them, especially the *A. indica*, are cultivated for their beautiful and fragrant flowers.

Aza'ra, de (DON FELIX), a Sp. naturalist, b. May 18, 1746. He was a member of a commission sent in 1781 to S. Amer. to determine the boundary between the Sp. and Port. possessions, and he remained there 20 yrs. He prepared numerous maps of S. Amer., and wrote works on nat. hist. D. 1811.

Azeglio, d', dahid-záil-yo (MASSIMO TAPARELLI), MARQUIS, an It. statesman, b. at Turin Oct. 2, 1798. He studied and worked as an artist in Rome, and became a skilful landscape painter; removed to Milan, and entered upon politics, advocating a moderate but liberal policy. In 1849 he became prime minister of King Victor Emmanuel, and in 1852 was superseded by Cavour. He wrote novels and political treatises. D. Jan. 11, 1866.

Azimuth of a Body, in astron., the angular distance between the meridian and a vertical plane through the body. The altitude and A. of a body at any given time determine its position at that time.

Az'of, Azoph, or Azov, Sea of (the anc. *Palus Mæotis*, called by the Rus. *Moré Azovskoe*), 200 m. long; greatest breadth, 100 m.; area, 14,000 sq. m. The water is nearly fresh. It is connected with the Black Sea by the Strait of Yenikale or Kertch, the anc. *Cimmerian Bosphorus*.

Azores, a-zôrz' [Port. *Açores*, from *agor*, a "hawk"], or **Western Islands**, in the N. Atlantic, about 500 m. W. of Port., and between lat. 36° 55' and 39° 44' N., and lon. 25° 10' and 31° 16' W. They are arranged in 3 groups, lying some distance apart. In all there are 9 islands. They are of volcanic formation, and generally mountainous, but with some fertile valleys. The chief articles of export are oranges and wine. The Port. took possession of them in 1449. Total area, 966 sq. m. Pop. 259,900.

Aztecs, az'teks, a Mex. people inhabiting the table-land of Anahuac at the time of the Sp. conquest of Mex. Following the Toltecs, they founded the city of Mex. about 1325, some say as early as 1216. They were a warlike people; their religion was a gross polytheism; they had no alphabet, but their knowledge of astron. was remarkable. They were diligent cultivators of the soil, but had no horses, oxen, or other animals of draught. Their staple productions were maize and the agave or Mex. aloë, which supplied them with food, drink, and clothing. They were ignorant of the use of iron, but found a substitute in bronze, an alloy of copper and tin, of which they made weapons and tools. They also cast golden and silver vases of large size. (See PRESCOTT, *Conquest of Mex.*, vol. i.) R. D. HITCHCOCK.

Azure Stone. See LAPIS-LAZULI.

Az'urite, a beautiful blue carbonate of copper, sometimes called **Blue Malachite**. It occurs in blue crystals which are very brittle, consequently this malachite is not well adapted for the ornamental purposes for which green malachite is so extensively used. The name A. has also been applied to lazulite.

Az'ymites [from the Gr. *α, priv.*, and *ζύμη*, "leaven"], a name given to Chrs. who use unleavened bread in the sacrament, as the Latins, Armenians, and Maronites. The Gr. and Prot. chs. use the leavened bread.

B.

B, the second letter of most alphabets, is a consonant of the class known as labial mutes. It is cognate with the mutes *p* and *f*, and etymologically interchangeable with them and with the liquid *m* and the semi-vowels *w* and *v*. In anc. Rome, B sometimes stood for 300, and B for 3000. The Gr. *β* stood for 2, and *β* for 2000. On old Fr. coins B stands for Rouen; on Prus., for Breslau.

Baa'der, von (FRANZ XAVER), b. at Munich Mar. 27, 1765; studied med. at Ingolstadt and Vienna 1781-86; then natural science, especially mineralogy, at Freiberg, under Werner, 1788-92; visited Eng. 1792-96, and held various positions in the Bavarian mining dept. from 1797 to 1820. In 1826 he was made prof. of philos. and speculative theol. at the Univ. of Munich. His views tended to a reconstruction of the whole civilization on the basis of religion, of the Ch., but in this new ch. there should be no pope. In 1814 he presented a memorial to the sovereigns of Rus., Prus., and Aus., urging the necessity of bringing politics once more into close connection with religion. D. May 23, 1841.

Ba'al, or Bel, the prin. god of the Phœnicians, Chaldeans, and Carthaginians, regarded as a personification of the sun, and identical with the Bel or Belus of the Babylonians and Assyrians.

Baal'bec, Balbec, or Baalbek (called by the Grs. *Heliopolis*, i. e. "city of the sun"), a city of Syria, situated in a valley 42 m. N. W. of Damascus. It was long one of the most populous and important cities of Syria. In 636 A. D. it fell into the hands of the Saracens, and in 748 was sacked by the caliph of Damascus. Its site is now partly occupied by a small modern v.; but there are ruins of anc. temples, among which are those of the great temple of the sun, built of enormous blocks of marble and granite.

Bab'bage (CHARLES), F. R. S., an Eng. math., b. 1792, prof. of math. at Cambridge, and author of the 9th *Bridge-water Treatise*; invented a calculating machine, whose construction was commenced but not completed. D. Oct. 20, 1871.

Bab'bitt's Metal, a soft alloy, invented by Isaac Babbitt of Boston, and used in lining boxes for axles and gudgeons, in order to diminish the friction and abrasion. The alloy is prepared thus: To 4 lbs. of melted copper add gradually 12 lbs. of the best Banca tin, then 8 lbs. of antimony, and finally 12 lbs. more of tin.

Bab'cock (O. E.). See APPENDIX.

Babcock (RUFUS), D. D., b. at N. Colebrook, Conn., Sept. 18, 1798, and grad. at Brown Univ. in 1821; pastor of a

Bap. ch. in Poughkeepsie, N. Y., in 1823, pres. of Waterville Coll. 1833-36, and pastor since of different chs. D. May 4, 1875.

Babel, or **Ba'bil**, was the Heb. or native name [signifying "confusion"] of the city of Babylon. It was also the name of a famous tower which the descendants of Noah began to build soon after the Deluge, on the plain of Shinar, but in consequence of the confusion of tongues they could not finish it.

Bab-el-Man'deb (i. e. "gate of tears"), a strait 20 m. long, which connects the Red Sea with the Gulf of Aden and the Indian Ocean. On the Ar. side of the strait is a cape, bearing the same name.

Bā'ber, or **Babur** (MOHAMMED), written also **Babour**, surnamed **ZAHHER-ED-DEEN** ("protector of religion"), an emp. of India, and the first of the Great Moguls, b. Feb. 14, 1483. He was a descendant of Tamerlane (Timur-Leng). In 1494 he succeeded his father, who was king of Ferghana. He extended his dominions by the conquest of Kandahar, Cabul, etc. Crossing the Indus in 1524, he defeated the king of Delhi in 1526, and became master of India. He was an able ruler, with a genius in poetry and music. D. Dec. 26, 1530.

Babirus'sa, or **Babyrous'sa** (*Babirusa affinis*), an animal of the hog family (Suidæ), native of Celebes, etc., remarkable for the long tusks of the jaws, which are curved backward and resemble horns. Its legs are more slender than those of the hog.



Babirusa.

Bab'ists, a Mohamadan sect which originated in Per. in the second quarter of the present century. It is said to derive its name from a prophet named Bāb, who was killed by order of the king of Per. in 1850. The adherents of Babism are said to amount to several millions. They profess to be reformers, assert the absolute unity of God, and claim that Bāb is as much superior to Mohammed as the latter is to Chr.

Baboon, *ba-boon* (*Cynocephalus*), a name given to species of monkeys (*Cercopithecidae*) distinguished by long truncated dog-like muzzles, cheek-pouches, and large callosities on the buttocks. They walk or run easily on the ground, climb, and are exceedingly strong, cunning, and mischievous. Troops sometimes enter a plantation for plunder, and destroy much besides what they eat and carry away in their cheek-pouches. They are chiefly found in Afr. They feed mostly on fruits and vegetables. As examples may be mentioned the *chacma*, or pig-faced B., also called the ursine B. (*Cynocephalus porcellus*), a native of S. Afr., and the Ar. or dog-faced B. (*Cynocephalus hamadryas*), a native of Ar. and Abyssinia. The latter species is often sculptured on the anc. monuments of Egypt, and it is supposed to have been the "Thoth" B. to which divine honors were paid. It was frequently embalmed, and the mummies are still found. The *chacma* is one of the largest of the B., about the size of an Eng. mastiff.

THEODORE GILL.

Babrius, a writer of Gr. fables who is assigned by Rutherford to the age of Alexander Severus. He made a collection of fables ascribed to Æsop, and turned them into verse.

Bab'ylon [Gr. Βαβυλών; Heb. *Babel*] was situated in the plain of Shinar, on both sides of the river Euphrates, about 60 m. S. of Bagdad; lat. 32° 28' 30" N., lon. 44° 9' 45" E. Its site is partly occupied by the modern town of Hillah. The earliest historian who gives a description of B. is Herodotus, who visited the city about 450 b. c., but does not tell us who founded it. The city was 4-square, and more than 50 m. in circuit. The prophet Isaiah, who lived about 300 yrs. before Herodotus, describes it (chap. xlii. 19) as "the glory of kingdoms, the beauty of the Chaldees' excellency." There is reason to believe that B. attained its highest prosperity and splendor in the reign of Nebuchadnezzar, who d. 561 b. c. The most remarkable buildings of this city were 2 royal palaces, one on either side of the river, and the great temple of Belus. Connected with one of these palaces was the "hanging garden," which the Grs. regarded as one of the Seven Wonders of the World. Prominent among the remains of B. is the Babil-mound, a pile of brick-work about 140 ft. high, which is supposed to be the ruins of the temple of Belus. The palace of Nebuchadnezzar is identified with a mound which the native Arabs call *El-Kasr* ("the castle"), in which are found fragments of alabaster vessels, fine earthenware, and bricks of excellent quality stamped with the name of Nebuchadnezzar. From the ruins of B. successive generations obtained materials with which Seleucia, Ctesiphon, and other cities were built.

History.—According to Gen. x. 10, B. was one of 4 cities founded by Nimrod. Rawlinson thinks the date to have been as late as 2296 b. c., certainly not earlier than 2458 b. c. Lenormant's date is much earlier. This first Cushite (Hamitic) empire was overthrown by the Assyrians about 1300 b. c. The later Babylonian dynasty of 6 kings began with Nabopolassar, the father of Nebuchadnezzar, in 625 b. c., and ended with the capture of B. by the Per. Cyrus in 538 b. c. After the death of Alexander in B., 323 b. c., the decay of the city was rapid. When Strabo wrote (about 20 A. D.) the great city was a vast desert. (See LAYARD, *Nimrod and B.*; RAWLINSON, *The Great Monarchies of the Anc. E. World*; RAWLINSON, *The Origin of Nations*.)

R. D. HITCHCOCK.

Babylon, on R. R. Suffolk co., N. Y., on S. Bay, S. shore of L. I. It is much frequented as a summer resort. Pop. 1870, 1235; 1880, 2142.

Babylonia, or **Chaldæa**, is called in Script. "the land of Shinar" and "the land of the Chaldees." It lay S. of the parallel of 34°. From this line down to the head of the Per. Gulf is now 420 m.; anciently it was only about 300 m. Between the Euphrates and the Tigris there were about

18,000 sq. m.; W. of the Euphrates, nearly 9000; in all, about 27,000 sq. m. The great and almost sole phys. features of this level region were the rivers Euphrates and Tigris, the former of which is navigable about 1200 m. from its mouth. The fertility of the soil in anc. times was proverbial. B. was favorably situated for commerce, and her people were among the most commercial nations of the anc. world. The Babylonians were distinguished for their intellectual ability, their high civilization, and martial spirit. "To B., far more than to Egypt, we owe," says Rawlinson, "the art and learning of the Grs. It was from the E., not from Egypt, that Gr. derived her arch., her sculpture, her science, her philos.—in a word, her intellectual life."

R. D. HITCHCOCK.

Babylonia (BABYLO'NIA). There were several deportations of portions of the Hebs. to Babylonia. The term is specifically used to denote the exile of 70 yrs., commencing in 605 b. c., when Nebuchadnezzar invaded Judea, captured Jerusalem, burned the temple, and carried the bulk of the people to Babylonia, and ending 535 b. c., when Cyrus permitted the tribes of Judah and Benjamin to return to Pal.

Bacchanalia, bak-ka-na'll-a (called by the Grs. *Διονυσία*), the feasts and orgies of the votaries of Bacchus among the anc. Grs. and Roms. In modern lang. the term is applied to wild revels and imtemperate feasts.

Bacchantes, bak-kan'tez [the plural of *bac'chans*, the present part. of the Lat. verb *bacchor*, to "revel" or "riot"], males or females who joined in the orgies of Bacchus among the anc. Grs. and Roms.

Bacchus, bak'kus [Gr. *Βάκχος*], the god of wine, called also DIONYSUS by the Grs., and sometimes LIBER by the Roms., was said to be the son of Jupiter and Semele, or, according to one tradition, of Ammon, king of Libya, and Amalthea. He taught men the culture of the vine, and first produced from grapes an intoxicating drink. He is usually represented as an effeminate young man, crowned with vine or ivy leaves, with a *thyrsus* in his hand.

Bach, bakh, the name of a Ger. family which for upward of 2 centuries was distinguished for musical talent and produced more than 50 distinguished artists.—VEIT BACH, the founder of the family, was a native of Presburg, in Hungary, and emigrated to Thuringia about 1600.

Bach (JOHANN SEBASTIAN), youngest son of Johann Ambrosius, court-musician of Eisenach, b. there Mar. 21, 1685, was a patriarch and founder of Ger. music, and has been termed the Albert Dürer of his art. Early throwing aside the traditions of the It. school, he penetrated the secrets of musical science, sought the boldest masters, and pursued the most rigorous methods. His ability and enthusiasm were recognized from the first. At 18 he was a violinist at the court of Weimar, at 20 he filled the place of organist at Arnstadt, at 21 he was at Mühlhausen, at 22 he was at Weimar again as court-organist; 7 yrs. later he resigned that position for that of concert-master to the duke. In 1723 the city authorities of Leipzig chose him to the place of musical director of the St. Thomas School. D. at Leipzig July 28, 1750.

O. B. FROTHINGHAM.

Bache, batch (ALEXANDER DALLAS), LL.D., an educator and scientist, b. July 19, 1806, a native of Phila., great-grand-son of Benjamin Franklin, grad. at the U. S. Military Acad. in 1825 at the head of his class. After serving there as assistant prof. for 1 yr., and on military engineering duty for 2 more, he was called to the chair of natural philos. and chem. in the Univ. of Pa., which position he filled for 8 yrs. In 1836 he was appointed pres. of Girard Coll., then about to be organized and established, and during 5 yrs. directed a magnetical and meteorological observatory. In 1843 he was appointed supt. of the U. S. coast survey, which important position he filled to the end of his life, displaying the highest administrative ability, combined with all the scientific knowledge requisite for the successful prosecution of that important work. He organized a systematic exploration of the Gulf Stream, an extended series of tidal observations, on the magnetism of the earth, on the direction of the winds, and instituted researches in regard to the bottom of the ocean within soundings, and the forms of animal life existing there. In addition to the direction of the coast survey, he had, *ex officio*, charge of the construction of standard weights and measures for the U. S., and was a member of the light-house board. As a regent of the Smithsonian Inst. from 1846 to the end of his life, he had a large share in shaping its operations. When, in 1863, the National Acad. of Sciences was organized by Cong., he was elected its pres. D. Feb. 17, 1867.

Bache (FRANKLIN), M. D., b. in Phila. Oct. 25, 1792, grad. at Univ. of Pa. in 1810. He wrote a *System of Chem. for the Use of Students of Med.*, became prof. of chem. in the Phila. Coll. of Pharmacy in 1831, and at the Jefferson Med. Coll. in 1841. He was one of the authors of Wood and Bache's *Dispensatory of the U. S.* D. Mar. 19, 1864.

Bache (HARTMAN), great-grandson of Dr. Franklin, b. Sept. 3, 1798, at Phila., Pa., grad. at W. Pt. in 1818; col. of engineers Mar. 3, 1863, served chiefly as topographical engineer 1818-51, on engineer boards 1852-55, as light-house engineer 1852-70, in charge of military roads on Pacific coast 1855-58, in topographical bureau, Washington, D. C., 1861-62, in charge 1861, and member of light-house board 1862-70. Became brevet brig.-gen. U. S. Mar. 13, 1865. D. Oct. 8, 1872.

Bache (RICHARD), b. in Eng. Sept. 12, 1737, emigrated to the U. S., and in 1767 married Sarah, only daughter of Benjamin Franklin; was P. M.-gen. of the U. S. in 1776. D. 1811.

Bache (SARAH), wife of the preceding, and only daughter of Benjamin Franklin, b. in Phila. Sept. 11, 1744. She was distinguished for her efforts to relieve the sick and disabled soldiers of the Revolution. D. Oct. 5, 1808.

Bachman, bak'man (JOHN), D. D., LL.D., a naturalist, b. in Duchess co. N. Y., Feb. 4, 1790; was pastor of a Ger. Lutheran ch. at Charleston, S. C., contributed to Audubon's great work on ornithology, and wrote the prin. part of the work on the quadrupeds of N. Amer., which was illustrated by Audubon and his sons. D. Feb. 25, 1874.

Back (SIR THOMAS), F. R. S., D. C. L., an Eng. navigator, b. in 1739. He accompanied Sir John Franklin on his Arctic voyage in 1845, and in 1850 commanded an expedition sent out in search of Capt. Ross, of which he wrote an account. Became admiral in 1867. D. June 23, 1878.

Backus (AZEL), D. D., a nephew of the preceding, b. at New Canaan, Conn., Oct. 15, 1754, grad. at Yale; was pastor of the Congl. ch. in Bethlehem, Conn.; in 1812 was chosen first pres. of Hamilton Coll. D. Dec. 9, 1817.

Backus (FRANKS), D. D., b. at Norwich, Conn.; Nov. 7, 1749, grad. at Yale; was settled over the Congl. ch. in Somers, Conn., in 1774. Nearly 50 theological students were trained by him in his family, among whom were several distinguished men. D. Dec. 30, 1833.

Backus (REV. ISAAC), b. at Norwich, Conn., Jan. 9, 1724; in 1748 became pastor of an independent ch. at Titicut, Mass., where he preached until his death. In 1751 he became a Bap., and was prominent in that denomination. He was a *Unit. of N. A.*, with special reference to the Baps. D. Nov. 20, 1806.

Backus (EZEKIEL), LL.D., b. in Stockbridge, Mass., Sept. 1, 1776, grad. at Yale in 1794, was one of the chief-justices of the Mass. court of common pleas, first comptroller of the U. S. treas., and an M. C. D. Oct. 18, 1870.

Bacon (FRANCIS, BARON VERULAM, and VISCOUNT ST. ALBANS), an Eng. philos. and lawyer, b. in Lond. Jan. 22, 1561, being a younger son of Sir Nicholas Bacon, lord keeper of the great seal. He studied at Cambridge, and afterward visited Fr. to acquire the Fr. lang. and continue his studies, but was recalled by the death of his father in 1579. He was admitted to the bar in 1582, was returned to Parl. in 1589, and in 1590 became counsel-extraordinary to Queen Elizabeth. In 1594 he was an unsuccessful applicant for the position of solicitor-gen., upon which his friend and patron, the earl of Essex, presented him with an estate valued at £1800 a yr.—equivalent to about \$40,000 in our time. In 1599 the earl of Essex, who had been the chief favorite of Elizabeth, entered upon some treasonable schemes, was tried, convicted, and executed. B. conducting the prosecution. Elizabeth soon became struck with remorse for her severity, and B. fell into disfavor at court. The accession of James I., in 1603, brought B. into court favor. He was knighted at once, was soon made K. C., solicitor-gen. in 1607, atty.-gen. and member of the privy council in 1613, and in 1617 keeper of the great seal and lord-chancellor—the highest dignity then attainable by an Eng. subject—being also raised the same year to the peerage as Baron Verulam, the title by which he is best known, although he received in 1619 the higher dignity of Viscount St. Albans. In 1620 B. had apparently reached the height of human greatness. Several notable works had made him famous; the publication of his *Novum Organum* gave him the pre-eminence among philos. But his downfall was close at hand. In 1621 charges of official corruption were brought against him by the House of Commons, and he was brought to trial before the peers. The proof that he had repeatedly received bribes was conclusive. At the beginning of the trial B. strongly asserted his innocence, but subsequently confessed his guilt. May 3, 1621, sentence was pronounced that he should pay a fine of £40,000 and be imprisoned at the king's pleasure. But this severe sentence was not carried into effect. After an imprisonment of 2 days he was released. The fine was subsequently remitted, and he was allowed an income of £1200. He then devoted himself to scientific investigations and literary pursuits.—Of the philos. of B. we cannot here speak at length. His greatest work is the *Novum Organum*; hardly of less value is the *De Augmentis* and the *Essays*. D. Apr. 9, 1626. *From an orig. aut. in the Lib. of Congress, by PROF. J. THOMAS, LL.D.*

Bacon (JOEL S.), D. D., b. in Georgetown, N. Y., in 1804, grad. at Hamilton Coll., Clinton, N. Y., in 1826, studied theol. at Newton, Mass.; was successively pres. of Georgetown Coll., Ky., pastor of a Bap. ch. in Lynn, Mass., prof. in the inst. at Hamilton, N. Y., 1834-37, pres. of Columbian Coll., D. C., 1843-54, and subsequently was a teacher in Ala. and Va. D. Nov. 9, 1869.

Bacon (LEONARD, D. D., LL.D., the son of a missionary to the Indians, b. at Detroit, Mich., Feb. 19, 1802, grad. at Yale 1824, and at Andover 1824; from 1825 to 1869 was pastor of the Centre ch., New Haven, Conn.; from 1860 to 1871 acting prof. of systematic theol., and since 1871 lecturer on ch. polity and Amer. ch. hist. in the Divinity School of Yale Coll. He contributed largely to the *Christian Spectator* and the *New Englander*, was for several yrs. one of the eds. of the *Independent*, a N. Y. religious journal, and wrote *Slavery Dissolved*. D. Dec. 24, 1881.

Bacon (SIR NICHOLAS), an Eng. statesman, b. at Chiselmurst, in Kent, in 1510, was the father of the great Francis Bacon, Baron Verulam; ed. at Cambridge, solicitor to the court of augmentations, then atty. to the court of wards, of which office he was deprived by Queen Mary in 1553 because he was a Prot.; appointed lord keeper of the great seal by Elizabeth in 1558; rendered important services to the Prot. cause. D. Feb. 20, 1579.

Bacon (ROGER), an Eng. philos., styled the Admirable Doctor, b. near Ilchester, Somersetshire, about 1204. He studied at Ox. and Paris, taking the degree of LL.D.; became a monk of the Franciscan order, and settled at Ox., devoting himself to experimental philos., making discoveries in several sciences. He wrote in Lat. a number of works on chem., optics, physics, etc., and seems to have been acquainted with the composition and explosive effects of gunpowder. He was charged with dealing in magic, and incurred the hostility of the clergy, whose ignorance and immorality he denounced. A council of the monks of his order condemned his writings, and he was, in 1278, thrown into prison, where he was confined at least 10 yrs.; it is not certain that he was ever liberated. His capital work, which treats of several sciences, is *Opus Majus*, and was written about 1266. D. in 1292 or 1294.

Bac'tria, or **Bactria'na**, an Asia. country of Central

Asia, the boundaries of which are not perfectly defined, but it is considered to be identical with the modern prov. of Balkh. B. was the centre of a powerful kingdom which flourished before the historical period. It became a Per. prov. in the time of Cyrus, and was conquered by Alexander the Great.

Bactrites, b. in the East, a species of *Nautilus*, *Ammonitoides*, with a straight shell and indented but not ramified septa. Several species have been found in the Devonian strata.

Baculites, b. in the East, a species of *Nautilus*, a genus of fossil cephalopod mollusks of the family of Ammonitidae, found in the upper chalk. The shell is chambered, perfectly straight, round (or compressed), and tapers to a point. Various species are found in Europe, N. and S. Amer., etc.

Badajos, bad-a-hos', a fortified town of Sp., on the Guadiana. It was besieged and taken by the Fr. gen. Soult in Mar. 1811; Wellington failed to retake it in Apr.; renewing the siege in Mar. 1812, he took it by storm on the 6th of Apr., after a desperate contest. Pop. 22,965.

Badeau, bah-dō' (ADAM), b. in New York, became capt. of volunteers in 1862, serving on the staff of Gen. Sherman; was aide-de-camp and military sec. to Gen. Grant 1865-69, with the rank of brig.-gen. U. S. A.; was sec. of legation in Lond., and afterward consul-gen. there. He wrote a *Military History of Gen. Grant*. Became consul-gen. at Havana 1882.

Baden, bah'den, **Grand Duchy of**, a S. W. state of the Ger. empire, separated by the Rhine from Alsace and Switz., bounded N. by Hesse-Darmstadt, and E. by Württemberg. Area, 3851 sq. m. Much of the surface is mountainous, and includes the Black Forest on the E., with the Feldberg, 4886 ft. high, and the Odenwald. In the W. is a long plain, extending along the Rhine from Bäle to Mannheim. It is drained by the Rhine, the Danube, and the Neckar. The Rhine valley has a mild climate and a fertile and well-cultivated soil. The minerals are copper, coal, silver, iron, and salt. Many of its mineral springs are much frequented, as Baden-Baden, Baden-Weiler, etc. The Black Forest abounds in lofty pines. The grape and other fruits flourish on the hill slopes; chestnuts and walnuts are largely cultivated; about 14,000,000 gals. of wine are made annually. The other crops are wheat, barley, maize, potatoes, tobacco, hemp, hops, and chicory. Manufactures employ 10,000 persons; cigars, cotton and silk stuffs, straw hats, brushes, trinkets, clocks, chemicals, and machinery are the chief articles produced. Exports, wine, timber, straw hats, and some chemicals. There are 776 m. of railway, mostly belonging to the state, and paying 6 per cent. dividend on a cost of \$5,500,000.

Population, Education, Etc.—1,570,254 (992,938 R. Caths., 545,854 Prots., 31,462 Jews, etc.). There are 11 dists. or circles (provs.), viz.: Baden, Karlsruhe, Constance, Freiburg, Heidelberg, Lörrach, Mannheim, Mosbach, Offenburg, Villingen, and Waldshut. There are 5 towns with over 20,000 inhabs., viz.: Mannheim, 53,465; Karlsruhe (the cap.), 49,998; Freiburg, 36,401; Pforzheim, 24,037, and Heidelberg, 24,417. There are 1885 schools and colls. and 2 univs., Heidelberg (Prot.) and Freiburg (Cath.); school attendance is compulsory. B. is governed by a hereditary grand duke (Friedrich I.) under a liberal const. There is a Parl. with a chamber of peers and a chamber of 63 deputies. The reigning family are descendants of Hermann II. (d. 1130), 1st margrave of B. Karl Friedrich, an enterprising ruler, became 1st grand duke in 1806; in 1818 the charter, the basis of the present const., was granted by Karl Ludwig; in 1848 there was a revolution, and the grand duke fled, but was restored the next yr. B. became a state in the new Ger. empire in 1870, having 3 votes out of 58, the whole number. L. P. BROCKETT.

Baden-Baden, a watering-place in the grand duchy of Baden, 23 m. S. W. of Karlsruhe and 6 m. from the Rhine. The warm saline springs were frequented in the time of the Rom. emps., and now annually attract about 30,000 visitors. Pop. in 1880, 11,923.

Badger, a name applied to certain animals of the family Mustelidae, assigned by naturalists to the genera *Meles*, *Arctonyx*, and *Taxidea*. They attain the size of a rat or a medium-sized dog, and are efficient burrowers. The common B., brock or gray, of Europe (*Meles taxus*), found also in Asia, was formerly, and is even now, kept for "B. drawing." The animal is quite harmless if not abused. Allied species are found in Asia. An E. I. B. (*Arctonyx collaris*) is closely related but generically distinct. The Amer. species of B. belong to another genus (*Taxidea*). They are more carnivorous than the European B., and are remarkable for their short ears, long hair, and the rapidity with which they burrow in the earth.

Badger (GEORGE EDMUND), LL.D., b. at Newbern, N. C., Apr. 13, 1795; grad. at Yale, practised law at Raleigh, and in Mar. 1841 was appointed sec. of the navy by Pres. Harrison. He resigned in Sept. of that yr. because Tyler vetoed the bill to recharter the U. S. Bank; was senator of the U. S. 1846-53. D. May 11, 1866.

Baf'fin (WILLIAM), an Eng. navigator, b. in 1584. He went on an Arctic expedition in 1612, and discovered Baffin's Bay in 1616; wrote accounts of these voyages, and propounded a new method of ascertaining the lon. at sea, by observation of the frequency of halos. D. May 25, 1662.

Baffin's Bay, or **Bylot's Bay**, a gulf or inland sea of N. Amer., communicating with the N. Atlantic by Davis's Strait, and with the Arctic Ocean by Smith's Sound. It is about 950 m. long, and has an average width of about 300 m.

Bag'by (ARTHUR PENDLETON), a lawyer, b. in Va. in 1794, was gov. of Ala. 1837-41, U. S. Senator 1843-49, and minister to Rus. 1849-53. D. Sept. 21, 1858.

Bag'dad, a city of Asiatic Tur., formerly the cap. of the empire of the caliphs, and now of the pashalic of B. on the Tigris, 60 m. N. of Babylon. It was founded about 763 A. D. by the caliph Almansur, being built from the ruins of Ctesiphon; in the 9th century was enlarged by Haroun-al-Raschid; is said to have contained 2,000,000 inhabs. in the 10th and 11th centuries; was sacked by Hulaku about 1258, and finally captured by the Turks in 1638. In 1881 a large

part of it was destroyed by an inundation. Pop. estimated between 10,000 and 20,000.

Bagley (JOHN J.), b. in Orleans co., N. Y., in 1832, and emigrated with his father to Mich. in 1840; very successful tobaccoist in Detroit; gov. from 1873 to 1877. During his administration the educational and charitable insts. of the State received special encouragement. D. July 27, 1881.

Baglioli (GIORGIO), F. R. S., an It. med. writer, b. at Iacusa in 1668; was author of the system of *Solidism*—i. e. the theory that diseases originate in the solids. D. Mar. 1707.

Bagnacavallo, an It. painter, whose proper name was BARTOLOMEO RAMEGGI, b. near Bologna in 1484; was a pupil of Raphael's, and is held to be the greatest painter of the Bolognese school. D. 1542.

Bagnes, a Fr. word signifying "galleys," the name of the convict prisons of Fr. in which criminals were employed at hard labor after the galleys were abolished in 1748. In the reign of Nap. III. the B. were gradually abolished, and the penal colonies substituted in their place.

Bag'ot (SIR CHARLES), an Eng. diplomatist, b. Sept. 23, 1781; was minister to Fr. in 1814, ambassador to St. Petersburg in 1820, and to Hol. in 1824; in 1842 gov.-gen. of Canada. D. May 18, 1843.

Bagration (PETER), PRINCE, a Rus. gen., b. in 1765; served in It. under Suwarrow in 1799, in Nov. 1805 kept in check for 6 hours a superior Fr. force under Murat, led the vanguard at Austerlitz 1805, fought at Eylau and Friedland 1807, was mortally wounded at Borodino. D. Oct. 7, 1812.

Bahama Islands, or **Lucay'os**, a group belonging to G. Brit., lying N. E. of Cuba, extending in a N. W. direction about 700 m. They consist of 12 islands, 661 keys, 2387 reefs and cliffs. One of these islands, probably San Salvador, was the first land discovered by Columbus in 1492. During the Amer. c. war the B. were a great resort of Eng. and Confed. blockade-runners. Pop. in 1881, 43,521.

Bahia, bah-'ah, or **São Salvador**, a maritime city of Brazil, cap. of a prov. of the same name, on All Saints' Bay, 740 m. N. N. E. of Rio de Janeiro, having one of the best harbors in the world, defended by several fts. It is the oldest city in Brazil, founded in 1549, and was the cap. until 1763. Pop. 128,929.

Bähr, bar, or **Baehr** (JOHANN CHRISTIAN FELIX), a Ger. philologist, b. at Darmstadt in 1798, ed. at Heidelberg, where in 1826 he became prof. of classical lit. Wrote a *Hist. of Rom. Lit.*, and edited several of Plutarch's *Lives* and an ed. of Herodotus with valuable notes.

Bahr-el-Abiad, "white river." See NILE.

Bahr-el-Azrek, "blue river." See NILE.

Baikal, bai'kal, Mongolian *Bai-Kul*, "rich sea," called also the **Holy Sea**, a lake in S. Siberia, between lat. 51° 28' and 55° 41' N., lon. 103° and 110° E.; 400 m. long, with average breadth of nearly 45 m.; area, estimated at 12,118 sq. m. It is frozen over from Nov. to Apr.

Bail [Fr. *bailler*, to "deliver"]. The original signification of this word is to "deliver." It is used both as a noun and a verb, and refers to property as well as to a person, in the custody of the law. It implies safe-keeping or delivery for a special purpose. It may signify the delivery of a person arrested, either on civil or criminal process, from the custody of the sheriff or some other officer of the law, into the safe-keeping of persons who bind themselves for his appearance in court or obedience to its processes. Again, it denotes the persons into whose keeping the party discharged from actual arrest is delivered, and sometimes the amount of security given or required for the defendant's appearance.

In all civil actions the defendant may give B. as a matter of right, and generally in criminal proceedings, unless he is charged with a capital offence. The amount of B. is in the discretion of the court, controlled by the somewhat vague constitutional provision that excessive B. shall not be required.

T. W. DWIGHT.

Bailey, ba'le (GAMALIEL), M. D., b. at Mt. Holly, N. J., Dec. 3, 1807. In conjunction with J. G. Birney he founded in 1836 the *Cin. Philan.*, an anti-slavery journal. Although his press was destroyed by a mob, he continued the publication till 1847, when he issued the first number of the *National Era* at Wash. *Uncle Tom's Cabin* first appeared in this journal. D. June 5, 1859.

Bailey (JACOB W.), officer and naturalist, b. Apr. 29, 1811, at Ward (now Auburn), Mass.; grad. at W. Pt. 1832, served as lieut. in Charleston harbor during threatened nullification of S. C.; at Bellona Arsenal, Va.; as assistant prof. at Military Acad. 1834-35, and acting prof. of chem., mineralogy, and geol. 1835-38, becoming, upon resigning his lieutenantcy, July 8, 1838, full prof., which position he held till his death. He was the inventor of *Bailey's Indicator*, and of many improvements in the microscope, in the use of which he achieved the highest distinction. He was pres. of the Amer. Association for the Advancement of Science 1857, and member of many scientific societies. D. Feb. 26, 1857.

Bailey, or **Bailay** (NATHAN), an Eng. lexicographer, who was the head of a school at Stepney, near Lond. About 1720 he pub. his *Universal Etymological Eng. Dict.*, which was the basis of Johnson's dict. D. June 27, 1742.

Bailey (PHILIP JAMES), an Eng. poet, b. at Nottingham Apr. 22, 1816; studied law, and was admitted to the bar in 1840. In 1829 he pub. *Festus*, a philosophical and theological poem, which excited much attention.

Bailey (SILAS), D. D., b. in Mass. about 1808; pres. of Granville Coll. (now Denison Univ.), Granville, O., and of Franklin Coll., Lafayette, Ind., and subsequently prof. of theol. in Kalamazoo Coll., Mich., and pastor for several yrs. of a Bap. ch. in Lafayette, Ind. D. June 30, 1874.

Bailey (THEOPHILUS), a naval officer, b. at Plattsburg, N. Y., Apr. 12, 1805; entered the navy as mdpn. 1818, became capt. 1855, com. 1862, rear-admiral 1866. On Apr. 24, 1862, he commanded the right column of Farragut's fleet in its passage of the fts. below New Orleans, and led the fleet in the capture of the Chalmette batteries and the city of New

Orleans; from 1862 to 1865 was in command of the E. Gulf blocking squadron. D. at Washington, D. C., Feb. 10, 1877.

Bailey (WILLIAM WHITMAN), b. at W. Pt., Orange co., N. Y., Feb. 22, 1843, grad. at Brown Univ., Providence, R. I.; a botanist, deputy sec. of state of R. I. in 1888; contributed to periodical lit.

Baillie (JOANNA), a Brit. poetess, b. in Scot. 1762, went to Lond. when young, residing with her brother, whose house was the resort of men of note. Wrote *De Montfort*, a drama which with several others formed a series under the title of *Plays of the Passions*. D. Feb. 23, 1851.

Baillie (MATTHEW), M. D., brother of the preceding, b. in Scot. Oct. 27, 1761; studied anal. under his uncle, John Hunter, whom he succeeded as lecturer on anal. in Lond., where he acquired high reputation, and in 1810 was appointed phys. to the king. Wrote a valuable work on *Morbid Anal.* D. Sept. 23, 1823.

Baillie (ROBERT), a Presb. theol., b. at Glasgow Apr. 30, 1602. He was distinguished for his learning and moderation. He was one of the coms. sent to Lond. in 1640 to prepare charges against Laud; became prof. of divinity at Glasgow in 1642, and was prin. of the Univ. of Glasgow after the Restoration. D. in July 1662.

Bailly (JEAN SYLVAIN), a Fr. astron., b. 1736, was guillotined 1793. He devoted much time to the theory of Jupiter's satellites, and was author of a *Hist. of Astron.*

Bailment [Fr. *bailler*, to "deliver"], a delivery of goods for some particular purpose, or on mere deposit, upon contract, express or implied, that after the purpose has been performed the identical goods shall be redelivered to the bailor, or otherwise dealt with according to his direction. If the contract permits the return of an equivalent instead of the goods bailed, there is no B., but the transaction constitutes a debt or some cognate engagement. The party making the delivery, or *bailing* the property, is termed the *bailor*; the party to whom it is delivered, the *bailee*.

B. have been classified as follows: 1. *Depositum*, or deposit; a delivery of goods to be kept by the bailee, and returned on demand, without recompense. 2. *Mandatum*, or mandate; where the bailee agrees to do something with or about the thing bailed, without recompense. 3. *Commodatum*, or loan; where the thing bailed is lent for use, without recompense. 4. *Pignus*, or pledge; where the thing bailed is security for a debt or other engagement. 5. *Locatio*, or hiring; where the use of something is to be given, or labor performed about it, for a compensation. *Locatio* is subdivided as follows: *Locatio rei*, where the bailee by hire gains the temporary use of a thing; *Locatio operis faciendi*, where the bailee agrees to perform labor and services, or bestow care and attention upon the thing bailed, for a recompense; *Locatio operis mercium vehendarum*, where goods are delivered to a bailee to be transported to another place, for a recompense.

There is a class of B. of an exceptional nature, embraced under the head of *locatio*, where the policy of the law imposes upon the bailee responsibilities for loss or injury to the property delivered to his charge, entirely irrespective of the question of his care or negligence; this class includes innkeepers and common carriers.

T. W. DWIGHT.

Bailly (FRANÇOIS), D. C. L., an Eng. astron., b. 1774, was one of the founders of the Astronomical Society; made a series of observations for determining the density of the earth, and contributed largely to the *Astronomical Society's Catalogue of Stars*. D. Aug. 30, 1844.

Bain (ALEXANDER), LL.D., b. at Aberdeen, Scot., in 1818, grad. at Marischal Coll., was prof. of natural philos. in Andersonian Univ., and author of books on mental philos. Belongs to the school of Mill and Herbert Spencer.

Bain'bridge, R. R. junc., cap. Decatur co., Ga., on Flint River, 50 m. from its mouth, and at the head of navigation. It has 3 acads. Pop. 1870, 1351; 1880, 1436.

Bainbridge, N. Y. See APPENDIX.

Bainbridge, (WILLIAM), a naval officer, b. at Princeton, N. J., May 7, 1774; became capt. in 1800, and commanded the frigate *Phila.* in the war against Tripoli; was captured Oct. 1803, and remained a prisoner until June 1805. In Sept. 1812, having been made com., the highest naval rank then existing in the U. S., he was put in command of a squadron of 3 ves. sels, and captured the Brit. frigate *Java* in Dec. 1812. D. 1833.

Bairam, bar'am, a feast of the Mohammedans, at end of great fast of Ramadan. "Little B." occurs 70 days later. **Baird** (ABRAHAM), b. at Washington, Pa., Aug. 20, 1824; grad. at W. Pt., served in Fla. 1851-53, as assistant prof. at W. Pt. 1856-59. During the c. war he served in Va., O., Tenn., and Ga., also during Sherman's Atlanta campaign, in the march to the sea, and in the through the Carolinas; in 1865 was brevetted maj.-gen. U. S. A.

Baird (HENRY MARTIN), PH. D., son of the succeeding, b. in *Phila.* Jan. 17, 1832; grad. at the Univ. of the City of N. Y., attended lectures at Univ. of Ohio, Athens, Gr., 1851-52, studied theol. in New York and Princeton 1853-56, in 1859 became prof. of Gr. in the Univ. of the City of N. Y., and was ordained as an evangelist in 1866. Wrote *Modern Greece*.

Baird (ROBERT), D. D., b. in Fayette co., Pa., Oct. 6, 1798, grad. at Jefferson Coll.; spent several yrs. in Europe, where he did much to promote Prot. Christianity and the temperance cause; wrote *A View of Religion in Amer.* and a *Hist. of the Waldenses*. D. Mar. 15, 1863.

Baird (SPENCER FULLERTON), LL.D., a naturalist, b. in Reading Pa., Feb. 3, 1823; became assistant sec., and in 1878 sec. of the Smithsonian Inst. He translated the *Iconographic Encyc.*, and with J. Cassin wrote the *Mammals of N. Amer.*, and the *Birds of N. Amer.*

Bajazet. See BATAZID.

Baker (DANIEL), D. D., b. at Midway, Liberty co., Ga., in 1791, grad. at Princeton in 1815, became a Presb. minister; was for a time pres. of Austin Coll., Huntsville, Tenn., and was an author of several religious works. D. 1857.

Baker (DAVID JEWETT), b. at E. Haddam, Conn., Sept. 7, 1792, grad. at Hamilton Coll. in 1816; became a prominent

lawyer of Ill.; was U. S. Senator 1830-31, a leading anti-slavery man of Ill. in the contest of 1830. D. Aug. 6, 1869.

Baker EDWARD DICKINSON, Col., a lawyer, b. in Lond., Eng., Feb. 24, 1811, emigrated to the U. S. in his youth, removed to Cal. in 1832; in 1860 was elected Senator for Dr. Had command of a brigade of the U. Army, and was killed at Bull's Bluff Oct. 21, 1861.

Baker (OSMON CLEANDER), D. D., b. in Marlow, N. H., July 30, 1812, studied at Wesleyan Univ., Conn.; became a theological teacher and prof., and was one of the founders of the Meth. theological schools, and was prof. in Biblical Inst. at Concord, N. H. In 1852, elected bp. D. Dec. 20, 1871.

Baker (Sir SAMUEL WHITE), K. C. B., an Eng. explorer, b. June 8, 1821; organized, with his brother, an agricultural colony in Ceylon, where he went in 1848. In 1861 he went to Afr., with the design of visiting the sources of the Nile. He fell in with Speke and Grant, and afterward discovered the Albert Nyanza Lake. In 1869 he set out, under the direction of the Khedive of Egypt, with 1000 picked men, with the design of suppressing the slave-trade, extending the boundaries of Egypt, and spreading the cultivation of cotton.

Baker City, cap. Baker co., Or., on the E. fork of Powder River. Pop. 1870, 312; 1880, 128.

Bakersfield, cap. Kern co., Cal., on Kern River, about 60 m. S. of Visalia. Pop. 1880, 801.

Bake'well (ROBERT), an Eng. agriculturist, b. in 1726. Improved the breeds of domestic animals, especially sheep and horned cattle, and by a cross of breeds originated the Leicester breed of sheep. D. Oct. 1, 1795.

Baku. See APPENDIX.

Balanicepsidae (*Balaniceps*, i. e. "whale head," so called from the likeness of the upper bill to the rostral portion of the skull of a Balæna), a family of stork-like grallatorial birds with the hind toe incumbent, the 3 anterior long, without membrane, and with stout claws (none pectinated), and with the bill very robust, much swollen at the sides, and arched, the upper hooked at the tip, the lower rounded. Only one species is known—the *Balaniceps pes* of N. Afr., where it lives in the swamps, feeding on snakes and fishes. It has been called shoe-bird, from a resemblance of its bill to a shoe.



The Balaniceps.

Balaka'va, or **Balac'lava**, a small port on the Black Sea, about 7 m. S. from Sevastopol, which became the headquarters of the Brit. fleet in the Crimean war. A battle between the Brit. and Rus. was fought here Oct. 25, 1854.

Balance [supposed to be derived from *bilanx*, having 2 scales; from *bis*, "twice," and *lanx*, a "scale or plate"] is a lever of the first kind, the fulcrum being between the power and the weight; used to ascertain the weight of bodies in comparison with the standard units of weight. The ordinary B. consists essentially of a metallic bar or lever, called the beam, either delicately suspended or supported on a stand by the intervention of a wedge-shaped prism, technically termed a knife-edge, exactly at its middle point. An index is fixed at right angles to the beam, and made to travel over a grad. arc, so as to show when the beam is horizontal. A scale-pan is suspended from each end of the lever. Since the arms of the B. are equal, it is plain that there cannot be equilibrium unless the weights placed in each scale are also equal. When this is the case, the beam is perfectly horizontal and the index vertical. The B. is then said to be true. When the beam is horizontal with unequal weights, the B. is false. F. A. P. BARNARD.

Balance of Power, a phrase used in modern European diplomacy to express a state of political equilibrium among neighboring powers, or a political system so arranged and counterpoised that no nation or monarch may be so powerful as to endanger the independence of other states.

Balance of Trade is the difference between the value of the exports and of the imports of a country. According to the old mercantile theory which long ruled the commercial world, trade was regarded as profitable only as it brought money into a country; hence the inference that the B. of T. must be in favor of a country when its exports exceed its imports, because the difference must be adjusted by the transmission of specie. A better exposition of political economy has shown that this is an erroneous view. The true advantage of foreign trade is that by means of it a people obtain things which either they cannot produce at all, or which they must produce at a cost beyond that of the things exported to pay for them. Trade between two countries is profitable when it yields to both this advantage, made evident by the fact that with each the value of its imports exceeds that of its exports. This means only that what we receive is worth more to us than what we send away. It matters not whether the surplus comes in money or something else. The outgo or income of money is of importance chiefly on account of the complications of credit, especially in the form of paper currency, issued in excess of the actual specie basis. The statistics of the custom-house do not furnish full and reliable data to determine the B. of T., since they omit altogether some phases of foreign trade, and give exports at their value here and imports at their value in foreign countries. A. L. CHAPIN.

Bal'bi (ADRIANO), an It. geog., b. at Venice Apr. 25, 1782; became a resident of Paris; pub. in 1826 an *Ethnographical Atlas of the Globe*, which is highly esteemed. His other chief work is a *Compendium of Geography*. D. Mar. 14, 1848.

Balbo'a, de (VASCO NUÑEZ), a Sp. navigator and explorer, b. in Estremadura in 1475. He emigrated to Hayti about 1500, and in 1510 accompanied Enciso on an expedition to Darien. Having quarrelled with Enciso, B. obtained the chief command of the party, and in Sept. 1513 discovered the Pacific Ocean. In 1514 Pedrarias Dávila was sent from Sp. to supersede B., who served as a deputy under Pedrarias, but was charged with treason and put to death in 1517.

Bal'bus (L. CORNELIUS), b. at Gades (Cadiz), became an intimate friend of Cæsar, whom he accompanied to Sp. in 61 B. C.; consul 40 B. C. He wrote a diary of the events of his own and Cæsar's life.

Balch (GEORGE B.), U. S. N., b. Jan. 3, 1821, in Tenn.; entered the navy as mdpn. in 1837, lieutenant in 1850, a commander in 1862, a capt. in 1866, and a com. in 1872. He served during the Mex. war, 1862 to 1865 commanded S. Atlantic blockading squadron in the c. war, and was often engaged with the enemy's batteries and fts. on the Stone and Black rivers, S. C. He was rear-admiral till retired in 1883, and was supt. of the Naval Acad. 1880-81.

Bald or **White-Headed Eagle** (*Haliaeetus leucocephalus*), so called on account of the snowy-white color of the head and neck, is a native of N. Amer. The length is about 40 inches, the stretch of wing from 7 to 8 ft. It will eat almost anything, even carrion, but it is especially fond of fish, which it steals from the osprey when practicable, but also catches itself. The B. E. has been adopted by the Amers. as their national emblem.

Bal'der, or **Baldur** [from *baldr*, "good," "strong," "valiant"], often called BALDER the GOOD, in the Norse mythology was the second son of Odin. He is supposed to typify the brightness of the summer sun, and to make all things bright and cheerful; hence he has been termed the "Apollo of the North."

Bald'ness (*Alopecia*), [Gr. ἀλωπῆς, a "fox," this animal being subject to baldness], loss of hair, which may be either gen. or partial, sudden or gradual. Senile B., the result of age, comes on gradually, the hair becoming thin on the crown or on the temples and forehead. It results from loss of nutritive activity of the hair-follicles, which atrophy and render the loss irreparable. When B. follows severe sickness, or results from constitutional debility, the hair-follicles are intact though inert, and may be stimulated to new activity by tonic applications.

Bald'pate, or **American Widgeon** (*Mareca americana*), a duck found throughout the U. S., Canada, and the N. part of S. Amer., highly prized for the delicacy of its flesh. It takes its name from its white crown. The male has a green band running from the eyes to the nape. The bird is about 19 inches long.

Baldwin (bald'win) I., king of Jerusalem, b. in 1058; joined the first crusade in 1096; was chosen count of Edessa by the Chr. inhabs. of that city. On the death of Godfrey, in 1100, he succeeded him as king of Jerusalem. D. 1118.

Baldwin II. (BALDWIN DU BOURG), king of Jerusalem, was a cousin of Baldwin I., whom he succeeded in 1118. During his reign the military order of Templars was instituted. D. Aug. 21, 1131.

Baldwin III., b. in 1129, became king of Jerusalem in 1143; defeated Noor-ed-Deen, the sultan of Aleppo, at Jerusalem, in 1152 and 1157. D. Feb. 10, 1162.

Baldwin IV., king of Jerusalem, surnamed the LEPER, b. in 1160. He succeeded his father Anaric in 1174. D. 1186.

Baldwin I., the first Lat. emp. of Constantinople, b. at Valenciennes in 1171. He joined the crusade in 1200, and co-operated with the Venetians in an enterprise against Constantinople, the throne of which was occupied by Alexis, an usurper. The crusaders defeated Alexis, captured the city, and elected B. emp. in 1204. He was defeated and taken prisoner by the Bulgarians in 1205. D. 1206.

Baldwin II., emp. of Constantinople, b. in 1217, was a nephew of Baldwin I. He succeeded to the throne in 1228. In 1261 his cap. was taken by Michael Palæologus, and B. fled to It., where he d.

Baldwin (ABRAHAM), a statesman of Ga., b. in Guilford, Conn., in Nov. 1754, grad. at Yale in 1772, became in 1777 a chaplain in the army. In 1784 he became a lawyer in Savannah, Ga., was a member of the convention which framed the U. S. const. (1787), and U. S. Senator from Ga. 1799-1807. He was the originator of the State Univ. D. Mar. 4, 1807.

Baldwin (ELIOT WHITTELEY), D. D., b. at Durham, N. Y., Dec. 25, 1789, grad. at Yale in 1812 and at Andover in 1817, was pastor of Seventh Presb. ch. in New York city 1820-35; pres. of Wabash Coll., Ind., 1835-40. D. Oct. 15, 1840.

Baldwin (HENRY), LL.D., a jurist, b. at New Haven, Conn., in 1779, became a citizen of Pa.; a judge of the supreme court of the U. S. in 1830. D. Apr. 21, 1844.

Baldwin (MATTHIAS W.), a machinist, b. at Elizabethtown, N. J., in 1796. He is said to have constructed the first locomotive on the Amer. continent. D. in Phila. 1866.

Baldwin (ROGER SHERMAN), LL.D., a statesman, b. in New Haven Jan. 4, 1793; became gov. of Conn. in 1844, and U. S. Senator in 1847. In 1841 he was associated with J. Q. Adams in the famous Amistad trial before the Supreme Court of the U. S. D. Feb. 19, 1863.

Baldwin (THERON), D. D., b. at Goshen, Conn., July 21, 1801, grad. at Yale in 1827, a home missionary of the Congls. to the W. In 1829, was one of the founders of Ill. Coll.; organized the Monticello Female Sem., near Alton, Ill., of which he was prin. 1838-43; sec. of the "Society for Promoting Collegiate and Theological Education." D. Apr. 10, 1870.

Bald'winsville, on R. R. Onondaga co., N. Y., and on the Seneca River, 12 m. N. by W. from Syracuse. A branch of the Oswego Canal runs to this place. It has an acad. Pop. 1870, 2130; 1880, 2121.

Bâle, bahl, or **Basel**, bah'zel [Ger. Basel; Fr. Bâle or Basle; anc. *Basilia* or *Basile'a*], a city of Switz., on the Rhine, 65 m. N. of Berne, and about 3 m. from the frontier of Alsace. B. is at or near the head of navigation on the Rhine, and is the most important commercial and manufacturing

city of switz. The cathedral, begun in 1010, was not completed till 1500; the univ., founded in 1459, formerly had a high reputation. Pop. 61,399.

Bale or **Basel**. **Council of**, called by Pope Martin V., and convened under his successor, Eugenius IV., opened Dec. 14, 1431. The pope tried repeatedly to dissolve the council, but in vain. A quarrel in regard to the Gr. Ch. resulted in a split, the papal legate, every cardinal but one, and many bishops withdrawing. The remaining members went on with business. Excommunicated by Eugenius they chose Felix V. as pope. The 4th and last formal session of the council took place in May 1443, although it was not formally dissolved until 1449, when the authority of Nicholas V., the successor of Eugenius, was acknowledged. The R. Cath. Ch. recognizes only the first 25 sessions of the council before the split.

Balearic Crane (*Balestris patinaria*), a beautiful crane found in W. Afr. conspicuous for its crown of golden plumes and its scarlet cheeks. It is of a bluish-slate color, and is 4 ft. high. Its bill is shorter and thicker than that of other cranes.



Balearic Crane.

and its scarlet cheeks. It is of a bluish-slate color, and is 4 ft. high. Its bill is shorter and thicker than that of other cranes.

Balearic (bal-ae-rik) **Isles**, a small group of islands in the Mediterranean Sea, of which Majorca and Minorca are the prin., constituting a prov. of Sp. Area, 1860 sq. m. Pop. 1877, 289,085.

Balfé, balf (MICHAEL WILLIAMS), a musician and composer, b. in Dublin, Ire., May 15, 1808. He was a skilful violinist, visited It. in 1825, gained distinction as a singer, and composed many operas, of which the *Bohemian Girl* is most popular. D. Oct. 20, 1870.

Balfour, bal-foor' (JOHN HUTTON), M. D., F. R. S., a Brit. botanist and phys., b. in Edinburgh Sept. 15, 1808. In 1845 he became prof. of bot. at Edinburgh. Wrote a *Manual of Bot.*, and a *Class-Book of Bot.* D. Feb. 12, 1884.

Balfour (Rev. WALTER), b. in Scot. 1777, was brought up a Presb. of the national Kirk; came to the U. S. in 1797, became a Bap., and in 1823 a Univ.; preached for many yrs. at Charlestown, Mass., and wrote several controversial works. D. Jan. 3, 1852.

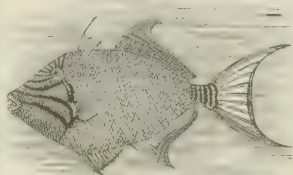
Balfurosh, or **Balfrush**, originally **Barfurosh**, "the mart of burdens," a city of Per., on the river Bahbul, 14 m. from its entrance into the Caspian Sea. Pop. estimated at 120,000.

Baliol, bali-ol, or **Bal'liol** (EDWARD), a son of King John Baliol, invaded Scot. in 1332; gained several victories over the Scot. army; was crowned king at Scone. About 3 months afterward he was surprised in his camp, and lost his crown. D. 1363.

Baliol, or **Ballioli** (JOHN), b. about 1259. He became the rival of Robert Bruce, and claimed the crown of Scot. The dispute was referred to Edward I. of Eng., who decided in favor of Baliol, and imposed the condition that he should do homage to the king of Eng. He was crowned in 1292, and swore fealty to Edward, but soon renounced his allegiance. Edward defeated B.'s army, and compelled him to resign the crown in 1296. D. in Fr. 1314.

Bal'iol College, Ox., Eng., was founded about 1263 or 1268 by John de Baliol, whose son of the same name was king of Scot. It was enriched by several benefactors separated by long intervals of time. Among the graduates of this coll. were John Evelyn and Bradley the astronomer.

Balistidae (*Balistes*), a family of plectognath fishes of the suborder Scleropterygii, with the pelvic bone well developed and movable, without ventral spines, and with the spinous dorsal represented by at most 3 spines. They are mostly found in tropical or sub-tropical seas, and are divisible into two sub-families. The *Balistinae* have brilliant colors, and a curious provision for fixing the first dorsal spine in an erect position or lowering it at will. For this reason they are sometimes called trigger-fishes. The



Trigger-Fish: *Balistes* *Ventratus*.

Monacanthinae are generally dull in color and have one spine, often supplemented by a second small one behind.

Balkan. See **TURKEY**.

Balkash, "large lake," or **Ak Tenghiz**, "white sea," a lake of Central Asia, on the borders of Rus. and Chi., having no visible outlet. It is 390 m. long; greatest breadth, 50 m.

Ball (GEORGE H.), A. M., D. D., b. at Oxford, Sherbrooke co., E. Canada, Dec. 7, 1818, grad. at the theological sem. of New York 1847; Bap. pastor in Buffalo, N. Y., for nearly 20 yrs., and in Providence, R. I., for 2 yrs.; ed. *Bop. Union*, and wrote *Tracts to the Lord's Supper*.

Ball (THOMAS), a sculptor, b. in Charlestown, Mass., June 3, 1819. His works of art are numerous and highly esteemed. Among them are busts of Webster and Choate, and statues of Webster, Everett, and Washington.

Balloon. See **AERONAUTICS**, by GEN. J. G. BARNARD.

Balloon-Fish, a name applied to marine fishes of the families Tetrodontidae, Diodontidae, and Triodontidae, from the power which they possess of inflating themselves with air.

Ballou, bal-loo' (HOSEA, second), D. D., b. at Halifax, Vt., Oct. 18, 1796. He became a Univ. preacher, and was settled at various places. He was (1853-61) the first pres. of Tufts Coll., at Somerville, Mass. He edited denominational periodicals and wrote *The Am. Hist. of Universalism*. D. 1861.

Ball'ston Spa, or **Balliston**, on R. R., cap. Saratoga co., N. Y., 30 m. N. of Albany. Here are mineral springs which rise from the lower part of the Hudson River (Silurian) shales and rank among the best acidulous chalybeate springs in the U. S. Pop. 1870, 2570; 1880, 3011.

Balm, balm (*Melissa officinalis*), a perennial herbaceous plant of the natural order Labiate, a native of the S. of Europe, is cultivated in Amer. gardens, and prized for its lemon-scented leaves, which are occasionally used in med. as a gentle aromatic, stimulant, and tonic.

Balmés, bal-mes' (JAYME LUCIO), a Sp. Cath. priest, b. Aug. 28, 1810. He wrote a work entitled *Protestantism Compared with Catholicism*, etc., which has been translated into Eng., Fr., Ger., and It. D. July 9, 1848.

Balm of Gilead. See **BALSAM** and **GILEAD**, **BALM OF**.

Balmoral (bal-mor'al) **Castle**, the autumnal residence of Queen Victoria in Scot., on the river Dee, 48 m. W. S. W. of Aberdeen. It commands a magnificent prospect and comprises 40,000 acres of beautiful grounds.

Balna'ves, or **Balnavis** (HENRY), of **Halhill**, a Scot. reformer and writer, b. in 1520. He studied law, and became sec. of state in 1543. In 1547 he was declared a traitor, and the Fr. took him, with Knox, to Rouen as prisoner; returned to Scot. in 1554. D. 1570.

Balsam, baw'sam [Lat. *bal'samum*; Gr. *βάλσαμον*], a name including many resinous substances and oils to which medicinal virtues are ascribed; also certain meds. compounded of resins and oils. The name was originally limited to a single substance, the balm of Gilead. Mecca B., or B. of Judea. B. are natural mixtures of resins and essential oils, the resins originating from the oxidation of the oils.

Balsam, **Canada**, the thick, terebinthine sap of *Abies balsamea*, which collects in blisters beneath the epidermis on the trunks of young trees. These blisters are punctured, and the B. gathered as an article of commerce.

Baltic, baw'tik, or **Baltic Sea** [Ger. *Ostsee*; Lat. *Mare Balticum* and *Sé'nus Codd'nu's*], an inland sea or gulf of N. Europe, between Rus., Swe., Ger., and Den., connected with the Ger. Ocean and the Cattegat by the Sound and the Great and Little Belts. It is 830 m. long. Its greatest width is 420 m., and the area 154,570 sq. m.

Baltimore, the chief city of Md., an important R. R. and commercial centre, is situated in 39° 17' N. lat. and 0° 29' E. lon. (76° 37' 30" W. from Greenwich), at the head of tide-water and of navigation on the Patapsco River, about 14 m. from the Chesapeake Bay, and nearly 200 from the ocean by ship-channel. The Patapsco to this point is a broad estuary; above, a small and swift stream, furnishing water-power to many mills and manufactories. The harbor is spacious and secure, but with a depth of but little over 20 ft. Its depth is preserved and is being increased, and an improved ship-channel provided by extensive dredging, prosecuted at the expense of the U. S., the State, and the city govts. The city covers about 10,000 acres of land, and the surface of its site was originally very hilly.

The first steps for "erecting a town" on the Patapsco, to be called B. Town, were taken by a legislative act in 1729, and it was laid out in half-acre lots in 1730. In 1752 it contained 25 houses and 200 persons; in 1765 the number had increased to 50 houses. After this the growth was more rapid, and in 1775 there were 564 houses and 5394 persons. In Dec. 1776 the Continental Cong. transferred its sittings from Phila. to B., and met here for about 2 months. In 1797 it was incorporated as a city. The pop. in 1790 was 13,503; in 1800, 26,514; in 1810, 35,583; in 1820, 62,738; in 1830, 80,625; in 1840, 102,313; in 1850, 169,054; in 1860, 212,418; in 1870, 267,354, and in 1880, 332,313.

The city is laid out, for the most part, at right angles, and the buildings are mostly built of red brick. The bricks used for building are made from immense clay-beds adjacent to the city, and are of unsurpassed quality. White marble, of excellent quality, is procured from inexhaustible quarries about 10 m. N. of the city; granite, from quarries about 15 m. W. Ship-building has always been one of the leading industries of the city, and the repairs of ships are greatly facilitated by an excellent dry-dock, recently constructed, capable of receiving the largest ships that can enter the harbor. There are several furnaces and foundries, producing iron in various forms from ores mined in the vicinity, one very extensive rolling-mill, several manufactories of agricultural implements, and very large machine-shops, employing many hundred hands. There are also extensive manufactories of clothing, leather, shoes, tobacco, etc. (census of 1880 reported 3683; products, \$78,417,304). There are about 100 es-

establishments for opening and packing oysters (and fruits). This business gives employment to several thousand hands, consumes from 7,000,000 to 8,000,000 bushels of oysters, gathered from the Chesapeake Bay, in a yr., and during the season Sept. 1 to Apr. 1, often sends inland, packed raw, or cooked and hermetically sealed, from 40 to 60 rail-car loads a day. These industries find their outlet both by land and water communication. There are lines of steamships to Liverpool, Bremen, Boston, Providence, New York, Wilmington (N. C.), Charleston, Savannah, Havana, New Orleans, etc., and steamboat lines to Norfolk, Richmond, Fredericksburg, Wash., and all points on the Chesapeake Bay and its many estuaries. It has several excellent R. Rs., and they are rapidly multiplying. The B. and Potomac road to Wash. passes by a tunnel 7400 ft. in length under the N. W. part of the city, and the N. Central road (to Harrisburg) reaches tide-water by a similar tunnel 3500 ft. long, passing under the N. E. section. Besides floating elevators for the transfer of grain, reaching the market by water, the R. Rs. have at their termini 6 substantial elevators with a storage capacity of 5,000,000 bushels, and others are projected.

Its sobriquet "Monumental City" was derived from the Washington Monument and Battle Monument, erected by the gratitude and patriotism of its citizens. The former, located at Mt. Vernon Place, N. Charles st., is a Doric shaft of white marble 180 ft. high, surmounted by a statue of Washington 16 ft. high, built 1816-30. Battle Monument, in Monument Square, N. Calvert st., is also of white marble, 52½ ft. high. Wilkey Monument on Broadway, of white marble, 52 ft. high, was erected to Thomas Wilkey, a citizen of B., who d. in 1801, and was the founder of Odd Fellowship in Amer. There is also in Greenmount Cemetery a creditable but plain monument and statue to John McDonogh, who bequeathed to the city a large sum (amounting now to about \$1,000,000) to establish the McDonogh Inst., "for the education of poor children." Greenmount and Loudon Park are its 2 beautiful cemeteries, and there are several others creditable, but of less pretensions. The city has about 160 chs. and 6 Jewish synagogues. The first ch. founded in the city was St. Paul's (Epis.) in 1731. The first Presb. ch. was erected in 1756, the first R. Cath. in 1770, the first Wesleyan Meth. in 1773, the first Bap. in 1780, the first Friends' meeting-house in 1781.

The water-supply of the city until 1881 was taken from Jones's Falls, about 7 m. above the city, and was of good quality and ordinarily abundant. In that yr. a further supply was brought, at an expense of \$4,000,000, from the Gunpowder River, by natural flow through a tunnel of 12 ft. interior diameter, 7 m. in length, with capacity for daily delivery of 170,000,000 gals. The reservoirs upon the 2 supplies have a storage capacity of 2,241,000,000 gals., the average daily flow of the stream that supply them 165,000,000 gals., and the aqueducts leading from the storage reservoirs have a capacity for delivering in the city 200,000,000 gals. a day. This is distributed everywhere in abundance, and there are about 1000 fire-plugs for use in case of fire. The fire dept. is well organized, directed by a police and fire-alarm telegraph, and notably efficient. It has 8 steam fire-engines, with a complement of horses and 12 men to each, and 3 hook-and-ladder companies, 13 men to each.

Numerous public squares add to the beauty and healthfulness of the city. The largest of these, Patterson Park, in the N. E. section of the city, contains 54 acres. Druid Hill Park, just outside the N. W. limits of the city, contains 704 acres of ground, with fine forests, lakes, and lawns, about 20 m. of good carriage-drives, and has no superior as a pleasure-ground.

First among the public buildings should be named the new city-hall, built of white marble, occupying an entire square, and costing \$3,000,000; the Md. Inst., of brick, 355 ft. long; the custom-house, 240 ft. long, with a dome 115 ft. high; the c.-h., and Odd Fellows' Hall—all of brick; the Masonic Temple, of white marble in the U. S. c.-h. and the jail, both of granite. Outside of the city limits, but a part of its inst., should be noted Bay View Asylum (city almshouse), 714 ft. in length; the house of refuge, retaining about 500 juvenile delinquents; Spring Grove Asylum, a State inst. for the insane, of granite, with capacity for 300 patients; the Md. Inst. for the Blind, a beautiful white marble building, where about 50 of these unfortunates are instructed; and the Sheppard Asylum (for the insane), endowed by the will of Moses Sheppard with about \$1,000,000. A superb P. O. building is now in process of erection by the U. S. govt. The Peabody Inst. of B. was the recipient of over \$1,000,000 from the late George Peabody. It has, in its fine white marble building by the side of the Washington Monument, a free library of 60,000 books and pamphlets, an art-gallery, musical conservatory, rooms for lectures, concerts, etc., and is one of the most thriving of the insts. endowed by that great philanthropist, which will "keep his memory green." The Hopkins Hospital has no superior in its appointments in this country, probably none anywhere. It originated in Mar. 1873, when Johns Hopkins, a merchant of the city, placed in the hands of trustees selected by him 13 acres of land in the E. part of the city, with directions to establish thereon a free hospital for the "indigent sick of the city and its environs, without regard to sex, age, or color," guaranteeing to them for the purpose \$100,000 a yr. during his life, and endowing it with \$2,000,000 for its support thereafter. He also established by most liberal endowment the Hopkins Univ., which already is taking high rank among schools for advanced instruction.

The gen. education of the city is provided for in about 125 graded public schools, in which about 40,000 pupils are taught by about 550 teachers. Loyola Coll., a Cath. inst., under the gen. supervision of the Jesuits, and the sem. of St. Sulpice (St. Mary's Coll.), a Cath. theological inst., are both in a flourishing condition, while the med. dept. of the Univ. of Md. takes very high rank, and the law dept. a re-

spectable position among professional schools. The city has 14 national banks, 6 daily, 7 weekly, 8 monthly, and 1 semi-monthly newspaper.

The prin. libraries of the city are: Peabody Inst., Mercantile Library Association, Md. Inst., B. Bar Association, Young Men's Chr. Association; Odd Fellows', Md. Historical Society, and Loyola Coll.

HENRY STOCKBRIDGE.

Baltimore, Lord, a title (of the Calvert family) in the Irish peerage, created in 1624 by James I., who marked his confidence in Sir George Calvert by making him, though a R. Cath., baron of B. (in Ire.). Calvert was b. at Kipling, Yorkshire, Eng., in 1582. He grad. at Ox., held several important public trusts, was knighted in 1617, became prin. sec. of state in 1619, M. P. 1620-21, and first Lord B. 1624. By grant of James I. he became proprietary of Avalon in Newfoundland, endeavored to plant a colony there, and went thither himself in 1625. The colony was a failure. He then (1628) visited Va., met an ungracious reception, and returned to Eng. He seems then to have petitioned the king (Charles I.) for a charter for founding a new colony, but before the charter was issued he d., Apr. 15, 1632. The charter was issued in June 1632 to his son Cecil, who became the 2d Lord B. and real founder of the colony of Md. Cecil never visited it, but sent out an expedition in Nov. 1633, under the charge of his brother, Leonard Calvert, as govt. The successive Lords B. were John (the 3d), Charles (4th), Benedict (5th), Charles (6th), and Frederick (7th). Frederick d. in 1771, and with him the title Lord B. became extinct.

HENRY STOCKBRIDGE.

Baltimore O'riole (*Icterus Baltimore*), also called **Fiery Hangbird** and **Golden Robin**, a well known and conspicuously beautiful bird of the New-World family of Icteridæ. Black and yellow, the two colors of the coat-of-arms of Lord B., predominate in all the members of the genus *Icterus*, and suggested the name of this typical species. It is a summer resident of the U. S. generally, but not found W. of our central region, where it is replaced by another closely allied species. As a vocalist it is a bird of rare power, combining pathos, beauty, and variety in its notes. The nest is a pendulous, cylindrical pouch, and is suspended from the extremity of a hanging branch. It feeds chiefly on insects, many of them highly injurious to vegetation, and is thus of service to the farmer.

Balzac, de, *deh* *bahl-zakh'* (HONORÉ), a Fr. novelist, b. at Tours May 16, 1799. He excelled in the analysis of emotions and the delineation of individual character. Among his works, translated into many langs., are *The Physiology of Marriage* and *Le Père Goriot*. D. Aug. 19, 1850.

Balzac, de (JEAN LOUIS GÜEZ), SEIGNEUR, a Fr. writer, b. in 1594. He was patronized by Richelieu, and was considered the best Fr. prose-writer of his time, doing much to improve and refine his native lang. D. Feb. 15, 1654.

Bamboo, bam-boo', a genus of arboreous grasses which are natives of the tropical and warm parts of Asia and Amer., and grow to a large size. Some of the species are 80 ft. high or more. It has been called the national plant of Chi., the natives of which make of it a great variety of articles, furniture, weapons, etc. Some species secrete a silicious, phosphorescent substance called tabasheer, to which remarkable properties have been attributed.

Banana, ba-nā'na (*Musa sapientum*), an herbaceous plant of the natural order Musacæ, extensively cultivated in all tropical regions of both hemispheres. It grows to the height of from 15 to 20 ft., and the stem terminates in a tuft of leaves which are from 6 to 10 ft. long, and about 1 ft. wide. The fruit, which is generally 5 or 6 inches long, has a soft, luscious pulp. It is stated that no other plant produces so great an amount of nutriment on the same space of ground.

Banca, bang'kah, an island of the Malay Archipelago, belonging to Hol. It is about 100 m. long, and has an area of 497 sq. m. It is celebrated for its mines of tin. Pop. in 1880, 69,312.

Bank, the standard money in which a bank keeps its accounts, as distinguished from current money. The term is chiefly applied to the money in which the Hamburg bank keeps its accounts, which is not current money.

Bankcroft (AARON), D. D., a Unit. minister, b. at Reading, Mass., Nov. 10, 1755; grad. at Harvard in 1778, became in 1785 pastor at Worcester. Wrote a life of George Washington. D. Aug. 19, 1839.

Bankcroft (GEORGE), PH. D., LL.D., D. C. L., an Amer. historian, son of the preceding, b. at Worcester, Mass., Oct. 3, 1800; grad. at Harvard in 1817, and entered in 1818 the Univ. of Göttingen, where he studied hist. and philology. In 1834 he produced the first vol. of his *Hist. of the U. S.* Pres. Polk made him sec. of the navy in 1845, in which yr. he founded the U. S. Naval Acad.; resigned that office in 1846, and was sent as minister plenipotentiary to Eng. in the same yr.; in 1849 retired from the public service, and became a resident of New York. His cap. work is a *Hist. of the U. S.* Mr. B. was appointed minister to the court of Berlin in 1867, and negotiated a treaty by which Gers. emigrating to the U. S. are released from their allegiance to the govt. of their native country. In 1871-74 he was minister plenipotentiary to the Ger. empire, and assisted in settling the San Juan boundary question.

Ban'da Isles, a group of lofty volcanic islands forming part of the Molucca Archipelago. They were discovered by the Port. who took possession of them in 1524, but came into the hands of the Dut. in 1599. The prin. produce is nutmegs and mace. Area, 8748 sq. m. Pop. 372,000.

Bandana, ban-dan'a, or **Bandan'na**, a silk or cotton handkerchief of E. Indian origin, though now extensively manufactured in G. Brit. The cloth is dyed Tur. red, and then the pattern is made by discharging the color with bleaching-liquor, in a hydraulic press. The spreading of this liquor is prevented by an enormous pressure. The patterns of the real B. are spots and diamond prints.

Banda Oriental. See UREGLAY.

Band-Fish, a name applied to *Cepola rubescens* and allied fishes, which have the body much elongated and com-



Red Band-Fish.

pressed. It has also been extended sometimes to other elongated and much compressed fishes.

Bandicoot, a name given to the species of *Peramelia*, a family of Australian marsupials with a long head and pointed muzzle, and 10 cutting teeth in the upper jaw and only 6 in lower. They devour grain in granaries and potatoes in the field.

Bandinelli (Baccio), an It. sculptor, b. at Florence, in 1497. He was considered as second only to Michael Angelo, of whom he was a jealous rival. D. 1559.

Banditti, ban-dit'te [It. *banditi*], bands of robbers who fall upon travellers and hold them captive for a ransom. In former times there existed in the larger towns of It. organized associations of bandits, whose stiletos were ready for hire. They were called euphemistically *bravi* ("brave men").

Banér, bah-nair', written also **Bannier** or **Bannér** (Johan), a Swe. gen., b. June 23, 1595. He commanded under Gustavus Adolphus at the battle of Lepsis in Sept. 1631. On the death of Gustavus Adolphus (Nov. 1632) he became the commander-in-chief of the Swe. army; gained a victory near Wittstock in Sept. 1636, and again defeated the imperial army near Chemnitz in 1639, after which he overran a large part of Ger. D. May 10, 1641.

Bangalore, bang-ga-lor', a fortified town of India, on a high table-land 71 m. N. E. of Seringapatam. It is an important military station, and is frequented by Europeans on account of the salubrity of the air. It was taken by Cornwallis in 1791. Pop. 142,513.

Bangkok, bang-kok', or **Bankok**, the cap. of Siam, on the river Ménam, about 20 m. from its entrance into the Gulf of Siam. Many of the houses are built on movable bamboo rafts on the river. The stationary dwelling-houses are raised on piles 6 or 8 ft. from the ground, in order to protect them from inundations. It is the seat of R. Cath. and of Amer. Bap. and Presb. missions. Pop. 600,000.

Bangor, bang'gor, a city and important R. R. and commercial centre, cap. of Penobscot co., Me., on the Penobscot River, about 60 m. from its mouth, 138 m. N. E. of Portland, 67 m. E. N. E. of Augusta, the cap. of the State. It has water-power equal to any other in N. Eng., and is one of the chief lumber depots in the U. S. It is the seat of a theological sem. It was settled in 1769, incorporated as a town in 1791, and as a city in 1834. Pop. 1870, 18,289; 1880, 16,856. [From orig. art. in *J. s. Univ. Cyc.*, by B. F. TEFPT, D. D., LL.D.]

Bangs (HEMAN), a Meth. preacher, b. in Fairfield, Conn., in 1799; labored effectively in N. Y. and Conn.; one of the founders of the Wesleyan Univ. at Middletown, Conn. D. Nov. 2, 1869.

Bangs (NATHAN), D. D., a Meth. minister, b. in Stratford, Conn., May 2, 1778; an ed. and author, and pres. of the Wesleyan Univ. at Middletown, Conn. D. May 3, 1862.

Banian Tree. See **BANACH**.

Bank [from It. *banco*, a "bench" or "table," on which the Venetian money-changers displayed their money]. In gen. B. are credit insts. or dealers in credits. The exchanges of the modern world are barter, effected by the indirect agency of the credit system, and B. and bankers are its machinery. Metallic money and its representative, the circulating note, are together only the small change of trade, employed in the settlement of balances and in the smaller purchases and payments. The operations of the New York clearing-house are a good illustration of the small amount of money required in the transaction of business; its exchanges amount to millions, while the balances paid in money are about 4 per cent. only of the amount of the settlements.

B. of Venice, It. was the earliest banking inst. in Europe, and was founded A. D. 1171. It was based upon a forced loan of the republic. Funds deposited in it could not be withdrawn, but were transferable on the books at the pleasure of the owner—in this respect not unlike the perpetual annuities of the British debt.

B. of Barcelona, Sp., was founded in 1401, and is said to have been the first B. that negotiated foreign bills of exchange. Jewish money-dealers, however, are entitled to the credit of the invention at a much earlier period.

B. of Genoa, It., went into operation in 1407. For centuries it was one of the prin. B. in Europe. It was the first to issue circulating notes, which were negotiated or passed only by indorsement, not made payable to bearer.

B. of Amsterdam, Hol., established in the yr. 1607, was the earliest considerable inst. of the kind which looked to the promotion of commerce. Its predecessors of Venice and Genoa were chiefly devoted to the management of state finances.

B. of Hamburg, Ger., established in 1619, was a B. of deposit and circulation, based upon fine silver bars. The deposits were confined to silver. This inst., like nearly all those of the time, had, as a prin. object, the protection of the people from worn, sweated, clipped, and plugged coins, and from coins of the Ger. empire secretly reduced in standard value.

B. of Eng. is a fiscal agent, but is also devoted to the service of domestic and foreign commerce. It was established in the yr. 1694, and there is no banking inst. elsewhere in the world equal to it in the management of national finances.

B. of France was authorized in 1800. Since 1803 it has had the exclusive privilege in Paris, and since 1837 in Fr., of issuing notes payable on demand. During the revolution of 1848 it was authorized to suspend specie payments, and its notes were made a legal tender. The B. of Fr. is not a fiscal agent of the govt., as is that of Eng. It does not collect or disburse the revenues of the exchequer, but lends to it largely in its exigencies, while its credits, in the form of circulating notes and other acceptances, have borne the govt. safely through extraordinary needs.

The first organized B. in the U. S. had its origin in the formation of a banking company without charter, which was proposed in a resolution, passed June 17, 1780, by citizens of Phila. The first action in the Cong. of the U. S. looking to the establishment of a B. was taken June 21, 1780, in reference to this proposed association. In the spring of 1781 Robert Morris, then supt. of finance, submitted to Cong. a plan for the establishment of the B. of N. Amer. at Phila., which plan was approved, and on Dec. 31 following a perpetual charter was granted to that inst. The B. opened for business on Jan. 2, 1782, and on Apr. 1 following the legislature of Pa. granted to the co. a perpetual charter, which, though repealed in 1785, was subsequently renewed from time to time to the date of its last charter, on Dec. 3, 1854. On Feb. 7, 1784, the State of Mass. incorporated the Mass. B. The B. of New York was chartered on Mar. 21, 1791, although it had since 1784 been doing business under "articles of association" drawn by Alexander Hamilton, who was a member of its first board of directors. All of the above-named insts. are still in a prosperous condition, and all have been converted into national B.

U. S. National B.—Sec. Chase, in his annual reports for 1861 and 1862, recommended the establishment of a national banking system. The act of Cong. which authorized the existing national system was approved on Feb. 25, 1863, but this law was subsequently superseded by the act of June 3, 1864, which provided for the establishment of a national B. bureau in the treas. dept., the chief officer of which is the comptroller of the currency. Under this act national B. may be organized by any number of persons, not less than 5, the cap. in any instance to be not less than \$100,000, except that, in cities containing a pop. not exceeding 6000, B. may be established with a cap. of not less than \$50,000. The cap. stock in cities having a pop. of 50,000 must not be less than \$200,000. Not less than one third of the cap. was required to be invested in U. S. bonds, upon which circulating notes may be issued equal in amount to 90 per cent. of the current market value, but not exceeding 90 per cent. of the par value of the bonds deposited; the notes are receivable at par in the U. S. in all payments to and from the govt., except for duties on imports, interest on the public debt, and in redemption of the national currency. [From orig. art. in *J. s. Univ. Cyc.*, by HON. J. J. KNOX.]

Bank-Notes. See ENGRAVING, BANK-NOTE.

Bankrupt [Lat. *ban'cus*, a "bench," and *ruptus*, "broken"], a term originally applied to a merchant whose bench or counter had been broken by reason of inability to pay his debts. In its popular sense the word is now nearly synonymous with *insolvent*, and denotes any person unable to meet his liabilities. By the Eng. laws a B. is a person who has committed an act of bankruptcy, as defined by statute.

In the U. S., Cong. possesses the power, under the const., to establish uniform laws on the subject of bankruptcies. Pursuant to this power, in the yr. 1800 Cong. passed a B. law, which by its own terms was limited to 5 yrs., but it was repealed in 1803. This law preserved the leading features of the Eng. laws relating to bankruptcy. It could be enforced only on the application of creditors, and embraced only the mercantile class.

In the yr. 1841 the second B. act was enacted by Cong. It could be taken advantage of by all persons whomsoever residing in the U. S. owing debts not contracted in a fiduciary capacity, although it could be enforced at the instance of creditors only against merchants, bankers, brokers, factors, and underwriters. This extended exercise of the power over the subject of bankruptcy was violently opposed as unconstitutional, on the ground that Cong. was confined to the well recognized meaning of the term bankruptcies as understood in the Eng. courts when the const. was formed. The law was repealed in Mar. 1843.

But by act approved Mar. 2, 1867, Cong. passed a third B. law, even more gen. in its scope than the preceding. This act has been in its turn repealed (chap. 160, laws of 1878).

The distinguishing feature of a B. act is the summary seizure of all the debtor's property, and its division among his creditors in proportion to their claims. The race of diligence among creditors is entirely at an end, and all legal proceedings, except such as are in conformity to the statute, are stayed. It is against the policy of the B. law to allow the debtor, in contemplation of bankruptcy, to give preference to one creditor over another. All such preferences are void, and an attempt to make them is of itself an act of bankruptcy.

The various States also possess the power to pass B. laws, but no State B. or insolvent law can impair the obligations of contracts. And when Cong. sees fit to exercise the power over the subject of bankruptcies granted it by the const., the State laws on the same subject are suspended. On the repeal of the congressional law the State laws revive. The power of Cong. over the subject is plenary, and its law may affect existing debts as well as those which are contracted after its enactment.

The judicial business in bankruptcy is in the main transacted by the dist. courts of the U. S., with officers called registers to conduct the administrative or non-contested

business. The estate is managed by an assignee, who acts as a trustee, and is accountable to the court referred to.

T. W. DWIGHT.

Banks—NATHANIEL PRENTISS, LL.D., a statesman and soldier, b. at Waltham, Mass., Jan. 30, 1816; was a machinist; studied law; in 1840 elected, as a Democrat, to the State legislature; in 1852 elected M. C.; separated from his party upon the slavery question; repeatedly re-elected, and in 1856 was chosen speaker of the House; gov. of Mass. 1857-59; in May 1861 entered the army as maj.-gen. of volunteers; operated unsuccessfully against Jackson in Va.; in Dec. 1862 superseded Butler in command of the dept. of the Gulf; captured Ft. Hudson July 9, 1863, and in the spring of 1864 conducted an unsuccessful expedition up the Red River, and was recalled. From 1864 to 1872 he was a rep. in Cong. as a Rep., advocated the election of Mr. Greeley as pres., and was defeated for Cong., but was re-elected in 1874 and 1876, serving on important committees.

Banks (Sir Joseph), LL.D., F. R. S., an Eng. naturalist, b. in Lond., Jan. 4, 1743; educated at Ox., elected a F. R. S. in 1766, and sailed with Capt. Cook in his voyage round the world in 1768; returned in 1771 with rich collections of plants, animals, etc.; in 1777 was chosen pres. of the Royal Society, over which he presided 42 yrs., and wrote many papers on nat. hist. D. June 19, 1820.

Banks (Thomas), the first great Eng. sculptor, b. at Lambeth Dec. 22, 1735; gained the gold medal of the Royal Acad. in 1770; was a member of the Royal Acad. D. Feb. 2, 1805.

Banks, Savings. See SAVINGS BANKS.

Ban'neker (BENJAMIN), a negro math. b. in Md. Nov. 9, 1781; was the author of an almanac; assisted in laying out Wash. D. 1806.

Ban'nockburn, a v. of Scot. on the Bannock rivulet, 3 m. S. of Stirling, where a great victory was gained, June 24, 1314, by Robert Bruce over the Eng. army, led by the king, Edward II.

Ban'tam Fowl, a variety of the common fowl, first brought from the Indies, and supposed to derive its name from Bantam, Java. It is remarkable for its small size and its courage. There are many sub-varieties, most of which have the legs feathered.

Ban'teng' (*Bubus Sondaicus*), a species of ox, (*Borida*), native of Java and Borneo, having short hair, slender limbs, and a sharp muzzle. Though extremely wild, it is domesticated by the natives, and becomes a very serviceable animal.

Ban'try Bay, a deep inlet in the S. of Ire., in Cork co., 23 m. long and from 3 to 5 m. wide. It is one of the finest harbors in Europe. Near the entrance of this bay occurred a naval action between the Eng. and Fr. in 1689.

Banyan, ban-yan', or **Ban'ian** (*Ficus Indica*), an E. I. tree remarkable for its mode of propagation by means of

sist on "a spiritual ch.-membership;" and it is largely through their influence that that idea has gained such wide acceptance in this country, and is gradually spreading throughout Europe.

3. They maintain that professed believers only should receive baptism. This position is a natural sequence of their view of the spiritual nature of the Ch. when coupled with the almost universally conceded doctrine that baptism is the initiatory rite of the Ch. They point, however, to the baptisms of the N. T. as by explicit statement or fair inference the baptism of believers, and insist that the baptism of an unconscious infant, either on the responsibility of the Ch., the state, or the religious household, is a violation of the rights of the individual conscience, which should, in their opinion, "give account of itself unto God" in all matters of religious faith and practice.

4. They maintain that there should be no organic connection between the Ch. and the State; and, further, that each individual ch. (by which they understand, "a body of baptized believers, with its pastor and deacons, covenanted together for religious worship and religious work") should be independent of any other body, whether ecclesiastical or political, being accountable for its doctrines and practices only to the great Head of the Ch. As a consequence of this, "associations," "conventions," and "councils," have with them no ecclesiastical authority, save that with which the Chr. comity of those constituting them invests them, and the moral weight which their conclusions carry.

It is to reinforce their utterances in behalf of a spiritual ch.-membership and allegiance in religious matters to Chr. alone, by an acted protest against what they believe to be a departure from the apostolic conception of the Chr. Ch., that the B. take a position with reference to the Lord's Supper similar to that taken by the Episcopalians with reference to ministers not episcopally ordained. While cordially co-operating with other religious denominations in all forms of moral and religious activity, they decline to invite them to participation in the Lord's Supper, taking the ground that there is an obvious and necessary distinction between Chr. fellowship and church fellowship. Their position with reference to this matter is, briefly stated, that the Lord's Supper is an ordinance designed by Chr. for his chs., and intrusted to their care; that baptism is the initiatory rite of the Chr. Ch.; that valid baptism involves the immersion of a professed believer. In the first two particulars they agree with most Chr. sects, and hence are accustomed to claim that they do not practise "close communion," but close baptism; that most of the other Chr. sects are no more willing than they to invite to the Lord's Supper those whom they do not conscientiously regard as baptized.

In 1815 Robert Hall (one of the most gifted and influential B. ministers of Eng.) pub. a treatise on the *Terms of Communion*, in which he endeavored to satisfy himself and others that baptism was not a prerequisite to communion. Since his day most of the B. of Eng. have been "open communionists," though his views have met with scanty acceptance in Amer.

History.—The name "B." has been borne by the denomination whom it now designates only about 200 yrs. The name by which they were previously known was "Anabaptists." In this historical sketch the name B. will be used to designate the Ger., Dut., and Eng. predecessors of the modern "B." without intending by the name to assert a perfect similarity between them in all things. The Ger. "Wiedertäufer" more frequently practised pouring than immersion; and the same statement may be made respecting the Dut. "Mennonites." These bodies of Chrs. agreed with our modern B., however, in admitting only professed believers to baptism, and in maintaining the independence of a gospel Ch. of ecclesiastical or political control.

The B. in the earliest yrs. of the Ref. consisted of the poor and obscure. Early in the 16th century, however, there was in Switz. a band of scholars who had been converted by means of these obscure men, and who before becoming B. were the friends and associates of Zwingle and his fellow-workers.

The liberty of private judgment, which both Luther and Zwingle claimed in their discussions with Romanists, they were unwilling to grant to B., and Prot. and Romanist joined hands in persecuting them unto death.

Until 1531-32, B. had been most numerous in Switz. and Ger.; after this date they appear in large numbers in the Netherlands, and in the countries bordering on the Baltic. When they first appeared in the Netherlands cannot be decided.

The B. in the Netherlands have been generally termed Mennonites, from Menno Simons, a priest in the R. Cath. Ch. in Friesland, who espoused B. principles in 1537. Long before Menno became a B., however, B. were united in chs. from the borders of Fr. to the bounds of Friesland, and proved steadfast unto death in the maintenance of their principles. Between the B. of the Netherlands and those of Ger. and Switz. there was an intimate union.

Commerce, manufactures, and neighborhood had long bound Eng. with many ties to the Netherlands, and the Eng. "Anabaptists" of the 16th century are shown by their statements, when on trial, to have been brethren of the Dut. B. It is quite difficult, however, to determine when the B. first appeared in Eng. We find distinct traces of a B. ch. organized by Helwisse in 1614; there was a Calvinistic B. ch. formed in Lond. in 1633, and in 1644 we have a Confession of Faith of "Chs. of Chr." in Lond. which are commonly (but unjustly) called Anabaptists. Like their brethren on the Continent, the Eng. B. were the unflinching advocates of religious liberty. In simple devotion to God's word, in pleading for the rights of man against all spiritual and political tyranny, the entire denomination, in fact, has led the van of all Chr. denominations and borne the brunt of the battle.

Under the Restoration, from Charles II. to William III.,



Banyan Tree.

aërial roots, which, on descending to the ground and penetrating it, become stems or trunks. In this manner a single tree spreads over a large extent of ground. In very old trees many of the stems often become almost or quite as large as the original trunk.

Baobab. See ADANSONIA.

Baph'omet, a mysterious symbol of the Knights Templars, was a small human figure cut out of stone, having 2 heads, male and female. It was environed with serpents and astrological attributes, and marked with inscriptions, mostly in Arabic.

Baptism. See BAPTISTS, by PRES. M. B. ANDERSON, LL.D.

Bap'tists, a body of Chrs. who maintain those views of Chr. truth which are commonly regarded as "evangelical," but who differ from adherents of the Ch. of Rome and from most Prots. in the following respects:

1. They maintain that immersion is an essential condition of valid baptism—appealing, in support of their position, to the significance of the Gr. word *Baptizō*; to the circumstances in which the baptisms of the N. T. were administered; to the scriptural significance of the rite as a burial with Chr.; to the practice of the Ch. in the early Chr. centuries; and to the concessions of those who, while practically rejecting immersion, admit that it was practised by the apostles and the early chs.

2. They maintain that a visible Ch. should be composed of such only as give credible evidence of regeneration—in opposition to those who would make the Ch. coterminous with the state, and those who would include in the Ch. the unregenerate members of Chr. households. They were the first among the various sects of modern Christendom to in-

they suffered bitterly, as did all dissenters, and then with peace came a period of stagnation. Near the close of the 18th century, however (when only the Moravians had preceded the Eng. B. in the work of foreign missions), the B. Missionary Society was formed (1792), and Carey, Marshman, and Ward, a triumvirate of Chr. missionaries unexcelled in labor and in Oriental scholarship, went forth to overthrow heathenism in India. B. missionaries from Eng. have labored in India, Ceylon, Chi. Afr., and the W. I., and with almost equal success.

The Eng. Separatists who fled to Hol. in the last part of the 16th century became very largely leavened with the views of the B., who were numerous in Hol. When the tide of emigration set toward N. Amer., many who felt the strength of these views joined the emigration and came out boldly on the side of the B. after reaching Amer. In N. Eng., however, as in Europe, the Ch. became political and the state ecclesiastical, and the union produced the unavoidable bastard fruit of persecution. Driven from Mass., Roger Williams and a small band of B. founded the colony which afterward became R. I., the type of all true democratic govt., on the principle of freedom for God's word and freedom for man's conscience. From N. Eng. B. emigrated to N. Y. and to Va., experiencing in both colonies at first the lot of a proscribed people. During the Revolution, however, they rendered effective service to the infant republic, and at its close were instrumental in securing the recognition of complete religious liberty in the const. of the U. S.

The 19th century has witnessed a marvellous increase in the B. of the U. S. From 77 chs., with hardly more than 5000 members in 1770, they had increased in 1880 to 26,060 chs., with 2,296,327 members and 16,596 ordained ministers. For the latter year (1880) they reported 102,724 baptisms, 1,043,334 officers, teachers, and scholars in Sunday-schools, and \$4,380,752.81 for benevolent contributions. In the same yr. the B. in Eng. reported 1893 chs., 203,304 members, and 1360 ordained ministers. The following table gives the statistics of the B., by continents, for 1880:

	Churches.	Baptisms.	Members.
North America.....	26,945	109,739	2,388,632
Europe.....	3,028	5,083	326,950
Asia.....	520	3,345	42,072
Africa.....	60	129	3,603
Australasia.....	143	331	7,918
	30,696	118,927	2,769,175

Stimulated by the example of their Eng. brethren, and providentially impelled to the work by Dr. Judson's adoption of B. views, the B. of the U. S. organized in 1814 the B. Foreign Mission Society (now the Amer. B. Missionary Union), which had in 1880 5 missions in Asia, 5 in Europe, and 1 in Afr. In these missions there are 1001 chs., 1393 laborers of all classes, and 89,593 ch. members. The receipts of the "Union" in 1880 were \$238,802.84. It has met with the most marked success in its missions among the Karens in Burmah, the Teluguos in India, in Ger., and in Swe. The Amer. B. Home Mission Society, organized in 1832, supported, in 1880, 392 missionaries and teachers among the freedmen, and received into its treas. \$235,032.44. The B. Bible and Publication Society, organized in 1824, received, in 1880, \$349,564.46, and issued 964,635,025 pp. In 1764, when the B. of the U. S. numbered barely 5000, they established R. I. Coll. (now Brown Univ.). In 1880 they numbered 8 theological sems., 31 colls., and 47 acads., with a total (according to the very imperfect return which we condense) of 707 instructors, 10,263 students, and property and endowments to the amount of \$16,959,552. With reference to B. list., reference may be made to THOMAS CROSBY, *Hist. of the Eng. B. from the Ref. to the Reign of George I.* (1738-40); IVIMEY, *Hist. of the Eng. B.* (1811-23); I. BACKUS, *Hist. of B. of N. Eng.*; *The Publications of the Hantsdon Knollys Society*; CRAMP'S *B. Hist.* (the best popular work), and CUTTING'S *Historic Vindications*. For works in exposition and defence of B. principles and practices, see WAYLAND'S *Principles and Practices of the B.*; DAGG'S *Ch. Order*; F. HISCOX'S *B. Ch. Directory*; CHASE, RIPLEY, JUDSON, and WIERG on Baptism; ARNOLD, PEPPER, and HOVEY on the Lord's Supper.

M. B. ANDERSON.

Baraboo', on R. R. cap. Sauk co., Wis., on Baraboo River, 33 m. N. W. of Madison. It is the centre of the Wis. hop-producing district, and is in the neighborhood of valuable iron-mines. Pop. 1870, 1538; 1880, 3266.

Bara'ga (FRIEDRICH), D. D., a Cath. missionary, b. near Dobernik, in Camiola, in 1797; visited Amer. in 1831; a missionary among the Indians, bp. of Sault Ste. Marie and Marquette; pub. a gram. and dict. of the Ojichipe lang. D. Jan. 19, 1868.

Baraguey d'Hilliers, bah-rah-gā' de-ye-ā' (ACHILLE), Count, a Fr. gen., b. Sept. 6, 1795; served in Algeria, in 1849 commanded the army that occupied Rome, in the Crimean war commanded a corps which co-operated with the Brit. fleet in the Baltic; a marshal of Fr. in 1854. D. June 6, 1878.

Baraguey d'Hilliers (LOUIS), a Fr. gen., the father of the preceding, b. in Paris Aug. 13, 1764; served in It. in 1796-97, commanded in Aus. in 1805, gov. of Venice in 1808. In the Rus. campaign of 1812 he was taken prisoner with all his division. D. Dec. 1812.

Barante, de, deh bah-ron' (AMABLE GUILLAUME PROSPER BRUGERE), a Fr. statesman and historian, b. at Riom June 10, 1782. He was appointed collector-in-chief of customs in 1818, and in 1819 was made a peer of Fr. Wrote *Hist. of the Dukes of Burgundy* and *Hist. of the National Convention*. D. Nov. 22, 1856.

Barb, a name given in N. J. to the king-fish (*Menticirrhus nebulosus*). Also the name of a noble breed of horses which originated among the Moors of Barbary.

Barbae'na (F. CALDERIA BRANTI), MARQUIS OF, a Brazilian soldier and diplomatist, b. at Sabora in 1772, negotiated concerning the independence of Brazil with Port.

afterward twice minister of finance; introduced steam-engines and the printing-press into Brazil. D. 1842.

Barba'does Cherry, the edible fruit of 2 small W. I. trees (the *Malpighia urens* and *Malpighia glabra*). Each fruit contains 3 seeds. The leaves of *Malpighia urens* have stinging hairs on the lower side.

Barbadoes Gooseberry, the edible fruit of *Pereskia aculeata*, a plant of the order Cactaceae, having a round stem, thick, alternate leaves, and large spines. The fruit has expectorant properties. It grows in the W. I.

Barbadoes Tar, or petroleum, is a black, opaque, inflammable liquid of the consistence of molasses. By distillation it yields naphtha, leaving a residuum of asphaltum.

Barba'dos, or **Barba'does**, the most E. of the Caribbee Islands, belongs to the Brit.; it is 21 m. long, 14 m. wide, and has an area of 166 sq. m. It is nearly encircled by coral reefs, which are dangerous to navigation. Pop. 171,889.

Barbaros'sa (i. e. "red beard"), two Ger. brothers who became Tur. corsairs, and were the scourge of Christendom from 1510 to 1546. One was master of Algiers, the other of Tunis.

Barbaroux, bar-bah-roo' (CHARLES JEAN MARIE), a Fr. Girondist and advocate, b. at Marseilles Mar. 6, 1767; a member of the National Convention in 1792; denounced Robespierre, and on the trial of the king voted for an appeal to the people; proscribed by the Jacobins; guillotined 1794.

Barbary (derived from *Berber*, the name of a native race), an extensive region of N. Afr., comprising the modern Barca, Tripoli, Tunis, Fezzan, Algeria, and Morocco.

Barbary Ape, **Pygmy Ape**, or **Magot**, a small species of tailless monkey, is a native of Europe, but is found in only one place in Europe, the Rock of Gibraltar. It also abounds in N. Afr., especially among rocky mts. and forests. It is not regarded as a true ape.

Barbauld, bar-bo' (ANNA LETITIA), an Eng. authoress, b. in Leicestershire June 20, 1743, a daughter of Rev. John Aikin, was married in 1774 to Rochemont Barbauld, a dissenting minister. Wrote *Devotional Pieces* and *Early Lessons for Children*. D. Mar. 9, 1825.

Bar'bel, a name applied to species of *Barbus*, and related fishes of the family of Cyprinidae, furnished with 4 soft barbules pendent from the snout and upper jaw, and derived from the Lat. *barba*, "beard." The *Barbus vulgaris* is a common Brit. species. It sometimes measures 3 ft. long, and weighs about 16 lbs. The B. of the U. S. is the horned sucker or dace (*Acrossocheilus tuberculatus*), which is readily taken by the hook.

Bar'ber (JOHN WARNER), b. at Windsor, Conn., in 1798. Wrote a *List of New Haven Historical Collections* of Conn., Mass., N. J., Va., and O., and *Our Whole Country*.

Barberini (FRANCESCO), an It. cardinal, a nephew of Pope Urban VIII., b. in 1597; became librarian of the Vatican, and was founder of the great B. library. D. 1679.

Barberis, (*Berberis*), a genus of plants of the natural order Berberidaceae, comprises many species, which are all shrubs and natives of temperate climates. The fruit is a berry used for preserves; the bark is astringent, used as a med., and the inner bark with the root furnishes a good yellow dye.

Barber's Itch, a term applied somewhat indiscriminately by the public and many phys. to 2 distinct diseases. 1. A majority of cases are instances of *impetigo mentis*, or pustular eruption on the face from the irritation of too frequent and close shaving. The face is inflamed, red, tender, and nodular, with numerous pustules of various size, discharging pus, which mats in the stumps of the beard and forms scabs. 2. The second form is the true "B. I.," contracted by contact of person or the soiled and contaminated razors and brushes of the barber. It is really "ringworm in the beard." Each hair of the infected beard is covered with a whitish powder of parasitic scales or spores. The parasitic vegetation is the *Microsporon mentagrophytes*. In either the *impetigo mentis* or the true *sycosis* the inflammation is to be removed by frequent applications of cold water, perfect cleanliness, and soothing lotions, as of glycerine, opium, and acetate of lead. With the first form such methods will suffice. In the second or parasitic form all the infected hairs should be pulled out with the depilation-forceps, and the parasites destroyed in the hair-follicles by "parasiticide" lotions or unguents. Chief of these are sulphurous acid, either pure or diluted, carbolic acid in glycerine, weak solutions of corrosive sublimate, and ointments of sulphur, iodide of sulphur, nitrate of mercury, and white precipitate.

E. D. HUDSON, JR.

Bar'bours (JAMES), a statesman, b. in Orange co., Va., June 10, 1775; was gov. of Va., a senator of the U. S., became pres. *pro tem.* of the Senate, sec. of war of J. Q. Adams, and was sent as minister to Eng. in 1828. In 1839 he was pres. of the Whig national convention. D. June 8, 1842.

Barbour, or **Barber** (JOHN), a Scot. poet, a contemporary of Chaucer, b. about 1320; archdeacon of Aberdeen; about 1374 one of the auditors of the exchequer. His prin. poem is *The Bruce*, a national epic. D. Mar. 13, 1396.

Barbour (PHILIP PENDLETON), a jurist, b. in Orange co., Va., May 25, 1783, was a brother of James, noticed above; appointed an associate judge of the supreme court of the U. S. in 1836. D. Feb. 24, 1841.

Bar'ca (anc. *Cyrenaica*), a region of N. Afr., a great part of which is desert, but having some fertile spots. It is subject to Turkey; cap. Benghazi. Pop. estimated, 302,000.

Barcelo'na [Lat. *Bar'cino*; Gr. *Βαρκινών*], a city of Sp., cap. of a prov. of the same name, on the Mediterranean. The harbor is commodious, but its mouth is obstructed by a bar, which excludes vessels drawing more than 12 ft. After Madrid, it is the largest city in Sp. It has a Gothic cathedral about 600 yrs. old, and a univ. Pop. 249,706.

Bar'clay (ROBERT), a reformer and defender of the Society of Friends, b. in Scot. Dec. 23, 1648; ed. in Paris at the Scot. Coll., of which his uncle was rector; became a member and minister of the Society of Friends in 1666. In 1677

he visited Ger. on a religious mission, in company with George Fox and William Penn. He was appointed gov. of the prov. of E. Jersey in 1682, but never went to Amer. Wrote *A. Apology for the True Chr. Divinity in the same is said forth and preached by the People called in common Quakers*. D. Oct. 13, 1694.

Barclay de Tolly (MICHAEL, PRINCE, a Rus. gen. of Scot. extraction, b. in Livonia in 1759; fought against the Swedes in 1790, and against the Poles in 1792 and 1794; led Benning's advanced guard in 1806; in 1809 he crossed the frozen Gulf of Bothnia, and advanced as far as Stockholm; became minister of war, then commander-in-chief of the Army of the West, and was defeated by the Fr. at Smolensk; commanded at Bautzen, Culm, and Leipzig; field-marshal in 1814. D. May 25, 1818.

Barcoch'ebas, or **Bar-cochab** ("son of a star"), a Jewish impostor, claiming to be the Messiah. His real name was Simon. In 132 A. D. he excited an insurrection among the Jews, and made Bethar his cap. This city was taken and he was killed, 135.

Bard (SAMUEL, M. D., LL.D., a phys., b. in Phila. Apr. 1, 1742, ed. at Edinburgh; was the family phys. of Gen. Washington; became pres. of the Coll. of Phys. and Surgeons of New York. D. May 21, 1821.

Bardesanes (**Bardaisan**) of Edessa, commonly but not quite justly called a Gnostic. His treatise *On Fate, or The Laws of Countries*, was written during the last half of the 2d century; in 1843 the MS. of it was recovered from the Syrian convent in the desert of Nitria.

Bardstown, Ky. See APPENDIX.

Bar'bones, or **Bar'bone** (PRAISE GOD, a family who was a member of Cromwell's Parl. in 1653, which was named after him the "B. Parl.") When Gen. Monk came to Lond., B. headed a procession of the people, and presented a remonstrance to Parl. against the restoration of Charles II.

Bar'footed Friars [Lat. *Discalceati*], certain R. Cath. monks who either wear sandals or go entirely barefoot. In some places they wear shoes in severe weather. There are also B. nuns.

Baregin, bar'a-zhan, a mucus-like substance produced by the algae which grow in mineral springs. It abounds in the hot springs of Barrèges in Fr.; hence the name. It imparts a flesh-broth flavor and odor to the water.

Bareilly, bar-ā'le, a city of India, on the river Jooa, 151 m. E. of Delhi. B. was a scene of outrage and rapine during the mutiny of 1857. Pop. 109,844.

Barère de Vieuzac, bah-rair' deh ve-uh-zahk' (BERTRAND, a Fr. revolutionist, b. at Tarbes Sept. 10, 1755; was a member of the National Convention, in which he voted for the death of the king; was a violent Jacobin, and was made reporter of the committee which ruled during the "reign of terror;" afterward aided in the overthrow of Robespierre (1794). He was banished as a regicide in 1816, but was permitted to return to Fr. in 1830. D. Jan. 14, 1841.

Ba'ri (anc. *Ba'riano*), a seaport of H. cap. of the prov. of B., on the Adriatic, 56 m. N. W. of Brindisi. It is defended by a massive old castle of Norman origin. The harbor admits only small vessels. Pop. of commune, 60,575.

Bari, the name of a negro tribe on the White Nile. The men go entirely naked and paint themselves with ochre, while the women only wear short aprons.

Baril'la [Fr. *Barille*], an impure carbonate of soda, used in the manufacture of soap and glass. It is procured by burning plants of the genus *Salsola* or other plants which grow near the sea. Large quantities of it are exported from Sp. and the Balearic Isles.

Bar'ing (Sir FRANCIS), an Eng. financier, b. near Exeter in 1740, was father of Lord Ashburton, and a founder of the banking-house of B. Brothers & Co. of Lond. D. 1810.

Bar'itah, the name of certain large Australian birds belonging to the crow family. The bill is large and conical, the base of it extending far backward on the forehead. The *Geophorhina tibicen* (piping crow or piping grackle) has a melodious voice, is easily tamed, and learns to whistle tunes. There are several genera of these birds.

Bar'ium [from the Gr. *βαρύς*, "heavy," as it is an ingredient of "heavy spar"], one of the alkaline earthy metals. It occurs in nature chiefly in the forms of sulphate, barite, barytes, or heavy spar, of carbonate, witherite, and of silicate, harmotome. It is very rarely prepared in the metallic state. The most important salts are the chloride and nitrate; both are used as tests for sulphuric acid and soluble sulphates. The chloride is used as a preventive of boiler incrustations, owing to its action on the sulphate of lime of the feed-water. It is also extensively used for the preparation of an artificial sulphate known as *blanc fix*, which is used in enamelling paper. In its native form, barytes or heavy spar is extensively mined and used to adulterate white lead, an application for which it is specially adapted by its high specific gravity. The soluble B. salts are all poisonous. Any soluble sulphate, as sodic, Glauber's salt, or magnesian sulphate, Epsom salt, is an antidote. C. F. CHANDLER.

Bark [Lat. *cor'tex*], the external covering of a tree. The development of B. is most perfect in exogenous plants with perennial woody stems. The outermost layer is called the epidermis, next to which is the true B., consisting of 2 layers; under it is the *liber* or inner B., composed of bundles of woody fibre or vascular tissue mixed with cellular tissue, which lies next to the albumen or sap-wood. B. increases by the addition of an annual layer on its inner surface. Several species of B. are used in tanning. The peculiar juices and characteristic properties of a plant are often most abundant in the true B., which is the most important part of many medicinal plants, especially of Cinchona.

Bark Beetle, or **Bark Chafer**, a name of several genera of coleopterous insects, belonging to the family Scolytidae. They bore holes in bark, deposit their eggs in the inner bark, and often kill the tree.

Bar'ker (FORDYCE, M. D., LL.D., b. May 2, 1819, at Wil-

ton, Me.; ed. at Bowdoin Coll., and studied med. in Boston and Paris. In 1860 became obstetric phys. and prof. of midwifery at Bellevue Hospital, N. Y.

Barker (GEORGE F.), M. D., a chemist and physicist, b. in Charlestown, Mass. July 14, 1835. He became an apprentice in 1851 in a philosophical instrument manufactory in Boston, where he remained until 1856, in which yr. he entered the Yale Scientific School, and grad. as bachelor of philos. in 1858. Subsequently became a phys. and prof. of chem., geol., toxicology, and natural sciences; author of many scientific essays, and of a *Text Book of Chem.*

Barker (JACOB), a financier, b. in Me. Dec. 7, 1779; became a New York merchant and politician; removed to New Orleans in 1834; during the c. war acted politically with the Unionists. D. Dec. 27, 1871.

Barker's Mill, or **Segner's Wheel**, an hydraulic machine invented by Dr. Barker toward the close of the 17th century. It consists of an upright tube resting on a pivot, with 2 horizontal tubular arms closed at the ends, near the bottom. Near the ends of the arms small holes are cut, one in each and on opposite sides. The tube is kept full of water from a constant source of supply, the water escaping from the holes in the arms. Hydraulic pressure causes the machine to revolve in the opposite direction.

F. A. P. BARNARD.
Bar'ley [Lat. *hor'dum*], a plant of the order Gramineæ, is a valuable cereal, and was an important article of food in remote antiquity. It is adapted to both cold and warm climates. The species are mostly annual. B. meal is used for bread in N. Europe, but in many parts of the world this grain is mostly malted (*germinated*) for the manufacture of beer.

Bar'low (FRANCIS CHANNING), MAJ.-GEN., b. in Brooklyn, N. Y., Oct. 19, 1834, grad. at Harvard in 1855, served in Va. 1862-65; was sec. of state for N. Y. in 1866-68, and atty.-gen. of N. Y. in 1871.

Bar'men, a manufacturing town of Prus., 24 m. N. N. E. of Cologne, stretching for miles along a narrow valley, being a collection of villages grouped under one name. Its limits touch upon Elberfeld. It is the prin. seat of the ribbon manufacture on the Continent. Pop. 1880, 95,941.

Bar'nabas, **Epistle of**, an epistle supposed to have been written early in the 2d century, and formerly ascribed to the apostle Barnabas. It is frequently cited by the Fathers, some of whom place it in the sacred canon.

Bar'nabites, an order of monks which originated at Milan in 1533, and were so called because they preached in the ch. of St. Barnabas.

Barnacle. See CIRCIPEDIA.

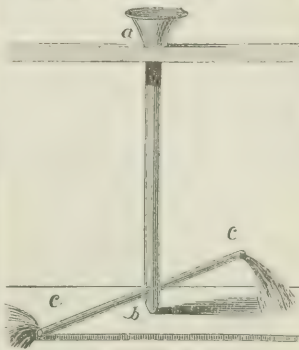
Bar'nacle Goose (*Anser bernicla* or *Bernicla bernicla*), a bird which frequents the coasts of Brit. in winter and migrates northward in spring. It takes its name from the old belief that barnacles were often changed into geese.

Barnard (DANIEL DEWEY), LL.D., a lawyer and Whig politician, b. at Sheffield, Mass., in 1797, grad. at Williams Coll.; was an M. C. from N. Y., and U. S. minister to Prus. 1849-53. D. Apr. 24, 1861.

Barnard (FREDERICK AUGUSTUS PORTER), S. T. D., LL.D., L. H. D., math., physicist, and educator, b. in Sheffield, Mass., May 5, 1809; grad. at Yale Coll. in 1828, tutor in Yale Coll. 1830, prof. of math. and natural philos. in the Univ. of Ala. 1837-48, and in the Univ. of Miss. 1854-61; pres. of the Univ. of Miss. 1856-58, and chancellor of the same 1858-61. In 1834 took orders in the Prot. Epis. Ch., resigned his chancellorship and his chair in the univ. in 1861, and in May 1864 was elected pres. of Columbia Coll., New York city, which post he still holds. He received the honorary degree of LL.D. from Jefferson Coll., Miss., in 1855, and from Yale Coll. in 1859; also the degree of S. T. D. from the Univ. of Miss. in 1861, and that of L. H. D. from the regents of the Univ. of the State of N. Y. in 1872. In 1860 he was a member of the eclipse expedition sent to Labrador (Cape Chudleigh) by the U. S. coast survey, and during this absence was elected pres. of the Amer. Association for the Advancement of Science. In the act of Cong. establishing the National Acad. of Sciences (1863) he was named as one of the original corporators; in 1867 he was one of the U. S. coms. to the Paris Exposition, and was chairman of the physical section 1870-72. In 1878 he was assistant com.-gen. to the Paris Exposition of that yr., and received the decoration of officer of the Legion of Honor. He is also a member of the Amer. Philos. Society, an associate member of the Amer. Acad. of Arts and Sciences, corresponding member of the Royal Society of Liege, and member of many other scientific and literary associations. Was ed.-in-chief of *J's Univ. Cyc.*

Barnard (HENRY), LL.D., an educator, b. at Hartford, Conn., Jan. 24, 1811, grad. at Yale Coll. in 1830, and was called to the bar in 1836. Having been elected to the legislature of Conn. in 1837, he reorganized the public schools. He was supt. of schools in Conn. 1838-42 and 1850-54, in R. I. 1843-49; pres. State Univ. of Wis. 1856-59, and of St. John's Coll. 1865-67. Is best known as ed. of the *Amer. Journal of Education*. He was appointed in 1867 U. S. com. of education, but resigned in 1871.

Barnard (JOHN G.), LL.D., was b. May 19, 1815, in Sheffield, Mass., grad. at the U. S. Military Acad. 1833, and was commissioned as brevet second lieut. in the corps of engi-



Barker's Mill.

neers. During the war with Mex. he was twice called to the field, and received the brevet of major "for meritorious services while serving in the enemy's country." In 1850 he was named by Pres. Taylor as chief of a scientific commission for the survey of the Isthmus of Tehuantepec, with the view of establishing a route of commerce and travel to our newly acquired Pacific possessions; in 1855-56 Supt. of the U. S. Military Acad.; subsequently, till 1861, was in charge of the fortifications of New York harbor. Serving as chief engineer under Gen. McDowell in the first Bull Run campaign, he was present on the field of that battle, as also at the earlier combat at Blackburn's Ford, the very first of the inchoate "Army of the Potomac." As chief engineer (with the rank of brig.-gen.) of the Army of the Potomac in the Va. Peninsular campaign of 1862, he directed the siege operations at Yorktown and before Richmond, and subsequently, as "chief engineer of the defences of Wash.," the extensive works for the defence of the national cap. In the campaign of 1864-65 he served on the staff of Lieut.-Gen. Grant as "chief engineer of the armies in the field," until the surrender of Lee's army at Appomattox c.-h., at which he was present. From the close of the c. war he served as senior member of the board of engineers for permanent fortifications, and as a member of the U. S. light-house board. He was one of the associate eds. of *J.'s Univ. Cyc.* D. May 14, 1882.

Barnave, bar-nah' (ANTOINE PIERRE JOSEPH MARIE), a Fr. revolutionist and advocate, b. at Grenoble in 1761; was elected in 1789 to the States-Gen., and became a leader of the popular party. His subsequent moderation rendered him unpopular; retired to private life in 1791, and was guillotined 1793.

Barnburners, a nickname given to that portion of the Democratic party of the State of N. Y. which opposed the extension of slavery and supported Van Buren against Cass for Pres. in 1848. They were esteemed too radical by their adversaries, one of whom illustrated his meaning by a story of a farmer who was so greatly annoyed by the rats who devoured his grain that he burned his barn to get rid of them.

Barnes (ALBERT), a divine, b. at Rome, N. Y., Dec. 1, 1798, grad. at Hamilton Coll. in 1820. He became pastor of the First Presb. Ch. in Phila. in 1830, retaining that charge more than 30 yrs. He was author of several religious works, but is best known by his *Notes* on the N. T., the Ps., Job, Dan., and Isa. He took a leading part in the controversy which divided the Presb. ch., and in 1837 was a prominent advocate of the New School doctrines. D. Dec. 24, 1870.

Barnes (JAMES), an officer and engineer, b. in 1806 at Boston, Mass., grad. at W. Pt. in 1829; was a lieut. of artil., serving at Military Acad. as assistant instructor 1829-30, and afterward with the army till 1836; then became an engineer in the construction of R. Rs. At the beginning of the c. war he resumed the military profession as col. 18th Mass. volunteers; brevet maj.-gen. U. S. volunteers Mar. 13, 1865, and mustered out of service Jan. 15, 1866. D. 1869.

Barnes (JOSEPH K.), brig.-gen. and surgeon-gen. U. S. A., b. in Phila. July 21, 1817, ed. in Phila., receiving his degree of M. D. at the Univ. of Pa. in 1838; practised in the hospitals there; in 1840 was appointed an assistant surgeon in the army, and in 1863 med. inspector-gen. with the rank of col.; on Aug. 22, 1864, was appointed surgeon-gen. with rank of brig.-gen.; retired 1882. D. Apr. 5, 1883.

Barnesville, Ga. See APPENDIX.

Barnesville, on R. R., Belmont co., O., 32 m. W. of Wheeling. Pop. 1870, 2063; 1880, 2435.

Barnveldt (JOHN VAN OLDEN), a Dut. statesman, b. in 1549. He was a member of an important embassy to Eng. in 1585, and after his return was appointed advocate-gen. of Hol. He was the head of the republican party, and in 1609 concluded a truce with Sp. for 12 yrs. He was many yrs. grand-pensionary of Hol. In the fierce religious contests which ensued, B. sided with the Arminians. The Synod of Dort having condemned the Arminians in 1618, B. was accused of treason. He was beheaded May 13, 1619.

Barnum (PHINEAS TAYLOR), b. in Bethel, Conn., July 5, 1810. He became an ed., a trader, and afterward a public showman; has been mayor of Bridgeport. See his *Life*, written by himself.

Barnwell (ROBERT WOODWARD), LL.D., a statesman, b. at Beaufort, S. C., Aug. 10, 1801, grad. at Harvard in 1821, and studied law; was U. S. Senator from S. C. in 1850, and afterward a member of the Confed. Cong.; was pres. of S. C. Coll. now Univ. of S. C. D. Nov. 25, 1882.

Baro'da, a city of Hindostan, 90 m. N. N. E. of Surat; is the residence of the gulcwar, a Mahratta prince; is connected by a R. R., 231 m. long, with Bombay. Pop. 112,057.

Barometer, ba-rom'e-ter (Gr. *βαρος*, "weight," and *μετρον*, "measure"), an instrument for measuring the weight or pressure of the atmosphere. In its ordinary form it consists substantially of a glass tube closed at one end, filled with mercury, and inverted in a basin of the same liquid. The pressure of the air on the surface of the mercury in the basin sustains a column of mercury in the tube, which thus becomes a measure of the varying atmospheric pressure. A scale divided into inches and decimals is placed behind the tube, which serves to indicate the height of the column from time to time. The mean pressure of the atmosphere at the sea-level is represented by a column 30 inches in height. The height of the column must be measured from the surface of the mercury in the basin; but the level of this surface itself varies with the rising and falling of the column in the tube. To provide against error from this cause, the whole scale is, in some B., made movable, and is raised or depressed as may be necessary, by means of a thumb-screw, before observation. An ivory point directed downward from a short projecting arm carried by the scale is brought so as exactly to meet its image reflected in the mercury of the basin, and this indicates that the zero of the scale is in its true position. In other instruments, and generally in those in common use, the adjust-

ment is made by raising or depressing the level of the mercury itself while the scale remains fixed. Instead of the ivory point, an ivory float is sometimes used, carrying an upright stem on which is a fiducial mark designed to be brought, in the adjustment, into coincidence with a similar fixed mark.

A description of B. without mercury has in recent yrs. come extensively into use, known as the Aneroid B., the invention of M. Vidi, a physicist of Fr. The instrument itself consists essentially of a flat cylindrical box formed of thin corrugated



Aneroid Mountain Barometer.

metal, from the interior of which the air has been entirely or nearly exhausted; the immediate effect being to bring the top and bottom into contact with each other by atmospheric pressure. The touching surfaces are then separated by means of a strong spring attached to the centre of the upper surface, while the lower is held down, the whole being placed within a larger box properly adapted to receive it. With the varying pressure of the atmosphere there the separation of the surfaces is greater or less, or the spring is more or less bent, and the movements thus occasioned are transmitted by proper multiplying apparatus to an index which traverses a dial like that of a watch (see fig.). Aneroid B. often perform very well, and perform well for long periods; but in time the spring is liable to lose its elasticity, so as to render the indications untrustworthy. These instruments should therefore be occasionally compared with standard mercurial B. They are very convenient for transportation, being constructed of various dimensions, from 8 or 10 inches in external diameter down to 2, and are often grad. to serve as mt.-B. for heights as great as 12,000 or 16,000 ft.

Baron, the title of the lowest degree of hereditary nobility in G. Brit. and Ire., the next below that of viscount. The word was formerly used to include the whole Eng. nobility, because all noblemen were B. At present there are in G. Brit. 5 classes of B., each class having special prerogatives. The B. of Scot. and Ire. are not, as such, members of the House of Lords. Certain judges of the exchequer courts are technically styled "B. of the exchequer."

Barozzo, bah-ro'tso, or **Barozzio** (JACOPO), an It. arch., b. at Vigola, near Modena, in 1507, from which fact he is often called **Vignola**. In 1550 he became arch. to Pope Julius III. He designed the splendid palace of Cardinal Farnese (Caprarola), in which were placed some of his own pictures; upon the death of Michael Angelo in 1564, he succeeded the latter as arch. of St. Peter's ch. His *Regole de cinque ordini d'architettura* was long the standard authority in classic arch. He was one of the designers of the Escorial Palace in Sp. D. July 7, 1573.

Barrackpore, or **Barrackpore**, a town and military cantonment of Brit. India, on the Hoogly, 15 m. above Calcutta. It contains the country residence of the gov.-gen. of India, many elegant mansions of the European citizens of Calcutta, and a park of 250 acres, which is a fine specimen of landscape gardening. Here began the Sepoy mutiny of 1857.

Barracu'da, or **Barracou'da**, a name primitively applied to the *Sphyrna barracuda* of the W. Indies. It is from 6 to 10 ft. in length, and very voracious. Its flesh is eatable, except at certain seasons, when, from some unknown cause, it becomes poisonous. It is also sometimes perverted to other elongated fishes.

Barras, de, deh-bah'rah' (PAUL FRANÇOIS JEAN NICOLAS), COUNT, a Fr. Jacobin and regicide, b. in Provence June 30, 1755; a deputy to the States-General in 1789, and a member of the National Convention in 1792. He acted with the party called the Mountain, voted for the death of the king, and joined the enemies of Robespierre on the 9th Thermidor, 1794, in which crisis he was commander of the national guard. On the 13th Vendémiaire (Oct. 5, 1795), with the aid of Bonaparte he defeated the royalist insurgents of Paris. He was one of the first 5 members of the Directory appointed in Nov. 1795. His political career was ended by the ascendancy of Bonaparte in 1799. D. Jan. 29, 1829.

Bar'ratry [from the old Fr. *barater*, to "deceive"], in law, used in various branches with different significations: 1. *Marine Insurance*.—An act committed by the master or mariners of a ship for some unlawful or fraudulent purpose, contrary to their duty to the owners, whereby an injury is sustained. The gen. rule is, that fraud is an element in an act of B., though the word *fraud* is employed in a broad sense to include acts done in opposition to the owner's instructions, and yet intended for his benefit, such as sailing

out of port without payment of the duties, disregard of an embargo, or breach of a blockade. Barratrous acts of a serious kind are declared to be crimes by the laws of Cong.

3. In *Criminal Law*.—The act of stirring up suits and quarrels. A person practising such acts is called a "common barrator," or, in the language of Lord Coke, a common mover and maintainer of suits in disturbance of the peace, etc. A person cannot be a barrator in respect of one act only. The subject is usually regulated by statute.

3. In Scotch law, B. is the crime of a judge who is induced by bribery to render a judgment. T. W. DWIGHT.

Barre, on R. R., Worcester co., Mass., 21 m. N. W. of Worcester. It has an inst. for feeble-minded children. Pop. of tp. 1870, 2572; 1880, 2419.

Barre, on R. R., Washington co., Vt., 6 m. S. E. of Montpelier. It has an acad. and is the seat of Goddard Sem. Pop. of tp. 1870, 1882; 1880, 2060.

Barre, bah-rā' (Col. ISAAC), b. in Dublin, Ire., in 1726, of Fr. parents; served in the Brit. army, receiving a wound at Wolfe's victory at Que. (1759), in consequence of which he became blind. He entered the Brit. Parl. in 1761, where he defended the rights of the Amer. colonists. D. July 20, 1802.

Barister, in law, a person admitted to plead at the bar and to take upon him the protection and defence of clients. Such persons are admitted in Eng. by voluntary societies existing for several centuries, called Inns of Court. A B. differs from an atty. principally in this respect, that an atty. prepares a cause for hearing, and a B. conducts the trial in court. In the U. S. the distinction corresponding to that in Eng. of "atty. and B." is atty. and counsellor-at-law. The common practice is to admit the same person to both degrees in the legal profession.

Barron (JAMES), a naval officer, b. in Va. in 1768, served in the navy under his father, who was a com. of all the armed vessels of Va.; lieutenant in the U. S. N. in 1798, capt. in 1799. On June 22, 1807, he was in command of the Chesapeake, off Hampton Roads, when she was fired into by the Eng. war-vessel Leopard, in consequence of a refusal of Com. B. to allow her to be searched for deserters; the two nations were then at peace, and the Chesapeake was entirely unprepared for battle; after discharging one gun the Chesapeake struck her colors; 3 deserters were taken from her, and then Com. B. was permitted to retain his ship. He was court-martialed for neglect of duty, found guilty, and suspended from the service for 5 yrs. Although restored to his rank, he never again did sea-service. A long correspondence with Com. Decatur on the Chesapeake affair terminated in a duel between them at Bladensburg, Md., in 1820, in which both were severely wounded, Decatur mortally. D. April 21, 1851, being at his death the senior officer in the U. S. N.

Barros, de, da bar'ros (João), a Port. historian, b. at Viseu in 1496. He was appointed gov. of the Port. possessions in Guinea in 1532. His greatest work is *Asia*, or the *Hist. of the Discoveries and Conquests of the Port. in the E. I.* (1552-62). D. Oct. 20, 1570.

Barrot, bah-rō' (CAMILLE HYACINTHE ODILLON), a Fr. statesman and advocate, b. at Villefort in Lozère July 19, 1791. He practised law in Paris, and acted with the popular party in the revolution of 1830; was minister of justice in the first cabinet of Louis Nap. 1848-49. D. 1873.—His brother, VICTORIN-FERDINAND, b. Jan. 10, 1806, was minister of the Interior 1849, senator in 1853, and afterward life senator. D. Nov. 1883.

Barrow [from the A.-S. *beorg*, a "hill or mound," allied to the Ger. *Berg*, a "hill"], a name of the artificial mounds which are found in many countries, and which were erected in anc. times in honor of eminent persons or for monumental purposes. They are formed of earth or stones, and contain in some cases human bones, with armor and utensils. Many artificial mounds occur in the U. S., as at Grave Creek, W. Va., and near Marietta, O.; also in Central Amer.

Barrow (ISAAC), D. D., F. R. S., an Eng. pulpit orator, math., and author, b. in Lond. Oct. 1630; grad. at Cambridge, and became prof. of Gr. in that place in 1660. He was appointed Lucasian prof. of math. in 1663, but resigned that chair in favor of his pupil, the illustrious Newton, in 1669. D. May 4, 1677.

Barrow (SIR JOHN), BART., F. R. S., an Eng. historical author, b. in Lancashire June 19, 1764; sec. to the admiralty for nearly 40 yrs. He was the chief founder of the Geographical Society. D. Nov. 23, 1848.

Barrows (ELIJAH PORTER), D. D., author and minister, b. at Mansfield, Conn., Jan. 5, 1805, grad. at Yale in 1826; subsequently pastor in New York city, prof. of sacred lit. in Western Reserve Coll., and of Hebrew lang. and lit. at Andover Theological Sem. In 1872 he entered the same professorship in Oberlin Theological Sem.

Barry, Ill. See APPENDIX.

Barry (JAMES), an historical painter, b. at Cork, Ire., Oct. 11, 1741; in 1797 he was expelled from the Royal Acad. of Lond. because of his irritable temper. His masterpiece is the *Victors at Olympia*. D. Feb. 22, 1806.

Barry (JOHN S.), b. in Vt. in 1802. He became a merchant of Constantine, Mich., and was gov. of Mich. (1842-46 and 1850-52). D. Jan. 15, 1870.

Barry (SIR CHARLES), an Eng. arch., b. at Westminster in May 1795. In 1841 he became a royal academician. His design for the new houses of Parl. was accepted. D. 1860.

Barry (WILLIAM FARQUHAR), a distinguished officer, col. of the 2d Artill., and brevet brig.-gen. U. S. A., b. Aug. 18, 1818, in New York city, grad. at W. Pt. in 1838; served in Fla. 1852-53, and in the Mex. war; was brevetted brig.-gen. U. S. A. for gallant services in the campaign terminating in the surrender of the army under Gen. J. E. Johnston, and was made brevet maj.-gen. U. S. A. in 1863; participated in the siege of Yorktown and the Seven Days' battles ending with Malvern Hill; in 1867 was appointed to command the U. S. Artill. School at Fortress Monroe. Gen. B. was the author of *Engineer and Artill. Operations of the Army of the Potomac*, A. D. 1861-62, in conjunction with Gen. Barnard, and

A System of Tactics for the Field Artill. of the U. S., in conjunction with Maj.-Gens. W. H. French and H. J. Hunt. D. July 18, 1870.

Barry (WILLIAM TAYLOR), b. in Lunenburg, Va., Feb. 5, 1784, grad. at William and Mary Coll. in 1803, became a lawyer, was M. C. from Ky., served in the war of 1812, was U. S. Senator, and in turn a judge, lieutenant-gov., State sec., and chief-justice of Ky.; postmaster-gen. under Jackson (1828-35); d. in Liverpool Aug. 30, 1835, on his way to Sp. as U. S. minister.

Barry, du (MARIE JEANNE COMART DE VAUBERNIER), COUNTESS, a mistress of Louis XV. of Fr., b. Aug. 9, 1746, had a great influence in public affairs. She was guillotined during the Reign of Terror, Dec. 3, 1793.

Barter, the exchange of one commodity for another, is a method of trading sometimes practised by barbarous people and others who have no money or credit. Ships sailing to uncivilized countries often carry weapons, tools, or ornaments to be used in B. with savages. Farmers in the U. S. also take produce to country stores, and receive goods in exchange without the intervention of money. In law, B. or exchange is a contract for transferring property, the consideration being some other commodity.

Barth, bart (HEINRICH), a Ger. explorer and author, b. at Hamburg Feb. 16, 1821. He travelled in N. Afr., Pal., Ar., and Asia Minor, and passed over 5 yrs. (1850-55) in Central Afr. In 1863 he became prof. of geog. in Berlin. D. 1866.

Barthélemy, bar-täl-me' (JEAN JACQUES), a Fr. antiquary and author, b. near Aubagne, in Provence, July 20, 1716. He learned the Gr., Heb., Ar., and Chaldean langs., and became keeper of the royal cabinet of medals in 1753. He was admitted into the Fr. Acad. in 1789. D. Apr. 30, 1795.

Bartholdi (F. A.). See APPENDIX.

Bartholomew (Gr. Βαρθολομαῖος; Lat. *Bartholomæus*), SAINT, one of the 12 apostles, supposed to be the same as the Nathanael mentioned in John i. 45-49. We have no authentic information respecting his labors or his death. According to tradition, he preached the gospel in India.

Bartholomew, St., Massacre of, the massacre of Fr. Prots., which commenced at Paris in the night between the 23d and 24th of Aug. 1572. During the minority of Charles IX. and the regency of his mother, Catherine de Médicis, a long c. war raged in Fr. between the Caths. and Huguenots, whose leaders were the Prince of Condé and Admiral Coligny. In 1570 the court made to the Huguenots overtures which resulted in a treaty of peace. Charles invited Coligny and other leaders of that party to court, and received them with warm demonstrations of friendship, which were probably perfidious. The false security of the Huguenots was increased by a marriage between Henry of Navarre and Margaret, who was a sister of Charles IX. Many Huguenots came to Paris to attend the wedding in Aug. 1572. Among the prin. instigators of the massacre were Catherine de Médicis and her sons. Admiral Coligny was wounded by a shot from a window of the royal palace on the 23d. The gen. massacre commenced at 2 o'clock on Sunday morning, Aug. 24, and continued for several days. The provs. followed the example of the cap., with some exceptions. In regard to the number of victims there is no certainty. Estimates have varied from 1000 to 10,000 for Paris, and from 2000 to 100,000 for the whole of Fr.

Bartlett (JOHN RUSSELL), a writer, b. at Providence, R. I., Oct. 23, 1805, was one of the founders of the Amer. Ethnological Society; was appointed in 1850 com. to determine the boundary between Mex. and the U. S. Wrote *Progress of Ethnology and Dict. of Americanisms*.

Bartlett (JOSIAH), M. D., b. at Amesbury, Mass., Nov. 21, 1729. He signed the Dec. of Ind., and was a member of the Continental Cong. in 1776-78; became pres. of N. H. in 1790, and gov. under the new const. in 1793. D. May 19, 1795.

Bartlett (SAMUEL COLCORD), D. D., LL. D., b. in Salisbury, N. H., Nov. 25, 1817; in 1836 grad. at Dartmouth Coll.; at the Andover Theological Sem. in 1842; became a pastor; was prof. of intellectual and moral philos. in Western Reserve Coll. in 1852, in 1858 prof. of biblical lit. in the Chicago (Congl.) Theological Sem., and elected pres. of Dartmouth Coll. in 1877. Wrote *Life and Death Eternal*.

Bartlett (WILLIAM), b. in Newburyport, Mass., Jan. 31, 1748. He acquired great wealth in mercantile pursuits, and gave \$30,000 to found the Andover Theological Sem., increasing this gift to about \$250,000. He also bestowed large sums upon other benevolent enterprises. D. Feb. 8, 1841.

Bartlett (WILLIAM FRANCIS), an officer of volunteers, b. in Haverhill, Mass., June 6, 1840, grad. at Harvard in 1861. On the outbreak of the c. war he entered the service as a private soldier, was appointed capt. in the 20th Mass., and rose to the rank of brevet maj.-gen. U. S. volunteers. D. Dec. 17, 1876.

Bartlett (WILLIAM H. C.), LL. D., a military officer, scientist, and author, b. in 1804 in Lancaster co., Pa., grad. at W. Pt. in 1826; served as a military engineer and as prof. of philos. at W. Pt., and retired from active service Feb. 14, 1871. Wrote *Analytical Mechanics and Spherical Astronomy*. In 1871 he became actuary of a life insurance co.

Bartol (CYRUS AUGUSTUS), D. D., a Unit. divine and author, b. at Freeport, Me., Apr. 30, 1813; grad. at Bowdoin Coll. in 1832, at the Cambridge Divinity School in 1835; settled as colleague pastor of W. ch., Boston, in 1837. Wrote *The Rising Faith*.

Barton (BENJAMIN SMITH), M. D., a med. author, b. at Lancaster, Pa., Feb. 10, 1796, ed. at Pa. Coll. and in Europe, graduating as M. D. at Göttingen; became a prof. of materia medica in the Coll. of Phila. D. Dec. 19, 1815.

Barton (BEHNARD), known as the "Quaker poet," b. in Lond. Jan. 31, 1784, was a member of the Society of Friends. He became a clerk in a bank. Wrote *The Reliquary and Household Verses*. His works are pervaded by pious sentiment and tenderness. D. Feb. 19, 1849.

Barton (CLARA), b. at Oxford, Mass., a daughter of Capt. Stephen Barton, and ed. at Clinton, N. Y.; founded a free school at Bordentown, the first in N. J.; in 1854 was appoint-

ed clerk in the dept. of patents, but on the outbreak of the c. war she resigned, and devoted herself to the alleviation of the sufferings of the soldiers on the battlefield. She lectured (1866-67) on *Incidents of the War*, then went to Europe for her health, and settled in Switz.; on the outbreak of the Franco-Ger. war she aided the grand duchess of Baden in the establishment of her hospitals; afterward she followed the Ger. army, and was decorated with the Golden Cross by the grand duke of Baden, and with the Iron Cross by the emp. of Ger.

Barton (WILLIAM P. CH. M. D.), a botanist and author, nephew of Dr. B. S. Barton, grad. at Princeton in 1805, and received his degree of M. D. at the Univ. of Pa. in 1808. He was prof. of bot. in the Univ. of Pa. D. 1855.

Bar'tow (FRANCIS STEBBINS), b. in Savannah, Ga., Sept. 6, 1816, grad. at Franklin Coll., Ga., 1835, studied law at the law school, New Haven, Conn.; became a prominent member of the Savannah bar, was a member of the Ga. legislature, of the senate, and of the Confed. Cong. During the c. war he entered the army as capt. of the Oglethorpe Light Inf., was col. of 8th Ga. Inf., and brig.-gen. C. S. A. Killed at Manassas July 21, 1861.

Bar'tram (JOHN), a botanist and author, b. in Darby, Pa., in 1701. Linnaeus pronounced him "the greatest natural botanist in the world." Wrote *Journal of a Tour to E. Fla.* D. Sept. 22, 1777.

Baruch, ba'ruk, a Heb. scribe, was a friend and companion of the prophet Jeremiah, whom he served as amanuensis. Shortly after 586 b. c. he accompanied Jeremiah to Egypt. His subsequent history is unknown. The book of B. is considered apocryphal by Prots. and Jews. The pseudographic "epistle of B." in the Syriac lang. is probably a monistic forgery, and certainly worthless.

Bar'wood, or **Camwood**, a red dyewood from the W. coast of Afr. It is the wood of *Euphorbia nitida*, a leguminous tree. Its coloring principle is slightly soluble in boiling water, freely soluble in alcohol and alkaline solutions. It is supposed to be identical with santaline.

Bar'ye (ANTOINE LOUIS). See APPENDIX.
Basalt, ba-saw't [Lat. *basaltēs*], a rock of volcanic formation, composed of felspar and augite or hornblende. It has a compact texture, a dark-green, dark-gray, or black color, and a conchoidal fracture. The most remarkable characteristic of B. is the columnar structure which it often assumes, as in Fingal's Cave and Giants' Causeway.

Bas'com (HENRY BIDDLEMAN), D. D., LL.D., a bp. of the M. E. Ch. S., b. at Hancock, Delaware co., N. Y., May 27, 1796. He was licensed to preach in 1813; became pres. of Madison Coll., Pa., prof. at Augusta Coll., Ky., pres. of Transylvania Univ., Ky. From 1846 to 1850 he was ed. of the *Quarterly Review* of his ch. D. Sept. 8, 1850.

Bas'com (JOHN), LL.D., b. at Genoa, N. Y., May 1, 1827, grad. at Williams Coll. in 1849, studied law and theol., the latter at Auburn Sem.; became prof. of rhetoric in Williams Coll. and pres. of Wis. Univ.

Base [Lat. *basis*; Gr. *basis*, a "foundation"], in arch., the part of a column between the shaft and the pedestal. In geom., the side of a plane figure on which it is supposed to stand—of a polyhedron, the face on which it rests; of a cone, the plane section on which it stands. In arith., the B. of a system of numbers is the value of the unit of the first order; the B. of a system of logarithms is a number whose exponents are the logarithms of the corresponding powers; thus 10 is the B. of the common system, and 2.71828 is the B. of the Napierian system. W. G. PECK.

Base-Ball. This most popular field-game in the U. S., and now known as the national game of the country, may be said to date its existence from the organization of the National Association of B.-B. Players in 1857. Prior to this period the game was not played under any general code of rules, a different method of playing it prevailing in different sections of the country. But not long after the establishment of the National Association all other rules were superseded, and ultimately but one code of playing rules governed the game throughout the entire country. B.-B. is of Eng. origin, it being the Amer. successor of the school-boy game of "rounders," but to this old pastime B.-B., as now played, bears about as much resemblance as draughts to chess, the only similarity which exists being that both are played on the same plane, the two ball games being played on a diamond-shaped field, and draughts and chess on a checkered board. This similarity between the Eng. and Amer. games does not interfere with the legitimacy of the claim of B.-B. to its existing title of "the national game of Amer." The gen. rules of the game are as follows: Upon a level field a space of ground is marked off in a diamond shape, each side being about 90 ft. long, a "base" being at each corner. There are 9 players upon each side, one side taking the field, the other the bat, the choice of position being decided by lot. Positions being taken, the pitcher delivers the ball to the batsman, who endeavors to send it beyond the reach of the fielders, and far enough to enable him to make the round of the bases; if he does this, and reaches the home-base or starting-point, without being put out, he scores a run. He is followed in rotation by the others of his side, until 3 of the batting party are put out, when the other side takes the bat. This goes on until 9 innings have been played, when the game closes, the side winning which has scored the most runs.

Basel, switz. See BASEL.

Ba'shan [Heb. בָּשָׁן, of disputed significance], a dist. in Pal. E. of the Jordan, most of it high table-land. At the time of the Exodus it was occupied by Amorites, whose king, Og, was slain in battle with the Israelites, and the terr. assigned to the half-tribe of Manasseh. The whole dist. was, and still is, famous for its oaks and its cattle. Remarkable ruins of anc. cities are found there.

Bashaw. See PASHA.

Bash'ford (COLEB.), b. in Wayne co., N. Y., in 1816; studied law, was admitted to the bar, and was dist. atty. of the co.

Removed to the W., and settled in Algoma, now a part of Oshkosh, Wis.; was member of Whig State convention in 1851, and in 1852 was elected as a Whig to the State senate, and re-elected in 1854; was the first Rep. gov. of Wis. in 1856, but declined a renomination in 1857. Resumed the practice of law, and resided in Oshkosh until 1863, when he removed to Tucson, Ari. Terr. In 1864 he was pres. of the Territorial council, and was atty.-gen. of the Terr. in 1866, and was delegate to the 40th Cong., and served one term. He was afterward sec. of the Terr., and resigned that office in 1876. D. Apr. 25, 1878.

Basil, baz'il, or **Basil'ius** [Gr. βασιλειος or βασιλιος], SAINT, surnamed THE GREAT, a Gr. Father of the Ch., b. at Caesarea, in Cappadocia, about 329 A. D.; was brother of Gregory of Nyssa, and an intimate friend of Gregory Nazianzen; was a student at Athens. In 370 he succeeded Eusebius as bp. of Caesarea. Author of a liturgy, and wrote on religious topics. D. Jan. 1, 379, worn out by his ascetic habits.

Basil I. [Lat. *Basilius*], surnamed THE MACEDONIAN, emp. of the E., b. in Macedonia in 820 A. D. His origin was obscure. He gained the favor of the emp. Michael III., who appointed B. his own colleague in the empire in 866. In 867 B. became emp. He obtained Asia Minor by conquest from the Saracens, whom he also drove out of Italy. D. in 886, and left the throne to his son, Leo VI.

Basil II., emp. of the E., a son of Romanus II., b. 958 A. D. He began to reign, in conjunction with his brother Constantine, in 975. He waged war with success against the caliph of Bagdad and the Bulgarians. Conquered Bulgaria in 1018. D. 1025.

Basile'an Manuscript [Lat. *Codex Basilensis*, from *Basile'a*, the Lat. name of Bâle], the name of 2 valuable MSS., now in the library of Bâle; one in uncial characters, ascribed to the 8th century, contains the Gospels; the other, in cursive characters, ascribed to the 10th century, contains the whole N. T. except the Apocalypse.

Basilian Manuscript [*Codex Basilianus*, an uncial MS. of the Apocalypse, now in the Vatican library. It takes its name from a B. monastery, to which it once belonged. It is referred to the 8th century.

Basilian Monks, or **Monks of St. Basil**, a monastic order founded by St. Basil in 363 A. D. He composed a system of monastic discipline which was approved by the pope, and was practised by great numbers of monks both in the chs. of the E. and the Lat. or W. Ch.

Basili'des [Gr. βασιλειδης], a Gnostic and founder of a sect called Basilidians, lived in Egypt in the reigns of Trajan and Hadrian, about 100-140 A. D. He taught the existence of two independent creative principles or powers—Good, or Light, and Evil, or Darkness.

Basilik, baz'i-lisk [Lat. *basiliscus*; Gr. βασιλίσκος, the diminutive of βασιλεύς, a "king," so called because the protuberance on its head was thought to resemble a crown].

The B. of anc. and mediæval writers was supposed to have the form of a snake or lizard, and infest the deserts of Afr., and to be hatched by a toad or serpent from an egg laid by a cock. According to popular opinion, its breath poisoned the air and burned up vegetation, and the glance of its eye was fatal to men and other animals. It was sometimes called cockatrice and the king of dragons. The only creature who could face the B. and live was believed to be the cock; and travellers were advised to carry loud-crowding cocks with them, for the B. was believed to stand in great dread of his near relative, the cock, and the crowing of the cock was considered the only means of driving him away. The name is now applied to a genus of saurian reptiles of the family Iguanidae, natives of the tropical parts of Amer. They are characterized by a thin triangular fold of skin rising from the occiput and inclined backward, as well as an elevated crest along the back and tail, capable of being erected or depressed at pleasure. The *Basileiscus mitratus* (or *Americanus*) is from 25 to 30 inches long, including the tail.

Bask'ing-Shark (*Cetorhinus maximus*), the largest of the sharks, and the type of a peculiar family (*Cetorhinidae*). It attains a length of nearly 40 ft., but its teeth are very small, and it feeds on small animals and is harmless to man. A large specimen will yield 6 or more barrels of oil from the liver. It is also known as bone-shark, elephant-shark, etc.

Basque (bask) **Provinces** [Sp. *País Vasco*], a part of Sp., bounded on the N. by the Bay of Biscay, comprising the 4 provs., Navarre, Biscay, Guipuzcoa, and Alava, having an area of 6827 sq. m. The B. people, whose origin is a matter of question, speak a peculiar lang. for which philologists find various affinities. Most of them dwell in these provs., a few in the adjacent parts of Fr. Their whole number is estimated at 785,000.

Bass [from the A.-S. *bæst*; Dan. and Ger. *bast*, the "inner bark" of a tree, especially the linden tree], or **Bass-wood**, is the Amer. name of a tree (*Tilia americana*), also called **Linden** or **Lime Tree**. The European linden (*Tilia Europæa*) is planted as an ornamental tree in many cities of Europe and the U. S. This species yields the bark which is made into Rus. matting.

Bass, a name applied to many fishes of various genera, but primarily belonging to the genus *Labrax*. The typical species is a European sea-fish, which is prized as food (*Labrax lupus*). Four related species inhabit the U. S. The striped B. (*Roccus lineatus*), often called rock-fish, affords a valuable supply of food. It ascends rivers, and is caught



Basilisk.

with salt and fresh water. The white B. or perch *Perca fluviatilis* replaces it in the great lakes and W. rivers. The little white B. or perch *Perca americana* and an allied species of the Miss. valley *Perca intermedia* are smaller allied forms. The other so called B. are but distantly related. The "B." of Charleston, S. C. is the red-fish *Sebastes* or *Sebastes*, a species of *Sebastes*. The so called orange B. *Salmo trutta* is a fine fish of the salmon family. There are also the black B., rock B., sea B., and stone B.

Bassompierre, *bassompier' de François*, Baron, a Fr. gen. b. at Jarnet, in Lorraine, 1559. Louis XIII. made him marshal of Fr. in 1622, and sent him on embassies to Sp. and Eng. He fought against the Huguenots at La Rochelle. Having offended Cardinal Richelieu, he was sent to the Bastille. D. 1646, leaving *Memoires*.

Bast, or **Bass**, *Lat. fiber* or *culephila*, the fibrous inner bark of exogenous plants, consists mostly of saps-vessels or laticiferous vessels. It is most conspicuous in exogenous trees as the substance interposed between the true bark and the wood. It is sometimes valuable for medicinal purposes, and is often used in the fabrication of cloths, ropes, mats, sacks, etc. The Rus. apply the name B. especially to the inner bark of the linden tree (*Tilia Europæa*), which is extensively used for making ropes, mats, and shoes. The trees are cut down in spring when the sap abounds. This matting is extensively imported, and used in packing furniture and other articles, covering tender plants in gardens, etc.

Bastard [Old Fr.], in law, a person b. of parents not married to each other. It includes several distinct cases, as where the mother is unmarried, or she is a married woman, or where she was married at the time of conception, but not married at the time of birth—e. g. being then divorced from the bonds of matrimony or a widow. By the rules of the common law the fact of the marriage of the parents at the time of birth is the test of legitimacy, even though such marriage may have immediately preceded the birth. By the civil or Rom. law, intermarriage after birth has a retroactive effect, and makes the child legitimate. This rule prevails in Scot. Some of the States in this country follow the common-law rule, while others by statute have adopted the Scotch. In the case where the mother is a married woman, and it is claimed that a child is the offspring of an adulterous connection, it will not be enough that the adulterer may have been the father. It must be proved that the husband could not have been, either by absence from the country or other sufficient reason. The presumptions of law favor legitimacy, and public policy requires that these should only be overcome by the most satisfactory proof. (The details of this branch of the law can be found in the work of Mr. NICHOLAS on the *Law of Adultery and Bastardy*.)

By the common law, a parent is not bound to sustain an illegitimate child. By a series of statutes in Eng., commencing in the reign of Queen Elizabeth, the duty of support is imposed on the supposed father as well as the mother. These statutes are substantially re-enacted in this country. This class of children do not have the same civil rights in all respects as those who are legitimate. They cannot inherit land from either father, mother, or collateral relatives, or transmit land to them. These disabilities in this country are to some extent modified by statutes in the respective States. Thus, in N. Y. an illegitimate child may inherit from its mother, in default of legitimate descendants; so the mother may in like circumstances inherit from the child. A B. child may be made legitimate by a special act of the legislature both in Eng. and in this country. Such an act cannot, however, interfere with vested rights of others. It could not divest property which had been previously transmitted to legitimate relatives.

T. W. DWIGHT.

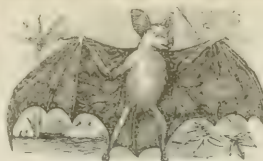
Bast'ian (HENRY CHARLTON), M. D., F. R. S., b. at Truro, Eng., Apr. 26, 1837; distinguished as an advocate of the doctrine of the spontaneous generation of living organisms; in 1851 became prof. of pathological anat. in Univ. Coll. Wrote *Modes of Origin of Lowest Organisms and The Beginnings of Life*.

Bastile, *bast-tee'*, or **Bastille** [from *bâtir* or *basin*, to "build"], a Fr. word signifying "fortress," applied especially to the state prison and citadel of Paris. It was surrounded by a wide ditch. Among its prominent features were 8 large round towers 5 stories high, having walls 12 ft. thick or more. In these towers were many cells for prisoners. The first violent symptom of the Fr. Revolution was the destruction of the B., which the populace took by storm July 14, 1789. They killed the gov., de Launay, and released the prisoners, who were only 7 in number.

Bat [Lat. *vespertilio*], the common name for animals belonging to the order Chiroptera, mammals possessing a fold of skin which commences at the neck and extends on each side between the fore legs or arms and the posterior limbs, serving as wings which enable the animal to fly.

B. are divided into 2 groups—the so called frugivorous and the insectivorous B. The former are found only in the Old World tropical regions. They feed chiefly on fruits, but also eat birds, small mammals, etc. They number 40 or more species, and include the rousettes, kalongs, "flying foxes," etc. Some of them can spread their wings 5 ft. from tip to tip. The prin. genus is *Pteropus*, and its species are remarkable as having only 24 vertebrae, a smaller number

than any other known vertebrate possesses. The insectivorous B. are by far the most numerous, some 200 species being described. The most formidable of these are the vampires—tropical Amer. B. of the genus *Phledrotus*, having a leaf-like membrane on the end of the nose. They are famous for their habit of fastening upon sleeping animals and men for the purpose of sucking their blood.



Vampire Bat.

Such witnesses as D'Azara, Tschudi, Waterton, and Darwin confirm this disputed statement. The B. of the U. S. are not very numerous in species, though abundant in individuals. They are of the genera *Vesperugo*, *Myotis*, *Plecotus*, etc. Europe is much more rich in species, the "long-eared B.," *Plecotus communis*, being one of the most common. B. are extremely useful in destroying insects, and their excrement so accumulates in certain caves



Long-Eared Bat.

as to promise to become important.

Batatas Edulis. See SWEET POTATO.

Bata'vi, an anc. Ger. tribe or nation who inhabited the country now called Hol., especially an island called *Batavia* or *Insula Batavorum*. They were conquered by Germanicus, and became loyal subjects of the Rom. empire. The Batavian cav. had a high reputation.

Bata'via, a city of Java, cap. of the Dut. possessions in the E. I., on the N. coast of the island and on the Java Sea. Its site is flat and marshy, and intersected by canals. The place was formerly very unhealthy, but has been improved by draining. The city, founded by the Dut. in 1619, has a good harbor, is the chief commercial emporium of the Malay Archipelago, and has telegraphic connection with Singapore, 600 m. distant. Pop. 102,901.

Batavia, R. R. junc., Kane co., Ill., on Fox River, 38 m. W. of Chicago. It has an inst. for the insane. Pop. 1880, 2639.

Batavia, R. R. junc., cap. Genesee co., N. Y., on the Tonawanda Creek, 36 m. E. of Buffalo. It has a ladies' sem. and the State inst. for the blind. Pop. 1870, 3890; 1880, 4845.

Bata'vian Republic. Hol. having been conquered by the Fr. in 1795, a new gov. was established, with the title of the B. R., under Fr. domination. In June 1806 this republic was converted into a kingdom, of which Louis Bonaparte became king.

Bates (EDWARD), LL.D., a statesman and lawyer, b. at Belmont, Goochland co., Va., Sept. 4, 1793, and emigrated to Mo. in his youth. In Mar. 1861 he was appointed atty.-gen. of the U. S. D. Mar. 25, 1869.

Bates (JOSHUA), D. D., b. at Cohasset, Mass., Mar. 20, 1776, grad. at Harvard in 1800, was pastor of the Congl. ch. at Dedham, Mass., in 1803, pres. of Middlebury Coll., Vt., 1818-39; was for a time chaplain of the U. S. senate, and pastor in Dudley, Mass., 1843-54. D. Jan. 14, 1854.

Bates (JOSHUA), b. in Weymouth, Mass., in 1788; removed to Lond. in 1826, and became a partner in the banking-house of Baring Brothers & Co. He contributed largely to the foundation of the Boston Free Library. D. Sept. 24, 1864.

Bates (SAMUEL PENNSYLVANIA), LL.D., b. at Mendon, Mass., Jan. 29, 1827, grad. at Brown Univ. in 1851, was prin. of Meadville Acad., Pa., 1852-57. In 1857 he became supt. of schools in Crawford co., Pa.; in 1860 deputy State supt.; in 1865 State historian of Pa. Wrote *Hist. of Pa. Volunteers*.

Batesville, Ark. See APPENDIX.

Bat-Fish, a name given to the species of *Malthe* (*Malthe vespertilio*, etc.) fishes inhabiting the Atlantic coast of N. and S. Amer. They are distinguished from their cordiform disk and stout tail, and the production of the rostral area.

Bath, a city, cap. of Somersetshire, Eng., on the river Avon, 20 m. from its mouth and 102 m. W. S. W. of Lond. The houses are mostly built of white freestone, quarried in the vicinity. B. presents perhaps a finer appearance than any other city of Eng., partly a consequence of the configuration of its site, which is in the form of an amphitheatre, on the declivity of which the finest streets extend in successive terraces. The beauty of the situation, the mildness of the climate, and the curative efficacy of its hot saline springs render B. a very fashionable place of resort. The temperature of the springs, 4 in number, varies from 97° to 117° F. They rise on the bank of the river, and discharge 184,320 gals. daily. The Romans erected baths at this place in the first century, and called it *Aqua Solis*. Pop. 1881, 51,700.

Bath, city and R. R. centre, cap. Sagadahoc co., Me., is on the right (W.) bank of the Kennebec River, 12 m. from the ocean, 30 m. S. of Augusta, and 36 m. N. E. of Portland. The prin. business is ship-building. Pop. 1870, 7371; 1880, 7874.

Bath, R. R. junc. and semi-cap. of Steuben co., N. Y., is on the Cohocton Creek, 74 m. S. S. E. of Rochester; has a soldiers' home. Pop. 1880, 3183.

Bath, Knights of the, a military order in G. Brit. deriving its name from the ceremony of bathing which was performed at the initiation of the Knights. It is now the second in rank among the orders of Eng., the order of the Garter being the highest. The order of the B. comprises 3 classes—1st class, Knights Grand Cross (K. G. C.), the number of whom is limited to 50 military men and 25 civilians, beside the royal family; 2d class, Knights Commanders



Flying Fox Bat.

(K. C. B.) = 102 military and 50 civil; these and the first have the title of Sir; 3d class, Companions (C. B.) = 525 military and 240 civil.

Bath Stone, a building-stone extensively used in Eng., is procured from quarries in the lower oolite. It is fine-grained, of a rich cream-color, is easily wrought, and hardens on exposure to the air, but is not very durable.

Bathybius [Gr. *bathu*, "deep," and *bios*, "life"], a name given by Huxley to a formless expanse of matter of supposed protoplasmic character, believed to cover large areas of the ocean's bed, and to manifest characteristic evidences of possessing life, but of at least doubtful nature.

Bathyllus (Gr. *Bathyllos*), a popular comedian and performer of comic pantomime in Rome about 30 B. C. He was a freedman of Mæcenas.

Baton Rouge, bah-tu-roozh', on R. R., city, cap. of parish of E. B. R., and of La., is on the left (E.) bank of the Miss., 129 m. above New Orleans. It stands on a bluff which rises about 25 ft. above the highest inundations. The seat of govt. was established here in 1847, but was removed to New Orleans during the c. war, and is now at B. R. The capitol was completed in 1852 at a cost of \$246,000. B. R. contains a State-house, a State univ., a collegiate inst., a ladies' sem., an acad., asylums for the deaf and dumb and the blind, and a penitentiary in which are 800 convicts. The convention met here Jan. 21, 1861, and on the 26th adopted the ordinance of secession. The city was taken by the U. S. forces May 7, 1862. On Aug. 5, 1862, a Confed. force numbering 5000 under Gen. Breckenridge, attacked the garrison under Gen. Thomas Williams, but was repulsed after a fierce contest of 2 hours' duration, in which Gen. Williams was killed. The place was shortly after evacuated by the U. S. forces. Pop. 1870, 6498; 1880, 7197. [From orig. art. in *J.'s Univ. Cyc.*, by ED. "CAPITOLIAN ADVOCATE."]

Batrachia, ba-trä'ke-a (plu.) [from the Gr. *bátraxos*, a "frog"], called also **Batrachians** and **Amphibians**, one of the 5 great classes into which the vertebrate animals are usually divided, though some writers have reduced the class to the rank of an order of reptiles—a class with which they are popularly confounded. The B. are cold-blooded and oviparous, and in most living species are without scales, and the blood is partly aerated through the skin. The young, for the most part, breathe by gills like those of fishes. They generally have limbs, but not always. Their eggs are generally fecundated after extrusion. In most cases the eggs are laid in moist places or in water; the young assume a fish-like form (as the tadpole), and finally, when adult, with few exceptions, lose their gills and commence breathing by lungs like true or scaly reptiles. They further differ from reptiles in various points, such as in having two occipital condyles, while reptiles have but one, and in having very short ribs or none at all, while reptiles have a series of ribs.

Batrachide. See TOAD-FISH.

Batrachomyomachia, bat-ra-kom-i-o-ma'ke-a [from the Gr. *bátraxos*, a "frog," *μῦς*, *mūs*, a "mouse," and *μάχη*, a "battle"], the name of a mock-heroic poem, the subject of which was the battle of the frogs and mice, erroneously ascribed to Homer.

Batrachophrynidæ. See TOAD.

Battaks, called also **Battas**, a race living in Sumatra, who speak a peculiar lang., have an original alphabet, and write on pieces of bamboo, commencing at the bottom of the p. and writing from right to left.

Battel [Fr. *bataille*], an anc. mode of trial by single combat, usually called "wager of battle." It had its origin among the Ger. tribes, and was introduced into Eng. by William the Conqueror. In criminal cases the accuser and the accused fought in person; in civil cases, by champions. This custom, based on the idea that Heaven would give the victory to the innocent party, though practically disused, continued to be a part of the law of Eng. till 1819, when it was abolished by statute.

Battery, bat'ter-ē [Fr. *batterie*], a military term used in various senses. In gen., a number of guns, organized into a single body; also in field operations, a number of guns with the necessary complement of horses and men to manage them. The term is also applied in a narrower sense to the *personnel* or complement of men and officers who serve a set of guns.

Battery. See ASSAULT AND BATTERY.

Bathyanyl, bot'yahn-ye (Louis), COUNT, a Hungarian patriot, b. at Presburg in 1806. He favored the liberal cause, and was appointed pres. of the ministry formed in Mar. 1848. Tried by an Aus. court-martial, and shot Oct. 6, 1849.

Battle-Axe, a weapon much used by the early N. nations. It had a longer handle and a broader blade than the common axe. The halberd was the latest form of the B.-A., and is still used on occasions of ceremony.

Battle Creek, city, R. R. centre, Calhoun co., Mich., at the confluence of the Kalamazoo and B. C. rivers, 120 m. W. of Detroit. Pop. 1870, 5838; 1880, 7063; 1884, 10,021.

Battle-Ground, a p.-v. of Tippecanoe co., Ind., where the celebrated battle of Tippecanoe was fought between Gen. Harrison and the Indians under Tecumseh and his brother, the "Prophet," Nov. 7, 1811.

Baughner (HENRY L.), D. D., a Lutheran divine, b. at Abbotstown, Pa., about 1803, grad. at Dickinson Coll. in 1825; studied theol. at Gettysburg and Princeton, became pastor of a ch. at Boonsboro', Md., in 1829, was a teacher at Gettysburg, Pa., 1830-32, prof. of Gr. and belles-lettres (1832-50) at Pa. Coll., Gettysburg, and was afterward its pres. (1850-68.). D. Apr. 14, 1868.

Baumgartner, howin'gart-ner, von (ANDREAS), a Ger. savant, b. in Bohemia Nov. 23, 1793; became Aus. minister of trade and public works, and was pres. of the Acad. of Sciences in Vienna. D. July 29, 1865.

Baur, bowt (FERDINAND CHRISTIAN), a Ger. Prot. theol. and critic, founder of the Tübingen school of theol., b. at Schmiden June 21, 1792. D. Dec. 2, 1860.

Bautzen, bowt'sen, or **Bu'dissin**, a town of Sax., on the Spree, 35 m. E. N. E. of Dresden. A great but indecisive battle was fought here May 20, 21, 1813, between Nap. and allies; the Fr. lost 20,000 men, but the allies, whose loss was 13,000, retired from the field. Pop. 1880, 17,593.

Bavaria, ba-vā'ri-a, the second kingdom in size and pop. of the Ger. empire, is divided into 2 unequal parts; the E. portion, $\frac{1}{4}$ of the whole, is situated between 47° 16' and 50° 33' N. lat., and 9° and 13° 48' E. lon.; the W. (the Palatinate W. of the Rhine), between 48° 52' and 50° N. lat., and 7° 20' and 9° E. lon. It is bounded N. by Prus. and the smaller states, E. and S. by Aus., W. by Württemberg, Alsace, Baden, and Hesse-Darmstadt. Area of B., 29,292 sq. m., being about half as large as Ga.

Surface in part mountainous; Algaü and Bavarian Alps in the S., the former 9000 ft. high; Bohemian and Bavarian mt. forests on the E.; Fichtel Mts. in the N. E.; the Franconia, Jura, and the Hardt. One third of the area is forest. There are also fertile plains and valleys. The rivers are the Danube, with 39 affluents in B., the Main, and the Rhine; Ludwig's Canal connects the Danube and Main. There are about 50 small lakes, mostly Alpine.

Climate usually temperate and healthy, but cold in mts. **Minerals**, salt, coal, iron, copper, and manganese. The famous mineral springs of Kissingen and Brückenau are in B.

Productions.—The soil is highly productive, wheat, maize, rye, oats, barley, buckwheat, hops, and tobacco being the prin. crops. Wine is made extensively in Lower Franconia and the Palatinate. Great numbers of cattle, sheep and swine are reared in the mts.

Manufactures.—Beer is the largest, over 5400 breweries producing annually 131,000,000 gals. There are more than 50 glass-works, upward of 30,000 cigars made annually, and there are also large manufactories of linen, woollen, paper, iron, wooden-ware, china, and guns, and celebrated melting-houses at Oberzell. The chief exports are timber, grain, wine, hops, beer, leather, glass, jewelry; imports, sugar, coffee, woollens, silks, stuffs, drugs, hemp, cotton, tobacco, flax.

Population.—The total, 5,284,778, is distributed pretty equally among the following govt. districts: Upper Franconia, Upper Palatinate, Lower Bavaria, Upper Bavaria, Suabia, Middle Franconia, Lower Franconia, and the Palatinate. The prin. towns are Munich (the cap.), 230,023 inhabs.; Nürnberg, 99,519; Augsburg, 61,408; Würzburg, 51,014; Regensburg (Ratisbon), 34,516; Hof, Bamberg, Schweinfurt, Erlangen, Speyer, Baireuth, and Passau are also important commercial cities. Of the pop. 3,573,742 were R. Caths., 1,392,130 Prots., and 51,335 Jews.

Education.—There are 3 univs. (Munich, Würzburg, and Erlangen), 9 lycæums, 28 gymnasia or colls., 10 normal schools, 2 polytechnic insts. (at Munich and Nürnberg), a number of Lat., technical, and special schools, and about 7200 public schools. School attendance is compulsory from 6 to 14.

Finances.—The gross revenue of 1884 was about \$47,000,000, and the expenditure the same amount. The public debt of B. in Jan. 1884 was \$270,000,000.

Railways.—There are over 1500 m. of railway and over 2000 m. of telegraph, both mostly owned by the state, but neither fully pays expenses.

Government.—B. is a constitutional monarchy, with a hereditary king in the male line only, and two houses of legislature; the upper, of 72 members, hereditary, official, or appointed for life; the lower, of 156 members, elected for 6 yrs.

History.—Early inhabs. of Old B., Celts; Germanic tribes immigrated there and ruled, though dependent upon Rome till 911; c. wars for the next 250 yrs. In 1180 Otto von Wittelsbach, count palatine, became master of B., and his descendants have ruled it with slight exceptions till now; 2 of them (Louis IV., 1314-47, and Charles VII., 1742-45) became Ger. emps. The counts of the Palatinate and the dukes of B. contended for the supremacy from 1255 to 1648, when it was settled by the peace of Westphalia. On the extinction of the Bavarian line in 1777, the elector of the Palatinate, Charles Theodore, became ruler of B., and Aus. tried very hard to obtain possession of it, and would have succeeded but for Frederick the Great. His brother, Maximilian IV. (I. of B.), succeeded him in 1799, and took the title of king in 1806. At first a member of the Rhenish Confederation, he joined the allies in 1813, and after the peace of Paris, in 1815, the boundaries of B. were settled nearly as at present. Louis I. succeeded Maximilian (1825-48), and was a tolerable ruler, though eccentric, and anti-liberal in his views. His son, Maximilian II. (1848-64), succeeded, and was a liberal patron of the arts. Louis II. succeeded his father in 1864, and in 1866 sided with Aus. in the Austro-Prus. war. B. took a part in the Franco-Ger. war, and in 1871 became a member of the Ger. empire. L. P. BROCKETT.

Baxter (DE WITT C.), b. in Dorchester, Mass., Mar. 9, 1829, entered the Amer. army in 1861 as Lieut., and rose to be brevet brig.-gen. of volunteers. Wrote *Baxter's Manual and Company Tactics*, and was naval officer of Phila. 1869-71. D. May 9, 1881.

Baxter (RICHARD), a divine, b. at Rowdon, in Shropshire, Eng., Nov. 12, 1615, was ordained in 1638. During the c. war he was friendly to the Puritans, but favorable to a monarchy. At the Restoration (1660) he was appointed one of the chaplains to Charles II. In consequence of the passage of the Act of Uniformity, 1662, he seceded or was ejected from the Anglican Ch. In 1672 he preached in Lond. to a congregation of nonconformists. Among his numerous works are the *Saint's Everlasting Rest* and a *Call to the Unconverted*. D. Dec. 8, 1691.

Baxterians, the term formerly applied to the adherents of Baxter's theological system, the doctrines of which were—1, that though Chr. d. in a special sense for the elect, yet he also d. in a gen. sense for all; 2, the rejection of the dogma of reprobation; 3, that it is possible for even saints to fall away from saving grace.

Baxter Springs, Kan. See APPENDIX.

Bay, or **Bay Tree**, a name of the laurel tree *Laurus nobilis*, which is sometimes called sweet B. The *Prunus laurocerasus* is sometimes called B. laurel. Several other trees are popularly called B. The leaves of the B. have long been subjects of popular superstition, and have been used with other evergreens to decorate chs. at Christmas. *Bays*, the plural, signify an honorary garland or crown, bestowed as a prize.

Bay'a (*Phœcus Philippi'nus*), a small E. I. bird of the family Ploceidae, allied to the weaver-bird.

Bayard (Gen. GEORGE D.), b. in New York in 1835, grad. at W. P. in 1856; became brig.-gen. of volunteers, and was killed at the battle of Fredericksburg Dec. 14, 1862.

Bayard JAMES ASHTON, a statesman and lawyer, b. at Phila. July 28, 1767, grad. at Princeton in 1784; settled in Del. and became an M. C. The contest between Jefferson and Burr in 1801 was decided in favor of the former by the votes of Federalists acting under the influence of Mr. Bayard. Subsequently U. S. Senator. He was one of the coms. that negotiated the treaty of Ghent in 1814. D. Aug. 6, 1815.

Bayard JAMES ASHTON, 2d, b. in Wilmington, Del., Nov. 15, 1799, grad. at Princeton; was U. S. Senator from Del. 1851-64 and 1867-69. D. June 13, 1880.

Bayard (PIERRE DU TERRAIL), CHEVALIER, a heroic Fr. knight, called the knight without fear and without reproach, b. at Castle B., near Grenoble, in 1475. He was remarkable for his modesty, piety, magnanimity, and his various accomplishments. He distinguished himself at the battle of Tornovo, performed several remarkable exploits in war against the Spaniards and Eng., took Prosper Colonna prisoner, and gained a victory at Marignano in 1515; defeated Mézières with success against the emp. Charles V. in 1522, and for this important service was saluted as the saviour of the country. He was killed in battle at the river Sessia, Apr. 30, 1524.

Bayard RICHARD BASSETT, son of James A. Bayard, b. at Wilmington, Del., in 1796, grad. at Princeton in 1814, became a lawyer, and was U. S. Senator from Del. 1836-39 and 1841-45. D. Mar. 4, 1868.

Bayard (THOMAS FRANCIS), LL.D., b. at Wilmington, Del., Oct. 29, 1828; in 1869 succeeded his father (J. A. Bayard) in the U. S. Senate, and was re-elected for a second and a third term. In Oct. 1881 he was chosen pres. *pro tem.* of the U. S. Senate; became U. S. sec. of state Mar. 6, 1885.

Bayazid, bah-yah-zeed' (often called **Bajazet** I., sultan of the Turks or Ottomans, surnamed ILDERIM (i. e. "the lightning"), b. in 1347. He succeeded his father, Amurath I., in 1389, and soon conquered Bulgaria, the greater part of Asia Minor, and part of Gr. In 1396 he gained a victory at Nicopolis over Sigismund, king of Hungary, and his allies, the Poles and Fr. His career of conquest was arrested by Tamerlane (or Timur), who invaded Asia Minor, and defeated him near Angora in June 1401. B. was taken prisoner here, and confined until his death, Mar. 9, 1403.

Bayazid II., sultan of the Turks, b. in 1447, succeeded his father, Mahomet II., in 1481. He was involved in almost continual wars against the Hungarians, Poles, Pers., and Venetians. D. May 26, 1512.

Bay'berry, the fruit of the bay tree; also the fruit of the wax-myrtle (*Myrica cerifera*), a shrub which produces a kind of wax, sometimes called "bayberry tallow," and used in pharmacy.

Bay City, an important R. R. centre, cap. of Bay co., Mich., on the right (E.) bank of the Saginaw River, 4 m. from its mouth and at the head of navigation. It deals principally in lumber and salt, immense quantities of which are produced. Several lines of steamers connect it with all lake points. Pop. 1870, 7064; 1880, 20,693; 1884, 23,415.

Bayeux (ba-yuh') **Tapestry**, a web of canvas or linen cloth 24 ft. long by 20 in. wide, on which is embroidered with woollen threads of various colors a representation of the invasion and conquest of Eng. by the Normans. According to tradition, it was embroidered by Matilda, the wife of William the Conqueror. Some persons believe that she directed the work, which was performed by her maids or the ladies of her court. It is considered a valuable historical document, as it gives a correct and minute portraiture of the manners and customs of that age, and of the Norman costumes. It contains the figures of about 625 men, 200 horses, 55 dogs, 40 ships and boats, and numerous quadrupeds, birds, etc. The tapestry was discovered in the cathedral of B. about 1730, and is now preserved in the hôtel de ville of that place.

Bay'field (HENRY WOOLSEY), a rear-admiral of the Brit. navy, entered the service in 1806; served against the U. S. in 1814 on the great lakes, and surveyed the lakes, the St. Lawrence River and Gulf (1815-27), of which he pub. valuable charts.

Bayle, bäl (PIERRE), a Fr. philos. and critic, b. at Carlat, now in Ariège, Nov. 18, 1647, was a son of a Prot. preacher. He studied at the Coll. of Toulouse, and became a prof. of philos. in the Prot. Coll. of Sedan, which was closed or suppressed by the govt. in 1681; thence he went to Rotterdam. B. was a sceptic, an eloquent advocate of religious liberty, and a very independent thinker. His most important work is a *Historical and Critical Diet.* D. Dec. 28, 1706.

Bay'ley (Most Rev. JAMES ROOSEVELT), D. D., b. in New York Aug. 23, 1814, grad. at Trinity Coll., Hartford, in 1835; was for a time a clergyman of the P. E. Ch., but became a R. Cath., studied theol. in Paris and Rome, and was ordained a priest in 1842. Was pres. of St. John's Coll., Fordham, N. Y., 1845-46. In 1853 became bp. of Newark, N. J., and in 1872 abp. of Baltimore. D. Oct. 3, 1877.

Baylor University. This inst. is situated at Independence, Washington co., Tex., 12 m. from Brenham, on the W. branch of the Houston and Tex. Central R. R., and 18 m. from Navasota, on the main trunk of the same road. The univ. was chartered by the republic of Tex. in 1845. One third of its trustees are annually chosen by the Bap. State Convention of Tex. The course of study is modelled after that of the Univ. of Va. Presidents have been the Rev.

Henry L. Graves, Rev. Rufus C. Burleson, D. D., Rev. George W. Baines, Rev. William Carey Crane, D. D., LL.D., Hon. R. E. B. Baylor, LL.D., former M. C. from Ala., and for 25 yrs. a judge in Tex., gave name to the univ.

Bay'ly (LEWIS), bp. of Bangor in Wales, b. at Caermarthen, ed. at Ox., and consecrated as bp. in 1616; author of the *Practice of Piety*, D. 1632.—His son Thomas became a R. Cath., and wrote *The End of Controversy*.

Baynes, bânz (ROBERT HALL), D. D., b. in Somersetshire, Eng., Mar. 10, 1831; ed. at Bath and at St. Edmund's Hall, Ox., where he took his master's degree in 1859; in 1870 was consecrated bp. of Madagascar. Wrote *Lyra Anglicana* and other poems.

Bayonne, bah-yonn' (anc. *Lapurdum*), a fortified city in S. W. Fr., on the Adour, 3 m. from the Bay of Biscay. The city has often been besieged, but never taken. Pop. 38,361.

Bay Rum (*Spiritus myrciæ*), a fragrant liquid obtained by distilling with rum the leaves of the *Myrica arbutifolia*, and probably of other trees of the genus.

Bazaine, bah-zân' (FRANÇOIS ARILLE), b. at Versailles Feb. 13, 1811, and after passing through all the intermediate grades, marshal of Fr. Sept. 5, 1864. The son of a prominent and wealthy officer, he could have readily obtained an officer's commission, but he declared it his pride to seek his marshal's bâton from the knapsack in which for "every Fr. soldier" the proverb potentially places one; and that bâton, when found, bore the inscription, "Simple soldat en 1831. Maréchal de France en 1864."

He went through many campaigns, beginning in 1833 and ending with 1870, serving in Afr., Sp., It., Mex., and Fr. On the breaking out of the war with Prus. he was in command of a single corps, but in consequence of the early reverses baffling MacMahon he became directly commander of the army of the Rhine. After the hard-fought battles that followed he concentrated his forces at Metz, where after a siege of long duration he at length surrendered his entire army of 160,000 men with 1800 cannon. After the war he was tried by court-martial for this surrender, and sentenced to be shot; but his sentence was commuted to 20 yrs. imprisonment in a fortress, without military degradation. On Aug. 9, 1874, he escaped from his prison, Île Ste. Marguerite, and took refuge in Sp. J. G. BARNARD.

Bazard, bah-zar' (AMAND), the founder of Fr. Carbonarism, b. in Paris Sept. 19, 1791. He organized societies of Carbonari about 1820; afterward he became a disciple of St. Simon and wrote on Socialism. D. July 29, 1832.

Beach (JOHN WESLEY), D. D., LL.D., a preacher of M. E. Ch., b. at Trumbull, Conn., Dec. 26, 1825, grad. 1845 at Wesleyan Univ., Middletown, Conn., was for 9 yrs. a teacher, and in 1854 entered the ministry. In 1872 received degree of D. D. from his *alma mater*, and in 1873 became pastor of a ch. in New Haven, Conn. Pres. Wesleyan Univ. 1880.

Beach (MOSES YALE), an inventor and pub., b. at Wallingford, Conn., Jan. 7, 1800. He invented a rag-cutting machine, now in gen. use in paper-mills. In 1835 he became interested in the New York *Sun*, and is regarded as a pioneer in the penny newspaper business. D. July 18, 1868.

Beach Plum, the *Prunus maritima*, a shrub of the order Rosacea, growing along the sea-beaches of the Atlantic coast of the U. S. It bears an edible fruit, sometimes not much smaller than that of the cultivated plum, which it resembles. Away from the sea-shore it degenerates.

Beacon, be'kn. The A.-S. root is the same as that of the noun *beck* and the verb *becken*; hence the word implies something which constitutes a significant sign or signal. Before other means of rapid telegraphy were invented, fires, kindled on the tops of mts., or prominent points of the coast, were an obvious resort as alarm-signals, giving warning of the approach of hostile fleets or armies. The word now denotes a mark or sign erected on coasts for guiding and preserving vessels at sea by night or by day.

Beadle (W. H.). See APPENDIX.

Beagle, be'gl, a small variety of hound, formerly employed in Eng. for hunting hares, but now nearly supplanted by the harrier. The B. is about 10 inches high at the shoulder, is compactly formed, and has long pendulous ears and smooth hair. It is remarkable for its keenness of scent and perseverance. During the chase it utters a musical cry. A small variety is used as a lap-dog.

Beale, beel (LIONEL SMITH), F. R. S., an Eng. microscopist, physiologist, and author, b. in 1828, grad. Bachelor of Medicine at the Univ. of Lond. in 1851, in which inst. he was afterward appointed prof. Wrote *Structure of the Tissues of the Body and Protozoa*.

Bea'man (FERNANDO C.), b. in Chester, Vt., June 23, 1814; studied law in Rochester, N. Y., and in 1838 became a lawyer of Mich.; was prosecuting attorney of Lenawee co., judge of probate, Presidential elector in 1856, and M. C. from Mich. 1861-69. D. Sept. 27, 1882.

Bean (Fa'ba), a genus of annual herbaceous plants of the order Leguminosæ. The common European B. (*Faba vulgaris*) has been cultivated in Asia and Europe since the earliest ages. The seeds are inclosed in long pods which are woolly on the inside. Many varieties are used as food for men and animals. The kidney-B. or haricot (*Phaseolus vulgaris*) is a totally distinct plant from the proper B. The B. cultivated in Amer. are various species of *Phaseolus*.

Bear (Lat. *ursus*, female *ursa*; Ger. *Bär*), the common name applied to the species of the family *Ursidae*. B. are found in Europe, Asia, and Amer., but not in Afr. Some species pass the winter in a state of torpidity and hibernation, during which they eat nothing and remain stationary in hollow trees or holes in the ground. They are all much alike in general structure and appearance, but on account of minor differences in dentition and details of structure have been distributed in 6 genera—*Ursus*, *Thalictos*, *Tremarctos*, *Helictos*, *Melictos*, and *Eumelictos*. The European and N. Amer. species belong to *Ursus*. The brown B. (*Ursus arctos*) is widely distributed over the continents of

Europe and Asia. The black *B. Ussus Americanus* is found in all parts of N. Amer.; it is an expert climber. The grizzly *B. Ussus ferrugineus* is much larger and more carnivorous than the black *B.* It sometimes measures 9 ft. from the nose to the tail, and is the most formidable beast of prey of Amer. It can run swiftly, but does not climb trees.

The polar *B.* or white *B. Thaddeus maritimus* is of an impure white. It sometimes measures nearly 10 ft. long and 5 ft. high. It is never found far from the sea, and inhabits the most N. shores of Amer., Asia, etc. It pursues seals and fishes both on the ice and in the water. Among the other species the *Medurus labialis*, or long-lipped *B.* of the E. I., is notable as an inoffensive and gentle animal, which is often led about by Indian jugglers for exhibition. In the Andes of Chili occurs the *Tremacetus ornatus*, called spectacled *B.*, which is black except 2 semicircular yellow marks above its eyes. Remains of several extinct species of *B.* have been found in caves.

Beard (GEORGE MILLER), M. D., b. at Montville, Conn., May 8, 1839, grad. at Yale 1862, and at Coll. of Physicians and Surgeons, New York, 1866; was a noted specialist in that city in hypnotism, insanity, electro-therapeutics, and nervous diseases, and wrote much on these subjects, including *Physiology of Mind Reading*. D. Jan. 23, 1883.

Beard (RICHARD), D. D., a clergyman of the Cumberland Presb. Ch., b. in Sumner co., Tenn., Nov. 27, 1799; grad. at Cumberland Coll., Princeton, Ky., and was immediately appointed prof. of langs. in that coll.; then went to Sharon, Miss., in connection with Sharon Coll. In 1843 he became pres. of Cumberland Coll., Ky., and in 1854 took the chair of systematic theol. in Cumberland Univ., at Lebanon, Tenn. His *Systematic Theology* is regarded as the crystallization of Cumberland Presb. thought and faith. D. Dec. 2, 1880.

Beardsley (E. EDWARDS), D. D., LL.D., b. in 1808 in Fairfield co., Conn., grad. at Trinity Coll., Hartford, in 1832. Wrote *Hist. of the Epis. Ch. in Conn.*

Beardsley (SAMUEL), LL.D., a native of Otsego co., N. Y.; practised law in Rome and Utica; became chief-justice of the State in 1847. D. May 6, 1860.

Beards' town, a city and R. R. junction, Cass co., Ill., situated on the bank of the Ill. River. The celebrated "Lithia Springs" are here. Pop. 1870, 2588; 1880, 3135.

Bears and Bulls, a phrase used in connection with the purchase and sale of stocks. The "bears" are those who wish to depress the price of stocks, and the "bulls" are those who wish to raise the price. An operator may be a bear one day and a bull the next, according as his pecuniary interest varies; or he may be at the same time a bull in regard to one stock and a bear in another.

Beas'ley (FREDERICK), D. D., a clergyman, philos., and author, b. near Edenton, N. C., in 1777, grad. at Princeton in 1797; became an Episcopalian minister, and was long provost of the Univ. of Pa. D. Nov. 2, 1845.

Beating the Bounds, a phrase used in Eng. to denote the periodical perambulation by which the boundaries of parishes are preserved. The clergyman with the parochial officers and the boys of the parish school march to the boundaries, which the boys strike with willow rods; being sometimes flogged at important points, in order to impress them upon their memories.

Beaton, Beatoun, or Bethune (DAVID), a Scot. cardinal, b. in 1494, was a zealous opponent of the Prot. Ref. He became a cardinal in 1538. On the death of James V., in 1542, B. produced a forged will of that king, appointing himself, with three others, regents of the kingdom; but his artifice failed, and the earl of Arran became the regent. Cardinal B. caused George Wishart to be burned at the stake. He was assassinated May 29, 1546.

Beatrice, city and R. R. junction, cap. Gage co., Neb., on Big Blue River, 90 m. S. S. W. of Omaha. It has water-power and building-stone. The U. S. land-office for the Nemaha dist. is located here. Pop. 1880, 2447.

Beatrice Portinari. See DANTE.

Beattie, bee'te (JAMES), LL.D., D. C. L., a Scot. philos. and poet, b. in Kincardine co. Oct. 25, 1735; became in 1760 prof. of moral philos. in Marischal Coll., Aberdeen; wrote *Evidences of the Christian Religion briefly and plainly stated*, *Elements of Moral Science*, and in verse *The Minstrel*. D. 1803.

Beatty (ORMOND), A. M., LL.D., b. at Washington, Mason co., Ky., Aug. 13, 1815, was ed. at Centre Coll. and Yale Coll., whence he grad. in 1835; was appointed prof. of Centre Coll. in 1836, and pres. in 1872, and has contributed to various papers.

Beaufort, bu'fort, on R. R., cap. Beaufort co., S. C., on Pt. Royal Island, and on an arm of the sea called Pt. Royal River, about 55 m. W. S. W. of Charleston, and 108 m. S. E. of Augusta; has a good harbor. Pop. 1870, 1739; 1880, 2549.

Beaufort, bo'fort (HENRY), CARDINAL, an Eng. prelate, b. about 1375, was a natural son of John of Gaunt and half-brother of King Henry IV. He became successively bp. of Lincoln and of Winchester, lord chancellor in 1403, again in 1413, and a third time in 1424. He acted a prominent part in political affairs. During the minority of Henry VI. he was very powerful, and was suspected of complicity in the murder of his nephew and rival, the duke of Gloucester. D. 1447.

Beauharnais, de, deh bö-ar-nä' (EUGENE), a son of Vicomte Alexandre de B., b. in Paris Sept. 3, 1781. His mother, Josephine, became the wife of Bonaparte, whom he accompanied to Egypt in 1798. He was rapidly promoted in the army, was appointed viceroy of It. in 1805, took part in the campaign against Aus. in 1809, and in the invasion of Rus. in 1812. Having obtained command of the army in Rus. after it had suffered great disasters, he made a masterly retreat. In 1813 he went to It., which he defended against the Aus. until the deposition of Nap. Afterward he resided at Munich, and obtained from the king of Bavaria, whose daughter he had married in 1806, the title and estate of duke of Leuchtenberg. D. in Munich Feb. 21, 1824.

Beaumarchais, de, deh bö-mar-shä' (PIERRE AUGUSTIN CARON), a Fr. dramatist remarkable for his wit and ver-

satility, and whose adventurous career and vicissitudes of fortune, obtained for him great celebrity, was b. at Paris Jan. 24, 1732, and was the son of a clockmaker. Having become a proficient in music, he was employed to give lessons to the daughters of Louis XV., and in consequence became acquainted with the financier Duverney, who instructed him in affairs of finance, and assisted him with funds and credit. After Duverney's death he became involved in a litigation of 7 yrs. to secure the sums due him from the estate, during which the singular ability of his arguments secured him wide celebrity. During the Amer. war of independence he furnished the Amers. with arms and ammunition, and received in consequence the thanks of Cong. He also undertook at this time an ed. of the works of Voltaire, in 92 vols., by which he sustained a heavy loss. Notwithstanding he gave his support to the principles of the Fr. Revolution, and imported firearms for the use of the Fr., his property was confiscated, and he was for a time an exile from his native land. After undergoing persecution and accusation, he returned to Fr. after the Revolution was over. He recovered possession of his beautiful villa at Faubourg St. Antoine, and died there May 17, 1799.

B. was the author of various dramatic productions. *Le Mariage de Figaro*, his masterpiece, produced the greatest excitement in Paris, and his *Barbier de Séville*, which preceded it, was also a great success. J. G. BARNARD.

Beaumont, Tex. See APPENDIX.

Beaumont, bö-mont' (FRANCIS), an Eng. dramatic poet, b. in Leicestershire in 1586, ed. at Ox. Besides works of his own, he wrote, in partnership with John Fletcher, several popular dramas. D. Mar. 1616.

Beaumont (WILLIAM), M. D., a surgeon, b. at Lebanon, Conn., in 1785. While in the U. S. A. in 1825 he made important investigations upon digestion, in the case of Alexis St. Martin, who had received a severe gun-shot wound, which healed in such a manner as to leave a large aperture through which the processes of digestion could be watched. D. 1853.

Beaumont de la Bonnière, de, deh bö-mon' deh lah bö-ne-air' (GUSTAVE), a Fr. publicist and advocate, b. in Sarthe Feb. 16, 1802. He was a grandson of La Fayette. Visited the U. S., and wrote *Slavery in the U. S.* D. 1866.

Beauregard, bö-re-gard' (PIERRE GUSTAVE TOUTANT), b. near New Orleans May 28, 1818, grad. at U. S. Military Acad. July 1, 1838; 2d lieutenant of engineers July 7, 1838; served in Mex. war; capt. of engineers Mar. 3, 1853; in charge of defences in La. 1853-60; appointed supt. of U. S. Military Acad. Nov. 1860, but held this position a few days only. Resigned Feb. 20, 1861, was made brig.-gen. in Confed. army, and directed the operations against Ft. Sumter which opened the c. war; defeated Gen. McDowell at Bull Run July 21, 1861, and was made gen.; planned the successful attack on Gen. Grant Apr. 6, 1862, at Pittsburg Landing, and on Johnston's death assumed chief command, and then withdrawing to Corinth, held that place against the superior forces of Gen. Halleck till May 30, when he evacuated it, making a masterly retreat to Tupelo. He subsequently commanded, with headquarters at Charleston, the defence of the S. coast. In 1864 he commanded in Va., successfully resisting Gen. Butler's forces at Drury's Bluff, and later, with a force of 5700 men, increased to 10,500, resisted Gen. Grant's front attack upon Petersburg, holding that place till reinforced by part of Lee's army, and thus compelling the long-protracted siege. Was subsequently charged with resisting Gen. Sherman's march to the sea, having but 5000 men, partly militia. The skillful withdrawal of Gen. Hardee's army from Savannah, invested by Sherman, to Pocotaligo, was due to B. At the time of the surrender of Gen. Johnston's army B. was voluntarily assisting him. In 1866 command of the Roumanian army was tendered him, and in 1869 that of the army of the khedive of Egypt, both of which he declined; became adjutant-gen. La. 1878. J. G. BARNARD.

Beaver, be'ver [Fr. *bévere*; Ger. *Biber*], (*Castor Fiber*), a quadruped of the order Rodentia, native of Europe, Asia, and N. Amer. B. were once abundant in the U. S., but they have gradually disappeared before the advance of civilization. They are characterized by industry, sagacity, and instinctive skill in building dams and houses. The body is about 2 ft. long. The toes of the hind feet are long, spreading, and webbed to the nails. The tail has an oval form



Beaver.

and is horizontally flattened, about 10 inches long and about 3 inches wide, and covered with horny scales. The fur is used for making hats and caps. The food consists of bark of trees, leaves, roots, and berries. The favorite haunts of B. are rivers and lakes which are bordered by forests. They pass the winter in houses or lodges which are 2 or 3 ft. high, are built on the edge of the water, and

afford them protection from wolves and other wild beasts. They also have holes or burrows in the ground adjacent to their lodges, with entrances under the water, in which they take refuge if their lodges are destroyed or become untenable. A great many of them are caught in traps by Indians and other trappers.

Beaver, on R. R. cap. B. co., Pa., on the right bank of the O. River, 27 m. N. W. of Pittsburgh. It is the seat of B. Coll., a female sem., and an acad. Pop. 1870, 1120; 1880, 1178.

Beaver Dam, on R. R., a city, Dodge co., Wis., on B. D. creek, 61 m. N. W. of Milwaukee. It is the seat of Wayland Univ., and has a fine water-power. Pop. 1870, 3265; 1880, 3446.

Beaver Falls, R. R. junc., B. co., Pa., and on E. River, 1 m. above its junc. with the O., 31 m. N. W. of Pittsburgh. Pop. 1870, 3112; 1880, 5104.

Bebeeria, or **Bebeerine**, a vegetable alkali or alkaloid obtained from the bark of the bebeeru, or green-heart, a tree of Brit. Guiana. It is used in med. as a substitute for quinine, which it resembles in properties.

Bebeeru, **Bibiru**, or **Bebeeru**, a tree of Brit. Guiana. (See GREEN-HEART.)

Beccafico, *Beccafico*, "fig-water" (*Uglydia hortensis* or *Carulea hortensis*), a small bird of the family of Sylviadæ or warblers, abundant in S. Europe, where its flesh is considered a great delicacy.

Beccaria, **di**, de bek-kah-ree'ah (CESARE BONESANA), MARQUIS, an It. economist and writer on penal laws, b. at Milan Mar. 15, 1738. In 1768 was appointed prof. of political philos. at Milan. D. Nov. 28, 1794.

Bêche-de-Mer, bash'de-mar' [Fr. for "sea-spade," because they are pressed and dried in a shape not unlike that of a spade], or **Trepang**, a name given to the dried bodies of several species of *Holothuridæ*, or sea-cucumbers. They are esteemed as food by the Chi. The Malay divers catch them and prepare them in large quantities for the Chi. market. They mostly range from 9 inches to 2 ft. long.

Bechuana, **Betjuans**, **Bechuans**, or **Boshuana**, a people of S. Afr., divided into numerous tribes, each governed by its chief; are unwilike, and are said to be superior to the Caffres in arts and civilization.

Beck (JOHN BRODHEAD), M. D., a med. writer, b. at Schenectady, N. Y., Sept. 18, 1794, grad. at Columbia Coll. in 1813; became in 1826 a prof. of materia medica in the Coll. of Phys. and Surgeons, New York. D. Apr. 9, 1851.

Beck (LEWIS C.), M. D., a brother of the preceding, b. at Schenectady Oct. 4, 1798, grad. at Union Coll. in 1817, became prof. of chem. in the med. coll. of Albany in 1840, and wrote several works on chem. and bot. His report on the mineralogy of N. Y. was pub. by the State in 1842. D. Apr. 21, 1853.

Beck (THEODORIC ROMEYN), M. D., LL. D., a med. writer, a brother of the preceding, b. at Schenectady Aug. 11, 1791, grad. at U. Coll. in 1804; in 1840 became prof. of materia medica in the med. coll. at Albany. D. Nov. 19, 1855.

Becker (HERMANN HEINRICH), a Ger. politician, called DER ROTHE BECKER (i. e. "the Red Becker," on account of his extreme radical views in politics), b. Sept. 15, 1820. Took part in revolution of 1848; member of Prus. house of deputies 1862, and of the N. Ger. parl. 1867-68.

Becker (KARL FRIEDRICH), b. at Berlin in 1777; studied philos. and hist. at Halle; was a teacher in Berlin, but gave up all kinds of business on account of ill-health; wrote *Universal Hist. for Children* and other juvenile books. D. Mar. 15, 1866.

Becket (THOMAS À), abp. of Canterbury, b. in Lond. in 1109. He studied at Ox. and Paris, and was appointed high chancellor in 1158, being the first native Englishman who filled a high office after the Conquest. When made abp. of Canterbury in 1162, he became a zealous champion of the Ch. against the aggressions of the king, whose policy tended to keep the clergy in subordination to the civil power. Becoming involved in a conflict with Henry II., he escaped in 1164 to Fr. and appealed to the pope, by whom he was supported. Henry confiscated his property, sequestered the revenues of his see, and was threatened with a papal interdict. In 1170 a formal reconciliation was effected, and he returned to Eng. and resumed his office. He also renewed his defiance of the royal authority, but was assassinated Dec. 29, 1170, by 4 barons, servants of the king. He was regarded as a martyr by many patriotic Sax. as well as by the zealous votaries of the Ch. He was canonized by the pope in 1173, and his bones were deposited in a shrine at Canterbury, which became the object of one of the great pilgrimages of Christendom.

Beckx (PETER JOHN), a Belg. Jesuit, b. Feb. 8, 1795. He joined the Society of Jesus in 1819, was elected procurator of the prov. of Aus. in 1847, was appointed, after the restoration of the Jesuits in Aus., provincial for Aus., and was elected in 1853 gen. of the order.

Bequerel, bek-rel' (ANTOINE CÉSAR), an eminent Fr. savant, b. at Chatillon-sur-Loire (Loiret) Mar. 8, 1788. He served in the army as an officer of engineers from 1810 till 1815, after which he gave special attention to the study of electricity, and made discoveries in electro-chem. He refuted and exploded Volta's theory of contact, and constructed the first constant pile. In 1837 he received the Copley medal of the Royal Society of London. He invented a method of electrotyping. He pub., beside other works, *Traité expérimental de l'électricité et du magnétisme*. He became a member of the Acad. of Sciences in 1829. D. Jan. 21, 1878.

Bedbug, a well known hemipterous insect, the *Cimex lectularius*, infesting beds, houses, dove-cots, and the nests of swallows, bats, etc. The eggs are oval and white, the young flat and transparent. In about 11 weeks the insect reaches its full size. Mercurial solutions, benzine, etc., will extirpate these vermin, but prevention by cleanliness is better than cure.

Bede, beed [Lat. *Bedæ*], surnamed THE VENERABLE, an Eng. scholar and monk, b. in the co. of Durham in 673. His name is regarded as the greatest in the anc. lit. of Brit. His

most important work is an *Ecclesiastical Hist. of the Eng. Nation*, which King Alfred translated into A.-S., and which has often been reprinted. D. May 26, 735.

Bedeau, beh-dô' (MARIE ALPHONSE), a Fr. gen., b. near Nantes Aug. 10, 1804; served in Algeria; had the command (under Bugeaud) of the troops in Paris when the Parisians revolted in Feb. 1848, and under the new republican régime became commander-in-chief of that city. D. Oct. 29, 1863.

Bedell (GREGORY THURSTON), D. D., a P. E. bp., b. at Hudson, N. Y., Aug. 27, 1817, ed. at Flushing, L. I., and Bristol Coll., Pa.; became bp. of the diocese of O.; is author of *The Divinity of Chr.* and other works.

Bedell (WILLIAM), an Eng. Prot. prelate, b. in Essex in 1570; in 1629 became bp. of Kilmore and Ardagh in Ire. He procured the translation of the O. T. into Irish. D. 1642.

Bedford, a market-town of Eng. on the river Ouse, 48 m. N. N. W. of Lond. It has more charitable insts. and public endowments, in proportion to its size, than any town in Eng. Bunyan wrote *Pilgrim's Progress* in B. jail. Pop. 19,532.

Bedford, R. R. junc., cap. Lawrence co., Ind., 71 m. N. W. of New Albany. Pop. 1880, 2198.

Bedford, on R. R., cap. Taylor co., Ia., on the river One-hundred-and-two, about 100 m. S. W. of Des Moines. Pop. 1870, 720; 1880, 1763.

Bedford, R. R. junc., cap. Bedford co., Pa., is on Rays-town branch of Juniata River, 94 m. W. S. W. from Harrisburg. The B. Springs, about 1 m. distant, are a summer resort. Iron ores abound. Pop. 1870, 1247; 1880, 2011.

Bedford (GUNNING), a patriot of Del., served against the Fr., was a native of Phila., an officer of the Revolutionary army, and gov. of Del. (1796-97). D. Sept. 30, 1797.

Bedford (GUNNING), a cousin of the preceding, b. in Phila. in 1747, grad. at Princeton in 1771, was a member of the convention (1787) that formed the U. S. const., and was U. S. district judge. D. Mar. 30, 1812.

Bedford (GUNNING S.), M. D., b. at Baltimore in 1806, grad. at Mt. St. Mary's Coll. in 1825; became prof. of midwifery in the Univ. of New York (1840-42); author of *Lectures on the Diseases of Women*. D. Sept. 5, 1870.

Bedford (JOHN PLANTAGENET), DKE of the 3d son of King Henry IV. of Eng., b. in 1389. After the death of his brother, Henry V. (1422), became regent of Fr., and gained a victory over the Fr. at Verneuil in 1424, but his conquests were soon checked by Joan of Arc. He abetted her murder. D. Sept. 19, 1435.

Bedlam, a corruption of **Bethlehem**, which was the name of a religious house in Lond. converted in 1547 into a hospital for lunatics. B. is sometimes used as synonymous with a mad-house, or a place of uproar.

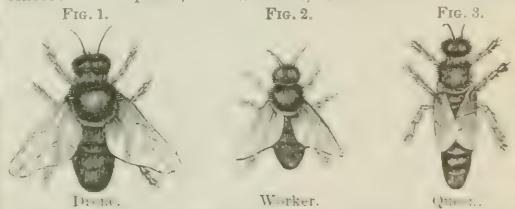
Bedle (JOSEPH D.) b. at Middletown Point (now Mattawan), Monmouth co., N. J., Jan. 3, 1831; became a lawyer and judge, and was elected gov. of N. J. in 1874.

Bedmar, de (ALFONSO DE LA CUEVA), MARQUIS, a Spaniard, b. in 1572. When ambassador to Venice in 1607, he formed a nefarious plot to betray the Venetian city and state into the power of the king of Sp. The plot was detected one day before that appointed for its execution. He became a cardinal in 1622. D. 1655.

Bedouins, bed'oo-eens, or **Beduins**, written also **Bedaween** and **Bedawee** (sing.), ("inhab. of the desert"), nomadic Arabs, who are, according to tradition, descendants of Ishmael. They form about $\frac{1}{2}$ of the pop. of Ar., and are widely distributed over N. Afr., Syria, etc. They are divided into tribes, each ruled by a sheik, whose authority is patriarchal. Their riches consist chiefly in flocks of sheep, camels, horses, goats, etc. Their complexion is brown of various shades. In person they are generally lean, sinewy, and active.

Bee [Gr. μέλισσα; Lat. *apis*; Fr. *abeille*; Ger. *Bie'ne*], the name of a large family of insects of the order Hymenoptera, but especially of the Apidae, the honey-bee.

This small insect has doubtless excited more admiration than any other individual of the whole animal creation, except man himself, and, with the exception of the silk-worm and cochineal, is almost the only insect of any commercial value. Every swarm is composed of 3 different kinds or classes—the queen, the workers, and the drones. The



"queen" is the only perfect female in the hive, and during the propagating season lays from 1000 to 2000 eggs in a day. She is longer than either the drones or workers, but her size in other respects is a medium between the two: in color darker on the upper side, with legs and under side yellowish. When the season for swarming approaches, which is always early in the season (usually June in our N. States), she deposits eggs, first for the workers, then in drone and queen cells, from which males and queens are developed. There seems to be no difference between the eggs for producing a worker or a queen, but the nature of the cell and the food effects the difference. The queen lives much longer than any other B., or writes 4 or 5 yrs., although this longevity is disputed by some writers on theoretical grounds; but observation appears to have fully established the age to be from 3 to 5 yrs. She is furnished with a sting, which she uses exclusively in combat with other queens.

The worker-B. are imperfect or undeveloped female B.,

comprising most of the hive, usually nine tenths or more, and commonly 12,000 or 15,000 in a single hive. All the labor is performed by the workers; they gather all the honey, B.-glue, and pollen, carrying the latter in little baskets on their thighs, and the former in a little sack; they secrete wax from honey, construct the combs, feed the young, and clean the hives. They usually live about 6 months through the winter, and not more than 2 or 3 months during the working season. A hive is therefore a community renewed repeatedly through the yr., the queen only seeing successive seasons, and on her producing many thousands of eggs the existence of the colony depends. When deprived of a queen from accident or death the hive soon dwindles and dies out.

The *drones* are the male B. of the hive. They have no sting, they do no work, and their only use is in the propagation of progeny. They are larger than the working B., have a rounder head, and are generally more clumsy in their movements. They are destroyed by the workers soon after the close of the honey season.

B. begin to breed early in spring, and they have usually increased their numbers greatly by the month of June. After the queen has deposited eggs, it requires about 22 days before the worker comes out a perfect insect, and about 25 days for the drone. The time for the development of the queen is only 16 days from the laying of the egg. The egg is fastened by one end to the bottom of the cell, so that it appears as if suspended in the air. It is soft and smooth, and 5 times as long as thick. It is first developed into a maggot which has little motion, with 2 white eyes, a mouth like a caterpillar, and 10 respiratory holes on the sides. The maggot is fed by the workers for about a week, after which a wax cover is placed over the cell, and it becomes a pupa, remains 10 days in this condition, and then breaks its wax cover, creeps out, dries its wings, and in a short time passes out of the hive, and flies away with its companions for the collection of honey and materials.

The swarming of the first colony usually takes place between the hours of 10 A. M. and 3 P. M., but second and third swarms often leave earlier or later in the day. The B. issue by many thousands, and the air is filled with them for a space of from 20 to 50 ft. as dense as a snow-shower. In a short time they settle, usually on the limb of a tree, from which they hang in the form of a bag.

Hives.—The first or original hives selected by the B. were the hollow trunks of trees, which they cleansed from dust and rubbish, gnawing off with their mandibles any asperities or projections which might interfere with the future construction of the comb. Next, they were made artificially somewhat of a bell-shape, and constructed of straw and willow twigs; and lastly in the form of oblong or cubical boxes, with various modifications and appendages. For small apiaries, when the owner desires honey simply for home consumption, and can give only occasional attention, a simple box-hive with holes through the top, and a simple rough box to hold 25 or 30 lbs. to set over, answers a good purpose. The size of the hive should not exceed a capacity of 2000 cubic inches; it should be smaller rather than larger, and some good apiarians prefer 1700 or 1800 cubic inches, or about 12 inches each way inside. Sticks are set across for the support of the combs. It is convenient to have a pane of glass set in one side, covered and kept shut by a wooden door, for occasional examination of the interior. If *guide-combs* (or small portions of empty combs) are attached to the ceiling of the hive, the combs may be so directed that their edges will rest against the glass, and enable the operator to see between them.

If the honey which is obtained from the upper movable box is made in small glass boxes placed within this upper box, or in a corresponding chamber made in the upper portion of the hive, it will present a finer appearance and sell at higher prices in market. This chamber may be entered by a side door, and 4 boxes may be placed within it.

Movable-Comb Hives.—Apiarians who have a large number of hives for commercial purposes, who can give much personal attention, and who do not fear to approach and handle B. freely, have adopted of late yrs. a contrivance known as movable-comb hives. These hives enable the owner to examine minutely every part of the interior, and any evil is readily discovered and remedied, each comb being made on a separate frame, which may be lifted out from the rest. If the hive should happen to be queenless, the fact may be at once determined without waiting till the numbers are ruinously reduced. Should the queen produce nothing but drones, the discovery may be at once made, and her place supplied with a more profitable incumbent. If too much drone-comb has been made, it may be replaced with worker-comb. If the moth has effected an entrance, the larvæ may be seen and at once taken out. He can limit the number of swarms by taking out the combs and removing all the queen cells but one. When one hive has a surplus of honey and another is deficient, an equilibrium may be effected by exchanging a few combs. Old combs may be removed, all that is necessary being to substitute empty frames. Movable-comb hives greatly facilitate the making of artificial swarms.

Guide-combs are attached to the bars to have the B. work them straight. Langstroth's hive consists of a series of these frames, so arranged that any one may be taken out separately from the rest. Many other forms of the movable-comb hive have been lately devised, obviating difficulties connected with those first made.

As soon as a hive is occupied by a new swarm, the first thing is to begin the manufacture of cells.

The wax has, perhaps, a nearer analogy to the sebaceous secretion of the integument than to any other animal secretion: it is formed beneath the scales on the under side of the abdomen, and, when accumulated there, seems to irritate the part, for the B. may then be observed wagging her body, and running round, or to and fro, as if endeavoring to shake out the little scales; and she is generally fol-

lowed by one or two other B. which have been attracted by her movements, and are ready to seize upon the plates of wax as they fall.

B. commonly begin at the top or roof of their chamber, and build downward, at first working irregularly, and as it were pasting over the surface, and then building horizontal cells of a more perfect form. The cells are not all of the same size, but a sufficient number of a given depth are reserved for receiving the eggs, and which are necessarily adapted to the size of the future maggot; the smaller or shallower cells are those in which the honey is stored. The breeding and store cells are placed horizontally, but the mouth of the cell is sometimes a little raised, the better to retain the honey. The shape of each cell is hexagonal—the only form which allows the cell to be of the largest size in proportion to the quantity of matter employed, and at the same time to be so disposed as to occupy in the hive the least possible space.

B. do not gather honey indiscriminately from every flower. The collection of the farina or pollen of flowers is a great object of the industry of B. In large flowers, as the tulip, the B. dives in; and if the pollen receptacle or anther be not burst, she bites it open, and comes out singularly disguised, being covered over entirely with the fertilizing dust, which adheres readily to the fringed hairs of her body and legs. When a pollen-laden B. arrives at the hive she generally walks or stands upon the comb beating her wings, and 3 or 4 of her fellow-citizens assist in lightening her of her load; or the laden B. puts her 2 hind legs into a cell, and with the intermediate pair or the extremity of the abdomen brushes off the pellets. These are then kneaded into a paste at the bottom of the cell, and several cells are thus filled with the packed and softened pollen, which is called B.-bread.

Besides the honey and farina, B. also collect a peculiar substance like gum-resin, which was called "propolis" by Pliny; and this they obtain principally from the balsamic buds of the horse-chestnut, birch, and poplar, especially the *Populus balsamifera*. The propolis is soft, red, will pull out in a thread, and is aromatic. It is employed in the hive not only in finishing the combs, but also in stopping up every chink or orifice by which cold, wet, or any enemy can enter.

The *I. B.* which has been introduced of late yrs. is distinguished from the common B. by the yellow bands on its body and by its more vigorous habits. It commences working earlier in the morning, and continues at work later in the evening. It has a longer proboscis, which enables it to take honey from the red clover. When properly managed, it has furnished large stores of honey, but apiarians are not fully agreed as to its gen. value and adaptation to common management, and some yrs. will probably be required to settle the question. [From orig. art. in *J.'s Univ. Cyc.*, by J. J. THOMAS.]

Beech [Ger. *Buche*, (*Fagus*), a genus of trees of the order Cupuliferae, natives of Europe, Amer., and Australia. The sterile flowers have a bell-shaped calyx 5 to 7 cleft, with 8 to 16 stamens. The fertile (or female) flowers grow on the same tree, the fruit of which is a triangular or sharply three-sided nut, two of which are inclosed in an urn-shaped, coriaceous involucre or husk. These nuts, called beechmast, are edible, and are valuable as food for swine. The wood is hard and valuable for fuel, and, being durable under water, is employed in the erection of mills. The Fr. use it extensively in the fabrication of *sabots* or wooden shoes. The white B., which is a common tree in some parts of the U. S., is, according to some botanists, the same species as that which has been just described. The *Fagus ferruginea* (red B. or Amer. B.) is abundant in the N. U. S., sometimes growing gregariously in forests which contain few other trees. The wood is hard, heavy, good for fuel, plane-stocks, shoe-lasts, tool-handles, and other purposes. The color of the wood is a light-brown or reddish; hence the name.

Beecher (CATHARINE ESTHER), a daughter of Lyman, noticed below, b. at E. Hampton, L. I., Sept. 6, 1800. Author of *Domestic Service* and other works. D. May 12, 1878.

Beecher (REV. CHARLES), a preacher and writer, a brother of the preceding, b. at Litchfield, Conn., in 1815. Wrote a *Review of Spiritual Manifestations*.

Beecher (EDWARD), D. D., a brother of the preceding, b. in 1804, grad. at Yale in 1822; was pres. of Ill. Coll. from 1831 to 1844, then a pastor in Boston. Author of *The Conflict of Ages*.

Beecher (HENRY WARD), an author and divine, son of Dr. Lyman B., noticed below, b. at Litchfield, Conn., June 24, 1813. At an early age he had a strong predilection for a seafaring life, which, however, he renounced in consequence of the deep religious impressions which he experienced during a revival. Grad. at Amherst Coll. in 1834, and studied theol. at Lane Sem. under tuition of his father, then pres. of that inst. Presb. minister in Ind. in 1837; in 1847 became pastor of the Plymouth (Congl.) ch. in Brooklyn. Has been a prominent advocate of anti-slavery and temperance reform, and more recently of the rights of women. Among his works are *Lectures to Young Men*, *Life Thoughts*, *Norwood*, a novel, and *Life of Christ*, vol. 1. He has also edited the *Independent* (1861-63) and the *Chr. Union* (1870-81).

Beecher (LYMAN), D. D., a theol., b. at New Haven, Conn., Oct. 12, 1775, grad. at Yale 1797; studied theol. under Pres. Dwight, became in 1798 minister at E. Hampton, L. I., and in 1810 of the Congl. ch. at Litchfield, Conn.; thence removed to Boston in 1826; pres. of Lane Sem., Cin., 1832-51. Author of *Views in Theol.* and *Sermons on Temperance*. Was a man of very energetic character. D. Jan. 10, 1863.

Beecher (THOMAS KENNICUTT), a Congl. minister, son of the preceding, b. Feb. 10, 1824, grad. at Ill. Coll. (Jacksonville, Ill.) in 1843; pastor in Elmira, N. Y.

Beechey (FREDERICK WILLIAM), an Eng. navigator, b. in Lond. Feb. 17, 1796; conducted an exploring expedition

to the Polar Sea and Bering's Strait; returned in 1828, and gave a narrative of his voyage in 1831; became post-admiral of the fleet. D. Nov. 29, 1856.

Bee-Eater, a name given to various birds of the order Icthyophaga, tribe Icthyophagæ, and family Meropidae, which is added to that of kingfishers. The genus *Merope* comprises numerous species, found in Asia, Afr., and Europe, which feed on bees and other hymenopterous insects. The common B.-E. (*Merope apiaster*) abounds in the S. of Europe as a summer bird of passage. It seizes bees as they fly in the air, and watches for them near their hives. It breeds in holes which it excavates in the banks of rivers. There are several other genera called B.-E. The Namaqua B.-E. (*Rhinopneuste namaqua*) is a W. and S. Afr. bird.

Beef-Eater (*B. phœnix*), a genus of birds of the order Insectores and tribe Conirostres, sometimes called oxpecker. They are exclusively Afr., and have a remarkable habit of sitting on the backs of oxen, buffaloes, camels, etc., in order to feed on the larvae of flies on their hides. This genus comprises the species called buffalo-bird of S. Afr.

Beef Tea, an important article of diet for infants and invalids. It is best prepared by taking 1 lb. of lean beef, chopped fine, putting it into an earthen vessel containing 1 pint of tepid water for 2 hours; then straining the liquid, adding a little salt, and placing it over a fire, but removing it before it boils, adding a little pepper or allspice if desirable.

Beelzebub (Gr. Βεελζεβοϋ, *Beelzeboul*, or *Beelzebub*), i. e. "the god of dung or of flies"), who was worshipped by the people of Ekron, in Philistia. Among the Jews B. came in course of time to be commonly applied to a prince or chief of evil spirits, and in this sense it is used in the Gospels.

Beer (Ger. *Bier*; Fr. *bière*). The common B. known as *beer*, *ale*, *porter*, *stout*, etc., is the fermented infusion of malted barley, flavored with hops. In a wider sense the term B. is applied to beverages prepared from cereals, barley, rye, wheat, Indian corn, millet, etc., the chief constituent of which is starch. The treatment involves the preliminary operations of *malting* and *mashing*, or changing the starch to gum (dextrine) and sugar (glucose) by the aid of the natural process of germination. The term *wine*, on the other hand, is restricted to alcoholic liquids obtained by fermenting the saccharine juices of fruits, as the grape, apple, pear, currant, and gooseberry, or the sap of such plants as the sugar-cane, palm, Amer. *ale*, etc. There are, however, many beverages of inferior quality called B., which consist of saccharine liquors more or less completely fermented, and flavored with various substances, such as spruce B., ginger B., root B., etc.

The manufacture of B. from barley is divided into 2 distinct processes—*malting* and *brewing*—which are conducted in different establishments, the *malt-house* and the *brewery*; the brewer often purchasing his malt from the maltster. *Malting* consists of 4 successive operations: (1) *Sleeping*. The barley is placed in wooden cisterns, covered with cold water, and allowed to soak for 2 or 3 days, when the water is drained off. (2) *Couching*. The softened barley is thrown out upon the floor of the malt-house in heaps or *couches*, where it heats spontaneously and begins to germinate, throwing out rootlets or *radicles*, and shoots or *acrospires*. At the same time it evolves a portion of its water, the operation being called *sweating*. (3) *Flooring* is resorted to in order to check the germination by reducing the temperature. It consists in spreading the barley over the floor, and repeatedly turning and respraying it over a constantly widening area in layers of diminishing thickness. When the process of germination has proceeded as far as is desirable, it is completely stopped by (4) *kiln-drying*. This is effected in a large room with brick or tile floors, the *kiln*, which is heated to the desired temperature. Here the germinated barley is rendered perfectly dry and crisp. It is then *malt*.

Ale is prepared from pale malt, and the active fermentation is checked while there still remains a considerable quantity of sugar unchanged. This, by subsequent fermentation in the barrel or bottle, keeps up the briskness. *Pale ale* is made from malt dried in the sun or by steam. It is not allowed to rise above 72° during the fermentation. The formation of acetic acid is thus prevented, and the unpleasant flavor due to the solution of the yeast by the alcohol is avoided. *Scotch ale* is a sweet strong ale. *Small B.* is a weak liquor made by using little malt, or by mashing with fresh water the malt residuum left after the wort for ale or porter has been drawn off. *Porter* is a dark-colored B. made from a mixture of pale, amber, brown, and black malt. *Stout* is strong porter. *Beck's white B.* (Gruess B.) is prepared by quick fermentation from a mixture of 1 part of barley malt and 5 parts of wheat malt with half a lb. of hops per bushel.

Lager B.—The B. of Bavaria, which has of late yrs. been so extensively manufactured in the U. S. under the name of *lager B.*, owes its name (from *lager*, a "storehouse") to the fact that it is stored in cool cellars or vaults for several months before it is used, and its remarkable keeping qualities and highly prized properties to the peculiar kind of fermentation by which it is produced. The fermentation of ordinary B. and ale takes place at high temperatures; it is consequently rapid, and the carbonic acid, evolved in bubbles, carries a portion of the yeast to the surface, forming a thick scum. This scum protects the B. from the oxygen of the air. The conversion of gluten into yeast is in part a process of oxidation, and the oxygen being excluded considerable gluten remains unchanged, and acting as a ferment leads to the subsequent change of alcohol to acetic acid. The fermentation of *lager B.* is conducted at a low temperature—between 40° and 50° F. It proceeds more slowly, and the carbonic acid does not carry the yeast to the surface. Consequently the air has a freer access, and the gluten is more completely converted into yeast. This B. is usually fermented in the winter, or, if in summer, in rooms cooled by

ice. This is called sedimentary or under-fermentation, to distinguish it from the ordinary surface fermentation. The yeast, called bottom-yeast, is quite different from ordinary yeast, and has a tendency to induce the kind of fermentation by which it was produced. The following is a brief outline of the process employed at one of the largest lager-B. breweries in New York. The barley is soaked 2 or 3 days, changing the waters; it germinates 6 to 10 days, till the radicles are brownish; it is then kiln-dried. It is crushed between rollers, mashed at 120° to 140° F. the temperature being raised by the addition of boiling water to 160° or 170°. By adding hot water to the residue a second wort is obtained. The first wort is boiled with the hops; the second wort is let in, and the whole is boiled 3 or 4 hours. After cooling to between 44° and 50° F., it is run into open fermenting tuns. One gal. of yeast is added for every 20 to 25 barrels. Fermentation continues from 10 to 20 days. There is a heavy froth at first, which subsides, leaving the surface clear. It is raked off into hogsheads, when the yeast is found at the bottom of the tuns. It stands in these hogsheads with the bung open. A few days before it is to be put in barrels for use the bung is driven in to accumulate carbonic acid for life.

Three varieties of this B. are made: (1) "*Lager*," or summer B., for which 3 bushels of malt and 1½ to 3 lbs. of hops are used per barrel, and which is not ready for use in less than from 4 to 6 months. (2) "*Schenk*," winter or present-use B.; 2 to 3 bushels malt and 1 lb. hops per barrel; ready in 4 to 6 weeks. (3) *Beck* beer, which is an extra strong B., made in small quantity and served to customers in the spring, during the interval between the giving out of the *schenk B.* and the tapping of the *lager*. In its manufacture 3½ bushels of malt and 1 lb. of hops per barrel are used, and it requires 2 months of its preparation. C. F. CHANDLER.

Beersheba (i. e. the "well of the oath," or, according to another etymology, "well of the seven"), an anc. frontier place of Pal., about 50 m. S. W. of Jerusalem, and near the border of the desert. The phrase "from Dan to B." was used proverbially to express the whole extent of the land of Israel.

Bees'wax [Lat. *ceræ*], a substance secreted by the honey bee, is the material of which its cells and combs are constructed, and is an important article of commerce. The natural yellow color is sometimes changed to white by exposure to the joint action of the sun, the ozone of the air, and moisture. It fuses at 145° F., is insoluble in water, and partly soluble in boiling alcohol. B. is much used in the manufacture of candles and tapers, and for other purposes.

Beet (Ger. *Beete*), (*Betta*), a genus of plants of the order Chenopodiaceæ. The species of *Beta*, which are not numerous, are natives of the temperate parts of the E. hemisphere. The common B. (*Beta vulgaris*) is extensively cultivated, the boiled roots being a common article of food in Europe and N. Amer. A coarser variety, called mangold-wurzel, is a valuable food for cattle. Large quantities of sugar are extracted from the roots of the B. in Fr. and Ger. The B.-sugar, when refined, is identical with that of the sugar-cane.

Beethoven, bā'to-ven, van (LUDWIG), b. at Bonn Dec. 17, 1770. He was the second of 4 children, of whom the first died an infant. Having outgrown his father's instruction, the lad was put under the tuition of Pfeiffer, oboist in the chapel, and then under that of Van der Eder, reputed the best organist in Bonn. At the age of 11 he was transferred from Van der Eder to his successor in the chapel, Neefe. At this period the lad dedicated to the elector 3 piano-forte sonatas, which also were printed. When but 14 he was made assistant court-organist, and 3 yrs. later was sent to Vienna, at the elector's expense, to pursue his studies under the direction of Mozart, then at the height of his fame. In Vienna he finally made his home, after an incidental residence of several yrs. in Rome, where his efforts were required to support his 2 younger brothers. On his return to Vienna he studied with Haydn and Albrechtsberger, the celebrated contrapuntist, making himself master of the science of musical composition. His favorite instrument at this time was the piano-forte. His technical education being completed, works came from his hand with astonishing rapidity. Before he was 30 yrs. old he had pub. as many as 20 sonatas for the piano-forte, 9 for piano and instruments, 2 concertos for piano and orchestra, trios, quartets, quintets, septets, a ballet, *The Men of Prometheus*, and 2 orchestral symphonies. At this period he moved in the best society, was noticed by persons of rank, and recognized by all as a genius of the first order. These days were soon clouded by the one great calamity of his life. Already in 1800 he speaks of a defect in his hearing which occasioned serious inconvenience. In the course of 2 or 3 yrs. he became totally deaf. From this time books, meditation, and solitary walks in the country were his sole recreation. His society was limited to a few friends, with whom he could forget himself. He lived in his work, which gained in power and intensity from yr. to yr. In less than 5 yrs. were produced the *Heroic Symphony*, *Fidelio*, Symphonies Fourth, Fifth, and Sixth, with the grand mass in C. In 1813 came the Seventh Symphony; 3 yrs. later the Eighth, in 1824 the Ninth or "Choral" Symphony, by many thought the most wonderful of all—by B. himself regarded as the most significant; and in the intervals between these gigantic creations was produced some of his most perfect music.

B. d. Mar. 26, 1827, of dropsy, following a violent inflammation of the lungs. His life was solitary; he was never married. His strongest natural attachment was for a nephew who proved unworthy of his uncle's devotion. Though his deafness made him a recluse, he was not selfish, sordid, or narrow-souled. An enthusiastic republican in his belief, and an ardent sympathizer with his countrymen in their struggles for political liberty, B. suffered bitterly for the woes of his Fatherland, and poured out through his music the passion of his proud, agonized heart.

B. was something besides a musician. He read much and thought much; he was familiar with the lit. of Ger., and even with It. letters. When interested, his conversation was animated, brilliant, and instructive. His latest and most careful biographer, however, Mr. A. W. Thayer, an Amer., describes him as looking much like a mulatto, short and sallow, with wide nostrils and projecting teeth, heavy lips, and high cheek-bones. Until the biography of Mr. Thayer the authorities were his contemporary, Moscheles (whose work has been republished in this country), and Schindler. [For a more complete article on BEETHOVEN, see *J. S. Univ. Lib.*.] O. B. FROTHINGHAM.

Beetle, a common name given to insects of the order Coleoptera. They may be distinguished and recognized by the 2 hard sheaths or *elytra* which cover the pair of true membranous wings and organs of flight.

Beet-Root Sugar, a kind of sugar made in Fr. and Ger. (See SUGAR.)

Beghards [Lat. *Beghardi*, *Beghardi*, and sometimes *Beguini*, for which see BÉGUINES], a name applied to semi-monastic societies of men, originating in the Netherlands, and dating from the early part of the 13th century. At first they were distinguished for piety and works of beneficence. Some connected themselves with monastic orders, some became fanatical, and some fell off into heresies. They were severely handled by the Inquisition, but spread into Ger., Fr., Switz., and It., and continued down to the Ref.

Begharmi, or **Bagirmi**, a state of Central Afr., is bounded N. by Lake Tchad, E. by the kingdom of Wadai, and W. by the river Shari, which separates it from Bornou. It was founded by a heathen chief about 300 yrs. ago, but Mohammedanism soon became the ruling religion. Area, 56,600 sq. m. Pop. estimated at 1,500,000.

Béguines, ba-gēen' [Lat. *Beguina*, *Begute*, some say from the old Sax. *beggen*, "to beg" or "to pray"; others from the supposed founder, Lambert le Bègue or Bèghe], the name given to semi-monastic societies of women, originating in Belg. about 1180. The women, without assuming monastic vows, lived in houses by themselves, labored for their own support, and took care of the sick. A few of these establishments (20) are still found in Belg.

Behaim, bā'hīm, or **Behem**, MARTIN, a cosmographer and navigator, b. at Nuremberg about 1459. A large globe which he made in 1492 is still preserved by his descendants in Nuremberg, and is prized as a record of the progress of geog. D. July 29, 1566.

Beheding. See CAPITAL PUNISHMENT.

Behemoth, bē'he-moth, a huge animal described in the book of Job, perhaps identical with the hippopotamus.

Behistun [Lat. *Bagistaban*; Pers. *Baghistān*, *i. e.*, "place of gardens"], a ruined town of Per., near which is a remarkable limestone rock, 1700 ft. high, a part of whose face has been smoothed off and is covered with inscriptions made by Darius about 515 B. C. Most of them are in Per., but some are in the Median and Babylonian langs.

Behring. See BEIRING.

Beirut, or **Bairut**. See BEYROUT.

Bejapoor (*i. e.*, "the victorious or unconquerable city"), a city of India, 140 m. S. E. of Bombay. It was formerly the cap. of the powerful Hindoo kingdom of the same name, which was conquered by Aurangzeb in 1686, and was afterward a part of the empire of the Grand Mogul. According to tradition, it contained 100,000 houses, now in ruins. It has some of the most magnificent remains in India.

Beke, beek (CHARLES TILSTONE), Ph. D., a traveller, b. in Lond. Oct. 10, 1800. Explorations in Afr. were the subject of his books. D. July 30, 1874.

Bekker (IMMANUEL), a philologist, b. in Berlin in 1785, a pupil of F. A. Wolf at Halle; prof. of philology at Berlin in 1810; pub. *Anecdota Græca* and good eds., with critical notes, of many classics, among which are Plato, *The Attic Orators*, and Aristotle. D. June 7, 1871.

Bel Air, Md. See APPENDIX.

Bel and the Dragon, **History of**, an apocryphal book of the Bible, regarded as canonical in the R. Cath. Ch., part of chap. xiv. of the book of Daniel in the Vulgate.

Belcher (SIR EDWARD), F. R. S., b. in 1799. When post-capt. he commanded an expedition sent in search of Sir John Franklin in 1852. D. Mar. 18, 1877.

Belcher (JONATHAN), a merchant, b. in Cambridge, Mass., Jan. 1681, grad. at Harvard in 1699. He was gov. of Mass. and N. H. (1730-41), and subsequently of N. J. D. Aug. 11, 1757.

Belem. See PARA.

Belemnite [Lat. *belemnites*, from the Gr. *βέλενον*, a "dart" or "arrow"], a name given to the endoskeleton of fossil Cephalopods, of a peculiar family (*Belemnitidae*). This portion is a cylindrical or conical mass of carbonate of lime, from 2 inches to a ft. in length, one extremity generally acute, the other excavated to form a conical cavity. This organ is called the *guard*. The guard of the B. expanded above into a hollow, chambered cone, the "phragmacone," and from one side of this projected a spatulate lamina of horny or shelly material, the homologue of the "cuttle-bone" of *Sepia* and the "pen" of *Loligo*. The B. animal somewhat resembled our common squid. The B. begin in the St. Cassian beds, as the top of the trias, are very numerous in the Jurassic strata, but are not found in any more recent deposits. They are represented in the chalk by *Belemnitella*, but have no living reps.

Belfast, a city and seaport of Ire. on Belfast Lough (an arm of the sea), at the mouth of the river Lagan, 101 m. N. of Dublin. The place, which first rose to importance about 1604, is now next to Dublin the most important city of Ire., being the great centre of the linen manufacture and trade. It is the seat of Queen's Coll., of a Presb. and a Meth. Coll., and of the Royal Academical Inst. connected with the Lond. Univ. Pop. 1881, 207,671.

Belfast, on R. K., a city and seaport, cap. Waldo co., Me., is on the N. W. shore of Penobscot Bay (sometimes

called Belfast Bay), 30 m. from the ocean and 30 m. S. by W. of Bangor. Pop. 1870, 5278; 1880, 5308.

Bel'ford (JAMES B.), b. at Lewistown, Pa., Sept. 28, 1837, ed. at Dickinson Coll., studied law; was appointed one of the judges of the supreme court of Col. (1870-75). Since the admission of Col. as a State, has been elected its rep. in the 44th, 45th, 46th, 47th, and 48th Congs., but was refused his seat by the Democratic majority in the 45th, on a technical quibble. Residence, Central City.

Belge, bel'je, the name given by Cæsar to the warlike tribes which occupied one of the 3 great divisions of Gaul. Their country, which was bounded N. W. by the ocean and E. by the Rhine, comprised the modern Belg., part of Hol., and the N. E. part of Fr. Some of the B. crossed the Channel and settled in the S. parts of Brit., and were found there by Cæsar when he invaded the island.

Belgiojoso, bel-jo-yō'so (CRISTINA), PRINCESS OF, b. at Milan June 28, 1808, a daughter of Marquis Geronimo Isidoro Trivulzio; married, on Sept. 14, 1824, Prince Emilio Barbiano B. She embraced the Italian cause with great enthusiasm, and made it the chief work of her life. In 1830 the Aus. govt. expelled her from It. She finally returned in 1861. She was the author of several books. D. July 5, 1871.

Belgium, bel'je-um, one of the smallest and the most densely populated of European states, situate in lat. 49° 30' to 51° 30' N., and lon. 2° 30' to 6° 5' E. It is on the Ger. Sea, between Hol., Prus., and Fr. Area, 11,373 sq. m., with a pop. of 5,519,844, or 485 to the sq. m.

Surface and Soil.—Mostly level, or slightly rolling; some offshoots of the Ardennes in the S., marshes and sand-dunes in the E.; soil generally moderately fertile. Coast 46 m. long, and few good harbors. Rivers—Scheldt, Meuse, and their affluents, the Sambre, Ourthe, Werze, Lys, Dender, and Rupel. Many canals, but no lakes of importance. Climate generally temperate.

Minerals.—Copper, zinc, lead, iron, and coal; in the last it is excelled only by Eng., its coal area covering 476 sq. m.

Animals.—Only domestic animals in the kingdom: horses, cattle, sheep, goats, swine, rabbits in great numbers, dogs, etc.

Vegetation and Vegetable Products.—The area is $\frac{1}{2}$ arable, $\frac{1}{10}$ meadow and pasture, $\frac{1}{10}$ woods and forests, $\frac{1}{10}$ marsh and sand. Chief products, wheat, rye, barley, oats, flax, hemp, tobacco, potatoes, etc.

Industries.—The manufacturing and mining products of B. are of immense amount and of excellent quality. Beer, 244,821,687 gals.; distilled spirits, 132,000,000 gals.; beet-sugar, iron and steel, and machinery; linen, woollen, cotton, and silk goods, carpets and oil-cloths; biscuit, starch, candles, cigars, varnish, chocolate, zinc, paper, firearms, glass, butter, and lace. The exports amount to about \$450,000,000, the imports to a trifle more. The prin. exports are iron and steel, coal, linen yarns and goods, flax, cotton and woollen and silk goods, lace, wrought iron, hardware, machinery, wool, zinc, paper, firearms, glass, and some sugar. The imports are cotton, wool, silk, some descriptions of iron, provisions of all kinds, silk goods, wine, etc.

Railways.—Total length, 2600 m., about $\frac{1}{2}$ under the control of the state; these pay large dividends. Telegraph, 3530 m.

Finances.—Public debt in 1880, \$268,644,500; public revenue, \$54,115,230; public expenditure, \$54,695,060.

Religion and Education.—R. Cath.; only 15,000 Prots. and 3000 Jews. Four univs.—Ghent and Liege, state insts.; Louvain, Catholic; Brussels, Prot. and liberal—3 conservatories of music, 2 acads. of fine arts, and a museum of painting and sculpture. Public or common-school education in the hands of R. Cath. clergy and Jesuits. In 1878, 5729 schools, 11,808 teachers, 687,749 scholars out of 772,076 of school age.

Government.—Since 1831 a constitutional monarchy; crown hereditary in male line only; executive power vested in king alone; legislative shared with senate (68 members, term 8 yrs.) and house of reps. (136 members, 4 yrs.); courts stand high; Code Nap. judicial standard. National colors, red, yellow, and black; national escutcheon, lion of Brabant.

History.—In time of Rom. empire inhabited by Celtic and Germanic races; called *Gallia Belgica*. By treaty of Verdun, B. given to Fr., Hol. to Ger.; after fall of Carolingian rule, Fr. B. converted into duchies and counties; Burgundy most powerful; the whole Netherlands became the Circle of Burgundy under Maximilian I. After 1555 B. was united with Sp., and subsequently portions ceded to Fr. In 1713 given to Aus., and held by her with brief exceptions till 1792-94, when it was ceded to Fr. and held by that country till 1814. From that time to 1830, united with Hol. as kingdom of Netherlands. Independent, and elected Leopold I. king in 1831. Has been quietly and steadily developing ever since.

Population.—We have already given the total in Dec. 1880. They are mostly of two nationalities—the Flemings, who speak Flemish, and who constitute $\frac{1}{2}$ of the pop., and the Walloons, who speak Fr.—about of equal numbers, and nearly 40,000 Gers. There are 9 provs.—Antwerp or Anvers, Brabant (S. Brabant), W. and E. Flanders, Hainaut, Namur, Liege, Limburg, and Luxembourg. The chief towns are Brussels (the cap.), pop. 399,936; Antwerp, 160,000; Ghent, 130,000; Liege, 120,000; Bruges, 45,097; Louvain, 35,000; Maestricht, 30,000; Namur, 27,000; Luxembourg, 15,000.

L. P. BROCKETT.

Belgrade, bel-grād' (anc. *Singidūnum*; Tur. *Bilgruad*; Ger. *Belgrad*), a fortified town of Servia, on the Danube, at the mouth of the Save, 42 m. S. E. of Peterwardein. The citadel is on a point of land between the rivers, behind which rises the city with antique Ger. edifices, a cathedral, and a palace. B. was besieged without success by the Turks in 1456, and taken by the sultan Solymán in 1522. In 1688 it was stormed and captured by the elector of Bavaria, but it was recovered by the Turks in 1690. Prince Eugène here de-

feated 300,000 Turks in 1717, after which it changed owners several times, and is now the cap. of Servia. Pop. 1880, 26,651.

Bellial, bæ'li-al [Heb., "worthlessness"], a term used in the Bible, frequently occurring in the phrase, "a son of B.," which, by a common Heb. idiom, signifies a worthless person. Some suppose that in the N. T. B. is also used as a proper name for Satan.

Bellator, de (BERNARD FOREST, a Fr. military engineer, b. in Catalonia in 1697; was a member of the Acad. of Sciences, and wrote upon math. and engineering. D. 1761.

Bellisarius [Slavic, the "white isar or chief"], a gen. to whom Justinian was chiefly indebted for the military glory of his reign. b. at Germania in Illyria, about 505 A. D. He defeated the Pers. at Dara in 530, and the Vandals in Afr. in 534. He also commanded the army of Justinian in a long war against the Ostrogoths in It., occupying Rome in 536, and gaining some other advantages. In 550 he served against the Bulgarians; in 563 he was imprisoned on a charge of treason. D. 565.

Bellknop, bel'nap (JEREMY), D. D., b. at Boston, Mass., June 4, 1734, grad. at Harvard 1762; studied theol., was pastor of the Congl. ch. at Dover, N. H., from 1767 until 1786, and afterward of the Federal street ch. at Boston for the remainder of his life; was an active patriot during the Revolution; projected in 1790 the Mass. Historical Society. Author of a *Hist. of N. H.* and other historical works and discourses, and of a *Collection of Psalms and Hymns*. To him was attributed by Mr. Bryant "the high merit of being the first to make Amer. hist. attractive." D. June 20, 1798.

Bellknop (WILLIAM G.), b. at Newburg, N. Y., Sept. 7, 1794; entered the service of the U. S. in 1813 as 3d lieut. of inf. and rose to be a brevet brig.-gen., serving in the war with G. Brit., against the Seminoles, and in Mex. D. 1851.

Bellknop (WILLIAM WORTH), son of Gen. William G., b. at Newburg, N. Y., 1829, grad. at Princeton 1848; studied law, settled at Keokuk, Ia., 1851, entered the army as major of 15th Ia. 1861, served under Grant at Shiloh, Corinth, and Vicksburg, and was in Sherman's "march to the sea;" brevetted maj.-gen. 1865, sec. of war under Grant from 1869 to 1876, when he resigned. Being impeached before Cong. on a charge of corruption, he was acquitted, and his case in the civil court was dismissed, as the testimony did not sustain the prosecution.

Bell [from the A.-S. *bellan*, to "make a loud noise"]. The antiquity of B. has been much debated, and to little purpose. Of the bronze B. found by Layard at Nimroud (anc. Larissa), the largest were only 3¼ inches high. The introduction of B. into chs. is usually ascribed to Paulinus, bp. of Nola in Campania (400 A. D.), but without sufficient authority. Several specimens, some of them, it is believed, as old as the 6th century, are still preserved in Ire., Scot., and Wales. B. came into use in the E. after 865. Ch. B. were then of a comparatively small size, and were frequently made of wrought instead of cast metal. It was not until the 14th century that they reached a large size. The largest B. in the world in actual use is at Moscow, and weighs 128 tons. The notion that B. are efficacious in dispelling storms is by no means extinct.

It was a belief that B. had the power to terrify evil spirits, and the custom of ringing the *passing-B.* grew out of the belief that devils troubled the expiring patient, and lay in wait to afflict the soul the moment it escaped from the body. The tolling of ch. B. while funerals are in progress is still practised in various countries.

The ringing of the *curfew*, instead of being introduced into Eng. by William the Conqueror, was probably an already existing regulation, requiring lights and fires to be extinguished by 8 o'clock.

The ringing of B. in chimes, and the playing of tunes upon them in ch. towers, have been carried to the greatest perfection in the Netherlands, but many fine chimes are found in many other European countries and in the U. S.

R. D. HITCHCOCK.

Bell (ALEXANDER GRAHAM), inventor of the speaking telephone, b. Mar. 3, 1847, at Edinburgh, Scot., ed. at the high school and the univ., and specially trained to follow his father's and grandfather's profession for the removal of impediments of speech. In 1872 he took up his residence in the U. S., and introduced his father's invention of visible speech in insts. for deaf mutes, and was subsequently appointed prof. of vocal physiology in Boston Univ. He occupied his leisure during many yrs. in working out his telephonic discovery, and in 1876 exhibited it publicly for the first time, but in an imperfect form, at the Centennial Exhibition. Its success is now established throughout the civilized world. He received, 1882, diploma and decoration of National Legion of Honor of Fr.

Bell (ALEXANDER MELVILLE), inventor of visible speech, a system of universal alphabets which has been successfully used for teaching the deaf (and dumb) to speak, b. Mar. 1, 1819, at Edinburgh, Scot., and ed. under his father, Alexander Bell, author of a method for the removal of impediments of speech. From 1843 to 1865 he held classes in connection with the Edinburgh coll., and in 1865 was appointed lecturer in Univ. Coll., Lond. In 1870 he removed to Canada, and was appointed register in Queen's Coll., Kingston, in 1877. His second and only surviving son is Alexander Graham Bell, inventor of the telephone.

Bell (ANDREW), D. D., a Scot. teacher, noted as the founder of the monitorial system of education, b. at St. Andrew's in 1753. Having obtained the direction of a school for male orphans at Madras, he employed the scholars in mutual instruction, and in 1797 pub. a treatise on the new method. He left £120,000 sterling to found educational insts. on the monitorial system. D. Jan. 27, 1832.

Bell (SIR CHARLES), F. R. S., a Brit. anatomist and physiologist, the youngest brother of Andrew Bell, b. in Edinburgh in Nov. 1774. He removed in 1804 to Lond., where he lectured and practised. He made the discovery that the nerve-

filaments of sensation are distinct from those of motion. In 1836 he became prof. of surgery in the Univ. of Edinburgh. Among his works is an *Exposition of the Anatomical System of the Nerves of the Human Body*. D. Apr. 29, 1842.

Bell (CHARLES H.), U. S. N., b. in New York Aug. 15, 1798; became a mdpn. in 1812, made rear-admiral in 1860. D. Feb. 19, 1875.

Bell (HENRY), a Scot. engineer, b. in Lindlithgowshire Apr. 7, 1767, was the first who obtained success in steam navigation in Europe. "The Comet," with an engine constructed by himself, was launched on the Clyde in 1812. D. 1830.

Bell (HENRY H.), U. S. N., b. Nov. 17, 1807, in Orange co., N. C., entered as a mdpn. Sept. 1, 1823, made a rear-admiral in 1866, commanded with distinction during the c. war. When in command of our squadron in the E. I. he was drowned, Apr. 12, 1867, in an attempt to pass in his barge over the bar at the mouth of the Osada River, Japan.

Bell (JOHN), a surgeon, b. in Edinburgh May 12, 1763, was an elder brother of Sir Charles Bell. Lectured and practised in his native city. Author of a *System of the Anat. of the Human Body* and other works. D. Apr. 15, 1820.

Bell (JOHN), a statesman, b. near Nashville, Tenn., Feb. 15, 1797, grad. at the Univ. of Nashville in 1814; was elected an M. C. in 1827, and chosen speaker of the House of Reps. in 1834. In Mar. 1841 he was appointed sec. of war by Pres. Harrison; in Sept. of the same yr. he sent his resignation to Pres. Tyler. In 1847 he became a senator of the U. S., and opposed the repeal of the Mo. Compromise in 1854. Was nominated in 1860 for Pres. of the U. S. by the Constitutional Union party, having Lincoln, Douglas, and Breckenridge as his competitors. He received 39 electoral votes. D. 1869.

Bell (LUTHER V.), M. D., LL.D., a son of Gov. Samuel Bell, b. at Chester, N. H., Dec. 20, 1806, grad. at Bowdoin in 1823, and received his diploma in med. at Dartmouth. Was pres. of the McLean Insane Asylum, Somerville, Mass., 1837-56; became med. director of Hooker's division. D. 1862.

Bell (SAMUEL), LL.D., b. in Londonderry, N. H., Feb. 9, 1770, grad. at Dartmouth in 1793. He became a lawyer, was a judge of the supreme court of N. H. 1816-19, gov. 1819-23, U. S. Senator 1823-35. D. 1850.

Bell (SAMUEL DANA), LL.D., son of the above, b. at Francetown, N. H., Oct. 9, 1798, grad. at Harvard Coll. in 1816; became chief-justice of N. H. 1859-64, and was one of the most eminent and profound jurists that N. Eng. has ever produced. D. July 31, 1868.

Bell (THOMAS), F. R. S., an Eng. naturalist, b. in Dorsetshire Oct. 11, 1792; in 1853 he was elected pres. of the Linnean Society. Among his works are a *Hist. of Brit. Quadrupeds*. D. Mar. 17, 1880.

Belladonna (*Atropa Belladonna*), an herbaceous perennial plant of the natural order Solanaceæ, is sometimes called **Deadly Nightshade**. It is a native of Europe, has ovate leaves, bell-shaped flowers of a lurid purple color, and berries which when ripe are black, shining, and sweetish in taste. All parts of the plant are narcotic and very poisonous, and contain an alkaloid called *atropia* or *atropine*, on which its active properties depend. The B. is considered a valuable med. and a powerful remedy for certain nervous diseases, neuralgia, paralysis, etc. It is administered both internally and externally. It is a physiological antidote for opium-poisoning. When applied to the eye it has the remarkable property of greatly dilating the pupil, and it is often used by oculists both in examinations and operations. The medicinal preparation of B. commonly used in the U. S. is an extract from the leaves.

Belladonna Lily (*Amaryllis Belladonna*), a beautiful rose-colored flower which grows wild about the Cape of Good Hope, and is cultivated in the gardens of Eng. and Fr. The drooping flowers are clustered at the top of a leafless stem, which is about 18 inches high.

Bellaire, a city and R. R. centre, Belmont co., O., on the O. River, 5 m. S. of Wheeling and 137 m. E. of Columbus. Coal, iron, and limestone are abundant. Pop. 1870, 4033; 1880, 8025.

Bellamy (JOSEPH), D. D., b. in N. Cheshire, Conn., in 1719, grad. at Yale 1735, pastor of the Congl. ch. at Bethlehem, Conn. 1740-90. Author of *True Religion Delineated* and other books. D. Mar. 6, 1790.

Bellarmino (ROBERT), [It. *Roberto Bellarmino*], a theol., b. in Tuscany Oct. 4, 1542. Became a Jesuit in 1560, and prof. of theol. at Louvain in 1569. Was an able controversial writer against heretics. His prin. work is *Disputationes de Controversiis Fidei adversus longos Temporis Hæreticos*. Cardinal in 1598, abp. of Capua in 1601, and librarian of the Vatican in 1605. D. Sept. 27, 1621.

Bella'ry, a town of India, in the province of Madras, 135 m. N. of Seringapatam, is one of the chief military stations in the prov. and has a ft. on a rock 450 ft. high. Pop. 51,766.

Bell Bird [Sp. *campanero*], (*Chasmorynchus nudicollis*, etc.), a name applied to certain birds in allusion to their calls. Those of S. Amer. are Cotingids, and are all nearly as large as a pigeon. They utter a note of metallic sound, resembling the tolling of a bell, which, it is said, can be heard at a distance of 3 m. The plumage of the male is snowy white. From the forehead grows a curious horn-like and tubular appendage, which when empty is pendulous, but when the bird is excited is filled with air and rises to the height of 3 inches. The Australian B. B. (*Myzantha melanophrys*) is one of the honey-eaters, and produces a peculiar tinkling sound.

Bellefontaine, R. R. junc., cap. of Logan co., O., 110 m. N. of Cin. and 55 m. N. W. of Columbus. It has the highest elevation of any town in the State. Pop. 1870, 3182; 1880, 3998.

Bellefonte, R. R. junc., cap. of Centre co., Pa., 87 m. N. W. of Harrisburg. It has a celebrated spring, and of late is a summer resort. Pop. 1870, 2655; 1880, 3026.

Belle Plaine, on R. R. Benton co., Ia., 116 m. W. of Clinton. It has a round-house and shops of the R. R. Pop. 1870, 1488; 1880, 1689.

Bellerophon, bel-ler'-o-fon (Gr. Βελλεροφώντας, "slayer of Bellerus"), originally called **Hippion'ous**, a personage of the Gr. mythology, was a son of Glaucus, king of Corinth. Killed Bellerus by accident, fled to Prætus, king of Argos, and from him, at the instigation of his wife, carried a sealed letter to Iobates, king of Lycia, requesting the latter to kill him, but that king imposed on him the mission of fighting with the Chimæra. He killed this monster and defeated the Amazons.

Bellerophon, a genus of fossil univalve gasteropod mollusks. Many species of it have been found in the Silurian, Devonian, and carboniferous rocks in various parts of the world.

Belleville, on R. R., cap. of Hastings co., Ont. (Canada), on the Bay of Quinté, 113 m. E. N. E. of Toronto. It is the seat of Albert Univ. (Meth. Epis.), which consists of Albert Coll. for young men and Alexandra Coll. for ladies. One m. W. of the town is the deaf and dumb asylum. Pop. 9516.

Belleville, city and R. R. centre, cap. of St. Clair co., Ill., 14 m. S. E. of St. Louis. It is in a region abounding in coal. Pop. 1870, 8146; 1880, 10,683.

Bellevue, Id. See APPENDIX.

Bellevue, Iowa. See APPENDIX.

Bellevue, R. R. junc., Huron co., O., 45 m. S. E. of Toledo. Pop. 1870, 1219; 1880, 1432, and 737 in Sandusky co.

Bellingham (RICHARD), a lawyer, b. in Eng. in 1592, emigrated to Amer. in 1634. In 1641 he was elected gov. of Mass. in opposition to Gov. Winthrop. D. Dec. 7, 1672.

Bellini, bel-lee'-ne (GIOVANNI), a painter, b. at Venice in 1426. He was the master of Titian, and was called the founder of the Venetian school. D. Nov. 29, 1516.

Bellini (VINCENTO), an It. composer, son and grandson of musicians, b. at Catania, Sic., Nov. 3, 1802. Wrote *La Sonnambula* and *La Norma*, etc. D. Sept. 24, 1835.

Bell Metal, a hard, dense, brittle, and sonorous alloy of copper with tin, zinc, or some other metal. The proportion in Eng. bells is usually 75 per cent. of copper and 25 of tin. The B. M. of commerce usually contains 80 of copper to 20 of tin, or else 78 of copper to 22 of tin.

Bello'na, the goddess of war in the anc. Rom. mythology, was represented as the companion and sister or wife of Mars, armed with a scourge and holding a torch in her hand.

Bellows (ALBERT F.). See APPENDIX.

Bellows (HENRY WHITNEY), S. T. D., LL.D., a Unit. minister, b. in Walpole, N. H., June 11, 1814, grad. at Harvard in 1832, and became a pastor in New York in 1838; was one of the founders of the *Chr. Inquirer*. Among his works is *The Old World in its New Face*. He was the first pres. of the U. S. Sanitary Commission. D. Jan. 30, 1882.

Bellows Falls, R. R. junc., Windham co., Vt., on the W. bank of the Conn. River, 53 m. S. E. of Rutland. The river here falls 44 ft. in half a m. The village has a medicinal spring and great water-power. Here is St. Agnes' Hall, a sem. for young ladies. Pop. 1870, 697; 1880, 2229.

Bellows-Fish. See TRUMPET-FISH.

Bells, in nautical lang., is a term used instead of those expressions by which people on land indicate the hour. The day or night is divided into periods of 4 hours, and the bell is struck once at the expiration of each half hour. The number of strokes denotes the number of half hours that have elapsed in that watch.

Belmont, Miss. co., Mo., on R. R. and the Miss. River, opposite Columbus, Ky., 197 m. S. E. of St. Louis. In 1861 this place was occupied as a Confed. camp. On Nov. 7 Gen. Grant undertook to dislodge the enemy; was partially successful at first, but the Confeds. being reinforced, the U. troops were repulsed.

Belmont (AUGUST), b. at Alzey, in Ger., in 1816, came to Amer. in 1837 as rep. of the Rothschilds. He became a prominent man in the financial world of New York and a leader in Dem. politics.

Beloit, city and R. R. junc., cap. of Mitchell co., Kan., on the N. bank of Solomon River. Pop. of tp. 1870, 173; 1880, 2793, including 1835 in city.

Beloit, city and R. R. centre, Rock co., Wis., on Rock River, 91 m. N. W. of Chicago and 47 m. S. E. of Madison. It is the seat of B. Coll. Pop. 1870, 4396; 1880, 4790.

Beloit College, at Beloit, Wis., was founded by the Congl. and Presb. chs. of Wis. and N. Ill., chartered by the Terr. legislature of Wis. in 1846, and opened for students in 1847. It embraces a coll. proper and a preparatory academic school. Aaron L. Chapin, D. D., is its pres. He is assisted by 9 profs. and 2 instructors of the preparatory school. It maintains a high standard of scholarship, and has rendered efficient service in the interests of education for the region in which it is located.

Beloochistan bel-ooh'-chis-tan', or **Belujistan** (anc. *Gedrosia*), a country of S. Asia, bounded N. by Afghanistan, E. by Sindh, S. by the Ar. Sea, W. by Per. It is almost destitute of rivers or permanent streams, and consists of high mts. and barren, sandy plains. The climate has great extremes of heat and cold. Most of the fruits known in Europe, as well as plantains and guavas, are common. The pop. consists of Sunnite Mohammedans, who subsist mostly by pastoral pursuits, raising sheep, goats, and camels or dromedaries. They are subject to a khan, who rules with despotic power. Area, 106,735 sq. m. Pop. 350,000.

Belsazar'zar [bel-sar'-uzur; Fr. *Balthazar*], son of Nabonadius (Labynetus), sixth and last king of the second Babylonian period. His mother was a daughter of Nebuchadnezzar, and probably widow of Neriglissar, fourth king of the period. He was associated with his father on the throne, and in the book of Dan. is therefore called king. At the fall of Babylon in 538 b. c. he was slain.

Belton, on R. R., cap. of Bell co., Tex., is situated on Leon River, 60 m. N. N. E. of Austin City. Pop. 1870, 281; 1880, 1797.

Belus (Gr. Βήλος), in classic mythology, a king of Phœnicia, said to be a son of Neptune, and also identical with Baul.

Belus [Βηλεύς, now called *Nahr Naaman*; perhaps the *Bealoth* of the Heb. text of the Bible], a small stream of Pal., which enters the sea near Acre. On its banks it is said that the art of glass-making was discovered.

Belus, Temple of, a famous temple of Babylon, rebuilt by Nebuchadnezzar shortly after 604 B. C.

Belvedere (*Chenopodium scoparium*, or *Salsola scoparia*), an annual plant of the order Chenopodiaceæ, is a native of Europe and Asia, and is sometimes called summer cypress. It is cultivated in gardens, but not for its flowers, which have no beauty. It has a close, pyramidal, rigid form and narrow leaves, and resembles a miniature cypress.

Belvidere, R. R. junc., cap. of Boone co., Ill., and on the Kishwaukee River, 78 m. W. N. W. of Chicago. Pop. 1870, 3231; 1880, 2951.

Belvidere, R. R. junc., cap. of Warren co., N. J., on the Del. River, 95 m. N. of Phila. The Pequest Creek affords a valuable water-power. Pop. of tp. 1870, 1882; 1880, 1773.

Belvisia, bel-vizh'-ya (also called **Napoleo'na**), a genus of exogenous plants, the type of the natural order Belvisiaceæ. The few species of this order which are known are natives of tropical Afr., and are large shrubs with simple alternate, coriaceous leaves. The flowers, each of which has 20 stamens, are sessile, beautiful, and have a very singular form. The calyx is a leathery cup, divided into 5 ovate segments. The corolla consists of 3 concentric and distinct rings, each of which is monopetalous; the lower or outer one, 5-lobed and furnished with 35 stiff ribs, by means of which it is strongly plaited; when fully blown it turns back over the calyx so as to hide it completely; the second, a narrow membrane, is divided into many fine regular segments like a fringe; the third, an erect, cup-shaped membrane, whose edge is cut into many fine segments turned downward. The fruit is a large berry, similar to a pomegranate in size and form, inclosing several reniform seeds, 1 inch long. One species of *B.* bears an edible fruit. According to Lindley, this order belongs to the Myrtal alliance, and is allied to Rhizophoraceæ.

Belzoni, bel-zo'-ne (GIOVANNI BATTISTA), an It. traveller and Egyptologist, b. at Padua Nov. 5, 1778, emigrated to Eng. in 1803, and gained a subsistence by exhibiting himself as an athlete. In 1815 he visited Egypt at the invitation of Mehemet Ali. Pub. in 1821 a *Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, etc., in Egypt and Nubia*. D. Dec. 3, 1823.

Bem (JOSEPH), a Polish gen., b. at Tarnov, in Galicia, in 1795; served during the Polish revolution of 1830; joined the Hungarian patriots in 1848; took part in the disastrous battle of Temesvár, 1849; then fled to Tur. D. Dec. 10, 1850.

Bem'bo (PIETRO), an It. scholar, b. at Venice May 20, 1470; became sec. to Pope Leo X.; made cardinal in 1539. His collected works were pub. in 1729. D. Jan. 18, 1547.

Bembridge Beds, a division of the upper eocone strata found in the Isle of Wight, and containing many fossil shells. Here are found remains of the *Anoplotherium*, an extinct animal.

Bement, Ill. See APPENDIX.

Ben, OIL of, a fixed oil, extracted by pressure from the fruits of *Moringa aptera* and other species, leguminous trees growing in the Levant and the E. and W. Indies. It is colorless or slightly yellow, and odorless. It is used to extract the odoriferous principles of fragrant plants.

Benares, be-na'-res (anc. *Varanashî* and *Kasi*), a city of Hindostan, on the Ganges, 428 m. N. W. of Calcutta and 477 m. S. E. of Delhi. It is the holy city of the Brahmans, the chief seat of their science, and may be called the Hindoo cap. of India. Flights of stone steps called *ghâts* lead down the steep banks of the Ganges, which is here about half a m. wide. The external appearance of the city, as seen from the river, is rendered very imposing by the minarets of about 300 mosques and the pinnacles of nearly 1000 pagodas. Among the public edifices are the great mosque of Aunungzeb, 232 ft. high, many Hindoo temples, a vast and old astronomical observatory, and the Hindoo Sans. coll., the chief seat of native learning in India. As the holy city of the Hindoos B. attracts on certain festivals a multitude of pilgrims. Pop. 1881, 207,570.

Benedek, von, fon bā'neh-dek (LUDWIG), b. at Odenburg, in Hungary, in 1804. As col. fought against the Its. in 1848, as maj.-gen. against the Hungarians in 1849, and again in It. in 1859. He commanded the grand Aus. army at the decisive battle of Sadowa, where the Prus. defeated him, July 3, 1866. D. Apr. 27, 1881.

Benedetti, ba-na-det'-te (VINCENT), COUNT, a Fr. diplomatist, b. in Corsica about 1815. In 1870 he represented Nap. III. at the court of Prus., and had a personal interview with King William at Ems, just before the emp. declared war against Prus.

Ben'edict [Lat. *Benedic'tus*], SAINT, an It. religionist, called the founder of monachism in the W., b. at Nursia, in Umbria, in 480 A. D. D. Mar. 21, 543. (See BENEDICTINES.)

Benedict I., became pope of Rome 574 A. D.; d. 578.—**BENEDICT II.**, a native of Rome, elected 683; d. 685.—**BENEDICT III.**, succeeded Pope Leo IV. 855; d. 858.—**BENEDICT IV.**, elected 900, as the successor of John IX.; d. 903.—**BENEDICT V.**, chosen 964, but banished from Rome by the emp. Otto I.; Leo VIII. was pope at the same time with him, and both are recognized by R. Cath. historians; d. 965.—**BENEDICT VI.**, elected 972, and killed by the rebellious Romans in 974.—**BENEDICT VII.**, succeeded Pope Benedict VI. 975; is said to have ruled with ability; d. 984.—**BENEDICT VIII.**, a son of the count of Tusculum, became pope in 1012; crowned the emp. Henry II. in 1013, and defeated the Saracens, who had invaded the Papal States; d. 1024.—**BENEDICT IX.** (THEOPHILACTUS of TUSCULUM), sometimes called the "boy-pope," chosen 1033; was extremely licentious, and was expelled by the Roms.; d. 1048.—**BENEDICT X.**, called the STUPID, chosen 1058, removed through the influence of Hildebrand in 1059, and d. in prison in the same yr.—**BENEDICT XI.**

(SAINTS), b. in 1240, a native of Treviso, succeeded Boniface VIII. in 1303; noted for humility; d. 1304.—**BENEDICT XII.** originally JACQUES FOURNIER, a native of Fr., chosen 1334; was the third pope who reigned at Avignon; wrote several works; d. 1342, and was succeeded by Clement VI.—**BENEDICT XIII.** succeeded Innocent XIII. in 1724; d. 1730.—**BENEDICT XIII.** (anti-pope) (PEDRO DE LUNA), b. in Aragon, and was elected pope by certain cardinals at Avignon in 1394; another party elected Boniface IX. at Rome, and a schism of the Ch. ensued; was deposed by the Council of Constance in 1417; d. 1424.—**BENEDICT XIV.** (PROSPERO LAMBERTINI), b. at Bologna in 1675; succeeded Clement XII. in 1740; was the author of several religious works; d. 1758.

Benedict (ERASTUS CORNELIUS), LL.D., b. at Branford, Conn., Mar. 19, 1800, grad. in 1821 at Williams Coll., became a lawyer; among his works is *Amer. Admiralty*. D. 1880.

Benedict (Sir JULIUS), an eminent musical composer, b. at Stuttgart, Nov. 27, 1804. Wrote the *Gypsy's Warning* and other pieces. He was knighted in 1871.

Benedict (LEWIS), a lawyer and gen. of volunteers, b. in Albany, N. Y., Sept. 2, 1817, grad. at Williams Coll., was admitted to the bar in 1841; entered the army as lieutenant-col. 73d N. Y. Volunteers, and rose to be brevet brig.-gen. of volunteers. Killed at battle of Pleasant Hill, La., Apr. 9, 1864.

Benedictines, or Benedictine Order, the name of the monks who observe the rule of St. Benedict. Was one of the most anc. and learned religious orders of W. Europe. St. Benedict founded his first monastery on Monte Cassino, near Naples, in 528 A.D., the number increasing, it is said, to 37,000 monasteries at one period. The B. boasted that their order had produced 24 popes, 200 cardinals, 4000 bishops, and 1500 saints. The rule of St. Benedict required that the monks should live frugally, avoid laughter, hold no private property, and be industrious. To them we are especially indebted for the preservation and transmission of many of the anc. classics through the Dark Ages down to the present time. Among the most celebrated houses or societies of this order was the Congregation of St. Maur (dating from 1621), on the river Loire. The Cistercians, Carthusians, Camaldules, Clunians, Celestines, and Trappists were branches of the B. order. In 1870 the order numbered 3069 monks, in 8 congregations, 2 of which comprise the monasteries in the U. S. There are also B. nuns, with 12 convents in the U. S.

Benet (STEPHEN VINCENT), b. at St. Augustine, Fla., Jan. 22, 1827; grad. at W. Pt. July 1, 1849, and was promoted brevet second lieutenant in the ordnance corps; became assistant prof. at W. Pt. in 1859; in 1864 placed in charge of the cannon and projectile branch of the inspection service of the ordnance dept.; in 1874 became chief of ordnance, with rank of brig.-gen. Author of *Military Law and the Practice of Courts-Martial* and other works.

Benevento [Lat. *Beneventum*], a city of S. It., on the river Calore, 33 m. N. E. of Naples. Among the many anc. remains found here is the magnificent Arch of Trajan, erected in 114 A.D., now nearly perfect. The city, with some adjacent terr., was given to the pope in 1053. In 1806 it was erected into a principality by Nap., who gave Talleyrand the title of prince of B. Pop. 21,631.

Benezet (ANTHONY), a Fr. philan., b. at St. Quentin Jan. 31, 1713. Became a friend and taught school in Phila.; wrote tracts in opposition to slavery and the slave trade. D. May 3, 1784.

Benfey, ben'fi (THEODOR), b. near Göttingen Jan. 28, 1809; became in 1834 prof. of Sans. and comparative gram. at Göttingen. Wrote many noted philological works.

Bengal, ben-gawl', the most important prov. of Brit. India, bounded N. by Nepaul and Bootan, E. by Burmah, S. by the Bay of Bengal, and W. by the N. W. and Central Provs. The greater part consists of the great alluvial valley of the Ganges and Brahmapootra. Area, 194,188 sq. m. Pop. 68,829,920.

Bengal, Bay of (anc. *Ganget'icus Sinus*), a part of the Indian Ocean extending between Hindostan and Farther India. Its S. boundary is variously placed by geographers. Its chief affluents are the Ganges, the Brahmapootra, and the Irrawaddi. There are no good harbors on the W. coast, but several safe ports occur on the E. side. The tide sometimes rises to the height of 70 ft.

Bengal Light, or Blue Light, a brilliant signal-light used at sea, and in ordinary pyrotechny, composed of 6 parts of nitre, 2 of sulphur, and 1 of the tersulphide of antimony, finely powdered, and then dried and mixed.

Bengel, beng'el (JOHANN ALBRECHT), D. D., a Ger. Lutheran theol., b. at Winnenden, Württemberg, June 24, 1687; was probably the first Prot. who treated the exegesis of the N. T. in a thoroughly critical spirit. He wrote the *Gnomon Novi Testamenti*, d. Nov. 2, 1752.

Benguella, ben-gā'lah, a country of W. Afr., the limits of which are not accurately defined; bounded N. by the Coanza River, which separates it from Angola, S. by Mossamedes, and W. by the Atlantic. The surface is mountainous, the soil fertile, the climate hot and unhealthy. It is nominally subject to Port.

Ben'ham (HENRY W.), b. at Cheshire, Conn., 1816, grad. first at W. Pt. in 1837; served in the Mex. and c. wars; a distinguished military and civil engineer; brevetted major-gen. U. S. A. in 1865. Retired June 30, 1882. D. June 1, 1884.

Benicia, ben-ish'e-a, a city on R. R., Solano co., Cal., on the N. side of the Strait of Carquinez (which connects San Pablo and Suisun bays), about 33 m. by water N. E. of San Francisco; was formerly the cap. of the State; has a law school, a U. S. arsenal and barracks, a ladies' sem., and a convent. It is the seat of St. Augustine Coll. (Episcopalian). Here are quarries of limestone, producing good hydraulic cement, and the machine-shops and foundries of the Pacific Mail Steamship Co. Pop. 1880, 1734.

Ben'i-Has'san, a v. of Egypt, on the Nile, 23 m. S. S. E. of Minieh. Here are some of the most remarkable of the rock-hewn tombs of anc. Egypt, the earliest of which is assigned to about 1800 B. C.

Be'ni Khaibir, a tribe in Ar., supposed by some to be a remnant of the anc. ascetic Rechabites. They number about 60,000.

Benin, a kingdom of W. Afr., in Upper Guinea, bounded N. E. and E. by the Niger, S. W. by the Bay of B. W. by Dahomey. Its limits in some directions are not well ascertained. The interior is elevated and hilly, and mostly covered with forests. The soil is fertile, the pop. dense. The religion fetichism; human sacrifices are frequent. Cap., Benin, where Belzoni d. in 1823.

Ben'jamin, the youngest son of the patriarch Jacob, and of Rachel, who named him Benoni. He was his father's favorite child, and was the patriarch of one of the 12 tribes, whose terr. was bounded N. by that of Ephraim, E. by the Jordan, S. by the land of Judah, W. by that of Dan. After the death of Solomon the tribes of B. and Judah remained loyal to his dynasty when the others revolted.

Benjamin (JUDAH PETER), an Amer. politician of Jewish extraction, b. in Hayti in 1812. Was a lawyer in New Orleans, and represented La. in U. S. Senate; was sec. of state of Confed. States; removed to Eng. D. May 7, 1884.

Benjamin (PARK), a poet, b. at Demerara, in Guiana, Aug. 14, 1809; grad. at Trinity Coll., Hartford, Conn., in 1829; became an ed. in New York. He wrote, besides many lyrical poems, a *Poem on the Meditation of Nature*. D. 1864.

Ben'nett (JAMES GORDON), a journalist, b. in Banffshire, Scot., Sept. 1, 1795, and ed. for the R. Cath. priesthood; emigrated to the U. S. in 1819; was chief ed. in 1833 of the *Pennsylvaniaian*; in 1835 he founded N. Y. *Herald*. D. June 1, 1872.

Ben'nett (JOHN HUGHES), M. D., a phys., b. in Lond. in 1812, took his degree at Edinburgh in 1837; became a prof. there; was an advocate of the expectant treatment of disease. Among his works is *Clinical Med.* D. 1875.

Bennett (MILO LYMAN), LL.D., b. in Sharon, Conn., in 1790, grad. at Yale in 1811; became a judge in the Vt. courts (1839-59). Author of *W. Justice* and other legal works. D. 1868.

Ben Ne'vis, a mt. of Scot., the highest point in G. Brit., 4406 ft. high, with a precipice of 1500 ft. on the N. E. side.

Ben'nington, on R. R., semi-cap. of B. co., Vt., 55 m. S. by W. of Rutland, and 36 m. from the Hudson River at Troy. Gen. Stark, at the head of a column of "Green Mt. Boys," defeated a Brit. detachment in force, commanded by Col. Baum, sent from Gen. Burgoyne's army to capture the public stores at B., Aug. 16, 1777; 600 Brit. prisoners were captured. Pop. 1870, 5760; 1880, 6333.

Ben'son (EDWARD WHITE), D. D., b. at Birmingham, Eng., 1829, grad. at Trinity Coll. 1852; was for several yrs. assistant in Rugby school; head-master of Wellington Coll. from its establishment in 1858 to 1872; chancellor of Lincoln Cathedral 1872; consecrated bp. of Truro 1877; became Abp. of Canterbury, Eng., 1882.

Benson (EGBERT), LL.D., b. in New York June 21, 1746, grad. at Columbia Coll.; became an M. C. and a judge of the supreme court of N. Y., afterward of the U. S. circuit court. Wrote several works. D. Aug. 24, 1833.

Benson (HENRY C.), D. D., a preacher and writer in the M. E. Ch., b. near Xenia, O., in 1815, was elected prof. of Gr. in Ind. Asbury Univ. in 1850; in 1852 went to Cal., where he became ed. of the *Advocate*; author of *Life among the Churches*.

Benson (JOSEPH), an Eng. Meth. minister, b. in Cumberland Jan. 25, 1748; author of *Commentary on the Holy Scriptures* and other works. D. Feb. 16, 1821.

Ben'tham (JEREMY), an Eng. philos. and reformer, a writer on ethics and jurisprudence, b. in Lond. Feb. 15, 1748; grad. at Queen's Coll., Ox., in 1766, studied law, and was called to the bar in 1772, but never practised. Pub. in 1776 *Fragments on Government*, in 1787 a *Defence of Usury*, and in 1789 *Introduction to the Principles of Morals and Legislation*. He adopted the theory that "Utility is the test and measure of virtue," and that laws should promote "the greatest happiness of the greatest number." He devoted himself chiefly to the reform of legislation and govt. He inherited from his father an easy fortune. Among his other works are *Panopticon* (1791), which treats on prison discipline. He has great merits in the Eng. jurisprudence, "which," as Macaulay says, "he found a gibberish and left a science," but on the public in gen. his influence was small, on account of the unreadableness of his writings. D. June 6, 1832.

Ben'tinck (WILLIAM GEORGE FREDERICK CAYENDISH), LORD, commonly called **Lord George Bentinck**, b. Feb. 27, 1802, was a 3d son of the 4th duke of Portland. He was much addicted to horse-races. After Peel adopted the policy of free trade in 1843, Lord George was recognized as the leader of the protectionist party, which opposed the repeal of the corn laws. D. Sept. 21, 1848.

Bent'ley (RICHARD), D. D., an Eng. critic and classical scholar, b. at Oulton, in Yorkshire, on the 27th of Jan. 1662. He entered St. John's Coll., Cambridge, in 1676, and took the degree of bachelor; ordained a priest in 1690; was appointed to deliver the Boyle lecture on the evidences of religion, and in 1694 became keeper of the Royal Library; author of *Dissertation on the Epistles of Phalaris*, maintaining that these epistles were spurious. He was appointed master of Trinity Coll., Cambridge, in 1700, and regius prof. of divinity in 1717. His principles of criticism have triumphed over all opposition. D. July 14, 1742.

Ben'ton (JAMES G.), b. in 1820 in N. H., grad. at W. Pt. in 1842; major of ordnance Sept. 15, 1863; brevet lieutenant-col. and col. Mar. 13, 1865. Author of *A Course of Instruction in Ordnance and Gunnery for the Use of the Cadets of the U. S. Military Acad.* D. Aug. 23, 1881.

Benton (THOMAS HART), a statesman, b. near Hillsborough, N. C., Mar. 14, 1782; removed to Tenn., studied law, and began to practise at Nashville about 1810. In the war of 1812 he served as col. under Gen. Jackson. He became a resident of St. Louis, Mo., in 1815, and was elected a senator of the U. S. for Mo. in 1820. He opposed the U. S. Bank and advocated a gold and silver currency, for which reason he was often called "Old Bullion." He was an M. C. for

30 yrs., and opposed the extreme State Rights policy of Calhoun. In 1852, as a member of the House of Reps., he opposed the repeal of the Mo. Compromise. A powerful party of State Rights Dems. in Mo. defeated him as a candidate for gov. in 1856. Author of a *Thirty Years' View, or a List of the Working of the Amer. Govt. for Thirty Years, 1820-50*, and *Abridgment of Debates in Cong.* D. Apr. 10, 1858.

Benton Harbor, R. R. junct., Berrien co., Mich., on the E. side of St. Joseph's River and the Benton Harbor ship canal. 1½ m. from Lake Mich. and about 60 m. E. by N. from Chicago. Pop. 1870, 661; 1880, 1230.

Bentonville, a p.-v. of Johnston co., N. C., about 17 m. W. of Goldsboro'. Here took place, Mar. 17-21, 1865, a series of sharp encounters between the Confed. forces under Gen. J. E. Johnston and the U. forces under Gen. Sherman, the result of which was that Johnston, failing to prevent Sherman's march, retreated toward Raleigh.

Bent Timber. The process of bending timber is performed either by bending it whole or in planks, which are afterward put together in pieces of any required thickness for ship-building, bridge-building, and other purposes. The objections to bending timber whole are that the wood is impaired by the steaming, and that the curvature must be very flat. These defects are obviated by cutting the logs into planks and bending them into the required curvature. Timber thus bent remains sufficiently elastic to admit of considerable movement under the pressure of a R. R. train.

Benu'e (i. e. "the mother of waters"), a large river of Central Afr., is the prin. tributary of the Niger or Quorra. It enters the Niger about 300 m. from its mouth, where it is 800 yards wide. Several expeditions have been sent to explore its course, which, however, is as yet only partially known.

Benzine. See BENZOLE, by PROF. C. F. CHANDLER.

Benzoic Acid, or Flowers of Benzoil, a substance which exists in many balsams and is obtained from benzoil. It is artificially made on a large scale from naphthalene and the urine of animals.

Benzoil, or **Ben'jamin, Gum** [Lat. *benzoinum*], a fragrant resinous substance, is the concrete juice of a tree called *Styrax B.*, which is a native of Sumatra, Siam, and Borneo, and belongs to the natural order Styracaceæ. The resin is obtained by making incisions in the bark of trees which are cultivated for that purpose. It is extensively used as incense in R. Cath. and Gr. chs.; is also used in perfumery, and in med. as a stimulant, emetic, and styptic. A tincture of B. is sometimes applied to wounds, and is employed in making a cosmetic called virgin's milk.

Ben'zole, Benzene, Hydride of Phenyl, or Phenene, a compound of carbon and hydrogen, is a product obtained by the distillation of coal or coal-tar. It is usually obtained from the light oil of coal-tar, coal-tar naphtha, by fractional distillation, and purification with nitric and sulphuric acids. Commercial B. usually contains considerable quantities of the homologous hydrocarbons toluole, xylol, etc. It is prepared on a large scale for the manufacture of nitrobenzole, aniline, and aniline colors, and for "carbonizing" coal-gas. At ordinary temperatures B. is a thin, limpid, colorless, and volatile liquid, emitting a characteristic ethereal odor. Its specific gravity is 0.85 at 60° F.; its boiling-point is 179.6° F. At 37° F. it becomes solid, or crystallizes into beautiful transparent crystals of fern-like forms. It is not soluble in water, but dissolves readily in alcohol, ether, and turpentine. It is valuable to the chemist as a powerful solvent of caoutchouc, gutta-percha, wax, and fatty substances. It is inflammable, and possesses great illuminating power, which it imparts to gases, and even to atmospheric air, when they are passed through it. With chlorine, bromine, nitric acid, etc., B. forms interesting substitution products, the most important of which is nitrobenzole or essence of mirbane. C. F. CHANDLER.

Béranger, de, *deh ba-ron-zhâ'* (JEAN PIERRE), a Fr. lyric poet, b. in Paris Aug. 19, 1780. He passed about 3 yrs. as an apprentice to a printer. Neglected by his father, he spent many of his early yrs. with an aunt, who imbued his mind with virtuous and republican principles. His first essays in verse, which were written under the pressure of poverty, obtained for him in 1804 the patronage of Lucien Bonaparte. Was for nearly 12 yrs. a clerk or subordinate sec. in the Univ. of Paris. In 1828 he pub. his fourth vol. of songs, for which he was sentenced to pay a fine of 10,000 francs and to be imprisoned for 9 months. When his friends obtained power by the revolution of 1830, they offered him lucrative places, which he declined. His fifth volume (1833) was his last. He rejected all the favors and overtures of Nap. III. His character was noble and independent. In his poems, gayety and pathos are happily combined. D. July 16, 1857.

Bérard, ba-rar' (CLAUDIUS), an educator, b. at Bordeaux, Fr., Mar. 21, 1786; in 1807 he emigrated to the U. S.; in 1815 became teacher in Fr. at the U. S. Military Acad., and in 1846 was made prof. D. May 6, 1848.

Berbers [supposed by some to be derived from the word *Barbari*, which the Grs. and Roms. applied to all foreigners], a name given to the nomadic tribes who inhabit the mountainous regions of Barbary and the N. part of the Desert of Sahara. They are sometimes called Kabyles, but they call themselves Amazerg, Amazigh, or Amoshagh. They are the descendants of the aboriginal inhabs. of N. Afr., who occupied the country before it was conquered by the Arabs, and they are the most numerous part of the present pop. In lang., customs, and phys. character, they resemble the Semitic races; are fierce, warlike, and tenacious of their independence. Many of them live in tents or clay huts, keep cattle and sheep, cultivate fruit trees, and practise a rude agriculture. In religion they are bigoted Mohammedans.

Bere'a, R. R. junct., Cuyahoga co., O., 12 m. S. W. of Cleveland, noted for its quarries of sandstone; is the seat

of Baldwin Univ. and Ger. Wallace Coll. Pop. 1870, 1628; 1880, 1682.

Berea College is situated in the S. part of Madison co., Ky., 40 m. S. of Lexington and 140 from Cin., very near the centre of the State. It originated in the labors of Rev. John G. Fee, a native of Ky., in the employment of the Amer. Missionary Association. Mr. Fee was the son of a slaveholder, but earnestly embraced the anti-slavery cause while pursuing theol. at Lane Sem., and, disowned by his father and his ch., devoted his life to that cause. The school, like its founder, was always noted for its abolitionism; yet, though its teachers were generally from Oberlin, its pupils were often the sons and daughters of slaveholders. Under the administration of Rev. J. A. R. Rogers the inst. became widely known and popular, and its influence began to be feared. The John Brown raid gave occasion for its enemies to rally, and a co. meeting sent a committee of 65 armed men to remove the school and its officers from the State. At the close of the war it was immediately revived. It has also normal and preparatory courses. About three fifths of the students are males, and nearly the same proportion colored. Rev. E. H. Fairchild was the first pres., and commenced his labors in the spring of 1869.

Bere'ans, a sect seceding from the Established Ch. in Scot., founded by one Barclay in 1773. They take their name from Acts xviii. 11, deny natural theol., make all the Psalms Messianic, and hold assurance to be of the essence of faith. Their numbers are small and diminishing.

Berenger (ba-ron-zhâ') [Lat. *Berengarius*] of Tours, a Fr. scholastic theol., b. at Tours in 998; became archdeacon of Angers in 1040. He rejected the dogma of transubstantiation and was compelled to recant, but afterward relapsed, or continued to oppose the doctrines of the Ch. D. 1088.

Berenice, ber-e-nî'se (called **Bernice** in the N. T.), a daughter of Agrippa I., king of Judea, b. 28 A. D.; married to Herod, king of Chalcis, and after his death to Polemon, king of Cilicia. She was a sister of King Agrippa, before whom St. Paul spoke in his own defence.

Berenice, an anc. city of Egypt, on the Red Sea. It was founded by Ptolemy Philadelphus, who named it after his mother, and was a great emporium of the trade with India. Here are the ruins of a temple of Serapis and other antiquities.

Beresford (WILLIAM CARR), Viscount, a gen., b. in Ire. Oct. 2, 1768, was a natural son of the first marquis of Waterford. He commanded the Port. army in the Peninsula, and in May 1811 defeated Soult at Albuera; was created a viscount in 1823. D. Jan. 8, 1854.

Berezina, or Beresi'na, a river of Rus., an affluent of the Dnieper, has a S. course of about 325 m., is connected with the Duna by a canal opening communication between the Baltic and the Black seas. In 1812 the Fr. army, on its retreat from Moscow, met with a severe disaster in crossing this river, losing 16,000 prisoners and nearly 12,000 more, many of whom were drowned in the attempt to cross.

Bergamot, the fruit of a tree which is a species or variety of the genus *Citrus*, is also called **Bergamot Orange, or Mellarosa**. It is cultivated in the S. of Europe. The fruit is of a pale yellow or green color, and has a green, sub-acid, and fragrant pulp. From its rind is obtained the oil of B., which is extensively used in perfumery.

Bergen, a fortified city of Nor., at the head of a deep bay of the Atlantic, 184 m. W. N. W. of Christiania. The harbor is deep and safe. B. has a cathedral, a theatre, a public library, a national museum, and a coll. Its prin. exports are fish and cod-liver oil. Pop. 34,388.

Bergen Point, N. J. See APPENDIX.

Bergh (HENRY), philan., b. in New York in 1823, ed. at Columbia coll., is the author of *Loe's Alternative*, a drama; *Married Off*, a poem; *The Portentous Telegram*, *The Ocean Paragon*, *The Streets of New York*, tales and sketches. In 1863 Mr. Bergh was made sec. of legation to Rus., and also acted as vice-consul there. He is known not as a writer, diplomatist, or govt. official, but as the founder and pres. of the Amer. Society for the Prevention of Cruelty to Animals. The Amer. Society was incorporated Apr. 10, 1866, and according to the seventh annual report many similar societies had been founded in 25 States and Terr. and in Canada. The work of the society covers all cases of cruelty to all sorts of animals, from the horse to the tortoise, employs every moral agency, social, legislative, personal, and touches points of vital concern to health as well as to humanity. The membership is large and influential. The work takes on new features every yr. Among the latest are an ambulance corps, and an ingenious invention for substituting artificial for live pigeons as marks for shooting.

O. B. FROTHINGHAM.

Bergmehl, burg-meel, a Ger. word, signifying "mountain meal," an extremely fine powder, found in geological strata of eocene formation, and composed of effete and indestructible silicious frustules of Diatomaceæ, which are microscopic plants of the class Algae. Vast beds of these fossils occur in Ger., Lapland, Va., Md., Vt., N. H., and other regions. It is mixed with flour and used as food by the people of Swe. and Nor. in seasons of scarcity. It is used in making water-glass and the floating bricks of S. Europe, and as polishing-powder.

Berg'sœ (WILHELM), Ph. D. b. in Copenhagen, Den., Feb. 8, 1835, was in youth a zoologist, but in consequence of the failure of his eyesight and of illness became a novelist. His first venture was *Fra Piazza del Popolo*.

Bergyll, Rose-Fish, or Red-Fish (*Sebastes marinus*), a fish of the family Scorpenidae, found in the N. Atlantic, is of a red color, attains a length of 2 ft. or more, and is used as food.

Bering, bâ'ring (VITUS), a Dan. navigator, b. in Jutland in 1680. He entered the Rus. navy at an early age, and in

1755 was appointed commander of an expedition to explore the Sea of Kamchatka. During this voyage he discovered B. Strait (1758), and ascertained that Asia was not joined to Amer. D. Dec. 8, 1741.

Bering Sea, or Sea of Kamchatka, the most N. part of the Pacific Ocean, extending between the peninsulas of Alaska and Kamchatka.

Bering Strait, a channel which connects the Pacific with the Arctic Ocean, and separates Asia from Amer. Its width is about 45 m. at the narrowest part.

Berkeley, on R. R. Alameda Co., Cal., seat of the Univ. of Cal., the State Agricultural Coll., and the Cal. inst. for the deaf, dumb and blind; 9 m. from San Francisco. Pop. in 1880 not given in census.

Berkeley (George), a philos. and bp., b. at Kilerin, Ire., Mar. 13, 1684. He studied at Trinity Coll., Dublin. In 1709 he pub. his *Essay towards a New Theory of Vision*, and in 1719 a *Treatise Concerning the Principles of Human Knowledge*, in which he affirmed that there is no proof of the existence of a material world. The objects of which we are conscious in perception he called "ideas." Their presence he held to be due to the constant agency of the Almighty, who causes them to pass in a real and orderly succession before the mind. His views are the result of the application of rigid logic to the principles which Locke and his school had adopted from Descartes. As distinguished from the egoistic system of Fichte, B.'s views have been called theistic idealism. His object was to undermine materialism and counteract scepticism. In 1724 he became dean of Derry. In 1728 he sailed for Amer. with the intention of founding an enterprise for the conversion of the savages, remaining about 2 yrs. In 1734 he was appointed bp. of Cloyne. "All his contemporaries," says Sir J. Mackintosh, "agreed with the satirist [Pope], in ascribing 'to B. every virtue under Heaven.'" D. Jan. 23, 1753.

Berkeley (Rev. Miles Joseph), an eminent Eng. botanist, b. in 1803, and ed. at Rugby and Christ's Coll., Cambridge, where he grad. in 1825. Author of *Gleanings of Brit. Alps* and other botanical works.

Berkeley (Sir William), b. near Lond., was appointed gov. of Va. in 1641; was removed in 1651 by Cromwell, but became gov. again in 1660. D. July 13, 1677.

Berlichingen, von, von berlik-ing-en (Götz or Gottfried), a Ger. knight, surnamed of the Iron Hand, b. in 1480 at B. Castle, in Würtemberg. He lost a hand at the siege of Landshut, and supplied its place by an iron hand. He fought for the insurgent peasants against the nobles in the Peasants' war, which closed in 1525. D. 1562.

Berlin, the cap. of the kingdom of Prus. and of the empire of Ger., on the river Spree. It is of comparatively modern growth, numbering at the death of the "Great Elector," Frederick William, in 1688, not more than 20,000 inlhab.; at the death of Frederick the Great, in 1786, the pop. was 114,000; in 1817 it was 188,000; in 1844, 311,000, since which time its growth has been very rapid. B. consists of 16 different parts, of which Old B., on the right bank of the Spree, and Old Cologne, on an island, are the oldest. The prin. streets, are Unter den Linden, with four rows of lime trees, the Wilhelmstrasse, and the Königstrasse. The prin. public places are the Opera Place, the Lustgarten, the Wilhelmplatz, the Gensdarmenplatz, the Belle Alliance Platz, the Leipziger Platz, and the Pariser Platz, all adorned with statues and surrounded by public buildings. The Spree is crossed by several fine bridges. The most important public buildings are the Königliche Schloss, the Königliche Palast, the palace of the Crown Prince, the Arsenal, the Artillery School, the Singing Acad., the Exchange, the Old Museum, and the New Museum. The chs. are numerous, but none of them of architectural importance. The univ. is among the foremost in Europe. The great hospital, the Charité, has some 10,000 patients in a yr. The Royal Library contains nearly 1,000,000 vols., and is constantly increasing. Among the literary insts. are the Acad. of Sciences, the Polytechnic Inst., the Building Acad., the Mining Acad., the Pharmaceutical School, asylums for the deaf, mute, and blind, and many gymnasia. In religion the greater part of the pop. are Prot. Pop. 1880, 1,122,330.

Berlin, on R. R., a city, Green Lake co., Wis., on Fox River, 94 m. N. W. of Milwaukee. Steamboats run to Green Bay. Pop. 1870, 2777; 1880, 3353.

Berlioz, ber-le-ō' (Hector Louis), a Fr. musical composer, b. Dec. 11, 1803, at Côte-Saint-André (Isère). The son of a phys. sent. to Paris to study med., he entered the Conservatory, following a bent for music. He composed *Symphonie Fantastique* and *Les Troyens*. He has been considered the chief of the romantic school. D. Mar. 9, 1869.

Bermuda Grass, the *Cynodon Dactylon*, a grass extensively cultivated in India (where it is called *dhab*), and of late yrs. introduced into the W. Indies, Europe, the S. U. S., and the S. I. It is especially prized in warm climates, where the grass crop is generally poor; but in light soils its perennial roots cause great trouble.

Bermuda Hundred, in Chesterfield co., Va., on the James River, just above the mouth of the Appomattox, and 1½ m. above City Point. The James River here incloses a neck of land which was occupied by Gen. Butler in May 1864, whence he was to co-operate with Gen. Grant by menacing Richmond and Petersburg. On May 16 Butler was attacked by the Confed. force under Gen. Beauregard, and driven back into his intrenchments. Subsequent expeditions were made for these works, which came to be a part of the U. lines in the investment of Petersburg.

Bermuda Islands, or **Bermudas** [Fr. *Bermudes*], or **Somers's Islands**, a group of small, low islands in the Atlantic, belonging to G. Brit. They are about 624 m. E. S. E. of Cape Hatteras, which is the nearest land. There are about 400 of these islands, lying within a space of 19 m. by 6 m., having a total area of not more than 41 sq. m. They are inclosed by coral reefs, the only ones in the central part of the Atlantic. They are separated by narrow channels,

have no running streams, and only a few pools of fresh water. The climate is delightful and the soil fertile. Their chief importance arises from their commanding position between the W. I. islands and the other parts of Brit. Amer. Pop. 13,948.

Bernadotte, ber-na-dot' (Charles XIV.), JOHN, king of Swe., a Fr. marshal, b. at Pau Jan. 26, 1764. His original name was JEAN BAPTISTE JULES B. He enlisted as a private in 1780, served as gen. of division under Kleber and Jourdan in Flanders in 1794, and under Bonaparte in 1797. In 1798 he was Fr. minister at Vienna, and married Mlle. Clary, a sister of Joseph Bonaparte's wife. In 1799 he was minister of war. Nap. created him a marshal of Fr. and prince of Pontecorvo. He fought at Austerlitz in 1805, and defeated the Prus. at Halle in 1806. He quarrelled with Nap., who censured his conduct at Wagram (1809), and resigned his command just after that battle. In Aug. 1810 the Swe. Diet elected B. as heir to the throne of Swe., then occupied by Charles XIII., who had no son, and he was associated with the old king in the exercise of royal power. In 1812 B., who took the name of Charles John, negotiated with Rus. a secret treaty of alliance against Nap. He openly joined the coalition of the allies in the spring of 1813, and led an army of about 28,000 men into Ger. His army defeated Oudinot at Gross-Beeren in Aug. 1813. He forced Prince Christian of Den., who had proclaimed himself king of Nor., to resign, and on Nov. 4, 1814, Charles XIII. was proclaimed king, and B. crown prince. When the allies entered Fr. in 1814, he led his army back to Swe. and conquered Nor. He began to reign alone on the death of Charles XIII., in Feb. 1818, after which a long peace ensued. D. 1844, and left the throne to his son, Oscar I.

Bernard [Fr. pron. ber-nar'] (CLAUDE), a Fr. physiologist, b. at St. Julien, in Rhone, July 12, 1813. He wrote *Researches on the Uses of the Pancreas*, and discovered the glyco-genic function of the liver. D. Feb. 10, 1878.

Bernard (Sir Francis), an Eng. lawyer, b. in 1714, who became gov. of N. J. in 1758, and of Mass. in 1760. D. June 16, 1779.

Bernard, SAINT, abbot of Clairvaux, a mediæval theol. and a doctor of the W. Ch., b. at Fontaines, near Dijon, in 1091. He was regarded as an oracle by all Christendom, founded monasteries, and was an implacable adversary of Abelard. He promoted the disastrous crusade of 1146. D. 1153, leaving many religious works: canonized in 1174.

Bernard (Simon), an officer of the Fr. imperial corps d'genie, b. at Dôle Apr. 28, 1779, at one time aide-de-camp to Nap. I., was invited to this country by Pres. Madison under a resolution approved Apr. 29, 1816, "authorizing the Pres. of the U. S. to employ a skilful assistant in the corps of engineers." With Col. (afterward Gen.) L. G. Totten he elaborated projects of defence for our prin. seaports, and also had a prominent part in the inauguration of some of our earlier works of civil engineering; e. g. the Chesapeake and O. Canal, the Del. Breakwater, etc. He resigned in 1831, and returned to Fr., and became aide-de-camp to Louis Philippe, and subsequently minister of war of Fr. D. in Paris Nov. 5, 1839. J. G. BARNARD.

Bernard of Cluny, not to be confounded with his more celebrated countryman and contemporary, B. of Clairvaux, was b. at Morlaix, in Brittany, of Eng. parents, probably not far from the yr. 1100. He was a monk at Cluny under Peter the Venerable, who was abbot there from 1122 to 1156. He wrote a poem, *De Contemptu Mundi*, in about 3000 lines. Hymns taken from this poem, such as *The world is very evil, Brief life is here our portion, and Jerusalem the golden*, are among the finest gems in recent Eng. and Amer. collections.

Bernard, the Great St., an Alpine pass, upward of 8000 ft. in height, between the Swiss canton of Vaud and the It. valley of Aosta. Near the summit is the hospice, said to have been founded in 962 by St. B. of Meuthon for the succor of travellers crossing the mt. In the efforts of the monks of this hospice the dogs known as the St. B. breed are valuable assistants. In 1800 Nap. crossed the Alps here with an army of 30,000, with cav. and artill.

Berne, or Bern [said to be derived from the Ger. *Bären*, "bears," figures of which are on the armorial bearings of the city], since 1849 the cap. of Switz., on the Aar, 65 m. S. of Bâle and 92 m. N. E. of Geneva. It is built of freestone, the houses resting on arcades which form covered promenades on both sides of the streets. Magnificent Alpine scenery is visible from this point. B. has a Gothic cathedral, a public library, a univ., a museum of nat. hist., a mint, and an arsenal. One of the finest buildings is the new federal palace. The river is here crossed by 4 large bridges. Several R. Rs. connect it with Geneva, Bâle, and other towns. Pop. 1880, 44,087.

Bernhard, duke of Saxe-Weimar, a Ger. gen., b. Aug. 6, 1604, was a younger son of John III. of Saxe-Weimar. He fought for the Prot. cause in the Thirty Years' war; became a col. in the army of Den.; then joined the standard of Gustavus Adolphus, and distinguished himself at Lützen in 1632; afterward, in command of a Fr. army, defeated the imperialists. D. July 8, 1639.

Bernice. See BERENICE.

Bernonillis, ber-nool-yè'. **The**, a remarkable family of maths.—JACQUES B. was b. at Bâle 1654, d. 1705; was prof. of math. at Bâle, solved the Leibnitz problem of the isochronous curve, and wrote many mathematical treatises.—His brother JEAN was b. 1667 and d. 1748; he succeeded Jacques as prof., solved the problem of quickest descent, and was author of many mathematical works.—The three sons of Jean were eminent scientists: NICHOLAS, b. 1695, was prof. of math. at St. Petersburg; DANIEL, b. 1700, was prof. of anat. and afterward of physics; and JEAN, b. 1710, was an author and prof. of math. at Bâle. Other members of the family were distinguished as maths. and naturalists.

Berosus (Gr. *Berosos*), a Chaldee historian, priest of Belus at Babylon, lived about 300 B. C. He wrote in Gr. a

Hist. of Babylonia and Chaldea, lost except fragments.

Berrien (JOHN McPHERSON, LL.D.), a lawyer, b. in N. J. in 1781. He removed to Ga., and was elected a senator of the U. S. in 1824, and again in 1840 and 1846. D. Jan. 1, 1856.

Berrien Springs, Mich. See APPENDIX.

Berry, or **Berri**, de (CHARLES FERDINAND), DUC, b. at Versailles Jan. 24, 1778, was the second son of Charles X. He emigrated with his father in 1793, returned to Fr. in 1814, and was assassinated by Louvel Feb. 14, 1820. He was the father of the count de Chambord (Henry V.).

Berry (HIRAM G.), a maj.-gen. of U. S. volunteers, b. at Rockland, Me., Aug. 27, 1824, killed at the battle of Chancellorsville, Va., May 2, 1863; entered the service as col. of the 4th Me. Volunteers, maj.-gen. Nov. 29, 1862.

Berryville, Va. See APPENDIX.

Berryer, ba-re-ä' (ANTOINE PIERRE), a Fr. orator, lawyer, and legitimist, b. in Paris Jan. 4, 1790. He defended Gen. Cambonne about 1815, gained distinction as an advocate of defendants in political trials, and was elected to the Chamber of Deputies in 1830, and in 1831 opposed the abolition of hereditary nobility. In 1840 he defended Louis Nap., who was tried for his attempt to excite a revolution at Boulogne. He opposed the republic, and protested against the *coup-d'état* of Dec. 1851. In 1852 he was elected a member of the Fr. Acad. D. Nov. 29, 1868.

Bersaglio, ri, the It. name of the riflemen or sharpshooters who served in the army of Victor Emmanuel.

Berserker [probably from the Scandinavian *berr-serkr*, "bear (skin) shirt"], a hero of Scandinavian mythology, who fought without coat-of-mail. The name has also been given to a class of warriors who fought without armor.

Bert (PAUL). See APPENDIX.

Berthier, ber-te-ä' (LOUIS ALEXANDRE), prince of Wagram, a Fr. gen., b. at Versailles Nov. 20, 1753; served as capt. under La Fayette in the U. S. 1778-82; in 1796 became gen. of division, and chief of the staff of Bonaparte's army of It., and accompanied Bonaparte to Egypt in 1798. In 1799 he was appointed minister of war, and became a marshal of Fr. in 1804. He usually rode in the carriage of Nap., whose plans he digested, and whose orders he despatched with rapidity and precision. For his conduct at battle of Wagram (1809) he received the title of prince of Wagram; sovereign Prince of Neuchâtel, Switz., from 1806. D. Jan. 1, 1815.

Bertrand, ber-tron', de (HENRI GRATIEN), COUNT, a Fr. gen., b. at Châteauroux Mar. 28, 1773. He followed Nap. to St. Helena in 1815. He wrote *Memoirs of the Campaigns of Egypt and Syria*, dictated by Nap. at St. Helena. D. 1844.

Berwick, on R. R., Columbia co., Pa., on the N. Branch of the Susquehanna, 28 m. S. W. of Wilkesbarre. Pop. 1870, 923; 1880, 2005.

Berwick (JAMES FITZ-JAMES), DUKE OF, a gen., a natural son of James II. of Eng. and Arabella Churchill, b. in Fr. Aug. 21, 1670. Commanded in his father's army in Ire. in 1690; in 1704 was given the command of the Fr. army in Sp., and gained a victory over the Eng. and their allies at Almanza in 1707. Killed at siege of Philippsburg, 1734.

Beryl (Gr. *βήρυλλος*; Lat. *beryllus*), a mineral which occurs in the form of 6-sided prisms, which are generally blue, yellow, or green, but are sometimes colorless. Those which display clear tints of sky-blue or sea-green are called aquamarine by jewellers. The deep green crystals constitute emeralds. It consists of 67 per cent. of silica, 19 of alumina, and 14 of glucina.

Berzelius, ber-ze-li-us (JOHAN JACOB), M. D., F. R. S., BARON, a Swe. chemist, b. in E. Gothland Aug. 20, 1779; acquired great excellence as an analyst, and made important discoveries in chem.; was author of the system of chemical symbols, and discovered the elements selenium and thorium. His most important work is a *System of Chemistry*, translated into every European lang. D. Aug. 7, 1848.

Besançon, b'z-on-son' (anc. *Vesontio*), a city of Fr. on the river Doubs, 58 m. E. of Dijon. It is connected with Paris and Lyons by several railways, is well built, and has a citadel which is considered impregnable. The most remarkable edifices are a Gothic cathedral, a town-hall, a theatre, the palace of Cardinal Granvelle, and the prefecture. Here are many Rom. antiquities, and the remains of an amphitheatre and aqueduct. Pop. 57,039.

Bessarabia, a prov. in the S. W. part of Rus., bounded N. by Podolia, E. by Podolia, Cherson, and the Black Sea, S. by Moldavia, W. by Moldavia and Bukovina. By the treaty of Paris (1856) part of B. was ceded to Tur., but by the treaty of Berlin, in 1878, it was ceded to Rus. again. Area, 14,014 sq. m. Pop. 1,314,191.

Bessarion (JOHN), b. at Trebizond in 1395, was appointed a cardinal by Pope Eugenius IV., and received in 1463 the title of patriarch of Constantinople. D. Nov. 19, 1472.

Bessel (FRIEDRICH WILHELM), an eminent Ger. astron., b. 1784; was director of the observatory at Königsberg, measured the parallax of the star 61 Cygni, catalogued the stars down to the 9th magnitude from 15° N. to 15° S., and pub. many valuable works on astron. D. Mar. 14, 1846.

Bessemer (HENRY), b. in Hertfordshire, Eng., in 1813, inventor of the B. process of refining steel.

Bessemer's Process for Refining Iron. See STEEL, by A. L. HOLLEY, C. E.

Bessières, ba-se-air' (JEAN BAPTISTE), duke of Istria, a Fr. marshal, b. near Cahors (Lot) Aug. 5, 1768. He entered the army as a private in 1792, and was made a marshal of Fr. in 1804; achieved a victory at Medina del Rio Seco, Sp., in 1808. Killed May 1, 1813, the day before the battle of Lützen.

Betel, or **Pawn**, a narcotic stimulant extensively used by tribes of the Malay race. It consists of a portion of the nut of the *Areca catechu* (called B.-nut or *pinang*), rolled up with lime in the leaf of the *Piper B.* or other species of pepper. This mixture is chewed continually by men, women, and children. The habitual use of it blackens the teeth, and perhaps destroys them.

Beth'any [Heb. "house of dates;" Gr. *Βηθανία*; Ar. *El-Azzeh* or *Lazarieh*], a v. of Pal., on the E. slope of the Mt. of Olives, nearly 2 m. E. of Jerusalem. From some point near the v. Chr. ascended into heaven. Here is a cave or excavation in a rock, which, according to tradition, is the grave of Lazarus.

Bethany, Mo. See APPENDIX.

Beth'el [Ar. *Beitin* or *Beiteen*], an anc. town of Pal., 10 or 12 m. N. of Jerusalem, near the boundary between Judea and Samaria. It has ruins of anc. chs. and other edifices.

Bethel, Conn. See APPENDIX.

Bethel College, in McKenzie, Carroll co., Tenn. This inst. was founded, with a liberal charter, in 1850. Its career of usefulness met the most sanguine expectations of its ardent friends. In a short time fine libraries of well selected books were collected, an excellent apparatus was obtained, and praiseworthy efforts made by the board of trustees to secure a liberal endowment. The war of the States in 1861-63 closed its doors, and left its denuded walls scathed and scarred, the endowment lost, libraries scattered, the apparatus destroyed, and its friends wasted and greatly disheartened. To secure better accessibility, it was moved from McLemoresville to McKenzie, and its doors are again open. The coll. is under the control of the Synod of W. Tenn. of the Cumberland Presb. Ch. A liberal Christianity and a high standard of moral character are inculcated, yet no peculiar sectarian or political principles are allowed in the literary dept. Candidates for the ministry of all denominations receive tuition free of charge. B. C. admits both sexes to her highest honors.

Bethesda [Heb. "house of mercy" or "place of the flowing of water"], a pool or tank at Jerusalem where the lame man was miraculously healed. Some identify it with Birket Israil, a large reservoir inside the city walls; others with the Fountain of the Virgin, about 300 yards S. of the Temple area, and others with the Pool of Siloam, about 300 yards farther S.

Bethlehem [Heb. *Beth-lehem*, the "house of bread"], a town of Pal., 5 m. S. E. of Jerusalem, the birthplace of our Saviour and of King David. Anciently it was called "B. Judah," to distinguish it from another B. in the N. part of Pal. Here are Gr., Lat., and Armenian convents, and the monks show a cave which they claim to have been the stable where our Lord was born. Pop. about 5000.

Bethlehem, R. R. junc., Northampton co., Pa., on left bank of the Lehigh River, 51 m. N. of Phila. A bridge across the river connects it with S. B., the seat of Lehigh Univ., founded in 1865. B. was founded in 1741 by the Moravians, who have here a theol. sem. and several benevolent insts. There is also a sem. for ladies. Pop. 1870, 4512; 1880, 5193; of S. B. 1870, 3556; 1880, 4925.

Bethlehmites, an order of monks established at Cambridge, Eng., in 1257; also an order of monks and nuns founded at Guatemala about 1665.

Bethsaida [Heb. "house of fish"], an anc. town in Pal., on the W. shore of the Lake of Galilee, the home of Andrew, Peter, and Philip. Another B., afterward called *Julias*, was situated near the head of the lake, on the E. side of the Jordan, about 2 m. from its mouth. It was near this B. that Chr. fed the 5000.

Bethune, be-thoon' (GEORGE WASHINGTON), D. D., a divine and poet, b. in New York in 1805; grad. at Dickinson Coll. in 1822, and at the Princeton Theol. Sem. in 1825; in 1828 became pastor of a Dut. Reformed ch. in Rhinebeck, N. Y.; was afterward settled in Utica and Phila.; in 1849 removed to Brooklyn, N. Y. Pub. several religious and literary works. D. Apr. 28, 1862.

Betts (SAMUEL ROSSITER), LL.D., a jurist, b. at Richmond Mass., June 8, 1787, grad. at Williams Coll. in 1806; practised law in N. Y., and became U. S. district judge (1826-67). Author of *Admiralty Practice*. D. Nov. 2, 1868.

Boudant (FRANÇOIS SULPICE), a Fr. mineralogist, b. in Paris Sept. 5, 1787. Among his writings is an *Elementary Treatise on Mineralogy*. D. Dec. 9, 1850.

Boulé (CHARLES ERNEST), a Fr. archaeologist, b. June 20, 1826, took part in excavations in Gr. and Afr., describing them in various publications. D. 1874.

Beurmann, von (KARL MORITZ), an Afr. explorer, b. in Ger. 1835. He explored the country of the Bogos, and in 1861 was sent to look for Vogel in Wadai; he reached that country, and was murdered there, in Feb. 1863, by command of the gov. of Moa.

Beust, boist, von (FRIEDRICH FERDINAND), COUNT, a Ger. statesman, b. at Dresden June 13, 1809. He was appointed minister of foreign affairs in Sax. in 1849. In Oct. 1866 he became minister of foreign affairs and prime minister of the Aus. empire. He received the additional title of chancellor of the empire in June 1867, when Aus. was apparently on the verge of ruin. He urged the emp. to adopt a liberal policy, and effected important reforms which promoted civil and religious liberty. He insisted on the abolition of the concordat with the pope, and induced Francis Joseph to enter into friendly relations with the king of Prus. and emp. of united Ger. Ambassador to Lond. in 1871, to Paris 1876; retir. 1882.

Beveridge (WILLIAM), an Eng. Orientalist, b. at Barrow, in Leicestershire, in 1688; became bp. of St. Asaph in 1704. Wrote *On the Canons of the Gr. Ch.* D. 1708.

Beverly, on R. R., Essex co. Mass., on a small inlet of the ocean, 18 m. N. N. E. of Boston. A bridge connects it with Salem. Pop. of pt. 1870, 6507; 1880, 8456.

Bewick (THOMAS), an Eng. engraver, b. near Newcastle-on-Tyne Aug. 12, 1753, was a pupil of Beilby. He was the founder of the modern Eng. school of wood-engraving. Among his best works is a *Hist. of Brit. Birds*. D. 1828.

Bey, or **Beg**, a title of the Tur. empire signifying "lord." The ruling officers of Tripoli and Tunis are B.; and the same title is given to some local magistrates and public functionaries. It is often a mere honorary title.

Beyroot, *bâ root*, **Beirut**, **Beirout**, **Beirut**, or **Bairut** (or *Bogoras*; Lat. *Beirut*), a seaport of Syria, on the Mediterranean at the foot of Mt. Lebanon, 38 m. W. N. W. of Damascus, of which it is the pt. and with which it is connected by a good macadamized road, traversed by diligences. The harbor admits only small vessels, but in the bay about 3 m. from the city there is good anchorage for large ships. Fr. steamers ply weekly between B. and Marseilles, and Brit. steamers between this city and Liverpool. Since 1829 it has been the seat of Amer. Prot. Missions, and a Prot. Syrian Coll. was opened there in 1896. Pop. 80,000.

Beza [Fr. *De Bèze*], (THEODORE), a Calvinistic theol., b. at Vezelay, in Burgundy, June 24, 1519. He enjoyed two benefices in the Cath. Ch., but in 1548 went to Geneva with his wife, and avowed himself a Prot.; became prof. of Gr. at Lausanne, and an intimate friend of Calvin, and defended the burning of Servetus. He translated the N. T. into Lat. He succeeded Calvin as prof. of theol. in 1564, and afterward ruled the Genevan Ch. with energy for 40 yrs. Among his works is a *Hist. of the Reformed Chs. in Fr. from 1521 to 1563*. D. Oct. 13, 1605.

Bezant, or **Besant**, a gold coin struck at Byzantium, or a circular piece of gold or silver without any impression, supposed to be a part of the old coinage of Byzantium. Some of these were brought home by the Crusaders, and were current in Eng. Their ordinary value was 10s. sterling, but some gold B. were worth £15 sterling.

Bhurtpoor, or **Bharatpura**, a large town of India, in a plain 33 m. W. of Agra; lat. 27° 12' N., lon. 77° 33' E. It was formerly fortified by a mud wall and a ditch which could be filled with water from a lake. Lord Lake having assaulted this town in 1805, lost 3000 men. It was besieged and taken by the Brit. in 1826. Pop. 60,000.

Bianchini, be-ahn-kee-ne (FRANCESCO), an It. astron. and antiquary, b. at Verona Dec. 13, 1662. Pub., beside other works, a *Universal Hist., proved by Monuments and illustrated with Symbols of the Antique* (1694). He succeeded in drawing a meridian line through the ch. of Santa Maria degli Angeli. D. Mar. 2, 1729.

Bias [Bias], one of the Seven Sages of Gr., was a native of Priene, and a contemporary of Cæsus, king of Lydia. He flourished about 570-550 B. C.

Bib, Pout, or Whiting Pout (*Gadus*, or *Brachy-gadus lucius*), a fish related to the cod, found on the Brit. coast and farther N. It is seldom more than 1 ft. long, and the depth of its body equals $\frac{1}{4}$ of its length. It is esteemed for food.

Bibb (GEORGE M.), b. in Va. in 1772, grad. at Princeton in 1792, became a lawyer in Ky.; chief-justice of that State, and vice-chancellor; U. S. Senator 1811-14 and 1829-35, and sec. of the treas. under Tyler. D. Apr. 14, 1859.

Bibb (WILLIAM WYATT) M. D., b. in Va. Oct. 1, 1780, was U. S. Senator from Ga. and first gov. of the State of Ala. 1819-20. D. July 9, 1820.

Bible Christians (called also **Bryanites**, from Rev. William O'Bryan of Cornwall, Eng., who had been a Wesleyan local preacher, but on account of his being married could not be received as an itinerant minister). The first society formed was in a farm-house in 1815, in Shebbear, Devon, when 22 gave in their names. They are found in Eng., Australia, Canada, and the U. S.

Bible Communists. See ONEIDA COMMUNITY.

Bible Revision. See REVISION OF THE BIBLE.

Bible, *The* [Lat. *Biblia*; Gr. τὰ βιβλία (i. e. "the books"); Fr. *la Bible*; Ger. *die Bibel*; It. *la Bibbia*], a collection of anc. writings, divided into 2 parts, the O. and N. Ts., of which the fr. is regarded by the Jewish Ch., and both are regarded by the Chr. Ch., as a divine revelation. The R. Cath. Ch. denies any such character to the B. as would make it a constitutional limitation on the sovereign power. The Gr. Ch. lays chief stress on orthodoxy—that is, on inflexible adhesion to the dogmatic symbols in which the faith of Christianity was codified in the early centuries. The Prots. of the 16th century, in reviving reverence for the authority of the Scriptures, developed various schools of opinion, the Lutherans being more lax than the Calvinists. Finally, the scientific and critical school, represented chiefly by modern Gers., regards the B. as the human record of a divine revelation; not absolutely infallible. Prots. generally are united in regarding the Scriptures—1, as of divine authority; 2, as containing all knowledge necessary to salvation; 3, as the appropriate form of a divine revelation (as opposed to tradition or the inner light); 4, as the heritage of all Chrs.

A. *The O. T.*—The Heb. MSS. which we possess are separated by a long interval and many vicissitudes from the original handwork of the authors.

Hist. of the Heb. Text.—I. *First Period* (526-180 B. C.).—The Babylonian captivity (from 586 to 516) forms an epoch in the hist. of the Jews. In the work which followed the return from Babylon, Ezra had a prominent part. He collected and arranged the anc. writings, and so laid the foundation of the canon (see below, section on the *Canon*); and from this point the hist. of the written codex begins. The popular dialect was the Chaldee, and the Heb. of Moses, David, and the prophets had become a sort of classical and sacred lang., which had to be explained and expounded. Hence the rabbinical tradition about the "Great Synagogue" which was said to have done this work.

II. *Second Period* (180 B. C. to 500 A. D.).—The "schools" begin with Simon the Just, in 180 B. C. These schools produced the Talmud, an immense work in a dozen folio vols., containing a commentary on the Mishna, which is itself a "repetition" of the "Law." The schools developed intense zeal for the text of the Scriptures—a zeal which, though frivolous and fanatical in many of its manifestations, has been of immense value to biblical scholarship.

The Targums.—One result of the zeal of the Jews for the original Heb. was the publication of paraphrases in the Aramaic or popular dialect, which were called *Targumim*

(from a root signifying to "interpret"). They present the rabbinical and traditional interpretation of the Scriptures. Their origin is very obscure.

III. *Third Period* (500-1488 A. D.).—Then a new work began. The Jewish nation had long been broken up and dispersed. Christianity had grown into a powerful opponent. The latter fact had led the Jews to abandon the Septuagint Gr. version of the O. T. (see below, on the *Version of the O. T.*), and the former fact made it necessary to provide still further for the preservation of the Heb. text. The chief seats of rabbinical learning at this period were Tiberias in Galilee and Sora in the Euphrates valley, and the scholars are known as the *Massoretes*. The *Massorah* was a mass of notes, comments, emendations, and corrections of various kinds, including also the vowels and accents. The work of the *Massoretes*, which did not begin before the 6th century, was finished before 1106, the date of the oldest MS. now known to exist. It was not possible even with the minute and stringent rules that were adopted, to prevent errors in copying, and our MSS., all of which belong to the period between 1106 and 1488, offer many variants.

IV. *After the art of printing* was invented some books of the O. T. were printed separately. In 1488 the first ed. of the whole Heb. B. was printed at Soncino. The second, based on the first, was pub. at Brescia in 1494. This was the one used by Luther. An independent version appeared in the Complutensian Polyglot, 1517. The Heb. B. in use are scarcely more than reproductions of the two first printed eds. A satisfactory critical ed., with a full account taken of the variants, is yet to be prepared.

V. *The O. T. in the Chr. Ch.*—The Septuagint Gr. version (see below) was the form in which the Chrs. became acquainted with the O. T. The first Chr. scholar who undertook to learn Heb. was Origen (185-254 A. D.). Jerome (430 A. D.) endeavored to learn Heb. of a Jew, and did learn as much as his teacher could or would teach him. Through him the rabbinical ideas of inspiration, etc., found their way into the W. Ch. In 1311 Clement V. ordered that Heb. should be studied at the univs., but no results followed. Nicholas de Lyra (1340) was a converted Jew. His commentaries influenced Luther so much that a popular saying arose: "If Lyra had not played the lyre, Luther would not have danced." The Reformers returned with zeal to the study of the Heb. It is probably not too much to say that the Heb. lang. is more at the command of this generation than of any other since the Babylonian captivity.

It follows from the above—1, That the only text we can hope to establish on MS. authority is that of the *Massoretes*. 2, We have no MS., even of this text, older than 1106. 3, The vowel-points, accents, word, verse, and chapter divisions are all many centuries more recent than the original writings. 4, The crude and superstitious theories of inspiration which have prevailed to some extent in the Chr. Ch. are of rabbinical manufacture.

VI. *The Canon and the Apocryphal Books*.—The Heb. B. as we now possess it is divided into 3 parts—1, the Torah (i. e. Law—Pentateuch); 2, the Nebim (Prophets, including Josh., Judg., 1st and 2d Sam., and 1st and 2d Kings); 3, the Chetubim ("Writings," including all the other books in the Eng. Version of the O. T.). Ezra and Nehemiah probably collected a book. The form of the collection, as a whole, bears witness to successive collections and successive gradations of authority. Here, then, we have the idea of the canon. It is the limited collection to which, and to which only, authority as the inspired word of God appertains. The works which were in circulation, and to which this authority was denied, were called apocryphal, from a Gr. word meaning "to withdraw," because they were withdrawn from use for public instruction. The third class, the pseudographs, were so called because many of them bore names that were forged. In the early Chr. Ch. the influence of the Septuagint secured the introduction of the Apocrypha with full canonical authority. Luther adopted the Heb. canon, but translated the apocryphal books, setting them by themselves, and giving them a heading which recommended them for edification, though not for dogmatic definition. The Eng. translators followed the same policy. Of late, however, the Apocrypha has been omitted from the popular eds. of the Eng. B.

VII. *The Order of the Books of the O. T.*—The following are the principal divisions:

1. Law (in Heb. תּוֹרָה, *Torah*; Gr. νόμος) or Pentateuch (Gr. πεντάτευχος), because it consisted of 5 parts.
2. Prophets (Heb. נְבִיאִים, *Nebi'im*; Gr. προφῆται), including Josh., Judg., 1st and 2d Sam., 1st and 2d Kings; and Isa., Jer., and Ezek., and the minor prophets. Hos., Joel, Amos, etc.
3. Holy Writings or Hagiographa (Gr. ἁγιογραφα), called in Heb. כְּתוּבִים, *Chetubim*—i. e. the "writings," par excellence, including the Ps., Prov., Job, The Song of Songs, Ruth, Lam., Eccles., Esth., Dan., Ezra, Neh., 1st and 2d Chron.

VIII. *Versions of the O. T.*—1. The first and most important of these is the Gr. version, called the *Septuagint* (LXX.). The Pentateuch was translated by Alexandrian (not Palestinian) Jews, but by how many is unknown. It was made in 285 B. C. The work thus begun was carried on by various persons at various times until all the canonical and apocryphal books were translated. Some originally written in Gr. were added. The parts vary in fidelity to the original and in literary excellence. It passed into the Chr. Ch. as the authoritative form of the O. T., and remains the authority of the Gr. Ch. to this day.

2. *The Peshito* is a Syr. version, whose name signifies "simple" or "faithful," because it is a literal translation, not a paraphrase. It includes the N. T. Its origin is obscure. Used in the time of Ephraim Syrus (378 A. D.).

3. *The Vulgate*.—Augustine (d. 430) recommends only one of the versions existing at the time—viz., the Itala. This is now lost, but seems to have been made from the Septuagint. Jerome (420 A. D.) made a new translation from the original, which was called the "Vulgate." After much opposition,

it was finally adopted, and now it has itself become sacred in the Lat. Ch. The text of the Vulgate became so corrupt by repeated copyings that, on the invention of printing, the true text seemed lost in a chaos of variants. A text having critical and scientific authority is still a desideratum.

B. The N. T.—With the advent of our Lord the fountain of divine revelation once more began to flow. The Gr. lang., which was at this time the medium of popular intercourse, became the vehicle of the new revelation.

I. Hist. of the text. Lat.—The oldest MSS. which we possess date from the 4th century. (See article on the Codices of the N. T.). The first printed text was contained in the Complutensian Polyglot, prepared under the patronage of Cardinal Ximenes, at Alcalá (the anc. Complutum), in Sp., in 1514. Erasmus prepared a very faulty text, pub. at Bale in 1516. These two eds. from MSS. taken at hazard, no doubt fresh ones, served as the basis of succeeding ones (Stephanus, Paris, 1546; Beza, 1565; Elzevir, 1641). The last of these (chiefly on account of its convenience of form and typographical beauty) became the "received text." The Elzevir remained supreme until the time of Griesbach (1812). After him came Lachmann (1851), Tischendorf (8th ed. 1869), and Tregelles (1857-72). The dialect of Gr. in which the N. T. is written is what is called the Hellenistic. The order of the books in the Gr. differs from that in the Eng. Version, in that the catholic Epistles follow the Acts.

II. Respecting the separate Books of the N. T. The Gospels.—We possess a fourfold record of the life and teachings of our Lord. It strikes the attention of the reader at once, that the first 3 contain many passages which are almost identical. On the other hand, each differs from each in a manner equally remarkable. The Gospel of John is clearly independent of the others in its material, scope, and purpose. It takes up the life of our Lord not so much pragmatically as philosophically and mystically—in its religious rather than its historical aspect.

III. The Canon.—The first to quote the N. T. in precisely the same manner as the O. T. was the Gnostic Basilides, about 125 A. D. From this time on, the chief interest of the Chr. Ch. is rapidly transferred to the N. T. By the close of the 2d century all but 7 of the 27 books were universally received. The present canon was established at the 3d Council of Carthage, in Aug. 397 A. D.

IV. Modern Translations of the B.—1. *Ger.* In the 15th century numerous attempts were made to translate the B. into Ger., but it remained for Luther to present the Ger. people with a national version. The N. T. appeared in 1522, and the whole B. in 1534.

2. *Fr.* A Fr. version by Le Fevre was pub. first in parts, then as a whole, at Antwerp in 1530. Another by Olivetan, improved by Calvin, was pub. in Switz. in 1536. Neither, and no other, has ever won the position of a national version in Fr.

3. *Eng.* John Wickliffe (1384) made the first translation into the Eng. lang. But William Tyndale is the true Father of the Eng. national version, founded on the original langs. He pub. the N. T. in 1525. He and Coverdale commenced to translate the O. T. at Antwerp, but they were discovered; Tyndale was captured, and burnt near Brussels in 1536. Coverdale finished the translation of the O. T. in 1535. "Matthew's B." (1537) was approved by royal authority. It contained notes. A new ed. (1539)—the "Great B."—and another in 1540 with Cranmer's preface—"Cranmer's B."—which omitted the notes, supplanted the former. The "Geneva B." followed in 1560, with Calvinistic notes. This won great popularity. Abp. Parker went back to the "Great B." and appointed a commission (mostly bps.) to revise it. This produced the "Bps.' B." (1568). It also had explanatory notes. In 1610 the R. Caths. also produced a rev. version, translated from the Vulgate, and known as the "Douay B." In 1604, at the "Hampton Court Conference," it was proposed to supersede the two Prot. versions by a new one satisfactory to both parties. James I. appointed a commission of 34 learned men of all parties to do the work, and fixed the rules under which they were to act. The "Bps.' B." was to be made the basis, and only altered where necessary. This version was pub. in 1611, and it gradually displaced the others by virtue of its intrinsic merits. Under the Commonwealth the question of a new version was raised, but the committee of Parl. reported that the Eng. version was "the best in the world." In 1870 the convocation of Canterbury proposed a revision, which is now finished; the N. T. appeared in 1881. *From orig. art. in J. S. Unit. Cyc., by PROF. W. G. SUMNER.*

Biblia Pauperum [a Lat. term signifying "the Bible of the poor"]. The work known to bibliographers under this name is one of the earliest "block books" printed before the use of movable type. The printing has been attributed to Lawrence Coster of Haarlem, and was probably printed somewhere between 1410 and 1420. The work consists of a series of cuts illustrating the hist. of our Lord, as set forth in the N. T. and as predicted in the Old. The descriptive text is in the abbreviated Lat. of the time.

Biblical Archaeology, the science which treats of things which illustrate the people and places mentioned in the Bible. Our knowledge of these subjects is obtained from the anc. lit. both of the Jews and Gentiles, and from the monumental and other remains of anc. nations, such as inscriptions, ruins, coins, etc., together with works of modern travel and research. The archaeology of the early Chr. Ch. receives light also from the writings of the Fathers, from the later classical authors, and from the catacombs of Rome.

Bibliography [from the Gr. βιβλίον, a "book," and γραφή, to "write"], that science which has for its object the knowledge and description of the literary productions of all ages and races. It is one of the most important auxiliaries in studying the hist. of science and art. Distinction is often made between pure and applied B. The former considers the books by themselves, and aims merely to show

what has been written, while the latter considers the books according to their character and contents. B. is also useful as facilitating the buying and selling of books, while classified catalogues are often valuable to the student of special subjects. Almost every nation, as well as every science, has its own B., and there are also separate lists of scarce and peculiar books, valuable to book-collectors.

Bib'liomancy, [Gr. βιβλία, the "Bible," and μαντεία, "divination"], a mode of divination used in both anc. and modern times, by opening the Bible and observing the first passage which occurred, or by entering a ch. and taking note of the first words of the Bible heard after entering.

Bichat, be-shah' (MARIE FRANÇOIS XAVIER), a Fr. anat. and physiologist, b. at Thoirette, in Jura, Nov. 11, 1771. In 1797 he began to lecture in Paris. His prin. work is *Gen. Anat. applied to Physiology and Med.* He was the first who recognized the importance of the distinction between organic functions and animal or vital functions. D. 1802.

Bick'ersteth (EDWARD), an Eng. theol. b. in Westmoreland in 1786; took orders in the Anglican Ch., and was sent by the Missionary Society to Afr. in 1816 to reorganize their mission stations. On his return he was chosen sec. to that society. Among his works is a *Help to the Study of the Scriptures*. D. 1850.

Bickersteth (EDWARD HENRY), a poet and clergyman of the Ch. of Eng., son of the above, b. Jan. 25, 1825, and ed. at Cambridge. Wrote sacred poetry chiefly.

Bick'more (ALBERT SMITH), Ph. D., naturalist, b. in St. George's, Me., Mar. 1, 1839, grad. at Dartmouth in 1860; became in 1870 prof. of nat. hist. in Madison Univ., and founded the Museum of Nat. Hist. at the Central Park, New York, of which he is superintendent. Also an author.

Bid'deford, a city and R. R. centre, York co., Me., on the Saco River, 15 m. S. W. of Portland. It was named from the city of Bideford, Eng. The first settlement was made at the "Pool" (at the mouth of the river) by Richard Vines in 1616-17. It was settled by a patent to John Oldham and Vines in 1630. York co. originally embraced all of the prov. of Me., and Bideford or Biddeford for a long series of yrs. was its chief settlement and centre. Here are inexhaustible ledges of granite, which ranks among the best in the world, and is largely exported. Cotton cloth is largely manufactured, also lumber. Pop. 1870, 10,282; 1880, 12,651.

Bid'dle (CHARLES JOHN), a son of Nicholas Biddle, b. in Phila. in 1819, and grad. at Princeton in 1837. He became a lawyer, served in the Mex. war, and also in the c. war; afterward an ed. Author of a vindication of Washington's conduct with regard to the execution of André. D. 1873.

Biddle (JAMES), a naval officer, b. in Phila. Feb. 28, 1783, ed. at the Univ. of Pa., and entered the navy in 1800; while commanding the Hornet captured the brig Penguin. Mar. 23, 1815; was afterward com. to Tur., Chi., etc. D. 1848.

Biddle (JOHN), founder of Eng. Unitarianism, b. at Wotton-under-Edge, Gloucestershire, in 1615, grad. at Ox. After a formal trial by Parl. for heterodoxy, he was condemned and imprisoned. While in prison he pub. in 1648 a *Confession of Faith concerning the Holy Trinity*. After the death of Charles I. he was liberated. It is stated that Cromwell once banished him in order to save his life. D. in prison Sept. 22, 1662.

Biddle (NICHOLAS), a naval officer, b. in Phila. Sept. 10, 1750; entered the royal navy in 1770, obtained the rank of capt. in the U. S. N. in 1776, and took several prizes from the Brit. When in command of the Randolph, a frigate, which encountered the Yarmouth, a 64-gun ship, Mar. 7, 1778, the magazine of the Randolph exploded and killed Capt. B., with nearly all his crew.

Biddle (NICHOLAS), LL.D., a financier, a nephew of the preceding, b. in Phila. Jan. 8, 1786. He was a son of Charles B., who was V.-P. of Pa. in 1786-87; grad. at Princeton in 1801, appointed a director of the U. S. Bank by Pres. Monroe in 1819; in 1823 became pres. of that bank, the affairs of which he managed with great ability and success for many years; in consequence of Pres. Jackson's veto, in 1832, of the bill to recharter it, the bank was closed in 1836 by the limitation of its charter; was elected pres. of a new State bank, called "The United States Bank," which became insolvent in 1841. He was pres. of the trustees of the fund (\$2,000,000) which Stephen Girard left to found a coll. for orphans, concerning which Judge R. T. Conrad says: "He proposed the present plan, and in the midst of wild political excitement and opposition persisted firmly and secured a building which every citizen now not only approves, but applauds." D. Feb. 27, 1844.

Biedermann, bee'der-mann (ALDOIS EMANUEL), a Ger. rationalistic theol., b. Mar. 2, 1819. Wrote *Christliche Dogmatik*.

Biel, beel (GABRIEL), "the last of the Schoolmen," b. at Spire, Ger., after 1422; prof. at Tübingen from the establishment of the univ. there in 1477. D. 1495.

Bicla, bee'la, von (WILHELM), BARON, an astron., b. at Rosla, Pruss., 1782, discovered 1826 the comet noticed below. D. 1856.

Bicla's Comet, a comet of short period (6½ yrs.), discovered by Baron von B. in 1826. It was observed apparently unchanged, at various returns, but at its return in 1845-46 it was found to have separated into 2 parts, both of which were observed in 1852. It was due in 1865, and again in 1872, but no trace of it could be found; in Nov. of the latter yr. the earth crossed its path, and a shower of meteors was observed, which is now supposed to have been due to fragments of the lost comet. W. G. PECK.

Bienne, be-enn', Lake of, in the Swiss canton of Berne, 10 m. long, 3 m. wide, and 250 ft. deep, is near the base of the Jura Mts., and has an elevation of 1419 ft. above the sea. The Thiele passes through it before joining the Aar. It incloses the island of St. Pierre, which was the residence of J. J. Rousseau in 1765. In digging peat, which is extensively procured from its marshy border, the remains of a

Bill of Lading. The written evidence of a contract for the carriage of goods by water. It is usually signed by the master of the vessel, either in duplicate or triplicate, acknowledges the receipt of the goods from a person (named the consignor), and undertakes to deliver them to a designated person (the consignee) or his assigns at a specified place, for the compensation and on the conditions therein specified. An indorsement of the B. of L. transfers the title

to the goods, and, if made in good faith and for a valuable consideration, cuts off the right of stoppage *in transitu*. For most purposes, a B. of L. is assignable, and an assignee takes it subject to any defence existing between the original parties. For the single purpose of shutting out the right of stoppage *in transitu* it is negotiable. Although the term was originally applied only to a memorandum of a contract for transportation by water, it is now frequently used to denote the memorandum given by any carrier of the terms on which he agrees to carry the goods received by him.

Bill of Rights, an Eng. statute enacted at the time of the accession of William and Mary to the throne. It declared the right of the subject to petition the king, freedom of election of members of Parl., and freedom of speech in Parl. It affirmed that standing armies without the consent of Parl. are illegal, and that the king had no power of suspending or dispensing with laws. It provided that excessive bail should not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted. A number of these provisions are literally inserted among the amendments to the U. S. const., and are also found in State const. The phrase "B. of R." is often employed in the U. S. to designate all those portions of a const., State or national, designed to secure liberty to the individual.

Bill of Sale, a writing under seal conveying the title to goods and chattels. The seal by the common law is conclusive evidence of consideration. Accordingly, a B. of S. formally executed passes the title without any consideration or delivery of the property. Where there is no seal there must be a consideration or delivery. A delivery without consideration would amount to a gift. A B. of S. may pass a title which would be valid as between the parties, and yet not of force as to creditors or purchasers, as if one who was indebted should make a B. of S. without actual consideration, or should sell, even with consideration, and still retain possession of the goods. The transaction might be regarded as infected with fraud, even though there were no fraudulent intent.

The phrase "B. of S." is frequently used in a more popular sense to indicate any written instrument, though not under seal, executed as evidence of a sale. In sales of ships the term "grand B. of S." is sometimes employed. The word "grand" indicates that the sale is made by the builder. All subsequent transfers would be indicated by the ordinary phrase "B. of S."

Bil'son (THOMAS), b. at Winchester in 1536, became bp. of Worcester 1596, and bp. of Winchester the yr. following. Was a zealous enemy of Puritanism. He assisted in the translation of King James's Bible. *The Perpetual Govt. of Christ's Ch.* was written by him. D. 1616.

Bingham (Hiram), b. in Bennington, Vt., about 1790, grad. at Middlebury Coll. in 1816, at Andover in 1819, and was one of the first Congl. missionaries sent to the S. I., where he long exercised a powerful and salutary influence. He returned to the U. S. in 1841. D. Nov. 11, 1869.

Bingham (JOHN A.), a legislator, b. in Pa. in 1815, removed to N. Y.; was chairman of the managers who conducted the impeachment of Andrew Johnson in 1868; was again elected to Cong. in 1870; U. S. minister to Japan 1873.

Bingham (KINSLEY S.), b. at Camillus, Onondaga co., N. Y., Dec. 16, 1808, studied law, went to Mich. in 1833, and was gov. (1855-59), and U. S. Senator (1859-61). D. Oct. 5, 1861.

Binghamton, bing'-um-tun, city and R. R. centre, cap. Broome co., N. Y., situated at junction of Susquehanna and Chenango rivers, 216 m. N. W. of New York and 142 m. S. W. of Albany. It is the S. terminus of the Chenango Canal. The State inebriate asylum is situated here, and also a State home for orphan and indigent children of Broome, Tioga, Tompkins, Cortland, Delaware, and Sullivan cos. It is the seat of Lowell's Business Coll. and Telegraphic Inst.; St. Joseph's (Cath.) Female Acad., conducted by Sisters of St. Joseph; St. James's (parochial) school for Cath. boys and girls, and several excellent private schools. Pop. 1870, 12,692; 1880, 17,317.

Binney (AMOS), M. D., a naturalist, b. at Boston Oct. 18, 1803, grad. at Brown Univ. in 1821; was pres. of the Boston Society of Nat. Hist. Wrote *Terrestrial and Air-Breathing Mollusks of the U. S.* D. Feb. 18, 1847.—His son, W. G. BINNEY, is also a conchologist.

Binney (HORACE), LL.D., a lawyer, b. in Phila. Jan. 4, 1780, grad. at Harvard in 1797; was admitted to the bar in Phila. in 1800, and rose in a few yrs. to the highest rank in his profession. In 1843 he made his argument in the supreme court of the U. S. in the case of *Vidal vs. the mayor of Phila.*, which is often cited by the bench and bar of the U. S. as authority on questions involving the law of charitable uses. He declined judicial positions. Wrote *Reports of Cases in the Supreme Court of Pa.* D. Aug. 12, 1875.

Binney (THOMAS), D. D., LL.D., b. in 1798, an Eng. dissenting minister, pastor of King's Weigh-house Chapel in Lond. 1829-69. He wrote many controversial papers, *Conscientious Clerical Nonconformity and Service of Song*, beside several volumes the products of a controversy with the Australian bp. of Adelaide. D. Feb. 1874.

Binocular telescope [from the Lat. *binus*, "double," and *oculus*, an "eye"], a telescope to which both eyes may be applied at once, and by which an object may be observed with both eyes at the same time. There are also B. microscopes, having two tubes, one for each eye. In some kinds of work they possess superior defining power.

Bino'mial (Lat. *bis*, "twice," *nomen*, a "name"), in algebra, the sum of two terms, either or both of which may be negative. Any power of such an expression may be written out by means of the "B. formula," a formula first demonstrated by Sir Isaac Newton.

Binturong (*Arctictis binturong*), a viverrid quadruped, native of Malacca.

Biogen'esis, the origin of life from life by parentage or descent; a term recently used in opposition to *abiogen-*

esis, or the origination of life in matter before not living. (See SPONTANEOUS GENERATION.)

Biology, bi-ol'-o-je [Gr. *βίος*, "life," and *λόγος*, "discourse"], is that branch of the study of nature which treats of organized beings, under their diverse relations, in contradistinction to mineralogy, which relates to the inorganic or mineral substances; its subjects are therefore animals (zoology) and plants (bot. or phytology), living and extinct. These agree with each other, and differ from minerals in (1) the phys. and chemical characteristics of their primitive constituents or cells, and the concomitant phenomena of life exhibited under certain conditions; (2) the perpetual change during life in the organism by loss of substance proportioned to the demands on the system of exertion or existence, and the renewal of substance by derivation and assimilation of nutriment from without; (3) the segregation and specialization, when the demand for rapid growth has been fulfilled, of certain portions of the organism as reproductive organs, differentiated as receptive and procreative (female), and impregnating and vivifying (male); from the former of which (after the conjunction of the two under certain conditions) an organism originates essentially like that from which it proceeds; and (4) the existence, for a vaguely determinate period, of the organism, and finally a disturbance of the equilibrium or conditions of existence, death and dissolution; (5) originating as above noted, the offspring repeats the same cycle of phenomena as the parent, and in turn contributes to the perpetuation of the race.

While animals and plants differ from minerals, and agree with each other in all the characters thus specified, there are no such salient differences between themselves. It is, indeed, easy to distinguish the higher animals and plants, and they are, to a certain extent, antitypes and complementary to each other. On the one hand, plants derive their nourishment by absorption from the inorganic world through the external surfaces of their roots and leaves, and (under most conditions) decompose carbonic acid gas, assimilate carbon (and nitrogen), and eliminate oxygen. On the other hand, animals derive their nutriment, immediately or mediately, from plants, and ingest it either through a provisional or specialized alimentary cavity, imbibe oxygen, and exhale carbonic acid gas. The mode of taking nutriment is the most characteristic feature, and specialization especially tends to that end, but supplemented, in the animal, by a specialization of other systems to guide it in the selection and pursuit of its food. Some rather high animals (e. g. certain Entozoa) take their nutriment through their external surfaces, but this is rather a teleological modification co-ordinated with atrophy of the intestinal tube, superinduced by peculiar conditions of life. In view of the slight differences between animals and plants, and their contrast with minerals, it is evident that the old ternary division of natural objects into animals, plants, and minerals does not express the degree of the relations between them; and hence the animal and plant kingdoms have been combined in an *organic empire* or realm on the one hand, and on the other minerals have been denominated an *inorganic empire*. The impossibility or great difficulty of discriminating the lowest plants and animals has also led some naturalists to separate them from the animal and vegetable kingdoms, and combine them in a peculiar one, which has received, with some varying limits, numerous names; e. g. Infusory world (Infusorienwelt), règne de Zoophytes, règne Psychodaire, règne chaotique, règne Plantanimal, regnum Amorphanicorum, règne organique Primitive, kingdom of Protozoa, regnum Primitivum, kingdom of Primordia, and Protistenreichs. Such propositions, however, do not remove the difficulty, but only shift and complicate the questions, and obscure the recognition of the tendencies of the two antitypically functional divisions of nature. It need only be added that there is also, to some extent, a contrast in respect to individuality in the respective kingdoms, numerous individuals (flowers) being developed from the outgrowth of the contents of a single seed, while in all except some of the lower animals a single individual only originates from one egg. The subject of individuality, however, is a somewhat obscure one, and has provoked much discussion; and the question has been involved by the confusion of potential and actual individuality.

THEODORE GILL.

Bi'on of Smyrna, a Gr. pastoral poet, was a friend and contemporary of Moschus, and lived about 250 B. C.

Biot (JEAN BAPTISTE), a Fr. nat. philos. and astron., b. in Paris Apr. 21, 1774. He became in 1800 prof. of physics in the Coll. of Fr. Author of a *Treatise on Experimental Physics and Math., Researches in Anc. Astron.*, and other works. In 1840 he received the Rumford medal of the Royal Society of Lond., for his researches on the circular polarization of light; admitted into the Fr. Acad. in 1856. D. Feb. 3, 1862.

Birch (*Betula*), a genus of trees or shrubs of the order Betulaceæ, native of temperate and cold regions in Asia, Europe, and Amer. The genus *Betula* is distinguished by 10 to 12 stamens and winged seeds, has alternate, simple leaves, and flowers in scaly catkins. The common B. of Europe and Asia (*Betula alba*) is a handsome tree, the bark of which is smooth, white, and separable into layers, and is used for tanning and dyeing; Rus. leather is tanned with it; the wood is tough, and used by coopers, turners, and wheelwrights. A European variety (*Betula pendula*) called "weeping B." attains a height of 60 ft. The Amer. white B., which according to Gray is a variety of this, is a small tree, not valuable for timber. Among other species indigenous to the U. S. are the *Betula lenta*, "sweet" or "black B.," having an aromatic bark and a fine-grained wood. The *Betula papyracea* grows to a height of 70 ft., has a hard-grained wood, the bark splitting into thin layers, sometimes used for paper; the Indians make canoes of this bark. The *Betula lutea* (or *excelsa*), sometimes 80 ft. high, has a bark of a brilliant yellow. The *Betula nigra*, or "river-B.," grows on the banks of streams and has a very tough wood.

Birch (SAMUEL, LL.D.), b. in Lond. Nov. 3, 1813, an Egyptologist; author of *Hieroglyphics* and other treatises on archaeology, etc. His studies embrace Chi. lit. and all depths of antiquities and ethnology.

Birch (THOMAS, D. D., F. R. S., an Eng. biographer and historian, b. in Lond. Nov. 23, 1705. He took orders in the Anglican Ch. Author of *The Geo. Dict., Historical and Critical*, and a *Hist. of the Royal Society*. D. Jan. 9, 1766.

Bird (FREDERICK MAYER), son of Robert Montgomery Bird, noticed below, b. in Phila. June 28, 1838, grad. at the Univ. of Pa. in 1857, and at Union Theological Sem. in New York in 1860. For several yrs. he was a minister in the Lutheran Ch. In 1868 entered the P. E. Ch., and in 1881 was made prof. in Lehigh Univ., Pa. Wrote *Charles Westey, in his Finer and less Familiar Poems*.

Bird (ROBERT MONTGOMERY), M. D., b. at New Castle, Del., in 1808. He wrote, besides other works, *The Gladiator*, a tragedy, and the *Infidel*, a novel; in 1847 became an ed. in Phila. D. Jan. 32, 1854.

Bird-Catching Spider (*Mygalis arcturaria*), a spider of Cayenne and Surinam. Its body is nearly 2 inches long, but its legs when stretched out occupy a space almost a ft. in diameter. The hooks of its mandibles are black and very

from the old fable that it had no feet], the best known and most elegant of the B. of P., is a native of the Aru Islands, W. of New Guinea, where it is killed in great numbers for



Emerald Bird of Paradise.

its plumage. The royal B. of P. has the 2 centre tail-feathers very long, thread-like, and ending in a disk. We are now acquainted with 25 species.

J. S. NEWBERRY.

Birds (Lat. *aves*; Fr. *oiseau*, plu. *oiseaux*; Ger. *Vögel*), a class of oviparous vertebrate animals, the recent members of which in several respects are peculiar, and separated from other animals by a very distinct line of demarcation; they are, however, more closely allied to the reptiles than to any other class of vertebrates. They are all bipeds, and are all covered with feathers. Nearly all B. have the power of flight. The most conspicuous external characteristic of B. is the plumage, which invests their bodies and wings, serves as clothing, and assists in motion through the air. The internal temperature of B. is from 105° to 112° F., much higher than that of men and beasts. Their buoyancy is increased by numerous air-cells which are connected with the lungs, penetrate the bones, insinuate themselves between the skin and subjacent muscles, and enter the quills, so that the whole organism is permeated by air. The gen. form of B. is adapted to aerial navigation, and the body is somewhat boat-shaped. The number of vertebrae in the neck varies from 10 to 26. Among their peculiar organs are the toothless jaws, covered with a hard, horny sheath, forming the beak or bill. (See **BILL**.) The head is so articulated to the neck by a single condyle or pivot that a B. can turn its head round in a manner impossible to Mammals. The number of toes of each foot is generally 4, of which 3 extend forward and 1 backward; but the *Zygodactyli* (climbers) have 2 before and 2 behind. The sternum or breast-bone is very large and strong, with a prominent keel, except in *Ratitæ*, serving for the attachment of the muscles which move the wings. The bones of the wing correspond to those of a human arm. The wing and tail are furnished with feathers called quills, which are larger and stronger than the others. The names of the several varieties of wing-feathers are *primaries*, *secondaries*, *tertiaries*, and *coverts*. The primaries are quill-feathers arising from the terminal joint—i. e. the part of the wing corresponding to the hand; the secondaries are attached to the fore-arm; the tertiary grow from the humerus. The leg is formed of bones homologous with those of Mammals. The thigh-bone is very short, and concealed within the body. The *tibia* or proper leg-bone is often mistaken for the thigh. The tarsus and metatarsus are represented by a single bone, called the tarsus. The feet vary according to the habits of the B.; some having the toes free, others having them united by a web.

B. do not masticate their food. The *crop*, or first stomach, is large in B. that feed on grain and seeds, and is wanting in those that eat fish. The second stomach, or *proventriculus*, is largest in those B. in which the crop is small or wanting. The third and prin. stomach is the *gizzard*, which is a powerful grinding apparatus, especially in those B. which feed on grain. The sense of sight is exceedingly keen, and is remarkable for its perfect adaptation to near or distant objects. Some B. have a well developed sense of smell, and nocturnal B. have sensitive organs of hearing. B. are distinguished for their musical powers. All the best singing-B. belong to the *Passeres*.

Among the most interesting subjects are their migrations and the ingenuity which they exhibit in building nests. The number of eggs in a state of nature varies from 1 to 20, and B. generally breed only once a yr. They all moult—i. e. change their feathers once a yr.—and the summer plumage of many B. is very different from the winter dress.

The earliest traces of the existence of B. on the globe have been supposed to be the so called B. tracks in the triassic sandstones of the Conn. valley; but it is now generally conceded that most if not all these tracks were made by reptiles and amphibians. It is especially noteworthy that the earlier B. (Jurassic and cretaceous) had true teeth in their jaws. In the lithographic slates of Solenhofen (Jurassic) have been found a feather and 2 nearly complete bodies of B. exhibiting some remarkable features, and representing a peculiar order (*Saururus*). (See **ARCHÆOPTERYX**.) The remains of B. have been found in the greensand of Eng., the eoene of the island of Sheppy, and the Paris basin, as well as in the more recent tertiary at various European localities. In Amer. fossil B. were unknown until quite recently; they have now been found, however, in



Bird-Catching Spider.

strong. It does not construct a net or web for the capture of its prey, but it obtains it by the chase, and hunts only in the night. This spider and other species of *Mygalis* will attack and kill small birds. It is asserted that in some tropical countries there are spiders which feed upon birds caught in their webs.

Bird Cherry, a name given in Eng. to the *Prunus Padus*, which is a small tree growing wild in Europe, and called *hagberry* in Scot. It bears racemes of small drupes of a sweetish and bitterish taste, which are used in the N. of Europe to make spirituous liquors. Nearly allied to this is the wild cherry or choke cherry of the U. S.

Birde, or **Byrd** (WILLIAM), an Eng. composer of ch. music, b. in 1540. In conjunction with Thomas Tallis he became organist to Queen Elizabeth in 1575. He produced, among other works, *Sacred Songs*, and a magnificent canon entitled *Von Nobis, Domine*. D. 1623.

Bird Lime (Lat. *viscus*), an adhesive substance placed on the branches of trees to catch birds. It is prepared by boiling the middle bark of the holly (*Ilex*), the mistletoe (*Viscum album*), or other glutinous plants, and concentrating the decoction by evaporation. The gluten of wheat flour is sometimes used as a substitute for B. L.

Bird of Paradise, the name of several species of birds of the family *Paradisæidae*, natives of Papua and the neighboring islands, nearly allied to the Corvidæ (crow family), and omnivorous. The plumes of the flanks often form 2 enormous bunches of feathers, reaching far behind the tail. The brilliancy of tints and velvety texture make the B. of P. a highly prized article of commerce for female ornament. The prin. species of this genus are the common B. of P. (*Paradisæa apoda*), the royal B. of P. (*Cicinnurus regius*), the magnificent B. of P. (*Diphyllodes magnifica* or *speciosa*), and the 6-threaded B. of P. (*Parotia sefilata*), from the head of which grow 6 long and thread-like feathers, each ornamented with an ovate black racket, 3 on each side. The common B. of P., sometimes called "the emerald B. of P." (*Paradisæa apoda*), [that is, the "footless," so called

The greensand of N. J., the cretaceous beds of Kent, and the tertiary deposits of Wyo. and Id. The cretaceous B., according to Prof. Marsh, belong to 2 distinct orders—*Odontornis* and *Odontotroch*. In the superficial deposits of New Zealand and Madagascar the remains of several kinds of extinct B. have been met with, some of which far exceed in dimensions the largest now living. The great B. of Madagascar is called *Epanax induratus*. It is supposed to have been at least 12 ft. in height, and very massive. The egg of this B. was over 4 in. in length. The contents of one of these eggs were equal to those of 6 ostrich eggs or 148 hen's eggs. The largest extinct B. of New Zealand have been described under the name of *Dinornis* by Prof. Owen, and were related to the ostriches, etc., of the present epoch. They were from 6 to 10 ft. in height; and one species, *Dinornis elephantopus*, had legs and feet nearly as massive as those of the elephant. J. S. NEWBERRY.

Birdsall WILLIAM RANDALL, M. D. See APPENDIX.

Bird's-Eye Limestone, a compact, dove-colored stone, with whitish crystalline points, belonging to the lower division of the Trenton group of the lower Silurian strata of N. Amer. It contains many orthoceratites of enormous size, and fossil brachiopods.

Birds' Nests, Edible, the nest of a peculiar swift sea-swallow (*Collocalia esculenta*) of the Malay Archipelago. It builds its nest of a glutinous substance, said to be derived from a sea-weed, which is swallowed and partly digested, and then disgorged and fashioned into a nest as large as a common coffee-cup. When fresh these nests are worth twice their weight in silver in the markets of Chi.

Birds of Passage are B. which are migratory, passing from one country or lat. to another on account of the change of the season. The migration of B. is generally from N. to S., or from S. to N., in the temperate zones. They migrate twice in a yr., moving northward in the spring and southward in the autumn, toward the regions in which their proper food is then most abundant.

Biren, Biron, or Bu'ren ERNEST JOHN, Duke of Courland, b. in 1687. He was a favorite of Anna, a niece of Peter the Great, who became empress of Rus. in 1730, and gave him the title of duke. On the death of Anna in 1740 he became regent, but was exiled to Siberia in 1741. When Elizabeth ascended the throne in 1741 she permitted him to return, and in 1763 the duchy of Courland was restored to him. D. Dec. 28, 1772.

Birkhead, a seaport town of Eng., on the left bank and near the mouth of the Mersey, opposite Liverpool, and 15 m. N. N. W. of Chester, with which it is connected by railway. It is about 1½ m. S. W. of Liverpool. Steamers cross the river between these places about once in 15 minutes, or oftener. B. was only a small fishing-v. as recently as 1824, since which it has increased rapidly in consequence of the construction of extensive docks and important public works. One of the docks occupies 120 acres. Pop. 83,324.

Birmingham, bur'ming-um, a manufacturing city of Eng., on the river Rea, 79 m. S. E. of Liverpool, and 130 m. N. W. of Lond. It is the chief town of G. Brit. for the manufacture of hardware, machinery, and other metallic products. Several railways extend from this city to Lond., Liverpool, Manchester, etc. B. contains Queen's Coll., connected with the Lond. Univ.; a free public library, a botanic garden, a R. Cath. cathedral, and a handsome town-hall, in which a musical festival is held once in 3 yrs. Among the charitable insts. are an asylum for the deaf and dumb and an asylum for the blind. Pop. 400,757.

Birmingham, city and important R. R. centre, cap. Jefferson co., Ala. Beds of coal and iron ore lie in its vicinity, and contribute much to the prosperity of the place. Pop. 1880, 3085.

Birmingham, New Haven co., Conn., on R. R. and the Housatonic River, at the mouth of the Naugatuck, 9 m. W. of New Haven. A bridge across the Naugatuck connects it with the v. of Old Derby, on R. R. Steamboats ply between this place and New York. Here is the first pin-factory established in the U. S. Pop. 1870, 2103; 1880, 3026.

Birnam, a hill of Scot., 12 m. N. W. of Perth, 1580 ft. high, commanding a fine view of the valley of the Tay. It was formerly covered by part of a royal forest, to which Shakespeare has given celebrity in his tragedy of *Macbeth*.

Birney (DAVID BELL), b. at Huntsville, Ala., May 29, 1825, practised law in Phila.; became a brig.-gen. of U. volunteers in 1861, and was raised to the rank of maj.-gen., serving with the Army of the Potomac. D. Oct. 18, 1861.

Birney (JAMES G.), an opponent of slavery, the father of the preceding, b. at Danville, Ky., Feb. 4, 1792, grad. at Princeton in 1812, and became a lawyer. He liberated his slaves, and founded at Cin. an anti-slavery paper called *The Philanthropist*. A mob threw his press into the river. He became sec. of the Amer. Anti-Slavery Society, and removed to New York about 1836. He was nominated in 1840 for the presidency of the U. S. by the Liberty party, which also supported him in the election of 1844. D. Nov. 24, 1857.

Biron, be-ton', de (CHARLES DE GONTAUT), DUKE, a Fr. gen., b. in 1562. He served at Ivry 1590, became a favorite of Henry IV. and marshal of Fr. in 1595, but was convicted of forming a treasonable plot with the duke of Savoy, for which he was put to death July 31, 1602.

Birth-Marks. See NAILS.

Biscay, Bay of (Fr. *Golfe de Gascogne*; anc. *Gallia-cus Oceanus*, or *Aquitanicus Sinus*), a portion of the Atlantic Ocean bordering on Fr. and Sp., extending from the Fr. island of Ushant to Cape Ortegal. The depth, greatest near the coast of Sp., varies from 20 to 200 fathoms. Violent currents and winds render the navigation difficult.

Bishareen', a name given to several nomadic tribes who live in the desert between the Red Sea and the valley of the Nile. Their most valuable possessions are camels, horses, sheep, and goats. They profess the Mohammedan religion, and pay taxes to the khedive.

Bishop (ANNA), b. in Lond. in 1814, was the daughter of Mr. Rivière, an artist. In 1831 she married Sir H. R. Bishop,

and M. Schultz in 1858. Her *début* was made in 1857. She won high distinction as a singer. D. 1884.

Bishop (Sir HENRY ROWLEY), MUS. DR., an Eng. composer of music, b. in Lond. in 1780. Among his operas are *King Manrico* and *The Virgin of the Sun*. His glees are very fine. He was knighted in 1842, and appointed prof. of music in the Univ. of Ox. in 1848. D. Apr. 30, 1855. His second wife was Anna B., noticed above.

Bismarck, cap. of Dak. Terr. and Burleigh co., on R. R. and Mo. River. Pop. 1880, 1758; 1885, 4500.

Bismarck-Schönhausen, von, fon biz'mark shen'-how-zen (OTTO EDWARD LEOPOLD, PRINCE, a Ger. statesman, b. at Schönhausen Apr. 1, 1815. He was ed. at the univs. of Göttingen and Berlin, studied law, and then retired to his paternal estates until 1847, when he was chosen member of the Prus. diet, where he distinguished himself as an advocate of ultra-royalistic principles. In 1851 he was made sec. of legation at the federal diet in Frankfurt, where he displayed a determination to aggrandize Prus. at the expense of Aus. In 1859 he was sent as ambassador to Rus., and early in 1862, having acquired the confidence of the king of Prus., he was made minister of foreign affairs and prime minister. He adopted as his cardinal principle that Aus. must be excluded from the Ger. confederation, and a new union of the states formed, with Prus. at its head. Prus. seceded from the confederation in 1866, and a war ensued with Aus., which was brought to a close by the great victory at Sadowa, July 3, 1866, and a treaty was signed by which Aus. was excluded from the Ger. confederation. As a result, Hanover and several other states were annexed to Prus., and the confederation of N. Ger. was formed, including all the states N. of the river Maine, the command of all the armies being vested in the king of Prus. B. was in 1867 made chancellor of this confederation. In the mean while jealousy arose between Fr. and Prus., and in 1870 war was declared, upon a slight pretext, by the emp. Nap. III. B. accompanied the army which invaded Fr., and in Feb. 1871 dictated the terms of peace, by which Fr. ceded Alsace-Lorraine, and agreed to pay an indemnity of \$1,000,000,000. The empire of Ger. having been formed, B. was made prince and became chancellor of the empire. In 1872 he resigned his position as prime minister, but continued to be the adviser of the emp. in all foreign matters, and in 1873 again became prime minister. In July 1874 an attempt was made to assassinate him, and he received a severe wound. In 1878 he presided over the cong. of the European powers, held at Berlin to discuss the provisions of the treaty of San Stefano. Since that time he has been really the head of the govt. of the empire, notwithstanding violent opposition from various quarters, and has distinguished himself by his hostility to the claims of the pope to ecclesiastical authority in Ger., and by a no less determined hostility to socialistic and revolutionary principles. A. H. GUERNSEY.

Bismuth (specific gravity about 9.8; equivalent, 210), a brittle metal of a crystalline texture and of a yellowish-white color, occurs native in Ger., Fr., Cornwall, Cal., Tex., and Swe. It is also found in combination with oxygen, sulphur, and arsenic. Rich deposits of B. ore have recently been found in Ut. It fuses at about 500° F. This metal is not often used in the arts in a pure state, but its alloys are of considerable importance. Some of them are extremely fusible. A compound of 8 parts of B., 5 of lead, and 3 of tin melts in boiling water, and is called *fusible metal*. Other alloys are even more fusible. The most important of several compounds it forms with oxygen is the trioxide, which is employed in the manufacture of porcelain as an agent for fixing the gliding and for increasing the fusibility of fluxes. The sub-oxide is a tasteless, heavy powder of pure white color, called *white*, *pearl powder*, *blanc de fard*, etc. This is used as a cosmetic. As a med. it acts as a tonic and antispasmodic. Other medicinal preparations are the sub-carbonate, the sub-oxide, the citrate, the tannate, and the valerianate.

Bison, bi'son, a genus of animals of the group Ruminantia and family Bovidae, natives of Europe and N. Amer. The B. have short horns, which are curved inward at the point; long woolly or shaggy hair, which covers the neck and shoulders of the males. At least 3 species of fossil B. have been discovered. The European B. is called *auratus*. The Amer. B. (*B. americanus*) is known in the U. S. by the incorrect name of buffalo. It is similar to the European B., but the fore parts are more



Bison.

shaggy, and it is a powerful and ferocious-looking animal, which no Amer. beast can overcome or resist except the grizzly bear. The color of its hair is mostly brown. Vast herds of B. roam over the plains and prairies between the Miss. River and the Rocky Mts., feeding on grass and brushwood. They are generally inoffensive, and will not attack men, but prefer to run rather than to fight. During their migration they move in enormous herds. Their hides are valuable, and under the name of buffalo robes are an important article of commerce. The flesh of the cows is highly esteemed, and is similar to beef, being very juicy and savory. The B. are swift in running, and have so keen a sense of smell that the hunter cannot easily approach near enough to shoot them. The chase of B. is attended with some danger, as they sometimes turn upon an assailant, who is liable to be trampled under the feet of the herd. Numerous tribes of aborigines are mainly dependent on the B. for their food and clothing. Their skins, which are covered with soft hair or fur, are much used for blankets, and their flesh and

fat are converted into *petroleum*, the favorite food of the Americans and *petroliers* of N. Amer. The B. differs from the true buffaloes in having a hump upon the back, and in the absence of the dewlap, which is small in the buffaloes. The horns turn outward in the true buffaloes, and inward in the B.

Bissell (WILLIAM H. M. D. D. in Cooperstown, N. Y., Apr. 1, 1811, removed to Ill. in 1837. He practised law for several yrs., served as a col. in the Mex. war 1846-47, and in 1850 was chosen gov. of Ill. D. Mar. 18, 1860.

Bissexile, bis-seks'li. Lat. bis, "twice," *sexilis*, "sixth." In the Julian calendar every fourth year contained 366 days, the intercalary day being inserted next after that named *Sexta Cal. Mar.* (Feb. 24). This day was called *bis sexta Calendas Martii*, and for this reason the yrs. of its insertion were called *bissexile*.

Bistort (*Polygonum bistorta*), a perennial herbaceous plant of the order Polygonaceae, is a native of Europe and Asia. The tortuous root is one of the most powerful vegetable astringents, and is used both internally and externally.

Bistre, or **Bister**, a pigment of a warm brown color or reddish brown, used by painters in water-colors. It is prepared from the soot of wood, especially the beech.

Bites of Serpents, See POISON OF SERPENTS.

Bitoor, or **Bittoor**, a town of India, on the Ganges, 32 m. N. W. of Cawnpore. It has numerous pagodas, and is visited by multitudes of pilgrims. During the mutiny of 1857 it was a stronghold of Nana Sahib, and was taken by Gen. Havelock in Aug. 1857. Pop. about 8000.

Bithynia, an ancient country of Asia Minor, bounded N. by the Black Sea, E. by Paphlagonia, S. by Galatia and Phrygia, W. by the Sea of Marmora, which separated it from Europe. B. was annexed to the Pers. empire in 543 B. C., and afterward became an independent kingdom. Prusias II. was king of B. in the time of Hannibal, who sought refuge at his court. In 74 B. C. B. became a prov. of the Rom. empire. In 1298 the Turks conquered the country.

Bitter Almond Oil, See ALMONDS, OIL OF.

Bitter King, *Scaevola arbutus*, a shrubby small tree of the order Polygalaceae, a native of the E. I. islands, derives its name from its intense bitterness. It is used as a remedy for fevers and other diseases.

Bittern, a name applied to various species of Ardeidae, e. g. in the U. S. to *Botaurus lentiginosus*, and in Eng. to *Botaurus stellaris*. They have a long, straight, and sharp bill, long legs, and a long neck. The neck is furnished with a loose plumage or fringe of feathers which can be erected at pleasure. They utter a peculiar hollow and booming sound, which is noticed in Goldsmith's line, "The hollow-sounding bittern guards its nest." The *Ardeia catas* of the U. S. has been called "least B."

Bittern, the mother liquid remaining after the removal of common salt from brines which have been partially evaporated. The bitter taste is due to the magnesium salts present. Sea-water and many salt-wells yield a B. which is valuable in the production of Epsom salts, and especially of bromine.

Bitter-Sweet, or **Woody Nightshade** (*Solanum Dulcamara*), a perennial plant with a shrubby stem, nearly allied to the potato, is a native of Europe and Asia, and is naturalized in the U. S. The fruit is a poisonous red berry. The name B.-S. is frequently given to a climbing woody vine, the *Celastrus scandens*, which grows wild in the N. and Atlantic States. It is popularly believed to have great virtues as an alterative.

Bitter Wood, a name given to several trees and shrubs of the genus *Xylopi* and the order Anonaceae, natives of Brazil and the W. I., remarkable for the bitterness of their wood. The term is also applied to the *Pierana excelsa* and *Quassia excelsa*, the wood of which is used as a tonic.

Bittle (DAVID FREDERICK), D. D., b. in Frederick co., Md., Nov. 19, 1811, grad. at Pa. Coll. 1835; studied theol. at the Theol. Sem. of the Lutheran Ch. at Gettysburg, Pa.; pastor in the Valley of Va., and afterward in Middletown, Md., until 1853, when he was elected to the presidency of Roanoke Coll., Salem, Va. D. Sept. 25, 1876.

Bitumen, be-tu'men (perhaps from the Gr. *pitrus*, a "pitch-pine tree"). This term applies to those mineral substances, both solid and liquid, of an oily or resinous nature, composed principally of hydrogen and carbon, sometimes united with oxygen. In gen. terms, therefore, the B. are mixtures in sundry proportions of many simple carbonated hydrogens, accompanied in the solid and viscous varieties by many oxygenated carburets of hydrogen. In gen., the whole series of B. arrange themselves between two extremes, represented by pit-coal and naphtha as types:

Pit-coal.	Naphtha.
Carbon..... 89.31	Carbon..... 88.20
Hydrogen..... 4.92	Hydrogen..... 11.80
Oxygen and azote. 5.77	
100.00	100.00

B. is employed as the binding substance in a variety of bituminous mastics and cements, which, though principally used as a surface coating for timber to protect it from decay, and for roofs, arches, walls, area and cellar floors, etc., to render them water-tight, is also quite often employed in masonry constructions, both as a matrix for concrete and as a cement between bricks and stone, instead of lime and cal-

careous cements. It is also used extensively for street and other pavements, and in some of its forms for fuel and for making illuminating gas and varnish. (From *orbis*, etc., in J. V. Lave, *Cap.*, by GEN. O. A. GILMORE.)

Bituminous Coal, a variety of coal which is valuable for fuel and burns with a smoky flame. It is composed of carbon, with a small proportion of hydrogen.

Bituminous Limestone, carbonate of lime impregnated with bituminous matter, derived from decayed vegetables or from the decomposed remains of those animals the hard parts of which form a large portion of the rock, which is sometimes very extensive.

Bituminous Shale, an indurated bed of clay, which occurs in many coal-fields, and contains portions of carbon and volatile matter. Oil, gas, and paraffine are obtained from it by distillation.

Bi'valve From the Lat. *bis*, "twice," "double," and *valva*, plu. *valvæ*, "folding doors"), a term applied in conchology to a shell which consists of 2 concave calcareous plates or valves joined together by a hinge and an elastic ligament, as the oyster, clam, and mussel. The class characterized by such shells has been called *Acephala*, *Conchifera*, and *Lamelibranchiata*.

Björnson, be-örn'son (BJÖRNSTJERNE), was b. Dec. 8, 1832, and ed. in the Lat. school at Molde, from which he went to the Univ. of Christiania in 1851. But already in the next year he broke off his Univ. studies and commenced a purely literary life. Of his novels—*Synnøve Solbakken* (1856), *Vron* (1858), *Een afdel god*, *Asnen*, *Fiskerjenten* (1860), etc.—an Eng. translation is now publishing. Of his dramas—*Halle-Halle!* (1858), *Storøst Skjæppe* (1862), *The Vandy Mermaid* (1868), *Marie Stuart* (1869), *A Færdig* (1871), *The New System* (1877), *The King* (1879), *The Glass* (1882), *The Endostasis* (1884), etc. During the last 10 yrs. he has taken active part in politics as the leader of the radical party. In the winter 1880-81 visited Amer. and delivered a series of brilliant lectures to his countrymen settled there. CLEMENS PETERSEN.

Björnstjerna, be-örn-she'r'na (MAGNUS FREDRIK FERDINAND), COUNT, a Swe. gen. and author, b. at Dresden Oct. 10, 1779; fought against the Fr. and negotiated the treaty by which Swe. and Nor. were united; was ambassador at Lond. D. Oct. 1847.

Black (JEREMIAH S.), b. in Somerset co., Pa., Jan. 10, 1810, became a judge of the supreme court of Pa. 1851, atty.-gen. of Buchanan 1857, and sec. of state 1860. D. Aug. 19, 1883.

Black (JOSEPH), a chemist and author of *Scot. extraction*, b. at Bordeaux in 1728; grad. as doctor of med. at Edinburgh in 1754, became prof. of anat. at Glasgow in 1756, and prof. of chem. at Edinburgh in 1766. He propounded the theory of latent heat. D. Nov. 26, 1799.

Black (WILLIAM), a Wesleyan divine, b. in Eng. in 1760, removed to N. S. in 1775, and founded there the Wesleyan Ch.; was subsequently gen. supt. of the Wesleyan missions in Brit. Amer. D. Sept. 8, 1834.

Black Art, See MAGIC.

Black Band, a variety of clay iron-stone or compact carbonate of iron, containing 25 or 30 per cent. of carbonaceous matter. It occurs abundantly in the coal-fields of Scot. It also occurs in the coal-measures of O., and is extensively used for the production of iron.

Black Bass, a common name for 2 centrarchid fishes of the genus *Micropterus*, highly esteemed as game fishes. The small-mouthed species is now known as *M. Dolomieu*, and the large-mouthed one as *M. salmoides*.

Blackbird, a popular name applied to various species. It is given in Eng. to the *Turdus merula* or *Merula vulgaris*, a species of thrush which abounds in Europe. The plumage of the male is all deep black, but that of the female is brown. It has a powerful voice, and its song is more mellow than that of the song-thrush, but inferior in compass and variety. The B. of the U. S. are icterine forms, e. g. *Quiscalus versicolor*, sometimes called "crow B." or purple grackle, and *Scolecophagus ferrugineus*, known also as the "rusty crow-B." The latter is a great depredator of corn-fields. The swamps and meadows of the U. S. are frequented by the *Agelaius Phœniceus*, or red-winged B. It is gregarious, and feeds on insects and grain.

Blackburn, a town of Eng., in a barren district on a small stream called "The Brook," 24 m. N. W. of Manchester. It has a beautiful Gothic parish ch., a fine exchange, and numerous chapels of the dissenters, a grammar school founded by Queen Elizabeth, a hospital, a theological acad., and a public park. The prin. business is the manufacture of coarse cotton stuffs. Railways extend from this point in various directions. Pop. 104,012.

Blackburn (WILLIAM MAXWELL), D. D., b. at Carlisle, Ind., in 1828, grad. at Hanover Coll., Ind., in 1850, and studied theol. at Princeton; prof. of biblical and ecclesiastical hist. in the Presb. Theol. Sem. at Chicago since 1868, and a contributor to religious lit.

Black Cap, **Black Cap Warbler**, or **Fauvette**, (*Curruca atricapilla*), a bird of the family Sylviidae or warblers. It is regarded as the sweetest song-bird in G. Brit., except the nightingale, to which it is somewhat inferior in size. The back, wings, and tail are of an ash-brown color, the belly white, and the top of the head jet black (in the male). Its note is rich in tone, and has a great variety of sweet and gentle modulations.

Black Chalk, a variety of shale, containing a large proportion of carbon. It is made into artists' crayons, and is ground to powder for paint.

Black Cock, **Heath Fowl**, or **Black Grouse**, (*Lyrurus tetrix*), a bird of the family Tetraonidae, abundant in the mts. and marshy parts of the continent of Europe, and in Brit. Its favorite haunts are moors, bogs, and morasses covered with rank herbage. The male, which weighs nearly 4 lbs., is of a shining bluish-black color, with a conspicuous white bar on the wings below the ends of the great wing-covers, and has the outer tail-feathers on each side elongated and curved outward. The female is of a rust

color, and is called the "gray hen." Their food consists of seeds, berries, insects, and the young shoots of the pine, fir, and birch. Their flesh is highly esteemed for food.

Black Death. See PLAGUE.

Black Duck (*Anas obscura*), one of the most highly prized of Amer. wild ducks, which breeds abundantly from Mex. to Labrador, and from the Atlantic to the Pacific. It is of a generally blackish-brown color, with bright tints about the bill, neck, wings, etc.

Black-fish, a name applied to various fishes. The B. of tautog of the N. U. S. is the *Tautoga Americana*, a species of the family Labridæ, of an oblong form with smooth scaly skin. It is one of the chief market-fishes of New York. In Eng. the name is given to the *Centrolophus pompius*, a species of the family Stromateidæ. It is a species more common in the Mediterranean and contiguous waters. The name is also applied to porpoises of the genus *Globicephalus*, e. g. *G. intermedius* of the Atlantic coast, and *G. Seamonti* of the Pacific coast of the U. S.

Black Flux, a mixture of carbonate of potash and finely divided carbon or powdered charcoal. It is prepared by mixing in a crucible 1 part of nitre with 2 or 3 parts of crude cream of tartar, and deflagrating the mixture by ignited charcoal; or by heating in a covered crucible crude cream of tartar or bitartrate of potash, when the tartaric acid is decomposed and charred, forming carbonic acid, which remains in combination with the potash. It is a valuable flux in reducing ores. The metal potassium can be obtained by heating this flux in iron vessels.

Black Forest [Ger. *Schwarzwald*; anc. *Hyrēnia Sylva*], a wooded region in Baden and Württemberg, with a chain of mts. which extends about 85 m., and separates the basin of the Rhine from that of the Neckar. This region is remarkable for its forests and mines. The soil is not adapted to tillage, and the prin. occupations of the inhabs. are mining, charcoal-burning, and the manufacture of wooden toys. In the vicinity of Neustadt is the mt. pass of Hölle, celebrated in connection with Moreau's retreat in 1796.

Black Friars, a term applied, on account of the color of their garments, to the Dominican order of monks, who first came to Eng. about A. D. 1230, and settled at Ox.

Black Gum, a popular name of the *Nyssa multiflora*, an Amer. tree, sometimes called pepperidge, hornpipe, tupelo, and sour gum. The fruit is a bluish-black drupe, the wood close-grained, tough, and very difficult to split.

Black Hawk, on R. R. Gilpin co., Col., 36 m. W. of Denver. It contains and is adjacent to mines of gold and silver. It has quartz-mills and smelting-works. Pop. 1870, 1068; 1880, 1540.

Black Hawk, an Amer. Indian, chief of the Sac tribe, b. in 1767. He waged war against the U. S. in 1832 for the recovery of lands which certain chiefs of the Sacs and Foxes had ceded to the whites. D. Oct. 3, 1838.

Black Hills, a mt. range in the S. W. part of Dak. and the E. part of Wyo. Terr. The highest point of this range, Laramie Peak, rises about 8000 ft. above the sea. Gold has been discovered among these hills.

Black Hole, a dungeon in Calcutta, 20 ft. square, in which the nabob Suraja Dowlah, in June 1756, shut up 146 Eng. prisoners. There were only 2 small windows, and 123 of the prisoners d. of suffocation in the first night; the 23 survivors were taken out the next morning.

Black'ie (GEORGE STODART), A. M., M. D., Ph. D., b. at Aberdeen, Scot., Apr. 10, 1834; ed. at the univs. of Bonn, Paris, and Edinburgh, grad. A. M. and M. D. at the last in 1855; came to the U. S., and became prof. of nat. hist. at the Univ. of Nashville 1856-61; served during the c. war as surgeon. Wrote *Cretinism and Cretinism, Med. Flora of Tenn.*, and *Hist. of the Knights Templar*.

Blackie (JOHN STUART), b. in Glasgow, Scot., in 1809, studied at Edinburgh and Göttingen. He translated Goethe's *Faust* and the works of Æschylus. In 1852 he became prof. of Gr. in the Univ. of Edinburgh. Author of *Lays and Legends of Anc. Gr.*, *Lyrical Poems and Altaona*.

Black'ing, a compound of bone-black, oil, sulphuric acid, and sugar or molasses, employed in polishing boots, shoes, or leather, on which it produces a black-glazed and shining surface. The ingredients in Day & Martin's B. are finely powdered bone-black ground with sperm oil, raw sugar or molasses, a little vinegar, and concentrated sulphuric acid, which unites with the lime of the bone-black to form sulphate of lime.

Black Jack, the name given by miners to blende (sulphide of zinc). It is also a popular name of a small species of Amer. oak (*Quercus nigra*), sometimes called barren oak and iron oak, of which there are several varieties.

Black Lead. See GRAPHITE.

Black Letter, the Gothic or Old Eng. types or letters. Books printed before 1500 are generally in this character, which was used in MSS. long before the invention of printing. A similar form of type is still used by the Gers.

Black'man (GEORGE CURTIS), M. D., a surgeon, b. at Newtown, Conn., Apr. 20, 1819, and grad. in med. at the Coll. of Phys. and Surgeons, New York, in 1840; afterward studied in the Lond. hospitals; became a member of the Royal Med. and Chirurgical Society, an honor rarely given to foreigners; located in Cin. in 1854, and was appointed prof. in the Med. Coll. of O. He was an able writer, a brilliant lecturer, and a bold and skilful operator. D. July 21, 1871.

Black Mountain, of N. C., is in Yancey co., a few m. W. of the Blue Ridge. This group of mts. derives its name from the forests of dark balsam fir which crown its summits. It has the shape of a horseshoe. The highest of its peaks rises to 6707 ft., and is called the Black Dome, or Mitchell's High Peak, in honor of Dr. Mitchell of the Univ. of N. C., who perished while exploring this inhospitable region, and was buried on its top. This is the highest point of the U. S. east of the Rocky Mts. ARNOLD GUYOT.

Black Oak, a large, handsome tree, common in U. S. east of the Miss., also called yellow oak and dyer's oak, re-

garded by Gray a variety of the *Quercus coccinea*. Its bark is used for tanning, and produces a valuable yellow dye.

Black Quarter, Quarter Evil, or Black Leg, a disease which attacks animals which are kept on fertile but undrained land. It is characterized by swelling of a joint, leg, or quarter, diarrhoea, extravasation of blood, and formation of abscesses, and is usually fatal. The best preventive is thorough underdrainage of pastures.

Black River Falls, cap. of Jackson co., Wis., on R. R. and Black River, 50 m. N. of La Crosse. It has saw-mills and flouring-mills, and iron. Pop. 1870, 1101; 1880, 1427.

Black Sea, or Eux'ine (anc. *Pontus Euxinus*; Tur. *Kara Dengiz*), a large inland sea, between Europe and Asia. The extreme length is about 700 m., and its greatest breadth about 380 m. Area, estimated at 185,000 sq. m. It communicates with the Sea of Marmora by the Bosphorus, and with the Sea of Azof by the Strait of Kertch. The navigation is not dangerous except during violent storms. In ancient times it was an important highway of commerce. The Turks excluded the ships of all foreign powers from it until 1774, when the Rus. obtained the right to navigate it. By the treaty of 1856 the Rus. and Turks were not permitted to keep ships of war in it. In 1871 the Rus. again were permitted to have men-of-war on this sea.

Black Snake, a name applied in different countries to characteristic serpents. That generally so known in the U. S. is *Bascanian constrictor*. It is smooth-scaled and remarkable for agility. It feeds on frogs, mice, lizards, eggs, birds, etc. The name is also given to the *Scotophilus Alleghaniensis*, easily distinguished by the keeled scales on its back.

Black'stone (SIR WILLIAM), an Eng. jurist and commentator on law, b. in Lond. July 10, 1723. He was admitted to the bar in 1746, but obtained little practice. In 1758 he became Vinerian prof. of law at Ox., of which he was a graduate, and in 1761 was elected to Parl.; was appointed solicitor-gen. in 1763, and a justice of the court of common pleas in 1770. His prin. work is *Commentaries on the Laws of Eng.* D. 1780.

Blackstone (WILLIAM), a clergyman of the Ch. of Eng., and the first white inhab. of Boston, Mass.; settled at Shawmut, now Boston, in 1633, but left in 1633, not liking his Puritan neighbors; said to have d. in R. I. in 1675.

Black Tin, the name given by miners to tin ore ready for the process of smelting.

Black Vomit, the name of the hemorrhagic discharge from the stomach peculiar to yellow fever.

Black Walnut (*Juglans nigra*), a valuable timber tree of the U. S., belonging to the order Juglandaceæ, and growing from Fla. northward and westward. It produces an edible nut. The wood is used for cabinet work, carpentry, and many other purposes.

Black'well (ANTOINETTE BROWN), b. in Henrietta, N. Y., May 20, 1825, studied theol. at Oberlin Coll., O.; was ordained pastor of a Congl. ch. at South Butler, N. Y., in 1853; has taken an active part in the Woman's Rights movement; married in 1856 to Samuel C. Blackwell.

Blackwell (ELIZABETH), M. D., b. at Bristol, Eng., in 1821, was the first woman who ever obtained the degree of M. D. in the U. S.; came to the U. S. with her parents in 1831, and taught school at Cin. from 1838 to 1847; she applied for admission to the med. colls. of Phila., New York, and Boston, without success; grad. as M. D. at the Coll. of Genera, N. Y., in 1849.

Blackwell (LUCY STONE). See STONE (LUCY).

Blackwell's Island, in the E. River, having an area of 120 acres, is a part of New York City. Upon it are the penitentiary, almshouse, and several public hospitals.

Blad'der-Nut (*Staphylea*), a popular name of several plants of the order Sapindaceæ. They are so called because the fruit is a bladder, membranous, and inflated capsule inclosing hard, bony seeds. The *S. pinnata* is planted as an ornamental tree in Eng. shrubberies. The *S. trifolia*, or Amer. B.-N., about 10 ft. high, is a native of the U. S. The seed is aperient, and the wood is suitable for turning.

Blad'derwort (*Utricularia*), a genus of aquatic plants of the order Lentibulaceæ, comprising numerous species, of which 14 or more are found in the U. S., their flowers adorning the surfaces of ponds and shallow waters. They are remarkable for a provision by which the plant, which is ordinarily submerged in water, is raised to the surface, in order that the flowers may expand in the air.

Blad'senburg, Prince George's co., Md., on R. R. and the E. Branch of the Potomac, 6 m. N. E. of Wash. A battle fought here Aug. 24, 1814, between the Brit. and Amers., resulted in the capture of Wash. Pop. 1870, 410; 1880, 466.

Blaine (JAMES GILLESPIE), LL.D., a legislator, b. in Washington co., Pa., Jan. 31, 1830; grad. at Washington Coll. 1847, removed to Me. in early life, and became ed. of the *Portland Advertiser*; first elected to Cong. in 1862; in 1876 was appointed by the gov. of Me. to fill a vacancy in the U. S. Senate, and was subsequently elected to fill that term and the succeeding one; in 1881 was appointed sec. of state of U. S. by Pres. Garfield. Resigned Dec. 1881. Nominated June 6, 1884, by Republican Convention, Chicago, Ill., for Pres. of U. S., but not elected. Author of *Twenty Years in Congress*.

Blainville, de, dech. blan-vel (HENRI MARIE DUCROTAY), M. D., F. R. S., a Fr. zoologist and anatomist, b. at Arques, near Dieppe, Sept. 12, 1777. He studied comparative anat. under Cuvier, was appointed pref. in the Faculty of Sciences of Paris in 1812, and admitted into the Inst. in 1825. In 1832 he succeeded Cuvier as prof. of comparative anat. in the Museum of Nat. Hist. Among his most important works are *Lectures on Gen. and Comparative Physiology*. D. 1850.

Blair, R. R. junr., a city and cap. of Washington co., Neb., on the Mo. River, 29 m. N. W. of Omaha. Pop. 1870, 494; 1880, 1317.

Blair (AUSTIN), b. at Caroline, Tompkins co., N. Y., Feb. 8, 1818, grad. at Union Coll. in 1839; studied law, removed to Mich.; gov. of the State 1861-65, and M. C. 1867-73.

Blair (FRANCIS PRESTON), a journalist, b. at Abingdon,

Va., Apr. 22, 1791, grad. at Transylvania Univ., and became in 1790 ed. of the *Republican*, a Dem. daily paper pub. at Wash., D. C., joined the Rep. party in 1835. D. Oct. 18, 1876.

Blair FRANKS PRESER, JR., a lawyer, son of the preceding, b. at Lexington, Ky., Feb. 19, 1821; grad. at Princeton in 1841, was elected a member of Cong. by the Free-Soil party of St. Louis, Mo., in 1856, after which he acted and voted with the Reps.; joined the U. army in 1861, and obtained the rank of maj.-gen. Having joined the Dem. party, he was selected as a candidate for the vice-presidency by the convention which nominated Horatio Seymour for the presidency in 1868; U. S. Senator for Mo. 1871. D. 1875.

Blair (HUGH), D. D., a Scot. divine, b. in Edinburgh Apr. 7, 1718, was licensed as a minister of the Ch. of Scot. in 1741. In 1758 he became one of the ministers of the High Ch. of Edinburgh, the highest promotion that a Scot. clergyman can obtain. In 1762 he was appointed prof. of rhetoric and belles-lettres in the Univ. of Edinburgh. Author of *Lectures on Rhetoric*, D. Dec. 27, 1800.

Blair (JAMES), D. D., b. in Scot. in 1656, entered the Anglican ministry, came to Amer. in 1685; in 1689 became commissary of the bp. of Lond. for Va. and Md.; was founder and first pres. of William and Mary Coll. (1693), and rector of Williamsburg. Author of a commentary on the *Sermon on the Mount*, D. Aug. 1, 1743.

Blair (JOHN), a jurist, b. at Williamsburg, Va., in 1732; grad. at William and Mary Coll., and studied law in Lond.; was appointed by Washington judge of the supreme court of the U. S., 1789. D. Aug. 31, 1800.

Blair (MONTGOMERY), b. May 10, 1813, in Franklin co., Ky., grad. at W. Pt. in 1835, serving while in art. in Fla. war till May 20, 1863; counsellor at law in St. Louis, Mo., and judge of the St. Louis court of common pleas 1843-49, counsellor at law in Montgomery co., Md., from 1853, and counsel for plaintiff in the Dred Scott case; P. M.-gen. of the U. S., 1867-64. D. July 30, 1883.

Blairsville, Pa. See APPENDIX.

Blake (GEORGE SMITH), a naval officer, b. at Worcester, Mass., in 1803; served in the Mex. war, and was made supt. of the U. S. Naval Acad. at Annapolis in 1857, and a com. in 1862. D. June 24, 1877.

Blake (HOMER C.), U. S. N., b. Feb. 1, 1822, in Duchess co., N. Y., entered the navy as mdpn. Mar. 2, 1840, became capt. in 1871. On the evening of the 11th of Jan. 1863, when in command of the merchant steamer *Hatteras*, which had been converted into a govt. vessel for blockading purposes, B. encountered the privateer *Alabama*, and was forced to surrender, "the *Hatteras* going down, bow first, 10 minutes after the crew left her decks." The battery upon the *Alabama* brought into action against the *Hatteras* numbered 7 guns, consisting of 4 long 32-pounders, 1 100-pounder rifled gun, 1 68-pounder, and 1 24-pounder rifled gun. The guns used by the *Hatteras* were 2 short 32-pounders, 1 30 pounder rifled Parrott, and 1 20-pounder rifled Dahlgren. He next obtained a command in the N. Atlantic blockading squadron. Became commodore. D. Jan. 21, 1880.

Blake (LILLIE DEVEREUX), a writer, b. in Raleigh, N. C., ed. in New Haven, Conn. *Peltered for Life* is the best of her stories; is an advocate of woman suffrage; twice married. **Blake** (ROBERT), b. at Bridgewater, Somersetshire, Eng., in 1599, elected to Parl. in 1640, and when the war began in 1642, took sides against the royalists; in 1649 was appointed "gen. of the sea;" in 1651 destroyed or captured nearly all of Prince Rupert's fleet in the Tagus; in 1652 became chief admiral, and fought Van Tromp. He destroyed the Sp. plate-fleet at Santa Cruz in 1657. D. Aug. 17, 1657.

Blake (WILLIAM PHIPPS), A. M., Ph. B., b. in New York June 1, 1826, and grad. at the Sheffield Scientific School, New Haven, Conn., in 1852. In 1853 he was mineralogist and geologist for the U. S. Pacific R. R. exploring expedition in Cal.; in 1861-63 mining engineer for the Japanese govt.; in 1863 became prof. in the Coll. of Cal. and geologist to the State board of agriculture; removed in 1867 to New Haven, Conn., and in 1873 went as special agent to the Vienna Exhibition. Among his writings are *Silver Ores and Silver Mines and Mining Machinery*.

Blake'y (JOHNSTON), b. in Ire. Oct. 1781. He came with his parents to the U. S., grad. at the Univ. of N. C. in 1800, entered the U. S. N. in 1800, and obtained command of the sloop *Wasp* in 1813. In June 1814 he captured the Brit. sloop-of-war *Reindeer*, and in the ensuing Sept. sank the sloop *Avon*. The *Wasp* never returned to pt., and the fate of Capt. B. and his crew was never ascertained.

Blanc, blon (AUGUSTE ALEXANDRE PHILIPPE CHARLES), a distinguished writer on the fine arts, b. at Castres, Fr., Nov. 15, 1813. He was a brother of Louis B. Beside a long series of valuable contributions on subjects connected with the fine arts to various Fr. journals, he was the author of *The Works of Rembrandt*, which first appeared in folio in 1853, and in 1859 was republished with additions in 2 vols. 4to. A new edition, enriched with many additional illustrations, was pub. in 1873. It is the best work on Rembrandt. He was the most important contributor to the *Hist. of the Painters of all the Schools*, a very complete and extensive work begun in 1849 by Armengaud, and continued till its completion in 1859, under the editorship of B., with the assistance of able writers, such as Delaborde, Mantz, Silvestre, and P. Chasles. B. has been twice Director of Fine Arts in Fr.—once in 1848, when he replaced M. Garraud, and again in 1871. D. Jan. 18, 1882. CLARENCE COOK.

Blanc (JEAN JOSEPH LOUIS), a Fr. historian and radical, b. in Madrid Oct. 28, 1813, ed. in Fr. He founded in Paris in 1839 the *Revue du Progrès*, which advocated social and political reform, and wrote the *Organization of Labor* and a *Hist. of Ten Years—1830-40*. Was a member of the provisional govt. formed in Feb. 1848, and was very popular with the socialists and workmen of Paris, who revolted and were defeated in June 1848. He then went into exile. In 1871 he was elected to the National Assembly of Fr. D. Dec. 6, 1882.

Blanchard, blon-shar' (FRANÇOIS), a Fr. aéronaut, b. at

Andelys in 1753. He constructed a balloon with wings and a rudder, and in 1785 crossed the Channel in this balloon, and landed in Eng. for which exploit the king of Fr. gave him a pension. D. Mar. 7, 1809.

Blanchard (THOMAS), b. in Sutton, Mass., June 24, 1788; invented a machine for turning gun-stocks. D. 1864.

Blanche (Fr. pron. blonsh) of Castile, queen of Fr., a daughter of Alfonso IX. of Castile, b. in 1187. When her husband, Louis VIII., king of Fr., died, she became regent of the kingdom, which she governed with ability during the minority of her son, St. Louis. D. Dec. 1, 1252.

Blanching [from the Fr. *blanche*, "white"], a process by which gardeners arrest the progress of secretions in the leaves of plants, in order to render them more wholesome and palatable as food. This is done by heaping up the earth against the growing plants, or covering them with boxes perforated with many holes.

Blanqui, blon-ke' (JÉRÔME ADOLPHE), a Fr. political economist, b. at Nice Nov. 20, 1798. Among his works is a *Hist. of Political Economy in Europe from the Anc. to the Present Time*. D. Jan. 28, 1854.

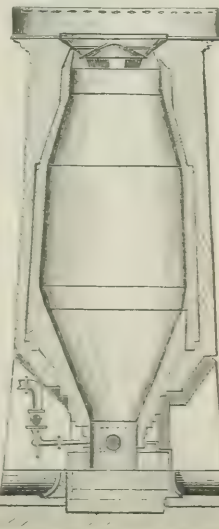
Blanqui (LOUIS AUGUSTE), a Fr. republican, b. in 1805, brother of preceding, took an active part in revolutionary movements of 1830, 1839, and 1848. Went beyond the most advanced, was condemned to death in 1840, and afterward repeatedly to long terms of imprisonment. In the Paris Commune, in 1870, he was a central figure, and was soon after sentenced to transportation for life, but was imprisoned instead at Clairvaux till a short time before his death, Jan. 1, 1881.

Blarney, a v. and castle of Ire., 4 m. N. W. of Cork, and surrounded by beautiful scenery. The ruined castle stands on a steep rock, at the base of which is a deep valley. Among its relics is the famous "Blarney stone," which is said to impart to those who kiss it great skill in the use of complimentary speech.

Blasphemy [Gr. βλασφημία], an indignity offered to the Deity or to religion. According to Blackstone, it is denying the being and providence of God, contumelious reproaches of our Saviour, and profane scoffing at the Holy Scripture, or exposing it to contempt and ridicule. It has been otherwise defined to be the act of wantonly uttering or publishing words casting contumelious reproach or profane ridicule upon God, Jesus Chr., the Holy Ghost, the Holy Scriptures, or the Chr. religion. If the words were written or printed, there might be a case of blasphemous libel. If oral, the case would be one simply of B. The law does not brand as a crime serious discussion or the promulgation in a temperate manner of opinions opposed to Christianity. B. is an offence punishable as a misdemeanor at common law. In many of the States the crime is punishable by statute.

Blast Furnace [Ger. *Hochofen*; Fr. *haut fourneau*]. In its primary signification the term B. F. implies an elevated shaft lined with a refractory material, designed for the reduction of metals from their ores. The shaft is open at the top, where the ore, fuel, and fluxes are charged, and supplied with a blast of air near the bottom, where openings are provided for removing the metal and cinder. The term has, however, by custom become almost entirely restricted to furnaces for the reduction of iron. In its essential details a B. F. consists of a stack, in whole or in part of masonry, surrounding a vertical chamber or shaft of circular section. The diameter of the shaft usually increases from the top downward and from the bottom upward. The lower part of the furnace is called the *hearth*, and has the smallest diameter. At its upper part are one or more openings through which the blast of air is introduced, and in the lower part, or *crucible*, the molten iron and cinder collect. The *hearth* is prolonged toward the front of the furnace, and is closed by the *dam*, and covered in on top by the *tymparch*. The *dam* is formed of fire-brick or other refractory material. It slopes inward toward the interior of the furnace, and has its outer vertical face covered with a cast-iron plate called the *dam-plate*. At the bottom of the *dam* is a channel communicating with the interior of the furnace, through which the molten iron is tapped off, and on its upper edge is a notch, called the *cinder-notch*, over which the cinder flows. The *tymparch* is covered by the *tymp*, a long, hollow casting, through which water constantly circulates. The blast is supplied through *tuyeres*, from 1 to 8 in number, which are set into the masonry of the furnace. They are hollow, truncated cones, supplied with a constant current of water to prevent the iron of which they are composed from melting. Into these *water-tuyeres* are fitted the *nozzles* of blast-pipes, which are connected with the *blast main* which encircles the furnace. The sloping walls connecting the *hearth* with the widest part of the furnace are called the *boshes*. This term is often, though incorrectly, used to express the greatest diameter of the

FIG. 1.



sloping walls connecting the hearth with the widest part of the furnace are called the *boshes*. This term is often, though incorrectly, used to express the greatest diameter of the

furnace. In many cases there is no sharp line of demarcation between the hearth and the boshes, the former being simply a continuation of the curved walls of the boshes.

There are but comparatively few furnaces at the present day driven with cold blast, the temperature used being from 300° to 1000° F.

FIG. 2.

Fig. 1 is a section of a modern B. F. in the Cleveland district of Eng. Its height is 75 ft.; greatest diameter, 24 ft., at an elevation of 24 ft.; diameter of hearth, 8 ft.; height of hearth, 8 ft.; diameter of mouth, 15 ft.; has 3 tuyeres, 4½ inches in diameter, cubic capacity, 20,000 ft. Yield, 350 tons of iron per week.

Fig. 2 represents an elevation of a modern Amer. furnace at Chicago. Its height is 66 ft.; greatest diameter, 17 ft.; yield, 350 tons iron per week. The gases are taken off at the top of the furnace, and descend by a vertical flue, then by an underground channel to the boilers and hot-blast stoves. The contrivance for closing the mouth of the furnace is known as the cup and cone, or bell and hopper. This arrangement is one of the simplest, and the one most generally adopted.

The product of the B. F. is *pig* or *cast iron*. Its composition is dependent on the ores and fuel used. It always contains 3 to 4 per cent. of carbon, and in some varieties as high as 5 per cent. The carbon exists in 2 forms in pig iron—chemically combined, and in the form of graphite. The darker and more highly graphitic varieties are formed at the highest temperatures. The higher the temperature and the more silica the charge contains, the more silicon will be reduced and unite with the iron. A high temperature has also the tendency, in very basic charges, to reduce some of the metals of the alkaline earths.

The production of a B. F. depends on its capacity, the richness and reducibility of its ores, the nature of the fuel, and the temperature of blast. While some small furnaces yield but 3 tons daily, the production of some of the mammoth furnaces of Eng. is 80 tons daily. The composition and character of the cinder or slag from a B. F. depends on the nature of the ore and the temperature of the furnace. It consists mainly of a double silicate of lime and alumina. [From *orig. art. in J. S. Van Nostrand's*, by T. M. Drown, M. D.]

Blasting [from the A.-S. *blasian*, to "blow"]. The use of gunpowder in quarrying stone probably dates back almost to the invention of that explosive. In ordinary practice the blocks of stone are separated from the mass in the quarry by means of one or more *blasts*, each blast being made by first drilling a hole into the rock by the use of a *drill*, operated either by hand, or—as is now the practice in large works, especially large tunnels or shafts—by machinery driven by steam or compressed air.

In hand-drilling the operation is performed by means of a *drill* or *jumper*, which is formed from a bar of steel or of iron tipped with steel at one end, which is flattened out into a fan shape, with a sharp cutting edge extending on each side a little beyond the body of the drill, so that the drill may have free play in working. The drills are of lengths suited to the depths of the holes to be drilled, it being customary to use a short drill in commencing a hole, and longer ones in succession as the hole is deepened.

In drilling shallow holes of 1 inch or less diameter, the quarryman holds the drill in one hand (see Fig. 1), turning it a little with each blow, and with the other hand wields a hammer weighing from 4 to 7 lbs. In this way he can drill in granite an average of 8 ft. in a day.

In drilling holes ranging from 1 to 3½ inches in diameter and 2 to 15 ft. in depth, 3 men are usually required (Fig. 2). The progress thus made in granite has been from 2½ to 12 ft. per diem, in holes varying respectively from 3½ to 1½ inches in diameter. From time to time the fragments and powdered stone have to be taken out of the drill-hole by means of a *spoon* or *scraper*.

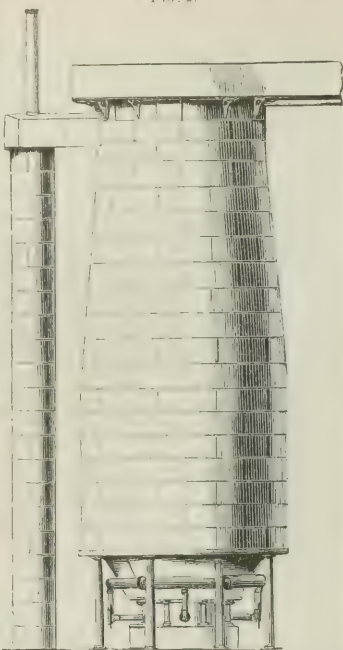


FIG. 1.



Another form of drill, called the *churn-drill*, is frequently used, when the holes are vertical or nearly so. It is usually 7 or 8 ft. long, but may be as much longer as required for

FIG. 2.



deeper holes. Two men are usually employed to operate it, raising it, turning it about one quarter round, and letting it fall, cutting the rock by the force of gravity (Fig. 3), the progress made being about 16 ft. per diem.

FIG. 3.



Charging the Drill-Hole.—After the strength of the charge has been determined, and all moisture removed from the bottom of the drill-hole by means of wisps of straw, hay, or bits of rags, the charge is introduced. If the hole be vertical, the powder is poured in by means of an ordinary funnel of tin, or, preferably, copper; but if the hole is inclined, the funnel is lengthened out by attachable sections, so as to reach nearly to the bottom of the hole, in order that the powder may be lodged at the bottom, without allowing any particles to adhere to the sides, as they would do if poured in loosely. The danger of premature explosion from the tamping-bar's striking fire against the sides of the hole is thus avoided. For this purpose, also, the tamping-bar should be shod with copper.

Tamping.—The *priming-needle* is a long wire tapering toward the point, so as to be easily withdrawn after the tamping is rammed around it, and enlarged at the other end to form an eye for the introduction of an iron bar in withdrawing it. It should be tipped with copper, and would be better if made entirely of that material. It is usually wrapped with paper, so that when withdrawn the paper may remain as a wall to the fuse-hole, preventing any loose particles of tamping from falling into and choking it.

Materials for Tamping.—Broken brick slightly moistened, rotten stone, quarry chips not containing any flinty substances liable to strike fire, well dried clay, and sharp pit-sand, are good tamping materials. Opinions have been much divided in this country and in Europe upon the comparative merits of sand and clay for tamping.

In using nitro-glycerine, sand-tamping is much preferable, as the shocks from ramming any other kind of tamping are liable to explode the charge.

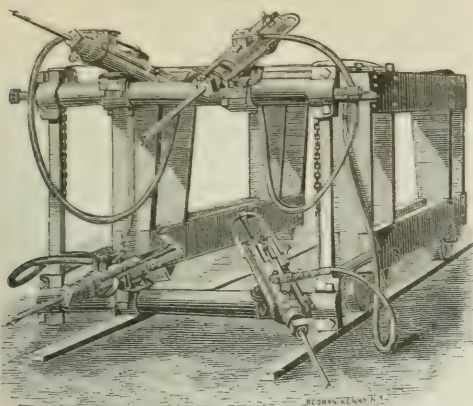
Many contrivances, such as cones, plugs, and wedges, have been employed to place over the charge in the drill-hole for the purpose of increasing the resistance of the tamping, but they consume time in their proper placement and confinement in position, and are also expensive.

Priming the Charge.—The usual way is to fill the needle-hole with fine powder, then place in connection with the powder at its mouth a slow match, made by soaking coarse paper in saltpetre or a solution of powder. The slow match is made long enough to allow the quarryman, after lighting one end of it, to seek a place of safety before the explosion takes place. Sometimes the priming is contained in straws, joined together end to end so as to make a tube sufficiently long to reach the charge. This is inserted in the needle-hole, and fire is communicated, as above, by a slow match or port-fire. Bickford's safety fuse and others of similar character are frequently used, especially in wet localities.

Of late years the use of electricity in blasting has much increased, especially since the introduction of nitro-glycerine and its compounds, and gun-cotton, which can best be fired by the shock of a minor explosion. If ignited, they burn without any explosive effect. In firing a charge of powder, all that is necessary is to make a short interruption of the conducting wires in connection with the charge. In passing the electric current a spark is produced at the point of interruption sufficient to ignite the powder. In firing nitro-

giving rise or gun-cotton, an "exploder" containing a sensitive priming composition is necessary.

FIG. 4.

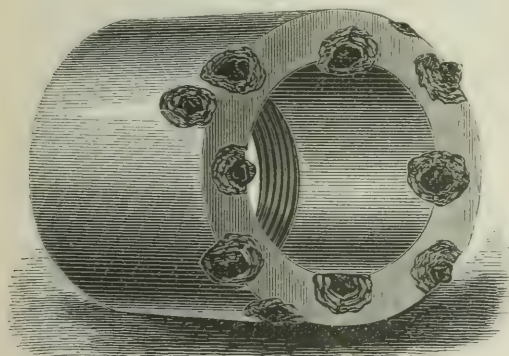


A frictional electric machine is very portable, and has been found useful for firing mines. The ebonite disk for exciting electricity is turned by a small crank between two rubbers covered with sulphuret of tin, and all is inclosed in a compact case of vulcanite. By simply turning the crank backward the connection of the poles of the battery with the conducting wires is made, and the charge is fired.

A magneto-electric machine was used at the Hoosac Tunnel, and possessed the power of firing 150 charges simultaneously. The conducting wires used were of copper incased in a water-tight covering of gutta-percha.

Cutting up Large Blocks.—In reducing the masses thrown out by a blast to the sizes of "dimension stone" required for use, lines of small holes are usually cut in the direction required, selecting, if possible, the natural lines of cleavage. These small holes are wedge-shaped, about 3 inches long, 2 inches deep, and 3 inches apart. Into these iron wedges are inserted, and struck with a heavy iron hammer, in succession, from one end of the row to the other. Splitting with the "plug and feather" is more generally used where it is desired to obtain a uniform split surface to much depth.

FIG. 5.



Annular Boring-Head.

Quarry Shields.—In a populous locality, or one where it is difficult for the quarrymen to reach a place of shelter from the small fragments of rock that are sent by the blast flying through the air, it is usual to cover the rock around the hole with brush or loose plank or timbers weighted with stone. These prevent the fragments from flying so far. Shields of boiler iron and of plank strongly nailed together are used in very confined localities, as in drifts and shafts of mines. The iron shields used in the quarries near Glasgow, Scot., were 2½ ft. sq. by ¼ of an inch thick.

Steam Drilling-Machines.—The length of time required, as well as the great labor and expense of drilling by hand, has led to the introduction, in large private and public works, of drilling-machines driven by steam or compressed air. Sommeiller invented a machine which was used with success at the Mt. Ceniz Tunnel. This was driven by compressed air conveyed into the headings in pipes, the compressors being situated near the E. and W. entrances to the tunnel. Subsequently the Burleigh drill, similar to the above, was patented in this country, and is now manufactured largely by the Burleigh Drill Manufacturing Co. at Fitchburg, Mass. This was used in the Hoosac Tunnel with great satisfaction.

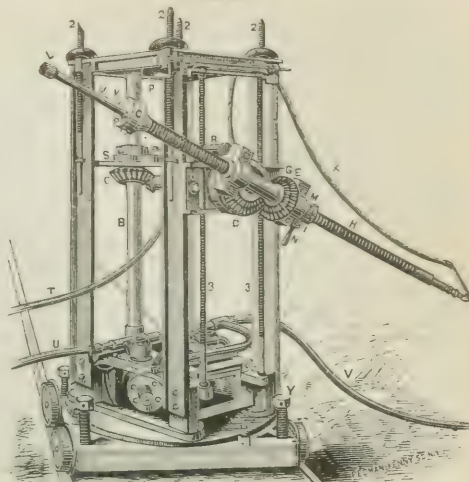
Of these various forms, the one shown in Fig. 4 shows a frame adapted for use in a tunnel. It mounts 4 drills upon 2 bars, the lower of which may be raised or lowered by means of chains, pulleys, and a windlass.

In the Hoosac Tunnel the motive-power was compressed air, and this is much better than steam for all tunnel and shaft work. At the works of improvement at Hallett's Point, carried on by the govt., it was reported that the drill performed twice the amount of work in the same time as and at ½ the expense of hand-labor.

Diamond Drill.—The first application of the diamond to drilling rock was made by Prof. Rodolphe Laschot, a civil

engineer of Paris, who found that a rotating drill armed with diamond points could be made to bore holes in rock rapidly to great depths by forcibly injecting a stream of water into the hole through the drill. He also arranged the diamond teeth upon the end of a cylinder or boring-head, so that a hole with an annular cross section could be bored, leaving a cylindrical core in the middle. Fig. 5 shows the

FIG. 6.



No. 1. Tunnelling Drill.

arrangement of the black diamonds upon this bit or boring-head, which is a steel cylinder about 4 inches in length. They are placed in 3 rows—1 on the end, 1 upon the inner, and 1 upon the outer edge. The diamonds in the row on the end cut the forward path of the drill, while those in the 2 other rows enlarge this path to admit the free ingress and egress of water to cool the diamond point and moisten and soften the rock. Fig. 6 exhibits one of the numerous forms of the machine adapted to tunnelling purposes.

FIG. 7.



Fig. 7 represents a more portable form of the machine, adapted to use in a shaft. It is mounted upon a movable frame, which is fixed in position by jack-screws pressing against the sides of the shaft.

At Hallett's Point, where both drills were used by Gen. Newton, the Burleigh drill gave the best results in tunnel-work; but for prospecting or drilling long holes for other purposes, it is stated that the diamond drill cannot be dispensed with. [From orig. art. in *A. S. Soc. Trans.*, by GEN. J. G. FOSTER.]

Blatchford (SAMUEL), LL.D., b. in Auburn, N. Y., May 9, 1820, grad. at Columbia Coll., N. Y., 1837; in 1840 became private sec. of Gov. W. H. Seward, N. Y.; in 1845 practised law in Auburn, N. Y.; in 1854 removed to New York city, practised law, and commenced reports of U. S. circuit court cases. In May 1867 he became judge of U. S. dist. court; Apr. 1878, judge of U. S. circuit court; Mar. 27, 1882, associate justice of the U. S. supreme court.

Bleaching [from the Ger. *bleichen*, to "whiten" (from *bleich*, "white" or "pale"); Fr. *blanchir*], a process by which the natural colors of various substances are discharged, so as to whiten them. B. is extensively applied to the textile fibres; linen, cotton, wool, and silk; and to straw,

paper-stock, ivory, wax, animal and vegetable oils, etc. Until the close of the last century the agents employed were air, light, and moisture, aided by weak alkalies and acids. More recently the process has been wonderfully hastened by the use of such powerful agents as chlorine and sulphurous acid. Numerous other agents possessing B. properties have been from time to time recommended, but they have not as yet been used to any extent.

B. Linen.—This is a very anc. art. The old method, still practised in some localities, consisted in the alternate treatment of the cloth with alkaline and acid liquids, and exposure on the grass to air, light, and moisture. Hol. long enjoyed the reputation of possessing the best bleachers. The brown linen of Scot. was sent over early every spring to be bleached, and on its return in the late autumn was sold under the name of "Hollands," a name still retained in the trade for certain kinds of bleached linen. The word "lawn" is another name of similar origin, having been applied to a finer quality of linen cloth bleached on better grass-plots, or lawns. The Dut. process lasted from March till Sept., and consisted of the following distinct operations, often repeated: (1) steeping in water 4 or 5 days, or in an alkaline lye 48 hours. (2) Bucking or bawking, boiling in an alkaline lye. (3) Crofting or exposing on the grass for several weeks, and sprinkling from time to time with water. (4) Souring with buttermilk. After every dipping the cloth was washed with soap, then with water. The process was necessarily very expensive and laborious. B. linen is still a tedious operation, as the fibres are heavily incrustated with impurities; the actual loss during the operations of B. being one third the original weight, while cotton loses only one twentieth. Steeping, washing, bawking, and crofting are still found necessary, and are several times repeated. Souring is effected with hydrochloric or sulphuric acid. The goods are then chlorinated with hypochlorite of potash, made by mixing chloride of lime with carbonate of potash. Washing, souring, soaping, scalding in soap-suds and weak lye, and crofting, complete the operation. A fortnight is the shortest time in which the B. can be effected, and often a much longer time is necessary.

B. Cotton.—Cotton is either bleached in the yarn or in the cloth. The following description of the process employed in Amer. print-works will sufficiently illustrate the methods in common use: The cloth is (1) "singd" by a shearing-machine or by passing over a red-hot roll or over a series of gas flames; (2) it is "limed," boiled for a night with milk of lime; (3) washed; (4) soured with dilute sulphuric acid; (5) washed; (6) bawked, boiled for a night with soda-ash and rosin; (7) washed; (8) bawked with a weak soda-ash lye for 7 or 8 hours; (9) washed; (10) chemicked with a weak solution of chloride of lime; (11) washed; (12) soured with dilute sulphuric acid; (13) washed—the entire series of operations being completed in 3 or 4 days.

B. Wool.—Wool is (1) washed on the sheep to remove sweat and much of the dirt, including a peculiar substance called suint, which is a neutral salt of potash with a peculiar organic acid. The wool contains from 15 to 33 per cent. of suint, a 9-lb. fleece containing 20 ounces of suint. (2) The wool is steeped in soap and water, weak alkaline lye, or putrid urine, to remove a peculiar lime-soap which it contains, and other impurities. It is then oiled for spinning, and finally cleansed and bleached, either in the yarn or in the cloth. The operations consist in passing it (3) through a weak warm solution of carbonate of soda and soap; (4) washing with lukewarm water; (5) exposing to sulphurous acid gas. Operations 3, 4, and 5 are sometimes repeated once or twice. The goods may then be blued with carmine of indigo in a weak solution of soap containing a little hydrate of alumina.

SILK B.—Raw silk contains about 40 per cent. of gummy matter, consisting of albumen, gelatinous substances, wax, fat, resin, and yellow coloring-matter. This is removed by boiling the silk in a solution of soap, and washing with pure water. Bran is sometimes added to the soap to neutralize by the lactic acid it yields any free alkali present. When the silk is to be left white, or dyed or printed with very light colors, it is exposed for a few hours to sulphurous acid gas.

B. Paper-Stock.—Cotton and linen rags are bleached in the same manner as cotton yarn and cloth. Old paper is treated with caustic soda to loosen the ink, then with soap-suds, and finally with chloride of lime. Tow and straw are treated with caustic soda and lime, and finally bleached with chloride of lime.

B. Straw.—For the manufacture of hats, bonnets, etc., straw is bleached by (1) exposing it on a meadow to air, sunlight, and dew, with occasional turning; (2) steaming; (3) fumigating with sulphurous acid gas.

Jute is bleached by caustic soda and a chlorine bath made by mixing chloride of lime and sulphate of magnesia in equivalent proportions, and dissolving them in cold water. **Human hair** is said to be bleached on the head to a blonde by the action of aqua regia or of peroxide of hydrogen. **Feathers** are bleached by immersion (1) in a dilute solution of bichromate of potassa, containing a little nitric acid, and (2) in a weak solution of sulphurous acid. **Sponges** are bleached by immersion in a warm solution of caustic soda, followed by washing in water and treatment with a hypsulphite of soda solution, to which a little hydrochloric acid has been added. **Ivory** is bleached by rubbing it with pumice-stone and water, and placing it under a glass shade in the sun. **Beeswax** is bleached by exposure to air, sunlight, and moisture in thin ribbons. **Animal and vegetable oils** are often bleached by heating them with a little caustic alkali, by which a small quantity of soap is formed, which settles to the bottom, carrying with it some of the coloring-matter. **Old engravings** which have turned yellow may be cleansed or bleached by exposure to ozone, generated in a capacious vessel, by a stick of phosphorus partly immersed in water.

C. F. CHANDLER.

Bleak (*Alburnus lucidus*), a small fresh-water fish of the family Cyprinidae, about 6 inches long, found in many European rivers. The inner surface of its scales is lined with a silvery substance which is used for making artificial pearls and white beads to adorn ladies' dresses.

Bled'soe (ALBERT TAYLOR, LL.D., b. Nov. 9, 1809, in Ky., grad. at W. Pt. in 1830; served as lieut. of inf. at Ft. Gibson till he resigned Aug. 31, 1832; became a prof. of math. in Kenyon Coll., O., 1833-34, in Miami Univ., O., 1835-36, and in the Univ. of Va. 1848-53, and during the c. war assistant sec. of war of the S. Confederacy. Author of an *Examination of Edwards on the Will* and other works. D. Dec. 1, 1877.

Bleeding, or Hemorrhage, hem/or-raj [from the Gr. *aiμα*, "blood," and *ρῆω*, to "flow"], in surgery, denotes the escape of blood from the vessels which normally contain it. A slight cut through the integument is usually followed by loss of blood, chiefly from the capillaries. Capillary B. will in many cases cease spontaneously, or it may require compression or the application of meds., such as persulphate of iron or tannic acid. These meds. are called hemostatics or styptics. Arterial B. is recognized by the fact that the blood escapes in jets and is of a bright-red color. Arterial B. tends spontaneously to grow less, both from the feebleness of the heart's action which naturally follows, and from the retraction and contraction of the arterial walls, and the consequent formation of a clot of blood, which plugs the wound; but it may be necessary to resort to ligation or tying, to acupressure or compression of the artery by needles, or to pressure, mechanical or by hand, upon the course of the artery between the heart and the wound. The wounded part should be elevated if possible. Venous B. is not generally very formidable. It may be recognized by the steady flow of dark blood. A great source of danger when large veins are cut is that air may enter the circulation; in which case death may immediately follow. Some individuals have what is known as the hemorrhagic diathesis—a disposition to bleed excessively even after a slight injury. E. DARWIN HUDSON, JR.

Bleek (WILHELM HEINRICH IMMANUEL, b. in Berlin Mar. 8, 1827, settled in Cape Town in 1856, where he became librarian of Sir George Grey's library. He wrote, among other works, a *Comparative Gram. of the S. Afr. Languages*. B. was probably the first to suggest a rational explanation of grammatical gender. D. 1875.

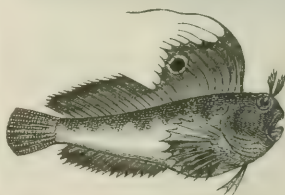
Blende [from the Ger. *blenden*, to "dazzle"], a name given to the native sulphide of zinc, which Brit. miners call black jack. Pure B. is composed of 67 per cent. of zinc and 33 of sulphur. The term is sometimes applied to sulphides of antimony and of manganese, the former of which is a rare mineral called red antimony.

Blenheim, blen'im, or Blind'heim, a v. of Bavaria, 23 m. N. N. W. of Augsburg. From it the Eng. have named the battle (called by the Fr. the battle of Hochstädt), fought Aug. 13, 1704, in which the Eng. and allies under Marlborough and Prince Eugène defeated the Fr. and the Bavarians under Tallard and the elector of Bavaria, who lost 10,000 killed and wounded and nearly 13,000 prisoners.

Blenheim Dog, or Marlborough Dog, a small and beautiful variety of spaniel, generally of a black color, with flame-colored spots above the eyes, and on the breast and feet. The muzzle is full. It derives its Eng. name from B. Palace, in Oxfordshire, where the breed has been preserved since the beginning of the 18th century.

Blen'nerhas'set (HARMAN), a rich Englishman, b. in Hampshire Oct. 8, 1767, who was ruined by his connection with Aaron Burr. He was ed. at Trinity Coll., Dublin. In 1798 he purchased an island in the O. River, 2 m. below Parkersburg, and erected on it an expensive mansion. He advanced money to aid Burr in his enterprises, and was indicted for treason in 1807 as an accomplice of Burr, but was released without a trial. D. in the isle of Guernsey 1831.

Blen'ny (*Blen'nus*), a genus of fishes of the order Teleostea and family Blenniidae. To this family the wolf-fish and the gunnel or butterfish are referred. They are generally remarkable for the abundance of slimy matter with which their skin is covered. Many are destitute of scales. The body is generally of an elongated form. They have only one dorsal fin, which, however, seems in many of them as if composed of 2 parts. They are found in the seas of many parts of the world.



Eyed Blenny.

They feed chiefly on small crustaceans. The *Blen'nus ocellaris* (eyed B.), called also the butterfly fish, has a large and prominent dorsal fin, in which is a spot resembling an eye. This beautiful fish is common in the Mediterranean, and is sometimes found on the coast of Eng.

Bles-Bok (*Damalis albibronis*), an antelope of S. Afr., so called from the blaze (Dut. *bles*) of white in its face.

Bles'sed This'tle (*Cnicus benedictus*), a plant of the order Compositae, a native of Europe, sparingly naturalized in the U. S. It was formerly regarded with great veneration on account of its supposed medicinal virtues.

Bles'sington (MARGARET GARDINER), COUNTESS OF, b. near Clonmel, Ire., Sept. 1, 1789. Her maiden name was Power. She was married in 1818 to the earl of B., and after he d. in 1829 she lived in Gore House, Lond., where her soirées were attended by many literati and other eminent persons. Wrote *Conversations with Lord Byron*. D. 1849.

Blight [probably from the A.-S. *be* and *līhtan*, "to fall upon"], a term for supposed atmospheric injuries received by plants, which was attributed to some mysterious influence in the air. It is now found that what is called B. is in some cases the effect of insects, while in other cases it is

caused by parasitical fungi. These fungi on grain crops are called fireblast, blight, smut, brand, and rust. The ergot or spurred rye used in med. is a somewhat similar fungus. A fungus upon the grape constitutes *mildew*, a most destructive disease. The sudden withering up or death of plants, without apparent cause, to which the name of B. should be restricted, is often produced by the transpiration of water from the leaves taking place more rapidly than can be supplied by the roots. B. on fruit trees is often only the injury to leaves and buds by the caterpillars of certain moths, and that on roses by the aphides or green-fly.

Blind Fish. See AMBLYOPTIDE.

Blindness is caused by diseases and injuries of the eye-ball or the optic nerve. Opacity of the cornea, cataract, inflammation of the retina, and sclerotina and amaurosis are its chief causes. The curability of B. depends upon the disease causing it. (See EYE, DISEASES OF.)

Blind worm, a popular name of the *Anguis fragilis*, a lacertilian reptile representing a peculiar family (*Anguidae*). It has a cylindrical body, destitute of external limbs, but the bones of the shoulder and pelvis exist in a rudimentary state. It is found in nearly all parts of Europe. Its length varies from 10 to 15 inches or more.

Bliss (PHILIP PAUL), b. at Clearfield, Pa., in 1838, received instruction in music from George W. Root; joined in the lay evangelistic labors of Major Whittle, and perished at the Ashtrubala R. R. accident Dec. 29, 1876. His hymns *Hold the Fort, Hallelujah, 'tis Done, More to Follow*, etc.—of which he generally composed both text and melody—became very widely used, especially in revival meetings.

Bliss (PORTER CORNELIUS), A. M., b. in Erie co., N. Y., Dec. 28, 1838; studied at Hamilton and Yale colls., travelled in Me., N. B., and N. S., 1860-61, investigating the condition of the Indian tribes in behalf of societies at Boston; accompanied Gen. J. W. Webb as private sec. on his mission to Brazil 1861-62; was com. of the govt. of the Argentine Republic for the exploration of the Indian country called the Gran Chaco, 1863; ed. at Buenos Ayres a monthly periodical, *The River Plate Magazine*, 1864; was appointed by Pres. Lopez historiographer of Paraguay; became sec. to Hon. C. A. Washburne, U. S. minister to Paraguay, 1866; aided him in collecting materials for his *Hist. of Paraguay*; was imprisoned by Lopez on a charge of treason and conspiracy for his assassination Sept. 10, 1868; was rescued by an Amer. squadron Dec. 10, 1868; was appointed translator to the state dept. at Wash. Mar. 1869; was ed. of the Wash. *Chronicle* 1869-70, and sec. of legation in Mex. 1870-74, acting minister in 1872-73. He was pres. of the Amer. Philological Society, one of the assistant eds. of *J.'s Univ. Cyc.*, and one of the eds. of *N. Y. Herald*. D. Feb. 1, 1885.

Bliss (WILLIAM W. S.), A. M., b. Aug. 1815 at Whitehall, N. Y., grad. at W. Pt. in 1833. He served in the Cherokee Nation 1833-34, as assistant prof. at the Military Acad. 1834-40, in the Fla. war 1840-41, as chief of staff of Maj.-Gen. Taylor in the military occupation of Tex. 1845-46, in the war with Mex. 1846-48, as private sec. of Pres. Taylor Mar. 4 to July 9, 1850, and as assistant adjutant-gen. of the W. division, headquarters at New Orleans, 1850-53. Was presented in 1849, by the State of N. Y., with a gold medal, with suitable devices, for gallant services in Mex. D. Aug. 5, 1883.

Blisters are plasters which, when applied to the skin, raise the cuticle into vesicles filled with serous fluid. They have for their object a counter-irritation or diversion of inflammatory action from an internal part to the surface of the body. The common B. is made of cantharides or Spanish fly (*Cantharis* or *Lytta vesicatoria*) mixed with a convenient proportion of lard and wax. If applied too long it produces distressing affections of the urinary bladder. In children and sensitive persons a layer of thin gauze may be placed between the B. and the skin. Under no circumstances should a B. be left long upon children, as it may produce sores which are difficult to heal. When the B. has raised the vesicles should be pricked and their fluid contents allowed to trickle away, the vesicated surface being then dressed with simple cerate or lard. E. D. HUDSON.

Blockade, in naval warfare, is such an obstruction of a harbor or mouth of a river as renders entrance or exit dangerous. This is called breach of B., and exposes a neutral vessel to confiscation if taken in either of these acts. To constitute a B., declared intention and actual force are necessary. The intention is made known by diplomatic communication, or at the beginning of the B., by notice at the mouth of a harbor, but both are not required afterward by Eng. and Amer. practice. Breach of B. subjects the offending vessel to confiscation. Paper or cabinet B. are not valid. By the declaration of Paris of 1856, B., to be binding, must be effectual, that is, maintained by a force sufficient actually to prevent access to the coasts of the enemy. T. D. WOOLSEY.

Block Tin, an inferior kind of tin. In the process of reducing the ore the purest metal melts first, and is withdrawn; the residue, melted at a higher temperature, is run into moulds, and is called B. T.

Blodget (LOUIS), a scientist and writer, b. in Chautauque co., N. Y., May 23, 1823. He received a thorough common school and academical education. In 1851 he became assistant prof. at the Smithsonian Inst. at Wash. In 1853-54 he had direction of the observations and calculations of the Pacific R. R. survey. Near the close of 1854 he was transferred to the war dept., but continued to have charge of the surveys. From 1859 to 1864 he was ed. of the *N. American*, of Phila., and sec. of the Phila. Board of Trade from 1858 to 1864. From 1863 to 1865 he had charge of the commercial bureau of the treas. dept. at Wash., and pub. several vols. of official reports. He contributed articles on finance to the *N. Amer. Review* in 1866 and 1867. Mr. B. has made a study of Amer. climatology, in which he has acquired a high reputation; wrote *Climatology in the U. S.*

Blot, blot (anc. *Blésie*), a town of Fr., on both sides of the Loire, and on the railway from Orleans to Tours, 36 m.

S. W. of Orleans, and 112 m. S. W. of Paris. It has a cathedral, a coll., a public library, a botanic garden, an epis. palace, a hôtel de ville, and a Rom. aqueduct cut in the rock. The castle of B. was for a long time the favorite residence of the Fr. kings. Pop. 20,515.

Bloodbird (*Myzomela sanguinolenta*), a species of honey-sucker of New S. Wales, which receives its name from the scarlet color of the head, breast, and back of the male.

Bloodflower (*Hemanthus*), a genus of bulbous plants of the natural order Amaryllidaceae, derives its name from the red color of the flowers. The juice of *Hemanthus toricarius* is used by natives of S. Amer. to poison arrows.

Bloodhound [so called because formerly employed to track wounded game by their blood], a name applied to several varieties of the dog, distinguished for the keenness of their scent and the persistency with which they will follow the track of game. The Cuban and Rus. hounds are celebrated for their ferocity.

Bloodroot (*Sanguinaria Canadensis*), a plant of the natural order Papaveraceae, growing wild in many parts of N. Amer. The root is a valuable expectorant, but its use requires caution.

Bloodstone. See HELIOTROPE.

Blood, Spitting of. See HEMOPTYSIS.

Blood, Vomiting of. See HEMATEMESIS.

Bloody Flux. See DYSENTERY.

Bloom'ary, or **Blo'm'ary** [from *bloom*, a mass of iron], a furnace for converting pig or cast iron into malleable or "wrought" iron, or for producing malleable iron from iron ore directly. In the latter case it differs from the blast furnace in reducing the ore and producing the iron in a mass or "bloom" without melting it, while the blast furnace produces an impure molten iron, which is tapped off and cast into pigs—the blast furnace working continuously, the B., in many cases, interruptedly. The change of cast into malleable iron by the B. process is generally superseded by "puddling," but the former is used to some extent in the U. S. and Swe. in making the better kinds of metal.

Bloom'er (AMELIA), b. in Homer, N. Y., in 1818, married in 1840, and settled at Seneca Falls, N. Y. Wrote often on reformatory subjects, and Jan. 1, 1849, established *The Lily*, a semi-monthly publication devoted to the interests of women. She has also advocated the enfranchisement of woman on the lecture stand. Since 1855 she has resided in Council Bluffs, Ia. Mrs. B. did not originate the Bloomer costume, as is generally supposed; but, after seeing it worn by Elizabeth Smith Miller, daughter of Hon. Gerrit Smith, who was the first, so far as known, to wear the dress in public, she, with Elizabeth Cady Stanton, Lucy Stone, and others, adopted it, and introduced it to the public through *The Lily*.

Bloom'field, R. R. junc., city, and cap. of Davis co., Ia. Pop. 1870, 1553; 1880, 1531.

Bloomfield, R. R. junc., Essex co., N. J., 4 m. N. N. W. of Newark. Pop. pt. 1870, 4580; 1880, 5748.

Bloomfield (JOSEPH), b. at Woodbridge, N. J., studied law, entered the Revolutionary army as capt.; became atty.-gen. of N. J., gov. of N. J. (1801-12), brig.-gen. in the war with G. Brit. (1812-15), and an M. C. (1817-21). D. Oct. 3, 1823.

Bloomfield (ROBERT), an Eng. pastoral poet, b. at Honington, Suffolk, Dec. 3, 1766, was a shoemaker in Lond. Wrote in a garret *The Farmer's Boy* (1798), a rural poem which was translated into Fr., Lat., and It.; also wrote *Wild Flowers and Ballads and Songs*. D. Aug. 19, 1823.

Bloom'ington, a city and R. R. centre, cap. of McLean co., Ill. It is connected by street R. R. with Normal, 2 m. distant, which is the seat of the State Normal Univ. and the Soldiers' Orphans' Home. B. is the seat of Major Female Coll., the Ill. Wesleyan Univ., a R. Cath. coll., and a business coll. Pop. 1870, 14,590; 1880, 17,180.

Bloomington, R. R. junc., a city, and cap. of Monroe co., Ind., 97 m. N. W. of New Albany and 51 m. S. W. of Indianapolis. It is the seat of State Univ., and has limestone quarries and tanneries. Pop. 1870, 1032; 1880, 2756.

Bloomsburg, cap. of Columbia co., Pa., on R. R. and Fishing Creek, near the N. branch of the Susquehanna, 56 m. S. W. of Scranton. Iron and limestone abound in the vicinity: is the site of a normal school with buildings capable of accommodating 500 pupils. Pop. 1870, 3341; 1880, 3702.

Blossburgh, Pa. See APPENDIX.

Blount (WILLIAM), b. in N. C. in 1744, was a member of the Continental Cong., and became gov. of O. Terr. in 1790. In 1796 he was elected a U. S. Senator for Tenn., and in 1797 was expelled from the Senate on the charge of implication in a plot to surrender a part of La. to the Brit. D. 1800.

Blow (HENRY T.), b. in Southampton co., Va., July 13, 1817, grad. at the Univ. of St. Louis, Mo.; was a prominent Unionist and anti-slavery man before the c. war; was minister to Brazil 1869-71. D. Sept. 11, 1875.

Blowing-Machines are used instead of bellows in furnaces, manufactories, and mines, where a large supply of air and adequate ventilation are required. They are of various construction; sometimes the blast is made by a stream of water falling through a long tube, in such a way that a large quantity of air is carried down with it.

Blow'pipe (Fr. *chadumeau*; Ger. *Löthrohr*), a tube bent at right angles and terminating in a fine nozzle, for directing a current of air from the mouth across the flame of a lamp, candle, or gas-jet. It produces a conical-pointed flame, intensely hot, which can be readily directed upon small objects by the operator. It is constantly used by the jeweller in soldering, but in the hands of the chemist and mineralogist it is the basis of a distinct and comprehensive system of analysis, both qualitative and quantitative. (See ELDSTON'S *Manual of R. Analysis*, and PLATTNER'S *Manual of Qualitative and Quantitative Analysis with the B.A.* See OXY-HYDROGEN B.) C. F. CHANDLER.

Blow'pipe and Arrow, called also *Gravata'na* and *Pocut'na*, a weapon used by some of the Indians of S. Amer. It is a straight tube, in which a poisoned arrow is placed and forcibly expelled by the breath.

Blücher, *bloo'ker, von* (GEBHARD LEBERECHE), prince of Wahlstadt, a Prus. gen., b. at Rostock Dec. 16, 1742. He entered the army in 1760, became a capt. in 1771, and a col. in 1790. In 1794 he distinguished himself as a cav. officer in the war against the Fr., and was made maj.-gen.; led the vanguard at the battle of Auerstadt (1806), from which he retreated to Lübeck; was defeated and taken prisoner near Lübeck in Nov. 1806. When the war was renewed in Mar. 1813, he was appointed commander-in-chief of the Prus. army, which he led at Lützen and Bautzen; defeated MacDonald at the Katzbach in Aug.; on Oct. 16 defeated Marshal Marmont at Möckern, and then formed a junction with the allied armies, which, with his co-operation, defeated Nap. at the battle of Leipsic, Oct. 17-19, 1813; made a field-marshal in 1813, and led the Prus. army, about 60,000 strong, which invaded Fr. early in 1814. Between Feb. 10 and 15 he was defeated by Nap. at Champaubert, Montmirail, Veauxchamps, etc., and lost about 15,000 men, but he defeated the same enemy at Laon Mar. 9, entered Paris at the end of that month, and here received from his king the title of prince of Wahlstadt. On the renewal of the war in 1815 he took command of the Prus. army, and was defeated at Ligny June 16, but reached Waterloo in time to decide the victory, June 18, 1815. He was noted for his energy and rapid movements, and was surnamed Marshal Vorwärts ("Forward"). D. Sept. 12, 1819.

Blue-bell, a name applied in G. Brit. to 2 different wild flowers: the *Tyacinthus non-scriptus*, a hyacinth with beautiful blue flowers, and the *Campanula rotundifolia*, the harebell, common in Asia, Europe, and N. Amer.

Blue Books. See APPENDIX.

Blue Earth City, Minn. See APPENDIX.

Blue Eye (*Eutamias cyanotis*), sometimes called **Blue-Cheeked Honey-Eater**, a beautiful bird abundant in New S. Wales. It feeds on insects and honey.

Blue-fish (*Tenisonodon saltator*), an acanthopterygian fish of the family Scomberidae, sometimes called "horse mackerel." It derives its specific name from a habit of leaping out of the water. It frequents the coasts of the U. S. in spring and summer, is very swift and voracious, and preys on other fishes.

Blue Grass, called also **Green Meadow Grass** and **June Grass** (*Poa pratensis*), a species of grass, a native of Europe and Amer., distinguished by its flat panicles, smooth culms and sheaths, and short, blunt ligules. It attains its chief value in that part of Ky. called the "B. G. region," where it is the most important crop; to it Ky. owes her great reputation as a stock-raising State.

Blue Laws, a name popularly applied to certain enactments said to have been made by the legislature of the colony of New Haven, now a part of Conn., which are said to have prescribed the private conduct, religious life, and even the dress of the people. Many of these alleged B. L. never had any legal existence.

Blue Light. See BENGAL LIGHT.

Blue Monday is said to have been so named from an anc. custom of decorating chs. with blue on the Monday before Lent, this Monday and afterward all Mondays being considered holidays for men whose business obliged them to work on Sundays.

Blue Nile, or **Blue River**. See NILE.

Blue Pill (*Phala hydragry*), or **Blue Mass**, consists of 2 parts of mercury rubbed with 3 parts of conserve of roses till globules of mercury can be no longer detected; to this is added powdered licorice-root, so that a pill of 3 grains contains 1 grain of mercury.

Blue Ridge, the range of the Alleghanies nearest to the Atlantic. It extends in a N. E. and S. W. direction through Pa., Md., Va., N. C., and Ga. The part in Pa. is called the S. Mt.; in Va. it forms the S. E. boundary of the Great Valley. From N. C. southward the name of B. R. is applied to the watershed which divides the waters flowing into the Atlantic from those of the Gulf of Mex.

Blue Springs, Neb. See APPENDIX.

Blue Throat, sometimes called **Blue Breast**, or **Blue-Throated Robin** (*Phoenicurus Sanguis* or *Sylvia Sanguis*), a singing bird of the family Sylviade, is common on the continent of Europe as a summer bird of passage. It resembles a redbreast in form, but is rather larger.

Blue Vitriol, the sulphate of copper. (See COPPER.)

Blue-wing Duck, or **Bluewing Teal**, a species of duck (*Anas discors*), a game bird of Amer. Vast numbers spend the winter in the marshes near the mouths of the Miss., to which they congregate both from the N. and E.; the summer migrations extend as far N. as the 57th parallel. It breeds also in the marshes of the S., and is common in Jamaica, where it is a permanent resident.

Bluffton, R. R. junc., cap. of Wells co., Ind., on the Wabash River. Pop. 1870, 1131; 1880, 2354.

Blum, bloom (ROBERT), a Ger. democrat, b. at Cologne Nov. 10, 1807. In 1848 he was the master-spirit of the Sax. liberals or democrats, and a member of the Frankfurt parl., in which he was the leader of the Left or moderate opposition. Was sent by this party to Vienna, joined the insurgents of that city, and was soon captured by the Aus. army. Shot at Vienna Nov. 9, 1848.

Blumenbach, bloo-men-bah (JOHANN FRIEDRICH), M. D., a Ger. naturalist and author, b. at Gotha May 11, 1752; grad. as M. D. at Göttingen in 1775; in 1778 became prof. of med. and anat. in the Univ. of Göttingen, where he lectured for 50 yrs. He may be said to have first placed nat. hist. on the scientific basis of comparative anat. He advocated the doctrine of the unity of the human species, which he divided into 5 races—the Caucasian, Mongolian, Malay, Amer., and Ethiopian. D. Jan. 22, 1840.

Blunt, Dak. See APPENDIX.

Blunt (EDMUND), a hydrographer, b. at Newburyport, Mass., Nov. 23, 1799, became in 1833 first assistant in the U. S. Coast Survey. D. Sept. 2, 1866.

Blunt (EDMUND MARCH), the father of the preceding, b. at Portsmouth, N. H., June 20, 1770. Pub. *The Amer. Coast Pilot* (1796). D. Jan. 2, 1862.

Blunt (GEORGE WILLIAM), b. in Newburyport, Mass., Mar. 11, 1802. He was the author of various charts and nautical books, and compiler of *The Amer. Coast Pilot*. He was a com. of emigration 1852-54, pilot com. after 1845, and harbor com. 1867. He did much for the preservation of the harbor of New York. D. Apr. 19, 1878.

Blunt (JAMES G.), M. D., b. at Trenton, Me., July 20, 1826, removed in 1856 to Kan., and was appointed in 1861 brig.-gen. and commander of the dept. of Kan.; was made a maj.-gen. in 1862.

Blunt'schli (JOHANN KASPAR), prof. of political science at Heidelberg, b. at Zurich Mar. 7, 1808. Author of a hist. of the Swiss federal laws, treatises on public and private law and a dict. of politics. D. Oct. 21, 1881.

Bo'a, the name of a genus of large non-venomous serpents, natives of the warm parts of Amer., the similar serpents of Asia and Afr. forming the genus *Python*. The family Boide (containing the *Python*, etc., of the Old World as well as the true B., anacondas, etc. of the New) is almost exclusively tropical, and nearly all the species are of great size and strength. It is related by Livy that a serpent 120 ft. in length devoured several soldiers and caused alarm to a Rom. army in Afr.; the skin is said to have been long preserved at Rome. The mouth of the B. is destitute of poi-



Boa Constrictors attacking a Deer.

son fangs. Their teeth are long and directed backward, to prevent the escape of the prey, which is first seized by the mouth, and then the serpent, with a rapidity of motion which the eye of the observer fails to follow, coils itself around it; the muscles of the body afterward compress it, so that in a few minutes life is extinct. Deglutition then takes place, accompanied with a flow of saliva, not only for lubrication, but to hasten the process of digestion. The food is always swallowed entire, and the process seems to require no small effort.

Boadicea, written also **Voadica**, a warlike Brit. queen, wife of Prasutagus, king of the Iceni, who d. about 60 A. D. Soon after this date she and her subjects took arms against the Rom. soldiers. The Britons took the Rom. colonies of Camalodunum and Londinium (Lond.), and killed about 70,000 Roms. She was defeated in 62 by Suetonius Paulinus, and then killed herself.

Boardman (GEORGE DANA), a Bap. missionary, b. in Livermore, Me., Feb. 1, 1801, grad. at Waterville Coll. (now Colby Univ.) in 1822, and at Andover Theological Sem. in 1825. He sailed for Burmah July 16, 1825, and was practically the founder of the Karen mission. D. near Tavoy, Feb. 11, 1831.—His son (REV. GEORGE D. BOARDMAN, D. D.), a Bap. clergyman of Phila., was b. at Tavoy, in Brit. Burmah, Aug. 18, 1828, and grad. at Brown Univ. in 1852.

Boardman (HENRY AUGUSTUS), D. D., b. at Troy, N. Y., Jan. 9, 1808, grad. at Yale in 1829; studied theol. at Princeton; was pastor of the Tenth Presb. Ch. in Phila. Author of *The Scriptural Doctrine of Original Sin* and *The Bible in the Coming House*. D. June 15, 1880.

Boardman (RICHARD), one of Wesley's first missionaries to Amer.; b. in Eng. in 1738, joined Wesley's conference in 1763; volunteered for Amer. in 1769, preached generally through the Middle States till 1774, when he returned to Eng. He is esteemed as one of the chief founders of Amer. Methodism. D. Oct. 4, 1782.

Boar-fish (*Capros*), a genus of fishes of the dory family, or Zeidae, differing from the genus *Zeis* in the still more protractile mouth (the resemblance of which to the snout of a hog is supposed to have given origin to the name), in the want of spines at the base of the dorsal and anal fins, and of long filaments to the dorsal spines. The body has the usual oval, much-compressed form of the family. The common B.-F. (*Capros uper*) is a well known inhabit. of the Mediterranean, rarely caught on the coasts of Eng.

Boat-Bill (*Canceroma coelestria*), a bird of the order Grallatores and of the heron family. It differs from the heron chiefly in the form of its bill, which is very broad, and somewhat similar in shape to a boat.

Boat-Fly (*Notonecta*), a genus of aquatic insects of the order Hemiptera and sub-order Heteroptera, derives its name from the form of the body, which resembles a boat, and is well adapted to movement in the water. They always swim on their backs. The *Notonecta glauca*, water-boatman, common in Eng., can fly well, but seldom uses its wings.

Bobadilla, de, da bo-bah-del'yah (FRANCISCO), a gov. of Hispaniola and knight of Calatrava, sent in 1500 by Ferdinand and Isabella with plenary powers to investigate the affairs of that colony. He put Columbus, who was then gov., in irons, and sent him to Sp. Columbus was, however,

well received there, and sent back on his 4th voyage, arriving on the day that B. started to return to Sp. for he had been recalled. Soon after he left the pt. his ship was lost in a hurricane, and he was drowned June 29, 1562.

Bobolink, Boblink, Reedbird, or Ricebird (*Ammodramus arizonensis*), a beautiful Amer. migratory bird of the order Icthyophaga, passes the winter in the W. L. or in tropical regions. It comes northward early in spring, and arrives in May in the lat. of N. Y. State, in which lat. it breeds. It builds its nest in meadows among the grass, and renders service to farmers by the destruction of insects and worms. In May and June the male is very musical, singing in the air with great volubility and hilarity, and rising and falling as by a series of jerks. "He chants out," says Wilson, "such a jingling melody of short variable notes, uttered with such seeming confusion and rapidity, that it appears as if half a dozen birds of different kinds were singing all together." The summer plumage of the male is mostly black, variegated with white on the scapulars and tail-coverts, and yellow, which it exchanges in July or Aug. for a plumage like that of the female. This is marked with several shades of brown or dull yellow. Its length is 7 or 8 inches. About the end of June the birds cease to sing, become gregarious, and move in large flocks to the Middle States. They are called reedbirds in Pa., where many of them are shot for the table in autumn. In the latter part of autumn immense flocks of them attack the rice-crops of S. C., where they are named rice-bird, rice-bunting, or rice-troopial.

Boccaccio, bok-kat'cho (GIOVANNI), a celebrated It. novelist and poet, b. in Florence in 1313, was an intimate friend of Petrarch, and ardently devoted to lit., was employed by the government of Florence in various diplomatic missions, lectured on Dante, collected a great library, containing many rare manuscripts which he had copied himself, and wrote *Il Filostrato*, *L'Amorosa Visione*, *Il Decamerone* (the famous series of novels from which Shakespeare took the subjects of several of his dramas, etc.). D. Dec. 21, 1375.

Bochart bo-shar' (SAMUEL), a Fr. Prot. Orientalist and theol., b. at Rouen May 30, 1599, studied Arabic, Chaldee, and Syriac under Erpenius at Leyden, and excelled in philology; became in 1652 pastor of Prot. ch. at Caen. His *Geographia Sacra* shows great learning and sagacity. D. 1667.

Böckh, or Boeckh (August), Ger. philologist and classical antiquary, b. at Carlsruhe Nov. 24, 1755. He was ed. at Halle, and appointed prof. in 1810 in Univ. of Berlin. Among his greatest works, which have formed an era in archaeology and philology, are *The Political Economy of the Athenians* and *Records of the Maritime Affairs of Africa*. He also edited *Pindar* and *Corpus Inscriptionum Graecarum*. D. Aug. 8, 1827.

Bode's Law is a merely empirical formula in astronomy, marking the apparent distances of the planets.

Bo'die, Mono co., Cal. Here are the noted "Bodie" and "Standard" gold mines. Pop. 1880, 2712.

Bo'din, bo-dan' (JEAN), a Fr. political writer, b. at Angers in 1531. His *Heptameron des Malices Rerum Sublimium Arcanum* is considered one of the most interesting books of that age. D. 1596.

Body Color, in oil-painting, the opaque coloring produced by certain modes of combining pigments. In water-color painting, when the colors are rendered opaque by being mixed with white, and laid on thickly, the work is said to be executed in B. C.

Boece, or Boyce, boiss (HECTOR), a Scot. historian, b. at Dundee about 1465; was in 1497 prof. of philos. at Univ. of Paris. His chief work is a *Hist. of Scot.* D. about 1536.

Behmeria [from G. R. Böhmer, a Ger. savant], a genus of plants of the order Urticaceae, was formerly included in the genus *Urtica* (nettle). The fibres of several species are used to make ropes, twine, nets, and cloth. The fabric called Chl. grass-cloth is made of the fibres of *B. nivea*, a perennial herbaceous plant without stings. The Malays call it *ramie*. Its fibre produces excellent paper, and its cultivation has been successfully introduced into the U. S.

Bœtia, bo-sha' (Gr. Βοωτία), a state of anc. Gr., bounded N. by Locris, N. E. and E. by the Eubœan Channel, S. by Attica and Megaris, S. W. by the Corinthian Gulf, and W. by Phocis. Area, estimated at 1100 sq. m. The surface is diversified by mts., valleys, and plains. It contains a large lake named Copais, which had no outlet except subterranean channels in the mts. These channels were not sufficient to carry off the water, which sometimes inundated the surrounding plain. To obviate this the anc. Bœotians constructed 2 tunnels through the rock. One was nearly 4 m. long, with 20 vertical shafts let down into it. These works are perhaps the most remarkable monuments of what is called the heroic age. The most remarkable tribes that inhabited B. in the heroic age were the Minyæ and the Cadmeones. At the commencement of the historical period the country was occupied by the Bœotians, who are supposed to have come from Thessaly. The prin. cities formed a confederacy under the presidency of Thebes. The Bœotians were regarded as a dull, unintellectual people.

Boerhaave, bôr-hav' (HERMAN), Ph. D., M. D., F. R. S., a Dut. phys., b. at Voorhout, near Leyden, Dec. 31, 1668. He took the degree of Ph. D. in 1689 at Leyden, and grad. as M. D. at Harderwick in 1693, after which he practised at Leyden, and in 1701 became lecturer on the theory of med. in the Univ. there. Among his important works are *Med. Institutiones*, *Aphorismi on the Diagnosis and Cure of Diseases*, and *Elements of Chem.* His reputation extended to every part of Christendom, and patients came to consult him from every country of Europe. He received, it is said, a letter from a Chl. mandarin, addressed "To Boerhaave, physician in Europe." D. Sept. 23, 1738.

Boers, bô'ez, are the farmers in S. Afr. of Dut. descent. After the annexation of Cape Colony by Gr. Brit., troubles arose between the govt. and the B., and in 1836 many of them left the colony and founded, first, the Republic of Natal, which was soon after overthrown and its terr. appropriated by the Eng., and then the Orange Free State and the

S. Afr. Republic. In Apr. 1877 the Eng. unexpectedly invaded and took possession of this republic, sometimes called the Transvaal, the B. numbering about 50,000, and the negro tribes several hundred thousand. In Dec. 1880 the B. took arms to assert their independence, which has since been substantially accorded to them by a treaty concluded in Oct. 1881.

Boëthius, bo-ê-thi-us (ANSELMUS MANLIUS SEVERINUS), a Rom. philos. and statesman, b. 470 A. D. He became a good Gr. scholar, was chosen consul in 510, and gained the confidence of Theodoric, king of the Goths, who reigned at Rome, and appointed B. *magister officiorum* in his court. His probity and virtues provoked the enmity of powerful courtiers. He was accused of treasonable designs, was confined in prison, and finally executed by order of Theodoric. Whether he was a Chr. or not is a matter of uncertainty. He was considered such in the Middle Ages, and the Bollandists gave him the position of a saint. But there is a predominance of argument in favor of the opinion that he was not, in any proper sense, a Chr. While he was in prison he wrote, partly in verse, *On the Consolation of Philos.*, which was very popular in the Middle Ages. It was translated into A.-S. by Alfred the Great. It contains no allusions to Christianity—a fact which can hardly be reconciled with the hypothesis of his being a Chr., considering the circumstances under which it was written. D. 524.

Bogardus (JAMES), an inventor, b. at Catskill, N. Y., Mar. 14, 1800; apprenticed to a watchmaker in 1814. Made important improvements in cotton spinning, and in 1847 built in New York the first iron building in the U. S. D. 1874.

Boggs (CHARLES STUART), U. S. N., b. Jan. 28, 1811, in New Brunswick, N. J., entered the navy as a midpn. Nov. 1, 1826; rose to be a rear-admiral in 1870, and retired from active service in 1873. In the *Arctica*, at the passage of Fts. St. Philip and Jackson and capture of New Orleans, he destroyed 2 Confed. gunboats.

Bog-Iron Ore, a mineral in which peroxide of iron often amounts to 60 per cent., water to 20, phosphoric acid from 2 to 11 per cent., while silicic acid, clay, and other substances make up the rest. It occurs in alluvial soils, bogs, lakes, etc. Some varieties are earthy and friable, some compact. It is easily wrought, but produces a somewhat inferior iron. It is highly prized for fine castings, making a good surface, with clean lines and edges.

Bog'omiles [a name said to be derived from their prayer in a Slavic lang., "*Bog milui*," "Lord, have mercy"], a sect of the E. Ch., one of whose leaders, Basil, was burned in 1119. He is said to have rejected the sacraments of the Gr. Ch. and denounced its priests or popes.

Bogotá, bo-go-tah' (formerly SANTA FÉ DE BOGOTÁ), a city of S. Amer., cap. of the republic of Colombia, on the San Francisco River, which here joins the Rio de Bogotá. It is on an extensive plateau 8800 ft. above the level of the sea. The houses have rarely more than 2 stories, and the streets are too steep and narrow to admit of vehicles. It is the seat of an abb., has a cathedral, a national acad., and a public library. A few m. distant are the falls of Tequendama, where the river Bogotá has a perpendicular descent of 650 ft. Pop. 40,883.

Bogue, bög (DAVID), D. D., a Scot. preacher and author, b. in Berwickshire Mar. 1, 1750; preached at Gosport to an Independent ch.; wrote *Essay on the Divine Authority of the N. T.* He and others founded the Lond. Missionary Society in 1795. D. Oct. 25, 1825.

Bohemia, bo-hë-me-a, a former kingdom of Europe, now a part of the empire of Aus.-Hungary, bounded N. by Sax. and Prus. Silesia, E. by Moravia and Prus., S. by Lower Aus. W. by Bavaria. It is between lat. 48° 33' and 51° 3' N., and lon. 12° and 16° 46' E. Area, 20,060 sq. m.; about the size of Vt. and N. H.

Topography.—Inclosed by 4 chains of mts.—the Erzgebirge or Ore Mts. on the N. and N. W., the Riesengebirge or Giant Mts. along the N. E., Moravian Mts. on the S. E., and the Böhmerwald (Bohemian Forest) on the S. W. The Schneekoppe (Snowcap) in the Riesengebirge is 5275 ft. above the sea. The surface of B. is mostly undulating, and is drained by the Elbe and its two affluents, the Moldau and the Eger, all which rise in the mts. and traverse the country. The Elbe and Moldau are navigable. About 1/5 of the area is covered with forests.

The climate is healthy and mild in the valleys; mean annual temperature at Prague, 49° F.

Minerals.—B. is rich in minerals, especially in the mts.; copper, tin, iron, lead, silver, nickel, zinc, cobalt, cinnabar, arsenic, sulphur, coal, alum, and precious stones are produced, and there are quarries of marble, granite, and sandstone. Mineral springs at Marienbad, Carlsbad, and Toplitz.

Some wild animals, especially wolves and foxes, in the Bohemian Forest.

Soil, Vegetation, and Productions.—Soil generally fertile; timber in the forests of large size; extensive vineyards. Staple products, rye, oats, barley, flax, wheat, sugar-beets, grapes, and wine. Many cattle, horses, and sheep reared in the hills.

Manufactures.—Beer, 884 breweries, 123,229,920 gals. in 1880; alcohol from 251 distilleries; linen goods, employing 450,000 spinners and weavers; cotton yarns and goods, 500,000 spindles; many woollen mills; glass works employing 30,000 persons; over 120 paper mills; beet-sugar in large quantities; iron in all forms.

Exports, beer, linen, cotton, and woollen goods, glass, paper, beet-sugar, etc.; **imports**, petroleum, sewing-machines, printing-presses, stoves and ranges, machines and tools for metal working, wooden-ware, stationery and blank books, canned goods, and pressed glass.

Education.—B. has 1 Univ. (at Prague), 23 gymnasia or colls., many technical schools, public schools, etc.

Railways connect Prague with Dresden, Munich, Vienna, Lenz, and Gmunden. There is also extensive telegraphic communication.

History.—Name derived from the *Bœi*, a Celtic race, early settlers, who were expelled by the Marcomanni in the time of Augustus (Æsar); conquered by the Czechs, a Slavic race; settled here after A. D. 550, and became independent in 630. The Přemyslides (a Czech dynasty) reigned till 1310, succeeded by the house of Luxemburg till 1437. John Huss led a religious reformation 1400-1414, and was burned by the Caths. The 16 yrs. war of Hussites followed. Annexed to Aus. 1526; Prots. revolted against the Aus. emp. and elected Friedrich, elector palatine, their king in 1619. He was defeated by the Aus. 1620, and a cruel persecution against Prots. commenced, lasting 20 yrs.; pop. reduced $\frac{3}{4}$. Strong antagonism exists between Czechs and Gers., the former demanding an autonomy like that of Hungary; but since 1848 B. has prospered, though losing by emigration.

Population and Religion.—Pop. 5,560,819. The R. Cath. religion is established by law, and about 5,160,000 of the inhabs. belong to it; about 120,000 are Prots., and 95,000 Jews. The chief towns are Prague (the cap.), with 162,323 inhabs., Pilsen, and Budweis. Its finances are included in those of the empire.

L. P. BROCKETT.

Bohe'mian Breth'ren, the former name of a sect of Chr. reformers, who may be regarded as the remnant of the Hussites. (See MORAVIAN CH.)

Bohe'mian Forest, or **Böh'merwald**, a chain of wooded mts. which forms the boundary between Bohemia and Bavaria, and separates the basin of the Danube from that of the Elbe; is about 130 m. long. The highest summits are the Aber, 4848 ft., and the Rachelberg, 4743 ft. above the sea. A railway from Bavaria to Prague crosses this range.

Bohe'mian Language, a name applied to one of the prin. dialects of the Slavic family of langs. It is sometimes called the *Cechic* (from *Cechi*, pron. chay'kee, the native name of the people who speak it). It is the richest of all the Slavic dialects, in the number of its terminations, for verbs and nouns resembling the Gr. and Lat. It abounds in consonants, some of which are greatly modified in sound by a superscribed diacritical sign ($\grave{}$). Thus, with this sign, *c, d, n, r, s, t, z* sound like our *ch* in child; *l* with a stroke through it has a sound which does not exist in our family of langs.; *c* without the diacritical mark always has the sound of *ts*; *n* is like the Sp. *ñ* (*ñ* *e. ny* uttered as one sound); *d* and *t* have this same vanishing sound of *y*; *rz* and *zh* are nearly like our *sh*. The other consonants have their analogues in Eng., Fr., and Ger. The vowels *a, e, i, o, u* are sounded nearly as in It.; *y* is like our *i* faintly uttered; *ê* is a diphthong, sounded like *yea*. The lit. of the lang. is considerable. Its golden period extended from about 1450 to 1620, after which it rapidly declined for nearly 200 yrs.; but about the beginning of the present century it sprang into new life, and now has valuable works in every dept. of culture.

Bohemond [Lat. *Bohemundus*] **I.**, a leader of the first crusade, b. about 1056, was a son of Robert Guiscard, duke of Apulia and Calabria. He joined the crusade with a large army in 1093, and took part in the capture of Antioch in 1098. He remained at Antioch while the other crusaders marched to Jerusalem, and reigned there as prince of Antioch. D. 1111.

Bohemond II., a son of the preceding, was a minor at his father's death; became prince of Antioch in 1126, and fought against the Saracens as an ally of Baldwin, king of Jerusalem. D. 1130.

Bohemond III., a prince of Antioch, was a grandson of B. II.; began to reign in 1163. D. 1201.

Böh'ler (PETER), a Ger. theol. and Moravian bp., b. at Frankfurt-on-the-Main Dec. 31, 1712. He is recognized, in Meth. hist., as having given a decisive impulse to Wesley's opinions and career. He removed to Amer. in 1738, and in 1740 founded the town of Nazareth, Pa. D. Apr. 27, 1775.

Böhme (JAKOB), b. at Görlitz, Upper Lusatia, Ger., 1575, worked there at his trade as a shoemaker, and d. there Nov. 24, 1624. His *Aurora* (1612) and other publications have exercised a decisive influence on the development of Ger. philosophy and theology.

Bo'hun U'pas [Malay for "poison tree"], the *Antiaris toxicaria*, a tree of the Malay and Philippine archipelagoes, of the order Artocarpaceæ. Many grossly exaggerated reports of its fatal qualities have been published. Its poison appears to be of an acid, not a narcotic character. Beside the above, another B. U., the *Strichuos Tieute*, is found in that region. It abounds in strychnine, and is even more deadly than the other.

Boil [Lat. *furunculus*], a hard, painful, inflammatory tumor on the surface of the body, which begins as a point of a dusky red color, and is hot, aching, and throbbing. These symptoms increase in severity for several days, when it is of a conical form, with a broad, firm base, and has on the apex a whitish point, which contains a little matter; this opens and after a few days more there is discharged a slough of cellular tissue, and the cavity left heals, leaving a depressed scar. The treatment of B. is simple. The intestinal canal should be cleared by laxative meds., and the digestive powers improved by tonics and antacids. The tincture of perchloride of iron is often a useful remedy. The skin should be kept healthy by frequent washing, while the inflamed point should be poulticed. Wet lint is a sufficient application after the core has been thrown off. Free incision of the B. hastens its course. E. D. HUDSON.

Boileau, or, more fully, **Boileau-Despreaux**, bwa-lo'-da-pra-ô' (NICOLAS), a Fr. poet and satirist, b. near Paris Nov. 1, 1636. He was liberally ed., and followed no profession but that of an author. He began his literary career by a satire entitled *Adieu of a Poet to the City of Paris* (1660). His letters to Racine and others have furnished materials for the literary hist. of his time. Among his best works is the *Art of Poetry* (L'Art Poétique, 1674), which is an exquisite performance, and is considered by some Fr. critics as equal to Horace's *Art of Poetry*. B. was admitted into the Fr. Acad. in 1684. He had great influence on Fr. lit. D. 1711.

Boiling-Point, the temperature at which the elastic

force of the vapor of any liquid is equal to the pressure of the atmosphere. When a vessel containing water is heated, the temperature rises and vapor silently passes off from the surface; but at 212° F., or 100° C. (the barometric column standing at 30 inches at the sea-level), steam begins to be formed in bursts at the bottom, and rising through the liquid, throws it into commotion. If the steam freely escapes the temperature of the water rises no higher. The water is then said to *boil*, and the temperature at which it remains is its *B.-P.* Every liquid has its own B.-P.

TABLE OF BOILING-POINTS OF VARIOUS LIQUIDS.

Liquid sulphurous acid.	17.6°	Benzole.....	177.4°
Ether.....	96.3	Water.....	212
Carbon bisulphide.....	118.5	Naphthalin.....	422.2
Wood spirit.....	151.3	Sulphuric acid.....	620
Ethylie alcohol.....	173	Mercury.....	662

F. A. P. BARNARD.

Bois d'Arc [Fr. for "bow-wood"], (popularly pron. bo'dock), a name given to the Osage orange tree (*Maclura aurantiaca*, order Artocarpaceæ) in some parts of the U. S. It is often used for a hedge-plant. As a tree its timber is tough, elastic, and extremely useful. It was used by the Indians for making bows and arrows.

Boise (JAMES ROBINSON), PH. D., LL.D., b. in Blandford, Hampden co., Mass., Jan. 27, 1815, grad. at Brown Univ. in 1840; became prof. of Gr. in the Univ. of Chicago. Prof. B. has pub. several classical text-books, among which are the first 6 books of Homer's *Iliad*.

Boisé City, cap. of Id. and of Ada co., is in the S. portion of the Terr., on Boise River, 50 m. above its confluence with the Snake, in the great Snake River Valley; derives large support from the rich placer and quartz mines in the mt. districts within 50 m. N., S., and E. The city has a U. S. assay-office and a penitentiary. Two large ditches, bringing water from B. River, give an abundance of water-power, and side ditches for irrigating purposes carry the water to every lot in the city. Pop. 1870, 995; 1880, 1899; 1885, 2500.

Boissonade, bwa-so-nahd' (JEAN FRANÇOIS), a distinguished Fr. classical scholar, b. in Paris Aug. 12, 1774. He became prof. of Gr. in the Univ. of Paris in 1812, and in 1823 in the Coll. of Fr. He edited several Gr. classic authors, and gave great impulse to the study of classical lit. D. 1857.

Bo'ker (GEORGE HENRY), a poet, b. in Phila. 1823, grad. at Princeton, N. J., in 1842. *Calagynos*, a tragedy (1848), and *War Lyrics* (about 1862) were written by him. Was U. S. minister to Tur. 1871-78.

Bokha'ra [Lat. *Bucharia*; anc. *Sogdiana* and *Transoxiana*], or **Uzbekistan**, called also **Great Buchar**, a state of Central Asia, in Independent Toorkistan, bounded N. and W. by Rus. Toorkistan, S. by Afghanistan and Toorkomania. The high mt.-range of Hindoo-Koosh extends along the S. border, but the greater part is level, consisting of the dry steppes and sandy wastes of the basin of the Caspian. The whole country is deficient in metals and timber, but there are some fertile tracts along the banks of the rivers. Camels, sheep, goats, and horses are numerous. B. corresponds in a measure to the anc. Bactria. Its present importance lies in its position between the Rus. dominions and India. In 1864 the Rus. conquered the N. half, and established the govt. of Toorkistan, and have since extended their sway until the whole region is under their influence. The people are of mixed race, the greater portion being Mohammedans. Area, 92,254 sq. m. Pop. 2,130,000.

Bokhara (*i. e.* "treasury of sciences"), a city of Central Asia, cap. of Bokhara, 138 m. W. S. W. of Samarcand. The streets are narrow and ill paved; the houses are small, have flat roofs, and are built of sun-dried bricks. It is probably the most important commercial town of Central Asia. It is said to have 360 mosques, and has long been famous as a seat of Mohammedan learning. B. was ruined by Ghengis Khan about 1232, and was rebuilt at the end of his reign. Pop. 70,000.

Bo'las (the "balls"), a missile used by the Indians of the S. Amer. plains, consisting of a pair of iron balls fastened together by a thong of hide. These are thrown at the legs of the animal which is in chase, entangling it until the hunter can come up.

Bole [Lat. *bolus*; Gr. *βῶλος*, a "lump or mass"], an earthy substance resembling clay, and consisting essentially of silica, alumina, and red oxide of iron. Armenian B. has a red tint, is often used for coloring false anchovies, and is also employed in coloring tooth-powders and in veterinary med. Lemnian earth, a B. from the island of Lemnos, was at one time prescribed as a tonic and astringent med., and acted beneficially from the large percentage of oxide of iron present. The B. are employed in veterinary practice. When B. is calcined it becomes hard; and when afterward levigated, a coarse red kind is used as a pigment under the names of Eng. red and Berlin red. Fr. B. is pale-red; Bohemian B., reddish-yellow; Silesia B., pale-yellow; and Blois B. is yellow. The B. are absorbent, astringent, and somewhat tonic.

Bole'tus [Gr. *βολιτς*], a genus of fungi of the division Hymenomycetes. It comprises several species, which resemble the mushroom in form, but differing in internal structure. Several species are edible.

Bo'leyn, or Bul'en (ANNE), queen of Eng., b. in 1507, was a daughter of Sir Thomas Bullen, afterward earl of Wiltshire. She was ed. at the Fr. court, and became about 1525 one of the maids-of-honor to the Eng. queen, Catherine. Henry VIII., attracted by her beauty, applied to the pope to obtain a divorce from Catherine, and married Anne privately early in 1533. She became the mother of the princess Elizabeth. She showed favor to the cause of the Ref. Having been supplanted in the favor of the king, she was accused of criminal intercourse with several men, was condemned by a jury of peers, and beheaded May 19, 1536. Some writers think that the charge was not proven.

Bolingbroke, bol-ing-brook (HENRY ST. JOHN), Viscount, an Eng. author and statesman, b. at Battersea Oct. 1, 1678; ed. at Eton and Ox., and was extremely dissipated in his youth. Entered Parl. in 1700, and became a prominent orator of the Tory party; was appointed sec. of war in 1704; lost this office when the Whigs obtained power in 1708, but continued to be a favorite counsellor of Queen Anne, who dismissed the Whigs in 1710 and placed Harley at the head of a ministry in which St. John was sec. for foreign affairs. He received in 1712 the title of Viscount B., and in 1713 concluded the treaty of Utrecht, which ended a long war between Eng. and Fr. He quarrelled with Harley (earl of Ox.), and supplanted him as prime minister in July 1714. His ambitious hopes were blasted by the death of Queen Anne (Aug. 1714), which also frustrated his designs and schemes to restore the Stuart dynasty. He was attainted in 1715, but he had escaped to Fr. and entered the service of the Pretender as his prime minister. In 1724 he was permitted to return to Eng., but not to enter Parl. He was brilliant and versatile, but not profound. D. Dec. 15, 1751.

Boliv, N. Y. See APPENDIX.

Bolivar, one of the 9 states of the S. Amer. confederation of Colombia. (See COLOMBIA, UNITED STATES OF.)

Bolívar [Sp. pron. bo-lé-*var*], (SIMÓN), or **Bolívar y Ponce**, surnamed the LIBERATOR, a S. Amer. patriot, b. at Caracas July 25, 1783, inherited an ample fortune. He studied law at Madrid, and afterward joined the patriots who revolted against Sp. in 1810. He served as an officer under Miranda in several battles. Having obtained the command of a separate army, he defeated the Spaniards, and entered Caracas in triumph in Aug. 1813, soon after which he was appointed dictator. In 1814 he was driven out of Venezuela, but again rallied near the end of 1816, and gained several victories over the Sp. gen. Morillo in 1817. In Feb. 1819 a cong. was opened at Angostura, and B. was chosen pres. In Dec. 1819 Venezuela and New Granada were united to form the republic of Colombia, of which B. was elected the first pres. He gained a victory at Carabobo in June 1821, and in 1822 led an army into Peru, which he liberated from the Spaniards; in 1823 he became dictator of Peru. In honor of him the S. part of Peru was named Bolivia, and erected in 1825 into a separate state, of which he became pres. for life. In 1826 he was also re-elected pres. of Colombia, from which Venezuela seceded in 1829. B. had many enemies who denounced his ambition. D. Dec. 17, 1830.

Bolivia, bo-liv'e-a, a S. Amer. republic, the central state of the continent, bounded N. and E. by Brazil, S. by the Argentine Confederation and Chili, and W. by Peru and Chili. It lies between lat. 9° and 23° 15' S., and lon. 57° 20' and 69° 30' W. The result of the war of 1879-80 between Chili and B. was the ceding by B. of all its coast terr. to Chili. Area of B. before this cession, 842,729 sq. m. The area of the cession is not definitely known. The executive power is vested in a Pres. elected for 4 yrs., and the legislative authority in the Senate and House of Reps., both elected by universal suffrage.

The Army consists of 2000 men, commanded by 8 generals and 1013 other officers—that is, one officer to every two men. The annual cost of that army amounts to about two-thirds of the whole revenue.

Topography.—The S. central, S. W., and W. portions of B. are a mass of mts., mainly E. and W. spurs from the Andes, including the great elevated plateau of Potosi, 13,000 ft. high, from which spring many peaks, a part of them volcanoes, the highest summits in the New World. Of these, Mt. Sajama is 22,760 ft., Mt. Illampu 24,744 ft., and Mt. Illimani 24,155 ft. high. The prin. lakes are Titicaca, partly in Peru, and Aullagas in the W. B. is drained by the Beni, Mamore, and Guapore, affluents of the Madeira, and the Vermejo, Pilcomayo, and Paraguay, affluents of the Parana.

Climate.—Five regions are distinguished.—1. *Puna brava* (very cold), between 13,000 ft. and the snow limits; 2. *Puna* (cold), between 11,000 and 13,000 ft., with heavy forests, and producing potatoes, oca, quinoa, and barley; 3. *Cabecera de Valle*, or high valleys, between 9000 and 11,000 ft., producing wheat, corn, and generally crops of the temperate zone; 4. *Valle*, or *Medio Yunga*, between 6000 and 9000 ft., producing grains, fruits, and plants of temperate and semi-tropical regions; 5. *Yunga*, the tropical region, with its tropical forests and fruits, producing the cacao, coca, bananas, etc.

Minerals.—Both silver and gold are found throughout the cordilleras, the latter in placers on all the streams; there are many mines of both, and also large beds of copper, tin, quicksilver, lead, iron, salt, and excellent coal.

Wild animals, both of tropical and temperate regions, abound, birds of beautiful plumage, and birds of prey.

Soil, Vegetation, and Productions.—The soil of the 3d, 4th, and 5th climatic regions is rich; the forest products are valuable; caoutchouc, cinchona, coca, and many other useful and medicinal barks, gums, resins, and roots, and cacao, coffee, cotton, tobacco, rice, barley, oats, some indigo. Sugar-cane, bananas, and Brazil-nuts are cultivated successfully. B. has also large guano deposits at Mejillones. Its exports include silver, cinchona, cocoa and coffee, and copper, tin, and other ores, guano and cubic nitro; and its imports are cottons, woollens, silks, iron, and hardware.

Its foreign trade is mostly carried on through Chili, Peru, and Brazil. B. has no sea-coast.

Railways.—There are 2 railways in operation—viz., from La Paz to Aygacha on Lake Titicaca, and from Autofagasta to Salar. Others in progress when the war began are not yet completed.

Finance.—Public debt 1880, \$30,000,000; revenue at latest report, \$2,990,000; expenditure, \$4,505,000. There is always more or less deficit of revenue.

Education.—Is at a low ebb; there are 3 nominal univs., but very few good schools. Illiteracy prevails.

History.—B. was a part of the empire of the Incas till 1538, when the Spaniards conquered it; their power was not fully established till 1780, when it became a part of the viceregal-

ty of La Plata. It was in a condition of revolution from 1809 to 1824; became independent in 1825, and was named after Gen. Bolívar. Const. adopted in 1826, and Gen. Sucre elected pres.; he was driven from the country in 1828; c. war ensued, and Santa Cruz chosen. In 1839 he was defeated by Chili and fled to Guayaquil. Gen. Ballivian succeeded, and maintained a tolerably peaceful administration till 1844, but from that time to the present revolutions and chronic c. war have been the usual condition of B.

Population, is now estimated at 1,957,352. Of these it is said that about 700,000 are Indians, mostly Chiquitos, Majos, and Chiriquanos. The remainder are whites of Sp. origin, large numbers of the mixed races, and comparatively few negroes. Religion, R. Cath., though most of the Indian tribes retain their old worship. B. is divided into 9 provs.—viz., La Paz de Ayacucho, Potosi, Oruro, Chuquisaca, or Sucre, Cochabamba, Beni, Santa Cruz de la Sierra, Tarija, and Atacama. In 1866 a part of dept. of Cochabamba was separated to form prov. of Murgareja, and prov. of Mexilones was decreed in 1867. L. P. BUCKERT.

Bollandists, a term applied to certain Jesuits who compiled, and are compiling, a voluminous work called *Acta Sanctorum*, or *Lives of the Saints*. They derived their name from John Bollandus, after whose death, in 1665, the work was continued at intervals by others.

Bologna, bo-lón-yah (anc. *Felsina* and *Bononia*), a city of It., on a fertile plain near the foot of the Apennines, 23 m. S. E. of Modena and 83 m. N. of Florence. It is connected by railways with various points; that to Florence crosses the Apennines by numerous tunnels. It has many churches and palaces, rich in works of art. There is here a leaning tower, built about 1100, 256 ft. high. B. is one of the great centres of It. learning. The univ., founded about 425 A. D., is said to have had 10,000 students in 1260; the library has 200,000 vols. and 1000 MSS. The anc. *Felsina* was founded by the Etruscans probably as early as the building of Rome. In 189 B. C. it was taken by the Roms., who changed its name to *Bononia*. It was taken by Charlemagne in 800 A. D., was annexed to the Papal States in 1514, and in 1859 was incorporated into the new kingdom of It. Pop. 1881, 123,274.

Bologna, da (GIOVANNI), a Flemish sculptor, b. at Douay in 1524. His chief works are the *Rape of the Sabines* and the great fountain of Bologna. D. 1608.

Bologna Stone, a variety of heavy spar (sulphate of baryta) found near Bologna, and sometimes called "B. phosphorus." When pulverized and made into cakes with gum-water they emit a phosphorescent light.

Bol-ton-le-Moors, a town of Eng., on the Croal, 11 m. N. W. of Manchester. Several railways extend to Liverpool, Manchester, and Blackburn. It is one of the prin. seats of the cotton manufacture. Numerous coal-mines are worked in the parish of Bolton. Pop. 105,422.

Bombardment. In the strict meaning of the term, a B. is the firing from mortars of *bombs*—(that is, shells or incendiary projectiles) into a fortress or place to compel, or aid in compelling, its surrender. "B., says Bardin (*Dict. de l'Armée*) "are an impolitic and barbarous means, since it attacks non-combatants, and is rather a warfare against the inhabs. than against the armed defenders, exasperating the people and *nationalizing* the strife." Of the B. recorded may be mentioned that of Genoa in 1684; of Tripoli in 1685, 1728, and 1747; Barcelona, 1691. Brussels was bombarded in 1694 by Louis XIV. ("3000 bombs and three times as many red-hot shot" were thrown in); Prague was bombarded in 1759; Breda, Lille, Lyons, Maestricht, Mayence in 1793, and Menin, Valenciennes, Le Quesnoy, Ostende, Nieuwpoort, and Lécuse in 1794. Some resisted—as Lille and Mayence—others succumbed. That of Lille is most noted, this small place being subjected for 140 hours (6 days and nights) to the fire of 12 mortars and 24 cannons. During the siege of Antwerp in 1832, 31,689 shells were thrown into the citadel without material effect in accelerating the surrender. Vera Cruz was bombarded by Gen. Scott in Mar. 1847 for several days, at the end of which time the town capitulated; Fts. Jackson and St. Philip, below New Orleans, were bombarded in Apr. 1862 by a bomb-flotilla under Admiral Porter, for 6 days and 6 nights, during which 7500 shells were thrown, without seriously injuring their military strength. Admiral Farragut then forced the passage and destroyed the rebel fleet above, after which the forts surrendered.

It is doubtful whether the effectiveness of B. as a means of warfare is sufficient to justify the suffering it inflicts on helpless non-combatants.

J. G. BARNARD.

Bom'box, a genus of large soft-wooded trees of the natural order Sterculiaceæ, nearly related to the baobab tree. They are natives of tropical climates, especially Amer. They yield great quantities of cotton, but the fibre is short, does not spin well, and is not durable.

Bombay, a presidency of Brit. India, bounded W. by the Indian Ocean or Ar. Sea. A large portion of the surface is mountainous. The W. Ghauts extend parallel to the sea-coast in a direction nearly N. and S. Between this range and the sea is a narrow tract called the N. and S. Concan, the climate of which is very hot and moist, the annual rainfall being more than 100 inches. The soil of the valleys and plains is fertile; cotton and rice are the staples. Area, including Sindh, 124,465 sq. m. Pop. 16,383,422.

Bombay (from the Port. *Bom Bahia*, or *Boa Bahia*, i. e. "good harbor"), a seaport of Brit. India, cap. of the above prov., on the S. end of the island of B. and on the Indian Ocean. It has an excellent harbor, affording good anchorage for ships of the largest size. It is the W. terminus of a railway which connects it with Calcutta. At the S. end of the island, which is 8 m. long and 3 m. wide, is the fortified European town, and 1 m. N. of that is the Black Town, in which the Hindoos and Mohammedans reside. Between these two towns is the esplanade and the barracks. The most remarkable buildings are the town-hall, mint, cathedral, the custom-house, the library of the Asiatic Society, the Elphinstone Inst., the missionary houses, the Grant Med.

Coll., the great Hindoo temple of *Mombai Devi*, and the Jansettie Hospital. B., excepting Calcutta and Canton, is the greatest commercial emporium of Asia, and is the chief Indian pt. connected with the establishment of steam navigation between India and Eng. Steamers also ply between this port and Point-de-Galle in Ceylon. Pop. 1881, 753,000.

Bomb Lance, an explosive missile used in the whaler-fishery, consisting of a cylindrical shell of iron charged with powder, and armed with a sharp and heavy point. It is discharged from a musket, and is exploded by a fuse after it has penetrated the body of the whale.

Bona De'a (the "good goddess"), a Rom. divinity, worshipped only by the women. Her festival was celebrated on the 1st of May, with mysterious rites, from which all males were strictly excluded.

Bona Fide [Lat.], "in good faith," without fraud, innocently; without notice. A B. F. purchaser is one who purchases for a valuable consideration, without notice. This subject is of great importance in equity jurisprudence. It is a gen. rule that a court of equity will grant no relief against a purchaser in good faith. If, on the other hand, the purchaser has notice, actual or constructive, of the equitable rights of others, he will stand in no better position than the person from whom he acquired his title. The same question is presented in the case of bills of exchange, promissory notes, and other commercial paper. If the acceptor or maker has a defence to it as to the payee, it will in gen. be shut off as to a purchaser in good faith before maturity, but not as to purchasers with notice of such defence.

Bonan'za, a Sp. word, probably derived from *bueno*, "good," and *za*, and by the termination *-anza* it becomes a noun signifying "goodness." In Sp. this word is generally used to indicate fair weather at sea; also to indicate prosperity or success. In Cal. and in N. Mex. it is a mining term to signify an abundance of metal. When a pocket of rich ore is struck the mine is said to be a B.

Bonaparte (CARLO), a Corsican lawyer, b. Mar. 29, 1746, was the father of Nap. I. He married in 1767 Letitia (Letizia) Ramolino, and had 5 sons and 3 daughters. Became counsellor and assessor of Ajaccio in 1773. D. Feb. 24, 1785.

Bonaparte (CAROLINE MARIE ANNONCADE), queen of Naples, a daughter of the preceding, b. at Ajaccio in 1782; married in 1800 Joachim Murat, who became king of Naples in 1808. Was the mother of 2 sons and 2 daughters. After the death of her husband she took the title of countess of Lipoma. D. 1839.

Bonaparte (CHARLES LUCIEN JULES LAURENT), prince of Canino, son of Lucien B., b. in Paris May 24, 1803. He was distinguished as an ornithologist, and took little part in political affairs. His wife was a daughter of Joseph B. He resided in Phila. and It., and pub. *Amer. Ornithology*, or a *Hist. of the Birds of the U. S.* D. July 30, 1857.

Bonaparte (JÉRÔME), king of Westphalia, a brother of Nap. I., b. at Ajaccio Nov. 15, 1784. He entered the Fr. navy in 1800, and during a visit to the U. S. married, in 1803, Miss Patterson of Baltimore, without the consent of Nap. This marriage was annulled by order of Nap. in 1805. Jérôme served as gen. of brigade against the Prus. in 1806, and was crowned king of Westphalia in 1807. In the same year he married a daughter of the king of Würtemberg. He lost his throne in Oct. 1813, and led a division at Waterloo in June 1815. After he had passed many years in exile he became a marshal of Fr. in 1850. D. June 24, 1860.

Bonaparte (JÉRÔME NAPOLEON), a son of the preceding by his first wife, b. in Eng. in July 1805, and grad. at Harvard in 1826. He greatly resembled Nap. I. in appearance. Left 2 sons, Jérôme and Charles Joseph. D. June 17, 1870.

Bonaparte (JÉRÔME NAPOLEON), an Amer. and Fr. officer, grandson of Jérôme B., king of Westphalia, and grandnephew of Nap. I., b. 1830, at Baltimore, Md., grad. at W. Pt. in 1852, and till his resignation of his lieutenancy in the Mounted Rifemen, Aug. 16, 1854, served on frontier duty. He entered the Fr. imperial army Sept. 5, 1854, as second lieutenant of the 7th Dragoons, became chef d'escadron 3d Cuirassiers Aug. 15, 1855, and was transferred, Mar. 16, 1857, to the Dragoons de l'Imperatrice. He served in the Crimean war against Rus. 1854-55, engineer at Balaklava, Inkerman, Tchernia, and the siege of Sebastopol; he was decorated by the Sultan of Tur. with the "Medjidie Order," made knight of the Legion of Honor of Fr., and received the Crimean medal from the queen of Eng. He was in the Algerian campaign in 1856-57, engaged in several actions with the Kabyles; in It. campaign against Aus. 1859, engaged at Montebello, Solferino, and various outpost affairs, receiving for his gallantry the Fr. "medaille d'Italie" and the decoration of "Military Valor" from the king of Sardinia; in the guard of the empress of Fr. 1867-72. On the fall of the empire he with difficulty escaped from the hands of the Commune in Paris.

Bonaparte (JOSEPH), king of Sp., the eldest brother of Nap. I., b. in Corsica Jan. 7, 1768. He studied law, married Julie Marie Clary, and was elected to the Fr. Council of Five Hundred in 1797. He negotiated the treaty of Lunéville with Aus. in 1801, and that of Amiens with Eng. in Mar. 1802. Urged by Nap., he accepted the throne of Naples in 1806. He was transferred in May 1808 to the throne of Sp. against the will of the majority of the Sp. people, who obstinately resisted the domination of the Fr. During his nominal reign many battles were fought between the Fr. and the allied Eng. and Sp. armies, who expelled him from Sp. in June 1813. In 1815 he emigrated to the U. S., and lived at Bordentown, N. J., under the name of the count de Survilliers. D. at Florence, It., July 28, 1844.

Bonaparte (LETIZIA RAMOLINO), the mother of Nap. I., b. in Corsica Aug. 24, 1750. She was considered a beauty, and had an uncommon intellect. According to her son Nap., "she had a great character, with much energy, elevation, and pride." She was married to Carlo B. in 1767. In 1804 received the title of Madame Mere. D. Feb. 2, 1836.

Bonaparte (LOUIS), a brother of Nap. I., b. at Ajaccio

Sept. 2, 1778. He entered the army in youth, and served at Arcola and Rivoli (1797). In compliance with Nap.'s will, he married Hortense de Beauharnais in 1802, and became king of Hol. in June 1808. He and his wife separated about 1807, in consequence of incompatibility. As nominal king of Hol. he was compelled by Nap. to sacrifice the interests of the Dut. to the designs of the emp., who was offended because Louis was not sufficiently subservient. Louis abdicated the throne in 1810, after which he resided in It. He was the putative father of Nap. III. D. June 29, 1846.

Bonaparte (LOUIS LUCIEN), a son of Lucien and a nephew of Nap. I., b. Jan. 4, 1813. He was elected to the Fr. National Assembly in 1849, became a senator in 1852, and grand officer of the Legion of Honor in 1855. He is distinguished for his labors in philology and chem.

Bonaparte (LOUIS NAPOLEON). See NAPOLEON III.

Bonaparte (LUCIEN), prince of Canino, a brother of Nap. I., b. at Ajaccio May 21, 1775. He was an active and energetic republican in the Fr. Revolution. In 1795 he married Christine Boyer, a woman of obscure birth. He was chosen in 1798 a member of the Council of Five Hundred, in which he opposed the Directory. On the 18th Brumaire (Nov. 1799) he displayed great resolution, and efficiently promoted the success of Nap. Lucien became minister of the interior in Dec. 1799, ambassador to Sp. in 1800, and a tribune in 1802. Having lost his first wife, he married in 1803 a widow named Joubertson without the consent of Nap., who was angry at the match. Lucien went into exile, and refused the throne of It., which Nap. offered him on condition that he should divorce his wife. He was in Fr. during the Hundred Days, 1815, and actively supported Nap. in that crisis. He passed the latter part of his life in It., and d. at Viterbo June 29, 1840, leaving 5 sons and 6 daughters.

Bonaparte (LUCIEN LOUIS), a son of Charles Lucien, b. at Rome Nov. 15, 1828. He entered the priesthood, and on Mar. 13, 1868, was made a cardinal priest.

Bonaparte (MARIE ANNE ELISE), princess de Piombino, a sister of Nap. I., b. in Corsica Jan. 3, 1777; married in 1797 to Felix Bacciochi, a Corsican officer, and received in 1805 the title of princess of Lucca and Piombino. From 1809 to 1814 she was grand duchess of Tuscany, which she ruled with ability. D. Aug. 7, 1820.

Bonaparte, Napoleon. See NAPOLEON I.

Bonaparte (NAPOLEON JOSEPH CHARLES PAUL), PRINCE, a son of Jérôme, king of Westphalia, b. at Trieste Sept. 9, 1822. His mother was a daughter of the king of Würtemberg. As a professed democrat he was elected to the Fr. Constituent Assembly in 1848. In 1852 he received the title of prince, and was recognized as the heir of his cousin, Nap. III., in case the latter should die without issue. He married Clotilde, a daughter of King Victor Emmanuel. His features resemble those of his uncle, Nap. I.

Bonaparte (NAPOLEON LOUIS JEAN JOSEPH), son of Nap. III. and the Empress Eugenie, b. Mar. 16, 1856. When the Franco-Ger. war broke out (1870), he went with his father to the front, and saw the battle of Gravelotte. When Nap. III. abdicated, and Fr. was proclaimed a republic, he went with his mother to Eng., and entered the military school at Woolwich, where he grad. During the Zulu war in S. Afr. he volunteered in the Brit. service, and was placed on the staff of Lord Chelmsford. He was put in command of a reconnoitring party, which rode some 20 m. from the camp. Just as the party was about to return, it was attacked by the enemy, and the prince was killed. His body was taken to Eng. and placed in the monumental chapel at Chiselhurst, beside that of his father. D. June 1, 1879.

Bonaparte (PAULINE), Princess Borghese, b. at Ajaccio in 1780, was the most beautiful of Nap.'s sisters. In 1801 she became the wife of Gen. Leclerc, who d. in 1802. Was married in 1803 to Prince Camille Borghese, an It., from whom she soon separated. A statue of Pauline, executed by Canova, is said to resemble the Venus of Praxiteles. D. 1825.

Bonaparte (PIERRE NAPOLEON), a son of Lucien, b. at Rome Sept. 12, 1815. He passed his youth as an adventurer in Amer., It., and Gr., and committed several homicides. In his own house near Paris he killed Victor Noir, in 1869, for which he was sentenced to pay a fine. D. Apr. 8, 1881.

Bona'sa, a genus of gallinaceous birds of the family Tetraonidae, and one of the genera included in the popular term grouse. It comprises the hazel-grouse, a European bird, the *Tetrao B.* of Linnaeus. Another species is the Amer. ruffed grouse (*B. or Tetrao umbellus*), about 18 inches long, and called the pheasant in Pa. and the partridge in N. Y. and N. Eng. The loud thumping or "drumming" sound heard in the localities frequented by this bird is produced by the bird beating on its sides with its wings.

Bonaventura (GIOVANNI DI FIDANZA), SAINT, an It. scholastic theol. b. in Tuscany in 1221, was called the SERAPHIC DOCTOR. He taught theol. in Paris, became gen. of the order of Franciscans in 1256, and cardinal in 1273. Miracles were ascribed to him. Among his works is *Biblia Pauperum* (Poor Man's Bible). D. July 14, 1274, canonized 1482, and made a doctor of the Ch. 1587.

Bond [from the root of the noun *band* and the verb *bind*], in law, an instrument in writing, sealed and delivered, whereby a person binds himself to pay a sum of money. It is also called a deed. It is either simple or with a condition. A B. is said to be simple when the engagement to pay is absolute. An instrument in the form of an ordinary promissory note becomes a simple B. if executed under seal. The most common form of B. is one executed under a condition. The instrument in this case consists of two parts—the engagement to pay, and the condition upon which the engagement to pay will become inoperative and void.

Bond (GEORGE PHILLIPS), an astron., b. at Dorchester, Mass., May 20, 1825, grad. at Harvard in 1845. He aided his father, W. C. Bond, in the observatory at Cambridge; wrote *On the Construction of the Rings of Saturn*. D. Feb. 17, 1865.

Bond (WILLIAM CRANCH), an astron., b. at Portland, Me., Sept. 9, 1789, was a watchmaker; appointed director of the

observatory of Harvard Univ. He discovered a satellite of Saturn. D. Jan. 29, 1859.

Bondoo, or **Bondou**, a small kingdom of W. Afr., in about lat. 14° to 15° N. and lon. 11° to 13° W.; bounded E. by the river Falemé, which separates it from Bambook. The surface is level, the soil fertile. Iron is abundant, and wild animals are numerous. The Foulahs are the most numerous of the tribes in B. Pop. about 1,500,000.

Bone, Chemical Composition of. B. consist of B.-cartilage, or ossein, and earthy salts, beside a certain quantity of fat, which is easily removed by ether, and is not considered as a constituent of the B. By burning B. till white, the ossein is destroyed, and the earthy salts remain as brittle B.-ash. By subjecting the B. to the action of dilute hydrochloric acid the earthy salts are dissolved and removed, and the ossein remains as a flexible, translucent substance retaining the forms of the B. By long boiling with water it is completely dissolved, being converted into gelatine, which sets to a jelly on cooling. The earthy salts contain phosphate of lime, phosphate of magnesia, carbonate of lime, fluoride of calcium, and chloride of calcium.

Uses of B.—In the arts, B. are employed as substitutes for ivory for buttons, handles of knives, brushes, etc., and for combs; they are also used as cattle food in the form of B.-meal; as a fertilizer, either in the form of B.-meal, B.-ash, or after treatment with sulphuric acid. They are used for the manufacture of B.-black, of gelatine, of phosphorus, of phosphate of soda, superphosphate of lime for raising bread, and B.-ash is used for cupels.

Bone-Ash is the residue left on burning B.; it amounts to about 66 per cent. of the weight of the original B. It consists of the earthy salts of the B., the composition of which is given above. It is used as manure, for the manufacture of superphosphates, phosphorus, cupels, and is an important constituent of Eng. china. C. F. CHANDLER.

Bone-Black, or **Animal Charcoal**, is the residue left on calcining B. in close vessels. The bones are placed either in retorts, like those used in making coal-gas, or in iron pots. On the application of heat destructive distillation takes place. Combustible gases escape, accompanied by vapors which condense to ammoniacal water and offensive oils. The residue in the vessels amounts to about 50 per cent. in weight of the original B. It is passed between rollers, and separated by sieves into different sizes. The average composition of dry B.-B., in 100, is carbon, containing nitrogen, 10; phosphate of lime, including a little phosphate of magnesia, 88; carbonate of lime, 8; sulphate of lime, 0.2; alkaline salts, 0.8; oxide of iron, 0.1, and silica, 0.3. In Fr., pulverized B.-B. in fine powder is often boiled with the raw sugar before it goes to the bag filters.

When B.-B. is to be used for decolorizing acid solutions, the phosphate of lime is first removed from it by dilute hydrochloric acid. Many other forms of charcoal possess these properties, but none of them have been found so well adapted for the use of sugar-refiners as B.-B. Under the name of ivory-black, animal charcoal is used as a pigment, especially for making shoe-blackening. C. F. CHANDLER.

Bone-set, a common name of the *Eupatorium perfoliatum*, an herbaceous plant, a native of the U. S., growing in low or moist places. An infusion of the leaves is used as a tonic, diaphoretic, etc.

Bong'ar (*Bungarus* or *Pseudobungarus*), or **Rock Snake**, a genus of venomous serpents in the E. I., allied to the *naja*. The *Bungarus annularis* is sometimes 6 or 7 ft. in length.

Bonham, a city and cap. of Fannin co., Tex., on R. R. and on Bois d'Arc Creek, 270 m. N. N. E. of Austin. Pop. 1870, 928; 1880, 1880.

Bonham (MILLEDGE L.), a statesman and Confed. gen., b. in S. C. about 1815, grad. at S. C. Coll. in 1834; became a lawyer, and served in Mex. war; was M. C. 1856-60, and gov. of S. C. 1862-64.

Bonheur, bo-nur' (ROSA), a Fr. painter of animals, b. at Bordeaux Mar. 22, 1822, was a pupil of her father, Raymond B.; produced in 1850 *The Nivernais Ploughing*, and *The Horse Fair* in 1853.

Boniface [Lat. *Bonifacius*] I., SAINT, POPE, elected in 418 A. D.; d. 422.—BONIFACE II., a Goth, b. at Rome, succeeded Pope Felix IV. 530; d. 532.—BONIFACE III., chosen pope 607; d. the same year.—BONIFACE IV., b. at Valeria, in It., succeeded Boniface III. 608; d. 615.—BONIFACE V., a native of Naples, became pope in 619; d. 625, and was succeeded by Honorius I.—BONIFACE VI., a native of Rome, succeeded Formosus in 896; d. 15 days after his election.—BONIFACE VII., considered by some authors an anti-pope, elected in 974 as a rival of Benedict VI.; was driven out of Rome in 975, and starved to death in prison in 985.—BONIFACE VIII., (CARDINAL (BENEDETTO GAETANI), b. at Anagni about 1228, became pope in 1294; d. 1303.—BONIFACE IX., (PIETRO TOMACELLI), succeeded Urban VI. in 1389; d. 1404, and was succeeded by Innocent VII.

Boniface [Lat. *Bonifacius*] (WINFRID), SAINT, called the APOSTLE of GER., b. in Devonshire, Eng., about 680; began in 716 to preach in Ger., where he founded schools and monasteries; in 732 Gregory III. made him abp. and primate of all Ger.; he brought the Ger. Ch. into complete subjection to the papacy. About 752 Pepin le Bref, king of the Franks, appointed him abp. of Mainz. In 755 he was assassinated by a pagan mob at Dockum in W. Friesland.

Bonitz (HERMANN), a Ger. philologist, b. July 29, 1814, became prof. at Vienna in 1849; called thence to Berlin. He pub. an ed. of the *Metaphysics* of Aristotle. *Platonic Studies*, and other works.

Bonn (anc. *Bonna*), a city of Prus., on the Rhine, 19 m. S. S. E. of Cologne, upon the railway which connects Cologne with Coblenz. It has a fine anc. cathedral. It is the seat of a univ. founded in 1818, which has a library of 200,000 vols., and is attended by about 1000 students. Connected with it are an observatory, a botanic garden, and a museum of nat. hist. It was captured by the Fr. in 1802, and was annexed to Prus. in 1814. Pop. 31,514.

Bon'ner (EDMUND), b. about 1495. Henry VIII. appointed him bp. of Lond. in 1530. Showing himself hostile to the Prot. cause, he was deprived of his bishopric in 1549, but was restored on the accession of Queen Mary in 1553. He was the prin. instigator of the bloody persecutions during her reign. Refusing to take the oath of supremacy on the accession of Elizabeth in 1558, he was imprisoned in the Marshalsea, where he d. Sept. 5, 1569.

Bonnet, bo-nā' (CHARLES), LL.D., F. R. S., a Swiss naturalist and philos., b. at Geneva Mar. 13, 1720. He made discoveries in the reproductive and other functions of insects, etc., which he announced in his *Treatise on Insectology*; wrote also *On the Use of the Leaves of Plants*, D. May 29, 1768.

Bonneville, bon-vil' (BENJAMIN L. E.), b. in Tenn., grad. at W. Pt. in 1815; became capt. in the U. S. A., and served in the Mex. war. Pub. a *Journal of an Expedition to the Rocky Mts.* D. June 12, 1878.

Bonpland, bon-plon' (AIMÉ), a Fr. botanist, b. at La Rochelle Aug. 22, 1773, studied med. and bot. at Paris. In 1799 he accompanied Humboldt in a scientific expedition to S. Amer.; on his return pub. *Equinoctial Plants Collected in Mex.* He had collected 6000 species of plants, of which 3500 were entirely new; became prof. of nat. hist. at Buenos Ayres in 1816; in 1821, on an excursion to the Andes, as he was passing through Paraguay he was arrested by order of Dr. Francia, who detained him a prisoner nearly 10 yrs. Humboldt, B., and Kunth pub. the *Nova Genera et Species Plantarum*, 1815-25. D. May 11, 1858.

Bony Pike (*Lepidosteus*), a genus of ganoid fishes found in Amer., remarkable as being examples of a type of fishes now almost extinct. To this genus belong the gar-pike and the alligator-gar of the U. S. The latter is sometimes 6 ft. in length, and resembles the alligator in appearance.

Booby (*Sula fusca*), a species of aquatic birds of the same genus as the gannet, and of the family Pelicanidae. It seldom swims, but is a bird of powerful wing, and feeds on fish, which it catches near the surface of the water by a sudden plunge. It is remarkable for stupidity and slow movement on the land.

Bood'dha, or **Buddha**, the title of an Asiatic divinity, or rather of a series of divinities, whose votaries are said to constitute more than $\frac{1}{2}$ of the human race. The name is derived from the Sans. verb *bud* ("to know"), and signifies, literally, "wisdom," and also the "wise one;" but it is applied particularly to certain divine sages who are believed to have become possessed of transcendent wisdom. The Hindoo systems teach the doctrine of accumulative merit. Not only can one in the present life, by prayer, penance, and sacrifice, acquire great merit, but this is supposed to be credited to him in the next life. Thus those who become B. acquire, in the course of innumerable transmigrations, an amount of merit which may be termed infinite; and this merit confers infinite wisdom and power. The aspirants to the Booddhaship (called in Sans. *Bodhisattvas*) are supposed, in the course of their countless transmigrations, to be born sometimes as *devas* (inferior deities), and sometimes in the form of various animals, or even insects; but when they are to assume the rank of supreme B., they are always born as men, and their human form becomes glorified, when they attain their highest perfection, and take their rank as the supreme power of the universe. But they continue only a very brief period in this state; they soon pass into *nirvāna*—a term variously interpreted. According to the majority of Booddhists, it simply signifies non-existence or annihilation, but according to others, the soul, in *nirvāna*, does not cease to be; it merely ceases its separate existence, having been absorbed into the essence of the supreme, eternal Spirit. It is held that there have been innumerable B. in the eternity of the past, each being separated from his nearest successor by thousands of yrs. (*From orig. art. in J. S. Unit. Cy.*, by PROF. J. THOMAS, LL.D.).

Book [A.-S. *boc*; Ger. *Buch*, supposed to be from the root of *Buche*, "beech," because thin pieces of this wood were formerly used for writing]. B. is the gen. name of almost every literary composition, but in a more limited sense is applied only to such compositions as are large enough to form a vol. The materials of which B. are composed have differed much at various periods and among different peoples. Plates of metal, or tablets of clay, afterward hardened by burning, slabs of stone or thin pieces of wood, often covered with wax, have been employed. At a later period the bark of trees (Lat. *liber*) came into use—whence our word "library." The leaves of a species of palm are still used for B. in some parts of India. The materials for B. were for a long time mainly derived from the papyrus, a water-plant once common in Egypt. At a later period the skins of animals, especially in the form of parchment, came to be the usual material. This grew to be very costly, and one writing was often erased in order to make use of the material for other works. B. thus written are called palimpsests. B. upon flexible materials were usually in the form of rolls (Lat. *rolumen*), whence our word "volume." But paper has practically superseded everything for B.

Book-binding, the art of fastening together and inclosing the leaves of a book for preservation and use, has been practised for many centuries. Long before the invention of printing the written leaves of missals and other books were united together and inclosed in covers of wood, parchment, and other materials. Much labor and expense was bestowed on a single vol., and the covers were frequently decorated with jewels and ornaments of gold and silver. Some of these vols. are still preserved in the monasteries and museums of the Old World, and are objects of interest and study.

Since the invention of printing, and especially from the beginning of this century, the rapid advancement of the mechanical arts, the extension of education, and the gen. diffusion of knowledge have made books as much a necessity of life as food and clothing, and their preservation is therefore an object of importance.

The modern operations of B. may be grouped in 2 main divisions—"forwarding" and "finishing," the first comprehending what is necessary for the preservation of books, the latter pertaining to their embellishment. In Amer. during the last quarter of a century, machinery for the binding of books has been invented, improved, and applied to a greater extent than in any other country; hence books in large eds. are produced in a style of great elegance and durability, and at prices so moderate as to be within reach of all classes of the community. The number of persons engaged in B. throughout the various States is very large. In the cities of New York, Phila., and Boston many of the establishments employ each from 100 to 300 hands (about 1/4 of the number being women), and produce from 1000 to 5000 vols. per day. *From wood, art, to Fr. Coll. Cyc., by J. SOMERVILLE.*

Boole, BOOL (GEORGE), b. Nov. 2, 1815, was prof. of math., Queen's Coll., Cork, Ire.; author of *An Investigation into the Laws of Thought, on which are founded the Mathematical Theories of Logic and Probabilities*. D. Dec. 8, 1864.

Boomerang, a missile used by the aborigines of Australia. It is about 2 ft. in length, flat on one side and rounded on the other, and is made of hard wood bent into a curve nearly resembling an obtuse angle. It is taken by one end with the bulged side downward, and thrown as if to hit some object in advance. Instead of continuing to go directly forward, it slowly ascends in the air, whirling round and round, and describing a curved line, till it reaches a considerable height, when it begins to retrograde, and finally sweeps over the head of the thrower and falls behind him. This surprising motion is produced by the reaction of the air upon a missile of this peculiar shape. The natives will often hit an object some distance behind them.

Boone (called **Montana** in the U. S. census of 1870), on R. R., a city of Boone co., Ia. Large quantities of coal are shipped from here. Pop. 1870, 2415; 1880, 3330.

Boone (DANIEL), a pioneer and hunter, b. in Bucks co., Pa., Feb. 11, 1735. He emigrated to N. C., where he married. In 1773 he moved with his own and other families to Ky.; in 1775 he built a ft. at Boonesborough, on the Ky. River. The Indians were repulsed from this ft. several times in 1777, but surprised and captured B. in 1778. They took him to Detroit, treating him with lenity, but he soon escaped and returned to his ft., which he defended with success against 450 Indians in Aug. 1778. In 1795 he removed to a place near St. Louis, Mo. D. Sept. 20, 1820.—His son ENOCH, who d. Mar. 8, 1862, aged 84, was the first white male child b. in Ky.

Booneville, or **Boonville**, a city, cap. of Cooper co., Mo., is situated on the right (S.) bank of the Mo. River, 227 m. by water and 187 m. by R. R. W. by N. of St. Louis. Lead, coal, marble, hydraulic lime, and iron are abundant here. At this place, on the 17th of June, 1861, Gen. Lyon routed 2500 Confed. troops under Col. Marmaduke, and captured their camp. Pop. 1870, 3506; 1880, 3854.

Boon-ton, Morris co., N. J., on R. R. and the Rockaway River, about 30 m. from New York. It has iron-works among the largest in the U. S., if not in the world. Pop. of tp. 1870, 3458; 1880, 2682, including 2277 in v.

Boonville, Oneida co., N. Y., 35 m. N. of Utica, on R. R. and the Black River Canal. Pop. 1870, 1418; 1880, 1677.

Boot (JOHN FLETCHER), a Cherokee, a member of the executive council of the nation, and a brave warrior. After his conversion in 1825 he was ordained deacon of the M. E. Ch. S., in Nashville, Tenn., and elder in Lebanon. He preached in his native tongue, and was the first Cherokee that administered the Lord's Supper. Was a founder of the Cherokee Bible Soc. D. Aug. 8, 1853, aged about 60 yrs.

Boötes, a N. constellation, is represented on celestial globes as a man holding in one hand a club, and in the other a leash by which he leads 2 hunting-dogs. This constellation comprises *scuturus*, a star of the first magnitude. B. is bounded on the N. by Draco, on the E. by Corona Borealis and Serpens, on the S. by Virgo, and on the W. by Canes Venatici and Coma Berenices.

Booth (ABRAHAM), b. at Blackwell, Derbyshire, Eng., in May 1734, became pastor of the Bap. ch. in Goodman's Fields, Lond. Author of *Pedobaptism Examined*. D. 1806.

Booth. This name, long eminent on the stage, was first made famous by BARRYTON, an Englishman, b. in 1681. He first appeared in 1698 at Dublin, Ire., and in 1701 in Lond. He left the stage in 1728, and d. in 1733. He was deemed excellent in such various parts as Hotspur, Antony, Othello, and Henry VIII.—JUNIOUS BRUTUS B., b. near Lond. May 1, 1796, first appeared on the stage Dec. 13, 1813, at Deptford, Eng., and within 4 yrs. became famous in Lond. as Richard III. and Sir Giles Overreach. He first acted in Amer. July 13, 1821, at Richmond, Va., as Richard III. His career on the Amer. stage was one long triumph—marked, however, by intemperance and incipient insanity. D. Nov. 3, 1852.—EDWIN B., son of J. B. Booth, b. at Baltimore Nov. 15, 1833, first appeared on the stage Sept. 10, 1849, at the Boston Museum, as Tresselt, in *Richard III.* After several years of "strolling" in Cal. and Australia, he returned to New York and other N. cities, and speedily acquired a high professional rank. He opened Booth's Theatre, New York, Feb. 3, 1869, and made a highly successful professional tour in Europe in 1882-83. His name, as an actor, is identified with Hamlet, Richelieu, Iago, Bertuccio, and Lucius Brutus.

Booth (JOHN WILKES), the assassin of Abraham Lincoln, b. in Harford co., Md., in 1838, was a brother of Edwin, noticed above, and became an actor. In the c. war he sided with the Confeds. On the evening of the 14th of Apr. 1865, in pursuance of a conspiracy with Surratt, Powell, and others, he entered Ford's Theatre, Wash., and shot Pres. Lincoln, who was sitting in a private box. Exclaiming, "Sic semper tyrannis!" he leaped down to the stage. Although his leg was broken by the leap, he mounted a horse and escaped. He was pursued to a barn near Bowling Green, Va.; refusing to surrender, he was shot, Apr. 26, 1865.

Booth (MARY L.), b. at Yaphank, N. Y., Apr. 19, 1831; has pub. a *Hist. of the City of New York* (1859-67), and more

than 30 vols. of Fr. translations. From its beginning, in 1867, has been ed. of *Harper's Bazar*.

Booth (NEWTON), b. in Salem, Washington co., Ind., Dec. 23, 1825, grad. at Asbury Univ. in 1846, became a lawyer in 1850; went to Cal. soon afterward, and engaged in business; returned in 1857 to Terre Haute, and practised law till 1860, when he went back to Cal.; in 1871 was elected gov. of Cal. on an independent ticket; in Mar. 1874 was elected U. S. Senator.

Booty. See **PROPE**, by PRES. T. D. WOOLSEY, LL.D.

Bopp (FRANZ), a Ger. philologist, b. at Menz Sept. 14, 1791. He studied langs. in Paris and Göttingen, and became in 1821 prof. of philology at Berlin. He gave special attention to the Sans. lang., and is regarded as founder of science of comparative philology. His great work is a *Comparative Grammar of the Sans. and its Kindred Langs.* D. Oct. 23, 1867.

Bo-ra, von, or Boh'ren (KATHARINA), the wife of Martin Luther, b. in Sax. Jan. 29, 1499. She was a nun, but embraced the Lutheran faith; escaped from the convent, and was married to Luther in 1525. D. Dec. 20, 1552.

Boracic (or **Boric**) **Ac'id** is obtained in white shining scales, which are soluble in water and in alcohol, to the flame of which this acid imparts a beautiful green color. B. A. occurs native in certain lagoons of Tuscany, and in a crater in the island of Vulcano (Volcano), N. of Sic. The native B. A. is of great commercial importance in the manufacture of BORAX (which see).

Borax, a compound of boracic acid and soda, is found native as a saline incrustation on the shores of lakes in Pers., Thibet, and India. The impure B. collected on these shores is called *tincal* or crude B., which is also found in Peru, Chili, Cal., Nev., and other regions. B. is also prepared from boracic acid by solution in boiling water, and the addition of a boiling solution of carbonate of soda. It is also prepared from borate of lime, a salt largely procured from Chili, Peru, etc. B. is a white salt of a sweetish taste, soluble in twice its weight of boiling water. It is useful as a flux in promoting the fusion of metallic mixtures, and producing fusible silicates in assaying and in welding iron. As an agent in experimenting with the blowpipe it is valuable for the readiness with which it forms colored glasses with various metallic oxides. It is also used in med., and as a detergent in the laundry.

Borax Lake, a small lake in Cal., N. of San Francisco, the water of which is a strong solution of B. Crystals of B. are also found in large numbers in the muddy sediment at the bottom. Many hundreds of tons of these have been collected and sent to San Francisco.

Bor'da (JEAN CHARLES), an eminent Fr. math. and astron., b. at Dax May 4, 1733. He served as an engineer in the army, and became a capt. in the navy. As a naval officer he fought for the U. S. in 1778-82. He wrote several scientific works, and invented or improved the reflecting circle. Aided by Delambre and Méchain, he measured an arc of the meridian from Dunkirk to the Balearic Isles. D. Feb. 20, 1799.

Bor'daux, bor-dô', a city and seaport of Fr. on the river Garonne, 58 m. from its mouth and 364 m. S. S. W. of Paris. It has a capacious harbor, accessible at all stages of the tide for vessels of 600 tons. It is connected by several railways with Paris, Toulouse, Marseilles, and other places, and the Canal du Midi joins it with the Mediterranean. It is the seat of an abp., has a Gothic cathedral, commenced about 1100, and the ch. of St. Croix, still older; a univ., a coll., a mint, a public library of 120,000 vols., and one of the finest theatres in Europe. It was founded before the Chr. era, became the cap. of Aquitania Secunda in the reign of Hadrian, about 130 A. D.; in 1532 was transferred to the Eng. crown, but reverted to Fr. in 1451. During the revolution of 1793 it was the headquarters of the Girondists, and suffered severely during the Reign of Terror. In Dec. 1870, when Paris was besieged by the Gers., the seat of govt. was at B., but in the following Mar. was transferred to Versailles. Pop. 1881, 221,305.

Bordeaux Wines, a gen. name for several sorts of Fr. wine. The red wine of B. are commonly called claret in the U. S. Among the best of these wines are the Médoc, which is red, and the Graves, which is white.

Bor'den (GAIL), the inventor of the product known as "condensed milk," b. in Norwich, N. Y., 1801. In 1829 he removed to Tex.; in 1853, after arduous and persevering efforts, he succeeded in producing condensed milk, for which he secured a patent. D. Jan. 11, 1874.

Borden (SIMEON), a C. E. and mechanician, b. in Fall River, Mass., Jan. 29, 1798; in 1834 was director of the geodetic survey of Mass., for which he invented valuable apparatus. D. Oct. 28, 1855.

Bor'dentown, R. R. junc., a city of Burlington co., N. J., on the Del. River, 30 m. N. E. of Phila., and 6 m. S. E. of Trenton. It is the terminus of the Del. and Raritan Canal. Here is a mansion built by Joseph Bonaparte, ex-king of Sp. Pop. of tp. 1870, 6041; 1880, 6334, including 4258 in city.

Bore, called also **Eagre** (perhaps from the sea-jotun Egir). In estuaries into which large rivers flow, the struggle between the ascending tidal wave and the opposing current of the stream produces the imposing phenomenon of a huge wave, which, like a moving wall of water, advances with great rapidity and a deep roaring noise up the river, often for hundreds of m., to the limit of tide-water. This is called the *B.* In the Hoogly River, one of the main mouths of the Ganges, the B. rushes up the river with great impetuosity. In the Chi. river Tsientang it rises to 30 ft. in height, and travels at the rate of 25 m. an hour, sweeping everything before it. In the Amazon River, at the time of the equinoxes, B. of 15 ft. in height follow each other in quick succession, and within the space of 200 m. 5 such mighty waves may be seen travelling simultaneously up the river. The Indians, imitating the roaring sound of the B., call it *pororoca*. ARNOLD GUYOT.

Bo'reas, in Gr. mythology, the personification of the N. wind, brother of Hesperus, Zephyrus, and Notus; was im-

used to dwell in the caves of Thrace, and represented with wings, hair, and beard dripping with snow-flakes.

Boreman (ARTHUR INGRAM), b. at Waynesburg, Pa., July 24, 1833; settled in W. Va., and practised law; was its first gov. in 1883; in 1899 elected U. S. Senator.

Borer, a name applied to the larvæ of many insects which feed upon trees and vegetables, in which they eat holes. Almost every kind of tree has a different B. by which it is specially infested.

Borghese, BOR-GA SA (CAMILLO), PRINCE, b. at Rome July 19, 1775; he served in the Fr. army in his youth, and married in 1803 Pauline, a sister of Nap.; was in 1806 created duke of Guastalla. Sold B. collection of antiquities and artistic treasures to Nap. for 130,000,000 francs. D. Apr. 10, 1832.

Borgia, bor-JAH (CESARE), duc de Valentinois, an infamous It. cardinal and soldier, a natural son of Pope Alexander VI. Was made cardinal in 1492, and received from Louis XII. of Fr. the title of duc de Valentinois in 1498. He was guilty of many acts of cruelty and treachery, and procured the death of several persons by poison. On the death of Pope Alexander VI. in 1503, and the accession of Julius II., who was an enemy, he was imprisoned; escaped in 1506 and joined the army of the king of Navarre, whose daughter he had married. Killed in battle Mar. 12, 1507.

Borgia (LUCREZIA), an It. woman renowned for beauty, talents, and vices, a sister of Cesare B., noticed above. Her second husband was Alfonso of Este, a son of the duke of Ferrara. Contemporaries accused her of incest and poisoning, but several modern writers maintain that the charges against her are greatly exaggerated. D. 1520.

Borgoo, a kingdom in Central Afr., W. of the Niger, S. of Gourma, E. of the Fellatah country, and N. of the kingdoms Egga and Yarbba. The pop. consists of the original inhabs. and Fellatahs and a Mohammedan conquering tribe.

Bo'rie (ADOLPH E.), b. in Phila. Nov. 25, 1809, ed. at the Univ. of Pa. and in Paris; a merchant of Phila.; was sec. of the navy in 1869 under Pres. Grant. D. Feb. 5, 1880.

Borland (SOLOH), b. in Va., studied med. and settled in Ark.; was a major in the Mex. war; elected to the U. S. Senate 1849, appointed U. S. minister to Central Amer. 1853, and became a Confed. brig.-gen. in 1861. D. Jan. 31, 1864.

Borneo, bor-ne-o, native **Poolo-Kalamantin**, the largest island in the world except Australia, situated in the Malay Archipelago, extending from lat. 7° 1' N. to 4° 10' S., and from lon. 108° 50' to 119° 2' E. Length, 807 m.; breadth, 600 m.; area, 290,000 sq. m., a little larger than Tex.

Topography.—Near the N. end is the peak of Kinibaloo, 13,680 ft. high; chains of mts. with fertile valleys and plains in the interior; the coasts are mostly low and marshy, with dense forests; very few bays or inlets. B. is drained by numerous navigable rivers—the Brunai, Sarawak, Pontianak, Kootai, Pembuan, Murong, etc. Large marshy deltas to most of these rivers, but inland navigation good.

Climate.—Hot and unhealthy on the coast; heavy rains from Oct. to Apr. In the interior, moderate and healthy.

Minerals.—Gold, tin (abundant), antimony (most of the commercial supply), zinc, diamonds (fine and in great numbers), iron and coal, both of excellent quality.

Soil and Vegetation, rich and luxuriant. Teak, iron-wood, gutta percha, ebony, cocoa-palm and several species of sago are the prin. forest trees. Cinnamon, camphor, betel, pepper, ginger, cotton, rice, and yams are produced.

Wild Animals.—Elephants, tigers, bears, leopards, buffaloes, orang-outangs, and other apes and baboons.

Population estimated at 1,750,000, consisting of Malays (mostly Mohammedans), Dyaks, Kyans, Bugis (native tribes and pagans), Papuas or Negritos (from New Guinea, also pagan), and Chi. (mainly Buddhists or Shintoists). The Dyaks are the most numerous, and are divided into many tribes; part wild, naked hunters, fishermen, and pirates, part more civilized and industrious. They have neither priests, temples, nor worship. About 2% of the island is included within the Dut. E. I. possessions, but over much of it their sway is only nominal. The most of it is ruled over by native sultans, who recognize a suzerainty on the part of the Dut. On the N. W. coast is a tract of about 35,000 sq. m., called Sarawak, with a pop. of about 250,000, of which an Englishman, Sir James Brooke, obtained control in 1841 from the sultan of Borneo. He had the title of rajah of Sarawak, which with the Eng. rule has descended to his nephew, rajah Charles Johnson Brooke. The imports of B. are opium, tea, cottons, cloths, hardware, brass, iron, etc.; exports, sago, beeswax, edible birds' nests, camphor, hides, rattans, tortoise-shell, trepan, cinnamon, antimony, tin, coal, diamonds, and gold. The prin. states or divisions of B. are B. proper, Pontianak, Banjermassin (these two controlled wholly by the Dut.), Sambas, Sarawak, Matan, Simpang, and Sooloo. The prin. towns are Borneo, Pontianak, Banjermassin, Sambas, Sarawak, and Succadana.

History.—B. was discovered by the Port. in 1518, and a Port. settlement made at Banjermassin in 1690. The Dut. visited B. in 1596, made a treaty with the sultan in 1609, built a ft. and factory at Tatis in 1643, and one at Pontianak in 1778. The Sarawak settlement is under Brit. control.

Bornou, bor-noo' (written also **Bornu** and **Bornoo**, native **Kanowra**), a negro kingdom of Central Afr., in the Sudan, of not well defined boundaries or extent. It is said to be bounded N. by the Sahara. E. by Lake Tchad (though it is doubtful whether it does not include that lake). S. by Fumina, and W. by Houssa. Area unknown. It forms a part of the great central plain of the Sudan, and is well watered by the Shary, Yeou, Serbenal, and some of the affluents of the Chadda or Benue. There are few minerals. The soil is fertile, producing maize, millet, dhourra, rice, cotton, indigo, pulse, etc., and affording pasturage for immense herds of cattle, horses, and sheep. There are extensive forests on the banks of the streams. Climate very hot, the mercury often rising to 105° F. in the shade. Rainy season from Oct. to Apr., during

which the country is extensively inundated. Lions, panthers, and other beasts of prey infest the forests. The natives manufacture cotton cloth, and coats-of-mail which they use in warfare. They exported many slaves, and some gold-dust till recently, but the slave-trade is now almost entirely abolished. The pop. is estimated at about 5,000,000, mostly negroes and Shouas, the latter said to be of Arab descent. The religion is Mohammedanism.

History.—B. was originally a part of the old kingdom of Kanem, and became a separate govt. in the 15th century, but did not attain its greatest power till the close of the 16th. It subsequently declined, and its terr. was greatly diminished by the inroads of the Fellatahs. The old cap., Birni, being destroyed by the Fellatahs, Kouka was made cap. An Arab from Fezzan defeated the Fellatahs, and his son Omar founded a new dynasty, Arab in race and Mohammedan in religion. Omar has done much to develop the country, and has treated travellers with great kindness. The chief towns are Kouka, Katsena, Kanou, Angomou, and Gudeiba. L. P. BROCKETT.

Bo'ro Bud'dor, or **Bo'ro Bo'do**, an anc. Booddhist temple of Java, believed to be the most elaborate specimen of Booddhist architecture now existing, and to have been built in 1350 A. D. It is a square pyramid, with 9 terraces or stories, 116 ft. high in all, and 400 ft. square at the base, each terrace covered with cells or small houses for monastics, and the whole covered with profuse carvings.

Borodino, a v. of Russ., 70 m. W. S. W. of Moscow. It was the scene of a battle between the army of Nap. (125,000 strong) and the Rus. army, of about 130,000 men, Sept. 7, 1812. The Fr. remained masters of the field and claimed the victory. They call this the battle of the Moskwa, that being the name of a river near the field.

Bo'ron [Lat. *borium*], a non-metallic element which Sir Humphry Davy discovered by exposing boracic acid to the action of a galvanic battery. It forms boracic acid, and it occurs in nature only in combination with oxygen, generally in the form of that acid or of BORAX (which see). It is not used in the arts in a separate state.

Borromeo, bor-ro-ma' [Lat. *Borromæus*] (CARLO), often called **Saint Charles Borromeo**, an It. cardinal, b. at Arona, on Lago Maggiore, Oct. 2, 1538, was a nephew of Pope Pius IV. He inherited an ample fortune, and was appointed a cardinal and abp. of Milan in 1560. He endeavored to reform the morals of the clergy and monks. Wrote many religious works. D. Nov. 3, 1584, canonized 1610. (See ALEXANDRE MARTIN, *Histoire de la Vie de S. C. Borromée*.)

Bor'row (GEORGE), an Eng. author, b. at Norwich 1803. In his youth he associated with the gypsies, and has written several works concerning them. D. July 30, 1881.

Bory de Saint-Vincent (JEAN BAPTISTE GEORGE MARIE), BARON, a Fr. naturalist, b. at Agen in 1780. He explored the island of Mauritius about 1800; afterward served as a capt. at Austerlitz and other battles, and in 1839 commanded a scientific expedition sent to Algeria. An ed. of the *Annales des Sciences Physiques*. D. Dec. 23, 1846.

Bos (gen. *bovis*), the Lat. for an "ox" or "cow," is the systematic name for the genus of ruminant animals which comprises the ox, buffalo, etc.

Boscawen, bos-ka-wen (EDWARD), an Eng. admiral, a son of Viscount Falmouth, b. Aug. 19, 1711. He became a vice-admiral of the blue in 1756, was sent to N. Amer., and gained several victories over the Fr. in 1758. In Aug. 1759 defeated the Fr. fleet in the Bay of Lagos. D. Jan. 10, 1761.

Bosch'bok [Dut. for "bush-buck"], the *Tragelaphus sylvaticus*, a S. Afr. antelope, which is almost always found in thick underbrush which is not easily penetrated by man. When surprised in the open country it is easily caught, and is prized for its fine venison. It is about 4 or 5 ft. long, and has a voice like the barking of a dog. Several other Afr. antelopes have this name.

Bosch'vark [Dut. for "bush-pig"], a wild hog of S. and W. Afr., in size and in habits much resembling the common hog. It has long pointed ears, a long tail, and is of a dull red color, with white marks. It goes in herds, and the stroke of the boar's tusks is much dreaded. It is the *Palomachoceros africanus*.

Bos'cobel, Grant co., Wis., on R. R. and the Wis. River, 70 m. W. of Madison. Pop. 1870, 1509; 1880, 1428.

Boscovich, bos'ko-vik (RUGGERIO GIUSEPPE), F. R. S., an astron. and natural philos., b. at Ragusa, Dalmatia, May 18, 1701. Entered the order of Jesuits in 1725, and became prof. of math. and philos. in the Rom. Coll. in 1740. Was one of the first on the Continent to adopt Newtonian philos. Wrote various scientific works. D. Feb. 12, 1787.

Bos'na-Sera', or **Sarajevo** (anc. *Theriacopolis*), a town of Bosnia, on the Migliazza, 115 m. S. W. of Belgrade. It is an important centre of commerce. A great part of it was destroyed by fire Aug. 8, 1879. Pop. about 45,000.

Bosnia, boz'ne-a, formerly an independent kingdom, from 1522 to 1878 a prov. of Tur., and since that time a prov. or state of Aus-Hungary; bounded N. by the river Save, E. by the Drin, S. by Albania, W. by Dalmatia, Area, 16,417 sq. m., or with Herzegovina and Novi-Bazar, 24,347 sq. m. Surface generally mountainous. Dinaric Alps on the W.; some peaks 7000 ft. above the sea. Rivers, the Save, Drin or Drina, Bosna, Verbas, and Narenta.

Soil, Vegetation, Etc.—Mt.-slopes covered with forests of oak, beech, chestnut, etc.; valleys and plains have fertile soil and yield good crops of maize, wheat, hemp, and fine fruits. B. is rich in coal, iron, lead, and other metals, but the mines are not much worked. Manufactures, firearms, sabres, and knives. Pop. 1879, 862,302; and of Herzegovina and Novi-Bazar, which are generally associated with it, and identical in race, religion, and customs, 349,970, making a total of 1,212,272, of which 418,613 are Mohammedans (not Turks, but Bosniacs, or of Slavonic race), 496,761 Bosniacs of the Gr. Orthodox Ch., 309,391 R. Caths., 3426 Jews, etc. The Slavonic race predominates. The prin. towns are Sarajevo (Bosna-Sera'), Mostar, and Banialuka.

History.—Very interesting, but too full of incidents to be given here. Settled by Slavs in the 5th or 6th century, it was under the sway of the Byzantine empire for several centuries: at one time a powerful kingdom, it was, both before and after, alternately the prey of Hungary, Servia, the Gr. empire, or the popes; its inhabs. largely Prots., repelled the attempts of each to convert them, and maintained their own faith amid terrible persecutions, till at last, in sheer despair, they surrendered to the Turks in 1463 to 1483, and their children were made Mohammedans by force. In the late Rus.-Tur. war of 1877-78 they opposed Tur., and were finally annexed to Aus. (See *Through B. and the Hæmorrhoid*, by A. J. EVANS. L. P. BROOKETT.

Bosphorus, or Bosporus [Gr. Βόσπορος, i. e. the "ox-passage," because cattle could swim it], the anc. name of the strait which connects the Black Sea with the Sea of Marmora, and forms part of the boundary between Europe and Asia. It is about 16 m. long, and varies in width from $\frac{1}{2}$ m. to 2 m. It was also called the Thracian B. to distinguish it from the Cimærian B.

Bosphorus, Cimærian [Gr. Βόσπορος Κιμαῖος], the anc. name of the Strait of Yenikale, which connects the Black Sea with the Sea of Azof. The width at the narrowest point is about $\frac{3}{8}$ m.

Bosquet, bos-ka' (PIERRE FRANÇOIS JOSEPH), a Fr. gen. b. at Pau Nov. 8, 1810. Served in Algeria, and in the Crimean war commanded a division at Alma, and rendered important services at Inkerman 1854, for which he received the thanks of the Brit. Parl.; became a senator and marshal of Fr. in 1856. D. Feb. 5, 1861.

Bossuet, bos-su-ä' (JACQUES BÉNIGNE), D. D., a Fr. pulpit orator and theol., b. at Dijon Sept. 27, 1627. He entered in 1642 the Coll. of Navarre in Paris; in 1652 was ordained a priest, received the degree of doctor, and became canon of Metz. In 1662 he preached in many chs. of Paris, and converted Marshal Turenne to the Cath. communion; he was appointed bp. of Condom in 1669, and preceptor to the dauphin in 1670. In 1671 he was admitted into the Fr. Acad. For the instruction of the dauphin he wrote a *Discourse on Universal Hist.* (1681). He became bp. of Meaux in 1681, and was the author of 4 articles which were adopted by an assembly of Fr. clergy in 1682, and which secured the liberties of the Gallican Ch. against papal aggression. Author of the *Hist. of the Variations of the Prot. Chs.*, and the chief Fr. champion of the Cath. Ch. in that age. His funeral orations have been much admired. D. Apr. 12, 1704.

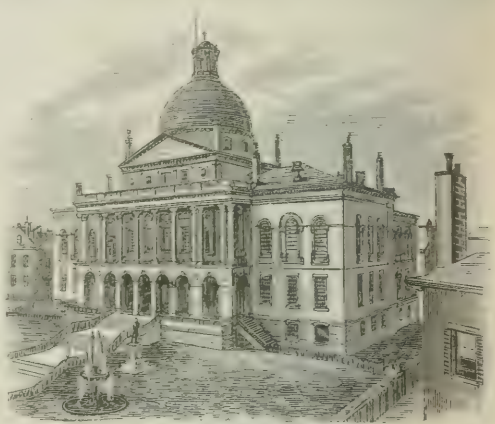
Boston, an important R. R. and commercial centre, the cap. of Mass., in Suffolk co., is situated at the W. extremity of Mass. Bay, about 450 m. by R. R. N. E. of Wash. and 232 m. N. E. of New York; the State-house is in lat. $42^{\circ} 21' 27.6''$ N., lon. $71^{\circ} 3' 30''$ W. It was founded in 1630 by Puritan colonists from Eng. under the lead of John Winthrop and Thomas Dudley.

Original Site.—The site was originally a small pear-shaped peninsula, in its extreme length less than 2 m., and its greatest breadth a little more than 1, bounded N. and W. by the Charles River, expanded into a broad estuary in its N. W. sweep into the deep water of the harbor. It was hung to the mainland at Roxbury by a slender stem or neck 1 m. in length, so low and narrow between tide-washed flats that it was often submerged. The water on the N. of this isthmus was an inlet of the Charles nearly 1 m. wide, called Back Bay, and that on the S. was an inlet of the harbor named S. Bay. This site was deeply indented by coves and bordered by salt-marshes, and its surface was abrupt, irregular, and hilly. Such essentially were the natural features of B. of 100 yrs. ago, with its narrow, crooked streets, nooks, and its detached buildings, only 4 being of stone, of which King's Chapel alone remains. At the time of the Revolution it was the richest and most populous city in the U. S., yet it contained only 2000 buildings and less than 20,000 inhabs.

Modern Changes.—While the original site still preserves to a great extent its irregularity of surface, every part has been graded, the steep eminences having been reduced or wholly removed. The highest remaining eminence, Beacon Hill, crowned by the State-house, is about 110 ft. high. The coves, inlets, and marshes of the northerly borders have been converted into solid land, covered with buildings and fringed with wharves and docks. On the opposite side the broad bays and flats have been reclaimed and covered with streets and squares, so that what was the narrowest and most disagreeable has become the widest and fairest portion of the primitive site, and thus the original 783 acres of solid land comprised in the peninsula have become 1829. This constitutes what is now B. proper. In the mean time additional terr. has been acquired, mostly in recent yrs., by annexing adjoining suburban cities and towns, until now the aggregate area of the city, with all its districts, is 23,661 acres ($36\frac{1}{2}$ sq. m.), more than 30 times as great as the original area. The territorial acquisitions called dists. are as follows: E. Boston, S. Boston, Roxbury, Dorchester, Charlestown, W. Roxbury, and Brighton.

Streets and Buildings.—The broad water-courses around B. proper are spanned by causeways or bridges—E. B. only, that the harbor may be open to the navy-yard in Charlestown, being reached by ferry. Washington st., extending from the B. and Me. R. R. station to Roxbury, has always been the main thoroughfare. Beacon st. has many of the finest dwellings of B. State st. is the financial street. Commonwealth avenue, 250 ft. wide, with a mall in the centre, extending upward of a m. and a half through the Back Bay section, is rapidly becoming one of the finest boulevards of the world. The street railways afford conveyance to almost every part of the city and its vicinity. The nine R. Rs. radiating from B. connect it not only with all parts of N. Eng., but with the far S. W. and E. In the centre of B. proper are the Common and the adjacent Public Garden, constituting a park of 70 acres. These and other public places are adorned with many statues, of which the most noted is the fine equestrian statue of Washington on the Public Garden.

Public Free Schools.—The system of public free schools has long been the special pride of the city. This well organized and liberally supported system comprises primary, gram., high, Lat., normal, and special schools, in which 54,323 pupils are taught by 1276 teachers. The 188 school-houses, containing 1083 school-rooms, are valued by the assessors at \$8,377,500. The finest and largest school edifice in Amer., consisting of 2 connected school-houses, for the Lat. and Eng. high schools for boys, has recently been erected, costing, with the site, \$741,949.16. The total school expenses for 1880-81 were \$1,775,037. The instruction in all grades is gratuitous, the system being wholly supported by money drawn from the gen. tax levy of the city. It is under the control of a board composed of the mayor, who is pres., and 24 members chosen by the citizens for 3 yrs. The supervision is exercised by a supt. and 6 supervisors. In the number and extent of its libraries B. stands at the head of Amer. cities.



State Capitol (Boston, Mass.).

The chief of these is the B. Public Library, opened in 1854, which is wholly free, and is supported out of the city treas. at an annual expense of \$125,000. With its 8 branches in the dists. it contains 400,000 vols. Its executive force consists of 150 persons; its building cost in 1848, \$365,000, and a new one is about to be built. The literary, scientific, benevolent, and secret societies are numerous and well sustained. Of the higher insts. for instruction are the Mass. Inst. of Technology, the B. Coll. (R. cath.), the B. Univ. (Meth.), and the Harvard Med. School.

Commerce and Finances.—B. has been from the first a commercial city, and it has commercial relations with every part of the globe. Its advantageous situation upon a harbor, deep, secure, unobstructed by sand-bars or ice, and containing nearly 60 sq. m. of anchorage, was early appreciated by the people, and the shipping interests were rapidly extended. There are now 10 or more different steamship lines to Europe, and numerous coastwise steamers. B. is the prim. mart of the country for the sale of shoes, leather, and wool, and it is the buying, selling, and financial centre of most of the manufacturing establishments of N. Eng. The first bank in Amer. was established in 1686, and the first savings inst. in 1816. There were in 1881 in the city 61 national banks, with a cash cap. of \$52,300,000, and a surplus amounting to \$11,703,936. At the clearing-house about \$12,000,000 change hands daily. The valuation of taxable property in 1880 was \$15,095,700, and the tax levy \$80,000; in 1880 the valuation was \$639,462,495, and the tax levy \$9,913,951. The total net debt, Apr. 30, 1881, was \$26,005,620; the valuation of the personal and real property owned by the city, exclusive of the means for paying the debt, May 1, 1881, was \$41,197,656. The works for the water supply are elaborate and extensive; Cochituate Lake works were completed in 1848. The growth of the city requiring an additional supply, in 1872 the Sudbury River works were begun on a larger scale, and are now finished. The annexation of Charlestown brought with it the Mystic Lake works. The cost of construction of these combined works was upward of \$18,000,000, and the gross expenditure on their account about double this amount.

History.—B. remained for nearly 2 centuries under the simple form of a town govt., by all the citizens assembled in "town-meeting." The city charter was granted in 1822. The present govt. is composed of a mayor, 12 aldermen, and a common council of 72 members, annually elected. There are coms. for fire, water, health, streets, and police, and boards for various other depts. of the public service. In and near Boston were enacted the first scenes of the drama of the Revolution. From this place the Brit. army went out to open the war at Lexington and Concord, and to fight the battle of Bunker Hill, the site of which is now within the city limits, and was forced by Washington to evacuate Mar. 17, 1776. On the evening of Nov. 9, 1872, the great B. fire broke out and destroyed the most substantial business portion of the city, sweeping over 65 acres, covered mostly with wholesale warehouses, nearly all being of brick or granite, involving a loss of over \$80,000,000. In a little more than 2 yrs. afterward the whole "burnt district," with widened and improved thoroughfares, was again covered with solid business edifices. Pop. 1800, 24,357; 1820, 43,298; 1850, 136,881; 1870, 250,526; 1880, 362,839. JOHN D. PHILBRICK.

Boston School System.—See SCHOOL SYSTEM OF B.

Boston University.—See APPENDIX.

Boswell (JAMES) of Auchinleck, a Scot. biographer, b. at Edinburgh Oct. 29, 1740. He studied law, and in 1763 became acquainted with Dr. Johnson, of whom he was a

devoted admirer. He diligently noted and recorded the sayings, opinions, and actions of Dr. Johnson, of whom he was an intimate associate. His *Life of Samuel Johnson* (1791) is a masterly and admirable biography. D. May 19, 1765.

Boswellia, a genus of trees of the order Amygdaceae, natives of India, Persia, and Ar. The *B. thurifera* or *scripta* is a large tree with small pink flowers, and yields the fragrant resin called *obanum*, believed to be identical with the frankincense of the ancients.

Bosworth, a market-town of Eng., on an eminence 10 m. W. of Leicester. On a moor near this town was fought, in Aug. 1485, the battle of B. or B. Field, in which Richard III. was defeated and killed. This battle ended the "War of the Roses," and raised Henry VII. to the throne.

Bosworth, Joseph, D. D., F. R. S., an Eng. philologist, born in Dorsetshire in 1780; published *First of the 1. S. Language*, which is indispensable to the thorough student of Eng. D. May 1876.

Botanic Gardens are collections of growing plants made for the purpose of instruction or for scientific observation. They have been very serviceable in introducing useful and ornamental plants from foreign countries.

Botany is the nat. hist. of the vegetable kingdom—i. e. the science that treats of plants. Probably the best gen. definition of plants, and that which brings prominently into view their nature and office, is this: They are those beings which derive their sustenance from the mineral kingdom—namely, from the earth and air. They only are capable of converting earth and air into nourishment. Plants create the food upon which animals live. Their office in the economy of nature is to transform lifeless mineral materials into living matter, or into matter capable of supporting or composing the corporeal structure of a living being. Animals take that which plants have prepared for them, transform it more or less, incorporate it into structures which manifest powers and vitality of a higher order. Like most definitions in nat. hist., this is subject to some qualifications and exceptions. For the 2 kingdoms of organic nature, vegetable and animal, are parts of one great system, are completely distinct in their higher organized representatives, but essentially confluent in the lowest and simplest forms of living beings.

The several depts. of B. relate to the different kinds of inquiry which may be made respecting plants. They all fall under two primary divisions—namely, *structural or biological B.* and *systematic B.*, with certain subsidiary inquiries.

1. *Structural or Biological B.* includes all inquiries into the structure, life, growth, action, and propagation of plants. The structure and the functions may be regarded separately, although practically they are best treated in connection. As to the first, pure *structural B.* is sometimes denominated *organography*—i. e. the study of the organs or members of plants. The study of the organs as compared with each other—as, for instance, of the different forms which leaf, stem, etc., may exhibit in the same plant or in different plants—has taken the name of *morphology* (the doctrine of forms or shapes)—a dept. or mode of treatment of the subject which in modern times has greatly enhanced the interest of B. The morphological study of abnormal parts or monstrosities takes the name of *teratology*. The organs of plants in the most gen. sense are their obvious parts or members, such as leaf, stem, and root, flower, fruit, and seed. But each of these is made up of parts, and the parts themselves are complex: the minuter parts or organic elements of plants, which compose the obvious members, are in the stricter sense the plants' organs. Their investigation takes the name of *vegetable anat.* or *histology*. The study of the actions of these organs, whether of the obvious members or of their minute components (which, indeed, are the parts that act), is the province of *physiological B.* or *vegetable physiology*.

II. *Systematic B.* comprises all inquiries relative to plants as consisting of kinds variously related to one another—i. e. as manifesting resemblances and differences in various degrees. Plants are thus considered as constituting a systematic whole or *vegetable kingdom*. Commonwealth would have been a truer term, for the vegetable creation does not culminate in a head, as does the animal realm in man. There are high and low plants in grade, but no one highest nor lowest. The prin. depts. of this branch of botanical science are—1, *Taxonomy*, 2, *Phylography*, or *Descriptive B.*

I. *Taxonomy* is the study of the principles of classification, and of the grounds upon which divisions expressive of the diverse grades of resemblance manifested among plants may be made and defined. The fundamental facts in nature upon which classification in nat. hist. is based are these two—1st. Plants and animals occur in kinds, and are reproduced true to their essential characteristics, from generation to generation; in other words, progeny is like parent. 2d. The numerous kinds exhibit unequal and very various degrees of resemblance, some being very similar, others widely dissimilar. Upon the first rests the idea of *species*; upon the second that of genera, orders, classes, etc. Species is the unit in nat. hist. Individuals occur as links in the chain of generations which have come down from the immemorial past: this "perennial succession of individuals," this ensemble of individuals proceeding from a common stock, constitutes a species. Genera, orders, classes, and the like are assemblages of species, of various degrees of likeness, according to the grade. Those species which are most alike are of one genus; for example, red oak, white oak, scarlet oak, live oak, etc., are so many species of the oak genus. Those which concur in a more gen. resemblance, as being on the same plan of structure in all their important organs, with whatever difference in details, represent an order or family; e. g. the oak genus, with the chestnut, beech, hazel, etc., are of one order. Those which have only a more gen. resemblance are of one class. Proceeding synthetically, from the species upward, these are *groups*, successively more and more comprehensive. Proceeding analytically from the vegetable kingdom as a whole, distinguishable into parts, they are *divisions*. The sequence of subordination, from

gen. to particular, in all nat. hist. invariably is—*Class, Order, Genus, Species*. Other grades have been recognized (such as tribes, which rank between order and genus), but these 4 are fundamental and universal. There is also a lower grade, of great importance to the cultivator, and of no small interest to the scientific botanist, that of variety.

Although *species* is the recognized unit in nat. hist. classification, no species is represented by absolutely identical individuals. The differences may be slight, apparently casual and evanescent; or they may be more remarkable, inexplicable by any known causes or conditions, and more enduring. Some species are much disposed to vary; some maintain a general uniformity. Even the branches from the same stem may vary, and when variations or "sports" of this character arise, they incline to be perpetuated in the offshoots. Bud variations, however, are not common: the offshoot for the most part strictly reproduces the parent stock. Most varieties originate from seeds. Here the result of all observation leads to the conclusion that there are two opposed tendencies in every sexual reproduction—1. That of the progeny to be like the parent or parents in all respects; this ordinarily obtains such full mastery as to have established the fundamental proposition that the species reproduces itself, which, more strictly analyzed, means that individuals reproduce their like. 2. The second is the tendency to be unlike the parents by varying in some minor particulars, to strike out something new and peculiar. The law of inheritance generally prevails, but the tendency to individualize manifests itself strongly now and then in certain and minor particulars, and sets up a variety. Unimportant as this may be in wild plants, and in any single step, it becomes of the highest practical consequence in horticulture, agriculture, and stock-breeding, in which all depends upon favoring, strengthening, and preserving varieties. Varieties of recent origination are seldom directly perpetuable by seed, although they are so by buds (offshoots, layering, grafting, etc.); the tendency of the offspring to inherit the peculiarities of the parent being likely to be overborne by the ancestral tendency—i. e. the disposition to take after grandparents, great-grandparents, etc. This is called *atavism*. Also, in uncontrolled nature, the cross-breeding with individuals of the unvaried stock is almost sure to obliterate the incipient variation. The variation is preserved and led on, under man's care, by close-breeding in the first instance, and by selecting for seed only those of the progeny that inherit most of the peculiarity; then again selecting from the best of these, and so on for a few generations. In this way the force of *atavism*, or taking after ancestors, is weakened or evaded; for the new generation is far more likely to take after its immediate parents, grandparents, and great-grandparents when all are similar, than after a remoter ancestry, the parental and the grandparental forces now acting in the same line. In this way varieties, which at first would come true only by bud-propagation, are developed into *races*, or varieties of greater fixity, which come true from seed. Races in plants are naturally most important in annuals and biennials, which are capable of perpetuation only by seed. There are perhaps no annuals or biennials in cultivation which refuse to diverge into races.

Moreover, nearly related species may often, but not in all cases, be cross fertilized, and so their peculiarities mixed in the progeny, which takes after both parents; this gives rise to *hybrids*. These are of transient existence, except when perpetuated from buds—first, because they are commonly sterile *per se*; secondly, because they are especially liable to be fertilized by the pollen of one or the other parent, and so brought back to that type; thirdly, because even when fertile *per se*, the progeny in a generation or two is said to return, some to one and some to the other parental type by a disaversion of the mixed characters, one part inheriting only the peculiarities of the male, the other only those of the female, parent of the hybrid.

Races and varieties, of whatever sort or degree of fixity, have been regarded as of economical importance only, but merely perplexing to the systematist. Recently, however, they have assumed a new interest in the eyes of the philosophical naturalist through the investigations and reasonings of Mr. Darwin, which tend to the conclusion that varieties are incipient species, and cognate species only varieties of greater divergence or fixity—offshoots of higher antiquity from a common stock. To many of the leading naturalists of the present day, even those who do not recognize the agency of "natural selection" as the operative cause, the terms relationship, affinity, consanguinity, and the like, by which the resemblance of one species or one genus to another has always been denoted, are no longer regarded as metaphors, but rather as unconscious expressions of the idea that the resemblances are a consequence of community of descent.

2. *Phylography*, or *Descriptive B.* in the larger sense, is the application of the principles of taxonomy to the actual arrangement of the known plants and the delineation of their distinguishing features or characters. Hence *method or system in classification*, and also nomenclature and prescribed rules regulating descriptions, and the construction of a precise technical lang. *Nomenclature*, or name-giving, in B. is twofold. Names are required for the plants, each species must have its own particular name, and so must each group of species or genus, each group of genera or order, each group of orders or class. Also for descriptive purposes, each organ should have a substantive name, and as far as possible the prin. modifications of every organ require names either substantive or adjective. *Terminology or Glossology* is the department of phylography which prescribes the names of the organs or parts of plants, and of the forms under which they occur, and which has developed a technical lang. by means of which plants may be compared and described with an exactness and a brevity not otherwise attainable.

Nomenclature proper fixes the names of the plants themselves, and of the groups into which they are disposed.

The binomial system of nomenclature—which was one of the happiest hits of Linnaeus—has established for each plant a double name—namely, that of its genus and that of its species. A genus bears a name of one word, a substantive (or sometimes an adjective used substantively), e. g. *Quercus*, the oak genus, *Lilium*, the lily genus. Genera and generic names, in the modern sense, date back as far as Tournefort (A. D. 1700). The specific name was the invention of Linnaeus (say 1750), who first distinguished the phrase or descriptive character of a species from its name, making the latter consist of a single word, preferably an adjective; e. g. *Quercus alba*, for white oak, *Quercus rubra*, for red oak. The generic name answers to our surname, as Brown or Jones; the specific to the baptismal name, as John or James. If a variety has to be designated, its name will be appended to that of the species—e. g. *Quercus coccinea* (scarlet oak), variety *finetoria*, for the quercitron oak. Names of groups higher than genera are in the nominative plural, and are mostly formed by an extension of the name of a prin. genus. For instance, *Rosa*, the rose genus, gives its name *Rosae* to the rose tribe, and of *Rosaceae* to the rose family. This is a short expression for *Plantae Rosaceae*—i. e. rosaceous plants. To call a plant by name is then to mention in connection the botanical name of its genus followed by that of its species, and if need be, that of its special variety. Rightly to arrange the genera into more comprehensive groups is the aim of the higher classification or system in B. The two great ends of a classification of the vegetable kingdom are—1, to exhibit the relationships which subsist among plants, and bind them into a systematic whole; therefore to arrange them in such order, and under such successive grades, that each species and each group of species shall stand next to those which it most resembles in all or in the most important respects—i. e. in a system which shall express (so far as we can discover and express in terms) the plan of nature, or, more worthily, the plan of the Creator in the vegetable world; 2, to enable a learner readily to ascertain the name, place in the system, and an account of all that is known of any particular species. These two ends should be subserved by one and the same classification. In the last century this was not practicable. So Linnaeus contrived the system which bears his name as a temporary but much needed expedient to subserve the latter purpose. He named it an artificial system, because in its classes and orders it did not attempt to express all or the more important relationships of plants, but only those which could most conveniently be used for a practical purpose. He named it the sexual system, because he founded it upon the stamens and pistils, of which he had just completed the proof that they were the sexual apparatus; and he saw, with instinctive sagacity, that agreement or similarity in the organs and method of reproduction would furnish the best characters for classification. Linnaeus accordingly arranged the vegetable kingdom under 24 classes, characterized mainly by the stamens, and a variable number of orders, characterized primarily by the pistils. This system gave a great impulse to B. through the latter half of the last and the earlier years of the present century, but is now quite superseded by the natural system, upon which Linnaeus himself wrought, which the Jussieus put into a practicable form, and which succeeding botanists have labored and are laboring to perfect. For the plan and details of botanical classifications, for the structure and growth of plants, for the names and the arrangement of their parts or organs, consult the common elementary botanical works, or *J.'s Univ. Cyc.* Consult the latter particularly for a succinct account of the ideas which rule modern B.

Agricultural B., *Med. B.*, and the like, signify so much of systematic B. as applies to agriculture, med., etc.

Paleontological or Fossil B. is the systematic and structural B., as far as it can be made out from fossil remains, of the vegetation of former ages. Its lessons, although fragmentary, are of the highest interest, as showing that a vegetation predominantly of the lower grades alone existed in the earlier geological eras; that gymnospermous plants long preceded angiospermous exogens; that the latter were apparently not introduced until the cretaceous period; and that our existing genera largely originated in tertiary times, and were then represented by species, some of them peculiar, but many much resembling and some obviously identical with those of the present day. So that it may be inferred that the actual flora of the U. S. originated in the cretaceous and tertiary periods, and has come down to the present day with change indeed, but with a continuity of type which argues genetic transmission.

Geographical B.—the study of the relations of plants to the earth, considered in reference to the natural distribution of the species over its surface, and the causes of that distribution—connects the science of B. with phys. geog. and climatology; also with geol. as it proceeds; and it becomes apparent that the present distribution of species is only to be explained, or clearly conceived, by study of the changes which the earth's surface and climates have undergone since the present types or forms came into existence. So that geographical and fossil B. are related as modern is to anc. hist. and to pre-historic times. ASA GRAY.

Botany Bay, in Australia, 5 m. S. of Sydney, discovered by Capt. Cook in 1770, and named by him with reference to the great number of new plants found there. A colony of Brit. convicts was planted here in 1787, and was removed to Pt. Jackson in 1788, but the penal colony long continued to retain the name of B. B.

Botetourt, *bot-tō-ort* (NORFOLK **Berkeley**), LORD, b. in Eng. about 1734. He was appointed royal gov. of Va. in 1768, and dissolved the assembly of burgesses in 1769 because they passed a remonstrance against some acts of the Brit. Parl. D. Oct. 15, 1770.

Bot-Fly, a name given to various dipterous insects of the family (Estridae), but in the U. S. generally applied to the horse B.-F., *Gastrophilus equi*. The fly lays her eggs upon the hairs of the horse, and after laying her eggs al-

most immediately dies. The eggs, conveyed to the horse's stomach, are hatched, and the larvæ are provided with mouth-hooks by which they hang on to the coats of the stomach. In about a yr.'s time they are discharged with



Bot-Fly.

the excrement, and in one month they are changed into perfect flies. When very numerous there is reason to believe that bots are very injurious to the horse; but there is some dispute among horse-breeders as to the extent of the injury done by them.

Bothnia, both-ne-a [Swe. *Botten*], a name formerly given to a country of N. Europe, which belonged to Swe., and was situated on both sides of the Gulf of B. The E. portion is now comprised in Finland, and the W. forms the Swe. provs. of Pitea and Umea.

Bothnia, Gulf of, the N. portion of the Baltic Sea, extending from Tornea southward to the island of Åland, and is about 400 m. long. Its width varies from 60 to 130 m. It is bounded E. by Finland, W. by Swe. The navigation is rendered difficult by many small islands and sand-banks near the shores. It is usually frozen in winter, so that sledges can cross it.

Bothrioccephalus [from the Gr. *βοθριον*, a "little pit," and *κεφαλή*, the "head," named from the depressions on each side of its head], a genus of cestoid intestinal worms, once supposed to be identical with the *Tenia*, or common tapeworm. It inhabits the bodies of some fishes as well as of human beings. Two species occur in man, *B. latus* and *B. cordatus*; the former being from 6 to 20 ft. in length, composed of numerous flat and wide segments, and an elongated, compressed, obtuse head. The mouth is small, with a longitudinal depression extending from it on each side. *B. cordatus* has been found to inhabit the human intestines only in N. Greenland, where it is common in dogs. It is about a ft. in length, and receives its name from the cordate or heart-shaped head.

Bothwell (JAMES **Hepburn**), EARL OF, a profligate and audacious Scot. courtier, b. about 1526. In 1562 he was imprisoned for a conspiracy to seize the queen's person, but escaped to Fr., after which he was outlawed. He returned in 1565, and became a favorite adviser of Queen Mary. In 1567 he was indicted for the murder of Lord Darnley, but, as he came to court with 4000 followers, he was acquitted. In May 1567 he married the queen, but a strong party soon took arms against him, and he fled to Den., where he was imprisoned. D. 1576. (See ROBERTSON, *Hist. of Scot.*)

Bo Tree, or **Peepul**, the *Ficus religiosa* or sacred fig tree of Hindostan and Ceylon, greatly venerated by the followers of Vishnu, who was born under this tree. It produces a small edible fruit of little value, but a large amount of lac is gathered from its branches. Its sap abounds in caoutchouc. The famous B. T. of Anarajapoor in Ceylon is believed to have been planted in 288 B. C.

Bot'ta (ANNE CHARLOTTE LYNCH), a poetess, b. at Bennington, Vt. She was married to Vincenzo Botta in 1855. Author of a *Handbook of Univ. Lit.*

Botta (CARLO GIUSEPPE GUGLIEMO), M. D., an It. historian, b. at San Giorgio, in Piedmont, Nov. 6, 1766. He served as surgeon in Fr. army 1795-96. Author of a *Hist. of the Amer. War of Independence*, and of others of It. D. Aug. 10, 1837.

Botta (PAUL EMILE), archaeologist and traveller, a son of the preceding, b. in 1794. He entered the service of Mehemet Ali of Egypt as a phys. about 1830; afterward was sent as Fr. consul to Mosul, and in 1843 began to excavate the mound at Khorsabad on the Tigris for monuments of anc. Assyria, and there discovered a palace with statues and cuneiform inscriptions, all of which he described in *Monuments of Niniveh*.

Botta (VINCENTO), PH. D., b. near Turin, It., Nov. 11, 1818; became prof. of philos. at Turin, a member of It. parl. in 1849, and prof. of It. lit. in Univ. of City of New York in 1853. Among his works is a *Life of Cavour*.

Bot'tle [Fr. *bouteille*; Sp. *botilla*, the diminutive of *bota*, a "leather bag for carrying liquids"], a vessel for holding liquids, now usually made of glass or earthenware. The B. mentioned in the Bible were made of the skins of animals, and such vessels are still used in many countries.

Bottle Gourd (*Lagenaria*), a genus of plants of the order Cucurbitaceæ, nearly allied to the genus *Cucurbita*. The *Lagenaria vulgaris*, or common B. G., is a native of India, but is cultivated in many warm climates. It has a large bottle-shaped fruit with a hard rind, which is called a *calabash*, and is used for holding or dipping water. Some varieties have an edible pulp.

Bottle-nose Whale, sometimes called **Bottlehead** (*Hyperodon bidens*), a cetaceous mammal of the family Phæteridae. It seldom exceeds 20 ft. in length. The name of B. W. is sometimes applied to another mammal, the *Delphinus Tursio*, which inhabits the N. Sea.

Botts (JOHN MINOR), a statesman, b. at Dumfries, Prince

William co., Va., Sept. 16, 1802. He was elected to Cong. several times, opposed the repeal of the Mo. Compromise in 1854, was a firm adherent of the U. during the c. war, and afterward wrote *The Great Rebellion*. D. Jan. 8, 1869.

Bouchette, boo-shet' (JOSEPH), was b. in Canada in 1774. In 1790 he entered the surveyor-gen.'s office for Brit. Amer., and afterward served in the volunteers and in the navy of the lakes. In 1804 he became surveyor-gen. He served against the U. S. in the war of 1812. As surveyor-gen. he was afterward employed in establishing the S. boundary of Canada. Author of *The Brit. Dominions in N. Amer.* and a *Topographical Dict. of Lower Canada*. D. Apr. 9, 1841.

Boucault, boo-se-kō' (DROX), b. in Dublin, Ire., Dec. 26, 1822, ed. by his guardian, Dr. Dionysius Lardner, and at the Lond. Univ. His first successful play was *London Assurance*, written in conjunction with John Brougham, and acted in 1841 in Lond. In 1853 he came to Amer. and remained till 1860, when he returned to Lond., and brought out, at the Adelphi Theatre, his first Irish play, *The Colleen Bawn*. In 1861 was produced at the same theatre his play *The Octoroon*. He remained in Eng. till 1872, and during these 12 yrs. he furnished to the Lond. stage over 20 plays. In 1872 he made another visit to Amer., coming again before the public as actor, author, and manager. The dramas of B. are seldom, if ever, original in plot, but they are often original, and sometimes superlatively good, in action, treatment of incidents, and brightness of dialogue. He is also the author of numerous newspaper essays and letters on dramatic subjects, and of a work on the stage and kindred themes, called *The Master of the Rehearsal*.

Boudino, boo'de-not (ELIAS), LL.D., b. in Phila. May 2, 1740. He practised law in N. J., was chosen a delegate to the Continental Cong. in 1777, and was director of the Mint at Phila. from 1796 to 1805; became first pres. of the Amer. Bible Society. D. Oct. 24, 1821.

Boufflers, boo-flair', de (LOUIS FRANÇOIS), DUKE, a Fr. gen., b. Jan. 10, 1644. He served under Turenne and Catina, became a marshal of Fr. in 1693, was besieged at Namur by William III. of Eng. in 1695, defended Lille with success in 1708 against Prince Eugene, and made a masterly retreat from Malplaquet in 1709. D. Aug. 20, 1711.

Bougainville, boo-gan-vel', de (LOUIS ANTOINE), a Fr. navigator, b. in Paris Nov. 11, 1732. He was aide-de-camp to Montcalm in Amer. in 1756; performed a voyage round the world in 1767-69, being the first Frenchman who circumnavigated the globe; during the Amer. Revolution he had a high command in several naval battles between the Fr. and Eng. D. Aug. 31, 1811.

Bouguer, boo-gair' (PIERRE), a Fr. math. and natural philos., b. in Brittany Feb. 16, 1698. He pub. in 1729 an *Essay on Optics and the Gradation of Light*, and was associated in 1736 with La Condamine in an expedition to Peru for the purpose of measuring a degree of the meridian, in which they spent several years. He pub. the results of this operation in an important work entitled *Theory of the Figure of the Earth*. He invented the heliometer. D. Aug. 15, 1758.

Bouillon, de (GODEFROI). See GODEFROI DE BOUILLON.

Boulder, a city and R. R. centre, cap. of B. co., Col., situated at the E. base of the Rocky Mts., on both sides of B. Creek, which flows through the famous B. Cañon, the Yosemite of Col. The State Univ. is located here. It is the centre of both the agricultural and mining interests of the co., the great telluride belt of mines being only 6 to 8 m. distant, the free gold-mines only 8 to 14 m., and the famous silver-mines of Caribou only 22 m. away; coal and iron mines abound in the valley within 4 to 6 m.; 13 m. to the famous seltzer springs of Springdale, and is a resort for tourists and invalids. Pop. 1870, 343; 1880, 3069.

Boulogne, boo-lon', or **Boulogne-sur-Mer**, a seaport of Fr., on the Eng. Channel, at the mouth of the Liane, 158 m. N. N. W. of Paris and 27 m. S. W. of Calais. The railway which connects Calais with Amiens passes through it, and steamers run twice a day to Folkestone, Eng. The place has borne several names, that of *Bolonia* being given to it some centuries after the reign of Constantine. Here in 1804 Nap. assembled an army of 180,000 men and a flotilla of 2400 transports for the invasion of Eng., a design which was not executed, but in commemoration of which a tower, 164 ft. high, was erected. Pop. 1881, 44,842.

Boulogne (ÉTIENNE ANTOINE), a Fr. abb., b. Dec. 26, 1747; during the Revolution his *Annales Religieuses* was often suppressed; under the empire he, as bp. of Troyes, was imprisoned for declaring the emp. had no authority to confine a bp. without the approval of the pope. D. May 13, 1825.

Boulton, bol-ton (MATTHEW), b. at Birmingham Sept. 3, 1728; became a friend and partner of James Watt; invented a new mode of inlaying steel. D. Aug. 17, 1809.

Bou-Maza (SI MOHAMMED BEN ABDALLAH, surnamed), an Arab chief, b. about 1820; stirred up the Kabyles in Algiers, preached extermination to Chrs., and waged war upon the allies of Fr.; surrendered to Gen. Herbillion in 1847. He afterward became col. in service of the Porte.

Bound, or **Bownd** (NICOLAS), D. D., a clergyman of the Ch. of Eng. at Norton, in Suffolk. Author of *Sabbathum Veteris et Novi Testamenti*, in which the Puritan doctrine of the Lord's Day was first prominently asserted. D. 1607.

Bouquetin, boo-ke-tin', or **Ibex of the Alps** (*Capra ibex*), [Ger. *Steinbock*], a species of wild goat formerly found on the Alps where it is nearly extinct, and which ascends to the limit of perpetual snow. It is larger than the common goat, and has large horns which curve backward; those of the male are sometimes 20 inches long.

Bourbaki (CHARLES DENIS SAUTER), a Fr. gen., b. Apr. 22, 1816, took part in the wars in the Crimea and in It., and in the Ger.-Fr. war of 1870.

Bourbon, boor-bon, called also **Ile de la Réunion**, or **Ile Bonaparte**, an island belonging to Fr., in the Indian Ocean, lat. 20° 51' S., lon. 55° 30' E., about 100 m. S. W. of Mauritius. It was discovered by the Port. in 1545, and

occupied by the Fr. in 1649. The island, about 38 m. long and 28 m. wide, is divided into 2 parts by a mt.-range, the highest point being about 10,000 ft. The Piton de Fournaise, 7300 ft. high, is an active volcano, with eruptions about twice a yr. Has no good harbor, and the navigation around it is dangerous. Area, 764 sq. m. Pop. 178,310.

Bourbon, the name of a Fr. royal family which reigned over Fr. from 1589 to 1792, and from 1815 to 1848. A prince of the B. dynasty also obtained the throne of Sp. in 1700, and another that of Naples and Sic. in 1735. The name is derived from the castle of B., built in the 13th century, and situated in the old prov. of Bourbonnais, 16 m. W. of Moulins. The heiress of the seignior was married in 1272 to Robert, a younger son of King Louis IX. The seignior was erected into a duchy, and Louis, a son of Robert, became about 1327 the first duke of B.

Among the collateral branches of the B. family were those of Vendôme, Condé, Montpensier, Orléans, Conti, and Soissons. Antoine de B., duke of Vendôme, became by marriage king of Navarre. His son, Henry of Navarre, was the first Fr. king of the house of B., and began to reign as Henry IV. in 1589. He had 2 sons, Louis XIII. and Gaston, duke of Orleans; a daughter, Elizabeth, who was married to Philip IV. of Sp., and Henrietta, who became the queen of Charles I. of Eng. Louis XIII., who d. in 1643, left 2 sons, Louis XIV. and Philip, duke of Orleans, who was the ancestor of King Louis Philippe. The dauphin, the eldest son of Louis XIV., d. in 1711, leaving 3 sons—1, Louis, duke of Burgundy; 2, Philip, duke of Anjou, who became king of Sp. as Philip V.; 3, Charles, duke of Berry. Louis of Burgundy, who d. in 1712, was the father of Louis XV., who succeeded his great-grandfather, Louis XIV., in 1715. Louis XV. had 1 son, Louis, who d. before his father, leaving 3 sons, who all reigned successively—namely, Louis XVI., Louis XVIII., and Charles X. Louis XVI. left 1 son, who by the royalists was recognized as Louis XVII., but perished as a child during the Fr. Revolution. As the circumstances of his death remained unknown, many adventurers claimed to be Louis XVII. Louis XVIII. had no issue. Charles X. had 2 sons—Louis Antoine, who d. without issue in 1844, and Charles Ferdinand, duke of Berry. The only son of the latter, Henri, duke of Bordeaux, now styled Count de Chambord, is the heir to the throne, according to the Legitimists, who give him the title of Henry V.

The house of Orleans is called the younger branch of the royal family of B., and is descended from Philip of Orleans, a younger brother of Louis XIV. His son Philip was regent of Fr. during the minority of Louis XV., and left a son, Louis Philippe, duke of Orleans. This last was the grandfather of the duke of Orleans known in the Revolution as Citizen Egalité. His eldest son, Louis Philippe, became king of the Fr. in 1830. This king had 5 sons—the duke of Orleans, the duke of Nemours, the prince de Joinville, the duke of Aumale, and the duke of Montpensier. The Count of Paris, the son of the eldest of these 5, is regarded as the heir to the throne by the Orléanist party.

Philip, duke of Anjou, who was placed on the throne of Sp. in 1700, was the founder of a Sp. dynasty, which reigned in Sp. until the dethronement of Queen Isabella in 1868. He was also the ancestor of the B. dynasties of Naples and Parma. Francis II., who was dethroned in Sept. 1860, was the last B. monarch of Naples (or the Two Sicilies). The B. also ceased to reign in Parma, which was annexed to kingdom of It. in 1860. (See ACHANTRE, *Histoire Chronologique et Généalogique de la Maison Royale de B.*)

Bourbon, de (CHARLES), Duc, usually styled CONSTABLE B. (Connétable de B.), a Fr. gen., b. Feb. 17, 1489, was a son of Gilbert B., count of Montpensier. He married the heiress of the duke of B., and became the owner of the vast estates of both branches of the B. The mother of Francis I. was enamored of him, but her overtures having been rejected, she became his enemy. At her instigation, the estates which he had acquired by marriage were seized by the king. Then renouncing his allegiance to the king of Fr. in 1523, he became the ally of the emp. Charles V. He contributed largely to the victory which the imperial army gained over the Fr. at Pavia in 1525. Quitting service of Charles V., he led a daring enterprise against Rome, took it by assault May 5, 1527, but was killed as he mounted the wall.

Bourdaloie, boor-dah-loo' (LOUIS), a Fr. pulpit orator, b. at Bourges Aug. 20, 1632; entered the order of Jesuits in 1648, and became prof. of rhetoric and philos.; in 1669 removed to Paris, where he preached many yrs. His sermons were pub. D. May 13, 1704.

Bourges, boorzh (anc. *Araricum*, afterward *Bituriges*), a city of Fr., near its centre, in a fertile plain at the confluence of the Auron and the Eure, 146 m. S. of Paris. It is connected by railway with Paris, Orleans, Moulins, and other cities. It was inclosed by ramparts, which have been converted into boulevards. It is the seat of an abb., and has one of the finest Gothic cathedrals in Europe. Its hist. begins at least 500 B. C., when it was the cap. of Celtic Gaul, and afterward of the Rom. prov. of Aquitania. In the middle ages 7 councils of the Ch. were held here. Pop. 40,217.

Bourmont, boor-mon', de (LOUIS AUGUSTE VICTOR), Comte de Ghaisne, a Fr. gen., b. in Anjou Sept. 2, 1773. He fought against the republic in 1794-96, and entered the service of Nap. about 1809; made lieut.-gen. in 1814; became minister of war in 1829, and commander-in-chief of the army sent against Algiers in 1830. He conquered Algiers, and was made a marshal of Fr. Upon the revolution of 1830 he went into exile. D. Oct. 27, 1846.

Bourne, boorn (HUGH), an Eng. preacher, b. in Staffordshire April 3, 1772; was "cut off" from the Wesleyan connection in 1808 for holding camp-meetings, before which he was a layman; a founder in 1810 of the sect of Primitive Meths. D. Oct. 11, 1852.

Bourrienne, boo-re-en', de (LOUIS ANTOINE FAUVELET), a Fr. diplomatist, b. at Sens July 9, 1769; was a fellow-student and friend of Bonaparte at the school of Brienne; in 1792 they

renewed their intimacy, and in 1796 B. became private sec. to Gen. Bonaparte, whom he followed to Egypt. In 1804 was sent as minister to Hamburg; in 1815 made minister of state by Louis XVIII. His *Memoirs of Bonaparte* is an important contribution to the Hist. of Nap. D. Feb. 7, 1834.

Boustrophedon [from the Gr. *Bous*, an "ox," and *στρέφω*, to "turn"], a word used to describe a mode of writing used by the anc. Grs. until about 450 B. C.—viz., in alternate lines from right to left and from left to right.

Bouton (NATHANIEL), D. D., b. in Norwalk, Conn., in 1799; settled as pastor of Congl. Ch. in Concord, N. H., Mar. 1825, where he preached for 40 yrs., received the honorary appointment of State historian of N. H. and was corresponding sec. of the N. H. Historical Society and one of its most prominent members; wrote *Hist. of Concord, N. H.* (1856), and *Provincial Records* (of N. H.). D. June 6, 1878.

Boutwell (GEORGE SEWALL), LL.D., a lawyer and statesman, b. in Brookline, Mass., Jan. 28, 1818; in 1851 and 1852 was chosen gov. of Mass. He organized the internal revenue dept. of the U. S. govt., and in 1862 became its first com.; was sec. of the treas. 1869-73, under Pres. Grant; was U. S. Senator from Mass. 1873-77.

Bouvier, boo-veer' (JOHN), a jurist and writer, b. in the Fr. dept. of Gard in 1787; emigrated to the U. S. in 1802, and practised law in Phila. Author of a *Law Dict.* and *Insts. of Amer. Law*. D. Nov. 18, 1851.

Bovide, bo-vi-de [from the Lat. *bos*, gen. *bo'ris*, an "ox"], a family of ruminating animals, comprises the ox, bison, buffalo, yak, zebu, etc. The B. are all large and gregarious animals, and they generally have unbranched horns. This family is usually regarded as equal in extent to the Linnaean genus *Bos*. Indigenous species of B. are found in Asia, Afr., Europe, and N. Amer. They have 8 cutting teeth in the lower jaw, and no cutting teeth in the upper, which is furnished with a fibrous and elastic pad. They also have 12 grinders (molar teeth) on each jaw. The exact number of species of B. has not been ascertained. They are all valuable to man for their flesh, tallow, hides, horns, etc., and several species beside the ox have been domesticated.

Bowditch (HENRY PICKERING), M. D. See APPENDIX.

Bowditch (NATHANIEL), LL.D., F. R. S., a math., b. at Salem, Mass., Mar. 26, 1773. Pub. a standard work on navigation and a valuable translation of Laplace's *Mécanique Céleste*, with commentary. D. Mar. 16, 1838.

Bowditch (NATHANIEL INGERSOLL), b. at Salem, Mass., Jan. 17, 1805, grad. at Harvard in 1822; became a lawyer, conveyancer, and author. D. Apr. 16, 1861.

Bowdoin, bo'd'in (JAMES), LL.D., b. at Boston Aug. 8, 1727, grad. at Harvard in 1745; pres. of convention which in 1778 formed const. of Mass., gov. of that State in 1785 and 1786. He suppressed Shay's rebellion in 1786. D. Nov. 6, 1790.

Bowdoin College, the oldest coll. in Me., was founded in 1802 at Brunswick, Cumberland co., on the Androscoggin River, about 4 m. from the Atlantic Ocean. It was named in honor of James Bowdoin, gov. of Mass., whose son James gave to the coll. 1000 acres of land, over £1000 sterling, and a valuable library and collection of paintings. The coll. was also liberally endowed by the State. Connected with this flourishing coll. is a med. school, founded in 1820.

Bowen (FRANCIS), LL.D., b. at Charlestown, Mass., Sept. 8, 1811, grad. at Harvard in 1833; edited *N. Amer. Review*; became in 1853 prof. at Harvard Univ.; has written biography, and on philos. and political economy.

Bowen (Rt. Rev. NATHANIEL), D. D., b. in Boston, Mass., June 29, 1779, grad. at Charleston Coll., S. C., in 1794; held pastorates in P. E. chs. at Providence, R. I., Charleston, S. C., and New York; consecrated bp. of S. C. in 1818; wrote *Christian Consolation*. D. Aug. 25, 1839.

Bower-bird, a name given to certain Australian birds of the bird of paradise family, remarkable for making bower-like erections, adorning them with gay feathers, rags, bones, shells, and other brightly colored objects. These bowers are not nests, and their purpose is a matter of question.

Bowers (THEODORE S.), b. in Pa. about 1832. A printer by trade, he subsequently edited a paper in Ill., but entered the army in 1861 as a private in the 48th Ill. Volunteers, was promoted to be first lieutenant, Mar. 1862, made aide-de-camp to Gen. Grant Apr. 1862, and thereafter served continuously in the field or on the staff of Gen. Grant in Wash. to Mar. 6, 1866, when he was accidentally killed by being thrown under a train at Garrison's Station, N. Y. Brevet lieutenant-col., col., and brig.-gen. U. S. A.

Bowles, bōlz (FRANCIS TIFFANY). See APPENDIX.

Bowles (SAMUEL), a journalist, b. at Springfield, Mass., Feb. 9, 1826. In 1844 became the prin. conductor of the Springfield *Republican*. Author of *The Switz. of Amer.* and other works. D. Jan. 16, 1878.

Bowling Green, city, cap. of Warren co., Ky., on R. R. and Barren River, 113 m. S. by W. of Louisville. Pop. 1870, 4574; 1880, 5114.

Bowling Green, Mo. See APPENDIX.

Bowling Green, Ohio. See APPENDIX.

Bowman (ALEXANDER H.), b. May 15, 1803, at Wilkes-barre, Pa., grad. at W. Pt. in 1825, lieutenant-col. of engineers Mar. 3, 1863. He served as assistant prof. at the Military Acad. 1825-36, then in building defences and improving rivers and harbors, as instructor of practical military engineering at W. Pt. in 1851-52, chief engineer U. S. Treas. building extension 1853-61, supt. of Military Acad. 1861-64; also as member of light-house and engineer boards. D. Nov. 11, 1865.

Bowman (THOMAS), D. D., LL.D., b. in Berwick, Pa., in 1819, grad. at Dickinson Coll. in 1837; became, in 1859, pres. of the Ind. Asbury Univ., which position he held when he was elected a bp. of the M. E. Ch. in 1872.

Bowring (SIR JOHN), b. at Exeter, Eng., Oct. 17, 1792. In 1825 he became ed. of the *Bombay Courier*. He collected and translated into v. the anc. and popular poems of almost all the countries of Europe. In 1854 became gov. of Hong-Kong, Chi., and was knighted. He wrote *The Kingdom and People of Siam*. D. Nov. 22, 1872.

Bow-string Hemp, the fibre of the *Sansevieria Zeylanica*, a plant of the order Liliaceæ and tribe Hemerocallaceæ, a native of the E. I. Its fibre, which is white, silky, and elastic, is used to make bowstrings.

Box (*Buxus*), a genus of evergreen shrubs or small trees of the natural order Euphorbiaceæ. The most important species is the *Buxus sempervirens* (common B.), a native of Europe and Asia, the wood of which is of very close grain, and is used almost exclusively for wood engraving, also for flutes and other wind instruments. In S. Europe the tree grows 20 ft. in height. A smaller variety, the dwarf B., is cultivated as a border for flower-beds and gravel-walks.

Box Elder, or **Ash-Leaved Maple**, a small tree of the order Sapindaceæ, the *Negundo aceroides*, which grows from Fla. to Pa. and westward. Sugar of a good quality is produced from its sap.

Box-Tortoise, or **Lock-Tortoise**, popular names of the *Cistuda Virginica* and *Cistuda Blandinii*, tortoises of the U. S., characterized by the division of the plastron into 2 parts by a crosswise division, united, however, by a ligament which serves as a hinge on which the parts of the plastron turn, thus enabling the animal to shut himself entirely up in his shell.

Boyce (JAMES PETIGRU), D. D., LL.D., b. Jan. 11, 1827, at Charleston, S. C., grad. at Brown Univ. in 1847; studied theol. at Princeton, N. J., pastor of a Bap. ch. at Greenville, S. C., 1851-55, then prof. of theol. in S. Bap. Theological Sem. (formerly Greenville, S. C., now Louisville, Ky.).

Boycott, a term coined in 1881, from Mr. Boycott, an agent in Ire. of Lord Erne's Lough Mask estate, who evicted a large number of his tenants. These and their neighbors refused all intercourse with him and his family, would not work for him or trade with him, or allow others to do so. He could gather his crops only under military protection. The term is equivalent to social outlawry.

Boydén (SETH), b. at Foxboro', Mass., Nov. 17, 1788, went into the leather manufacture in Newark, N. J., in 1813, began the making of patent leather in 1819, invented a process for making spelter and a machine for leather splitting. In 1826 he made the first malleable cast iron. He also discovered a process for making Rus. sheet iron, invented a doming machine for hat-bodies, and built the first successful locomotive with cylinders outside. It is claimed that he produced the first daguerreotype in the U. S., but the claim is also made for others. D. Mar. 31, 1870.

Boydén (URIAH ATHERTON), b. at Foxboro', Mass., Feb. 17, 1804; acquired early, at the work-bench and the forge, a knowledge of materials and skill as a workman. Worked as an engineer on the construction of the R. R. from Boston to Nashua, was employed in hydraulic engineering at Lowell and at Manchester, and here he made a comprehensive study of the theory of the turbine water-wheel, which resulted in a practical reconstruction of the engine. He donated \$1000 to his native town, the interest to be expended for educational purposes. D. Oct. 17, 1879.

Boyer, boi'er (JEAN PIERRE), a pres. of Hayti, b. at Port-au-Prince Feb. 28, 1776, and was a mulatto. He entered the Fr. army in his youth; was elected pres. of the republic in 1818; he offended the negroes, who expelled him from the island in 1842. D. July 9, 1850.

Boyle (ROBERT), an experimental philos., b. at Lismore, Ire., Jan. 25, 1626, 7th son of Richard, first earl of Cork; ed. at Eton and Geneva; became a resident of Ox. in 1654, and was a founder of the Royal Society. He made important discoveries in pneumatics. Author of a *Disquisition on Final Causes*, *Excellency of Theol.*, and *Hydrostatical Paradoxes*. Endowed the Boyle Lectures. D. Dec. 30, 1691.

Boylston (ZABDIEL), F. R. S., a phys., b. at Brookline, Mass., in 1680, was the first who practiced inoculation for the small-pox in Amer. D. Mar. 1, 1766.

Boyne, a river in the E. of Ire. On its banks, 3 m. from Drogheda, was fought, July 1, 1690, the battle of the B., in which William III. defeated James II.

Boynston (EDWARD C.), b. in Vt., grad. at W. Pt. in 1846. Served in the Mex. war; assistant prof. at W. Pt. 1848-55, prof. in Univ. of Miss. 1856-61, and brevetted major 1865. Wrote hist. of W. Pt., and one of U. S. N. Resigned 1872.

Boze'man, city, on R. R., cap. Gallatin co., Mont., has great deposits of coal. Pop. 1870, 168; 1880, 894; 1885, 3000.

Boz'zaris, or **Bot'zaris** (MARCO), a Gr. patriot, b. at Suli, in Albania, about 1790. He enlisted in the Fr. army about 1808, and served several campaigns. When the Grs. took arms against the Turks in 1820, B. became the leader of a band of Sulioti, and gained several victories. He defended Missolonghi in 1822. Aug. 20, 1823, he defeated a superior force at Carpenisi, but was killed in the action.

Brabant, a former duchy of the Netherlands which has undergone many vicissitudes. In the 15th century it came under the sway of the house of Aus. It joined the Dut. in the revolt against Philip II. of Sp.; the N. part gained its independence, but the S. part remained under Sp. until 1714, when it again came under the dominion of Aus. This was conquered by the Fr. in 1794, the Dut. part being conquered by Nap. in 1810. In 1814 the whole of B. was assigned to the Netherlands, and in 1830 S. B. was given to the new kingdom of Belg., while N. B. remained with Hol.

Brace (CHARLES LORING), b. at Litchfield, Conn., June 19, 1826, grad. at Yale in 1846. He wrote *Races of the Old World*, *Gesta Christi*, and was the prin. founder of the Children's Aid Society of New York.

Brachiopoda, brak-i-op-o-da (plu.), [Gr. *βραχίον*, "arm," and *πῶς*, *πόδος*, "foot," alluding to their two long fringed and coiled arms], or **Fallobranchiata**, a class of molluscoloid animals which have symmetrical dorsal and ventral valves, the former of which is usually much the smaller, free and imperforate. Brachiopods are among the most anc. of fossil organisms, being found from the Cambrian to the existing fauna.

Brachyptere, bra-kip-ter-e, or **Brachypteres** [Gr. *βραχύς*, "short," and *πτερον*, a "wing"], a section of the

web-footed birds of the system of Cuvier, embracing the *Pelecanidae* and *Phalacrocoracidae*.

Brachyura (from *brachy*, "short," and *oura*, a "tail"), a tribe of decapod crustaceans which takes its name from the post-abdominal segment, which is short and folded beneath the trunk. (See CRAB.)

Brackenridge (HENRY M.), b. at Pittsburgh, Pa., May 11, 1789. Was a judge in La. and Fla., U. S. com. to S. Amer. republics 1817-21, and M. C. from Pa. 1829. Wrote *Reveries of a Pennsylvanian* and *Phases of the W.* D. Jan. 18, 1871.

Brackenridge (HUGH HENRY), father of the preceding, b. in Scot. in 1748; emigrated to the U. S. in childhood, grad. at Princeton in 1771, became a judge of the supreme court of Pa. in 1780; wrote *Henry's Country, or a tour of Capt. Ferguson*. D. June 25, 1816.

Brackett (ALBERT GALLATIN), b. in Cherry Valley, N. Y., Feb. 14, 1829; served during Mex. war as first lieut. 4th Ind. Volunteers, appointed capt. U. S. cav. Mar. 1855, and served during c. war; became col. 3d cav. Mar. 20, 1879, and has since been in command of various depots. He wrote *Lane's Brigade in Mex.* and *Hist. of the U. S. Cav.*

Brackettville, Kinney co., Tex. It is in the S. W. part of the State, about 30 m. from the Rio Grande. Pop. 1870, 332; 1880, 1326.

Brad/dock, P. A. See APPENDIX.

Braddock (EDWARD), an Eng. gen., b. about 1715; commanded in a war against the Fr. and Indians, and on the march to attack Ft. Duquesne was surprised by the Indians near Pittsburgh, Pa., defeated and mortally wounded July 9, 1755. D. July 31, 1755.

Brad/don (MARY ELIZABETH), a popular Eng. novelist, b. in Lond. in 1837. Among her works are *Lady Audley's Secret*, *Arctura Flayed*, and *Reveries*.

Bradford, a town of Eng., the chief seat of the worsted manufacture, on a branch of the river Aire, and on the Leeds R. R., 9 m. W. of Leeds. It has a parish ch., erected in the reign of Henry VI., an exchange, public hall, and cloth hall. Near the town are Bap., Independent, and Wesleyan colls.; also coal and iron mines. Pop. 180,459.

Bradford, city and R. R. centre, McKean co., Pa. It is the centre of a petroleum region. Pop. 1880, 9197.

Bradford, Bradford tp., Orange co., Vt., on R. R. and the Conn. River, 29 m. S. E. of Montpelier. Pop. of tp. 1870, 1492; 1880, 1320.

Bradford (ALEXANDER WARFIELD), LL.D., b. in Albany, N. Y., in 1815, grad. at Union Coll.; surrogate of New York 1848-51; pub. several vols. of legal reports. D. Nov. 5, 1867.

Bradford (AUGUSTUS W.), b. in Md. about 1805. Studied law, and entered into politics as a Whig. He was a firm Unionist; was a delegate to the peace cong. 1861, and was chosen gov. of Md., holding the office until 1866. He was largely influential in securing the new const. of Md. (1864) by which slavery was abolished. In July 1864 his house was burned by Confed. raiders. He was surveyor of the pt. of Baltimore under Pres. Johnson, and declined a position in the custom-house offered to him by Pres. Grant. D. Mar. 1, 1881.

Bradford (JOHN), a preacher, b. at Manchester about 1550; became a chaplain to Edward VI., and after the accession of Mary was burned at the stake July 1, 1555.

Bradford (JOSEPH M.), U. S. N., b. Nov. 4, 1824, in Sumner co., Tenn.; entered the navy as a midpn. Jan. 10, 1840, became capt. in 1871. From Nov. 1863 to June 1865 he was fleet-capt. of S. Atlantic blockading squadron. D. Apr. 14, 1872.

Bradford (WILLIAM), one of the Pilgrim Fathers, b. in Yorkshire, Eng., in Mar. 1583. He emigrated to N. Eng. in the Mayflower in 1620, and was elected gov. of Plymouth Colony. He left a *Hist. of Plymouth Colony*, which was printed in 1856. D. May 9, 1657.

Bradford (WILLIAM), a lawyer, b. in Phila. Sept. 14, 1755, grad. at Princeton in 1772; served in the war of the Revolution, and was appointed atty.-gen. of the U. S. in 1794. D. Aug. 23, 1795.

Brad/fish (LUTHER), LL.D., b. in Cummington, Mass., Sept. 15, 1783, grad. at Williams in 1804. He studied law, settled in Franklin co., N. Y., lieut.-gov. 1829-43, and under Fillmore assistant U. S. treas. at New York. D. Aug. 30, 1863.

Brad/laugh (CHARLES), an Eng. atheist and republican, b. in Hoxton, Lond., Sept. 26, 1833. Owing to the extreme poverty of his parents, he ceased attending school before he was 11 yrs. old. At the age of 15 he appeared as an orator before street audiences during the political turmoil of 1847-48; his atheistical opinions date from the same period. Studying to fit himself for a Sunday-school exhibition before the bp. of Lond., he became sceptical, and declared his inability to reconcile the Thirty-nine Articles with the Four Gospels. In 1858-59 he edited the *Iconoclast*, and became well known under the name of "Iconoclast," which he signed to all his writings. A yr. later the journal which he has since edited, the *National Reformer*, was established. Systematic attempts were made to suppress his journal, but their only effect was to increase its circulation. The *Reformer* claims a circulation of 7000. Like himself, in politics it is republican, in religion atheistic, in social economy Malthusian, after the standard of the late John Stuart Mill. It assumes that the "right to deal with the throne is inalienably vested in the Eng. people, to be exercised by them through their representatives in Parl.," and argues that the house of Brunswick occupies it only from the acts of settlement and union. Visited the U. S. in 1873, and lectured in all the largest cities. Elected M. P. in 1880, but prohibited from taking his seat because, as an atheist, he would not take the oath.

Brad/ley (EDWARD), better known as "Cuthbert Bede," an Eng. novelist and humorist, b. in 1827, ed. at Durham Univ., and entered the Anglican ministry. *Verdant Green* is his best known book.

Bradley (JAMES), D. D., F. R. S., a distinguished Eng. astron., b. 1692. He was Savilian prof. of astron. at Ox. in 1721, and in 1742 was appointed to succeed Halley as "Astron. Royal" at Greenwich. He discovered the "aberration of

light" and explained the nutation of the earth's axis. He left 13 folio vols. of observations. D. July 13, 1762.

Bradley (JOSEPH P.), LL.D., b. at Berne, Albany co., N. Y., Mar. 14, 1813, grad. at Rutgers Coll., New Brunswick, N. J., in 1836, was admitted to the bar in 1839, at Newark, N. J. He has been engaged in many important causes in the State and U. S. courts, and was appointed to the U. S. supreme court Mar. 21, 1870.

Bradley (STEPHEN ROW), LL.D., b. at Wallingford, Conn., Oct. 20, 1754, grad. at Yale in 1775, and served as an officer in the Revolutionary war. In 1779 he removed to Vt.: was U. S. Senator 1791-95, 1801-13. D. Dec. 16, 1830.

Bradshaw (JOHN), the most prominent of the Eng. regicides, b. in Cheshire, probably in 1602, became in 1627 a barrister, a com. of the great seal in 1646, chief-justice of Chester in 1647, sergeant-at-law in 1648, and was in 1649 pres. of the High Court which condemned Charles I. He afterward opposed Cromwell's designs, was removed from his chief-justiceship, but held later various important positions. D. 1659. At the Restoration his body was exhumed from Westminster Abbey, gibbeted, and then beheaded.

Bradstreet (SIMON), colonial gov. of Mass., b. at Hurling, Lincolnshire, Eng., in 1603, and studied at Cambridge. He came to Salem, Mass., in 1630, as assistant judge, was a founder of Cambridge and Andover, and resided also at Ipswich and Boston; gov. 1679-86 and 1689-92. D. Mar. 27, 1697.

Bradwardine (THOMAS), an Eng. private and scholastic theol., called the PROFOUND DR., was b. in 1290. Became confessor to Edward III., and was afterward abb. of Canterbury. His prin. work, *De causa Dei, scholasticæ Peripateticæ*, is a masterly argument for the doctrine of Augustine. He was an able math. of Ox. Univ. D. Aug. 26, 1349.

Brady (NICHOLAS), D. D., b. at Bandon, Ire., Oct. 28, 1659, ed. at Ox. and Dublin; sided with King William against James II., and received several Eng. ch. preferments, but is best known for his share in the metrical version of the Psalms, made in conjunction with Nahum Tate (1652-1715), the poet-laureate. D. May 20, 1736.

Brady (WILLIAM MAZIERE), D. D., b. in Dublin, Ire., 1825, grad. at Trinity Coll. Entering the Irish State Ch., he received lucrative appointments, but was one of the foremost leaders of the movement which resulted in the disestablishment of the Irish Ch. Wrote on ecclesiastical hist. and antiquities of Ire. and G. Brit.

Braganza, or **Braganca**, the name of the royal family of Port. and the imperial family of Brazil, which is descended from Afonso, duke of B., a natural son of John I., king of Port. He d. in 1461. The first member of this family that became king of Port. was the 8th duke, who began to reign as John IV. in 1640. The first emp. of Brazil was Dom Pedro I., the eldest son of King John VI.

Braddon (EDMUND ERASTUS EASTMAN), D. D., a Meth. Epis. divine, b. at Acton, Me., Dec. 8, 1812, grad. at the Wesleyan Univ., Middletown, Conn., in 1841. Pastor in New York, and subsequently prof. of anc. langs. in the O. Univ., Athens, in the Ind. Asbury Univ. at Greencastle, and in Genesee Coll., Lima, N. Y. D. Mar. 20, 1862.

Bragg (BRAXTON), b. in 1817, in Warren co., N. C., grad. at W. Pt. in 1837, and became brevet lieut.-col. in 1847. On his resignation, Jan. 3, 1856, he became sugar-planter at Thibodeaux, La. In the c. war he was given command of the forces of the S. army at Pensacola operating against Ft. Pickens 1861, and of 2d Corps at Shiloh 1862, being promoted to gen. on the death of Gen. A. S. Johnston; was defeated at Perryville, Ky., Oct. 9, 1862, opposed Rosecrans at Chickamauga 1863, and was relieved from command Dec. 2, 1863, for loss of Mission Ridge. Became chief engineer of improvements in Mobile harbor. D. Sept. 27, 1876.

Bragg (THOMAS), a brother of Braxton B., b. at Warrenton, N. C., Nov. 9, 1810; admitted to the bar in 1831, gov. of N. C. 1854-58, U. S. Senator 1859-61, and atty.-gen. in Jefferson Davis's cabinet 1861-63. D. Jan. 21, 1872.

Bra/gi, **Braga**, or **Brage**, in Scandinavian mythology, a son of Odin, was the god of eloquence and poetry.

Brah, or **brah** (TYCHO), a Dan. astron., b. 1546. He built the observatory of Uraniborg, on the island of Huena, and enriched the science of astron. by numerous observations. He rejected the Copernican system, and held that the sun revolved around the earth, carrying the planets with it as satellites. He supposed Mercury and Venus at a less distance from the sun than the latter was from the earth, while the other planets were at a greater distance. This theory explains the apparent motions of the planets as well as the Copernican system. He wrote *Astronomia Instaurata Prognosticæ*. D. Oct. 13, 1601.

Brahm, written also **Brahme** (but pron. in one syllable), in the Hindoo mythology, the name of the eternal, self-existent Spirit. His image is the external universe. His attributes or powers took a personal form in Brahma, Vishnu, and Siva. The Hindoos make no images of B., but the devout Brahmans meditate with silent and unspeakable awe on his mysterious attributes.

Brah'mā, a Sans. term which literally signifies "worship" or "prayer," but now used as the name of one of the great Hindoo deities, called the "Creator," but who is in fact the personification of the creative power of Brahm. B., though regarded as the first of the gods, is much less worshipped by the Hindoos than either Vishnu or Siva. There are no temples and no rites exclusively dedicated to B., though his images are occasionally found in the temples of the other gods.

Brah'manism, the name given to the religious system founded by the Brahmans of India. Scarcely any trace of B. is discoverable in the Vedas, the oldest writings of the Hindoos. We first find it developed in a work entitled the *Upanishads*, of which the earliest portions are probably 600 yrs. before the Chr. era. The deities of the Vedas are impersonations of the great powers and phenomena of nature—the earth, the heavens, the sun and planets, air, fire, etc., as in the Gr., Rom., and other mythologies. But in the Brah-

manical system all these deities of nature retire into the background, and are replaced by the great gods, such as Brahma, Vishnu, and Siva, with their consorts (*saktis*), their various avatars, etc. The inst. of Caste had no little influence in shaping the development of B. The doctrine of "emanation," with its associated doctrine of transmigration, forms the philosophical basis of the Brahmanical system. According to this doctrine, Brahm is the centre and source of all the various beings of the universe, these being nothing more than emanations from him; and as he is the source whence all things have been evolved, so all things will ultimately return to him, and be absorbed into the essence of the Self-Existent. The same gen. doctrine, with some modifications, forms also the basis of Buddhism. One of the most remarkable features of the Brahmanical system is the great importance which it attaches to the performance of penance and prayer. The Brahmans teach that persevering prayer, if made in due form, though prompted by the most unworthy motives, can, especially when it is combined with penance and sacrifice, compel the gods to accede to the wishes of the suppliant. [From orig. art. in *J. Comp. Lit.*, by Prof. J. Thomas, LL.D.]

Brahmapootra, written also **Burmapooter** (anc. *Dyrdanates* or *Eddanates*), a river of Asia, rises in Tibet, on the N. side of the Himalaya Mts. It flows E. then S. until it breaks through the Himalayas, then W. S. W. until it enters Bengal, then S. again until it falls into the Bay of Bengal, its mouth being near that of the Ganges, with which it is connected by a large channel called the Jena. Its entire course is about 1700 m. It inundates the level tracts of Bengal from Apr. to Sept. Its navigation is difficult by reason of the current and tidal bore.

Brahmo Samaj (i. e. "worshipping assembly") is the name of a society of Theists in India, which was founded in 1830 by Rammohun Roy, increased under various leaders, latterly under Keshub Chunder Sen, and has within a few yrs. made great progress. His gen. ideas bear a close resemblance to Unitarian Theism.

Braidwood, a city, Will. co., Ill., on R. R., 58 m. S. W. of Chicago. Pop. 1880, 5524.

Braird (JOHN GARDINER CALKINS), a poet, b. at New London, Conn., Oct. 21, 1796, grad. at Yale in 1814; pub. a vol. of poems, and was ed. of Conn. *Mirror*. D. Sept. 26, 1838.

Brair Coral, a name of various corals, especially applied to the *Meandrina cerebriformis*, which takes its name from the fact that its surface has convolutions shaped somewhat like those of the human brain.

Brairerd, Crow Wing co., Minn., R. R. June, at the crossing of the Miss. River, 115 m. W. S. W. of Duluth. Pop. 1880, 1865.

Brainerd (DAVID), a missionary, b. at Haddam, Conn., Apr. 20, 1718; entered Yale Coll. in 1739, but was expelled in 1742 for a very trivial offence. In 1743 he began his famous labors among the Indians of Mass., N. Y., Pa., and N. J., but in 1747 returned to Mass. in broken health, and d. at Northampton Oct. 9, 1747.

Brainerd (THOMAS), D. D., of the same stock as the above, b. at Leyden, N. Y., June 17, 1804, grad. at Andover Theological Sem., Mass., in 1831. From 1831 to 1833 was pastor of the Fourth Presb. ch. in Cin., O., from 1833 to 1836 edited the *Cin. Journal and Youth's Magazine*, and from 1837 till death was pastor of Pine St. ch., Phila. D. Aug. 21, 1866.

Brain Fever. See MENINGITIS.

Braize, or Becker (*Pagrus vulgaris*), a European sea-fish of the family of Sparids.

Bramah's Press. See HYDROSTATIC PRESS.

Bramante, bra-man'ta (DONATO LAZZARI), an It. arch. and painter, b. near Urbino in 1444. He designed the vast galleries which connect the Vatican with the palace of Belvedere. He was the first arch. of St. Peter's ch., which he began to build in 1506. D. 1514.

Brambling, Bramblefinch, or Mountain Finch (*Fringilla montifringilla*), nearly allied to the chaffinch. The colors of the upper parts are black and brown, with white bands on the wings. The belly and uropygium are white, throat and shoulders rusty colored. It breeds in N. and visits Central and S. Europe in winter.

Bran, the husk or outer covering of wheat, which in the process of flouring is separated from the fine flour. In 100 parts of B. there are of water, 13.1; albumen, 19.3; oil, 4.7; husk (with a little starch), 55.6; ash or saline matter, 7.3. Calico-printers use B. and warm water to remove coloring matter from those parts of their goods which are not mordanted. B. and the flour united—i. e. unbolted wheat flour—make a good bread, which is considered more digestible than that made of fine white flour.

Branch (JOHN), b. at Halifax, N. C., Nov. 4, 1782, grad. at the Univ. of N. C. in 1801; became a lawyer, gov. of N. C. 1817-20, U. S. Senator 1823-29; sec. of the navy 1829-31, M. C. 1831-33, gov. of Fla. Terr. 1844-45. D. Jan. 4, 1863.

Branchiopoda, bran-ki-o-p'o-da [Gr. *βράγχια*, the "gills," and *πους*, *podós*, a "foot"], an order of entomostracous crustaceans, deriving their name from the peculiarity of having the gills attached to the feet. They are small, many of them almost microscopic. Some are called water-fleas. The genera *Cyclops* and *Cypris* may be mentioned, the former on account of its frequency in stagnant waters, the latter because its fossil shells are abundant.

Brande (WILLIAM THOMAS), F. R. S., an Eng. chemist, b. in Lond. in 1788. He lectured with success on chem. at the Royal Inst., and filled for many yrs. an important office in the Mint. Among his works are a valuable *Dict. of Science, Lit., and Art*, and a *Manual of Chem.* D. 1866.

Brandenburg, bran'den-boorg, a prov. of Prus., which formed the nucleus of the Prus. kingdom, corresponding nearly to the old Mark of B. Albert, called the Bear, was the founder of the house of B., beginning to reign in 1134. Early in the 15th century the margrave became an elector of the Ger. empire, and took the title of elector of B. Frederick William, who became elector in 1640, added the duchy of

Prus. and part of Pomerania to his dominions, and his son took the title of king of Prus. in 1701. Area, 15,505 sq. m. Pop. 3,389,155.

Brandon, Rutland co., Vt., on R. R., 16 m. N. N. W. of Rutland. It has a graded acad., and the tp. contains the v. of Forestdale. Pop. tp. 1870, 3571; 1880, 3280.

Brandy [Ger. *Braunwein* (i. e. "burnt wine"); Fr. *eau de vie*] is the liquid obtained by distilling the fermented juice of the grape. It is generally manufactured from white and pale-red wines. The peculiarities of the wine pass to a certain extent to the B. Wines which taste of the soil communicate the same taste, the *goût de terre*, to the B. made from them. The best B., that made in the dept. of Charente, known as *cognac* and *armagnac* (names of towns), is made from very choice wines. Inferior B. are made from dark-red wines of Fr., Sp. (*Aguardiente*), and Port., also from the fermented marc or refuse of the grape, and from the lees of wine and the scrapings of the casks. The catawba B., made from the lees of catawba wine in O., is a very good B., though it has the peculiar flavor of this wine. The B. distilled from catawba marc has an unpleasant taste, and contains much fusel oil. The wines of Cal. yield B. abundantly and of good quality. Various other liquors are known as B., such as "cider B." or "apple jack," distilled from cider or from the "pomace" or refuse ground apples from the cider-press. This, when new, is a harsh, fiery liquor, but is much improved by age. "Peach B." is extensively made from the pulp of ripe peaches in some of the S. States.

Fresh B. is colorless, and remains so in glass vessels. The sherry-wine color which B. generally exhibits is either derived from the cask or from burnt sugar purposely added. B. is almost pure alcohol and water, the percentage of alcohol varying from 48 to 56 per cent. Beside alcohol and water it contains the volatile oil of the wine, a little acetic acid, acetic ether, aldehyde, etc., together with the coloring-matter and tannic acid derived from the cask.

The greater part of the B. and cognac of commerce is made from alcohol derived from Indian corn—rectified and deodorized whiskey. This is diluted to proof, 50 per cent., and flavored with acetic ether, ananethic ether, oil of grapes, argol, and tannin, and colored with burnt sugar. It is improved by the addition of a little real B., and by keeping it a few years in the cask. The following recipe for cognac B. is taken from the circular of a New York firm, whose business is to supply the necessary materials to the manufacturers of wines and liquors: "To 40 gals. of cognac spirit, double distilled and free from odor, and reduced to proof with distilled water, add $\frac{1}{4}$ ounce of our best cognac oil, distilled from grapes, $\frac{1}{4}$ pints burnt-sugar coloring, and $\frac{1}{4}$ ounce of tannin." At the prices charged for the materials this choice B. would cost the compounder \$1.25 per gal., and would sell at from \$10 to \$25.

B. is an esteemed cordial and stomachic. It is frequently given in the sinking stages of low fevers and to convalescents, and to check diarrhoea. C. F. CHANDLER.

Branford, a borough of New Haven Co., Conn., on R. R. and L. I. Sound, 8 m. E. S. E. of New Haven; has an acad. The harbor will admit vessels of 300 tons. Pop. tp. 1870, 2488; 1880, 3047.

Brass [Lat. *es. gen. aris*; Fr. *airain*], an important alloy of copper and zinc extensively used for a great variety of purposes in the arts, on account of the ease of working and its acceptable color. Common B. for ordinary purposes, which is cast in moulds and finished by turning and filing, contains about 70 parts of copper and 30 of zinc. *Munsz* or *yellow metal*, which is rolled into sheets and used for sheathing ships, contains from 50 to 63 parts of copper and 37 to 50 of zinc. *Pomace, pinchebeck, prince's metal, Mannheim gold, mosaic gold, similar*, etc., contain 80 parts or more of copper to 20 or less of zinc. A little lead diminishes the ductility, while tin increases the hardness of B. Articles of B. are cleaned by immersion in aqua-fortis (nitric acid), and lacquered with shell-lac in alcohol. B. is harder than copper, is malleable and ductile, and can be readily cast, rolled, stamped, and turned in the lathe. Next to iron in its different forms, it is the most important metal used in the arts.

Brasseur (brah-sur) de Bourbourg (CHARLES ÉTIENNE), a Fr. priest, b. Sept. 8, 1814, travelled extensively in N. and Central Amer. Wrote *Histoire de Canada* and *Histoire des Nations civilisées du Mexique et de L'Amérique Centrale*.

Bra'tleboro', R. R. centre, Windham co., Vt., on the Conn. River, 60 m. N. of Springfield, Mass., is seat of Vt. Asylum for the Insane, and has an acad. Pop. 1880, 4471.

Bravo, brah'vo (NICOLAS), a Mex. gen., b. about 1792, fought against the Spaniards in several campaigns; was elected v.-p. of Mex. in 1824, revolted against Victoria in 1827, and was defeated; officiated as the executive chief and substitute of Santa Anna in the absence of the latter, from Oct. 1842 to Mar. 1843. D. Apr. 22, 1854.

Braxton (CARTER), a planter, b. in Newington, Va., Sept. 10, 1736, grad. at William and Mary Coll. in 1756; was elected to the Continental Cong. in 1775, and signed the Dec. of Ind. D. Oct. 10, 1797.

Brazen Sea, a great bowl of cast metal, probably of copper or bronze, which stood in the priests' court in Solomon's temple. (1 Kings vii. 23-26; Josephus's *Antiquities*, viii. 3, 5.) Its purpose was to hold water for the ablutions of the priests. The B. stood upon 12 oxen, the latter facing outward. The exact shape and size of the B. S. are not known, but the best commentators think its contents exceeded 11,000 wine-gals.

Brazen Serpent, the name of a copper or bronze figure of a serpent erected by Moses during the journey of the Israelites from Egypt to the land of promise, for the miraculous cure of those who had been bitten by venomous serpents. This B. S. became an object of superstitious worship among the Israelites, and was consequently destroyed by Hezekiah. In accordance with John iii. 14, the B. S. is regarded as a type of Chr.

Brazil, bra-zil (Port. brah-zeel), the only empire or monarchy on the Amer. continent, and the largest state of S. Amer., is bounded N. by the Atlantic Ocean, Guiana, and Venezuela, W. by Ecuador, Peru, Bolivia, Paraguay, and the Argentine Confederation, S. by Uruguay, and E. by the Atlantic. It extends from lat. $4^{\circ} 30' N.$ to $33^{\circ} 45' S.$, and from lon. $34^{\circ} 40' W.$ to $72^{\circ} 30' W.$, being 2600 m. in length from N. to S., and 3500 m. in breadth from E. to W. Its area is 3,218,166 sq. m., about 305,000 sq. m. less than the U. S.

Topography, Rivers, and Lakes.—B. has several chains of mts., but is nowhere connected with the Andean system. The mts. approach the coast at only 3 or 4 points—viz. near Cape Orange, on either side of Cape St. Roque, and at some distance from it, and from above Rio Janeiro to Torres. Elsewhere the coast lands for many m. inward have very little elevation. Of the mt.-chains, the Serra do Mar extends along the coast to $26^{\circ} 30' S.$ and incloses with its 2 branches the valley of the Uruguay. The central chain, Serra de Mantiqueira, extending from $20^{\circ} 30'$ to $33^{\circ} S.$, has the highest elevations in B. Its continuation, Serra do Espinhaço, is parallel to the coast. The other chains farther W. are Serra da Tabatinga, Serra Piahy, Serra Ibiapaba, the Pyreneo Mts., and the low chains along the S. branches of the Amazon. The Amazon is the largest river. Its N. branches are the Yapura, the R. Negro, the Trombetas, etc.; the S. branches, the Xingu, Topayos, Madeira, Purus, Yurua, and Yavari. Other rivers; Araguay and Tocantins, Maranhão, San Francisco, Paranaíba, R. Grande de Belmonte, R. Doce, S. João de Parahiba Contas, Vaso, R. Grande do Sul. The R. Paraná, the Paraguay, and Uruguay rise in B., but pass through other states. There are many small lakes, but only Lake Mirim and Lake Patos are important.

Minerals.—These comprise gold, silver, iron, copper, zinc, coal, diamonds of great size and beauty and in great numbers, chromate of lead, euclase, immense crystals of iron-glance, talc, topaz, crystals, rock crystals, and kyanite. Some of the diamonds, first discovered in 1730, are famous for both size and perfection.

Soil and Vegetation.—Soil is generally excellent, but only $1/100$ of it is under cultivation, and this mostly in the N. E. and along the coast. Of cultivated plants, shrubs, and trees, the most useful are sugar-cane, coffee, cotton, cacao, rice, tobacco, maize, manioc, beans, bananas, ipecacuanha, ginger, yams, lemons, oranges, figs, cinchona, etc. The manioc produces tapioca, the staple farinaceous food of the empire. It yields 6 times as much nutriment to the acre as wheat. The forests of B. are vast in extent and luxuriance, and many are draped with climbing plants and parasites. Some of the forests are too dense to be penetrated. Many of the trees are valuable for med. or the arts, as the cinchona, siphonia or caoutchouc, bertholletia (B.-nuts); purga das Paulistas, which yields a tasteless but powerfully purgative oil; the myrtaceous rose, whose blossoms fill the air with perfume; B.-wood, rosewood, fustic, mahogany, the jaborandi, Franciscea uniflora or manuca, and other shrubs. The flowers of B. are the most beautiful in the world. The vast plains are covered with herds of horses and horned cattle, many of them wild, and large flocks of goats and sheep, though not of high grade, and herds of swine are pastured there.

Wild Animals.—Pumas, jaguars, several native animals of the wolf family, sloths, porcupines, peccaries, capibaras, monkeys, or rather lemurs; vampire bats, many batrachians; of serpents, anacondas and other pythons, coral snakes, surucutis, and jararacas—the last 3 are venomous and deadly; turtles abound in the Amazon, and tortoises and terrapins on land; of birds of prey, many vultures, condors, eagles, hawks, and owls; of birds of beautiful plumage, an infinite variety, including many species, and immense numbers of humming-birds, parrots and paroquets, toucans, cockatoos, and hundreds of native species; wading birds of fine plumage, ducks, geese, pelicans, etc. The insect tribes are brilliant, abundant, and beautiful—over 1000 species of butterflies have been described; scorpions and centipedes are formidable, while the bees are stingless. The rivers abound in fish; Prof. Agassiz found 1163 new species in the Amazon alone.

Climate.—Most of the N. provs. are subject to heavy rains, and some of them are unhealthy. In the N. E. there are frequent droughts, and sometimes no rain for 2 or 3 yrs. In the S. the climate is healthy and settled, though often very warm. Dec., Jan., and Feb. are the hottest months, and June, July, and Aug. the coolest. While malarial fevers prevail along the lower Amazon and its affluents, yellow fever is hardly known there, and many other N. diseases never occur. Some of the contagious diseases are very malignant.

Industries, Exports, and Imports.—B. is almost wholly an agricultural, pastoral, and mining country, and its industries, except those connected immediately with its own necessities, are very few and mostly crude. The preparation of sugar in its unrefined state, of coffee for shipment, of the caoutchouc in crude masses, of the various woods, roots, and barks for medicinal, chemical, or economic uses; of the various farinas and cacao for use; the production of lumber for home use, and of food products; rude manufactures of cotton, wool, and of the native silk—these constitute the greater part of its industries. Its exports are mostly coffee, sugar, cacao, tapioca, hides, cotton, wool, and hair of horses, goats, etc. The exports to the U. S., G. Brit., and Fr. in 1879 were \$73,105,421, and the imports from the same countries \$51,000,000. In 1880 our imports from B. (its exports to the U. S.) were nearly \$52,000,000, while its imports from the U. S. were only \$8,605,346.

Finances.—The public debt, foreign, home, and floating, in 1880 was \$407,716,027; estimated public revenue, 1881-82, \$57,423,412; estimated public expenditure, \$59,762,389.

Religion and Education.—R. Cath. the established religion; other religions tolerated; no persecution allowed; some Prot. chs. and missions; Indian tribes mostly pagan. Great

efforts are making to improve the educational condition of B.; primary schools in most of the large towns; military and naval schools, engineering schools, museum, libraries, and med. school at Rio Janeiro; a med. school and 2 law schools elsewhere. The official lang. of B., Port.

Government, hereditary constitutional monarchy; the emp., Dom Pedro II., is of the house of Braganza. Legislature, 2 chambers; senate elected for life, the deputies for 4 yrs.

Railways and Telegraphs.—1911 m. of railway open in 1882, and 477 m. more to be completed in 1884; about 4340 m. of telegraph in 1882.

History.—Discovered in 1500 by V. Y. Pinzon, one of the companions of Columbus; Pedro A. Cabral took possession of it; Port. made settlements, notwithstanding opposition of other nations; Indians exempted from slavery in 1755; John VI. of Port. came to B. in 1808, escaping from the Fr.; in 1815 he raised B. to the rank of a kingdom; returned to Port. in 1820, leaving his son, Dom Pedro I., regent; in 1822 Dom Pedro declared B. free and independent, assumed the title of emp., and was recognized by Port. in 1825; Dom Pedro I. abdicated in 1831 and returned to Europe, leaving his son, then 6 yrs. old, as his successor; Dom Pedro II. remained under regents until 1841, when he was crowned, and has proved himself a wise and able ruler; gradual abolition of slavery provided for in 1871; war with Paraguay 1865 to 1870; all important rivers opened to foreign commerce in 1866; subsidies given to steamship lines.

Population, estimated from partial enumeration, is about 10,108,291. Of this number it is officially estimated that 1,000,000 are wandering tribes of Indians. There were 1,016,262 slaves in 1874, B. being the only Amer. state in which slavery exists, and even here partial emancipation is in progress. There are 6 prominent and many smaller tribes of Indians, mostly in the N. The negroes, free and slave, are in a majority in the S. There are great numbers of the mixed races, descendants of whites and Indians (Mamelucos), of Indians and negroes (Cafuzos), and of the settled Indians (Caboclos). The white Indians are mostly of Port. descent, except the colonists, who are largely Ger. The provs., 30 in number, are Rio de Janeiro, São Paulo, Santa Catharina, Paraná, Rio Grande do Sul, Espírito Santo, Bahia, Parahiba do Norte, Pernambuco, Alagoas, Sergipe, Rio Grande do Norte, Ceará, Piahy, Maranhão, Pará, Minas Geraes, Goyaz, Matto Grosso, and Alto Amazonas. The prin. cities are Rio Janeiro (the cap.), 228,743; Bahia, 128,929; Pernambuco, 116,671; Pará, 35,000; São Paulo, 25,000; Parahiba, 15,000; Maranhão, 31,604; Rio Grande do Sul, 20,000.

L. P. BROCKERT.

Brazil, R. R. June, a city and cap. of Clay co., Ind., 16 m. E. N. E. of Terre Haute. It is an important centre of the block coal and iron business. Pop. 1870, 2186; 1880, 3441.

Brazil-Cabbage, the *Caladium sagittifolium*, a plant of the natural order Araceæ, supposed to be a native of tropical Amer., but is now in cultivation throughout the tropics. Both root and leaves are almost entirely destitute of the acidity so generally characteristic of the order.

Brazilian Grass, a popular name of a substance used in the manufacture of hats, sometimes called chip hats. It is not grass, but the leaves of a species of palm.

Brazil-Nuts, the seeds of the *Bertholletia excelsa*, a tree of the natural order Lecythidaceæ, which attains a height of 100 ft. or more, abounds on the banks of the Orinoco and in the N. parts of Brazil, and bears a round woody pericarp nearly as large as a man's head. This pericarp has about 24 seeds or nuts, which yield a large quantity of oil.

Brazil-Wood, an important dyewood from the *Cas-alpina crispa*, a tree of the order Leguminosæ. There are



Brazil-Wood.

several varieties, known as Pernambuco, Lima, Santa Martha, Sapan or Japan, etc. The wood contains a colorless principle, *brasilin*, which changes by oxidation to *brasilin*.

which is the red coloring-matter which gives the wood its value. Pernambuco and Lima wood contain as high as 2.7 per cent. of brazilin. Sapan, 1.5, and Santa Martha (also called Peach or Nicaragua) still less. B. W. is very heavy and hard, is pale when freshly cut, but becomes red by exposure to the air. The coloring-matter is soluble in water, but more so in alcohol or ammonia. It is used in dyeing to produce reds with alumina, purples with tin, etc., for coloring wall-paper and for red ink. C. F. CHANDLER.

Brazos, one of the largest rivers of Tex., rises in the N. W. part of the State, and enters the Gulf of Mex. about 40 m. S. W. of Galveston. Its whole length is estimated at 900 m. In the rainy season, from Feb. to May inclusive, it is navigable for steamboats about 300 m. from its mouth.

Breach of the Peace, the offence of disturbing the public peace, either by actively or constructively breaking it. Unlawful assemblies, riots, affrays, and challenges to fight are B. of the P., and by the common law the offender is indictable. The phrase is sometimes used to distinguish civil from criminal cases, as in the clause of the U. S. const. which grants to members of either house of Cong. freedom from arrest except in cases of treason, felony, and B. of the P. In this connection it seems to include all indictable offences, not only those which are in fact attended with force and violence, but also those which are constructive B. of the P. of the govt., as tending to violate good order.

Bread (Gr. *artos*; Lat. *panis*; Fr. *pain*; It. *pane*; Ger. *Brod*; etymology uncertain), the most common kind of prepared food. It is made from the flour or meal of some grain, which is moistened with water, and mixed or kneaded till uniform. It may or may not be *raised* by the development in the mass of carbonic acid or other gas; it is then formed into loaves or cakes, and finally baked before a fire or in an oven.

I. B. which is not raised is often called *unleavened B.* This may be made from the whole grain by soaking it in water, forming it in the hands, and either drying it in the sun or baking it before a fire. This is the simplest process of B.-making, and is still practised to some extent among savages. Generally, unleavened B. is made from grain which has been pounded or brayed in a mortar or between flat stones, reduced to meal in a mill, or even further reduced to flour. Coarse oat, barley, and pease meals are in Scot. made into B. by simply kneading with water, flavored with salt, and baking before a fire. Wheat B. is made in a similar manner in many localities. The *passover cakes* of the Israelites were thus prepared. In the U. S., especially among the poorer classes in the S., Indian corn meal is thus made into corn B. From wheat flour, sea biscuit and the various kinds of crackers are prepared.

II. Raised B. is B. which is made porous and spongy by the aid of some gas, produced either before or during the baking. This gas may be carbonic acid, either generated by fermentation, produced by the decomposition in the B. of an alkaline bicarbonate, or mingled with the flour in solution in water under pressure. It may be air which is incorporated with the dough during the kneading and expanded during the baking, as in pastry, sponge cake, etc., or it may be carbonate of ammonia, which is vaporized during the baking.

Fermented B. is prepared either with leaven or yeast. Leaven is dough—i. e. flour and water—in a state of incipient fermentation.

Notwithstanding the difficulty of making good B. with leaven, and the frequent failures in private families, in Paris, where B.-making has reached a high degree of perfection, the B. is raised chiefly by leaven, a little yeast only being added to facilitate the fermentation.

A very essential element of success in B.-making is thorough kneading. When the B. has risen sufficiently it is baked. The carbonic acid which gives lightness to fermented B. is derived chiefly from the small amount of sugar contained in the flour. If wheat is exposed to dampness after harvesting, or if the flour has been exposed to heat and moisture, the albumen which it contains is transformed into diastase, which possesses the property of changing starch to dextrine (gum) and sugar. B. made from such flour is sweet, sticky, heavy, and dark-colored.

The baking of B. can be effected at 212° F., but no crust will be formed; to secure the best result a temperature of 350° to 570° F. should be employed. A high heat should be avoided at first, lest a hard crust be formed while the interior of the loaf remains unbaked. 100 pounds of flour yield from 125 to 135 pounds of B., the increase being due to the water added. The most common faults of wheat B. are due to its being (1) *sour*, from the flour having been partly spoiled, the yeast or leaven having been too old, or the dough standing too long before baking; (2) *bitter*, from excess of yeast or bad yeast; (3) *heavy*, from insufficient kneading, raising, or bad leaven; (4) *mouldy*, from the flour having been kept too long in a damp place.

Graham B. is made from the unbolthead meal of wheat, a mixture of bran and flour; it is used by dyspeptics. **Rye B.** is largely used in N. Europe, and to some extent in the U. S. It is dark-colored, is harder than wheat B., and has a peculiar taste.

Wetted B. is prepared by kneading flour in a closed vessel with water supersaturated under pressure with carbonic acid gas. On bringing the dough into the air, the carbonic acid gas set free by the removal of the pressure expands it into a sponge. C. F. CHANDLER.

Bread-Fruit Tree (*Artocarpus incisa*), an important tree of the order Artocarpaceæ, a native of S. Asia, of the islands of the S. Pacific and of the Indian Archipelago, now naturalized in some of the W. I. This tree grows to the height of 40 or 50 ft., and has large, glossy, dark-green leaves, which are pinnatifid or deeply divided into pointed lobes. The leaves are sometimes 18 inches long. The fruit, which is a *sorosis*, is nearly spherical, and is covered with a rough rind, which is marked with small irregularly hexag-

onal divisions, having each a small prominence in the middle. The fruit sometimes weighs 4 lbs. or more, contains a large portion of starch or fecula, and is a prin. part of the food of the natives of the S. Sea Islands. The tree produces 2 or 3 crops in a year. It has been introduced into the W. I.



Bread-Fruit.

with some success. The timber, which is light and of a rich yellow color, is used in building houses and for other purposes, but if exposed to the weather is not very durable. A sort of cloth is made of the fibrous inner bark. The tree abounds in a glutinous milky juice, which, when boiled with coconut oil, is used as a cement and as bird-lime.

Bread-Nut, the fruit of the *Brosimum Alicastum*, a tree of the order Artocarpaceæ, is a native of Jamaica. It is allied to the bread-fruit.

Break-water. An artificial barrier designed to *break* the force of waves in seaports and harbors and thus to protect shipping from damage; but more commonly to *create* a harbor or a secure anchorage where none existed before. Among anc. works, the piers of the anc. Piræus and of Rhodes may be denominated B., as also similar modern structures projected from the shore and called *piers* or *moles*; but the term B. has of late years been considered as more peculiarly appropriate to large insulated aggregations of stone, whether of regular masonry or sunk promiscuously in rough masses, so placed as to form an artificial island across the mouth of an open roadstead, and thereby, in obstructing and breaking the waves of the sea, to convert a dangerous anchorage into a safe and commodious harbor for the reception of ships of war or merchantmen.

Bream [Fr. *bremel*], a name given to various fishes. The species best known as such is a fresh-water Cyprinid, the *Abramis brama*, found in Europe. The name is also locally applied to the sunfish, or *Eupomotis aureus* of the U. S.

Breast, Abscess of, chiefly arising from overloading of the B. with milk, following childbirth. It is best prevented by a brisk purge, quinine, and febrifuges, and the unloading of the B. by the nursing infant, the B.-pump, thorough rubbing, andunctions of warm camphorated oil. When abscess is formed it must be poulticed or incised.

Breath'itt (Joux), b. near New London, Va., Sept. 9, 1786, removed in youth to Ky., where he was a surveyor and teacher, and was admitted to the bar in 1810; was gov. of Ky. 1832-34. D. Feb. 21, 1834.

Breck'nrIDGE (Joux), a native of Va., b. in 1760, removed to Ky.; was elected to the U. S. Senate in 1801, and appointed atty.-gen. by Pres. Jefferson in 1805. D. Dec. 17, 1806.

Breckenridge (Joux), D. D., b. at Cabell's Dale, Ky., July 4, 1797, grad. at Princeton in 1818, was a Presb. preacher, a polemic writer, and prof. of theol. at Princeton 1836-38. D. Aug. 4, 1841.

Breckenridge, or Breckinridge (JOHN CABELL), a statesman and gen., a grandson of John, first noticed above, b. near Lexington, Ky., Jan. 21, 1821. He studied law, which he practised at Lexington, and was elected to Cong. in 1851. He was chosen V.-P. of the U. S. in 1856, when James Buchanan was elected Pres. In 1860 he was nominated for the presidency by the Anti-Douglas Dems. who seceded from the convention that met at Charleston. His competitors were Abraham Lincoln, John Bell, and Stephen A. Douglas. B. received 72 electoral votes, being supported by all the S. States except Va., Ky., Tenn., and Mo. Having been elected to the U. S. Senate, he took his seat in Mar. 1861, but joined the Confed. army in the autumn of that yr. He served as maj.-gen. at the battle of Stone River, which ended Jan. 2, 1863, and at Chickamauga, Sept. 19 and 20 of that yr. In May 1864 he defeated Gen. Sigel at Newmarket, in Va.; became sec. of war at Richmond in Jan. 1865. D. May 17, 1875.

Breckenridge (ROBERT JEFFERSON), D. D., LL.D., a Presb. minister, b. at Cabell's Dale, Ky. Mar. 8, 1800, was an uncle of the preceding; grad. at Union Coll. in 1819, and practised law in Ky. 1823-31. Afterward preached in Baltimore, and then removed to Lexington, Ky., in 1847, and became prof. of theol. at Danville in 1853. Also wrote on theol. Remained loyal to the c. war. D. Dec. 27, 1871.

Breck'nrIDGE (Gen. JAMES), b. in Botetourt co., Va.,

May 7, 1768, grad. at William and Mary Coll. in 1785; was a soldier of the Revolution; became a lawyer, was ap. M. C. 1800-17, and co-operated with Jefferson in establishing the Univ. of Va. D. Aug. 1, 1846.

Breech-Loading Firearms are those which are loaded by putting the cartridge directly in at the breech, instead of ramming it in at the muzzle. Among the weapons of this character are the Armstrong and Whitworth guns, the Krupp steel guns, the *cartridgers*, and among small arms the needle-gun and the Chassepot, Sharps, Snider, Spencer, Ward-Burton, and Remington rifles.

Breed, a variety produced in animals in consequence of domestication. These varieties are in some species, as the dog and pigeon, very marked, exhibiting differences which, if they originated by natural and unexplained causes, would be regarded as sufficient to distinguish species. They are developed by attention to the principle that "like produces like," or that certain qualities possessed by the parent may be perpetuated and increased in the offspring.

Breed (WILLIAM P.), D. D., b. in 1816, at Greenbush, N. Y., removed in childhood to New York; grad. in 1843 at the Univ. of New York. Presb. pastor in Steubenville, O., 1847-56, and in Phila.; an author of religious works.

Breese - KIDDER RANDOLPH, U. S. N., b. Apr. 14, 1831, in Phila., entered the navy as a midpn. Nov. 6, 1846, became a commander in 1866. At the close of 1861 he was placed in command of the third division of Porter's mortar flotilla, and in Oct. 1862 of Admiral Porter's flag-ship, the Black Hawk, serving on the Miss. and tributaries. In 1864, when Admiral Porter took command of the N. Atlantic blockading squadron, he selected B. as fleet-capt. D. Sept. 13, 1881.

Breese (SAMUEL L.), U. S. N., b. in New York in 1794, entered the navy in 1810, served against G. Brit. and Mex., became capt. 1841, and rear-admiral 1862. D. Dec. 17, 1870.

Breese (SIDNEY), b. at Whitesboro', Oneida co., N. Y., July 15, 1800, grad. at Union Coll. in 1818. In 1821 he was called to the Ill. bar, was an officer in the Black Hawk war, U. S. Senator from Ill. 1843-49, speaker of the Ill. legislature in 1850; became a judge, and was one of the originators of the Ill. Central R. R. D. June 27, 1878.

Breeze, a gentle wind, a moderate gale. *Land and Sea B.* - In a fair day, near the sea-shore, an hour or two after sunrise, a gentle wind begins to blow from the sea toward the land, gradually increasing in force during the day. With the declining sun the sea-B. loses its power, and dies out before sunset. A lull then ensues, after which a land-B. sets in from the land toward the sea, and continues all night until before sunrise, when another calm occurs. The cause of these alternate winds is to be found in the fact that the land is more readily heated by the rays of the sun, and more quickly cooled in their absence, than the sea. During the day the warmer air on the land rises and the cooler air rushes in from the sea. At night the reverse takes place.

Brehm - ALFRED EDMOND. SEE APPENDIX.

Bremen, *brem'en* (Ger. *brä'men*), a free city of Ger., on the river Weser, about 45 m. from the sea and 60 m. S. W. of Hamburg. It is divided into the old and the new town; the former has narrow, crooked streets; the new town is more regular. The old ramparts have been levelled and converted into promenades and pleasure-grounds. The most remarkable edifices are the cathedral, built about 1100; the Gothic town-hall, with a famous wine-cellar; the exchange, the museum, and the observatory of Olbers. It is, next to Hamburg, the most important commercial city of Ger., and is connected by R. Rs. with Hanover, Bremerhafen, and other towns. Vessels drawing 7 ft. ascend to B.; larger ones stop at Bremerhafen, 35 m. below. B. is nominally a republic, being governed by 4 burgomasters and 24 senators, elected for life. Area, including the territory attached to it, 98 sq. m. Pop. of the state, 156,229; of the city, 112,158.

Bremer (FREDRIKA), b. at Abo, Finland, Aug. 17, 1801. She was ed. at Stockholm, and became in early youth familiar with Ger. lit. Author of numerous novels. She visited the U. S. in 1850, and after her return pub. *The Homes of the New World* (1853). D. Dec. 31, 1865.

Brenham, R. R. junc., city, and cap. of Washington co., Tex., 95 m. E. of Austin City. It has a sem. for ladies. Pop. 1870, 2321; 1880, 4101.

Bren'ner Pass, the lowest pass in the main chain of the Alps, 4775 ft. above the sea. In 1867 a railway was opened through this pass from Innsbruck to Botzen, where it connects with the railways of Ger. and It.

Bren'us, [Celtic *bran*, a "chief." *Bran*, as a proper name, is well known both in Cymric and Erse tradition], a chief of the Senones, a tribe of anc. Gauls who invaded the Rom. state, and defeated its army about 390 B. C. B. then captured Rome, except the capitol, which he besieged for about 6 months. During this siege he attempted to surprise the garrison by night, but was repulsed by Manlius, who was awakened by the cackling of some geese. The Romans bought peace by payment of 1000 lbs. of gold. To increase the price, B. is said to have thrown his sword on the scale.

Bren'ton (SAMUEL), b. in 1810 in Gallatin co., Ky., became a Meth. Epis. preacher in 1830, and subsequently a lawyer. In 1841 he returned to the ministry, but having become disabled by paralysis, he again left the profession. He was an M. C. from Ind. 1852-57, and at the same time pres. of Ft. Wayne Coll. D. Mar. 25, 1887.

Brenton (WILLIAM), emigrated to Boston from Hammersmith, Eng.; held important offices in Mass., was pres. of R. I. 1660-61, and gov. 1666-69. D. 1674.

Brenz, *brents* (JOHANN), [Lat. *Brentius*], a Ger. reformer, b. at Weil, in Swabia, June 24, 1490, ed. at Heidelberg, and became a Prot. under Luther's influence. He preached at Halle, but in 1530 had to flee to Stuttgart, to the protection of Duke Ulrich of Württemberg against Charles V., and d. there Sept. 11, 1570. He wrote much, chiefly expository lectures on the Bible. He taught that the Lord's body is everywhere present; hence his followers are called U. biquitarians, but in the main his doctrines are those of Luther.

Brescia, *bresh'e-a* (anc. *Brizaria*), a city of It. on the river Garza, 62 m. E. N. E. of Milan, on the railway which connects Milan with Venice. It contains an old cathedral, and the "New Cathedral" (*Duomo Nuovo*), begun in 1604, many chs. adorned with works of art, an episcopal palace, coll., public library, museum of antiquities, and botanic garden. Pop. 43,354.

Breslau, or **Breslaw** [Lat. *Bratislavia*; Polish *Wrocław*], a city of Prus., the cap. of Silesia, on the river Oder, at the mouth of the Obilau, and on the railway from Berlin to Vienna, 221 m. S. E. of Berlin. It is, next to Berlin, the most populous city of Prus., and is the great wool-market of Ger. The most remarkable edifices are the cathedral founded in the 12th century, St. Elizabeth's ch., the theatre, the Rathaus, exchange, and mint. The univ. has a library of 350,000 vols. Pop. 272,012.

Brest [Lat. *Brestum*], a fortified city and seaport of Fr., 314 m. W. of Paris, on the N. shore of the Road of Brest. Its outer harbor has room for 500 ships of the line, and is connected with the ocean by a channel 1750 yards wide. The inner harbor is spacious and secure, and both are strongly fortified. It is by nature and art one of the strongest naval stations of Europe; has large basins, quays, magazines, barracks, and a prison sufficient for 4000 convicts. It is the terminus of a railway connecting it with Paris, and is connected by a submarine telegraph with Duxbury, Mass. Pop. 66,110.

Bretagne, *bre-tahn'* [Lat. *Britannia Minor*], usually called *Brit'tany* by the Eng., or *Little Brittany*, a former prov. of Fr., is a peninsula, bounded N. by the Eng. Channel, W. and S. W. by the Atlantic. It is now divided into 5 depts. Much of its surface is covered by forests and uncultivated heaths, and the shore is indented by numerous bays and inlets. The prov. was anciently called *Armorica*, and was peopled by the Cymri, a Celtic race to which the ancestors of the Welsh belonged; and the present lang., called *Armorican*, closely resembles the Welsh. B. abounds in Druidical remains. It was conquered by Charlemagne, and afterward by the Normans. In 992 it became a duchy, which remained almost independent until 1531, when it was annexed to Fr. Pop. 3,071,868.

Brethren. See PLYMOUTH BRETHREN (so called); also DUNKERS and UNITED BRETHREN.

Brethren and Sisters of the Free Spirit, a sect of pantheistic semi-monastic enthusiasts, who probably originated in the sect of Almericians, followers of Amalric of Bena, who d. in 1209. They were otherwise known as *Homines Intelligentie* ("men of understanding"), and by several other designations.

Brethren of the Christian Schools, an order in the R. Cath. Ch. founded in 1679, and confirmed in 1725 by Benedict XIII. Its members are not allowed to enter the priesthood, but devote themselves especially to the instruction of the poor. They are a branch of the Jesuits.

Brethren of the Common Life [Lat. *Fratres Vitæ Communis*], an association of clergymen founded in Hol. in 1384. They soon were joined by many laymen. A semi-monastic discipline was maintained, without lifelong vows. The brotherhood became extinct before 1650, many of them having become Prots.

Breviary (Lat. *brevarium*, from *brevis*, "short") is the name of a book containing the daily service of the church of Rome or of the Gr. church, and thus called probably because it was abridged from another service-book called *Plenarium officium*, the "full service." There were several such abridgments in use in the Roman church, but the *Breviarium Romanum* is the most generally used.

Brewer (THOMAS MAYO), A. M., M. D., b. in Boston, Mass., Nov. 21, 1814. His grandfather, Col. James Brewer, was a patriot of the Revolution and a leader in the "Boston tea-party" of 1773. Dr. B. grad. at Harvard in 1835, and at the Mass. Med. School in 1838, and was actively engaged for a lifetime in professional, editorial, and business duties, but was best known as a thorough ornithologist. In 1839 he edited a new ed. of Wilson's *Ornithology*, and one vol. of a work on the *Ornithology of N. Amer.* was pub. by the Smithsonian Inst. He also wrote most of the biographical portion of the *Hist. of N. Amer. Birds*. D. Jan. 23, 1880.

Brewer (WILLIAM HENRY), b. at Poughkeepsie, N. Y., Sept. 14, 1828, ed. at Scientific School of Yale Coll. and at univs. of Heidelberg and Munich; became prof. of agriculture in Sheffield Scientific School, New Haven, Conn., in 1864. Author of *Botany of Cal.* and various scientific papers.

Brewerton (HENRY), LL.D., b. Sept. 25, 1801, at Newburg, N. Y., grad. at W. Pt. 1819; col. corps of engineers Apr. 22, 1864, and brevet brig.-gen. Mar. 13, 1865; was assistant prof. at W. Pt. and served in constructing fortifications, roads, and harbor improvements. Retired Mar. 7, 1867; d. Apr. 17, 1879.

Brewster (BENJAMIN HARRIS), D. D., N. J. Oct. 12, 1816, grad. at Princeton 1834; studied law, and was admitted to the Phila. bar 1838, and was soon appointed by Pres. Polk to pass upon the claims of the Cherokee Indians against the U. S.; was in 1867 appointed atty.-gen. of Pa., holding the place 2 yrs. In Dec. 1881 he was appointed by Pres. Arthur atty.-gen. of the U. S.

Brewster (SIR DAVID), LL.D., D. C. L., F. R. S., a Brit. natural philos. and writer, b. at Jedburgh, Scot., Dec. 11, 1781, ed. at the Univ. of Edinburgh, and became in 1808 ed. of the *Edinburgh Encyc.*; invented the kaleidoscope in 1816, made discoveries in optics, was knighted in 1832, and elected in 1849 one of the 8 foreign associates of the Fr. Inst., the highest scientific distinction in Europe. Among his works are an *Essay on the Polarization of Light by Reflection*, a *Treatise on Optics*, and *More Worlds than One*. In 1859 was chosen prin. of the Univ. of Edinburgh. His wife was daughter of Macpherson, author of Ossian's poems. D. Feb. 10, 1868.

Brewster (JAMES), b. about 1785, a merchant and philanth. of New Haven, Conn. He founded in that city Brewster Hall, the Franklin Inst., and the Orphan Asylum. D. 1866.

Brewster (WILLIAM), one of the Pilgrims of Plymouth, b. at Scrooby, Eng., in 1566, ed. at Cambridge; entered the public service, became a nonconformist, and in 1607 was imprisoned at Boston, Lincolnshire; on his liberation he went to Leyden, where he taught Eng. In 1620 he came to Amer. on the Mayflower's first voyage. D. Apr. 16, 1644.

Brewster, R. R. junc., Putnam co., N. Y., 53 m. N. N. E. from New York. It has 2 mines of magnetic iron ore. Pop. 1880, not given in census.

Brialmont (ALEXIS HENRI), a Belg. officer, engineer, and military writer, b. May 25, 1821, at Venloo, prov. of Limburg, Netherlands; grad. at the military school of Brussels 1843, became capt. 1855, col. 1868, chevalier of the order of Leopold 1846, officer 1859, commander 1870, and maj.-gen. 1874. B. is now an acknowledged authority on the modern art of fortification; his military publications are numerous; the most important are *La Fortification à Fossés Sees* and *Études sur la Fortification des villes Capitales*.

Bribery, brî'ber-e [from the Fr. *brûbe*, a "piece of bread," or a gift to a beggar], in criminal law, the offence of taking or offering any gift or reward to influence one's behavior in a public office, whether executive or judicial. It is an offence at common law. It also includes the case of influence or attempting to influence, by money, voters at an election to Parl. The crime may be committed though it turn out that the person whose vote is thus solicited has no right to vote. It is an offence in any case to offer the bribe, though it is not received. The U. S. const. brands it as a crime of magnitude by declaring that the Pres. and other civil officers are liable to impeachment for "treason, B., and other high crimes and misdemeanors." It is usual to pass statutes in the States extending the cases to which B. as an offence may be applied, and fixing the punishment.

Brick, a species of artificial stone made by moulding plastic clay into blocks, and burning them. A very inferior quality of B. is made by simply drying the blocks in the sun. The earths most employed in B.-making are (1) the plastic clays, composed principally of silica and alumina in varying proportions; (2) the loams or sandy clays; and (3) the marls, which are either sandy, clayey, or calcareous, according as silica in the form of sand, alumina, or carbonate of lime preponderates in the mixture. These B.-clays almost always contain a small percentage of oxide of iron, carbonate of lime, soda, and carbonate of magnesia. The purer clays contain about 1 part of alumina to 2 of silica, with a percentage of water varying greatly among the different clays. They all mix up freely with water in either large or small proportions, and are characterized by a tenacious plasticity. If moulded and baked, they shrink and warp greatly out of shape, and crack. Hence, these rich clays all have to be tempered with sand, ashes, or cinders before they can be used for B. Some clays contain too much sand, and are weak and brittle after burning; these must be mixed with the richer clays. From the greatly varying character of the raw material, it results that the methods pursued in B.-making must vary among different localities. Some clays require but very little change in the natural proportion of their ingredients, and but very little labor to prepare them for moulding into B., it being merely necessary to add the requisite quantity of water to render the clay plastic; while others, such as the fire-clays and some of the marls, have to be pulverized by machinery before they can be reduced to a sufficiently plastic condition. The red color of burnt B. is caused by the presence of a small percentage of oxide of iron, generally the protoxide. When there is more than 10 per cent. of iron oxide present the clay burns to a blue and almost a black color. A large percentage of iron, if lime also or an excess of silica be present, renders the clay fusible. Some clays contain lime and very little or no iron. These burn white, and require a less intense heat than any other clays to produce hard B., the lime being a flux on the silica. When carbonate of lime, whether as chalk, marl, nodules of calcareous petrifications, or in any other form, is present in the clay, it is converted into quicklime in burning, and only such portions of it will combine with the silica and alumina as come into actual contact with them. The balance remains quicklime, which will slake when the B. become wet, and destroy them. Hence clay containing too much carbonate of lime is unfit for B. Other clays contain iron and lime with an excess of the latter, in which case the B. burn to a light dun or a whitish color. Magnesia generally produces a brown color.

The presence of iron pyrites is objectionable, for the burning expels the sulphur, leaving oxide of iron or a basic sulphate, which occupies less volume than the original pyrites, and makes the B. porous and weak. Vegetable remains, such as roots, grass, etc., should be excluded for a similar reason.

It is impossible to ascertain, by chemical analysis alone, whether or not a given clay or any mixture of two or more clays will make good B. The best chemical tests will furnish only a close approximation. The composition of four clays—two suitable for common B. and two for fire-B.—are given below. Nos. 3 (from Stourbridge, Eng.) and 4 are the fire-B. clays:

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	50.40	49.44	51.80	58.40
Alumina	24.00	31.26	30.40	35.78
Oxide of iron		7.74	4.14	3.02
Carbonate of lime	2.70	1.48	—	—
" of magnesia	1.30	5.14	.30	2.72
Water, etc.	21.60	1.94	13.11	—
	100.	100.	99.75	99.92

Some fire-clays contain as high as 65½ to 66 per cent. of silica, 27½ to 26½ per cent. of alumina, and 5½ to 6 per cent. of oxide of iron, the rest being the alkalis and water.

Fire-B. are used for lining furnaces, kilns, ovens, etc., subjected to an intense heat that would destroy common B. or

stone. The Stourbridge fire-B. are noted for their excellence. Excellent fire-B. are made in N. J. at Perth Amboy, Woodbridge, S. Amboy, Trenton, and other places in the vicinity. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. Q. A. GILLMORE.]

Brick Church, N. J. See APPENDIX.

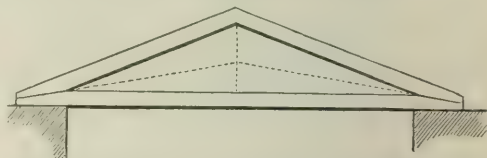
Bridge, an artificial structure designed to afford a passage across a stream or ravine. A fallen tree was probably the earliest B. The next seems to have been formed by stretching across a river a number of ropes, made of rushes or leathern thongs, secured on the opposite banks between trees and posts, and connected and covered, so as to form a passage-way. This method is practised in some of the mountainous dists. of S. Amer. The ropes are formed of thongs of ox-hide, consisting of several strands, about 6 or 8 inches in thickness, and across these, in a transverse direction, sticks are laid, and these are covered with a flooring of branches of trees. In other cases, an ox-hide rope is extended from one side of the river to the other, and is secured to each bank by means of strong posts. On one side is a kind of wheel, or winch, to straighten or slacken the rope, from which hangs, by a clew at each end, a kind of leathern hammock, capable of holding a man. A rope fastened to either clew, and extended to each side of the river, is used for drawing the hammock to the side intended. A push at its first setting off sends it quickly to the other side. Mules are carried over in this way.

To use these cables in pairs and to suspend from them a flooring is all that is needed to make a suspension B. Such B. are very numerous in various parts of the world. In Chi. suspension B. are formed of 5 parallel chains with links 1 ft. in diameter, on which a loose bamboo flooring is laid. Another form is described as consisting of 2 parallel chains 4 ft. apart, suspended over stone piers about 8 ft. high on each bank. The ends of the chains pass back from thence, turn obliquely, and are bedded in the rock, each being fastened round a large stone, which is kept down by a mass of smaller stones laid upon it. A plank about 8 inches wide, extending across the river, is suspended from the chains by bands made of roots, of such length that the path is 4 ft. below the chains in the middle of the length of the bridge. The suspending bands are renewed every year, and the planks are loose, so that any part can be prepared separately. The length of one of these B. is described as being 59 ft. It is only used for foot-passengers; but it is a proper suspension B., with a horizontal platform suspended from the main chains.

But to return to the "fallen tree." Instead of "felling" a tree in place, the transition to stretching the trunk of a tree, a "log," or "beam" over a ravine with suitable, however rude, artificial bearing-points, or "abutments," is natural and obvious. The "timber B." becomes thus the natural development of the fallen tree. It would soon be discovered that the simple "beam" stretched between two bearing points would receive its maximum bending strain at its middle point; that thence, toward each abutment the strain would rapidly diminish. Hence, to get the greatest strength with the least weight, the obvious expedient of making the beam thicker in the middle.

Again, the discovery would soon be made that the upper or top fibres of a beam are compressed, and those at the bottom extended, while the middle ones are comparatively without strain; and the transition to the truss or framed girder in which the lower or tie-beams, alone, suffer extension, the upper or brace timbers are compressed.

FIG. 1.



In applying the above to long spans it becomes necessary that the lower or tie-beam (which may indeed be made up of more than one piece "fished" together) should have points of support intermediate between the two abutments; also that the upper (or thrust-bearing pieces) should be stiffened by the application of intermediate bearing points. To meet these requirements the truss assumes more complicated forms, thus:

FIG. 2.

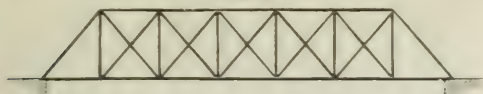


Since in a bent beam it is found that the top fibres are compressed, the bottom ones extended, while the middle ones, neither compressed nor extended (*longitudinally*), serve to bind the other parts together, an artificial beam on a large scale may be made by uniting the top and bottom longitudinal pieces by a web of diagonals which shall serve the purpose of the middle fibres of the pure beam. This is done in the various kinds of "trusses," in which the upper and lower members are connected by different systems of diagonal bracing combined with vertical ties, as in Fig. 3.

Hence, also, the "lattice B." so much in use for ordinary road B. in this country, and for some of our earlier R. R. B. The principles and qualities of the Town lattice (Fig. 4) are too well known to need description. Its cheapness and

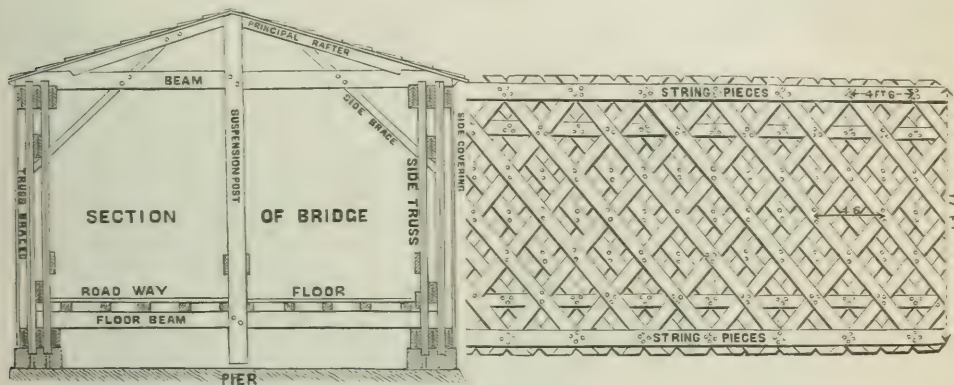
the facility of its construction adapted it for universal use in a country like ours, where the roadways which they are to carry over the numerous streams are themselves, for the most part, only the earth thrown up and consolidated. On our earliest railways they were naturally resorted to, but being deficient in strength, other combinations of timber

FIG. 3.



were resorted to, especially the arch, which (the Burr truss is exemplified in some of our older existing railway B., and in the well known road-B. at Trenton, built in 1804. Other forms of timber B., though admirable for their extent and the ingenuity employed in their construction, were likewise deficient in the rigidity essential for railway purposes.

FIG. 4.



with a span of 560 ft. It is suspended by chains. In later constructions wire cables have been used. The Wheeling B. over the O., suspended in this way, was built by Ellet in 1848, with a span of 1010 ft. It was blown down in 1854. The great railway suspension B. at Niagara, built by Roebling, has a span of 821 ft. The Brooklyn suspension B., completed in 1883 by the younger Roebling, has a span of 1595 ft. (See BROOKLYN.)

Tubular B. have in a few instances been constructed in preference to suspension B. They are rectangular tubes of wrought iron, the sides being single thicknesses of iron plate, and the top and bottom being of a cellular structure, to give them greater resistance to tension and compression. The Britannia B. over the Menai Strait, constructed on this principle by Robert Stephenson, has 2 spans of 460 ft. each, and 2 of 230 each. The Victoria B., over the St. Lawrence at Montreal, by the same engineer, has 25 spans of 242 ft. each, and 1 of 380, the entire tube being 6600 ft. in length. Including approaches and abutments, the whole B. is 9084 ft., or nearly $\frac{1}{4}$ m. long.

In point of economy, suspension B. have greatly the advantage of tubular B., and it is probable that no more of these expensive structures will be erected. J. G. BARNARD.

Bridgeport, a city and seaport, is an important R. R. and commercial centre, one of the co. seats of Fairfield co., Conn., on an inlet of L. I. Sound, at the mouth of Pequonnock River, 58 m. N. E. of New York and 18 m. W. S. W. of New Haven. It is mostly built on a plain lying on both sides of the Pequonnock River, the E. portion being designated E. B., while on the W. side, back of the plain, rises Golden Hill. It is the third city in wealth and importance in Conn. Pop. (1870, before the annexation of a part of Fairfield) 18,969; 1880, 27,643.

Bridgeport, Belmont co., O., R. R. junc., on the O. River, opposite Wheeling, with which it is connected by a bridge. Pop. 1870, 1178; 1880, 2395.

Bridge'ton, R. R. centre, a city, pt. of entry, and cap. of Cumberland co., N. J., is situated on both sides of Cohansy River, a tide-water stream, 20 m. from Del. Bay, 37 m. S. of Phila., and 127 m. S. of New York. As a pt. of entry it is second in the State. It is the leading city of S. N. J. in the variety and value of its manufactured products. Here are located the S. Jersey Inst., for both sexes, opened in 1870; the W. Jersey Acad., Ivy Hall a select boarding-school for young ladies, and a children's home for the care of destitute children. Dr. Jonathan Elmer, a Bridgetonian, was a member of the Revolutionary Cong. Pop. 1870, 6830; 1880, 8732.

Bridge'water, Plymouth co., Mass., on R. R., 27 m. S. of Boston. It contains a State Normal School, an acad., and a State almshouse. Pop. pt. 1870, 3660; 1880, 3620.

Bridge'water (FRANCIS HENRY EGERTON, EARL OF, b. Nov. 11, 1758, was a son of John Egerton, bp. of Durham; inherited the earldom in 1823, and d. without issue in 1829. By his last will he left £8000 to be paid to the authors of the best treatises *On the Power, Wisdom, and Goodness of God as manifested in the Creation*. He was an Anglican priest.

Bridge'water Treatises, a celebrated series of works named in honor of the earl of Bridge'water (see preceding article). The series consists of eleven treatises, of which the most famous are: 1. *The Hand as Evincing Design*, by Sir Charles Bell; 2. *Astronomy and General Physics with Reference to Natural Theology*, by Rev. William Whewell.

Bridg'ton, on R. R., Cumberland co., Me., 38 m. from

The construction of wooden B. was greatly improved by Col. S. H. Long of the U. S. Engineers in 1828, of whose plans the Howe and McCallum B. are further improvements. The most remarkable single-arch wooden B. ever constructed was built by Lewis Wernwag over the Schuylkill at Phila. Its span was 340 ft. It was unfortunately destroyed by fire in 1838.

For permanent structures on great lines of transportation, stone B. of one or more arches are generally used, but where great span is required, iron has in later yrs. become the favorite material. A remarkable structure of this kind may be seen in the aqueduct B. over Rock Creek, between Georgetown and Wash., D. C., built by Gen. M. C. Meigs, U. S. Engineers. It is built of cast iron, and has a span of 200 ft. The St. Louis B., crossing the Miss., built by Capt. James B. Eads, has 1 span of 520 ft. and 2 of 515 ft., rising 60 ft. above the spring.

Suspension B. have been employed in many cases in which intermediate piers cannot be conveniently introduced. The Menai B. over the strait between Caernarvonshire and the island of Anglesea, finished in 1826, was built by Telford,

Portland; is accessible by steamboat from the foot of Sebago Lake. Pop. pt. 1870, 2685; 1880, 2863.

Brienne, bre-en', or **Brienne-le-Château**, called also **Brienne-Napoléon**, a town of Fr. on the river Aube, 23 m. E. N. E. of Troyes. Here was a military school in which Nap. I. was ed. In Jan. 1814 a battle was fought here between Nap. and the allies, in which the latter were victorious. Pop. 1918.

Brigan'tes, a powerful nation of anc. Brit., inhabiting what is now the N. of Eng.

Briggs (CHARLES AUGUSTUS), D. D., b. in New York Jan. 15, 1841; studied at the Univ. of Va., the Union Theological Sem. of New York, and the Univ. of Berlin; became pastor at Roselle, N. J., in 1870, and prof. of Heb. at the Union Theological Sem. of New York in 1874, and translated and edited the commentaries to the Psalms and to Ezra in *Lange's Commentaries*. Ed. of *Presbyterian Review*.

Briggs (GEORGE NIXON), LL.D., a lawyer and judge, b. in Adams, Mass., April 13, 1796; was gov. of Mass. from 1844 to 1851, also pres. of Bap. Missionary Union. D. Sept. 12, 1861.

Briggs (HENRY), an Eng. math., b. near Halifax, Yorkshire, in 1556, ed. at Cambridge; Savilian prof. of geom. at Ox. 1619; made important contributions to the theory of logarithms, and pub. *Arithmetica Logarithmica*. D. 1631.

Brig'ham (AMARIAH), M. D., b. near New Marlborough, Mass., Dec. 26, 1798; became supt. of the lunatic asylum at Utica, N. Y., in 1842; author of *The Anat., Physiology, and Pathology of the Brain*. D. Sept. 8, 1849.

Brigham (REV. CHARLES H.), b. in Boston, Mass., July 27, 1820, grad. at Harvard; became a pastor, and from 1866 was prof. of biblical archaeology and ecclesiastical hist. in the Meadville (Pa.) Theological School, and was the author of contributions to periodical lit. D. Feb. 19, 1879.

Bright (JESSE D.), a lawyer and judge, b. at Norwich, Chenango co., N. Y., Dec. 18, 1812; U. S. Senator from Ind. 1845-62. D. May 20, 1875.

Bright (JOHN), an Eng. orator and statesman, b. near Rochdale Nov. 16, 1811. He is a Friend. About 1840 he gained distinction as an orator of the Anti-Con Law League; was elected a member of Parl. for the city of Durham in 1843, and for Manchester in 1847. Cobden and B. became the prin. leaders of the Manchester school or party, which was not identified with either of the great political parties, but advocated a pacific foreign policy and electoral reform. He opposed the Crimean war against Rus. and the Chi. war, and during the c. war in the U. S. expressed his sympathy with the U. cause in several eloquent speeches. In 1867 the friends of reform triumphed, and procured the passage of a bill granting the right of suffrage to every householder in a borough. He entered the cabinet of Mr. Gladstone in Dec. 1868, as pres. of the board of trade, and resigned on account of ill health 1871; again a member of Mr. Gladstone's cabinet 1880, resigned 1882.

Bright'on, formerly **Brighthelmstone**, a town of Eng., on the Eng. Channel, 50 m. S. of Lond. It is the S. terminus of the Lond. and E. Railway. To resist the inroads of the sea, a sea-wall 60 ft. high has been constructed, which forms a fine promenade. It is a fashionable watering-place; contains the Pavilion, a fantastic structure built by George IV. when Prince of Wales; a fine terrace, called the Marine Parade; is the seat of Brighton Coll. and of the Sussex Lit. and Scientific Inst. Steamers ply between B. and Dieppe, Fr. Pop. 197,328.

Brighton, Suffolk co., Mass., on R. R. 5 m. W. of State house: had long a noted cattle-market. It became a part of the municipality of Boston Jan. 5, 1874.

Bright's Disease, Albuminuria, or Nephria, so called after the Eng. phys. Dr. Bright, who first investigated its character, consists essentially of a degeneration of epithelium of the kidneys. This impairs the excreting powers of the organ, so that the urea is not properly removed from the blood. The disease is characterized by albuminuria. When we apply heat and nitric acid to the urine from a kidney so affected, albumen is coagulated; under the microscope we observe casts of the tubules of the diseased organ. Headache and sickness of stomach are common symptoms, and dropsy usually attends the disease. The retina is usually attacked by a degenerative inflammatory disease, which impairs the sight, and is detected by the ophthalmoscope.

The causes are, indulgence in strong drinks, exposure to wet and cold, gout, and syphilis. The indications for treatment are, to remove any of those causes which may be present, relieve congestion of the kidneys, at the same time endeavoring to increase strength by iron and other tonics. When considerable dropsy occurs, cathartics may be called for. B. D. may be either acute or chronic. The prospect of recovery is small, but patients sometimes attain a comfortable, but generally a precarious, degree of health.

E. D. HUDSON, JR.

Brill (*Rhombus vulgaris*), a European flatfish, related to but inferior to the turbot, distinguished by its want of tubercles on the upper surface, and by the color, which is a brown on the upper side, sprinkled with white pearly spots. It reaches a weight of 8 lbs. or thereabouts.

Brimstone, common name for SULPHUR (which see).

Brindisi, brin'de-see (anc. *Brundisium*), a seaport of It., on a bay of the Adriatic, was for many centuries the prin. port on that sea, but during the Middle Ages the harbor was choked up by sand. In 1860 it was dredged out, so that large steamers now enter, and the opening of the Suez Canal has added to its importance. A railway connects it with Ancona and Milan. Pop. 16,719.

Brindley (JAMES), an Eng. mech. and engineer, b. at Thornst. in Derbyshire, in 1716; was the engineer of a canal from Worsley to Manchester, completed in 1761, which was the first navigable canal made in Eng. D. Sept. 27, 1772.

Brine Shrimp, an active, translucent crustacean, the *Artemia salina*, a branchiopod 1 inch long, found especially in the half-evaporated sea-water of the salt-works of Lyminston, Eng. The workmen believe that these animals clarify the brines, and they therefore are careful to put them into such brines as appear to be without them. They breed rapidly and become very numerous. *Artemia fertilis* is extremely abundant in the Great Salt Lake.

Brinton (D. G.), SEE APPENDIX.

Briou, bre-on' (GUSTAVE), a Fr. artist, b. at Rothau (Vosges) in 1824. His *Sixth Day of Creation*, exhibited in Salon in 1867, was brought to New York in 1872. D. Nov. 6, 1877.

Brissoit de Warville, bre-so' deh var-veel' (JEAN PIERRE), a Fr. Girondist and political writer, b. near Chartres Jan. 14, 1754; about 1788 he visited the U. S. to promote abolition of the slave-trade; in 1791 elected to National Assembly by the voters of Paris; in the convention he opposed the execution of the king. Guillotined Oct. 31, 1793.

Bristed (CHARLES ASTOR), b. in New York Oct. 6, 1820, ed. at Yale Coll., and Trinity Coll., Cambridge; author of *The Infuence Theory of Gort.* D. Jan. 15, 1874.

Bristol, a maritime city of Eng., on the Avon at its confluence with the Frome, 8 m. from the sea, 11½ m. N. W. of Bath, 118 m. W. of Lond., and is the terminus of the Great W., the Bristol and Exeter, and the Midland railways. It was formerly, next to Lond., the chief commercial town of Eng., and has now an extensive trade. It has a cathedral, begun about 1150, the ch. of St. Mary Redcliffe, completed in 1376, and many fine public buildings, and religious, scientific, and benevolent insts. Pop. 206,503.

Bristol, Hartford co., Conn., on R. R., 18 m. W. S. W. of Hartford. Pop. tp. 1870, 3788; 1880, 5347.

Bristol, Bucks co., Pa., on R. R. and the Del. River, 19 m. above Phila., and nearly opposite Burlington, N. J. Has a mineral spring. Pop. 1870, 3269; 1880, 5273.

Bristol, a port of entry and cap. of Bristol co., R. I., on R. R. and Narragansett Bay, 16 m. S. S. E. of Providence and 7 m. S. W. of Fall River. Its harbor will admit large vessels. Mt. Hope is situated in B. tp. Pop. tp. 1870, 5302; 1880, 6028.

Bristol, a city, cap. of Sullivan co., Tenn., partly in Washington co., Va., on R. R., 130 m. E. N. E. of Knoxville. It is the seat of King Coll. Pop. 1880, 1647.

Bristol Channel, an inlet of the Atlantic Ocean, in the S. W. part of Eng., is bounded on the N. by Wales and on the S. by Somerset and Devonshire. At the E. end it communicates with the estuary of the Severn. It is the largest inlet of G. Brit. and has a coast-line of 220 m. The tides rise here to an extraordinary height—at Bristol about 40, and at Chepstow sometimes 70 ft.

Bristow (BENJAMIN H.), b. at Elkton, Todd co., Ky., in 1833; studied law, and practised in Ky. till 1861, when he became major of the 25th Ky. Volunteers, and afterward col. of the 8th Ky. Cav.; was appointed atty.-gen. in 1873; became sec. of U. S. treas. 1874-76.

Brit, a name applied to the young of the herring on the coasts of N. Eng. and the Brit. provs. of N. Amer.

Britannia, the anc. name of the island of G. Brit., given, it is said, by Julius Cæsar to the island, which was before called *Albion*, although the name *Britannica Insula* was applied to the Brit. Islands collectively before his time. It was then inhabited by the Britons (Lat. *Britanni*), who were probably not the aborigines. They were rude and uncivilized, their religion being a sanguinary Druidism. They offered a long, brave, but unsuccessful resistance to the Romans. The S. portion of the island being finally conquered about 75 A. D. But the Romans were unable to subdue the N.

part, inhabited by the Caledonians and Picts, to restrain whose incursions several long walls and ramparts were built. The Romans retained possession of their conquests until about 420 A. D., when disasters at home compelled the withdrawal of their legions, and the country was soon after conquered by the Sax., and in 1066 by the Normans.

Britannia Metal, an alloy of tin with a little antimony, zinc, and copper, is largely used in the manufacture of coffee-pots, tea-pots, and other vessels. It is harder than pewter, and not so easily indented or bent. The proportions of the metals combined to make this alloy are various. The average composition in 100 parts is—tin, 85½; antimony, 10½; zinc, 3; and copper, 1. The present composition of the alloy used at Birmingham, Eng., is stated to be 90 of tin, 8 of antimony, 2 of copper.

Britannicus, a surname which the Rom. senate bestowed in 42 A. D. on the emp. Claudius and his newly born son by Messalina, Claudius Tiberius Germanicus. The latter was poisoned by the emp. Nero in 55.

British America is usually applied to that portion of N. Amer. which lies N. of the parallel 49° N., except Alaska. It also extends several degrees farther S., where the great lakes form the boundary between it and the U. S. This vast region was formerly divided into numerous terrs. or provs., but afterward the whole of it was admitted into the Dominion of Canada, with the exception of Newfoundland and Labrador.

B. A., in a more extended sense, comprises all the Brit. possessions in Amer., with Brit. Guiana, the Brit. W. I., etc.

British Columbia, a prov. of the Dominion of Canada, bounded S. by the U. S. E. by the Rocky Mts., W. by the Pacific Ocean. It includes the islands of Queen Charlotte and Vancouver. Certain islands in the Strait of San Juan de Fuca, having been claimed by both the U. S. and G. Brit., were held under joint military occupation until Oct. 1872, when by a decision of the emp. William I. of Ger., to whom the dispute was referred, they became U. S. terr. These islands, of which San Juan is the most important, are 10 in number. Area, 341,305 sq. m. Pop. in 1881, 49,459, including 25,661 Indians and 4350 Chinese.

British Gum, SEE DEXTRENE.

British Museum, The, in Lond., was established in 1753 by act of Parl. in pursuance of a bequest of Sir Hans Sloane to the nation of his cabinets of nat. hist. and library, numbering 50,000 vols., in return for a sum of £20,000 to be paid to his heirs. The palace of the duke of Montague on Russel st. was purchased for the reception of the collection. In 1801 the Elgin Marbles, in 1823 the library of George III., containing 80,000 vols., were added to the M., and it has been subsequently enriched by the Granville library, the Sir William Temple coin cabinet, the Layard and Loftus collection of Assyrian, and the Lady Webster collection of Mex. antiquities, and other extensive accessions. The building was in 1823-47 enlarged and renovated at a cost of £150,000. The collections of antiquities are altogether the completest in Europe. The M. contains also the finest collection of vases, among them the famous Portland Vase, and the largest collections of Gr. and Rom. sculpture in the world, and the cabinets of natural objects embrace every prov. of science.

Briton, a native of anc. Brit. or Britannia. Cæsar (55 B. C.) found the island occupied by two races. In the interior were the primitive Celts, who had been driven back by a people, probably of Gothic descent, who had colonized the S. E. part of the island. The lang. of the Celtic B. was similar to the Welsh. The Picts, who inhabited the N. part of the island, were probably Celtic. The term B. is now used as a gen. name of the people of the modern G. Brit.

Brittany, SEE BRETAGNE.

Broad'us (REV. ANDREW), D. D., b. in Caroline co., Va., Nov. 4, 1770, became a pastor in Va. Compiled *Dover Selection* of hymns and the *Va. Collection*. D. Dec. 1, 1848.

Broad River of the U. S. rises at the foot of the Blue Ridge, in the W. part of N. C. Having entered S. C., it flows in a S. S. E. direction through fertile uplands, and unites with the Saluda at Columbia to form the Congaree. Total length, estimated at 150 m.

Broad Top Mountain, Pa., is in the N. E. part of Bedford co. and the S. part of Huntingdon. It rises about 2500 ft. above the level of the sea. Here are extensive beds of bituminous coal, for the transportation of which a R. R. has been opened to Huntingdon.

Broad'us (JOHN ALBERT), D. D., LL.D., b. Jan. 24, 1827, in Culpeper co., Va., grad. at the Univ. of Va. in 1850; became a pastor, and since 1859 has been a prof. in the S. Bap. Theological Sem., Greenville, S. C. Author of *Treatise on the Preparation and Delivery of Sermons*.

Brocade [It. *broccata*], a silk fabric variegated with gold and silver threads, or a silk fabric on which figures of flowers, foliage, or other objects are formed by the threads of the warp and woof being raised by the Jacquard loom or other means.

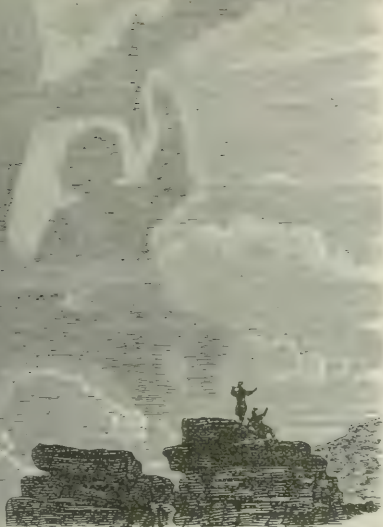
Broc'chi (GIOVANNI BATTISTA), an It. naturalist, b. at Bassano Feb. 18, 1772. He pub., beside other works, *Sub-Apennine Fossil Conchology, with Geological Observations on the Apennines*, &c. D. Sept. 28, 1826.

Broccoli, brok'-ole, a variety of the cabbage (*Brassica oleracea*). It has considerable resemblance to cauliflower, from which it differs by the purple or green color of its heads and its greater hardness. It is propagated by sowing the seeds in the spring or in autumn, and transplanting the young plants once or twice. The leaves are often tinged with purple.

Brock (SIR ISAAC), a Brit. gen., b. Oct. 6, 1769; in 1812 captured Gen. Hull and his army at Detroit; was killed at the battle of Queenstown, Oct. 13, 1812.

Brock'en, The, or Blocks'berg (anc. *Mons Bruce-ferus*), a mt. of Prus., the highest summit of the Hartz Mts., 3740 ft. above the sea. The B., according to an anc. belief, is the scene of the annual dance of the witches on Wal-

purges Night May 1. This superstition probably owes its origin to the phenomenon known as "The Spectre of the B." which is simply the magnified reflection of the forms



The Spectre of the Brocken.

of men and other objects against the sky, the vapors of the atmosphere acting as a vast concave mirror.

Brockett (LANS PIERPONT), A. M. (Amherst Coll. 1857), M. D. (Yale Coll. 1839), b. Oct. 16, 1820, in Canton, Conn.; ed. at Conn. Lit. Inst., Brown Univ., and New York, Wash., and Yale Med. Colls.; practised his profession in Conn. and Ky. till 1847; from 1847 to 1857 partner in publishing house, but engaged in literary pursuits a part of the time. Has been connected with several newspapers and periodicals, and has been author, in whole or in part, of over 60 vols., mostly historical, biographical, geographical, and statistical, including cyclopædic works, and a frequent contributor to magazine and review lit. He was a large contributor to and an assistant ed. of *J. S. Unit. Cycl.* Ed. of *Descriptive America*.

Brockport, Monroe co., N. Y., on R. R. and the Erie Canal, 17 m. W. of Rochester. A State Normal School is located here. Pop. 1870, 2817; 1880, 1971.

Brockton, Plymouth co., Mass., 20 m. S. of Boston, on R. R.; is the seat of courts for the first Plymouth dist. Pop. 1870, 8007; 1880, 13,608.

Broderick (DAVID COLBRETH), b. at Wash., D. C., in 1818; removed to Cal. in 1849, was elected a senator of the U. S. in 1856, and opposed the extension of slavery. Killed in a duel Sept. 21, 1859.

Brodhead, Green co., Wis., on R. R. and Sugar River, 90 m. W. of Milwaukee. Pop. 1870, 1548; 1880, 1254.

Brodhead (JOHN ROMEYN), LL.D., an historian, son of Rev. Dr. Jacob Broadhead, b. in Phila. Jan. 2, 1814, grad. at Rutgers Coll. in 1831, and was admitted to the bar in New York in 1835. After 2 yrs. he began to devote himself to the study of Amer. hist. In 1839 became sec. of the U. S. legation at the Hague, in 1841 was appointed to search out and copy documents relating to the early hist. of N. Y. These documents were pub. in 11 4to vols. Was sec. of legation in Lond. 1846-49, and naval officer of the pt. of New York 1853-57. Wrote *Hist. of the State of N. Y.* D. M. 6, 1873.

Brodie (SIR BENJAMIN COLLINS), D. C. L., F. R. S., an Eng. surgeon and author, b. in Wiltshire June 9, 1783. Made valuable contributions to physiology. D. Oct. 21, 1862.

Broken Bones. See FRACTURE.

Broken Breast. See BREAST, ABSCESS OF.

Broken Wind, a disease of the horse, characterized by difficulty in the act of expiration. The symptoms are best observed when the horse is exercised, the breathing becoming labored, the nostrils dilated, the eyes bloodshot, showing imperfect purification of blood in the lungs. The only treatment is palliative—keeping the alimentary canal in order, and providing proper food. The hay should be cut and wet. Fresh grass in its season is the proper food.

Broker [Norman Fr. *brogour*], in gen., a species of agent employed to act as a middleman or negotiator between distinct parties, such as buyer or seller, though this statement would not include a pawnbroker. He differs from a factor, since he does not have possession of the property with which he deals. He is in a certain sense the agent for both parties, though primarily of the party by whom he is employed. Accordingly, until he closes the negotiation he is the agent of the party who employs him. When he has closed the negotiation, he usually gives to either party a memorandum of the transaction, and in the

case of the sale of goods gives a "bought and sold note." For the purpose of complying with the rule of law requiring in certain sales a written memorandum, he is the agent of both parties. His compensation is usually derived from commissions upon the transaction, termed "brokerage." It is earned when the negotiation is completed.

In the large cities B. form a distinct class of persons, devoting themselves to special depts. of agency, such as insurance B., stock B., real-estate B., produce B., and the like. A person, however, may act as a B. in a single transaction without following the business, and be governed in the main by the rules already stated.

T. W. DWIGHT.

Brome Grass (*Bromus*), a genus of plants of the order Gramineæ, comprising numerous species. The *Bromus mollis* grows well on poor soils, and is readily eaten by cattle. The tall B. G. (*Bromus giganteus*) affords a large bulk of foliage, not much relished by cattle. The *Bromus secalinus*, commonly called chess or cheat, is a weed which infests grain-fields. It resembles rye (*secale*) when it is young, hence the specific name *secalinus*.

Bromelia, brom-e'll-i-a, a genus of plants of the order Bromeliaceæ, named after the Swe. botanist Bromel, are natives of tropical Amer. The genus comprises a number of species, among which are *B. pigma*, which abounds in the Philippine Islands, and is cultivated for its fibre; and the *B. pinguis* of the W. I., from the fruit of which a vinous liquor is prepared.

Bromeliaceæ, a natural order of endogenous plants, natives of tropical climates. The order comprises more than 150 species, among which are the pineapple (*Ananas sativus*) and the *Tillandsia usneoides*, which is called Sp. moss or old man's beard, the fibre of which is used for mattresses. Many of the species grow on trees and are capable of vegetating for a long time without contact with the earth. The leaves of some are so formed as to retain near their base a quantity of water. Many plants of this order afford valuable fibres.

Bromide, a chemical term applied to a salt formed by the combination of bromine with a metal. Several B., especially B. of potassium, are used in med.; others are used in photography.

Bromine, or **Brômium** [from Gr. *βρῶμος*, a "strong and fetid odor"], a chemical element discovered in 1826 by Balard. It resembles chlorine in chemical habitudes, and exists in minute quantity in sea-water and the ashes of marine plants. It is also found in many mineral springs, especially those of Kissingen, Tenbury in Worcestershire, Saratoga and Ballston, N. Y., and in many brines, especially those of Pa. and W. Va., and in the waters of the Dead Sea. B. also occurs as a bromide of silver in the mines of Chili and other countries. It is usually extracted from the mother-liquors or bitters of brines, or from the purification of rock-salt and chloride of potassium by the agency of chlorine or of binoxide of manganese and sulphuric acid. In the U. S. much B. is made at Tarentum, Sligo, and Natrona, Pa., at Pomeroy, O., and Kanawha, W. Va.

B. is a dark reddish-brown liquid, having a powerful suffocating odor and emitting heavy red fumes. Its specific gravity is 2.976; it boils at 145.4° F., and freezes at 19.4°. It is very poisonous; is soluble in alcohol and ether, slightly so in water. Its equivalent is 80. It combines readily with metals; forms hydrobromic acid with hydrogen, and with oxygen bromic acid and hypobromous acid, all of which are analogous in their properties to the corresponding compounds of chlorine. B. possesses bleaching and disinfecting properties.

C. F. CHANDLER.

Bronchitis, bron-k'i'tis [from *bronehus*, and *-itis*], inflammation or hyperemia (congestion) of the mucous membrane lining the air-passages, and usually accompanied by a more or less excessive secretion of mucus from that membrane. Young children, old people, and those who are feeble or ill-nourished are especially liable to it. More or less B. is usually associated with pulmonary consumption, with obstructive heart-disease, and with asthma. It is often seen in patients with intermittent fever, typhoid, measles, and smallpox. Perhaps the most fruitful cause is exposure to sudden and extreme changes of the weather, leading primarily to that form of acute B. which is known as a "cold on the lungs." Influenza is an epidemic B. caused by some unknown influence probably existing in the air.

The symptoms of B. are of various character, varying according as the disease is seated in the larger or the smaller bronchi: the disease is also much more formidable in young children and in aged persons than in others. There is especial danger in the case of infants that collapse of small portions of the lung may ensue. B. may be either chronic or acute. Uncomplicated chronic B. may require the use of sedatives or tonics, with systematic exercise and careful attention to the other hygienic conditions, but the treatment of individual cases will vary with the circumstances and special condition of the patient. Acute B. is in gen. to be treated by expectorants or emetics, to remove the secretion, and by diaphoretics and counter-irritants, such as mustard, on the extremities and the chest, to relieve the congested blood-vessels of the bronchi. When the case is extreme and suffocation threatened, an infant may be often relieved by a warm bath. There are other special remedial measures which may be resorted to under the advice of the physician.

E. D. HUDSON, JR.

Bronchocele. See GOITRE.

Bron-té (CHARLOTTE), "Cutter Bell," an Eng. novelist, b. at Thornton, in Yorkshire, Apr. 21, 1816. Her father, Patrick Brontë, originally *Pronny*, became curate of Haworth (Yorkshire) in 1820. Her first successful work was *Jane Eyre*, an *Autobiography*, edited by Currer Bell, 1847. Married in 1854 to the Rev. A. B. Nichols, her father's curate. D. Mar. 31, 1855.

Bronze, an alloy of copper and tin in variable proportions, is harder and more fusible than copper, but less malleable. Bell-metal is a variety of B., and the common com-

monly called brass are made of this alloy. B. was used by the anc. for weapons and utensils before the art of working iron had been invented. The metal which the Romans called *æs* was probably B. The brass mentioned in the Bible is supposed to have been either pure copper or an alloy of copper and tin. B. is extensively used in the form of statues, machinery, and ordnance. Its hardness and durability render it well adapted for the speculums of telescopes. B. when well prepared is the most durable of metallic materials, except gold, platinum, and some rare metals. Tempering produces on B. an effect directly opposite to that on steel; and in order to render B. malleable it must be heated to redness and quenched in water. A mixture of 90 parts of copper with 10 of aluminium produces a valuable alloy which is used as a substitute for B. The varieties of B. are composed of the following proportions: B. cannon, copper 9, tin 1; Chl. gongs, copper 5, tin 1; musical bells, copper 6, tin 1; house bells, copper 4, tin 1; large bells, copper 3, tin 1; B. for toothed wheels, copper 10, tin 1; telescope or speculum metal, copper 2, tin 1; B. for mathematical instruments, copper 12, tin 1.

Bronze, Age of. It is held by some archaeologists that when man first began to grow civilized his weapons and utensils were made of stone. Then came a period when copper and its alloys were used. After which men learned to smelt and work iron. These 3 hypothetical periods are styled respectively the Age of Stone, the Age of Bronze, and the Age of Iron.

Bronze Wing, or Bronze Pigeon, the name of several species of pigeons, natives of Australia, mostly belonging to the genus *Phaps* of Selby. They have wings marked with lustrous bronze-colored plumage. The common B. W. is *Phaps chalcopetra*.

Bronzing is the covering of articles made of clay, wood, or other material with a substance which gives them the appearance of being made of bronze. Bronze is sometimes used, either applied mechanically or by the electrolytic process. There are also certain chemical reactions which will impart a bronzed appearance to other metals.

Brooke (Sir JAMES), rajah of Sarawak, b. of Eng. parents in Bengal Apr. 29, 1803; served in the Brit. army in India; in 1838 went to Borneo, whose sultan in 1841 appointed him gov. of Sarawak; framed a code of laws for the natives of Sarawak, and displayed great energy in the extirpation of pirates. D. June 11, 1868.

Brookfield, Linn co., Mo., on R. R., which has extensive shops here. Pop. 1870, 402; 1880, 2264.

Brookhaven, a city, cap. of Lincoln co., Miss., on R. R., 34 m. S. by W. of Jackson. It has a female coll. Pop. 1870, 1614; 1880, 1615.

Brookings, Dak. See APPENDIX.

Brookline, R. R. June, Norfolk co., Mass., on the Charles River, which separates it from Boston and Cambridge. A small part of this tp. has been annexed to Boston since the census of 1870. Pop. tp. 1870, 6650; 1880, 8057.

Brooklyn, city, Poweshiek co., Ia., on R. R., 104 m. W. of Davenport. Pop. 1870, 971; 1880, 1234.

Brooklyn, a city, seaport, and cap. of Kings co., N. Y., having a shore line of $8\frac{1}{2}$ m. on N. Y. Bay and the East River, an estuary of L. I. Sound. Lat. $40^{\circ} 51' 30''$ N. lon. $73^{\circ} 59' 30''$ W. from Greenwich. Area, 25 sq. m., or 16,000 acres.

The commerce of B. has mostly grown up since 1844, previous to which date it had only a small coasting trade. It has now over 25 m. of dockage, and \$160,000,000 of private and corporate cap. have been invested in docks and warehouses, beside a large amount expended by the U. S. gov. in its navy yard and by the city and State in their docks and piers. In these warehouses are stored imported goods in bond, amounting to \$150,000,000 annually: flour, grain, provisions, cotton, refined sugar, molasses, glucose, petroleum, etc., for export or consumption, to the amount of more than \$200,000,000 more; coal, ship stores, lumber, bricks, and building materials, to the amount of \$50,000,000 more, are stored on sheds and wharves in the upper part of the shore line, and the vast petroleum trade is partly within its limits.

Here, too, are ship-yards, gas-works, lumber-yards, sugar-refineries, etc. Nearly 4000 vessels are unloaded every yr. at the B. docks. B. is one of the largest grain depots in the world. The boats engaged in the grain trade are valued at \$20,000,000, and its elevators and warehouses have storage for 32,000,000 bushels at once. The grain and provision trade with Europe employs 7 lines of steamships, and a fleet of transient steamers and ships. Railway lines are now build-

ing and steam ferries in progress, by means of which the grain, provisions, sugar, petroleum, and other imports and exports will be brought from all points to the B. warehouses without breaking bulk, for shipment and distribution.

Manufactures.—The U. S. census of 1880 gives the value of the aggregate amount of the manufactures of the city as \$177,223,142, not including those owned in and run from New York city. The largest of these is that of sugar and molasses, the annual product of which, from 11 establishments, was \$59,711,168; petroleum oil refining, \$15,115,293, from 18 works; paints, lead, and zinc, 28 factories produced \$8,442,938, and slaughtering and meat-packing, \$8,010,492, from 28 establishments. Three other items—drugs and chemicals, carpentering, and bakery products—exceeded \$5,000,000 in the amount of their products. There were in all 5201 manufacturing factories in the city.

Finances.—Permanent and temporary debt, Dec. 1881, \$38,174,421; tax levy, \$6,316,073.28; valuation for 1881, \$260,908,625; taxes collected to Dec. 1881, \$5,150,621.16.

Courts.—A city court of 3 judges sitting in gen. and special sessions, 6 district justices and 1 central court, supreme and county courts, together with U. S. circuit and district courts; a large city jail and county penitentiary.

City Institutions.—A fine City Hall, a Municipal Building, the Kings co. c-h., U. S. court rooms, and P. O. are grouped together. The City Hospital is on Raymond st., the Truant Home, County Hospital, Almshouse, and Insane Hospital at Flatbush; the Inebriates' Home at Bay Ridge.

Charitable Institutions.—Sustained mainly from private funds, are: 6 hospitals and a seventh building, a maternity hospital, 6 homes for aged and infirm of both sexes, 5 orphan asylums, 2 nurseries, 7 gen. or special dispensaries, 3 diet dispensaries, a home for incurables, sanitariums, employment societies, a Good Samaritan home, private insane asylums, an asylum for feeble-minded children, etc.

Education.—There were in 1880, 59 public schools in B., viz.

—1 high school, 42 grammar schools, 4 primaries, 4 colored, 6 branch, and 2 truant schools, also 16 evening schools. Number of children of school age, 181,083; enrolled in public schools, 96,063; daily attendance, 52,893; number of teachers, 1,397—48 men and 1349 women; teachers' wages, \$740,365.61; value of school-house sites and buildings, \$4,943,532.32; whole amount expended for public schools in 1880, \$1,162,894.82. Aside from these public schools, there were 3 incorporated schools of the highest order—the Polytechnic and Packer Insts. and the Adelphi Acad.—many excellent sems. and acads. for both sexes, 1 univ., 2 colls., 1 med. coll., 3 business colls.; 3 large and many smaller public libraries, aggregating over 200,000 vols.; museums of nat. hist., antiquities, and mechanical art; an acad. of design, 2 art associations, etc.

The newspapers include 4 dailies, 5 weeklies, 2 monthlies, and many papers of irregular issue.

Churches.—There were in B. in 1881, 285 chs. and missions. The leading denominations are R. Cath., Meth., Epis., Bap., Presb., Reformed (Dut. and Ger.), Congl., Lutheran, Univ., Unit., Friends, Jews, Disciples, etc.

Principal Buildings.—The City Hall, Kings co. c-h., the Municipal Building, Acad. of Music, Acad. of Design, B. Library buildings, L. I. Historical Society building, the Packer Collegiate Inst., Ch. Charity Foundation, the New B. Orphan Asylum, Coll. of St. John the Bap., the new R. Cath. cathedral, Ch. of the Holy Trinity, etc., Low's buildings, and the Phoenix and Continental Fire Insurance buildings, etc.

Parks and Cemeteries.—Prospect Park is of irregular figure, having an area of 522 acres, beside a parade-ground of 40 acres adjoining. It has 2 fine boulevards, 200 ft. wide, one extending to the sea, 6 m. distant, the other to E. New York. Its grand old forest trees, fine landscapes and vistas, its lakes, bridges, and drives are much admired. There are 6 or 8 smaller parks, the most noted being Washington Park, where are entombed the remains of 11,000 of the martyrs of the prison-ships of the Revolution. Greenwood Cemetery, which has nearly 600 acres inclosed, is renowned for its beauty and the magnificence of its monuments. The Evergreens, inclosing 207 acres, is also an attractive cemetery.

Railways and Rapid Transit Roads.—There are now more than 40 R. R. routes having one or both termini in B. Their whole extent exceeds 250 m. Of these 16 are or are to be propelled partially or entirely by steam. There is one elevated R. R. nearly finished, and several others projected.

Ferries.—There are 10 ferry companies with 18 ferries.

Brooklyn or East River Bridge is a suspension bridge con-



East River Bridge.

necting B. with New York, and extending, with its approaches, from Sands st., B., to City Hall Park, New York, 5880 ft., about $1\frac{1}{2}$ m. It has 2 towers 276½ ft. high situated

on the shores; length of river span, 1595½ ft. In each are 2 arches, for entrances to the bridge, which is supported by 4 large and many smaller cables and by straight stays running

from the top of each tower each way. The cables and suspended structure are of steel, and the floor Georgia pine. The bridge floor at the towers is 118 ft. and at the centre 135 ft. above high water. The cables are anchored 930 ft. from the towers on each side; the granite anchorages, 119 x 132 ft. at base, rise 90 ft. above high water; weight, 60,000 tons. The 4 great cables are 15½ inches in diameter, made of steel wire a little over ¼ inch thick, and each cable contains 5282 wires. The foundation was commenced Jan. 3, 1870, and the bridge completed in 1883, costing about \$15,500,000, of which B. pays ⅔ and New York ⅓. The bridge was formally opened, and the event publicly celebrated, May 24, 1883. It is 85 ft. wide, and contains 5 parallel avenues—the outside ones for vehicles, the central one for foot-passengers, and those adjoining that, on each side, for R. R. cars drawn by a stationary engine and an endless rope.

Water-Works.—B. is supplied with water from ponds and running streams on the S. side of L. I. The water is brought by a conduit to the great reservoir, into which it is pumped by 4 or 5 powerful engines. The present consumption averages 35,000,000 gals. a day. The cost of the water-works was \$11,375,500; amount of water rates collected in 1880, \$998,000.

Banks, Etc.—There are 12 banks of discount (10 national), 15 savings banks, 1 trust co., 3 safe deposit cos., 7 gaslight cos., 2 electric light cos., etc.

Population.—In 1800, 3298; in 1850, 96,850; in 1860, 266,661; in 1870, 396,099; in 1880, 566,663.

History.—First settlement, 1636–37; an Indian tribe, the Mamekewicks, the previous inhabs. First ferry established 1642. There were, about 1643, 5 hamlets on the present site of B.—viz., "The Ferry," "Breuckelyn," near present Hoyt st.; "Gowanus," in S. Brooklyn; "Bedford," from present Franklin avenue and Fulton st. eastward; "The Wallabout," around Wallabout Bay. These hamlets were placed under one corporate jurisdiction in 1646. In 1665 it had nearly 500 inhabs., but grew very moderately for the next 100 yrs. In 1800 the 5 hamlets, still quite distinct, had but 3298 inhabs. On Aug. 27, 1776, the battle of B. was fought, over the spaces now occupied by Prospect Park, Washington Park, Greenwood, Evergreens, and Cypress Hills cemeteries. Its hist. and result are well known. The B. navy-yard was begun in 1801, and has been largely increased since. It is now one of the largest and best furnished navy-yards in the U. S. In 1814 B. was fortified, in the expectation of an attack from the Brit. forces, but escaped unharmed. In the late c. war B. took a noble and conspicuous part in raising troops and supplying material aid. Her sanitary fair of Feb. 1864 realized \$402,943.74. The v. charter of B. bears date Apr. 12, 1816; the first city charter, Apr. 8, 1834; consolidation act, uniting Williamsburg and Greenpoint with the W. dist., Apr. 17, 1854. A new charter was granted by the legislature in 1873, and amended in 1880 and 1881. Twenty-five aldermen compose the common council, but the Mayor has vested in him the right, exclusive of the aldermen, to appoint the heads of depts., and therefore is responsible for the proper exercise of the executive powers. L. P. BROCKETT.

Brooks (CHARLES SHIRLEY), an Eng. journalist, lecturer, dramatist, and novelist, b. in Oxfordshire in 1815. He was for several yrs. ed. of *Punch*. D. Feb. 23, 1874.

Brooks (ERASTUS), a journalist, b. at Portland, Me., Jan. 31, 1815, grad. at Brown Univ.; became ed. of the *New York Express* in 1836. Was in N. Y. legislature in 1833, candidate of Amer. party for gov. of N. Y. in 1856, again in the legislature in 1881.

Brooks (HORACE), U. S. A., b. in Boston, Mass., was a son of Maria G. Brooks, the poetess; grad. at W. P. t. in 1835, served in Fla., Mex., and c. wars, and was made brevet brig.-gen. in 1865. Retired Jan. 10, 1877.

Brooks (JAMES), b. in Portland, Me., Nov. 10, 1810, grad. at Waterville in 1831; became a journalist, and in 1836 established the *New York Express*. D. Apr. 30, 1873.

Brooks (JOHN), M. D., LL.D., b. in Medford, Mass., May 31, 1752; served as an officer in the Revolutionary army, practised med. at Medford, Mass., after the war, and became gov. of Mass. 1816–23. D. Mar. 1, 1825.

Brooks (KENDALL), D. D., b. at Roxbury, Mass., Sept. 3, 1821, grad. at Brown Univ. 1841, Newton Theological Inst. 1845; became Bap. pastor, and since 1868 has been pres. of Kalamazoo Coll., Mich.

Brooks (MARIA GOWEN), a poetess, b. at Medford, Mass., about 1795. D. Nov. 11, 1845.

Brooks (NATHAN COVINGTON), LL.D., b. in Cecil co., Md., Aug. 12, 1809, became pres. of the Baltimore Female Coll. in 1848. Beside poems, is an author of school books.

Brooks (Rev. PHILLIPS), D. D., a divine, was b. in Boston, Dec. 13, 1835, and grad. at Harvard 1855; studied in the Epis. Theological Sem. at Alexandria, Va., was ordained in 1859, became pastor of the Ch. of the Advent, in Phila., and in 1862 of the Ch. of the Holy Trinity, where he remained until 1870, when he became pastor of Trinity ch., Boston.

Brooks (PRESTON S.), a politician, b. in Edgefield co., S. C., Aug. 4, 1819, grad. at S. C. Coll. in 1839. When a member of the House of Reps. he violently assaulted Senator Sumner (for words spoken in debate) in the Senate chamber in May 1856. D. Jan. 27, 1857.

Brooks (WILLIAM KEITE), Ph. D. See APPENDIX.

Brooks (WILLIAM T. H.), b. in O. in 1821, grad. at W. P. t. in 1841; became, Sept. 28, 1861, brig.-gen. U. S. volunteers, and major 18th Inf. Mar. 12, 1863; served in Fla., Mex., and c. wars, and was in command of the 10th Corps before Richmond 1864. D. July 19, 1870.

Brookville, Ind. See APPENDIX.

Brookville, cap. of Jefferson co., Pa., on R. R. and Red Bank Creek, 170 m. W. N. W. of Harrisburg. Coal, timber, and iron abound. Pop. 1870, 1942; 1880, 2136.

Broom, a name given to several shrubs of the order Leguminosæ. They belong to the allied genera of *Spartium*, *Genista*, and *Cytisus*. The common B. of Europe (*Cytisus Scoparius*) grows on dry and sandy soils and heaths; the

branches are used for making brooms; the young tops and seeds are strongly diuretic. The Sp. B. (*Spartium junceum*) possesses med. properties like the common B.; the fibre of its branchlets is used for making cloths and ropes. The *Cytisus albus*, or white B., is cultivated in Eng., and bears white flowers which are much admired.

Broom Corn (*Sorghum vulgare*), a plant of the order Gramineæ, is a native of the E. I., and is cultivated in the U. S. It has a jointed stem, which grows to the height of 8 or 10 ft., and bears spikelets, 2 and 3 together, on the ramifications of an open panicle, which is extensively used in the manufacture of brooms, and the seeds are valuable as food for domestic animals. It is stated that this plant was first introduced into the U. S. by Dr. Franklin, who, finding a seed on a whisk that had been imported, planted it and propagated it. The average produce of an acre is about 500 pounds of the brush or material for brooms. The usual practice in harvesting is to bend the stalks about 3 ft. from the ground, leave them for a few days to dry, and then cut them 6 or 8 inches below the brush or panicle.

Bro'ra Beds, a series of strata at Brora, a v. in Scot. Here is a seam of good coal 3½ ft. thick, and the thickest bed of true coal hitherto discovered in any secondary strata of G. Brit.

Bross (WILLIAM), b. at Montague, Sussex co., N. J., Nov. 4, 1813, grad. at Williams Coll., Mass., in 1838; settled in 1848 in Chicago; established in 1852, in connection with J. L. Scripps, the *Daily Democratic Press*, which was consolidated with the *Tribune* July 1, 1858, and was for several yrs. pres. of the *Tribune* co.; was lieut.-gov. of Ill. 1865–69.

Brothers, Lay, an inferior class of R. Cath. monks, not in holy orders, but bound by monastic rules.

Brough, bruf (JOHN), b. in Marietta, O., Sept. 17, 1811, was a printer in his youth, and studied at O. Univ.; became an ed., lawyer, and R. R. pres., and in 1864 was elected gov. of O. by the joint vote of all parties in favor of prosecuting the war against the insurgent States. D. Aug. 29, 1865.

Brougham, broo'am or broo'm (HENRY), LORD, a Brit. statesman, b. in Edinburgh Sept. 19, 1779. He grad. at the Univ. of Edinburgh, and was admitted to the bar in 1800. In 1802 he was associated with Francis Jeffrey and Sidney Smith in founding the *Edinburgh Review*, to which he contributed largely for many yrs. In 1808 he removed to Lond. and entered upon successful practice as an advocate, and in 1810 was returned to Parl., of which he continued to be a member until 1830, distinguishing himself as a legal reformer and promoter of education. He was the leading counsel in the defense of Queen Caroline, wife of George IV., in 1820–21, and it was owing to a significant threat of his that the prosecution was abandoned. In 1830 he was made lord chancellor of the Whig ministry, and was raised to the peerage under the title of Baron B. and Vaux. He retired from the ministry, with his colleagues, in Nov. 1834, after which he pursued an independent political course in the House of Lords. Among his works are *The Objects, Advantages, and Pleasures of Science and Statesmen of the Time of George IV.* He left an *Autobiography*, which was pub. by his directions, soon after his death. D. at Cannes, Fr., May 9, 1868.

Brougham (JOHN), D. at Dublin, Ir., May 9, 1810, ed. to be a surgeon, but reverses of fortune, affecting his family, led him to go on the stage at the Tottenham Theatre, Lond., in 1830. In 1842 B. came to Amer., acted at the Park Theatre, made a professional tour of the theatrical cities of Amer., and then settled down as a member of the stock co. of Burton's Theatre, New York. On Dec. 23, 1850, he opened Brougham's Lyceum, which afterward became Wallack's Theatre. B. did not keep it long, and afterward became a member of Wallack's co., and then again of Burton's. In 1861–62 B. went to Lond., where he remained upward of 4 yrs. In 1866–67 he returned to Amer. On Jan. 25, 1869, he opened Brougham's Theatre on the S. side of 24th st., New York, which afterward became Daly's Fifth Avenue Theatre. He latterly acted at Wallack's Theatre, at Daly's Grand Opera House, and miscellaneous at provincial theatres. B. wrote nearly 40 plays, among which may be mentioned *Don Cesar de Bassano*, *Dunboy & Son*, *Pirates of the Missisippi*, *Night of Right*, and *The Lily of France*. D. June 7, 1880.

Broussa. See BRUSA.

Broussais, broo-sai' (FRANÇOIS JOSEPH VICTOR), b. at St. Malo, in the dept. of Ille-et-Vilaine, Fr., Dec. 17, 1772. On the outbreak of the Revolution he joined the army as a volunteer, but was discharged on account of sickness, and went in 1799 to Paris to pursue a regular course of med.; from 1804 to 1814 served professionally in the army; in 1832 was appointed prof. of gen. pathology in the Acad. of Med., which office he held till his death, Nov. 17, 1838. He was the founder of the physiological system of med., and finally overthrew the so called ontological system represented by Pinel, but lived to see the physiological system itself superseded. Author of several med. works.

Brousson, broo-sôn' (CLAUDE), b. at Nîmes, Fr., in 1647; studied law, and was advocate in Toulouse when the persecutions began against the Huguenots, to whose sect he belonged. After the Revocation of the Edict of Nantes in 1685, he was compelled to flee to Switz. Here he was consecrated to the ministry, and although the gov. of the prov. of Languedoc put a price of 10,000 livres on his head, he returned to Fr., and lived up to 1693 as an itinerant priest in the Cévennes, where he preached in the caves and crags to those who from the surrounding country gathered around him, forming the famous *assemblées du désert*. After a short residence in the Netherlands he re-entered Fr., and began once more to preach in the Cévennes, but was caught, brought to Montpellier, tried on a charge of co-operating with Count Schomberg in a scheme of invading Fr., and broken on the wheel Nov. 4, 1698. He wrote *Lettres au Catholiques romains* and other works.

Brown (AARON V.), a statesman, b. in Brunswick co., Va., Aug. 15, 1795, grad. at Chapel Hill in 1814, removed to Tenn. in 1815; gov. in 1845; P.-M.-sen. of U. S. 1857. D. 1859.

Brown (ALBERT G.), b. in Chester dist., S. C., May 31, 1813; gov. of Miss. in 1843, was re-elected to the U. S. Senate in 1858, but withdrew in 1861. D. June 12, 1880.

Brown (BENJAMIN GRATZ), b. in Lexington, Ky., May 28, 1826, grad. at Yale in 1847; commenced the practice of law at St. Louis, Mo., and edited the *Mo. Democrat* 1854-59; in 1861 raised a regiment and fought on the side of the U.; was U. S. Senator 1863-67, and gov. of Mo. in 1871. He was nominated at the Cin. Convention, May 1872, for the office of V.-P. of the U. S., the Hon. Horace Greeley being the nominee for Pres.

Brown (CHARLES BROCKDEN), a novelist, b. at Phila. Jan. 17, 1771. He founded in 1803 *The Literary Magazine and Amer. Register*. Among his works are *Ormond*, or *the Secret Witness*, and *Jane Talbot*. D. Feb. 22, 1810.

Brown (DAVID PAUL), a lawyer, b. in Phila. in 1795. Author of *The Forum*, or *Forty Years' Full Practice at the Phila. Bar*. D. July 11, 1872.

Brown (FRANCIS), D. D., b. at Chester, N. H., Jan. 11, 1784, grad. at Dartmouth Coll. in 1805; in 1810 was settled over the Congl. ch. in N. Yarmouth, Me., and was chosen pres. of his alma mater in 1815. D. July 27, 1820.

Brown (GEORGE L.), a landscape painter, b. in Boston in 1814. Among his masterpieces is a view in the White Mts. entitled *The Crown of N. Eng.*

Brown (GOULD), a grammarian and teacher, b. in Providence R. I., Mar. 7, 1791. Pub. *Insts. of Eng. Gram.* (1823), and *Gram. of Eng. Grams.* (1850). D. Mar. 31, 1857.

Brown (HARVEY), b. in 1795 at Rahway, N. J., grad. at W. Pt. in 1818; col. 5th Artil. May 5, 1861, and made brevet maj.-gen. in 1863; engaged in Black Hawk expedition, and in Fla., Mex., and c. wars, and as military commander of the city of New York, Jan. 15-July 16, 1863, suppressed the draft riots. Retired 1863; d. Mar. 31, 1874.

Brown (HENRY KIRKE), a sculptor and painter, b. at Leyden, Mass., in 1814. Among his best works are the equestrian statue of Washington in Union Square, New York, and a statue of Gov. Clinton at Wash.

Brown (JACOB), b. in Bucks co., Pa., May 9, 1775; joined the army in 1812, defended Sackett's Harbor in 1813, made maj.-gen. and invaded Canada in the spring of 1814; commanded with success at Chippewa and Niagara Falls in July of that yr., and became commanding general of the U. S. A. in 1821. D. Feb. 24, 1828.

Brown (JAMES), b. near Staunton, Va., Sept. 11, 1766, grad. at William and Mary Coll.; became a lawyer, represented La. in the U. S. Senate 1812-17 and 1819-24, and was minister to Fr. 1824-28. D. Apr. 7, 1835.

Brown (JOHN), a Scot. religious writer, b. in Perthshire in 1722. He preached at Haddington, and had a high reputation for piety and learning. Among his works are a *Dict. of the Bible* and a *Self-Interpreting Bible*. D. June 19, 1787.

Brown (JOHN), a brother of Senator James Brown, b. at Staunton, Va., Sept. 12, 1757, served in the Revolutionary war, studied at Princeton and at William and Mary Coll.; removed to Ky. 1782; U. S. Senator 1793-1805. D. Aug. 29, 1837.

Brown (JOHN) of **Ossawatimie**, a zealous opponent of slavery, b. at Torrington, Conn., May 9, 1800. He removed to O. in early youth, where he worked at the trade of a tanner. In 1855 he emigrated to Kan., where he fought against the pro-slavery party, and lived at Ossawatimie. He was the master-spirit of the convention which met at Chatham, Canada, May 1859, and organized an invasion of Va. in order to liberate the slaves. On the 16th of Oct. aided by about 20 friends, he surprised Harper's Ferry, captured the arsenal and armory. He was wounded and taken prisoner by the Va. militia on the next day, and was hanged at Charlestown Dec. 2, 1859.

Brown (JOHN NEWTON), D. D., a Bap. divine, b. at New London, Conn., June 29, 1803; pub. in 1834 *Memorials of Bap. Martyrs*. D. May 15, 1868.

Brown (JOSEPH E.), b. in Pickens co., S. C., Apr. 15, 1821. During his youth his father moved to Ga., of which State he was frequently elected gov.; took a leading part in the secession movement in 1861, and a prominent part in support of the reconstruction measures of Cong. was appointed in May 1880 U. S. Senator; re-elected, 1884.

Brown (MASON), LL.D., father of B. Gratz Brown, b. in Phila. Nov. 10, 1799, grad. at Yale 1820; was a judge, and one of the authors of *Morehead and B's Digest*. D. Jan. 27, 1867.

Brown (NICHOLAS), a merchant, b. at Providence, R. I., Apr. 4, 1769, grad. at R. I. Coll. in 1786. He gave to that coll. about \$100,000, and in 1804 it was named B. Univ. in his honor. D. Sept. 27, 1841.

Brown (OLYMPIA), b. in Kalamazoo co., Mich., Jan. 5, 1835; entered the Univ. theological school at Canton, N. Y., grad. and was ordained in June 1863; in Feb. 1864 installed in Weymouth, Mass.; in 1869-76 preached at Bridgeport, Conn.; was married to Henry Willis.

Brown, or **Brownie** (ROBERT), an Eng. theol., the founder of the sect of Brownists, b. in 1549. D. after 1630.

Brown (ROBERT), F. R. S., D. C. L., a botanist, b. at Montrose, Scot., Dec. 21, 1773. He was employed as naturalist of an expedition to Australia in 1801, and pub. a *Flora* of that region, *Prodr. novae Florae Hollandiae*; in 1827 became keeper of the botanical dept. of the Brit. Museum. D. June 10, 1858.

Brown (SAMUEL GILMAN), D. D., LL.D., son of Pres. Francis Brown, noticed above, b. at N. Yarmouth, Me., Jan. 4, 1813, grad. at Dartmouth Coll. in 1831, and at Andover Theological Sem. in 1837; was prof. in Dartmouth Coll. from 1840 to 1867, and pres. of Hamilton Coll. 1867-81. Author of a *Biography of Self-Taught Men and Life of Rufus Choate*.

Brown (THOMAS), M. D., a Scot. metaphysician, b. near Dumfries Jan. 9, 1778. In 1810 he was appointed colleague of Dugald Stewart as prof. of moral philos. in the Univ. of Edinburgh. Pub. *Lectures on the Philos. of the Human Mind*. His chief contribution to psychology is an explication of the 6th or muscular sense. D. Apr. 1820.

Brown (THOMPSON S.), b. 1807 in New York, grad. at

W. Pt. in 1825. He served as assistant prof. at the Military Acad. 1825, and subsequently in the construction of fortifications and in river and harbor improvements. Upon the invitation of the czar of Rus. he became consulting engineer of the St. Petersburg and Moscow R. R. D. Jan. 30, 1855.

Brown Coal. See **LIGNITE**.

Browne (CHARLES FARRAR), known as **Artemus Ward**, a humorous writer and lecturer, b. at Waterford, Me., Apr. 26, 1834; became a printer; wrote for the public journals a series of *Letters from Artemus Ward, Shoemaker*, *Artemus Ward his Book*, and other works. D. Mar. 6, 1867.

Browne (JOHN ROSS), b. in Ire. in 1817; was U. S. minister to Chi. in 1868-70. Also an author. D. Dec. 8, 1875.

Brownell (Rev. THOMAS CHURCH), D. D., LL.D., b. at Westford, Mass., Oct. 19, 1773, and grad. at Union Coll. in 1804. In 1819 he was consecrated P. E. bp. of Conn., and was the first pres. of Trinity Coll., Hartford (1824-31). Author of an *Expositor* of the N. T. and other works. D. Jan. 13, 1865.

Brownian Movements are those seen with the microscope among minute particles (not living) in a limpid liquid. Robert Brown the botanist first described them in 1827. These molecular movements have often been mistaken for vital motions. When the minute organisms called *Bacteria* are exposed to a heat of 200° F. they are killed, but molecular motion still goes on in a manner obviously different from their living movements. These movements have not been satisfactorily explained.

Browning (ELIZABETH BARRETT), an Eng. poetess, b. in Herts in 1806. Pub. in 1826 an *Essay on Mind and other Poems*, and in 1850 her collected works, including *The Drama of Exile*. In 1846 was married to the poet Robert Browning. D. June 29, 1861.

Browning (ORVILLE H.), b. in Harrison co., Ky., ed. at Augusta Coll.; was called to the bar in 1831, and removed to Quincy, Ill.; was U. S. Senator 1861-63, sec. of the Interior 1866-68, and acting atty.-gen. of U. S. 1868-69. D. Aug. 10, 1881.

Browning (ROBERT), an Eng. poet, b. at Camberwell, a suburb of Lond., in 1812, ed. in the Univ. of Lond. Among his works are *Paracelsus*, *Men and Women*, the *Red Cotton Night-Cap Country*, and *Ferishtah's Fancies*.

Brownlow (WILLIAM GANNAWAY), a Meth. divine and politician, b. in Wythe co., Va., Aug. 29, 1805; removed to Tenn., where he edited the *Knoxville Whig*. During the c. war was a firm adherent of the U. party, and in 1865 was elected gov. of Tenn., and re-elected in 1867; became U. S. Senator in 1869. D. Apr. 29, 1877.

Brown-Séguard, brown-se-kar' (C. EDUARD), M. D., a physiologist, b. in the island of Mauritius in 1818, was the son of Edward Brown of Phila. and a Fr. lady named Séguard. Grad. as M. D. in Paris in 1840. He gained distinction by experiments on blood, animal heat, and the spinal cord. Was appointed prof. in School of Med., Paris, 1869. Author of valuable professional works.

Brownson (NATHAN), grad. at Yale in 1761, became a phys. and resided in Ga.; was a member of the Continental Cong. (1776 and 1778), and gov. of Ga. in 1781. D. 1796.

Brownson (ORESTES AUGUSTUS), LL.D., a journalist and theol., b. at Stockbridge, Vt., Sept. 16, 1803; founded in 1838 *The Boston Quarterly Review*, and was a contributor to the *Democratic Review*; became a R. Cath. in 1844. He conducted Brownson's *Quarterly Review*. D. Apr. 17, 1876. (See complete ed. of his works by H. F. Brownson.)

Brownsville. Mo. See **APPENDIX**.

Brownville, Fayette co., Pa., on R. R. and Monongahela River, 35 m. S. of Pittsburg. Pop. 1870, 1749; 1880, 1489.

Brownsville, cap. of Haywood co., Tenn., on R. R. 57 m. N. E. of Memphis. It has 4 colls. (3 female, 1 male). Pop. dist. 1870, 4262; 1880, 5013.

Brownsville, a river-port and city, on R. R., cap. of Cameron co., Tex., on the left bank of the Rio Grande, opposite Matamoros (Mex.). Here is a custom-house and a R. Cath. coll. Pop. 1870, 4905; 1880, 4938.

Brown University, an inst. of learning founded in 1764 at Warren, R. I., and removed to Providence, its present seat, in 1770. Its first name was R. I. Coll., but in 1804 it received its present name, in honor of Nicholas Brown, one of its chief benefactors. Its presidents have been J. Manning, D. D., 1765-90; Jonathan Maxcy, D. D., 1792-1802; Asa Meser, D. D., 1802-27; Rev. Francis Wayland, D. D., 1827-55; Rev. Dr. Barnas Sears, 1855-67; Dr. Caswell, 1867-72. The Rev. E. G. Robinson, D. D., became pres. in 1872. The majority of the board of trustees must be selected from the Bap. denomination; the univ., however, is notably unsectarian.

Brownville, a city, cap. of Nemaha co., Neb., on the W. side of the Mo. River, 95 m. by water S. E. of Omaha, or 65 by rail. Pop. 1870, 1305; 1880, 1309.

Brownwood, Tex. See **APPENDIX**.

Bruce, the name of a noble family of Scot., descended from Robert de Bruis (or de Brus), a Norman knight who followed William the Conqueror to Eng. in 1066. He derived his lineage from Brusi, a Northman, a son of the famous Sigurd. His younger son, Adam, who acquired a large estate in Yorkshire, left a son, Robert, who received from David I. of Scot. a grant of the lordship of Annandale, held by the tenure of military service. He d. in 1141, and left a son, Robert, who was the second lord of Annandale. This second lord had a grandson, Robert, who was the fourth lord of Annandale. He married Isabel, a daughter of David, earl of Huntingdon, younger brother of King William the Lion, and thus laid the foundation of the royal house of Bruce. He d. in 1245. Robert de B., a son of the preceding, and the fifth lord of Annandale, was b. in 1210. When the Scot. throne became vacant by the death of Queen Margaret in 1290, the Robert de B. and Baliol claimed the throne. The dispute was referred to Edward I. of Eng., who decided in favor of Baliol. Robert d. in 1295, leaving a son, Robert, who by his marriage with the countess of Carrick had obtained the title of earl of Carrick (1271). He fought in the Eng. army against Baliol at the battle of Dunbar. He d. in 1304, and left a son, Robert, who became king of Scot.

Bruce (SIR FREDERICK WILLIAM ADOLPHUS), a Brit. diplomatist, b. at Elgin Castle in 1814; in 1865 succeeded Lord Lyons as ambassador at Wash. D. 1867.

Bruce (JAMES), a Scot. traveller, b. in the co. of Stirling Dec. 14, 1780. He discovered the source of the Blue Nile in Nov. 1790. In 1790 he pub. *Travels to Discover the Source of the Nile*. D. Apr. 37, 1794.

Bruce (ROBERT), a heroic and famous king of Scot., b. Mar. 21, 1274, was a son of Robert de B., earl of Carrick. In 1296, as earl of Carrick, he swore fealty to Edward I. of Eng., but he soon joined the Scot. leaders who were fighting for the independence of Scot. Having made peace with Edward I., he became in 1299 one of the four regents who ruled the kingdom. In 1306 he was crowned king at Scone; in May 1307 he defeated the Eng. at Loudon Hill; in 1309 he drove back an invading army of Edward II., and on June 24, 1314, gained a complete victory at Bannockburn. By a treaty of peace concluded in 1328 the Eng. king recognized the independence of Scot. D. June 7, 1329, and was succeeded by his son David.

Bruges, bru'jiz [Dut. *Brugge* or *Bruggen* (i. e. "bridges")]: Lat. *Brugæ*, a city of Belg., on a fertile plain about 8 m. from the ocean, and 64 m. N. W. of Brussels. The railway from Ostend to Brussels passes through B., which is connected with the ocean by several canals. It derives its name from the numerous bridges which cross the canals. It contains many fine old Gothic edifices, richly adorned with works of art. Among these are the ch. of Notre Dame, which has a spire 450 ft. high; the town-hall, with a lofty tower and a chime of 48 bells, and the cathedral of St. Sauveur. B. was the great mart of the Hanseatic League, being especially noted for its tapestry, its pop. at one time exceeding 200,000. Pop. 44,501.

Brugsch (HENRICH KARL). See APPENDIX.

Brühl, brül (GUSTAVS), M. D., b. at Herdorf, Prus., May 31, 1826, studied in the colls. of Siegen, Münster, and Treves, where he grad.; studied med. at Munich, Halle, and Berlin; grad. M. D. at the univ. Sancti Ludovici; became in 1848 a phys. of Clin. O.; was phys. of St. Mary's Hospital, lecturer in Miami Med. Coll.; edited the *German Pioneer* 1869-71, and wrote *Poesien des Verbannten*.

Bruses. See WOUNDS contused.

Brunaire, the second month in the calendar of the Fr. Republic, derived from *brume*, a "fog." It comprised the time from Oct. 23 to Nov. 21. The 18th B. (Nov. 9), 1799, was a famous epoch in Fr. hist. Then occurred the *coup d'état* which subverted the power of the Directory and raised Bonaparte to supreme power as first consul.

Brunel (ISAMBARD KINGDOM), D. C. L., F. R. S., a Brit. engineer, b. at Portsmouth Apr. 9, 1806. He was the designer and engineer of the Great Western steamship, also of the Great Eastern, said to be the largest vessel ever built, and of the Royal Albert Bridge, Saltash. D. Sept. 14, 1859.

Brunel (SIR MARK ISAMBARD), F. R. S., an engineer, b. near Rouen, Fr., Apr. 25, 1769, was the father of the preceding. Driven from Fr. by the Reign of Terror, he removed to New York in 1793, thence went to Eng. in 1799. His most important work is the Thames Tunnel, commenced in 1825 and opened in 1843. D. Dec. 12, 1849.

Brunn [Slavic, *Brno*, the "ford"], a city of Aus., cap. of Moravia, at the confluence of the Schwarza and the Zvitawa, 94 m. N. N. E. of Vienna and 159 m. S. E. of Prague. Here is the castle of Spielberg, used as a state prison. Among the public buildings are the cathedral, the Gothic ch. of St. James, and the *Landhaus*, formerly an Augustine convent. It is the seat of the highest authorities of Moravia and Aus. Silesia and of a R. Cath. bp. Pop. 82,660.

Bruno (Lat. *Brunus*) (GIORDANO), an It. philos., b. at Nola, in the kingdom of Naples, in 1548. He rejected the orthodox doctrines of the Ch., and was obliged to flee. About 1592 he returned to It. and became a resident of Pavia. Was burned as a heretic Feb. 17, 1600. His system is called Pantheism, and has had much influence in modern philos.

Bruno, SAINT, b. at Cologne about 1040. About 1087 he founded near Grenoble the order of Carthusians, who adopted the rule of St. Benedict. D. Oct. 6, 1101.

Bruno the Great, abb. of Cologne, b. 925 A. D., was a younger brother of the emp. Otto I.; became lord high chancellor of the empire. D. 965.

Brunswick, a duchy of the Ger. empire, consisting of 3 larger parts and several enclaves. The larger part, containing the cap., is entirely surrounded by Prus. The govt. is a constitutional monarchy, the supreme power being vested in a duke and a legislative body of 46 members. B. joined the Ger. customs-union in 1844, assisted Prus. in the war of 1866, joined the N. Ger. Confederation in the same yr. and became a member of the Ger. empire in 1870. Area, 1526 sq. m. Pop. 349,429.

Brunswick [Ger. *Braunschweig*; anc. *Brunonis Ficus*], a city of Ger., cap. of the duchy of the same name, on the river Oker, 47 m. E. S. E. of Hanover. The old fortifications have been demolished and converted into promenades. It contains a ducal palace, an anc. cathedral, the ch. of St. Andrew, with a steeple 316 ft. high, a mint, a town-hall, and a museum with paintings by Albert Dürer, Rembrandt, Holbein, and other great masters. Railways extend to Hanover, Magdeburg, and other places. A great annual fair is held here. Pop. 75,038.

Brunswick, city, R. R. junc., and pt. of entry, cap. of Glynn co., Ga., on St. Simon's Sound, 8 m. from the Atlantic Ocean and 80 m. S. W. of Savannah. Pop. 1870, 2948; 1880, 2861.

Brunswick, R. R. junc., Cumberland co., Me., on the right bank of the Androscoggin River, 30 m. N. E. of Portland. It is the site of Bowdoin Coll. The river here falls nearly 50 ft. in the distance of half a m., affording abundant water-power. Pop. v. 1870, 1440; 1880, 2410.

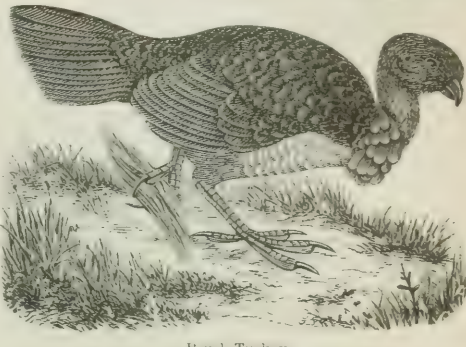
Brunswick, Chariton co., Mo., on the N. bank of the Mo. River, 292 m. by water from St. Louis, and on R. R. Pop. 1870, 1645; 1880, 1801.

Brunswick Black, a varnish employed to coat over iron grates, etc., composed of lampblack and turpentine.

Bru'sa, or *Bur'sa* (anc. *Prusa ad Olympum*), a city of Asia Minor, at the N. base of Mt. Olympus, about 60 m. S. by E. of Constantinople, is one of the most commercial cities in Asiatic Tur. It has more than 200 mosques and minarets, many colls., schools, and Armenian chs. Here are warm mineral springs. B. was the cap. of anc. Bithynia, was taken by the Turks in 1326, and was the cap. of the Tur. empire until 1453. It was nearly destroyed by an earthquake Feb. 28, 1855. Pop. 60,000.

Brush (GEORGE JARVIS), b. at Brooklyn, N. Y., Dec. 15, 1831, ed. at Yale Coll., at the Univ. of Munich, the Mining Acad. of Freiberg, Sax., and the School of Mines in Lond.; became in 1855 prof. of metallurgy in Yale, and is executive officer of the Sheffield Scientific School.

Brush Turkey, *Sageoallus leucurus*, sometimes called **Wattled Tailgall** and **New Holland Vulture**, a bird of Australia remarkable for the peculiar manner in which its eggs are hatched. Several pairs of these birds having united to build a nest, collect leaves, grass, etc., into



Brush Turkey.

a heap, sometimes to the amount of several cart-loads. In this mass the several females deposit their eggs, where they remain till hatched by the artificial heat of the mound. The bird is about the size of the common turkey, and has wattles on its head and neck.

Brus'sels [Dut. *Brussel*; Fr. *Bruxelles*], the cap. of Belg., on the river Senne, 27 m. S. of Antwerp, 227 m. N. N. E. of Paris. It is built partly on the slope of a hill which rises 220 ft. above the sea, and partly on a plain. The town on the hill contains the royal palace and public offices. B. ranks among the finest cities of Europe. The walls have been converted into boulevards, lined with double rows of shade trees. The Allée Verte extends to the royal palace of Laeken, about 3 m. N. of the city. The prin. public squares are the Place Royale, the Grande Place, and the Place de la Monnaie. Among the edifices are the hôtel de ville, with a spire 364 ft. high; the Gothic cathedral of St. Gudule, built about 1270; the ch. of Notre Dame de la Chapelle, commenced in 1134; the royal palace; the modern ch. of Notre Dame de Bon Secours; the former palace of the prince of Orange, and the Palace of the Fine Arts. B. has a mint, a public library of about 200,000 vols., a botanic garden, an astronomical observatory, one of the finest in Europe; a magnetic observatory, a free univ., a polytechnic school, and insts. for the blind and for deaf-mutes. B. is celebrated for the manufacture of lace, which is considered the finest in the world. Its trade is facilitated by a canal which connects it with Antwerp, and by railways which radiate in many directions. About one third of the inhabs. speak Fr., the others Flemish or Dut. Pop., with suburbs, 394,940.

Brutus (LUCIUS JUNIUS), a Rom. patriot, was a son of Tarquinia and a nephew of Tarquin the Proud. According to tradition, that tyrant was about to put him to death, but he saved his life by feigning idiocy, which was the origin of his surname *Brutus*. He expelled the Tarquins from Rome, and founded a republic (509 B. C.). He was then elected one of the consuls. D. about 507.

Brutus (MARCUS JUNIUS), a Rom. republican, a descendant of the preceding, b. 85 B. C.; took part in the murder of Julius Cæsar, led an army against that of Antony and Octavius at Philippi (42 B. C.), and after the reverse of Cassius killed himself on the field.

Bryan, cap. of Williams co., O., on R. R., 54 m. W. of Toledo. It is noted for its artesian wells. Pop. 1870, 2284; 1880, 2562.

Bryan, a city, cap. of Brazos co., Tex., on R. R., 100 m. N. W. of Houston. It is the seat of the State Agricultural and Mechanical Coll. Pop. not in census.

Bryanites. See BIBLE CHRISTIANS.

Bryant (WILLIAM CULLEN), b. Nov. 3, 1794, at Cummington, Hampshire co., Mass.; ed. at Williams Coll., which he entered in 1810. He studied law, and in 1815 was admitted to the bar, but after practising successfully for 10 yrs., first at Plainfield and then at Great Barrington, removed in 1825 to New York, and engaged in the business of an ed. In 1826 he became connected with the *Evening Post*, of which he was the ed. in chief till his death. In 1834, 1845, 1849, and 1857, Mr. B. visited Europe, and presented the literary fruit of his travel in a series of *Letters of a Fatherless and Letters from Sp. and other Countries*. B.'s career as a poet began very early. He contributed verses to the co. gazette before he was 10 yrs. old; in his 14th yr. he pub. a political satire, *The Embargo*, together with another long poem, *The Revolution*, which in a twelvemonth reached a second ed. *Thanatopsis* was produced in his 19th yr. He pub. the first vol. of poems in 1821 at Cambridge, and the first complete col-

lection in 1832 at New York. Nevertheless, his poems are not many, nor are they the product of a facile muse. The latest fruit of his genius is his translation of Homer, of which the *Iliad* appeared in 1870, and the *Odyssey* in 1871. His addresses have been collected in a vol. of *Orations and Addresses*. D. June 12, 1878. O. B. FROTHINGHAM.

Bu'aze, an Afr. plant which Livingstone found growing in large quantities N. of the Zambesi River in Afr., and thought its fibre stronger and finer than that of flax.

Bubastis, a goddess of anc. Egypt, a deification of the moon, said to signify literally "she who multiplies her aspects." According to other authorities, B. was the deification of the cat. Her name, according to modern Egyptologists, was *Pecht* or *Pashit*.

Buccaneer [Fr. *boucanier*], a name applied to the adventurers who in the 16th and 17th centuries infested the W. I. and the Sp. colonies of S. Amer. They were mostly Eng. and Fr., and were united by a common hostility to the Spaniards, for mutual protection against whom they organized themselves into an association or community. They took immense booty from galleons carrying precious metals to Sp., and often attacked towns on the coasts.

Bu'cer [from the Gr. *bovs*, a "cow," and *keras*, a "horn," being a literal translation of his Ger. name, *Kuhhorn* (MARTIN), a Ger. Reformer, b. near Strasburg in 1491, and for a time a Dominican friar. He became a Prot. in 1521; was a friend of Luther, and studied Gr. and Heb. at Heidelberg; introduced the Reformed doctrines at Strasburg 1523, and was prof. of theol. there. When discussions arose between Luther and Zwingle, B. was mediator. His opinions in relation to the sacrament accorded more nearly with those of Zwingle than those of Luther. He attended the Diet of Augsburg in 1548, but refused to subscribe to the "Interim." At invitation of Abp. Cranmer he went to Eng. in 1549, and became prof. of theol. at Cambridge. Wrote many religious works and commentaries on Script. D. Feb. 27, 1551.

Buceroti'dæ [*bovs*, an "ox," and *keras*, a "horn"], or **Hornbills**, a family of the *Picariæ*, remarkable for the excessive size of the mandibles, of which the upper usually supports a large horn-like protuberance. The feet are strong and short, the wings short; size large. They are natives of the Old World.

Buchanan, bu-kan'an, Berrien co., Mich., on the St. Joseph River and on R. R., 87 m. E. of Chicago and 197 m. W. of Detroit. Pop. 1870, 1702; 1880, 1894.

Buchanan (FRANKLIN), b. at Baltimore, Md., became a mdpn. of U. S. N. in 1815, and capt. in 1855; joined Confed. navy and commanded the Merrimack frigate after she was fitted up as an iron-clad, and with her engaged and sunk the wooden frigates Congress and Cumberland; became a rear-admiral; was defeated and made prisoner by Farragut in Mobile Bay, Aug. 5, 1864.

Buchanan (GEORGE), a Scot. poet and historian, b. at Killearn, in the co. of Sterling, in Feb. 1506; ed. in Paris. Having adopted the Reformed doctrines, he wrote *Somnium*, a satire against the monks, for which he was persecuted, and passed over to Fr. about 1540. In 1562, after his return, he was appointed classical tutor to Mary Queen of Scots, and in 1570 keeper of the privy seal. Wrote a *Hist. of Scot. and Franciscanus*, a poetical satire. D. Sept. 28, 1582.

Buchanan (JAMES), 15th Pres. of the U. S., b. in Franklin co., Pa., Apr. 23, 1791, grad. at Dickinson Coll., Carlisle, in 1809, and was admitted to the bar in 1812. He was a Federalist in his youth, but voted for Gen. Jackson in 1828. In 1831 he was sent as minister to Rus., was U. S. Senator 1833-45, and was then appointed sec. of state; in 1853 was sent as minister to Eng. He was nominated by the Dems. and elected Pres. of the U. S. in 1856. The other candidates were John C. Fremont, Rep., and Millard Fillmore, "Amer." Mr. B. received 174 electoral votes. His policy was hostile to those who opposed the extension of slavery. In his message of Dec. 1860 he blamed the N. people for the disruption of the U., and affirmed that the executive had no power or right to prevent the secession of a State. D. June 1, 1868.

Buchanan (JOSEPH RODES), M. D., b. at Frankfort, Ky., Dec. 11, 1814, grad. in med. at Louisville Univ. in 1842; in 1846 became prof. of physiology in the Eclectic Med. Inst. of Cin.; was for several yrs. dean of the faculty; edited the med. journal connected with this school; pub. for several yrs. *Buchanan's Journal of Man*.

Buchanan (ROBERT C.), U. S. A., b. in 1811 in Md., grad. at W. P. in 1830; brevet maj.-gen. in 1863, and col. 10th Inf. Feb. 8, 1864. Engaged in Black Hawk, Fla., and c. wars. D. Nov. 29, 1878.

Buch'anites, a Scotch sect, which derived its name from a Mrs. Buchan, who claimed to be the woman mentioned in Rev. xii. The last of the sect d. in 1846.

Bucharest, bu-ka-rest', the cap. of Roumania, on the river Dimbovetza, about 140 m. N. W. of Varna. It is said to contain 95 chs., 1 coll., a public library, several hospitals, and an excessive number of gaming houses. This city has the reputation of being the most dissolute cap. in Europe. Pop., 221,000.

Buchtel (buk'tel) College, Akron, Ohio. The cornerstone of this inst. was laid July 4, 1871, and it was opened for students Sept. 11, 1872. It was founded by the Univts. of O. and Pa. and named B. C. in honor of John R. Buchtel, who gave his wealth to its support. It offers equal opportunities to students of both sexes.

Buchu, bu'ku [a S. Afr. word], the leaves of *Barosma crenata*, *crenata*, and *serratifolia*, and of other strong-smelling S. Afr. plants used in med. for their diuretic properties. Its various kinds all contain a volatile oil.

Buck (GURDON), b. in New York May 4, 1807, grad. at the Coll. of Phys. and Surgeons in 1830; educated in Paris, Vienna, and Berlin, and began to practise in New York in 1833. He succeeded in the most difficult surgical operations. Wrote *Contributions to Reproductive Surgery*. D. Mar. 3, 1877.

Buck, a name given to the male of the fallow deer and other species of deer, but not to the male of the red deer,

which is called a stag. The term is also applied to the males of some other animals (rabbit) as well as to certain antelopes.

Buck Bean, or **Marsh Trefoil** (*Menyanthes trifoliata*), a plant of the order Gentianaceæ, the only known species of its genus. A bitter extract obtained from the leaves is a remedy for dyspepsia and disorders of the bowels. The whole plant is tonic, and is used in Ger. instead of hops.

Buck'eye, the popular name of certain Amer. trees and shrubs of the genus *Æsculus* and the order Sapindaceæ. The Ohio B. (*Æsculus glabra*) is a large tree with strong-smelling bark, small flowers, and prickly fruit containing the seed, which is a large nut resembling that of the horse-chestnut. The sweet B. (*Æsculus flara*) has yellow or sometimes dull purple flowers. The red B. (*Æsculus Paria*) is generally small, and has bright-red flowers. The white B. (*Æsculus parviflora*) is a shrub of the mts. of the S. States, with white flowers.

Buckingham, buk'ing-am (GEORGE VILLIERS), DUKE OF, the favorite of James I. of Eng., b. in Leicestershire Aug. 20, 1592. He became in 1617 a gentleman of the bed-chamber, and in 1619 was appointed lord admiral of Eng. After the death of James I. he became the favorite and prime minister of Charles I., but he made himself odious to the nation. He was assassinated Aug. 23, 1628.

Buckingham (GEORGE VILLIERS), DUKE OF, a son of the preceding, b. in Westminster Jan. 30, 1627. He was the pres. of the ministry called the "Cabal." D. Apr. 16, 1688.

Buckingham (JOSEPH TINKER), a writer, b. at Windham, Conn., Dec. 21, 1779; pub. *Specimens of Newspaper Lit.*, etc., and became successively ed. of the *N. Eng. Galaxy*, *Boston Courier*, and the *N. Eng. Magazine*. D. Apr. 11, 1861.

Buckingham (WILLIAM ALFRED), LL.D., b. at Lebanon, Conn., May 28, 1804, was gov. of the State 1858-66, and in 1869 was elected to the U. S. Senate. D. Feb. 5, 1875.

Buck'land (WILLIAM), D. D., F. R. S., an Eng. geologist, b. at Axminster in 1785, ed. at Ox. His prin. work is the *Bridgewater Treatise* entitled *Geol. and Mineralogy considered with reference to Natural Theol.* D. Aug. 14, 1856.

Buck'le (HENRY THOMAS), an Eng. author, b. Nov. 24, 1822. Wrote *Hist. of Civilization in Eng.* D. May 29, 1862.

Buck'ley (SAMUEL BOTSFORD), Ph. D., b. in Torrey, Yates co., N. Y., May 9, 1809, grad. at Wesleyan Univ. in 1836; was assistant naturalist and geologist in the State survey of Tex. 1860-61; State geologist of Tex. 1866-67, and was 1871-72 editorially connected with the *State Gazette*, Austin, Tex. He discovered the flowers and fruit of the shrub *Buckleya distichophylla*, named in his honor by Dr. Torrey.

Buck'ner (SIMON BOLIVAR), b. 1823 in Ky., grad. at W. P. in 1844, in inf. 1844-52, and subsequently as commissary of subsistence, rank of capt. Served at frontier posts and in Mex. war; resigned Mar. 26, 1855. He joined the S. army in the c. war, and was in command at Ft. Donelson, surrendering, Feb. 16, 1862, to Gen. Grant, with 16,000 troops and vast stores; prisoner of war at Ft. Warren till Aug. 1862; as maj.-gen. engaged at Murfreesboro' and Chickamauga, and included, May 26, 1865, in Kirby Smith's surrender to Gen. Canby.

Bucksport, Me. See APPENDIX.

Buck'wheat (*Fagopyrum esculentum* or *Polygonum Fagopyrum*), an annual plant of the order Polygonaceæ, is said to be a native of Central Asia and the basin of the Volga. It has triangular, heart-shaped or halberd-shaped leaves. The seeds are triangular and resemble a beech-nut in form. Cakes of B. eaten warm are a favorite and nutritious food. B. comes to maturity in a shorter time than most other grains, and may be sown late. It requires little manure, and does not exhaust the soil.

Buckwheat Tree, a small tree or shrub of Ga. and the Gulf States (the *Cliftonia ligustrina*), a smooth, elegant evergreen of the order Cyrillaceæ. It has clusters of white fragrant blossoms, and is often called *tili*. Its fruit is shaped like a kernel of buckwheat; whence the name.

Bucy'rus, cap. of Crawford co., O., R. R. June., and on Sandusky River, 62 m. N. of Columbus. There are mineral springs in the town and neighborhood. The skeleton of a mastodon was found in the vicinity in 1838. Pop. 1870, 3066; 1880, 3885.

Bu'da [Ger. *Ofen*; Slavonic, *Budin*; Lat. *Buda*], a free city of the Aus. empire, cap. of Hungary, 130 m. S. E. of Vienna, on the right bank of the Danube, opposite Pesth, with which it is connected by a suspension bridge. It is built around a hill 485 ft. above the sea. This hill is crowned by a citadel and a royal palace. The other remarkable edifices are the cathedral, the palaces of the nobility, and the observatory. Here are hot sulphur springs from which B. derives its Ger. name of *Ofen*—i. e. "oven." B., formerly considered the key of Christendom, was taken by the Turks in 1541, and held by them until 1686. B. and Pesth are now considered as one city, styled B.-Pesth. Pop. of B. alone, about 60,000; of the combined cities, 360,551.

Budde'us, bood-da'us (JOHN FRANCIS), a Lutheran theol. and philos., b. at Anklam June 25, 1667. At the age of 20 he was A. M. and adjunct prof. in the philosophical faculty at Wittenberg, and after holding professorships at Coburg and Halle, became prof. of theol. at Jena in 1705. He wrote more than a hundred books, most of which are still sought by scholars, several of which are acknowledged standards. His practical skill as an instructor was of a high order, and many of his pupils rose to great eminence. Wrote *Institutiones Philosoph. Eccl. Theologia Moralis, Historia Ecclesie Veteris Testamenti, Theologia Dogmatica, Isagogæ ad Theologiam Universam, Ecclesia Apostolica*. D. Nov. 19, 1729.

Buddha, or **Buddhism**. See BOODDHA.

Bud'ding, or **Inoculation**, a mode of propagating choice varieties of fruit which cannot be reproduced by seeds. The operation is performed by opening the bark of the stock with a cut, nearly like a letter T, and inserting into it a leaf-bud of another variety. These buds are taken from a branch formed in the present or preceding yr. The

process, best performed late in summer, is finished by tying the head with matting, cotton twine, or woollen yarn.

Bude Light, a name originally applied to a brilliant light invented by a Mr. Gurney of Bude, in Cornwall, Eng. He introduced a stream of oxygen into a flaming jet of oil or gas. The expense of this system has prevented its gen. use. The same name is sometimes inappropriately given in Eng. to other similar inventions.

Budington (WILLIAM IVES), D. D., a Congl. clergyman, b. Apr. 21, 1815, at New Haven, Conn., grad. at Yale Coll. in 1834; studied theol. at the Yale Divinity School and at Andover, leaving the latter inst. in 1839. Pastor of the First ch., Charlestown, Mass., for 14 yrs.; in 1855 Apr. 23, took charge of the Clinton avenue Congl. ch., Brooklyn, N. Y., and was its pastor for 23 yrs. Author of *Hist. of the First Ch., Charlestown, Mass.* D. Nov. 29, 1870.

Buell (DON CARLOS), b. Mar. 23, 1818, near Marietta, O., grad. at W. Pt. in 1841, and after serving in the inf. till 1848, became, July 17, 1842, assistant adjutant-gen. U. S. A., rank of col., and Mar. 21, 1862, maj.-gen. U. S. volunteers. He served in Fla. war 1841-42, on frontier duty 1843-45, in the military occupation of Tex. 1845-46, and in Mex. war 1846-48. In c. war he was in command of the dept. of the O. 1861-62, in command of the army of the O. 1862, engaged at the battle of Shiloh, siege of Corinth, operations in N. Ala., and the retreat to Louisville to cut off the army of Bragg, which he drove from Ky. Resigned, June 1, 1864.

Buena Vista, bwa'na vees'ta, a hamlet in Mex., about 90 m. S. W. of Monterey, and 7 m. S. of Saltillo, where a series of battles was fought, Feb. 22-23, 1847, between the U. S. forces under Taylor and the Mex. under Santa Anna, in which the latter were defeated. The U. S. force was about 5300, the Mex. about 20,000. The U. S. loss was 746 killed and wounded, that of the Mex. about 2000.

Buena Vista, Col. See APPENDIX.

Buenos Ayres, a seaport of S. Amer., cap. and largest city of Argentine Republic, on the river La Plata, 150 m. from the ocean. Vessels drawing more than 12 ft. cannot come within 5 m. of the city, and smaller ones usually anchor a m. from the shore. The adjacent country is almost destitute of timber. The climate is variable, but dry and healthy. Fresh water can only be obtained from the river, and is carried around in carts. The city was founded in 1580, and became cap. of viceroyalty in 1776. Pop. 1882, 295,000.

Buffalo, a name given to animals of the family Bovide, but especially to the *Bubalus Buffelus* and *Bubalus Caffer*. The former is a native of India, where it has been long domesticated, and is used as a beast of burden in India and also in It., where it was introduced about 600 A.D. It is larger and more powerful than an ox, and has a larger head in proportion to the size of the body. It has large, crooked horns, which are curved first outward and downward, and next backward and upward. The B. is partial to marshy places, and is addicted to wallowing in the mud and shallow water. Its flesh is inferior to that of the ox. The Cape B. (*Bubalus Caffer*) is a native of S. Afr., and has not been domesticated. Its hide is so thick and tough that the Kafirs make of it shields impenetrable to a musket-ball. Vast herds are found in S. Afr. (For the Amer. B., see Bison.)

Buffalo, a city, pt., and important R. R. and commercial centre, cap. of Erie co., N. Y., at foot of Lake Erie and at head of Niagara River, also the W. terminus of the Erie Canal, in lat. 42° 53' N., lon. 78° 55' W. It has a water-front of more than 5 m., has a fine park, and is nearly surrounded by boulevards. It has a handsome city and co. hall, completed in 1876, an insane asylum calculated for 1000 patients, a State Normal School, a med. school, several collegiate insts., and numerous literary and scientific associations. Of the chs. 2 (one R. Cath. and the other Epis.) are imposing cathedrals. It is the great N. terminus of the lake commerce, especially of the grain, cattle, and lumber trade.

Commerce.—In 1880, grain receipts by lake, 112,042,977 bushels (including flour estimated as wheat), and at least 80,000,000 ft. by R. R. The imports of lumber in 1881 were 2,357,066 ft.; exports, 74,865,668 ft.; imports of all kinds of coal in 1881 were 2,243,571 tons; exports, 825,240 tons, and the coal trade is rapidly increasing; the receipts of live stock in 1881 were 738,900 cattle, 2,096,325 hogs, 1,113,350 sheep, 17,76 horses; the exports, 41,024 car-loads of cattle, 12,533 of hogs, 4654 of sheep, and 853 of horses; stock slaughtered in 1881 (estimated), 35,845 cattle, 443,100 hogs, 98,600 sheep.

Manufactures.—In 1880, 1183 establishments of all industries; value of products, \$42,937,701.

History.—B., which then contained about 200 inhabs., was burned by the Brit. Dec. 30, 1813, but was soon rebuilt, and in 1828 had about 7000 inhabs. The completion of the Erie Canal in 1825 gave a rapid impetus to its growth. It was incorporated as a city in 1832, when its pop. was 15,000. Pop. 1850, 42,300; 1860, 81,130; 1870, 117,714; 1880, 155,134; 1884, about 200,000. [From orig. art. in *J. S. Univ. Cyc.* by WILLIAM THURSTONE. COMMERCIAL ED. OF "COURIER AND REPUBLIC."]

Buffon, buff'on or buf-fon', de (GEORGES LOUIS LECLERC), COMTE, a Fr. naturalist and philos., b. at Montbar, in Burgundy, Sept. 7, 1707. He was liberally ed. In 1739 he was elected to the Acad. of Sciences, and appointed intendant of the royal garden in Paris. Author of *Nat. Hist.*, consisting of 15 vols. (1749-67). D. Apr. 16, 1788.

Bu'ford (JOHN), b. in 1826 in Ky., grad. at W. Pt. in 1848; capt. 2d dragoons Mar. 9, 1859, and Dec. 16, 1863, maj.-gen. U. S. volunteers. He served on frontier duty 1848-61, and

during the c. war with the Army of the Potomac, as assistant inspector-gen. and then as chief of cav. D. Dec. 16, 1863.

Bu'ford (NAPOLEON B.), b. Jan. 13, 1807, in Woodford co., Ky., grad. at W. Pt. in 1827; resigned Dec. 31, 1835, while lieutenant. Served in Ky., Tenn., Miss., and Ark. during c. war, and rose from col. of the 27th Ill. Volunteers to be brevet maj.-gen. U. S. volunteers Mar. 13, 1865. D. Mar. 28, 1883.

Bulgaria, bool-ga're-a (anc. *Moesia Inferior*), a principality created by the treaty of Berlin July 1878, within the Ottoman empire, of which it is practically independent, though paying an annual tribute to the Porte as suzerain. Its precise limits were not defined, but in gen. it is bounded N. by the Danube, which separates it from Rumania, E. by the Black Sea, S. by the Balkan range, W. by Servia. The treaty provided that B. should be a Chr. govt.; the prince, who could not be a member of any of the reigning houses of the great European powers, should be elected by the people and confirmed by the Porte, with the consent of the powers; the National Assembly to be elected by universal manhood suffrage; the prince to have the right to nominate additional deputies equal to half the number returned by the popular vote; the executive power to be vested in a ministry under the prince, and appointed by him. Alexander of Hesse, brother of the empress of Rus. (b. Apr. 5, 1857), was unanimously chosen as prince, and assumed the govt. June 28, 1879. The Bulgarians belong almost wholly to the Gr. Ch. Cap. Sophia. Area estimated at 24,360 sq. m. Pop. 1,998,983.

Bulkheads, in a ship, are the partitions between the several portions of the interior, whether to separate it into rooms or as a safeguard in case of wreck. In ships of war the B. are chiefly of wood, and may be removed when prepared for action. In emigrant ships they are frequently mere lattice-work. Water-tight B. are iron walls running athwart the hold, as a means of dividing it into several portions, each water-tight in reference to its neighbors. Most passenger-steamers are provided with these B.

Bull [Lat. *taurus*; Fr. *taureau*], the male of animals belonging to the family Bovide and genus *Bos*. Also the name of one of the 12 signs of the Zodiac and of a constellation which does not coincide with the sign.

Bull [Lat. *bullo*, a "seal"], or **Papal Bull**, an ordinance or decree of the pope. B. are written on parchment, and the leaden seal of the Ch. is appended by a silken cord if the B. be a gracious one, but if severe the cord is of hemp. The publication of a B. is termed fulmination (from the Lat. *fulmino*, *fulminatum*, to "hurl a thunderbolt," *fulmen*).

Bull (OLE BORNEMANN), a Nor. violinist, b. at Bergen Feb. 5, 1810. In 1845 he came to the U. S. and founded the colony of Oleona, in Pa. This proved to be a failure, and he returned to Europe. He afterward resided in the U. S. several times. D. Aug. 18, 1880.

Bul'la, a genus of gasteropodous mollusks, having the male and female organs of sex in the same individual. They have a convoluted shell, which serves as a protection for the gills, and which in some species is large enough for the entire animal; in others it is itself enveloped in the mantle. The gizzard is very muscular, and in some species are found calcareous plates, which serve to grind the food. All the species are marine. Some, from their form and fragility, are called bubble-shells.

Bull-Baiting, a sport once common in Eng. It consisted in causing a bull to be attacked by dogs. Another form was to fasten the bull by a rope, and to send bulldogs against him, one at a time, to seize him by the nose.

Bull'dog [so called from the now obsolete practice of causing this animal to fight with the bull], a variety of the dog especially bred in Eng., and more remarkable for courage, persistency, and strength than for docility or intelligence. It is now much less frequently bred than in past times. The size of the neck and fore quarters of this dog is quite in excess of the development of the other parts.

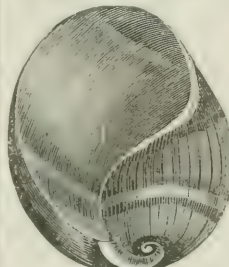
Bull'dozing, **Bulldozer**, or **Bulldozen**, a slang term of uncertain derivation, originating in La., and used in several of the S. States. At first it was applied to a small band of "regulators," who undertook to put a stop to petty thefts by flogging the supposed perpetrators; then it came to denote all summary punishment not authorized by law; and later, and more specifically, to designate various kinds of intimidation alleged to be practised at elections.

Bul'let [Fr. *balle*; Ger. *Kugel*], a projectile of lead to be discharged from various kinds of small-arms. For smooth-bore arms B. are usually spherical, but for rifled musketry various forms are used. Most B. have an expansive base, the design being to force the soft lead outward, so as to cause it to fit the grooves of the rifle, and thus give the B. a rotation around its long axis during the motion forward.

Bull-Fight [Sp. *corrida de toros* or *fiesta de toros*], a combat of men with bulls, a popular pastime in Sp. In Madrid the amphitheatre will seat 10,000 spectators. There are three classes of performers. First come the *picadores*, mounted on horseback, whose business is to irritate and partially tire the bull, who not unfrequently kills several of the horses. Then come the *chulos*, on foot, having short barbed darts ornamented with flags, which they stick into the animal. Lastly comes the *matador*, armed with a long, straight, sharp sword, and carrying in his left hand the *muleta*, a stick to which is attached a piece of red silk. The bull lowers his head and rushes at the *muleta*, and is usually dispatched with a single thrust. Sometimes the *matador* is killed or disabled, when another takes his place.



Cape Buffalo.



Bulla Velum.

Bullfinch, (*Pyrrhula Europaea* and *major*), a European bird of the family Fringillidae, about the size of the common sparrow. It is easily tamed. The genus is characterized by its short, thick, rounded bill. The plumage is



Bullfinch.

grayish above; below, in the male, bright rose color, in the female reddish gray; crown of the head, wing, and tail black; upper and under tail-coverts white. Its song is agreeable. The pine B. (*Pinicola enucleator*) is a N. bird of both hemispheres. The male is of a splendid red, the female an orange-green color.

Bullfrog (*Rana mugiens*), a frog found in the U. S., above of an olive-green color, and generally 8 to 12 inches long, though in some cases it attains the length of 19 to 21 inches. It derives its name from the remarkable loudness of its voice, which is bass and resembles the bellowing of a bull. The hind legs of this frog are often used as food.

Bullhead, the popular name of small fishes of the genus *Cottus*, and also sometimes applied in the U. S. to the common catfish.

Bullions (PETER), D. D., a divine and educational writer, b. in Perthshire, Scot., in 1791, removed to Amer. in 1817, and became in 1824 prof. of Lat. and Gr. in the Albany Acad. Author of Lat. and Gr. gramm. and readers and a Lat.-Eng. lexicon. D. Feb. 12, 1864.

Bullitt (ALEXANDER SCOTT), b. in Prince William co., Va., in 1761, emigrated to Ky. in 1784; became a prominent politician, was pres. of the State senate for several yrs., and lieut.-gov. 1800-04. D. Apr. 13, 1816.

Bullock (ALEXANDER HAMILTON), LL.D., b. in Royals-ton, Mass., Mar. 2, 1816, grad. at Amherst in 1836; became a lawyer, and was gov. of Mass. 1866-69. D. Jan. 17, 1882.

Bullock (ARCHIBALD), a native of Charleston, S. C., was a delegate to the Phila. Cong. from Ga. in 1775, and in the following year pres. of the executive council of Ga. D. 1777. —His son, WILLIAM B. BULLOCK (d. Mar. 6, 1852), was in 1813 U. S. Senator from Ga.

Bullock (RUFUS B.), a native of N. Y., went to Ga. before the c. war, and was elected in 1848 first gov. of Ga. under the new const. adopted in pursuance of the reconstruction measures of Cong. This office he held until the fall of 1871, when he resigned and abandoned the State.

Bull Run, Battle of, the first great battle of the war of secession, so called from the name of a small tributary of the Occoquan Creek on which it was fought, the U. troops under Gen. McDowell and the Confeds. under Beauregard. The attack was made by McDowell in the morning of July 21, 1861, and was till 3 P. M. successful; but about that hour the Confeds. were reinforced by the army of Gen. J. E. Johnston from the upper Potomac, and the temporary success was turned into a defeat, ending with a hurried retreat; the U. troops checked the confeds. pursuit at Centreville.

SECOND BATTLE OF BULL RUN (called also the battle of GROVETON) was fought upon nearly the same ground, Aug. 29, 30, 1862, between the U. forces under Gen. Pope and the Confeds. under Gen. Lee. There had been severe fighting the previous day, and on the 30th Gen. Pope made an attack in force upon the Confeds. This was repelled, and the U. army retreated across the B. R. Pope lost in this campaign nearly 30,000; the Confeds. about 15,000.

Bull-Terrier, a dog bred by cross between bulldog and terrier, and uniting the courage and strength of the bulldog with the intelligence of the terrier; especially used to kill rats.

Bülow, von (FRIEDRICH WILHELM) BARON, b. on the paternal estate of Falkenberg, Prus. prov. of Brandenburg, Feb. 16, 1755; entered the army in 1769, and was a lieut.-gen. at the opening of the war of independence in 1813; by his victory over Ney at Dennewitz (Sept. 6, 1813) he prevented the Fr. from pushing onward to Berlin; took part in the battle of Leipsic, and then drove the Fr. out of Westphalia, Hol., and Belg., joining the allies in Paris. D. Feb. 25, 1816.

Bülow, von (HANS GUIDO), b. at Dresden Jan. 8, 1830; studied law in Leipsic and Berlin, but determined, under the influence of Richard Wagner and Liszt, to devote himself exclusively to music; studied under Liszt at Weimar 1851-53. He has made concert tours in Europe and Amer. He is also a composer and musical writer.

Bulwer (EDWARD GEORGE EARLE LYTTON), BARON LYTTON, an Eng. author, b. in Norfolk May 1805; grad. at Trinity Hall, Cambridge, 1826, having gained the chancellor's prize for Eng. verse. In 1827 he pub. his first novel, which was followed by a large number of works in many

depts. of lit. He was member of Parl. for the city of Lincoln 1832-41, and made a baronet in 1838; in 1844, on the death of his mother, he came into possession of the Knebworth estates, and assumed the name of Bulwer-Lytton; was chosen lord rector of the univ. of Glasgow 1856, and in 1858 was sec. of state for the colonies; was raised to the peerage in 1866 as Baron Lytton. In 1827 he married Rosina Wheeler (b. 1807); the union was unhappy, they separated in 1836, and she wrote the novel *Chevely, or the Man of Honor*. His novels are about 30 in number, of which *Eugene Aram*, *Rienzi*, *The Last Days of Pompeii*, and the *Caxton* series are among the best. He produced several dramas, of which *Richelieu* and *The Lady of Lyons* were successful on the stage. D. Jan. 18, 1873.

Bulwer (EDWARD ROBERT). See LYTTON (EDWARD ROBERT BULWER-LYTTON).

Bulwer (HENRY LYTTON EARLE), BARON DALLING AND BULWER, an Eng. diplomatist and author, a brother of the preceding, b. 1804, was sent as ambassador to Madrid in 1843; in 1849 was transferred to Wash., and became minister plenipotentiary at Constantinople in 1858. Wrote *France, Social and Literary*, and *Life of Lord Byron*. D. May 27, 1872.

Bulwer-Clayton Treaty. See CLAYTON-BULWER TREATY IN APPENDIX.

Bummalo'ti (*Saurus ophiodon*), a fish of the family Scopelidae, which is regarded as a subdivision of the family Salmonidae. It is a native of the seas of India, from which it is exported in large quantities, salted and dried, being highly esteemed for its flavor. In commerce it is called "Bombay duck." It is long, with a very large mouth, the gape of which extends behind the eyes, and which is furnished with many long, slender, barbed teeth.

Bun'ion, or **Bunyon**, a painful inflammation of the *bursa mucosa*, or membranous sac of the great-toe joint. The pressure of a boot causes it. Rest and poulticing will generally subdue the attack, and wearing a shoe so constructed as to save the B. from pressure will usually prevent a recurrence.

Bunker Hill, on R. R., Macoupin co., Ill., 37 m. N. E. of St. Louis, Mo. Pop. 1880, 1441.

Bunker Hill, an eminence in Charlestown, now a part of Boston, Mass., connected by a ridge with another small eminence 700 yards distant called Breed's Hill. These two elevations are famous for the battle fought here between the Brit. and Amer. forces June 17, 1775. The Amer. redoubt was on Breed's Hill, but by common usage the event is known as the battle of B. H. A considerable body of militia, under Gen. Ward, had assembled near Boston, and it having been ascertained that the Brit. were about to seize and fortify B. H., Prescott and Putnam were detached to forestall them. For this purpose they threw up a breastwork upon Breed's Hill, from which the Brit. undertook to dislodge them. Under cover of a fire from their shipping a force landed and advanced upon the works; the Amers. withheld their fire until the enemy were within close range, and the Brit. fell back in disorder; but being reinforced they rallied and made another attack, which was also repelled. A third assault, in still greater force, was made. The ammunition of the Amers. was now exhausted, but they made a brief defence with clubbed muskets. They were pressed by superior numbers, and a retreat was ordered. The Brit. loss was about 1050, that of the Amers. 450. The scene of this battle is marked by a granite monument 221 ft. high, the corner-stone of which was laid by La Fayette June 17, 1825, and which was dedicated June 17, 1843, Daniel Webster being the orator on both occasions.

Bunodes Gemma'cea, called in Eng. *gem pimplet*, a zoophyte of the order Actinoida (sea anemones). When open it bears a striking resemblance to a flower, but when closed it assumes a spherical form, having the appearance of an echinus stripped of its spines. The generic name is from the Gr. *βουνός*, signifying "resembling an eminence or a woman's breast" (referring to its form when closed); the specific name is from the Lat. *gemma*, a "bud," or small protuberance, and has allusion to the wart-like protuberances on the exterior surface.



Bunodes, open.



Bunodes, closed.

Bun'sen (ROBERT WILHELM), a distinguished Ger. chemist, b. at Göttingen Mar. 31, 1811, became in 1851 a prof. of chem. at Breslau, and in 1852 at Heidelberg. He is the author of several works, the most important perhaps being on gas analysis. His investigations on organic compounds of arsenic, kadoyl, etc., in 1841, attracted much attention. He has invented several important pieces of apparatus, several of which bear his name, as the B. battery, gas-burner, photometer, filter pump, etc. His most brilliant discovery was probably that of spectrum analysis and the spectroscopic, made in connection with Kirchhoff. He also devised a new system of analysis by flame reactions.

Bunsen, von CHRISTIAN KARL JOSIAS, Ph. D., D. C. L., CHEVALIER, a GER. writer and diplomatist, b. at Korbach, in Westphalia, Aug. 25, 1791. He was sent as ambassador to Lond. in 1841. Among his works are *Die Verfassung der Kirche der Zukunft* and *Gott in der Geschichte*. He had a high reputation as an Egyptologist. He was recalled from the court of St. James in 1854, and was raised to the peerage as *Freiherr* thereof in 1858. D. Nov. 20, 1890.

Bunting, a name given to numerous *Emberiza*, mostly confined to the palaearctic region, but some are found in Amer.

Bunyan (JOHN), author of *Pilgrim's Progress*, b. at Elstow, near Bedford, Eng., in 1628, and learned the trade of a tinker. He enlisted in army of Parl. about 1645; married about the age of 20, soon quitted the army, and joined the Baps. After passing through severe spiritual conflicts he became a preacher in 1655. He preached at Bedford until 1660, and was then committed to Bedford jail for nonconformity. He was detained here for 12 yrs., but for the latter part his confinement was not rigorous. After his liberation he resumed his labors at Bedford, making frequent ministerial visits to Lond. and elsewhere. He wrote *Pilgrim's Progress* in Bedford jail; subsequently put forth other works, many of them mere pamphlets, numbering in all about 60. D. Aug. 31, 1688.

Buprestis [from the Gr. *βουπρεστις*, the name of an insect whose bite is said to have caused cattle to swell up; derived from *bous*, an "ox," and *πρηβο*, to "puff up" by blowing], a genus of coleopterous insects of the family Buprestidae, which includes more than 1000 species. They are remarkable for the splendor and richness of their colors. They are found in N. Amer., but are more abundant in tropical countries. The *B. gignis* of Cayenne is about 2 inches long, and is larger than any N. Amer. species.

Burbot (*Lota vulgaris*), the only exclusively fresh-water species of the family Gadidae. It is found in the N. parts of Amer., Europe, and Asia, and attains a weight of 8 or 10 lbs. It has 2 dorsal fins, the second of which is very long, and a very long anal fin. Its flesh is white and firm.

Burbridge (STEPHEN GAXCO), a gen. of volunteers, b. in Scott co., Ky., Aug. 19, 1831, ed. at Georgetown Coll. and at Ky. Military Inst., Frankfurt; studied law, then engaged in mercantile business till 1853, when he turned his attention to farming. At the outbreak of the c. war raised the 26th Ky., which he led in the field until the battle of Shiloh, where he was promoted to be a brig.-gen. of U. S. volunteers. Served against Bragg in Ky. in 1862, at Vicksburg, Ark. Post, and Ft. Gibson. He also defeated John Morgan in his raids, and drove him into Tenn., and was then brevetted maj.-gen.; resigned in 1865.

Burckhardt, burkhart (JOHANN LUDWIG), a Swiss traveller, b. at Lausanne Nov. 24, 1784. In 1806 he entered the service of the Afr. Association, which in 1809 sent him to explore the interior of Afr. He travelled through Cairo and Nubia to Mecca, where he arrived in 1814. Disguised as a Moslem haji, he made a pilgrimage to Mt. Ararat and to Medina. D. at Cairo Oct. 15, 1817.

Burden (HENRY), b. at Dumbleane, Scot., Apr. 20, 1791, ed. at Edinburgh, and in 1819 came to the U. S. and located at Troy, N. Y. He made the first cultivator, and brought out a horseshoe machine, and the hook-headed spike used on R. R. tracks. D. Jan. 19, 1871.

Bureau Veritas, an inst. for the classification of the steamships and sailing vessels of all nations, for use by underwriters, maritime insurance agents, etc., with head-quarters at Brussels, in Belg. It was founded at Antwerp, Belg., in 1828, by Charles Bal. During the revolution of 1830, which separated Belg. from Dut. rule, the B. V. was removed to Paris, where it was long known as the Fr. Lloyd's. In the Franco-Ger. war of 1870-71 the B. was finally located at Brussels. Its surveyors and agents are found in the seaports of all maritime countries, and their ratings of vessels are the fruit of the utmost severity in examination.

Burges (THISTAM), LL.D., a statesman and orator, b. at Rochester, Mass., Feb. 26, 1770, grad. at Brown Univ. in 1796. Was a lawyer, chief-justice of R. I., a prof. in Brown Univ., and an M. C. D. Oct. 13, 1853.

Burges (JOHN W.), LL.D., b. at Cornersville, Giles co., Tenn., Aug. 26, 1844, ed. at Cumberland Univ., Lebanon, Tenn., and Amherst Coll., Mass., whence he grad. in 1867; was admitted to Mass. bar in 1869; was appointed prof. of Eng. lit. and political economy at Knox Coll., Galesburg, Ill., in 1869; went to Europe in 1871, studied hist. and public law at Göttingen, Leipzig, and Berlin; prof. of hist. and political science at Amherst in 1873, and of political hist. and public law at Columbia Coll., New York, in 1876.

Burglary [from *burg*, a "town," and the old Fr. *laire* (Lat. *latro*), a "thief"], in criminal law, the act of breaking and entering into a dwelling-house of another or a ch. in the night-time, with intent to commit a felony therein. There are four circumstances necessary to constitute the offence, referring to place, time, the acts done, and the intent. The place is a dwelling-house or a ch. As to time, the rule is that the offence must be committed by night. The better opinion is, that both the breaking and entering must be by night, though the two acts, so far as they are distinct in their nature, may be committed on separate nights. The acts to be done are breaking and an entry. The word "breaking" is not to be construed so as to require any great degree of force or violence. Unlatching a door or raising a window is sufficient. Finally, there must be an intent to commit a felony. If a felony be actually committed, the intent may be inferred.

The common-law ingredients of this crime have been modified in this country by statute. B. is sometimes divided into degrees; some of these degrees would include breaking and entry in the day-time, or into buildings other than dwelling-houses and chs., or breaking out of a building as well as into it. In some of the States statute law makes the intent to commit any crime sufficient.

Burgoyne, bur-goin' (JOHN), a Brit. gen. and dramatist, b. in 1730, captured Alcántara, in Sp., in 1762; commanded an army of about 8000 men that invaded N. Y. from Canada, was repulsed at Stillwater in Sept., and captured at Saratoga in Oct. 1777 by Gen. Gates. One of his dramas is *The Maid of the Oaks*. D. June 4, 1792.

Burgoyne (Field-Marshal Sir JOHN FOX), son of the gen. above named, and godson of Charles James Fox, b. in Lond. July 24, 1782, entered the Royal Engineers as second lieut. in 1798. Served under Gen. Frazer in Egypt, under Sir John Moore in Port., under Wellington in Sp., under Pakenham at New Orleans, and under Raglan in the Crimea; was inspector-gen. of fortifications till 1868, when, after 70 yrs.' service, he retired with promotion to the rank of field-marshal, and the appointment of constable of the Tower of Lond. D. Oct. 7, 1871.

Burgundy [Fr. *Bourgogne*; Lat. *Burgundia*], a former prov. of Fr., now divided into several depts. It derived its name from the *Burgundi*, a Ger. tribe who settled here about 408 A. D. The country known as B. varied much in extent at various periods, and was at times a kingdom, a part of which became a dual fief of the Fr. crown. In 1364 John II. of Fr. made his son, Philip the Bold, duke, several of whose successors became practically independent sovereigns. Charles the Bold was killed in battle in 1477, and the duchy was then annexed to Fr.

Burgundy, DUKES OF. See CHARLES THE BOLD, PHILIP THE BOLD, PHILIP THE GOOD.

Burgundy (LOUIS), DUKE OF, dauphin of Fr., b. in 1682, was a grandson of Louis XIV. and the father of Louis XV. D. 1712.

Burgundy Pitch (*Pix Burgundica*), a resinous substance, is a concrete exudation from the *Abies canad.* or Nor. fir. It has a pleasant resinous odor and a slightly bitter taste. It is used in med. as an external application in the form of a plaster.

Burgundy Wines are produced in the former prov. of B. chiefly on the range of hills called Côte d'Or, between Dijon and Châlons. They are celebrated for richness of flavor and perfume. The best red wines of B. are the Clos-Vougeot, Chambertin, Romané-Conti, Volnay, Pomard, and Richebourg. The white wines are said to be the finest in Fr.

Bu'ri, a name of a species of palm, a native of the Philippine Islands. Its trunk is employed in the construction of houses; sugar and spirituous liquors are made of the sap; the pith yields a valuable article of food (sago), and mats and sails are made from its fibre. This palm is the *Sagurus saccharifer*.

Burke (EDMUND), LL.D., a Brit. statesman, b. in Dublin Jan. 12, 1729, N. S.; entered Trinity Coll., Dublin, studied law in Middle Temple, Lond., but returned to Ire., taking his degree of A. M. at Trinity Coll. 1751; then took up his residence in Lond. In 1756 he put forth anonymously, under the title of a *Vindication of Natural Society*, an ironical critique upon Bolingbroke's attacks upon Christianity. Soon after appeared his essay upon *The Sublime and Beautiful*. In 1759 he became private sec. to William Gerard Hamilton, through whose influence a pension of £300 per annum was given him; but finding that his political independence would be compromised, he threw it up at the end of the year. In 1765, and again in 1768, he was returned to Parl. for Wendover, and purchased an estate of 600 acres 24 m. from Lond. When the troubles with the Amer. colonies broke out, B. warmly espoused their cause, and in 1771 he was appointed by the colony of N. Y. as its agent. In 1772 he declined an official offer of the first position in a committee of 3 to investigate the administrative system of India and remedy any evils which they could discover. In Apr. 1774 he made an able speech on the taxation of Amer., and in Mar. 1775, having been returned to Parl. from Bristol, he spoke earnestly in favor of conciliatory measures toward the colonies. In 1782 he became a privy councillor and paymaster-gen. of the forces, under the Rockingham ministry, but retired from office in 1783, when Pitt became prime minister. Early in 1787 he was named by the House of Commons as chairman of the committee to present articles of impeachment against Warren Hastings, and his opening speech, delivered in Westminster Hall Feb. 15, 1788, is a masterpiece of eloquence. In 1790 he wrote the *Reflections upon the Revolution in Fr.* which contributed much toward shaping the future conduct of Eng. toward the Fr. republic. About this time an angry separation took place between him and Fox and others of his political associates. B. was charged with having abandoned the principles of his party—a charge which he repelled in his *Appeal from the New to the Old Whigs*. About 1795 he received several valuable pensions, bestowed at the express desire of the king, and without his own solicitation; but his acceptance of them caused severe accusations, which he successfully repelled in his *Letter to a Noble Lord*. His last yrs. were clouded by failing health and the loss, in 1794, of his only son, a young man of great promise, from the shock of which he never recovered. D. July 9, 1797.

Burleigh, or **Burghley** (WILLIAM CECIL), LORD, an Eng. statesman, b. at Bourne Sept. 13, 1520. He grad. at Cambridge, studied law, and in 1548 became sec. of state under Edward VI. Being a Prot. he resigned upon the accession of Mary in 1553, but by his prudent conduct avoided molestation during her reign. In 1558, upon the accession of Elizabeth, he was again made sec. of state, and for 40 yrs. in various offices was virtually prime minister, being the only man in whom the queen put absolute trust. In 1571 he was raised to the peerage. D. Aug. 4, 1598.

Burlingame, Kan. See APPENDIX.

Burlingame, bur'ling-gam (ASSON), LL.D., b. at New Berlin, in Chenango co., N. Y., Nov. 14, 1822, grad. at Harvard in 1846. He became a lawyer, a resident of Boston, and M. C. from Mass. (1854-60); in 1861 was sent as com. to Chi., and in 1867 was appointed ambassador from Chi. to the U. S. and the great powers of Europe. D. Feb. 23, 1870.

Bur'lington, city, important R. R. centre, and river-

port of Ia., cap. of Des Moines co., on the Miss. River, 207 m. W. S. W. of Chicago. It has B. Univ., about 14 chs. and many manufactories, 2 Eng. and 1 Ger. daily, and 3 weekly newspapers. Here is a valuable variety of carboniferous limestone. Pop. 1870, 14,930; 1880, 19,450; 1884, about 25,000. [From orig. art. in *J. s. Unit. Cyc.*, by "THE HAWKEYE."]

Burlington, R. R. junc., a city and cap. of Coffey co., Kan., on Neosho River, 65 m. S. of Topeka. Pop. 1870, 960; 1880, 2011.

Burlington, a city of B. co., N. J., on R. R. and the Del. River, nearly opposite Bristol, 23 m. above Phila. and 12 m. S. W. of Trenton. It is the seat of B. Coll. (Epis.), founded in 1846. Pop. 1870, 5817; 1880, 6090.

Burlington, city, R. R. centre, and cap. of Chittenden co., Vt., on B. Bay of Lake Champlain, 40 m. W. of Montpelier. It was incorporated as a city in 1855, and is the largest place in the State. Area of original tp., 6 sq. m.; about two fifths were included in the municipal limits, the rest forming a new town called S. B. The heaviest trade in the city is in lumber. There are large quarries of building-stone, of limestone, and fine marble within or near the city limits. The Winooski, on the N. E. limit of the city, furnishes water-power. The Univ. of Vt. and State Agricultural Coll., chartered in 1791, to which is attached a med. dept., is situated here; since 1872 young women have been admitted to the classical and scientific depts. on the same terms as young men. There are also 2 R. Cath. schools and an Epis. inst. for boys within the city limits. There are 2 orphan asylums—1 R. Cath. and 1 Prot. Green Mt. Cemetery contains the monument to Ethan Allen, who was one of the early settlers and buried here—a shaft of granite surmounted by a heroic statue of Allen in marble, which was unveiled July 4, 1873. Pop. 1870, 14,387; 1880, 11,364.

Burlington, Racine co., Wis., on R. R. and the Pish-taka or Fox River, 27 m. W. by S. of Racine. Pop. 1870, 1389; 1880, 1611.

Burlington Limestone, a variety of sub-carboniferous magnesian limestone, named from Burlington, Ia., where it was first studied. It is a valuable building-stone, and is very rich in fossils, especially Crinoida.

Burmah, or **Birmah**, a kingdom of Farther India, formerly extensive and influential, but now including, beside B. proper, N. B. and the Shan tributary states, whose allegiance is little more than nominal, having an area of 192,000 sq. m. It extends from 19° 29' to 28° N. lat., and from 93° to 100° E. lon. B. proper, cap. Mandalay, occupies the lower valleys of the Irrawaddi and Salween, an area of 44,500 sq. m.

Topography, Rivers, Etc.—N. B. is mountainous; the E. has high hills and some mts.; B. proper is a rolling upland declining toward the Bay of Bengal, with alluvial basins, swamps, and sudden ridges of hills; the Irrawaddi and Salween rivers and their affluents drain the whole; both are navigable for several hundred m.

Climate.—Two seasons—the rainy, from Oct. to Apr.; the dry and hot, from May to Oct.; they are regulated by the N. E. and S. W. monsoons. The dry season, healthy, but hot; the rainy, pestiferous, especially in the jungles.

Minerals.—Gold, silver, and lead in the N. and E.; iron, copper, rubies, sapphires, amber, and petroleum abundant in B. proper.

Vegetation and Soil.—Magnificent forests; 7 or 8 species of palms, teak, mesua or iron-wood, camphor shrub, peepul, evergreen oaks, pine, and other tropical trees; flowers and shrubs of great beauty.

Products.—Rice, maize, millet, beans, yams, cotton, tobacco, indigo, bananas and plantains, and other tropical fruits.

Exports.—Teak timber, petroleum, gold leaf, silver, copper, indigo, tobacco, cotton, ivory, horns, and gums.

Animals.—The elephant, tiger, leopard, rhinoceros, and buffalo; the elephant and buffalo are domesticated.

People.—The Burmese are Mongols; their lang. is monosyllabic; they are industrious and ingenious in the mech. arts; the Karens and Shans are of a different race, less intelligent, and not so advanced in industrial pursuits, but learn readily. The govt. is an absolute monarchy, and often a brutal tyranny. The present king, Thebau, put all his relatives to death when he ascended the throne.

History.—Two kingdoms, Ava and Pegu, were rivals for many centuries; in 1364 the kingdom of Ava obtained the advantage, and retained it for 369 yrs. Pegu regained the power in 1733, but was conquered by Alompra in 1756. His descendants still rule, but the present cap. is Mandalay. The kingdom of B. was at its zenith in 1822, but 2 wars with G. Brit., in 1826 and 1852, caused it to lose its prestige and 88,556 sq. m. of its terr. (see B., BRIT.), and it is now waning in power.

Population, Etc.—The pop. of the whole kingdom of B. is estimated at 4,000,000. N. B. is inhabited by wild, warlike tribes—Singphos, Shans, Kyans, Red Karens, Kakhyens, etc.; the E. tributary states by Shans, with some Red Karens and Burmese; the natives of both these sections are not idolaters, but were demon worshippers. The pop. of B. proper is about 1,200,000, Burmese, and Karens of several tribes. The Burmese are mostly Buddhists and of marked Mongolian race. The Karens are probably also Mongols, but with less marked features. Many of them are now Prot. Chrs., through the labors of Amer. missionaries.

L. P. BROCKETT.

Burmah, British, a collective term applied to several provs. of the Anglo-Indian empire conquered from the kings of B. These are Aracan, Martaban, Pegu, and the Tenasserim provs. of Maulmain (or Amherst), Tavoy, and Mergui. Aracan and the Tenasserim provs. were ceded to the Brit. by a treaty signed in Feb. 1826, at the end of the first war with B. Pegu and Martaban were retained as compensation after the war of 1852. The Amer. Bap. missionaries have in Brit. B. one of the most successful missions of modern times. The area of Brit. B. is 88,556 sq. m. Pop. 3,707,646.

Burmann (PETER), a philologist, b. at Utrecht July 6, 1668; prof. of hist., eloquence, and the Gr. lang. at Leyden in 1715; edited Horace, Ovid, Quintilian, Lucan, *Poete Latini Minores*, and other classics. D. Mar. 31, 1741.

Burnes (Sir ALEXANDER), a traveller and Orientalist, b. at Montrose, Scot., May 16, 1805. He entered the army of India in his youth, afterward travelling in Central Asia; in 1833 he pub. *Travels into Bokhara*. In 1838 he was sent on a mission to Cabool, where he remained as political resident; was murdered there, Nov. 2, 1842, by the Afghans.

Burnet, the popular name of 2 genera of plants, the *Sanguisorba* and *Poterium*, generally referred to the natural order Rosaceae. The great B. (*Sanguisorba officinalis*) is cultivated in Ger. as a forage-plant, and yields a good crop on poor soils. A similar species grows wild in N. Amer. The common B. (*Poterium Sanguisorba*) furnishes valuable pasture for sheep on the Eng. downs. It is sometimes seen in Amer. gardens, and is used in salads.

Burnet, Tex. See APPENDIX.

Burnet (GILBERT), F. R. S., a Brit. historian and prelate, b. in Edinburgh Sept. 18, 1643. He became prof. of divinity in the Univ. of Glasgow in 1668, resigned that chair in 1675 and removed to Lond. He was a defender of civil liberty in the crisis which preceded the revolution of 1688, and gained the favor of William III., who appointed him his chaplain, and in 1689 bp. of Salisbury. Author of a *Hist. of the Reformation in Eng.* and other works. D. Mar. 17, 1715.

Burnet (JACOB), LL.D., b. at Newark, N. J., Feb. 22, 1770, grad. at Princeton in 1791; was one of the founders of Cin., whither he removed in 1796; became a judge of the supreme court of O. in 1821, and a Senator of the U. S. in 1828. D. Apr. 27, 1853.

Burnett's Disinfecting Fluid, a strong solution of chloride of zinc. It is of service in preserving dead animal tissues, as in the dissecting-room and in jars containing anatomical specimens. It has little action on steel instruments. It has been applied to the preservation of timber by a process called *burnettizing*. Crowe's disinfectant liquid is the same.

Burney (CHARLES), F. R. S., an Eng. composer, b. at Shrewsbury Apr. 7, 1726; wrote, beside other works, a *Gen. Hist. of Music from the Earliest Ages*. D. Apr. 12, 1814.

Burning Glasses and Burning Mirrors, lenses or mirrors so formed as to collect the sun's rays which fall on them into a point or focus, and thereby produce intense heat. This method of producing heat has been known from remote times. It is said that Archimedes (about 210 B. C.), by means of such mirrors, set fire to the Rom. fleet which was besieging Syracuse.

Burns (FRANCIS), D. D., a colored bp. of the M. E. Ch., b. in Albany, N. Y., Dec. 5, 1809, was sent as missionary to Liberia, Afr., in 1834; taught school at Cape Palmas, joined the Liberia Conference in 1838, founded Monrovia Acad. in 1851, was ordained bp. of his denomination, in Liberia, 1858, and, after nearly 5 yrs. of epis. service, d. in 1863.

Burns (ROBERT), a Scot. poet, b. near Ayr Jan. 25, 1759. He was the eldest of 7 children, their father being a poor cotter, who yet contrived to give a fair education to his children. Up to the age of 15 B. was a ploughboy; but he early manifested decided poetic power, accompanied by a temperament which led him into many amours and other excesses. At different times he made unsuccessful attempts at farming. In 1785 he entered into a connection, which according to Scot. usage was equivalent to a marriage, with Jane Armour, who bore to him twins. Her parents were opposed to this connection, and B. resolved to emigrate to Amer.; but before doing so he succeeded in procuring the publication of a collection of his poems, which were received with great favor, and he was invited to visit Edinburgh, where he was for a time lionized in social and literary circles, but his patrons made no effort to improve his fortunes. In 1788 he avowed his marriage with Jane Armour, and was soon after made an officer of the excise, with a salary of £50, which was afterward raised to £75. In 1791 he took up his residence at Dumfries, where the remainder of his life was passed, mostly in poverty, arising mainly from his intemperate habits, although he received some income from the sale of his poems. B. has been accepted as the national poet of Scot., and nearly 20 yrs. after his death a splendid monument was erected to his memory in the churchyard of Dumfries, into which his remains were removed. D. July 21, 1796.

Burns (WILLIAM W.), b. in O., and grad. at W. Pt. in 1847; became a maj.-gen. of volunteers in 1862 and brevet brig.-gen. U. S. A. in 1865; served in the Army of the Potomac until 1863.

Burns and Scalds. B. arise from the application of a hot solid body or flame, and S. from hot liquid or steam. Severe B. are often fatal, especially to children; quite as much, perhaps, from the shock which attends them as from any appreciable injury. In all cases the clothes should be removed with great care so as not to remove the cuticle with them. If cold water be agreeable to the patient, it may be cautiously applied. Pain and shock may often be relieved by opiates or stimulants. The injured surfaces are to be dressed with carron oil (a mixture of olive oil and lime-water), with collodion, with oiled cotton, or they may simply have flour dredged over them. When the surface takes on an unhealthy action and granulations are excessive, a weak solution of nitrate of silver or other local stimulant may produce good results.

Burnside (AMBROSE EVERETT), b. May 23, 1824, at Liberty, Ind., grad. at W. Pt. 1847, and as lieu. ofartil. served in Mex. war 1847-48; afterward on the frontier; resigned Oct. 2, 1853. Manufacturer at Bristol, R. I., 1853-58, of breech-loading rifles, which he had invented; cashier of land dept. Ill. Central R. R. Co. 1858-59; treas. Ill. Central R. R. Co. 1860-61. In the c. war, as col. R. I. 3-months volunteers, served in Maj.-Gen. Patterson's operations about Cumberland, Md., and in the Manassas campaign, 1861, engaged at

Bull Run. Appointed brig.-gen. U. S. volunteers Aug. 6, 1861, and promoted to maj.-gen. May 18, 1862; in command of dept. of N. C. 1862, engaged at Roanoke Island, Newbern, Camden, and Fort Macon; in command of forces 9th army corps at Newport News and Fredericksburg 1862; in Md. campaign, engaged at S. Mountain and Antietam, in command of left wing; in gen. charge of Harper's Ferry 1862; in command of Army of Potomac Nov. 7, 1862, to Jan. 28, 1863, defeated at Fredericksburg; in command of dept. of O. 1863, engaged against Morgan's raiders, capture of Cumberland Gap, occupation of E. Tenn., in several actions and siege of Knoxville; in command of 9th corps in Richmond campaign 1864, engaged at Wilderness, Spotsylvania, North Anna, Totopotomoy, Bethesda Church, and Petersburg, including Mine assault. Resigned Apr. 15, 1865, from volunteer service. Civil engineer 1865-66, pres. of Cin. and Martinsville R. R. Co. in 1865, of R. I. Locomotive Works in 1866, and of Indianapolis and Vincennes R. R. Co. in 1867, gov. of R. I. 1866-69; was elected U. S. Senator from R. I. in 1875, and re-elected in 1880. D. Sept. 13, 1881.

Burnt Offerings. See SACRIFICE.

Burnt Sienna, a fine orange-red pigment, transparent and permanent, obtained by burning the ferruginous ochreous earth called terra di Sienna. It is used both in oil-painting and painting with water-colors. Mixed with Prus. blue it produces a beautiful green.

Burnt Umber, a pigment of a russet-brown color, is semi-transparent, mixes well with other pigments, and dries quickly. It is prepared by burning umber, an ochreous earth first discovered in Umbria, It.

Bur Oak (the *Quercus macrocarpa*), a species of oak of medium size found in the U. S., principally E. of the Miss. It is also called over-cup oak and mossy-cup oak. Its timber is valuable.

Burr (AARON), father of the V.-P., b. at Fairfield, Conn., Jan. 4, 1716, grad. at Yale in 1735; licensed to preach in 1736, settled over the Presb. ch. in Newark, N. J., in 1738, chosen pres. of the Coll. of N. J. in 1748. Author of a Lat. gram. known as *The Newark Gram.* D. Sept. 24, 1757.

Burr (AARON), b. at Newark, N. J., Feb. 6, 1756, a son of the preceding and a grandson of Jonathan Edwards; grad. at Princeton in 1772, joined the Provincial army at Cambridge, Mass., in 1775, served as a private soldier, and afterward as aide to Montgomery on the Quebec expedition, on the staffs of Arnold, Washington (whom he disliked), and Putnam, becoming a lieutenant-col. and commanding a brigade at Monmouth; resigned in 1779; practised law at Albany in 1782 and in New York in 1783, and became atty.-gen. of N. Y. in 1789; was U. S. Senator 1791-97. In 1800 he and Jefferson each had 73 electoral votes for the office of Pres. of the U. S. The choice was thus left to Cong., which, on the 36th ballot, chose Jefferson for Pres. and Burr for V.-P. In 1804 he mortally wounded in a duel his rival, Alexander Hamilton, and soon after prepared an attempt upon Mex. and, as was asserted, upon the S. W. ters. of the U. S.; in 1807 was tried at Richmond, Va., on a charge of treason, but acquitted. Subsequently practised law in New York. D. Sept. 14, 1836.

Burr (ENOCH FITCH), D. D., a kinsman of Pres. Burr of the Coll. of N. J., b. at Green's Farms, Fairfield, Conn., Oct. 21, 1818, grad. at Yale in 1839; was settled over the Congl. ch. in Lyme, Conn., in 1830. Author of *A Treatise on the Application of the Calculus to the Theory of Neptunism, Peter Mundi, A Song of the Sea*, and other works.

Burrampooteer. See BRAHMAPOOTRA.

Burrill (ALEXANDER M.), b. about 1807, grad. at Columbia Coll. in 1824, and studied law. Author of a *Law Dict.* D. Feb. 7, 1869.

Burrill (JAMES), LL.D., b. in Providence, R. I., Apr. 25, 1772, grad. at Brown Univ. in 1788; was atty.-gen. of R. I. 1797-1813, chief-justice of the State supreme court 1816, U. S. Senator 1817-20. D. Dec. 25, 1820.

Burritt (ELIHU), called the LEARNED BLACKSMITH, b. in New Britain, Conn., Dec. 8, 1811. He worked at the trade of a blacksmith, and became a self-taught master of many anc. and modern langs.; subsequently lectured on temperance and peace. Among his works is *Thoughts on Things at Home and Abroad.* D. Mar. 7, 1879.

Burroughs (GEORGE), a victim of the witchcraft delusion, grad. at Harvard Coll. in 1670, and was a preacher in Salem, Mass., in 1681; he was accused in 1692 of witchcraft, placed on trial, and, owing to the infatuation then prevailing, was declared guilty of exercising diabolical powers, and executed Aug. 19, 1692.

bird, found on the plains of Amer., the N. and S. Amer. forms being varieties of the same species. In N. Amer. it inhabits the same localities as the marmot (or prairie-dog), whose dwelling it often shares, the rattlesnake sometimes making the third member of this singular family. It also digs burrows for itself; but these are not so deep as those of the prairie-dogs.

Burrows (WILLIAM), b. near Phila. Oct. 6, 1785. He entered the navy at the age of 14, and commanded the brig Enterprise in an engagement with the Brit. brig Boxer, off Portland, Me., Sept. 5, 1813, during which he was mortally wounded. He lived, however, long enough to receive the surrender of the Brit. vessel.

Burrstone, or **Buhrstone**, a sedimentary silicious rock containing small cells, which give it a roughness of surface adapting it for millstones. The cells are often produced from the removal, by solution, of imbedded fossil shells. The stone, of which there are some varieties, occurs in several geological formations. The best is obtained at La Ferte, near Paris, but good B. is found in Wales, Scot., Ger., and It., also in Pa., O., S. C., and Ala. Millstones are often made of pieces of B. bound by iron hoops.

Burt (WILLIAM A.), b. in Worcester, Mass., June 13, 1792, became a surveyor, and in 1824 removed to Mich. At the World's Fair in Lond., 1851, obtained a medal for his solar compass; was one of the originators of the canal at Sault Ste. Marie. D. Aug. 18, 1858.

Burton (JOHN HILL), LL.D., F. R. S. of Edinburgh, a Scot. historian and advocate, b. at Aberdeen Aug. 22, 1809. Pub. beside other works, *The Hist. of Scot. from Agricola's Invasion to the Revolution of 1688.* D. Aug. 10, 1881.

Burton (RICHARD FRANCIS), an Eng. traveller, b. in Norfolk in 1821. Among his works are *The Lake Regions of Central Afr.* and *The Highlands of Brazil.*

Burton (ROBERT), an Eng. clergyman, b. at Lindley, in Leicestershire, Feb. 8, 1856, ed. at Ox. He became rector of Segrave in 1628; was author of *The Anat. of Melancholy.* D. Jan. 25, 1640.

Burton (WILLIAM EVANS), a comedian and writer, b. in Lond. in Sept. 1802; compiled the *Cyclopaedia of Wit and Humor*; built the National Theatre in Phila., and in New York purchased the Metropolitan Theatre. D. Feb. 10, 1860.

Burying Beetles are certain insects of the order Coleoptera and family Silphidae, so called from their habit of interring the bodies of dead animals. When a carcass of a small animal is found, several collect around it, and by digging the earth from beneath gradually sink it several inches below the surface. In it the female deposits her eggs, and when the larvæ are hatched they find themselves in the midst of suitable food.

Bush (GEORGE), a theol. and biblical scholar, b. at Norwich, Vt., June 12, 1796, grad. at Dartmouth Coll. in 1818, at Princeton Theological Sem. in 1821; became pastor of a Presb. ch. in Indianapolis, Ind., and in 1831 prof. of Heb. and Oriental lit. in the Univ. of New York, and was converted to the doctrines of Swedenborg in 1847. Wrote *Heb. Gram.* and *Bible Commentaries.* D. Sept. 19, 1859.

Bushbuck. See BOSCHBOK.

Bushel [Fr. *boisseau*], a measure of capacity, containing 4 pecks of 8 quarts each. The Winchester B. contains 2150.42 cubic inches, or, roughly, about 1¼ cubic ft.

Bushman, or **Bosjesman**, a name given to some roaming tribes of S. Afr. They are diminutive in stature, of dark-brown complexion, and have no houses or tents.

Bushnell, R. R. junc., a city of McDonough co., Ill., 60 m. W. of Peoria and 194 m. S. W. of Chicago. It has a supply of timber and coal. Pop. 1870, 2003; 1880, 2316.

Bushnell (HORACE), D. D., a Congl. clergyman, b. at New Preston, Conn., Apr. 14, 1802, grad. at Yale Coll. in 1827; was settled over the N. ch. in Hartford, Conn., from 1833 to 1859, when the failure of his health compelled him to resign his pastorate, though he was still able to do literary work and preach occasionally. Among his pub. works is *Nature and the Supernatural.* D. Feb. 17, 1876.

Bushwhackers (in the lang. of our late c. war) were those men who rarely or never wore a uniform, and claimed to be peaceful farmers or herdsmen when in presence of a superior hostile force, but had firearms concealed at a convenient distance, and did not scruple to use them on any opportunity to pick off a soldier from an ambush while he was moving in fancied security. B. were especially murderous in Mo., and were often treated, when captured, with unrelenting severity.

Business Colleges are of comparatively recent growth in the U. S., although schools for instruction in book-keeping, writing, and arithmetic have been in vogue for the past 50 yrs. The course of study varies in different colls. and schools, but embraces generally, beside the studies named, commercial law, commercial geography, political economy, modern langs., phonography, telegraphy, practical gram., etc. The main feature of the more important schools is the business practice which comes through actual correspondence between the students of the several insts. This is done in a manner and with a degree of efficiency and thoroughness which cannot be approached through any isolated school. The peculiar work of these insts. has necessitated the production of a large number and variety of text-books, which have greatly added to our technical lit. [From *origin. art. in J.'s Univ. Cyc.*, by S. S. PACKARD.]

Bustiris (Gr. *Βούστις*), in Gr. mythology, a fabulous king of Egypt, who sacrificed all the foreigners who entered his dominions, and was killed by Hercules.

Bussu Palm (*Maurandia swartziana*), a palm growing in the tidal swamps of the Amazon, the only known species of its genus. The stem is 10 to 15 ft. high, curved and deeply ringed. The leaves are undivided, and are the largest of the kind produced by any known palm, being often 30 ft. long and 4 or 5 ft. wide. The leaves make excellent and durable thatch, being split down the midrib and laid obliquely on the rafters, so that the furrows formed by the



Burrowing Owls.

Burrowing Owl (*Speotyto cunicularia*), a small, lively

veins lie in a vertical direction, and serve as gutters to carry off the water. The spathe is used by the Indians as a bag, and the larger ones to make caps.

Bustamante (often incorrectly written **Bustamante**) (ANASTASIO), M. D., a Mex. gen., b. in 1782, was a phys. by occupation; obtained power as pres. of Mex. in 1829, was banished by Santa Anna about 1833, and was elected pres. in 1837; was again banished in 1841. D. 1851.

Bustard (*Otis*), a genus of gallinular birds having 3 toes, long legs, and short bills. They are inhabs. of open plains, where they often endeavor to escape from danger by running. The great *B. otis tarda* is the largest of European land-birds. The plumage is of a pale chestnut color on the upper parts, finely variegated with black. The male has on each side of the chin or neck a tuft of feathers nearly 9 inches long, and in the throat a sac or pouch.

Butea [named in honor of the earl of Bute], a genus of trees and shrubs of the natural order *Leguminosae*, remarkable for the length of the standard of the flower, and having a compressed, one-seeded pod. The *B. frondosa*, called dhak tree, and *B. superba* are natives of India, and bear racemes of large and beautiful scarlet flowers. The twigs yield a resinous exudation in lurid red tears, a variety of lac. The sap of the trunk also yields gum-kino. A beautiful dye is obtained from the flowers, and the bark has a useful fibre.

Butler, Ind. See APPENDIX.

Butler, on R. R., cap. of Bates co., Mo., about 75 m. S. by E. from Kansas City. Pop. 1870, 1064; 1880, 2162.

Butler, cap. of Butler co., Pa., on R. R. and the Connequessing Creek, 31 m. N. of Pittsburgh. It is situated in the "oil region," and 2 lines of pipe bring petroleum 10 m. to the R. R. Pop. 1870, 1935; 1880, 3163.

Butler (ANDREW PICKENS), b. in Edgefield dist., S. C., Nov. 18, 1796, grad. at S. C. Coll. in 1817; was admitted to the bar in 1818, became a judge in 1833, and was U. S. Senator from S. C. 1846-57. D. May 25, 1857. His father, WILLIAM BUTLER (1759-1821), was a soldier of the Revolution.

Butler (BENJAMIN FRANKLIN), lawyer and statesman, b. at Deerfield, N. H., Nov. 5, 1818, son of Capt. John Butler, who commanded a co. of dragoons during the war of 1812 and served under Jackson at New Orleans. Grad. at Waterville Coll., Me., and in 1840 was admitted to the bar at Lowell, Mass., where he rapidly advanced to an extensive and lucrative practice. He served in the State militia through all grades from private to brig.-gen.; in 1853 was a member of the constitutional convention, and in 1859 a member of the senate of Mass. On Apr. 15, 1861, upon a call for troops to hasten to the defence of Fortress Monroe and Wash., Brig.-Gen. B., who at 5 p. m. was in court in Boston trying a cause, issued the requisite orders for mustering the regiments of his brigade. Apr. 16 the 6th regiment left Boston, and on the 18th Gen. B., at the head of the 8th, took his departure, having been ordered to proceed to Wash. by way of Baltimore. Two regiments of his brigade had, in the mean time, sailed for Fortress Monroe, which they garrisoned, and saved from falling into the hands of the enemy. Prevented from reaching Wash. by way of Baltimore in consequence of the burning of bridges, he seized Annapolis, repaired the R. R. between that city and Wash., and thus the 8th Mass. and 7th N. Y. reached the cap. in time to prevent all attempts on the part of hostile forces to seize it. May 13, 1861, at the head of 900 men, he marched upon Baltimore, and encamped on Federal Hill, in the midst of the city, without opposition—a service immediately (May 16) rewarded by Pres. Lincoln with the commission of maj.-gen. in the service of the U. S., and by assigning him to the command of Fortress Monroe, where he arrived May 22. He here refused to send back the runaway slaves to their masters, on the ground, originated by him, that the slaves were "property contraband of war." Feb. 23, 1862, he was assigned to the command of the troops, 18,000 in number, forming part of the expedition against New Orleans, Capt. Farragut commanding the naval force. After the passing of the fts. defending the Miss. by Capt. Farragut, Gen. B. (May 1, 1862) landed and took possession of the city, where he remained until Dec. 16 following, when he was relieved by Maj.-Gen. N. P. Banks. During his administration of the dept. of the Gulf he taxed the wealthy Confed. citizens to support the inhabs. reduced to destitution by the war. In Nov. 1863 he was appointed commander of the dept. of Va. and N. C. On May 5, 1864, he occupied City Point and Bermuda Hundred. He went with a detachment of his forces in Nov. 1864 to New York during the presidential election, and with a small force held the city in peace and quiet, and compelled an orderly election. He was sent against Ft. Fisher in Dec. 1864, but the navy not having reduced the ft. by bombardment, and a storm arising so that he could not land his troops, he took the responsibility of disobeying orders and returning; the enemy withdrew their troops, deeming further attack there abandoned; so that when another command was sent against Ft. Fisher the enemy were unprepared. Before the second expedition Gen. B. was relieved of his command. M. C. from Essex dist., Mass., 1866-75, and 1878-79; gov. of Mass., 1883; Greenback candidate for pres. of U. S., 1884.

Butler (BENJAMIN F.), a lawyer and resident of Albany, N. Y., b. Dec. 15, 1795, was atty.-gen. of the U. S. under Pres. Jackson from Dec. 1831 to June 1834. D. Nov. 8, 1858.

Butler (CLEMENT M.), D. D., b. in Troy, N. Y., Oct. 16, 1810. He was ordained a minister of the P. E. Ch. in 1836; was rector at Georgetown, D. C., Boston, and of Grace Ch., at Rome (It.), from 1862 to 1864, and prof. of ecclesiastical hist. in the Divinity School of the P. E. Ch. in W. Phila. Among his works are *Inner Rome* and a *Manual of Ecclesiastical Hist.*

Butler (EZRA), b. about 1762, held justiceships and chief justiceships of the courts of Chittenden and Addison cos., Vt., 1803-26; was a member of Cong. 1813-15, and gov. 1826-28. D. July 19, 1838.

Butler (JOHN J.), D. D., a Free-will Bap. minister, b. at

Berwick, Me., in 1814, grad. at Bowdoin Coll. in 1837; studied theol. at Andover, Mass., was prof. in Whitestown Theological Sem. 1844-54, and at the Theological School of New Hampton, N. H., 1854-70, afterward prof. of sacred rhetoric and homiletics in Bates Coll. Theological Sem., Lewiston, Me. Author of several commentaries on parts of the Bible, and a work on natural and revealed theol.

Butler (JOSEPH), an Eng. bp. and writer, b. at Wantage, in Berkshire, May 18, 1692. About 1714 he wrote an able refutation of Dr. Samuel Clarke's celebrated *a priori* argument. In 1750 he was made bp. of Durham. His chief work is *The Analogy of Religion, Natural and Revealed, to the Const. and Course of Nature*. D. June 16, 1752.

Butler (PIERCE), b. in Ire. in 1744, was an officer of the Brit. army. While stationed at Boston, Mass., he resigned his major's commission, removed to S. C., was a member of Cong. 1787, a member of the convention which drew up the Federal const. 1787, and U. S. Senator from S. C. 1789-96 and 1802-04. D. Feb. 15, 1829.

Butler (PIERCE M.), b. in Edgefield dist., S. C., Apr. 11, 1798; entered the army in 1819 as second lieutenant, became capt. 1825, resigned in 1829, and was pres. of a bank at Columbia until 1836; was elected (1838) gov. of S. C.; at the outbreak of the Mex. war was elected col. of the "Palmetto regiment" of S. C. volunteers, which regiment he led to the seat of war. Killed at the battle of Churubusco, Aug. 20, 1847.

Butler (SAMUEL), a witty Eng. poet, b. in Worcestershire Feb. 8, 1612. Author of *Hudibras*, 1663-78. D. Sept. 25, 1680.

Butler (WILLIAM ALLEN), a lawyer and poet, b. at Albany, N. Y., 1825, grad. at Univ. of New York in 1843; wrote *Nothing to Wear*.

Butler (WILLIAM ORLANDO), b. in Ky. in 1793; served in the war of 1812 and Mex. war, and became a maj.-gen. in 1846; was Dem. candidate for V.-P. in 1848. D. Aug. 6, 1880.

Butte City, on R. R., cap. Silver Bow co., Montana. Pop. 1880, 3363.

Butter [Ger. *Butter*; Fr. *beurre*; Lat. *butyrum*; Gr. *βούτυρον*, supposed to be from *βούς*, a "cow," and *τύπος* "cheese") is the fatty substance extracted from milk. In anc. times the Hebs. made use of B. as food, but the Grs. and the Roms. used it only as an ointment in their baths; and it is probable that the Grs. obtained their knowledge of the substance from the Scythians, Thracians, and Phrygians, while the Roms. obtained it from Ger. In S. Europe at the present time B. is very sparingly used, olive oil often taking its place; and in It., Sp., Port., and S. Fr. it is sold by apothecaries as a medicinal agent for external application. In the E. I. the natives use *ghee*, which is B. clarified by boiling. B. is usually made from cow's milk, which has the following average composition:

Fat (B.)	3.83
Caseine	3.88
Sugar (dactose)	4.08
Salts (alkaline and earthy)	0.76
Water	87.45
	100.00

The caseine, sugar, and most of the salts are in solution, while the fat is in suspension in the form of minute globules, which are readily seen by the aid of the microscope. They are quite transparent, refract light strongly, and give the milk its white color.

Cream.—When milk is allowed to stand, the fat globules rise to the surface and form a layer of cream, while below remains a blue transparent fluid, serum, containing the other constituents of the milk. The separation of fat and serum is never complete; each retains a certain quantity of the other. Dr. Voelcker gives the composition of cream as follows:

Fat (B.)	33.43	25.40
Caseine	2.62	7.61
Sugar	1.56	2.19
Salts	0.72	64.80
Water	61.67	100.00
	100.00	100.00

To allow the cream to rise for the manufacture of B. the milk is placed in a cool cellar, at a temperature of 55° to 59° F.

If much cooler than this, the cream rises too slowly; if warmer, the milk sours rapidly. When the cream is to be kept for a few days before churning, it is poured into a clean stoneware vessel; and some B.-makers add a little saltpetre, which prevents moulding and keeps the cream free from a cheesy taste.

Artificial B., or Oleomargarine.—Mége-Mourié, investigating the production of the milk, noticed that cows deprived of food continued to give milk in some quantity, and that the milk continued to contain B. This led him to infer that the fat of the animal was changed to B., and, acting upon this hint, he succeeded in extracting from beef tallow (suet) a fat having the consistence of B., which he converted into an excellent substitute for genuine B. As is well known B. consists chiefly of oleine, palmitine, and stearine. The same is true of suet, but the oily oleine is not present in so large a proportion as in B. Mourié, therefore, removes such a proportion of the palmitine and stearine as to leave a mixed fat having the consistence of B. His process is as follows: Fresh suet is cut very fine, placed in a vessel containing water, a little carbonate of potash, and fresh sheep's stomachs cut in pieces are added. The whole is warmed to 122° F. Under the influence of the heat and the pepsin of the stomachs the fat separates from the cellular tissue. This fat is allowed to cool till it solidifies, when it is subjected to pressure in a hydraulic press, when it separates into 2 portions—a hard white stearine and palmitine, suitable for the manufacture of candles, and a liquid oil, which on cooling solidifies into a white fat with the consistence of B. Mourié calls it *oleomargarine*, from the old idea, now disproved, that a fat margarine existed in B. and suet.

To produce B., the oleomargarine is poured into a churn while still liquid with about half its volume of fresh milk and nearly as much water. A little annatto is added for color, and a little water in which pieces of cows' udder and milk glands have been soaked. The mixture is then churned, yielding a sweet, palatable B. which may be salted as usual. As nothing unwholesome is used in the manufacture of this B., its use in place of real B. is a mere matter of taste. As it can be made for from one fifth to one third the cost of real B., and does not readily become rancid, it has become an important article of manufacture. C. F. CHANDLER.

Butterfield (DANIEL), b. in Oneida co., N. Y., in 1831, ed. at Union Coll. During the c. war was made brig.-gen. of volunteers, took part in many actions under Gens. McClellan, Pope, and Burnside, and was chief of Gen. Hooker's staff at Lookout Mt. and afterward; brevetted maj.-gen.

Butterfly, the name of the diurnal lepidopterous insects. They are distinguished in most cases without difficulty by their knobbed antennæ. B. at rest hold their wings erect, the under side being thus chiefly exhibited; while most other lepidopterous insects hold their wings in a horizontal or inclined position. Their caterpillars have 16 feet, 10 of which are abdominal. The pupa or chrysalis is angular, especially on the thorax, is seldom enveloped in a cocoon, is generally suspended by the tail by means of a silky substance, but is sometimes supported by bands around the middle, and generally exhibits more or less of that golden color from which both the names *aurelia* (from the Lat. *aureum*, "gold") and *chrysalis* (from the Gr. *χρυσός*, "gold") are derived. The number of species is very great, not less than 5000 being known, of which there are probably 1000 in N. Amer. Some B. measure almost a ft. across the expanded wings. The largest species are tropical.

Buttermilk, the part of milk that remains after the butter has been separated from it. It contains caseine, sugar, water, and all the original ingredients of milk except the oily matter. It is a nutritious beverage, and is extensively used in many places as food.

Butternut, or **White Walnut**, a name given to the *Juglans cinerea* and its fruit, which is indigenous in the U. S. The tree grows to the height of from 30 to 50 ft., and has oblong-lanceolate leaflets, which are serrate, pointed, and rounded at the base. The fruit is oblong and clammy, and contains an oily, edible kernel. The wood is valuable in the arts.

Butter Tree, a name given to several tropical trees, the fruits of which yield concrete fixed oils which are similar to butter and used as food. The B. T. of India and Afr. belong to the genus *Bassia* and the order Sapotaceæ. Those of Brazil and Guiana belong to the genus *Caryocar*.

Butterwort (*Pinguicula*), a genus of herbaceous plants of the natural order Lentibulariaceæ, distinguished by a 2-lipped calyx, the upper lip trifid, the lower bifid; and a spurred corolla, 2-lipped and gaping, the upper lip arched. The *Pinguicula vulgaris* is a small stemless perennial, growing in marshes and on wet rocks in Europe and the U. S. It has the power of coagulating milk, and is used for that purpose by the Laplanders.

Butt, von (EVA), b. in 1670 at Eschwege, in Hesse, an only child; married in 1687, but in 1697, having met with the famous Pietist Vockerodt of Gotha, she left her husband, and in company with other Pietists, on Jan. 2, 1702, formed a new "Christian" congregation at Allendorf, in Hesse, in which she was worshipped first as the Holy Ghost, afterward as the mother of the Lord, who should give birth to the new Chr. Under the direction of this female Brigham Young a fantastic system of religious blasphemies, not unlike the Mormonism of our days, was developed, and the immoral practices in which the members indulged brought great odium upon other Pietists. Finally, the congregation was broken up in Altona. D. subsequently to 1717.

Buttmann (PHILIPP KARL), a Ger. philologist, b. at Frankfurt-on-the-Main in Dec. 1764. Author of a *Gr. Gram. für Schulen*, a large *Gr. Gram. Ausführliche Griechische Sprachlehre* (unfinished), and *Lexilogos*. D. June 21, 1829.

Butt-on-Bush (*Cephalanthus occidentalis*), a common Amer. shrub of the Cincchona family, has a white flower in globose heads, whence its name. When in flower it is much frequented by bees.

Butt-on-wood, a common name of the *Platanus occidentalis*, a tree which is a native of the U. S., and is also called plane tree.

Butyric [from the Lat. *butyrum*, "butter"] **Acid** may be obtained by saponifying butter with potash, adding dilute sulphuric acid, and distilling. B. A. may also be obtained by allowing a small quantity of milk-curd to act on a solution of sugar at temperature of 77° to 86°. B. A. is a transparent, thin, oily liquid, with a persistent rancid odor.

Butyric Ether, or **Ethylie Butyrate**, an exceedingly fragrant liquid obtained by distilling butyric acid (or the butyrate of lime), alcohol, and sulphuric acid. B. E. is mixed with alcohol and sold as artificial pineapple oil. The artificial variety is used for flavoring various articles and for sophisticating bad rum. Other B. E. are the methylic, butylic, propylic, amylie butyrates, etc.

Buxton (JEDEDIAH), an Englishman, b. near Chester in 1704. Though below mediocrity in respect of intellect, he possessed such marvellous powers of arithmetical calculation that he was regarded as one of the wonders of his time. His insight into the relations of numbers was so far intuitive that he never could explain the processes by which he arrived at his conclusions. D. about 1774.

Buxton (SIR THOMAS FOWLER), an Eng. philan., b. in Essex Apr. 1, 1786; elected M. P. in 1818; was an eminent advocate of the abolition of slavery and other humanitarian measures. D. Feb. 19, 1845.

Buzzard, a name applied in Eng. to the *Buteo vulgaris* and related forms of the family Falconidæ. They are of moderate size and generally brownish of color; their flight is tolerably sharp, and they feed on insects and small verte-

brates. In the U. S. it is only used under the form turkey-B. for the *Cathartes aura*.

Buzzard's Bay, in the S. part of Mass., is 30 m. long, has an average width of 7 m., and contains the harbors of New Bedford, Fairhaven, and Wareham.

Byerly (WILLIAM EDMOND). See APPENDIX.

Byford (WILLIAM HEATH), M. D., b. at Eaton, Preble co., O., Mar. 20, 1817; self-ed.; became an active practitioner in Chicago, pres. of faculty and prof. of clinical surgery in the Woman's Hospital Med. Coll., twice pres. of the Amer. Med. Association; author of *Theory and Practice of Obstetrics* and other works.

Byles (MATHER), D. D., b. in Boston, Mass., Mar. 26, 1706. His father was a native of Eng.; on his mother's side he descended from the Rev. Richard Mather and the Rev. John Cotton; grad. at Harvard Coll. in 1725, and was ordained first pastor of Hollis st. ch., Boston, 1733. He soon attained eminence in his profession, and also attracted considerable attention by his poetical talents. During the Revolution charges were made against him that he prayed for the king and received visits from British officers, and on the 2d of June 1777 he was placed on trial, pronounced guilty, and ordered to be confined on a guard-ship, and in 40 days to be sent to Eng. with his family; this sentence, however, was not executed. He continued to reside in Boston, but was not again connected with any parish. D. July 5, 1788.

Byrd (HARVEY LEONIDAS), M. D., b. in Salem, S. C., Aug. 8, 1820, received his degree in med. from the Univ. of Pa. 1847; was prof. in the Savannah Med. Coll., in the Oglethorpe Med. Coll., Ga., in the Wash. Univ., and in the Coll. of Phys. and Surgeons of Baltimore; was also dean of the 3 first named and pres. of the last; has written largely for the med. journals.

Byron (GEORGE GORDON), LORD, an Eng. poet, b. in Lond. Jan. 22, 1788. His father, John Byron, having squandered his own estates, married for a second wife Catherine Gordon, a Scot. heiress, with whose fortune he soon made way. B. was b. with a malformation of one foot, which rendered him slightly lame through life. At the age of 10 he succeeded to the title and estates of his grand-uncle, William, Baron B. The estate of Newstead Abbey and others were large, but greatly encumbered, so that the income was inconsiderable. In 1805 he entered the Univ. of Cambridge, where he spent 2 yrs., and put forth the *Hours of Idleness*, a small vol. of poems, which was contemptuously criticised in the *Edinburgh Review*. B. retaliated by writing the *Eng. Bards and Scotch Reviewers*, in which almost every writer of note was bitterly satirized. In 1809 he set out on an extended tour, visiting Sp., Port., Tur., and Gr. He returned to Eng. after 2 yrs., and soon pub. the first 2 cantos of *Childe Harold*, which made him famous at once. He took his seat in the House of Lords, and entered upon a wild career, meanwhile writing the *Giaour*, the *Corsair*, *Lara*, and several other poems, in which he was supposed to indicate his own foreign adventures. In Jan. 1815 he married Isabella Millbanke, the prospective heiress of a large fortune. Her mother's family name was Noel, which B. was sometimes wont to assume. Not long after the birth of Ada, their only child, Lady B. left her husband and returned to her parents. The reasons for this step have never been authentically stated, but popular report ascribed to B. the foulest of crimes. He went to Switz., where he formed a brief connection with a half-sister of the wife of Shelley, the issue of which was a daughter, who d. young. While here he wrote the 3d canto of *Childe Harold* and *The Prisoner of Chillon*. He then took up his residence at Venice, where he flung himself into excesses, by which his health was impaired. He at length entered into a *liaison* with the young countess Guiccioli, which seems to have been sanctioned by her brothers, the counts Gamba, and her elderly husband. Soon after he took up his residence with the Guicciolis and Gambas at Ravenna, and subsequently at Pisa. During this period he wrote the 4th canto of *Childe Harold*, *Manfred*, *Don Juan*, several dramas, and other poems. By this time his estates had become disembarassed, and by selling Newstead he was in possession of ample means. The Gr. struggle for independence now began. B. entered eagerly into the cause, advanced large sums of money, and in 1823 resolved to take a personal part in it. After passing some months in Cephalonia, he sailed for Missolonghi, where he arrived early in 1824. He took a severe cold Apr. 9, which soon developed into a fatal illness. D. Apr. 19, 1824. [From orig. vol. to J. S. Under, Esq., by Prof. J. THOMAS, LL.D.]

Byssus, a name given to a bundle of silky or shining, semi-transparent, horny filaments by which many bivalve mollusks (e. g. common sea-mussels) attach themselves to rocks or other fixed substances. These filaments are secreted by a gland at the base of the foot of the animal. They are guided to their place by the foot, and expand into a sort of disk at the point of attachment. The *Pinna* of the Mediterranean produces long and strong filaments of a silky lustre, which can be woven into cloth. This cloth is highly prized, but the *Pinna* has become so rare that it cannot be produced in large quantities.

Byzantine (biz'an-tin) **Art**, in ornament and arch., is that symbolic system which originated at Byzantium, and was developed by the Gr. artists out of the Chr. symbolism. The great features of this style are the circle and dome, the round arch, and all the various details of form which are derived from the lily, the cross, the nimbus, and other symbols. Among the finest specimens of this style of arch. are the mosque (formerly ch.) of St. Sophia at Constantinople and the ch. of St. Mark at Venice.

Byzantine Empire, called also the **Eastern** or **Greek Empire**, the E. part of the Rom. empire, which on the death of Theodosius the Great, A. D. 395, was assigned to his son Arcadius, the W. portion being bequeathed to Honorius, with its cap. at Rome. Byzantium or Constantinople, which had been since A. D. 330 the new cap. of the

Rom. empire, was the residence of Arcadius, whose dominion included Syria, Asia Minor, and Pontus in Asia, Egypt in Afr., and Thrace, Moesia (now Bulgaria), Macedonia, Gr., and Crete in Europe. This empire continued from A. D. 335 to A. D. 1453. Arcadius was a weak ruler, and left the govt. in the hands of his favorites and parasites and his shameless empress Eudoxia, till his death in 408. His son, Theodosius II., at the age of 7 succeeded, under the regency of Anthemius and the administration of his sister Pulcheria, till his death, 450. Pulcheria and her husband Marcianus reigned till 457. For the next 70 yrs. 5 emps., all of low birth and small ability, but violent persecutors of those whom they called heretics, ruled. From 527 to 565 Justinian reigned, celebrated alike for his code of laws (see JUSTINIAN), and the victories won by his gens., Belisarius and Narses. His nephew, Justin II., a weak ruler, succeeded (565-578), and suffered the enemies of the empire to encroach upon it on all sides. Tiberius II., 578-582, did better, but his reign was short. During the next 136 yrs., 582-718, the 13 emps. only varied from very bad to worst; 9 of the 13 suffered violent death, and nearly all deserved it. Leo III. (718-741) was an abler monarch, but in 726 became involved in the controversy in regard to images or icons in the chs., then generally used; this controversy continued for more than a century, and caused much bloodshed. Constantine IV. and his son Leo IV. were efficient rulers, but iconoclasts. In 780 Constantine V. and his mother Irene changed the policy of the govt. in favor of image-worship. Irene was a cruel and vicious empress; she put out her son's eyes, and elevated her paramour to the throne, but was banished in 802. A dreary period followed of 65 yrs., in which the only redeeming name is that of Theophilus, whose 13 yrs. of rule, in which there was some semblance of justice, was followed by that of his widow, the cruel and blood-thirsty Theodora, who butchered 100,000 Paulicians; and this by that of her drunken son, Michael III. In 867 Basilus I. (Macedo) ascended the throne and founded Macedonian dynasty. He was a reformer, statesman, and jurist. The Macedonian dynasty reigned till 1057, but of its 23 rulers all were either weak, profligate, or desperately wicked, except Basilus I. and Basilus II.; and the empresses, as in all the hist. of this empire, were much worse than the emps. From 1057 to 1204 the Comnenian dynasty ruled, at first much after the base fashion of their predecessors, but with Alexis I. Comnenus (1081-1118), in whose reign the crusades began, there was more ability, though the persecuting spirit predominated, and until 1180 the emps. were an improvement on the preceding dynasty. With the accession of Alexis II., 1180, the old scenes of blinding, murder, and assassination were renewed. In 1204 Constantinople was taken by the Fr. and Venetians, and the Lat. emps. ruled there, and the Gr. emps. transferred their caps. to Nice and Trebizond. This was an effort on the part of the crusaders to save the empire to Christianity, but it was not successful. In 1261 Constantinople was restored to the Grs., and Michael VIII. (Palæologus) founded the Palæologian dynasty. In a better time and with a better people some of these crises might have made a fair record in hist.; but the empire was doomed, and after almost 300 yrs. of fruitless and imbecile resistance, it closed with the surrender of Constantinople to the Turks May 29, 1453. From the 6th century it had been almost constantly at war with Armenians, Paulicians, Arabs, Tartars, Bulgarians, Rus., Servians, Bosnians, and Turks, and its final downfall, even at the hands of the Turks, was not to be expected.

L. P. BROCKETT.
Byzan'tium [Gr. Βυζάντιον], an anc. Gr. city, on the site of the modern Constantinople. It is said to have been founded in 667 B. C., and its position soon made it a place of importance. It was captured by the Pers., but was retaken by the Athenians in 478 B. C.; it revolted against the Athenians in 440, and was retaken by Alcibiades in 408 B. C. In 340 B. C. it was besieged by Philip of Macedon, but an Athenian fleet compelled him to raise the siege. About 279 B. C. the Byzantines were forced to pay an annual tribute to the Gauls. In 196 A. D. it was captured, after a 3-yr. siege, by the Romans, who destroyed a great portion of the city. In 330 A. D. Constantine made it the cap. of his empire, calling it New Rome.

C.

C, the third letter of most European alphabets, is in Eng. either a palatal mute, with the sound of *k*, a sound which it has before *a*, *o*, *u*, and the consonants (except *h*), unless marked with the cedilla, thus, *ç*, as in *façade* and other words, mostly from the Fr. and Port. When marked with the cedilla, or when occurring before *e*, *i*, or *y*, it has the sibilant sound of *s*. *Ch* has (1) the Sp. sound, as in the word *church*; (2) the Fr. sound (equivalent to *sh*, the Ger. *sch*), as in *chaise*; and (3) the hard sound, equivalent to *k*, as in *chord*. The Ger. guttural *ch* is never used in Eng.

Caaba. See KAABA.

Caal'ing Whale [Scot. for "driving whale"], the *Globicephalus deductor*, a large porpoise occurring in large herds on the coasts of Europe and N. Amer. It takes its name from the fact that when one of the herd is stranded, the rest all follow it, often rushing to their own destruction in this manner. They are the source of rich booty to fishermen. It is one of the "bottle-head" whales of N. Amer., and is most frequently caught in Scot.

Cabal, a secret council formed under the reign of Charles II. (1667), consisted of the following members: Clifford, Arlington, Buckingham, Ashley, and Lauderdale. It is generally supposed that the term was formed from the initial letters of their names. In gen., any secret association formed for private purposes.

Cabbage [Fr. *chou*; Ger. *Kohl*], a variety of the *Brassica oleracea*, a plant of the order Crucifere. Other varieties of this species are the broccoli, cauliflower, and kale.

C. are of many sorts, which are divided into common and Savoy C., the latter characterized by wrinkled leaves.

Cabbage But'terfly, a name common to several species of butterfly, the larvæ of which devour the leaves of plants of the cabbage tribe, and are known as cabbage-worms. They belong mostly to the genus *Pieris*, are natives of Europe, but have been introduced into Amer.

Cabbage-Fly (*Anthomyia brassicae*), a species of Muscidae, or the fly family, of which the maggots often do injury to the roots of cabbages.

Cabbage-Palm, or **Cabbage Tree**, a name given to several species of palm, the great terminal bud of which is eaten like cabbage. The C.-P. of the W. I. is the *Areca oleracea*, which grows to the height of 130 ft. or more. The palmetto (*Chamerops palmetto*) is sometimes called C.-P.

Cab'bala [Heb. קבלה, "that which is received" (by tradition), from קבל (*kibbel*), "to receive"], an anc. Jewish system of philos., the origin and tenets of which are obscure; only it is certain that it attempted to explain the nature of God and the universe, and that among its doctrines was that of the transmigration of souls. Some suppose that it originated at Alexandria, about the beginning of the Chr. era, and that it was related to Neo-Platonism. The Cabbalists professed to be in possession of an interpretation of the Heb. law given to Moses by God and handed down orally by tradition.

Cabbalists. See CABBALA.

Cab'ell (JAMES LAWRENCE), A. M., M. D., LL.D., b. in Nelson co., Va., Aug. 26, 1813, studied med. at the univs. of Va., Md., and Pa., and finally in Paris; was appointed prof. in the Univ. of Va. in 1837, and is pres. of the State board of health and vital statistics of Va.

Cab'inēt, in politics, a select council of an executive chief; a committee of ministers or the governing council of a country. In the U. S. the C. is composed of 7 heads of depts., the secs. of state, of the treas., of war, of the navy, of the interior, the P.-M.-gen., and atty.-gen. In G. Brit. the C. consists of a number of ministers (usually about 15) among whom are the first lord of the treas. (who is prime minister), the lord chancellor, the chancellor of the exchequer, the pres. of the council, and 5 secs. of state.

Cabi'ri, or **Cabeiri** [Gr. Κάβειροι], anc. divinities worshipped in Samothrace, Phœnicia, Gr., and other countries. Their worship was solemn and mysterious.

Cable (GEORGE W.). See APPENDIX.

Cabool, or **Cabul**, a fortified city of Afghanistan, on the Cabool River, 80 m. N. E. of Ghuznee, in lat. 34° 30' N., about 6400 ft. above the sea. The climate is severe in winter, but the region is famous for its fruits. The people are a mixed race, mostly Mohammedans. It was captured by Tamerlane about 1400; was the cap. of the Mogul emps. under Bâber (1494-1530); was taken by Nâdir Shah 1738. The Brit. seized it in 1839, but in 1842 the Afghans rose and massacred the Brit. army. The Brit. again occupied it early in 1880, but evacuated it Aug. 11. Pop., estimated, 60,000.

Cab'ot (GEORGE), b. at Salem, Mass., Dec. 3, 1752; was elected to the Senate of the U. S. in 1790, and was pres. of the Hartford Convention in 1814. D. Apr. 18, 1823.

Cabot (JOHN), a foreign merchant of Bristol, who after the discovery of Amer. by Columbus was placed in command of a fleet of 5 vessels, which sailed in the spring of 1497. They reached the coast of Newfoundland June 24, and were in Eng. again in Aug.

Cabot (SEBASTIAN), & navigator, b. in Bristol about 1476; in 1499 conducted an expedition that visited the Gulf of Mex.; entered the service of Ferdinand, king of Sp., in 1512, and commanded an expedition which examined the coasts of Brazil and La Plata in 1526; returned to Eng. in 1548. D. about 1557.

Cabral (PEDRO ALVAREZ), a Port. navigator, b. about 1460; commanded a fleet which Emmanuel of Port. sent to the E. I. in 1500. Having been carried out of his course by a westward ocean current, he discovered Brazil in Apr. 1500. He afterward pursued his voyage to Calicut, and made conquests in India, where he founded the first Port. factory. D. about 1526.

Caca'o, the fruit of the *Theobroma Cacao*, a tree of tropical Amer., of the order Byttneriaceæ. Chocolate is made of the roasted kernels of the nut.

Cacao Butter, a fixed oil, hard and solid at ordinary temperatures, which is yielded in large quantities by the fruit of *Theobroma Cacao*. It is extracted by heat and pressure. It is largely used in the preparation of cosmetics, and is especially useful in pharmacy, in the preparation of suppositories. C. B. is not to be confounded with cocoa butter, a kind of palm oil, used in the manufacture of soap. It contains a very large proportion of stearine.

Cachalot. See SPERM WHALE.

Cach'olong, a beautiful mineral, sometimes called **Pearl Opal**, is a milk-white variety of opal, nearly allied to hydrophane. It is opaque and pearly, has a conchoidal fracture, and sometimes has a reddish tinge. The name is derived from the river Cach, in Bucharra, where it was first discovered.

Cacta'ceæ (named from *Cactus*, one of the genera), a natural order of exogenous plants remarkable for their gay and large flowers, and for the grotesque forms of some of the species, which are nearly all succulent. It comprises about 500 species, all natives of Amer., growing in hot climates and arid situations, to which they are well adapted by their thick skins, almost impervious to moisture. The so called cactuses of the Old World are often Euphorbiaceæ; or, if they are really cactaceous, they are naturalized plants. The C. for the most part are easily naturalized, and hence some species abound in S. Europe and Asia. Most of them are leafless, and instead of leaves have clusters of hairs or prickles. In some species, as the melon cactus or melon thistle, the stem swells into a globe. Other species have long creeping or trailing stems. This order comprises

the night-blooming cactus, the *Cylindropuntia* or prickly pear, which bears an edible fruit, and the *Opuntia*, on which the common insect breeds. The stems of the C. are used by a juice which affords a wholesome and valuable beverage to men and animals in the long dry season which prevails where they grow. Many species occur as epiphytes on forest trees. The C. are extensively cultivated in greenhouses and hothouses in Eng. and the U. S. Most of them are easily propagated by branches, which are allowed to dry a little before they are planted. Numerous species are natives of the U. S., especially in the extreme S. W.

Cactus. See CACTACEÆ.

Cæ'cus, an It. giant, said to be a son of Vulcan. He stole some wheat of Hephestus, who killed C.

Cad'dice-Fly, or **Caddis-Fly** (*Phryganeidae*), a family of insects of the order Neuroptera. They are most interesting, on account of their larvæ, of which the larger kinds are the caddice-worms or cad-bait of Brit. anglers. The species of C.-F. are numerous in the U. S., and they are more so in the N. than in the S. of Europe. The angler looks for cad-bait about the edges of streams and under stones, or on the stalks of aquatic plants. As a bait, the caddice is almost as deadly as the May-fly, and more so in running streams than the ordinary worm.

Cade (JACK), an Irishman who called himself MORTIMER, the leader of an insurrection which broke out in Kent in June 1450. He marched with about 16,000 insurgents, defeated a royal army which was sent against him, entered Lond., in which he maintained strict order, but caused Lord Say, a royal favorite, to be put to death. Many of his followers were induced to disperse by a promise of pardon. Among their motives for rebellion was oppressive taxation. C. fled, but was pursued and killed July 11, 1450.

Cadillac, on R. R., city, cap. of Wexford co., Mich., 100 m. N. of Grand Rapids. Pop. 1880, 2213; 1884, 2946.

Cad'iz (anc. *Gades*), a seaport of Sp., on the Atlantic, and on the N. W. extremity of the isle of Leon, 94 m. S. by W. of Seville, with which it is connected by a R. R. Its site is a long tongue of land surrounded by water on 3 sides, having an inlet called the Bay of Cadiz, which forms a good harbor. It is connected with the mainland by a neck, 200 yards wide, defended by fts. C. was founded by the Phœnicians, probably before the foundation of Rome; was for a time in the possession of the Carthaginians, and fell into the hands of the Romans, 206 B. C. It was pillaged by the Eng. in 1596, and besieged by the Fr. 1810-12. Pop. 65,028.

Cadiz, on R. R., cap. of Harrison co., O., about 22 m. N. W. of Wheeling. It is the commercial centre of a wool-growing dist. Pop. 1870, 1495; 1880, 1817.

Cad'mium, a white metal having a slight bluish cast, discovered in 1817 by Stromeyer, and also independently by Hermann, named from *cadmia fossilis*, a name given to an ore of zinc mentioned by Dioscorides and Pliny. Symbol, Cd; atomic weight, 112; sp. gr. after fusion, 8.6; hammered, 8.7 nearly. C. is lustrous, takes a fine polish, and possesses a fibrous fracture. It tarnishes very slightly in the air, and only burns at a high heat. It is more tenacious than tin, though, like that metal, a bar of it gives a "cry" when bent. It melts below 260°, and volatilizes at about 360° C. It occurs in nature as the sulphide "greenockite" at Bishopstown, Renfrewshire, Scot., and incidentally as a constituent of various zinc ores, as the carbonate, silicate, etc., as well as the sulphide in several localities. The zinc flowers in the flues of zinc-reducing furnaces contain even as much as 11 per cent. of C. Commercial Eng. zinc often contains C. Its salts are mostly colorless, and when taken into the stomach act as emetics; their taste is disagreeably metallic. C. finds its chief application in the arts in the form of the sulphide, which has an intense yellow color, and is used for coloring soaps, and in paints, etc. It is known as C. yellow and jaune brillant. The iodide and bromide of C. are used in photography. The metal is used for forming a fusible with lead, tin, and bismuth for filling teeth. C. F. CHANDLER.

Cad'mus [Gr. Κάδμος], in classical mythology, was a son of Agenor, king of Sidon; sent to seek his sister Europa when carried off by Jupiter; fabled to have founded Thebes, in Boeotia; invented or introduced from Phœnicia 16 letters of the Gr. alphabet.

Cadwal'ader (Gen. GEORGE), a native of Phila., where he practised law, served in the Mex. war, and was brevetted maj.-gen. for services at Chapultepec. He was maj.-gen. of Pa. troops 1861-62, and in 1862 became maj.-gen. of U. S. volunteers. D. Feb. 3, 1879.

Cady (ALBEMARLE), b. in 1907 in N. H., grad. at W. Pt. 1829, and Oct. 20, 1863, col. 8th U. S. Inf.; served in war with Mex., engaged at Vera Cruz, Cerro Gordo, Amazoque, San Antonio, Churubusco, and Molino del Rey; in the c. war was in command of the dist. of Or., acting inspector-gen. of the dept. of the Pacific, and in command of draft rendezvous at New Haven, Conn. Brevet brig.-gen. U. S. A. Mar. 13, 1865. Retired May 18, 1864.

Cady (DANIEL), b. in Columbia co., N. Y., in 1773, admitted to the bar in 1795; was an M. C., and for 8 yrs. judge of the supreme court and the court of appeals of N. Y. One of his 5 daughters is Elizabeth Cady Stanton. D. 1859.

Cæcillidæ [Lat. *cæcus*, "blind"], a family of amphibians whose body is almost cylindrical, the head small, and the eyes very small or wanting. The skin is viscous and angularly wrinkled, appearing naked, although minute scales may be found between its wrinkles. The vertebrae are articulated as in fishes, and the skull is united to the first vertebra by two condyles. The ribs are short. The species are inhab. of tropical countries.

Cæcilius Stat'ius, a Rom. comic poet, a native of Milan and a friend of Ennius. Only small fragments of his comedies are extant. D. in 168 B. C.

Cæn, kæn or kahn [Lat. *Cadomus* or *Cadomum*], a city of Fr., on the river Orne, 10 m. from the sea and 148 m. W. N. W. from Paris; is connected by a canal with the sea,

and with Paris by a R. R. It has wide streets, several fine public squares, and many noble specimens of Norman arch., the buildings being mostly built of the cream-colored stone (known as Caen stone) which is quarried in the vicinity. It was an important place as early as 912; was the residence of William, duke of Normandy, before his conquest of Eng.; in 1346 was pillaged by Edward III. of Eng. Pop. 41,508.

Cæ'sar, the cognomen of a patrician Rom. family which was one of the most anc. in the state, and claimed a descent from Iulus, a son of Æneas. After the family had become extinct (at the death of Nero), the succeeding emps. of Rome assumed the name of C. as a title. It subsequently became the title of the heir-presumptive to the throne.

Cæsar (CAÏS JULIUS), a Rom. soldier and statesman, b. July 12, 100 B. C. While quite young he served with the army in Asia Minor; afterward studied rhetoric at Rhodes, and became an aspirant for political honors. In 68 B. C. he was elected quaestor and married a kinswoman of Pompey. In 65 he was made an ædile, and rendered himself popular by the magnificence of the games which he instituted. In 63 he was chosen pontifex maximus. He was suspected in that yr. of complicity in the Catilinian conspiracy, and narrowly escaped condemnation. In 62 he was made prætor, and sent to command in Sp. In 60 he became consul, Bibulus being his colleague. He proposed and carried an agrarian law by which a large tract of public land was divided among the poorer citizens. He now entered into the secret alliance with Pompey and Crassus known as the first triumvirate, and with their aid was able to carry out all the measures which he proposed. In 58 he went as gov. to Gaul, where he made successful campaigns in Switz, and Ger., and in 55 invaded Brit. Meanwhile Crassus was killed in Parthia, and jealousy arose between the other two triumvirs. Pompey sided with the aristocracy, C. with the commonalty, each being at the head of an army. In 50 B. C. it was decreed in the senate that C. should lay down his command and disband his army. The proposal was vetoed by the tribune Curius, but C. offered to dismiss his army if Pompey would do the same. The senate would not listen to the proposition. C. thereupon assembling 5000 inf. and 300 cav. crossed the river Rubicon and marched toward Rome. Pompey and his adherents fled to Gr., whither C. followed them. A decisive battle took place on the plain of Pharsalia (Aug. 9, 48 B. C.), in which Pompey, whose force was more than double that of C., was routed. The war was carried on in Egypt, Pontus, Afr., and Sp. until 46, when C., having triumphed over all his opponents, became master of the republic. The senate made him "imperator" for life, dictator, and pontifex maximus, thus concentrating in his hands all military, civil, and sacerdotal power. The title of king was offered to him, but he refused it, knowing that the designation would be odious to the populace. He proposed and carried into effect many wise laws, notable among which was the reformation of the calendar. It was not long before a conspiracy, embracing many of the foremost Romans, was formed against him. He was warned of its existence, but took no measures to protect his person. The conspirators fell upon him in the senate-chamber, and stabbed him again and again. It is said that the fatal blow was given by Brutus, whom C. had regarded as his most intimate friend. D. Mar. 15, 44 B. C. [From *orig. act. by J. C. Cæsar*, by W. J. MOORE.]

Cæsare'a [Gr. *Kaisareia*; anciently called *Turris Stratonis*], an anc. city and seaport of Pal., now in ruins, was situated on the Mediterranean, about 37 m. N. of Jaffa and 55 m. N. N. W. of Jerusalem. It was founded by Herod the Great (22 B. C.), who erected here several magnificent edifices, and protected its port by a semicircular mole, which is said to have been one of the most wonderful works of antiquity. C. was the scene of several events recorded in the book of Acts (See Acts, chaps. x., xxiii., xxv.). It was taken by the crusaders in 1101. The site is now covered with shapeless ruins.

Cæ'sium (symbol Cs; atomic weight, 133), an alkali metal discovered with the spectroscope by Bunsen and Kirchhoff in 1860 in the water of some saline springs in Ger. C. is widely diffused in nature, though in exceedingly small quantities. In its chemical relations C. is closely analogous to potassium, though it is more electro-positive, being, indeed, the most electro-positive element known.

Caff'feine, an alkaloid existing in coffee, tea, Paraguay tea (*Ilex Paragayensis*), and guarana (*Guarana officinalis*, or *Paulinia sorbilis*), called also **Theine** and **Guaranine**. When pure, C. appears in white silky needles having no odor, sparingly soluble in cold water, and much more so in hot, less soluble in alcohol, and still less so in ether. It acts as a weak base, dissolving in acids, from which it may be crystallized by evaporation.

Cafraria. See KAFFERIA.

Cain, eldest son of Adam and Eve, and murderer of his brother Abel, was condemned to be a fugitive on the earth. He then retired to the land of Nod, and built there a city, which was called Enoch, after the name of his eldest son.

Cagliostro kal-yos'tro (ALEXANDER), b. at Palermo, 1743, d. in Rome, 1775, played, though he was a mere impostor, a great rôle in Paris shortly before the outbreak of the revolutions, 1789-85.

Cairn, a Celtic word signifying a "heap on pile," is applied to artificial heaps of stones frequently found in Europe. In some cases the C. are encircled by large unhewn stones set upright in the ground. The majority of them were raised as sepulchres and monuments for the dead. In countries where stones are scarce the place of the C. is supplied by the barrow or earthen mound, which differs from a C. only in the material of which it is made.

Cairn'gorm Stones, a name given to brown or yellow quartz or rock-crystal found at Cairngorm, Scot. They are used as ornamental stones, and the yellow variety is often enclosed in quartz.

Cairo, kî'ro [called by the Arabs *Al Masr* or *Muer*; also *Al Kahirah*, i. e. "the victorious"; the cap. of modern

Egypt, in a sandy plain on the Nile, 5 m. S. of the commencement of the Delta, and connected by R. R. with Alexandria. The Tombs of the Caliphs, which are without the walls, are beautiful specimens of Saracenic arch. There are handsome public gardens with groves of orange, citron, and palm trees. In the vicinity are the palace of the viceroy, the obelisk of Heliopolis, and the old Nilometer, which indicated the height of the inundations of the Nile. The Great Pyramid is about 10 m. S. W. of the city. C. has long been celebrated as a seat of Oriental learning and Mohammedan theol. It was founded by the Arabs about 970 A. D.; was ruled by the Fatimite caliphs until superseded by Saladin, 1171; was taken by the Turks in 1518. Pop. 349,883.

Cairo, kâ'ro, R. R. centre, city, and river-port of Ill., cap. of Alexander co., situated at the southern extremity of the State, upon the point formed by the junction of the O. and Miss. rivers, 175 m. below St. Louis. It is a depot for the products of N. Ill., Ia., and Wis. seeking S. markets. Over 4000 steamboats land at its wharf annually. The low site of the city necessitated the construction of a levee to protect it from inundations. Pop. 1870, 6267; 1880, 9011.

Caius (the Latinized form of *Kap, Kay, or Cay*) (JOHN), M. D., an Eng. phys., b. at Norwich Oct. 6, 1510; was appointed phys. successively to Edward VI., Queen Mary, and Elizabeth. In 1557 he founded Caius Coll., Cambridge. He wrote, beside other works, a *Treatise on the Sweating Sickness*. D. July 29, 1572.

Cajuput, or **Cajeput** (*Melaleuca Cajuputi*), a tree, from the leaves of which the pungent, aromatic volatile oil of C. is obtained by distillation. It is rather small, with a crooked trunk, thick spongy bark, white wood, and terminal spikes of white flowers. The greater number of the species of this genus are natives of Australia, some of them very beautiful ornaments of hot-houses. Much of the oil of C. of commerce is prepared in the island of Banda, and at Amboyna and Bourou. Several other species yield this oil. Two sackfuls of leaves yield scarcely 3 drachms of the oil, which is green, transparent, limpid, with a strong odor, agreeable only when much diffused. It is sometimes used as a stimulating aromatic in med., and is considered very efficacious in rheumatism.

Calabar Bean, the seed of the *Physostigma venenosum*, a twining, half shrubby leguminous plant, a native of W. Afr. It belongs to the sub-order Papilionaceæ, and is nearly allied to the kidney bean. The bean is used as an ordeal among the Afrs. It is very poisonous; 15 of the beans have produced death in an hour. It is used by surgeons, in small amounts, to cause contraction of the pupil of the eye, the opposite of the effect of belladonna. It is also sometimes given in tetanus and some other diseases. It is a powerful depressant to the nervous action.

Calabash Tree, (*Crescentia Cujete*), a tree of the order Bignoniaceæ, is a native of the tropical parts of Amer. It bears a large fruit, sometimes 1 ft. in diameter, the hard shell of which is used as a substitute for bottles and other vessels. These shells are so hard that water may be boiled in them. They are sometimes polished, carved with figures, and converted into ornamental vessels. Its wood is tough and flexible, and suitable material for coaches.

Calabria, the anc. name of the S. E. part of It.; bounded N. E. by the Adriatic, S. W. by the Gulf of Taranto, N. W. by Apulia. Chief towns, Brundisium and Tarentum.

Calabria (anc. *Bruttium*), a region of S. It., now divided into 3 provs., separated from Sic. by the Strait of Messina, and traversed by the Apennines. Area, 6663 sq. m. Pop. 1,209,315.

Calais, kal'is (Fr. kah-lâ'), [Lat. *Calæum*], a seaport of Fr., on the Strait of Dover, 122 m. N. N. E. of Amiens, 19 m. N. E. of Boulogne, and 26 m. E. S. E. of Dover, Eng., with which it is connected by steamers, also by R. R. with Amiens and Paris. The harbor, formed by 2 moles, is nearly dry at ebb tide. It was taken by the Eng. in 1347, and remained in their possession until 1558. Pop. 13,529.

Calais, a city, port and cap. of Washington co., Me., on R. R. and St. Croix River, at head of navigation, 264 m. N. E. of Portland. Bridges across the river connect it with St. Stephen's, in N. B. C. derives its prosperity from the lumber-trade and ship-building, and has an acad. The river, which affords water-power, is part of the E. boundary of the U. S. Pop. 1870, 5944; 1880, 6173.

Calamander Wood, a cabinet-wood resembling rosewood, but more beautiful. It is produced by the *Diospyros hirsuta*, a native of Ceylon and S. Hindostan. This wood has great richness and variety of colors, and is said to be so hard that it cannot be worked with edge tools.

Calamary. See SQUID.

Calambu'co, a timber tree which grows in the island of Luzon. It resembles the teak in appearance, is very durable, and is never eaten by the white ant.

Calamine (*Lapis calaminaris*), an ore of zinc, a native carbonate, containing, when pure, 52 per cent. of zinc. This ore is called Smithsonite by Dana and other mineralogists, who apply the term C. to the silicate of zinc.

Calamin (*Calamintha*), a genus of plants of the order Labiate. The common C. (*Calamintha officinalis*) is indigenous in Eng. It has serrated leaves, with an agreeable aromatic odor, and is used in domestic practice as a pectoral med. The U. S. have several species.

Calamus (Gr. κάλαμος), a Lat. word signifying a "reed," a "stalk" (of a plant), was used by the anc. Roms. to denote an arrow, a musical pipe, and a pen made of a reed.

Calamus (sweet flag). See ACORUS CALAMUS.

Calamus, a genus of Palmaceæ, yields a great part of the canes and rattans of commerce, which are used in Europe and the U. S. for the seats of chairs and other purposes. Among the species of this genus are *C. Rotang* and *C. eminalis*, which are natives of the warm or tropical parts of Asia. The *C. rotundum* has been found 500 ft. long (Humboldt). *C. Draco* yields the best dragon's blood. Several species are climbers.

Cal'and (PIETER), a Dut. engineer, b. 1826; studied at the Royal Military Acad. of Breda, and in 1845 was made a sub-engineer in the "waterstaat;" passing through various grades until, in 1873, he was made one of the two inspectors—the highest office in that national establishment. He has written several important professional works, and is the engineer under whose charge was constructed a navigable channel at the mouth of the Rhine and Meuse and, as one of the commission for improvement of water communication from Rotterdam to the sea, projected the great works which have made that city an excellent seaport.

Calcareous [Fr. *calcaire*, from Lat. *calx*, "lime"], applied to rocks which are chiefly composed of lime—i. e. to limestone, marble, and chalk, which are carbonates of lime. They are sedimentary and stratified rocks, and consist chiefly of shells of marine animals, corals, and encrinites. The term is applied to springs and to water which hold in solution carbonate or sulphate of lime. Such water is commonly called *hard*.

Calcareous Spar, or **Calc Spar**, a common name of crystallized carbonate of lime, composed, when pure, of 44 per cent. of carbonic acid and 56 of lime. It is one of the most abundant of all minerals, and is found in all geological formations and in every part of the world. The purest variety is called Iceland spar, and exhibits double refraction in a remarkable degree.

Cal'chas (Κάλχας), a celebrated soothsayer in the Gr. army at the siege of Troy.

Calcium, kal'se-un, the metal present in lime. Combined with oxygen it forms lime or oxide of C. It is a yellowish-white malleable metal, having a specific gravity of 1.578. It does not occur naturally in a separate state.

Calculus, a term used originally to describe a method of operating on analytical symbols; thus, the method of operating on radical expressions was called the C. of radicals. By common consent the term is now restricted to a branch of math. which treats of the forms and relations of functions. As thus defined it may be divided into 3 parts—viz., *differential C.*, *integral C.*, and the *C. of variations*. The first 2 parts treat only of *determinate functions*—i. e. of functions whose forms are known; the third part treats of *indeterminate functions*—i. e. of functions whose forms are to be determined so as to satisfy certain conditions.

Differential C. explains the relations that determine functions bear to certain derived functions called differential coefficients, and also the methods of applying these relations to investigations in analytical geom. and the various branches of mathematical philos., as mechs., astron., and physics. The relation between a function of one variable and its differential coefficient indicates the law according to which the function changes with a uniform and continuous change of the variable, and this without reference to the manner in which the differential coefficient is obtained, whether by the method of limits as explained by Newton, or by the infinitesimal method as developed by Leibnitz.

Integral C. is the inverse of differential C.; it explains the method of finding the function when its differential coefficient is given—i. e. it shows us how to find the form of a function when we know its law of variation. Like the differential C., it is applied in the investigations of geom. and mathematical philos.

The *C. of variations* explains the methods of applying the principles of the differential and integral C. to ascertain the form that a function must have that it may satisfy certain given conditions. Thus, the problem "to find the shortest line between 2 points on the surface of a spheroid" may be solved by the C. of variations. The given conditions are that the line shall lie on the surface of the spheroid, and that its extremities shall be at the 2 points; the solution consists in finding the line of minimum length that shall conform to these conditions. W. G. PECK.

Calculus, or **Stone**. See GALL STONE and URINARY CALCULUS.

Calcut'ta [Sans. *Kalikâta*, "dwelling of Kali"], the cap. of Brit. India, in the presidency of Bengal, on the E. bank of the Hoogly, an arm of the Ganges, about 75 m. from the sea. Vessels of 1400 tons ascend the river, and the city is connected by R. R. with Bombay, 1420 m. distant, and also with Delhi and the Indus. The residences of the Europeans are in the S. part, beyond which is the native city, called the Black Town. A quarter of a m. to the S. W. is Ft. William, mounting 619 guns and requiring a garrison of 10,000 men, between which and the city is the Maidân, a handsome park, and the Esplanade, upon which is the Govt. House. There are many imposing buildings, and numerous educational insts. supported by the govt. On the opposite side of the river is the botanic garden. C. was founded by the E. I. Co. about 1690; in 1756 it was taken by Surajah Dowlah, and retaken in 1757 by Clive, who built the fortress. Pop., with suburbs, 683,458.

Calderon de la Bar'ca (PEDRO), the most eminent Sp. dramatic author, b. in Madrid Jan. 17, 1600, ed. at the Univ. of Salamanca. Entered the army in 1625, and served several campaigns in It. and Flanders. He began to write dramas about the age of 13, and after he had gained distinction as an author he was patronized by Philip IV., who invited him to his court in 1636, and created him a knight of Santiago. He produced about 500 dramas. In 1651 he entered the Ch., and became chaplain in the royal chapel at Madrid 1663. In the latter part of his life he wrote many religious poems, *Autos Sacramentales*. He is ranked among the greatest Sp. poets by native critics. D. May 25, 1681.

Cald'well, Kan. See APPENDIX.

Caldwell (JOSEPH), D. D., b. in Leamington, N. J., Apr. 21, 1773, grad. at Princeton in 1791; became in 1796 prin. prof. in Univ. of N. C., and first pres. in 1804. D. Jan. 24, 1835.

Caldwell (MERRITT), A. M., an educator in the M. E. Ch., b. at Hebron, Me., Nov. 29, 1806, grad. at Bowdoin Coll. in 1828; became prin. of the Mc. Wesleyan Acad. at Read-

held in 1828, prof. at Dickinson Coll., Pa., in 1831; visited Eng., and assisted in founding the Evangelical Alliance at the "World's Convention," Lond., 1846. Author of *Philos. of the Pacific, The Pacific of the King, Verb.* and other works. D. June 6, 1848.

Caldwell, SAMUEL L., D. D., b. Nov. 13, 1820, in Newburyport, Mass.; grad. at Waterville Coll., now Colby Univ., Me., 1839; teacher Hampton Falls Acad., N. H., and Newburyport, 1839-42; grad. at Newton Theological Inst. 1845; pastor Bangor, Me., 1846-58, First Bap. ch., Providence, R. I., 1858-73; prof. of ch. hist. Newton Theological Inst. 1873-78; elected pres. Vassar Coll., N. Y., Sept. 12, 1878.

Caledonia, the Rom. name of that part of Scot. N. of the Firths of Forth and Clyde. It was inhabited by a rude and warlike people called Caledonii, who are supposed to have been a Gaelic race.

Calendar [Lat. *calendarium*, the "money-lender's account-book," because interest was payable on the calends; hence, a register of times and seasons—an almanac], a term applied to any systematic and comprehensive method of dividing, distributing, and reckoning time, or to a book or table exhibiting such a method. In the regulation of the yr. we find the C. of different peoples materially differing. The Egyptian yr. had 12 months of 30 days each, and counted 5 unallotted days at the end. It was too short by nearly a quarter of a day, and hence the beginning of the yr. went backward through the seasons once in 1460 natural yrs. or 1461 Egyptian yrs. This was known as the Sothic Period. Because of this incessant movement the Egyptian yr. is called *vague* or wandering. The Gr. yr. consisted of 12 lunar months of 30 and 29 days alternately. This made the length of the yr. 354 days, or 11¼ days too small. To compensate for the deficiency, an intercalary month of 30 or 29 days was introduced every alternate yr. which made the average length 7 days too great; for which reason the intercalary month was omitted once in about 8 yrs. The earliest Rom. yr., attributed to Romulus, had only 10 months, of which the 1st, 3d, 5th, and 8th had 31 days, and the rest 30 each. This yr. of only 304 days was shorter than the natural yr. by about one sixth. Each Romulan yr. therefore began 2 months earlier in the season than the last, and the 6th came to an end at the same time with the 5th natural yr. This circumstance, according to Niebuhr, determined the period of the lustrum.

In the 46th yr. before the Chr. era a reformation of the C. was introduced by Julius Caesar, according to which the yr. consisted of 365¼ days, and consequently differed in excess by 11 minutes 13.95 seconds from the true solar yr., which consists of 365 days 5 hours 48 minutes 46.05 seconds. In consequence of this difference the equinox, in the course of a few centuries, fell back sensibly toward the beginning of the yr. In the time of Julius Caesar it corresponded to the 25th of Mar.; in the 16th century it had retrograded to the 11th. The correction of this error was one of the purposes sought by the reformation of the C. effected by Pope Gregory XIII. in 1582. By suppressing 10 days in the C., Gregory restored the equinox to the 21st of Mar., the day on which it fell at the time of the Council of Nice in 325. This council determined that the E. chs. should celebrate Easter at the same time as the W.—i. e. on the Sunday following the Paschal full moon, and not on the 14th day of the Paschal moon. The Gregorian rule of intercalation may be expressed as follows: Every yr. of which the number is divisible by 4 without a remainder is a leap yr., excepting the centesimal yrs., which are only leap yrs. when divisible by 4 after suppressing the 2 zeros. Thus, 1600 was a leap yr.; 1700 and 1800 were common yrs.; 1900 will be a common yr., 2000 a leap yr., and so on.

A new reform of the C. was introduced in Fr. during the period of the Revolution. The commencement of the yr. was fixed at the autumnal equinox, which nearly coincided with the epoch of the foundation of the republic. The names of the anc. months were abolished, and others substituted having reference to agricultural labors or the state of nature in different seasons of the yr. But the alteration was found to be inconvenient and impracticable, and after a few yrs. was formally abandoned. F. A. P. BARNARD.

Calends [Lat. *calendæ*, from *calo* (Gr. *καλεω*), "I call"], the first day of each Rom. month, because it was the custom among the Rom. priesthood to announce on that day the calendar for the month by publicly calling.

Calhoun, kal-hoon' (JOHN CALDWELL), an Amer. statesman, b. in Abbeville dist., S. C., Mar. 18, 1782, grad. at Yale Coll. in 1804; studied law, and was sent to Cong. in 1811; began his political career as a leader of the war party at that time. Was sec. of war in 1817, elected V.-P. in 1824, and again in 1828 on the ticket with Gen. Jackson. He was an earnest advocate of the reserved rights of the States under the Federal const. Resigned the office of V.-P. in 1832, and was elected U. S. Senator from S. C. He favored the ordinance of nullification adopted by S. C. legislature in 1832. C. held that under the const. the judiciary of each State had the power to decide, in the last resort, upon the reserved powers of the States respectively. He cordially supported Mr. Clay's tariff compromise in 1833, by which the nullification imbroglio was settled. Was sec. of state under Tyler in 1844, but was returned to the senate in 1845, where he remained until his death. His mind was eminently metaphysical, and his private character without reproach. Among his writings are two posthumous works—one a disquisition on govt., the other a discourse on the govt. and const. of the U. S. D. Mar. 31, 1850. ALEX. H. STEPHENS.

Calhoun (WILLIAM BARRON), LL.D., b. in Boston, Mass., Dec. 23, 1795, grad. at Yale in 1814; became a lawyer of Springfield, Mass., was speaker of the Mass. house of reps. 1834-35, M. C. 1835-43, pres. of the Mass. senate 1846-47, and State sec. 1848-51. D. Nov. 8, 1863.

Calico-Printing is the art of producing patterns on cotton cloth, either by printing in colors or in mordants which become colors when subsequently dyed.

California, kal-e-for-ne-a, the largest of the Pacific States, extending from 32° 28' to 42° N. lat., and from 114° 30' to 124° 45' W. lon. It is bounded N. by Or., E. by Nev. and Ari., S. by Lower C., and W. by the Pacific. It has a coast-line of more than 700 m., and an average breadth of 200 m.



California Seal.

The topography of C. may be briefly described as consisting of 2 mt.-ranges somewhat more than 100 m. apart, running from N. W. to S. E. through the whole length of the State, and with a broad valley, mostly fertile, lying between. These mt.-ranges are of varying width, sometimes consisting of 3, 2, or a single chain, and with spurs and outliers extending at some points nearly from one to the other. The name of the W. range is the Coast Range—not always appropriate—and its branches have many local names; the best known of these is the San Diablo range, 150 m. long by 50 broad; between this and the coast are lower ranges, as the Palo Scrito, Santa Lucia, San Rafael, and Santa Inez mts. In S. C. this Coast Range spreads out in a confused mass of mts. extending across the State—the San Bernardino, San Jacinto, and other chains. The great E. range is the Sierra Nev. or Snowy Mts., forming a boundary between C. and Nev. for a part of the distance, but about the 38th parallel turning due S. and dividing into 3 parallel chains, and farther S. uniting with the Coast Range in masses of mts. and hills in a wild, rugged, and desert region. There are many lofty peaks in both ranges, though the highest are in the Sierra Nev.—Shasta, Sp. Peak, Mts. Dana, Lyell, Brewer, Tyndall, Whitney, Lassen's Butte, Pyramid Peak, and others. Some of these have been and perhaps still are volcanoes. What is known as the C. Valley, perhaps 400 m. long and from 40 to 100 m. in width, lies between these mt.-ranges. There are also other large valleys, rich and fertile, as well as some which are waterless, barren, and deadly in their mephitic vapors. The most picturesque and remarkable of the valleys of C. are the Yosemite (see YOSEMITE) and the Tuolumne Valley, which much resembles it. E. of the Sierra is a series of lakes, extending nearly the whole length of the State—Klamath, Goose, Honey, Owens, and others—some of them alkaline, others salt, others dry most of the yr., and Lake Tahoe, one of the deepest, sweetest, purest, and most elevated lakes on the continent. In the S. E. and E. S. E. there are deep depressions (former lakes) like the Death Valley, 400 ft. below the sea, and the bed of an anc. estuary, 600 ft. below. In the C. Valley are several important lakes, of which Clear, Tulare, and Kern are the largest. There is only one navigable river—the Salinas—which discharges its waters directly into the ocean, at the bay of Monterey; other mt. torrents of moderate length, not navigable, are numerous. Two important navigable rivers—the San Joaquin from the S. E. and the Sacramento from the N. E.—as well as several smaller navigable streams, flow into the San Pablo, Suisun, and San Francisco bays. Tulare Lake receives King, Kern, White, and Tule rivers. The harbors of C. are San Francisco (the best on the Pacific coast), San Diego, San Pedro, San Luis Obispo, Monterey Bay, etc. There are numerous islands near the coast, some of them inhabited and cultivated. The arable lands of C., including the irrigable and swamp lands, are nearly 60,000,000 acres, and the pastoral and vinicultural, about 30,000,000 more; not over 1/15 of the area is woodland.

Minerals.—Gold and silver have been found in paying quantities in 18 or 19 cos. of the State, and probably exist in others; the gold pure, in scales, fine dust, nuggets, crystals, and in combination with copper, silver, lead, zinc, cinnabar, arsenic, iron, sulphur, tellurium, iridosmine, etc.; silver native, in combination with lead, copper, sulphur, iron, etc.; copper native and in many forms; quicksilver abundantly as cinnabar, and occasionally native; platinum and tin, not in large quantity; lead and iron almost everywhere; arsenic, tellurium, graphite, borax, salt, soda in several forms; sulphur, gypsum, barytes, antimony, ochre, alabaster, fluor spar, corundum, and cobalt; diamonds, tourmalines, zircon, garnets, chrysolites, etc.; coal of fair quality, petroleum, and bitumen. The gold mining is of three kinds—common placer mining, now nearly abandoned; hydraulic mining, which is placer mining on a large scale, and mining in quartz veins or lodes. The silver is mined only in veins; copper may be found native, but is generally an ore, and in veins or lodes.

Soil and Vegetation. Most of the arable lands of C. have a rich deep soil of wonderful fertility. Some of it requires to be quickened into activity by irrigation, but is then astonishingly productive. There are 48 genera and 105 species of forest trees already known in C., the greater part not only indigenous but peculiar to the Pacific slope. Forty species are evergreens, including the 2 sequoias or

giant redwoods; the sugar and 15 other species of pine, 6 species of true fir, 12 of oak, white cedar, 4 species of cypress, manzanita, wild nutmeg, *C. laurifolia*, chinquapin, maples, etc. There are many valuable shrubs and small fruits, only 1 native grape, but all the European and E. species and varieties flourish well, and C. is becoming the vineyard of Amer. There are many nutritious grasses, but with few exceptions there is no sod, nor grass fit for hay. Alfalfa, wild oats, Hungarian grass, and millet are much used for feeding cattle. The flowers of C. are abundant, fragrant, and beautiful.

Animals.—There are 115 species of mammals in C., 27 of which are carnivorous; they include the grizzly, black, and brown bear, raccoon, badger, 2 or 3 species of skunk, the wolverine, fisher, Amer. sable or marten, mink, weasel, C. otter and sea-otter, cougar, jaguar, 2 species of lynx, raccoon-fox or mt.-cat, gray wolf, coyote, 5 species of fox, 3 or 4 of sea-lion, 2 of seal, and the sea-elephant. There are 2 of moles, 2 of shrews, 16 species of bats, 50 species of rodents, some of them (the squirrels) specially destructive of grain; of ruminants, the elk, 3 species of deer, the Amer. antelope, and big-horn; of cetacea, 11 species. There are 350 species of birds native to C., including a great variety of each family, order, and tribe. There are many reptiles, but no saurians, and only one poisonous serpent, the rattlesnake, of which, however, there are 5 species. The fish are of 240 species, of which 185 are edible; 60 mollusks, and 8 crustaceans.

Climate.—Prof. E. W. Hilgard classifies the climate as follows: 1. Bay and coast climate; characteristics, small range of thermometer, extremes only 53° apart, means of summer and winter only 6° apart; no intense heat; frosts very rare; fogs from the sea in the afternoons of summer; rainfall averages 27.3 inches, of which about 25 are between Dec. and May. 2. Climate of the great interior valley; characteristics, average winter temperature lower than the coast, though minimum temperature about the same; frosts rare; summer heat very high, above 100° F. many days of the season; nights warm, but the dry air is less oppressive than a moist one; extreme annual range, 76°; mean range, 23.6°; rainfall for yr., 21.50 inches, of which 19.80 is between Dec. and May. 3. Climate of the slope of the Sierra Nev.; characteristics, considerable snowfall and much rain; cool summers, summer thunder-storms; winters often severe; mean winter temperature, 43.5°; mean summer temperature, 57.5°; mean range, 14°; rainfall, 57.24 inches. But aside from these there are many local climates. Even in S. C. on the coast the heat is not so great as in the interior valley, and the climate of Los Angeles, San Diego, and Santa Barbara is desirable for consumptive invalids. In the S. E., at Ft. Yuma and in valleys adjacent, it is fearfully hot and dry. The rainfall is only 2 or 3 inches a yr., and there are from 100 to 115 days when the maximum temperature exceeds 100° F.

Agricultural Products.—Wine, grapes, and raisins occupy the front rank among these. With 60,000,000 grape vines, most of them in full bearing, and representing the choicest of European and Amer. vines, and a climate admirably adapted to grape culture, C. can supply the whole Amer. continent with grapes, raisins, and wine. As yet most of her vines are too strong, but they are improving. The grapes and raisins are unsurpassed anywhere. Wheat is a great crop, 29,017,707 bushels by 1880 census; barley, 12,463,561; Indian corn, 1,993,325; oats, 1,341,271; potatoes, 4,636,849; hay, 1,135,180 tons; a total value of agricultural crops, aside from fruit, of more than \$100,000,000. The grazing lands of C. sustained, in 1880, 337,710 horses, 28,343 mules, 210,078 milch cows, 454,229 oxen and other cattle, 4,152,349 sheep, and 608,550 swine.

Manufactures.—Mining and agricultural machinery, lumber for building purposes and ornamental woods, tanning and dressing of leather and leather manufactures, woollen goods of several classes, flouring mills, the production of wine and brandy, carriages and wagons, iron manufactures and iron castings, manufactured tobacco and cigars, refined sugar, syrup, and candies (from S. I. sugar); grain bags, gunpowder, dynamite, giant powder, and chemicals for mining purposes. There were in C., in 1880, 5885 manufacturing establishments; capital, \$61,243,784; value of products, \$116,218,973.

Mining Products.—The mines of C. have not been as productive within the past few yrs. as they were 2 decades ago, but they are now on the increase. The production of gold and silver in 1880, deposited in the mint or forwarded by express cos., was \$18,276,166. Ten per cent. should be allowed for amounts otherwise forwarded, making the whole over \$20,000,000. In 1881 the amount was about \$20,000,000. The director of the mint reports that \$703,736,520.80 of gold and silver had been deposited at the mints from C. between 1848 and June 30, 1880. Of this, \$702,038,970.35 was gold. Mr. T. F. Cronise, in his *Natural Wealth of C.* has demonstrated that this mint statement does not fully represent the product of the mines of C. He gives the amount produced each yr. from the most authentic data, and these supplemented by the known products of the yrs. since 1870 make the total product, in round numbers, \$1,130,000,000. The lead parted from silver in 1879 amounted to about \$1,000,000; quicksilver is produced to the extent of over \$2,000,000; while the platinum, copper, lead (not charged with silver), iron, tin, borax, soda, salt, sulphur, coal (\$26,950 tons were mined in 1880), precious stones, building stones, gypsum, etc., aggregate at least 3 times as much as the gold and silver.

Fisheries.—The census of 1880 reports the value of the products of the fisheries for that yr. as \$1,860,714, and of the marine salt produced at \$121,659.

Railways.—The number of m. of railway operated in C. in 1880 was 2212; many m. have since been opened.

Finances.—The assessed valuation of the State in 1880 was \$584,578,036, averaging \$476.05 per capita; the State debt, net, was \$3,306,614; local, net, \$13,449,074; total, \$16,755,688; the rate of taxation for all purposes was 5.5 mills on the dollar, and the amount of State and local tax in 1880, \$12,628,005.

Commerce and Navigation.—The number of Amer. and foreign vessels which entered and cleared at San Francisco and San Diego in 1880 was 633, and the tonnage 720,130 tons. The number of registered, enrolled, and licensed vessels of those ports the same yr. was 884, and their tonnage 202,114.30. The value of the imports from foreign countries into San Francisco in 1880 was \$41,265,317; of domestic exports, \$37,213,443; of foreign exports, \$3,145,459; whole exports and imports, \$81,624,219. The interstate and internal commerce of the State by railways and steamers is still greater, though exact figures cannot be given. Lines of ocean steamers ply to Alaska, Wash. Terr., Or., and the Mex. coast, Panama, Honolulu, Chi., and Japan.

Banks.—There are 10 national banks in C., having a cap. in 1881 of \$3,180,073; deposits, \$4,876,000 in 1880; there were also in 1880 111 State, savings, and private banks and trust companies, reporting \$21,535,175 cap. and \$81,426,012 deposits.

Education.—In 1879 there were 216,404 children of school age, 156,769 enrolled, 144,806 attending; average attendance, 98,468. There were 1999 dists., 2743 schools—1000 of the first grade; 3453 teachers—1236 men, 2217 women; average monthly pay of men, \$82.13; of women, \$66.37; whole annual expenditure for common schools, \$3,010,907; value of school property, \$6,857,359; school fund, \$2,011,800; children attending private schools, 15,432; not attending any school, 56,369. There are also 2 normal schools and 4 normal depts., 1 State univ., with 9 literary, scientific, and professional colls. under its control; 12 other colls., some of them having business or professional courses attached to them; 7 of these admit women as students, and there are many sams. of high grade for women alone. There is also a school of engineering, 4 theological schools, and a scientific inst. of high character—the San Francisco Acad. of Sciences. There are 86 public libraries in C., numbering about 307,000 vols. An observatory, largely endowed by the late James Lick, is now building. In 1880 there were 3446 public schools in C.

Churches.—All denominations are represented. The Meths. lead, with about 250 chs.; the R. Caths. come next, and then in order Presbys., Baps., Congls., Episcopalians, Disciples, Chr. Connection, Lutherans, Ger. Reformed, Evangelical Association, Friends, United Brethren in Chr., Jewish synagogues, Units., Univts., New Jerusalem Ch., Second Adventists, Gr. Ch., Spiritualists, Mormons, Chi. temples, etc.

Population.—The first census of C. was in 1850, pop. 92,597; in 1860, 379,994; in 1870, 560,247, excluding tribal Indians; in 1880, exclusive of tribal Indians, 864,694 (white 767,181, colored 97,513, including 75,132 Chi., 86 Japanese, and 16,277 Indians). There are about 7300 tribal Indians.

The prin. towns are San Francisco, the largest city, pop. 233,959; Sacramento, cap., 21,420; Oakland, 34,555; San Jose, 12,567; Stockton, 10,282; Los Angeles, 11,183; Vallejo, 5987; Alameda, 5708; Marysville, 4321; Nevada, 4023; Santa Cruz, 3998; Napa, 3731; Santa Rosa, 3616; Santa Barbara, 3460; Petaluma, 3326. San Diego, San Rafael, Santa Clara, Eureka.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Alameda	4-B	24,237	62,976	Oakland	34,555
Alpine	3-C	685	539	Markleeville	80
Amador	4-B	9,582	11,234	Jackson	1,040
Butte	3-B	11,404	18,721	Chico	3,300
Calaveras	4-B	8,895	9,084	San Andreas	597
Colusa	3-B	6,165	13,118	Colusa	1,779
Contra Costa	4-B	8,461	12,525	Martinez	.....
Del Norte	1-A	2,022	2,584	Crescent City	1,551
El Dorado	2-C	10,209	10,685	Placerville	1,081
Fresno	5-C	6,336	9,478	Fresno City	1,112
Humboldt	2-A	6,140	15,512	Eureka	2,689
Inyo	5-D	1,956	2,928	Independence	.....
Kern	6-C	2,925	5,601	Bakersfield	801
Lake	2-A	2,999	6,596	Lakeport	592
Lassen	2-C	1,237	3,340	Susville	943
Los Angeles	6-C	15,209	33,581	Los Angeles	11,183
Marin	4-A	6,903	11,324	San Rafael	2,576
Mariposa	4-C	4,572	4,339	Mariposa	342
Mendocino	3-A	7,545	12,800	Ukiah	924
Merced	4-B	2,807	5,656	Merced	1,446
Modoc	1-C	.....	4,399	Alturas	143
Mono	4-C	420	7,499	Bridgeport	.....
Monterey	5-B	9,876	11,302	Salina	1,584
Napa	3-B	7,163	13,223	Napa City	5,731
Nevada	4-B	19,134	20,823	Nevada City	4,092
Placer	3-B	11,357	14,232	Auburn	1,229
Plumas	3-B	4,489	6,180	Quincy	432
Sacramento	4-B	26,830	34,390	Sacramento City	21,420
San Benito	5-B	5,030	5,584	Hollister	1,034
San Bernardino	6-D	3,993	7,736	San Bernardino	1,873
San Diego	7-D	4,951	8,618	San Diego	9,637
San Francisco	4-A	149,473	233,959	San Francisco	233,959
San Joaquin	4-B	21,050	24,349	Stockton	10,282
San Luis Obispo	5-B	4,772	9,132	San Luis Obispo	2,343
San Mateo	4-C	6,525	8,669	Redwood City	1,233
Santa Barbara	4-C	7,794	9,513	Santa Barbara	3,460
Santa Clara	4-B	26,246	35,039	San Jose	12,567
Santa Cruz	4-B	8,743	12,902	Santa Cruz	3,998
Shasta	2-B	4,173	9,492	Shasta	443
Sierra	3-B	6,619	6,922	Downville	650
Siskiyou	4-B	6,848	8,610	Yreka	1,059
Solano	4-B	16,871	18,475	Fairfield	424
Sonoma	3-A	19,819	25,926	Santa Rosa	3,616
Stanislaus	4-B	6,439	8,751	Modesto	1,693
Sutter	3-B	5,080	5,159	Yuba City	650
Tehama	2-B	3,587	9,301	Red Bluff	2,106
Trinity	2-A	3,213	4,989	Weaverville	.....
Tulare	5-C	4,533	11,281	Visalia	1,412
Tuolumne	4-C	8,150	7,848	Sonora	1,492
Yuba	6-C	9,809	5,073	S. Buenaventura	1,370
Yolo	3-B	9,809	11,772	Woodland	2,257
Yuba	3-B	10,851	11,284	Marysville	4,321
Total	.....	560,247	864,694		

History.—Present State of C. discovered by J. R. Cabrillo, a Port. navigator in the Sp. service, in 1542; he named Cape Mendoza, now Cape Mendocino, and the Farallones Islands. In 1578 Sir Francis Drake discovered and landed at Drake's Bay, and took possession of the country, calling it New Albion. It was again explored by the Spaniard S. Viscayo, in 1602, but no attempt made at settlement till 1769, when

* Reference for location of counties. See map of California.





the Franciscan Fathers planted a mission at San Diego, and 6 others in the next 7 yrs., the last, San Francisco,—being established in 1776 as the Mission Dolores. Within 50 yrs. they had founded 21 of these missions, had accumulated enormous wealth in live stock, gold and silver, and buildings and lands, and had reduced more than 30,000 Indians to slavery, treating them with the utmost cruelty; the Indians of the interior were left to themselves. With the downfall of the Sp. power in Mex. these missions waned, and were finally abolished and confiscated in 1845. Then came a great rush of immigrants from all quarters. In 1847 Com. Stockton captured C. and drove the Mex. forces out of the country. There was some conflict of authority between Com. Stockton and Gen. S. W. Kearney, but it was soon settled, and Col. R. B. Mason appointed gov. In Oct. 1849 a const. was framed by a convention, and ratified by the people Nov. 13, 1849. After a long and angry debate and discussion, lasting from Dec. 22, 1849, to Sept. 1, 1850, the State was admitted to the U. Gold was discovered in Feb. 1848, on the estate of Gen. Sutter in Coloma, and there was an instant rush thither till, 4 yrs. later, there were 250,000 men in the State, many of them energetic, daring, reckless persons, capable of almost any crime. Gambling, intemperance, licentiousness, theft, and murder were rife. A vigilance committee of the best citizens was formed in 1851, and some of the worst villains tried and hanged. In 1855 the ruffians had regained their power, and seized upon the courts and offices. The vigilance committee was reorganized, and broke up the gang of villains, hanging 4, driving 1 to suicide, and banishing about 20. Since that time the State has been quiet and prosperous, though threatened with disorder in 1879 and 1880 on account of the Chi. It bore an excellent record in the late c. war in its contribution of men and means. The Union and Central Pacific R. R. were completed in 1869, and now the State is connected with the E. by several lines, and others are in rapid progress.

Governors—Spanish Rule.

Gaspar de Portala	1767-71	José J. de Arrillaga	1793-94
Felipe de Barri	1771-74	Diego de Borica	1794-1800
Felipe de Neve	1774-83	José J. de Arrillaga	1800-14
Pedro Fajés	1782-90	José Arguello	1814-15
José Antonio Roman	1790-92	Pablo Vicente de Sola	1815-22

Mexican Rule.

Pablo Vicente de Sola	1822-23
Luis Arguello	1823-25
José María de Echeandía	June 1825-Jan. 1831
Manuel Victoria	Jan. 1831-Jan. 1832
Pío Pico	Jan. 1832-Jan. 1833
José Figueroa	Jan. 1833-Aug. 1835
José Castro	Aug. 1835-Jan. 1836
Nicolas Gutierrez	Jan. 1836-Apr. 1836
Mariana Chico	Apr. 1836-Aug. 1836
Nicolas Gutierrez	Aug. 1836-Nov. 1836
Juan B. Alvarado	Nov. 1836-Dec. 1842
Manuel Micheltorena	Dec. 1842-Feb. 1845
Pío Pico	Feb. 1845-July 1846

American Military and Territorial Rule.

Com. John D. Sloat	July 7, 1846-Aug. 7, 1846
Com. Robert F. Stockton	Aug. 17, 1846-Jan. 1847
Col. John C. Fremont	Jan. 1847-Mar. 1, 1847
Gen. Stephen W. Kearney	Mar. 1, 1847-May 31, 1847
Col. Richard B. Mason	May 31, 1847-Apr. 13, 1849
Gen. Bennet Riley	Apr. 13, 1849-Dec. 1849

State Government.

Peter H. Burnett	Dec. 1849-51	Frederick F. Low	1863-68
John McDougall	(act'g) 1851-52	Henry H. Haight	1868-72
John Bigler	1852-56	Newton Booth	1872-75
J. Neely Johnson	1856-58	William Irwin	1875-79
John B. Weller	1858-60	George C. Perkins	1879-83
Milton S. Latham	1860	George Stoneman	1883-87
John G. Downey	1860-62		
Lehman Stanford	1862-63		

L. P. BROCKETT.

California, Mo. See APPENDIX.

California, Gulf of, or Sea of Cortes [Sp. *Mar Bermejo*], an arm of the Pacific Ocean, separates the peninsula of Lower Cal. from the Mex. provs. of Sinaloa and Sonora. It is about 700 m. long and from 40 to 100 m. wide. It was once famous for its pearl-fisheries, and mother-of-pearl is still obtained here.

California, Lower, or Old, a part of Mex., bounded N. E. by the Gulf of Cal., S. W. by the Pacific Ocean. Cap. La Paz. It is a peninsula, 750 m. long and from 30 to 150 m. wide; mountainous and arid. Pop. 23,195.

California, University of, was established by an act of the State legislature approved Mar. 23, 1868. It was an outgrowth of the Coll. of Cal., which was chartered in 1855, admitted its first class in 1860, and was maintained on a non-sectarian basis. Finding the coll. fettered by its want of endowments, and wishing to see a larger and stronger inst., the trustees in 1867 offered all their property to the State. This included a new, unoccupied site of 160 acres at Berkeley, 5 m. N. of Oakland and 9 m. from San Francisco. The State had already accepted the Congressional provision for an agricultural coll. It was now proposed to unite all interests in a univ. adequate to the wants and worthy of the name of the State. The proposition was agreed to. The first board of regents, appointed in 1868, kept the coll. in existence another yr., and in 1869 the univ. was organized for instruction and received its first class.

Caligula (CAIUS CÆSAR), a Rom. emp. b. at Antium in 12 A. D. was a son of Germanicus. His mother was Agrippina, a granddaughter of the emp. Augustus. He succeeded to the throne 37 A. D., at the death of Tiberius. His reign was at first mild and popular, with an ostentation of generosity, but he soon showed himself a monster of cruelty, and indulged his vicious propensities without restraint. He ordered that sacrifices should be offered to

himself as a god. In 41 A. D. he was assassinated by conspirators, and was succeeded by his uncle Claudius.

Caliph [Ar. *khalifah*, a "successor"], the spiritual and temporal head of orthodox Mohammedanism—so called as being the "successor" of Mohammed. The C. are usually classed as follows: 1. The 5 Ar. C. (632-661); 2. the 14 Omayyads of Damascus (661-750); 3. the 27 Abbassides of Bagdad (750-1258); 4. the 14 Fatimides of Egypt (909-1171); 5. the 27 C. of Cordova, who had authority in Sp. and N. W. Afr. (756-1031). Later Moorish dynasties are not generally reckoned as C. The Shah of Per. (since 1502) claims the caliphate as being a descendant of Ali, the lawful heir of Mohammed; the sultan of Tur. (since 1517) also claims the title.

Calixtines, the name given to a party of the Hussites, because they insisted on giving the cup (*calyx*) in the Eucharist to all who were not guilty of mortal sins. (See HUSSITES.) The term C. has also been applied to the adherents of G. Calixtus, a Lutheran prof. of theol. at Helmstedt.

Calixtus, originally **Callisen** (GEORGE), a Prot. theol., b. at Medelbye, in Schleswig, Dec. 14, 1586. He became prof. of theol. at Helmstedt in 1614, and wrote several treatises against the doctrines of the R. Caths. Among his works are an *Epidrome of Moral Theol.* and *theol. Treatises of Reformers*. His followers were called Calixtines. D. Mar. 19, 1656.

Calixtus I. (POPE), SAINT, succeeded Zephyrinus 219 A. D.; d. 223.—CALIXTUS II. succeeded Gelasius II. in 1119; d. Dec. 12, 1124.—CALIXTUS III. (ALONZO BORGIA) succeeded Nicholas V. in 1455; d. Aug. 6, 1458.

Cal'ia, a genus of plants of the natural order Araceæ. The genus is characterized by a flat spathe, within which is a cylindrical spadix covered with naked flowers, appearing as a mere mixture of stamens and pistils, and a 1-celled ovary. The *C. palustris* is a native of Europe and the U. S., growing in swamps and bogs. It has cordate leaves, a white spathe, and very acrid rhizomes, which are cooked for food by the Laplanders. The *C. Æthiopica* or *Richardia Æthiopica* is prized for the beauty of its flowers.

Callao, kal-lah'o, a fortified town of N. Peru, on the Pacific Ocean, 6 m. W. of Lima, of which it is the port. It is connected with Lima by R. R., and has a commodious quay and a fine fortress. The harbor is the best on the coast of Peru. The town was destroyed by an earthquake in 1746. Pop. 33,502.

Callender (JOHN), b. in Boston, Mass., in 1706, grad. at Harvard in 1723; became pastor of the Bap. ch. of Swansey, Mass., in 1728, and in 1731 of the ch. at Newport, R. I. In 1738 he delivered a historical discourse, which is of great value in the early hist. of R. I. D. Jan. 26, 1748.

Callierates, kal-lik'ra-téz [Gr. *Καλλικράτης*], a Gr. arch. who flourished about 440 B. C. Among his works was the Parthenon of Athens, in which he was assisted by Ictinus.

Callieratidas [Gr. *Καλλικρατίδας*], a Spartan gen. who defeated the Athenians in a naval battle, and was afterward defeated by an Athenian fleet at Arginusæ in 406 B. C., where he was killed.

Calligonum, a genus of plants of the order *Polygonaceæ*, having a quadrangular fruit (*achenium*), winged at the angles. The *C. pallasiæ*, a succulent shrub, is found in the sandy steppes near the Caspian Sea. Its acid fruit and shoots serve to allay the thirst of travellers. From its root exudes a nutritious gum which is similar to tragacanth, and is used as food by the Kalmuks.

Callimachus, kal-lim'a-kus, a Gr. sculptor and arch., supposed to have lived about 450-400 B. C. The invention of the Corinthian cap. is ascribed to him.

Callimachus [Gr. *Καλλίμαχος*], a celebrated Gr. poet and grammarian, b. at Cyrene, and flourished about 260-240 B. C. He was appointed chief librarian of the great Alexandrian library. He wrote an epic poem, tragedies, elegies, comedies, etc. His works are nearly all lost, except his epigrams and hymns.

Callinus [Καλλίνος] of Ephesus, the earliest of the Gr. elegiac poets, is supposed to have lived about 600 or 650 B. C. Only small fragments of his poems are extant.

Calliope, kal-li'o-pe [Gr. *Καλλιόπη*], one of the 9 Muses, presided over epic poetry. She was represented as holding a tablet or closely rolled parchment in her hand.

Callippic Period, a correction of the Metonic cycle, proposed by Callippus. The Metonic cycle was a period of 19 solar yrs., at the end of which the new moons return again on the same days of the yr. The period contained exactly 6940 days. Now 6940 days exceed 235 lunations by only 7½ hours. At the end of 4 cycles, or 76 yrs., the accumulated excess of 7½ hours amounts to 1 day and 6 hours. Callippus proposed to quadruple the period of Meton, and to deduct a day at the end of it.

Callippus, or **Callippus** [Gr. *Καλλίππος* or *Καλλίππος*], an anc. Gr. astron., b. at Cyzicus, lived about 330 B. C. at Athens. He invented a new cycle of 76 yrs. (See CALLIPPIC PERIOD.) It began 331 B. C.

Callisthenes [Gr. *Καλλισθένης*], an historian, b. at Olynthus about 365 B. C., was a relative and pupil of Aristotle. He accompanied Alexander the Great in his expedition against Per. in 334 B. C.; was put to death on a charge of treason in 328 B. C. He left a hist. of Alexander's expedition against Per., which is not extant.

Cal'titris, a genus of trees of the order Conifera. The cones consist of 4 to 6 woody scales, which separate one from another, each scale having from 3 to 6 winged seeds. *C. quadrivalvis*, a large tree of Barbary, called arar, yields a very hard, almost indestructible, fragrant wood, and the aromatic gum-resin called sandarach. The timber is highly prized, and is used for the floors of mosques.

Calms, kahmz. *Equatorial C.*—A belt of C., variable winds, sudden squalls, and tornadoes, and almost daily thunder-showers, situated about and somewhat N. of the equator, 4° to 6° lat. in breadth, and separating the 2 bodies of N. E. and S. E. trade-winds.

C. of the Provinces of Venezuela and Capricorn.—Two belts of C. and light winds, almost rainless, situated in the neighbor-

hood of but outside the tropics. They are found at the polar limit of the trade-winds, which they separate from the region of variable winds of the temperate zones. (See WINDS, GENERAL CIRCULATION OF.) ARNOLD GUYOT.

Calmucks. See KALMUCKS.

Calomarde (FRANCISCO TADEO), COUNT, a Sp. minister of state, b. at Villé in 1775. He studied law, joined the absolutist party, and became in 1823 minister of grace and justice. He persecuted the liberals and favored the Jesuits. In 1833 he was exiled for his intrigues to raise Don Carlos to the throne. D. 1842.

Calomel [from the Gr. *καλός*, "beautiful," "good," and *μέλας*, "black," perhaps so named because it was supposed to be good for black bile] is one of the compounds of mercury and chlorine, known to chemists as the subchloride of mercury, or, according to the new nomenclature, mercurous chloride. It is prepared by taking two equal portions of mercury, dissolving one portion in hot sulphuric acid, which forms sulphate of mercury, then adding the second part, and triturating the whole in a mortar till the metal becomes incorporated with the sulphate. This mixture is added to $\frac{1}{2}$ its weight of common salt, and heated in a retort, when C. condenses in the cool part of the receiver as a white powder. It is also sometimes prepared by precipitation. A minute quantity of corrosive sublimate which accompanies it is removed by washing. C. is very heavy. It is not soluble in water, and sparingly so in acids. It turns black on the addition of lime-water, potash, soda or ammonia. When heated it sublimes unaltered, and readily condenses again on any cool surface held near it. Its medicinal properties are of a decided character, and though capable of being misused, and thus doing great harm, it is still of great value in the treatment of certain diseases. WILLARD PARKER.

Calophyllum [from the Gr. *καλός*, "beautiful," and *φύλλον*, a "leaf"], a genus of trees of the order Guttiferae natives of warm climates. Some of the species produce edible fruits and valuable timber. The resin called E. I. tacamahac exudes from the trunk of *C. Inophyllum*, a beautiful tree, which has large shining leaves and fragrant white flowers. This is one of the most valuable timber trees of the S. Sea Islands. The timber is very durable, and resembles mahogany, but is of a lighter color. It is used for building and for masts. The fruit of this and other species is a drupe.

Caloric. See HEAT, by PROF. W. P. TROWBRIDGE.

Caloric Engine. See HOT-AIR ENGINE.

Calpurnius (TITUS JULIUS), a Lat. poet, is supposed to have lived about 280-300 A. D. The events of his life are unknown. Several of his eclogues are extant, and have some merit.

Caltha, the Lat. name of the marigold. *C. palustris* is the systematic name of the marsh marigold, often called in Amer. "cowslip," a plant of the natural order Ranunculaceae, which grows in swamps and wet meadows in Asia, Europe, the U. S., and even in Alaska. It is boiled and eaten in the spring as a pot-herb, the poisonous properties which it is said to possess being destroyed by cooking.

Caltrop, or **Calthrop**, a low herb of the genus *Tribulus*, growing in the S. of Europe: its burs are armed with strong spines, which inflict wounds upon the feet of men and beasts if trodden upon. This name is also applied to a 4-pointed piece of steel, so shaped that one prong always points upward.

Calumet, on R. R., Houghton co., Mich. Pop. tp. 1870, 3182; 1880, 8299.

Calvary, Mount, the scene of our Saviour's crucifixion, is commonly thought to be an eminence which lay at the N. W. and just on the outside of the anc. city of Jerusalem, but the locality is by no means certainly known.

Calvert, a city, cap. of Robertson co., Tex., on R. R., 130 m. N. N. W. of Houston. Pop. 1880, 2280.

Calvert (GEORGE AND CECIL). See BALTIMORE, LORD.

Calvert (GEORGE HENRY), b. in Baltimore, Md., Jan. 2, 1803, a descendant of Lord Baltimore and of the painter Rubens; became a journalist of Baltimore. Author of *Scenes and Thoughts in Europe, An Introduction to Social Science*, and other works.

Calvert (LEONARD), younger brother of Cecil, second Lord Baltimore; was the first gov. of Md., whither he led the first colony in 1634. D. June 9, 1647.

Calvin, the Lat. [*Calvinus*] for **Cauvin** (JOHN), b. at Noyon, some 70 m. N. E. of Paris, July 10, 1509. His father destined him to the priesthood. In 1521 he received the tonsure, though never ordained. In 1523 he went with the young De Mommois to Paris, entering first the Coll. of La Marche and, shortly after, the Coll. of Montaigu. He was an ardent and precocious scholar, bright, sharp, sedate, severe. Near the close of 1527 he went to the Univ. of Orleans, and the yr. after to the Univ. of Bourges, to study law. In the summer of 1531, his father having d. May 26, he returned to Paris, and in 1532 pub., with a commentary, the *De Clementia* of Seneca, aiming as yet at nothing higher than a reputation like that of Erasmus. In 1536, having been twice expelled from Paris, he went to Geneva, his final home. What he calls his "sudden conversion" occurred in 1533. His greatest work, the *Institutes* (1536), was at first only a catechism. He revised it for the last time in 1559. In 1540 he married the widow Idelette de Bures. Their only child, a son, d. very early. C. himself d. May 27, 1564. The Fr. lang. owes him a debt like that which the Ger. lang. owes Luther. Civil liberty, the world over, is likewise his debtor. He is the father of Presbyterianism, and the greatest of all Prot. commentators and theologists. There is but one blot upon his memory. The burning of Servetus for heresy (Oct. 27, 1553), though sanctified even by Melancthon, was a shocking tragedy. The standard ed. of Calvin's works is that of Amsterdam. Reuss's exhaustive ed. appeared in 1863-1880. The best biographies are by Beza, by Paul Henry, by Dyer, by Stähelin, and by Kampschulte, R. Cath. Another R. Cath. biography by Audin is bitter and scurrilous. R. D. HITCHCOCK.

Calvinism, as also Arminianism, Pelagianism, and Lutheranism, designates not merely the opinions of an individual, but a mode of religious thought, of which the person whose name it bears was an eminent expounder. There have existed in the Chr. Ch. 3 generically distinct systems of doctrine: Pelagianism denies the guilt and moral impotence of man and makes him independent of the supernatural assistance of God. C. emphasizes the guilt and impotence of man, and refers salvation to the undeserved favor and the new creative energy of God. Between these comes Arminianism, which admits man's original pollution, but denies his guilt; regards redemption as a compensation for innate and irresponsible disabilities, and refers the moral restoration of the individual to the co-operation of the human will with the Divine energy, the human will being the determining factor. The system to which this article is devoted takes its modern and specific title from the fact that it was developed into a perfect form and infused into the creeds of Prot. chs. through the instrumentality of JOHN CALVIN (which see). A statement of the constituent doctrines of this system is to be drawn not exclusively from his writings, but from the public Confessions of those chs. which have adopted it, and from the classical writings of their respective theols. It is here proposed to present an outline of the fundamental characteristics of this system, and of its historical development.

STATEMENT OF PRINCIPLES. I. *The Relation of the Creator to the Creation.*—There are 3 distinct views upon this subject, each embracing many specific varieties: (1) The Deistic view, which admits a creation out of nothing, an original endowment of the elements with their active powers, and the subjection of the whole system to certain fixed laws. It admits of a Creator in the gen. sense of an indefinitely remote First Cause, who inaugurated the ever flowing line of second causes, but denies the continual dependence of the creature upon the Creator for existence and the exercise of its powers. (2) Opposite to this is the Pantheistic mode of thought, which identifies God and the universe, at least so far as this—that it denies that the Deity is a conscious Person, whose actions are rational volitions. (3) Between these extremes is Chr. Theism, which emphasizes the transcendence of God beyond the world and his immanence in the world. He is a conscious personal Spirit, able to exercise, by his own volition, a sovereign and supernatural influence upon any part of the system which he has created; working usually through second causes, yet free to work above without, or against them at his own pleasure. Every creature is at every moment dependent upon the Creator for existence and the exercise of its powers.

All Chrs. are Theists in this last sense. But beyond this point the views of different schools of theol. begin to diverge. On the one hand, some urge the essential and absolute dependence of the creature in every possible respect; on the other hand, others urge the self-active power of second causes, and by consequence their self-sufficiency and independence. Herein lie the ultimate antithetical grounds of Pelagianism and Augustinism, or C.

II. *The End or Design of God in Creation.*—Every Theist admits that the universe is one system, and that the Creator must have had one gen. end, for which it and all parts of it were intended. This has been generally referred to the benevolence of God, which prompts him to confer the greatest possible amount of happiness upon the objects of his love. This is the gen. view of Pelagians and Semi-Pelagians, or Arminians. Calvinists, following the teachings of Scripture, make the glory of God the absolute end of creation, carrying with it, however—not as a co-ordinate design, yet as a subordinate though certain effect—the blessedness of all loyal creatures. The recognition of this great principle, and the application of it to the interpretation of all God's dealings with man and man's duties to God, is the essential characteristic of C.

III. *The Relation between the Eternal Plan of God and the Actual Events in Time.*—Every Theist admits that the Divine plan embraced the entire system of creation and providence. Pelagius admitted that the foreknowledge of God embraces the future volitions of free agents, although he denied their foreordination. The Socinians deny foreknowledge as well as foreordination. The Arminians admit foreknowledge, but deny foreordination. Calvinists maintain the following propositions: (1) The eternal plan of God constituted man a free agent, and cannot interfere with the exercise of that freedom. (2) This free will is not independent, but has its ground in the conserving energies of the Creator. (3) The certain foreknowledge by the Creator of all future events involves the predetermination of each and every event. (4) Since all events constitute a single system, the plan of the Creator must embrace not only the system as a whole, but the most infinitesimal part of it. Hence, while every event is contingent upon its conditions, none of God's purposes can be contingent. All the decrees of God are called absolute, because they are determined by "the counsel of his own will," and never by anything exterior to him, which has not been determined by him. (5) This determination does not interfere with the true causality of the creature and the free self-determination of men and angels. And since the holiness of the created moral agent depends upon the indwelling of the Divine grace, and its turning from this grace is the cause of sin, it follows that all which is good in the volitions of free agents is to be referred to God as its positive source, but that all the evil is to be referred simply to his permission. Thus all events—including the primal apostasies of Satan and Adam and all their consequences—are embraced in God's eternal purpose.

IV. *How the Benevolence, Justice, and Grace of God are exemplified in the Scheme of Salvation.*—Arminians have generally held that "justice is benevolence acting according to wisdom"—that is, inflicting a lesser pain in order to effect a greater happiness—and that the necessity for punishment lies not in the inexorable demands of justice, but in its being

the best means for securing the reformation of the sinner and for deterring others from disobedience. The atonement, therefore, was solely an exhibition of the Divine benevolence, but not of justice. Calvinists, on the contrary, hold that justice as well as benevolence is an essential property of the Divine nature, and determines the character of the Divine volitions. By his own nature God is benevolent to the innocent, and is determined to punish the guilty. In the gospel God has in certain cases sovereignly separated the sin from the sinner. In the vicarious penal sufferings of his Son he punished sin in strict rigor of justice, and then treating the sinner as one with regard to whom the demands of justice had been fully satisfied, he exercised both justice and benevolence, while benevolence to the undeserving is sovereign grace. While Arminians emphasize benevolence, Calvinists emphasize justice and grace.

V. *The Degree of Guilt which the Apostasy of Adam entailed upon his Posterity.*—The answers given to this question give form to all the various systems of theol. 1. Pelagius held that an unconditioned power to choose between good and evil is essential to responsible moral agency; and since all men are responsible agents, their nature must in this respect remain in the same condition as that in which it was created, and that they possess power to will and do all that God has any right to require of them. Hence they deny all original sin or corruption of nature, all guilt or desert of punishment prior to actual transgression, and consequently affirm that men need redemption through Chr. only to deliver them from the guilt of actual transgression.

2. Calvinists, on the contrary, hold: (1) That the soul is the organ of volition; (2) that the soul possesses the property of self-determination—the character of its determination depending upon the moral condition of the soul itself; (3) that the holy condition of the soul depends upon the indwelling of the Divine Spirit. Adam was created with a holy tendency of heart, with full power not to sin, but also, during a certain period of probation, with ability to sin. He did sin, and as a punishment the Holy Spirit is withdrawn from him and his descendants, who thus lost the ability not to sin, but retained the ability to sin, which became the fatal inability not to sin—*non posse non peccare*.

Hence, as to *Original Guilt*, Calvinists hold: (1) Human sin, originating in the free apostatizing act of Adam, deserves the infliction of God's wrath, which is demanded by immutable justice. (2) Such was the relation between Adam and his descendants that God regards and treats each one of them, as he comes into being, as worthy of punishment for the sin of Adam, and consequently withdraws his life-giving fellowship with him. There are several forms of representing the nature of this responsibility on the part of the descendants of Adam, that styled the "federal view" being most generally accepted, according to which God, as the guardian of our interests, gave to us the most favorable probation possible by making Adam our covenant representative. But according to every mode of presentation, each individual of the race is under the just condemnation of God, and hence the entire scheme of redemption is a product of sovereign grace. God was free to provide redemption for many, few, or none, just as he pleased, and in every case the determining motive of God cannot be found in the subject himself, but in the good pleasure and will of the Divine Agent.

As to *Original Sin*, Calvinists hold: (1) Every man comes into the world, in consequence of Adam's apostasy, in a condition of ante-natal forfeiture, is excluded from the quickening power of the Holy Ghost, and hence begins to think, feel, and act without a bias to moral good. (2) Since moral obligation is positive and the soul active, it develops a positive inclination to evil, involving the corruption of the whole nature, and tending to the indefinite increase of depravity and guilt. It is therefore said to be *total*. The advocates of the middle scheme vary much in their mode of presentation. The Semi-Pelagians admit that the nature of man was so far injured by the fall that he could in his own strength do nothing morally good in God's sight. But they also hold that man is able to incline toward good, though unable to effect it, and that in spiritual reformation the first movement toward good is from the soul itself, while the performance of it is the result of the co-operation of the Divine grace with the human will. The modern Prot. Arminians admit Original Sin, while they deny Original Guilt, regarding innate corruption rather as a fault of nature than as a sin in the full sense of that term.

VI. *The Nature and Necessity of that Divine Grace exercised in the Moral Recovery of Human Nature.*—Grace is free sovereign favor to the undeserving. It is the motive, in the mind of God, to redemption. It is exercised, in the sacrifice of his Son, in the free justification of the believing sinner, on the ground of Chr.'s vicarious obedience and sufferings, and in the change wrought in the moral character of the sinner by the energy of the Holy Ghost, so that the renewed soul is enabled to act in compliance with the will of God.

Pelagius, in his system, found only incidental need for this Divine energy. Semi-Pelagians admit its necessity in order to help man to complete what he had already commenced, and hold that it is given to all who have made themselves worthy of it. Arminians admit that it is necessary in order that the corrupt will shall be even predisposed to good. Regeneration, in their view, is the result of the co-working of two energies, but the determining factor is the human will. Calvinists, on the other hand, hold: (1) That, for Chr.'s sake, and in despite of human demerit, a "common grace," of various intensities, is exerted upon all men, which may be resisted, and always is resisted by the unregenerate. (2) That God, in certain cases and at his own pleasure, exerts a new energy which changes the moral character of the will of the subject, and implants a prevailing tendency to co-operate with future grace in all forms of holy obedience. This is styled *gratia efficax*, "effectual calling," and is always effectual, because it consists in effecting a regener-

ative change in the moral nature of the will itself. It merges itself into the spontaneity of the will, enfranchising it from the corruption which had hitherto held it in bondage, and making it in harmony with reason, conscience, and the indwelling spirit of God. (3) The same Divine energy continues to support the soul, and prepares it to concur in every good work; and though sometimes resisted, is yet so prevailing in the regenerated soul that in the end the state of grace is succeeded by the state of glory. Calvinists hold that this "grace," in all its stages, is undeserved favor, sovereignly exercised by God upon whom and at what times he pleases. It works progressively, except in the single regenerative act, and infallibly secures perseverance in faith.

VII. *The Relation of the Eternal Plan of God to the Redemption of Individuals.*—Predestination, or the purpose of God to secure the salvation of some men and not of all, has been popularly regarded as the distinguishing feature of C., and one most revolting to the moral sense. Some Calvinists have indeed made it the foundation of their whole system, conceiving it in the logically coherent Supralapsarian sense, which in a speculative point of view is impregnable. Most of them, however, are willing to rest in the Infralapsarian view, which if less logically complete conforms to all the facts embraced in our experience and to all the representations of Scripture. The Scriptures never speak of God as creating men in order to either save or to damn them, nor of his electing certain individuals and then allowing them to fall in order that they might be redeemed. But they uniformly represent God as electing his people out of the mass of guilty sinners, and then providing redemption for them in order to carry out his purpose of election. As to the position of authorities upon this point, it may be said, in gen., that of Calvin has been disputed. Beza, Gomarus, Voetius, and Twiss, the prolocutor of the Westminster Assembly, advocated Supralapsarianism. The canons of the Synod of Dort, the Catechism of the Westminster Assembly, the Helvetic Consensus, and the great majority of Calvinists, anc. and modern, are decidedly Infralapsarian. In fine, upon the Calvinistic theory, God positively decrees grace, and thus produces all that is good. He determines the permission of sin, and punishes it because he forbids and in every way morally discountenances it. He elects of free grace, and actually saves all whom he purposes to save, and leaves those whom he does not elect under the operation of the law, whatever that may be. All infants, idiots, and all believers in Chr. are saved by grace; all others are left to the operations of pure justice. Calvinistic "particularism" admits the actual results of salvation in their widest scope, referring all to the gracious purpose of God, but does not at all restrict it within the limits determined by the facts themselves.

THE HISTORY OF C.—Pantheism, in its various phases—such as Brahmanism, Dualism, Gnosticism, and Manichæism, constituted the substratum of all anc. philosophies and religions. These were all essentially fatalistic, making sin either an essential attribute of an eternal self-existing principle, or a necessary condition of the eternal evolution of the Infinite and Absolute into the Finite and Contingent. The early Fathers—such as Origen and his colleagues and followers of the Alexandrian school—were led, in necessary antagonism to these theories, to insist upon the self-determining power of the human will, and to maintain that sin is the product of the abuse of that freedom. But they conceived of these great principles in a crude and indefinite manner, without determining their relations to each other. In gen., the Grs. emphasized the autocracy of the will, without denying the need of grace, while the Lat. emphasized inherent depravity, without denying the freedom of the will.

The hist. of systematic theol. properly commences with the controversy between Augustine and Pelagius, in the first quarter of the 5th century. The opinions of Pelagius were condemned by the whole ch. at oecumenical councils held in 407, 416, and 431 A. D. This universal condemnation of Pelagianism evinces that Augustinism was in all essentials the common and original faith of the Ch. Pelagianism has never been wrought into the creed of any ecclesiastical body except that of the Socinians, and has prevailed practically only among rationalists, whose theol. was disintegrating into Deism.

In the mean time John Cassian, abbot of Marseilles (about 430 A. D.), brought forward a system of compromise, the advocates of which in the Rom. Ch. are styled Semi-Pelagians; among the Lutherans, Synergists; among the Reformed, Arminians. Semi-Pelagianism was also condemned finally by the synods of Orange and Valence (529 A. D.), whose decrees were confirmed by Pope Boniface II. (530 A. D.), from which time a moderate form of Augustinism became the recognized orthodoxy of the entire W. Ch., and the most illustrious teachers of the scholastic age were disciples of Augustine.

The controversy was revived about the middle of the 13th century, between the Dominicans, led by Thomas Aquinas, who advocated Augustinism, and the Franciscans under Duns Scotus, who advocated Semi-Pelagianism. The controversy thus renewed has agitated the Romish Ch. down almost to the present day. The council of Trent (1546) attempted to satisfy both parties, each of whom claims that its views were sanctioned. The fact is that the gen. statements of doctrines are Augustinian in form, while the detailed explanations are Semi-Pelagian in sense. The Jesuits have been uniformly Semi-Pelagian; and at last, by the action of the Vatican council of 1870, all the authority of anc. traditions and canons was superseded by the plenary inspiration of a pope who was the creature of the Jesuits. Thus, at last, Popery has become Semi-Pelagian.

All the great evangelical teachers—such as John Huss, Jerome of Prague, and Savonarola—who were the immediate forerunners of the Ref. were decided Augustinians. All the great national Reformers—Zwingli, Luther, Calvin,

Cranmer, and Knox—though differing in many points, were strictly Calvinistic. Melancthon, indeed, who at first took extreme ground in favor of the impotence of the human will and of absolute predestination, ultimately changed his views, and finally assumed a Synergistic or Arminian position. But the greatest of the Reformers was John Calvin, whose *Institutes*, written in 1530, is the grandest work of systematic theol. which the world has seen. He recast Augustinianism, and handed it down to the ages stamped with his name. By him C., with its correlates, Presbyterianism in the Ch. and republicanism in the State, were not invented, but were advocated with transcendent ability and success. At this day the Calvinists number fully 36,000,000 throughout all Prot. Christendom.

It has been disputed whether the Anglican Ch. was or was not Calvinistic in its origin. Certain it is that its founders and its eminent ministers during the 1st century of its existence were Calvinists, and its creed remains such to this day. The 17th article, "On Predestination," corresponds entirely with all the other Calvinistic creeds in the world. But since the time of Laud (1644) a large proportion of the clergy and influential writers of this ch. have been Arminians.

During the long period of its existence C. has preserved its essential identity as a theological system, although it has undergone various modifications as to details and modes of statement. In Ger. it has been rendered less definite through the influence of the compromising school of Melancthon. In Hol., Eng., and Scot. it has been modified by the "federal scheme," introduced by Cocceius and the Westminster divines (1650). In Amer. it has been coerced through more radical and more transient transformations in the speculations of Hopkins, the younger Edwards, Emmons, Taylor, and others of the so-called "N. Eng. school." Of its mighty influence upon individual character, upon civil and religious liberty, and public education, our limits will not permit us to speak. Its hist. has entered into that of the world and is its best eulogy. (See ARMINIANISM.) (See Dr. P. SCHAFF's *Hist. of the Chr. Ch.* and Dr. E. P. HEMPHREY's *Our Theol. and its Developments*.) [From orig. art. in *J. s. Univ. Cyc.*, by A. A. HODGE, D. D.]

Calvinistic Meth. Connexion, in G. Brit., are in 3 divisions: (1) "Whitefield's Connexion," dating from 1741; (2) "Lady Huntingdon's Connexion," dating from 1748; (3) "Welsh Methodists," from about 1750.

Calydonian Hunt, The, in classic mythology, an enterprise against a wild boar which ravaged the dominions of Ceneus, king of Calydon. Among the heroes of this hunt were Meleager, Theseus, Jason, and Nestor.

Calypso [Gr. *Καλυψώ*], a beautiful nymph of classic mythology, who was, according to Homer, a daughter of Atlas. She reigned over the island of Ogygia, and received Ulysses kindly when shipwrecked.

Calypso Borealis, a rare and beautiful plant of the natural order Orchidaceæ, growing in cold bogs and wet woods of the N. U. S. and Canada. The flower is variegated with purple, pink, and yellow. It has a single nearly heart-shaped leaf.

Calyptrae'dæ [Gr. *καλύπτρα*, a "head-dress or veil"], a family of gastropods whose shell is generally more or less limpet-shaped, but the apex is spiral, and has a calcareous process from its inner surface for the attachment of a muscle. The species differ in shape, some being flattish and others conical, while some are elongated and slipper-like. The species are mostly natives of warm climates.

Cambacères, kon-bah-sa-ress' (JEAN JACQUES RÉGIS), duke of Parma, a Fr. statesman and lawyer, b. at Montpellier Oct. 18, 1753. He was elected in 1792 a member of the National Convention; after the death of Robespierre (9th Thermidor 1794) he was pres. of the Committee of Public Safety, and opposed the continuance of the Reign of Terror; about the end of 1799 he was appointed second consul by Bonaparte, of whom he became a faithful adherent. He took a prominent part in the redaction of the civil code. Under the empire he was arch-chancellor and pres. of the council of state. During the Hundred Days he was Nap.'s minister of justice. D. Mar. 5, 1824.

Cambodia. See ANAM, by L. P. BROCKETT, M. D.

Cambria, kalm'bre-a, the anc. Lat. name of Wales, derived from *Cymry*, by which name the Welsh people call themselves.

Cambridge, kām'brij [anc. *Granta*; Lat. *Cantabrigia*], a town of Eng., on the river Cam, 48 m. N. N. E. of Lond., with which it is connected by R. R. It is the seat of one of the great univs. of Eng. (Univ. of C.), and contains many noble edifices belonging to that inst. C. is mentioned in hist. as early as 871 A. D.; was an important place at the time of the Norman conquest, and received a royal charter in 1200. Pop. 35,372.

Cambridge, on R. R., cap. of Henry co., Ill., 140 m. N. by W. from Springfield. Pop. 1880, 1308.

Cambridge, Md. See APPENDIX.

Cambridge, a city of Mass., and one of the shire-towns of Middlesex co., on R. R. and the N. W. bank of the Charles River, which is here about 1 m. wide, and separates C. from Boston. C., though incorporated as one city, was formerly divided into several v., the local names of which still survive; these are Old C., Cambridgeport, E. C., and N. C. Harvard Univ. is in Old C. The first printing-office in Amer. was located in C. Near Harvard Univ. is a fine soldiers' monument, erected in 1869-70 at a cost of \$35,000. The city hall is situated in Cambridgeport. Pop. 1870, 39,634; 1880, 52,099.

Cambridge, Washington co., N. Y., on R. R., 35 m. N. E. of Albany. Pop. 1870, 1530; 1880, 1482.

Cambridge, R. R. June., cap. of Guernsey co., O., on Will's Creek, in a mineral region, 85 m. E. of Columbus. Pop. 1870, 2193; 1880, 2883.

Cambridge (ADOLPHUS FREDERICK), DUKE OF, 7th son of George III. of Eng., b. Feb. 25, 1774; entered the army

about 1790, was appointed gov. of Hanover in 1816, and viceroy of that kingdom in 1831. D. July 8, 1850.

Cambridge (GEORGE WILLIAM FREDERICK CHARLES), DUKE OF, a son of the preceding, b. Mar. 26, 1819; became a maj.-gen. in 1845, served in the Crimean war in 1854, and was appointed acting commander-in-chief of the Brit. army in 1856, and field-marshal in 1862.

Cambridge City, R. R. June., Wayne co., Ind., on the Whitewater River, 15 m. W. of Richmond. Pop. 1870, 2162; 1880, 2370.

Cambridge Platform, a system of ch. govt. drawn up by a synod held at Cambridge, Mass., in 1648. There was a difference of view among the N. Eng. chs., mainly upon the mode of ch. govt. The synod affirmed the doctrines of the Westminster Confession, but recommended a form of discipline essentially congl.

Cam'bridge, University of. A univ., in Rom. law, was a corporation, and a *studium generale* denoted a place for gen. study, especially for scholastic divinity and philos., law, and sometimes med. The univ. was the incorporated body of teachers and officers, and there might be one or more of them, as there were at one time 4 at Bologna. The univ. at Cambridge arose out of teachers of divinity and school philos., who in time had houses or *hostels* where, with the help of fellows or associate teachers, they taught pupils. In time the principals, fellows, and students formed bodies under the univ. or collection of schools. The inst. began in the 12th century, and was ere long under a chancellor and vice-chancellor, with a senate, having certain corporate rights, power of conferring degrees, etc. The Eng. univs. by degrees lost their prominence as such, the system of teaching by lecturers fell into decay, and fellows of the colls. or private tutors chiefly filled their place. There are at Cambridge 17 colls. or halls, the oldest, St. Peter's coll., founded in 1257, and all but 4 existing before the Ref. The students are ranked in 4 classes—fellow-commoners and noblemen, pensioners, sizars, and scholars on foundations. The study of math. opens the way to the higher honors after severe examination, and the fellowships are filled on examination. (For information about the univs., see the *Cambridge Calendar*.)

Camby'ses [Gr. *Καμβύσις*; Old Per. cuneiform inscriptions, *Kambūšiya*], king of the Medes and Pers., and a son of Cyrus the Great, whom he succeeded about 530 B. C. He invaded Egypt in 525, captured Memphis, the cap., and then marched into Ethiopia, from which he was compelled by famine to retreat. His subsequent career was such that he was thought to be insane. D. 522 B. C.

Cam'den, Ark. See APPENDIX.

Camden, Knox co., Me., on the W. side of Penobscot Bay, about 8 m. N. N. E. of Rockland. Pop. tp. 1870, 4512; 1880, 4386.

Camden, city, an important R. R. centre and river-port of N. J., cap. of Camden co., on the Del. River, opposite Phila., 32 m. S. W. of Trenton. Numerous steam ferry-boats cross the river at various points, and connect C. with Phila. Pop. 1870, 20,045; 1880, 41,659.

Camden, Oneida co., N. Y., on R. R., 18 m. N. W. of Rome. Pop. 1870, 1703; 1880, 1589.

Camden, cap. of Kershaw co., S. C., on R. R. and the E. bank of the Wateree River, 33 m. N. E. of Columbia. It has good water-power. Gen. Gates was defeated here Aug. 16, 1780, by Lord Cornwallis, and April 25, 1781, Gen. Greene was defeated by Lord Rawdon at Hobkirk's Hill, near C. There are anc. mounds near it. Pop. 1870, 1007; 1880, 1780.

Camden (CHARLES PRATT), FIRST EARL OF, an Eng. statesman and lawyer, b. in 1713, was a son of Chief-Justice Sir John Pratt. He was called to the bar in 1738, became atty.-gen. about 1758, and chief-justice of the court of common pleas in 1762. Decided against the legality of gen. warrants in the trial of John Wilkes; in 1765 was appointed lord chancellor, but resigned in Jan. 1770. He afterward distinguished himself as a champion of constitutional liberty, and acted with Lord Chatham in opposition to the Amer. policy of Lord North. In 1783 he became pres. of the council, and was created Earl Camden in 1786. His name became very popular in the U. S., and was given to several counties and many towns and villages. D. Apr. 18, 1794.

Camden (WILLIAM), an Eng. antiquary, b. in Lond. May 2, 1551, grad. at Oxford. His most important work is a description of G. Brit. in Lat., entitled *Britannia sive Regiorum Angliæ, Scotiæ, et Hiberniæ, ex vetustissima Antiquitate Chorographica Descriptio* (1586). He became head-master of Westminster School in 1593, and Clarenceux king of arms in 1597. He has been called "the judicious C." and "the Brit. Pausanias." D. Nov. 9, 1623.

Camden Society, an association organized in 1838 in Lond. for publishing the MSS. of old Brit. authors, historical documents of importance, old records, visitations, both heraldic and ecclesiastical, and other matter of antiquarian, literary, or historical int. relating to Eng. Some of their materials are not very anc., but are pub. for their gen. int. The results of their work are contained in a large number of vols., which are, as a whole, of very great value. The rooms of the society are in Parliament st., Lond. The name was given in honor of William Camden, the historian.

Cam'el [Lat. *camelus*; Ger. *Kameel*; Gr. *κάμηλος*; Arabic *gammel*], a genus of ruminant quadrupeds of which only 2 species now exist—viz., the Ar. C. (*Camelus dromedarius*), which has only 1 hump on the back, and the Bactrian C. (*Camelus Bactrianus*), with 2. The first-named species is found in Ar., Syria, and N. Afr., is slender and fleet, travelling 100 m. a day. The latter is a native of Central Asia, where it is still found wild. It is slow but strong, carrying a burden of 1000 lbs. The C. is specially adapted to a desert country, having appendages to the stomach in which a supply of water is carried, cushioned feet, suitable for walking on sand, and nostrils which open or close at will. The C. belongs to the order of Artiodactyls or even-toed animals, with the cow, cameloopard, etc., and are ruminants, but differ from others of the group in having incisors in both

upper and lower jaws. They are represented in the New World by the *Bactrian* of S. Amer. Many fossil species have been found in Asia and N. Amer.

have been imported and bred in the U. S. for use in the



Dromedary, or Arabian Camel.

arid regions of Arii, N. Y., etc., and have proven well adapted to the country, but the inhab. prefer mules, and both are being superseded as means of transportation by R. Rs.

J. S. NEWBERRY.

Camel, a contrivance by which ships are floated over sandbars and shoals. C. were formerly used at Nantucket and New Bedford, Mass. A similar machine is employed in raising sunken ships.

Camelopard, see GIRAFFE.

Camelopardalis, a constellation of the N. hemisphere of the celestial globe called the GIRAFFE. It contains only sparsely scattered stars. It is situated between Cassiopeia, Perseus, Ursa Major, etc. It was added by Hevelius to the list of constellations.

Camel's Hair is woven by the Arabs and Pers. into coarse cloth. It is woven to some extent in Europe, but most of the stuffs so called are of wool. The so-called "C. H. shawls" are made of the wool of the Angora goat. Pencils for artists are made of C. H.

Camel's Thorn (but *kumel-doon*) (*Alhagi*), a genus of plants of the order Leguminosae, comprises numerous herbaceous and shrubby species, mostly natives of the deserts of Asia and Afr. They have simple leaves and jointed pods, with 1 seed in each joint. These plants grow where other vegetation is scarce, and afford valuable food for camels, which are fond of them. The *Alhagi camelorum* yields a kind of manna, which appears in the form of drops on the leaves. In S. Afr. fences of the C. T. are used to protect camps by night from wild beasts.

Cameo, kam'e-o [Fr. *caméion*], a term applied especially to diminutive pieces of sculpture upon precious stones having 2 layers of different colors, the uppermost of which is partially cut away so as to expose the lower and darker one, which forms the background of the figure. The art of C. cutting is of high antiquity, having been practised by the Egyptians and Babylonians, and brought to perfection by the Grs. C. are also cut upon shells having layers of different colors. C. cutting in stone or shell is mainly done in It., although fine work is done in other parts of Europe and in the U. S.

Camera Lucida (Lat. a "light chamber"), an instrument invented by Wollaston, and intended to facilitate the delineation of objects, consists of a quadrilateral prism of glass (A B) in a frame attached to an upright rod, having at its lower end a clamp to fix it to the edge of a table. The prism has its upper face horizontal, and 2 of its faces are at a right angle to A. Rays from an object (P Q) falling nearly perpendicularly on the first surface enter the prism and undergo reflection at the contiguous surface; they then fall at the same angle on the next surface, and are reflected again; finally they emerge nearly perpendicularly to the remaining surface. The eye receives the emergent light in such a way that an image of the object is seen projected upon a sheet of paper upon the table. The pencil and image being seen together upon the paper, a sketch of the latter can be taken. F. A. P. BARNARD.

Camera Obscura (Lat. a "dark chamber"), an instrument whose invention is ascribed to Baptista Porta in the 16th century, but Roger Bacon described it 300 yrs. before. It is known in a simple form as a box furnished at one end with a lens whose focal length is equal to the length and depth of the box, at the opposite end of which a plane reflector is placed at an angle of 45°, which throws the image of any objects to which the lens may be directed upon an opaque surface viewed through a slit in the box.

Camérarius (JOACHIM), an eminent Ger. scholar, b. at Bamberg Apr. 12, 1500. His proper name was LIEBHARD. His ancestors were chamberlains to the bps. of Bamberg; hence he took the Lat. name CAMERARIUS. He was rector of the Univ. of Leipzig for many yrs. after 1541. He prepared

translations of Gr. authors, a *Life of Melanchthon*, *Elements of Rhetoric*, and Lat. *Commentaries on the Gr. and Lat. Language*. D. Apr. 17, 1574.

Cam'eron, R. R. junc., Clinton co., Mo., 35 m. E. of St. Joseph. Pop. 1870, 1428; 1880, 2109.

Cameron (ASGUTH), b. at Caledonia, Livingston co., N. Y., July 4, 1826, studied law in Buffalo, and in 1857 removed to La Crosse, Wis.; was regent of the Univ. of Wis. 1866-75, and was U. S. Senator, 1875-85.

Cameron (DONALD) of **Lochiel**, a Highland Scot. chief who fought for the Pretender in 1745. After the battle of Culloden he escaped to Fr. in 1746. He was the subject of Campbell's poem, *Lochiel's Warning*. D. 1748.

Cameron (Sir DUNCAN A.), b. about 1808, entered the Brit. army as ensign in 1825, and in 1854 became col.; commanded in the Crimea, also in New Zealand during the war of 1863-65; became lieut.-gen. in 1868, and gen. in 1874; gov. of the Royal Military Acad. at Sandhurst 1868-75. He was nominated a knight Grand Cross of the Bath in 1873.

Cameron (HENRY (LAT), Ph. D., D. D., b. at Shepherds-town, Va., Sept. 1, 1829, grad. at Coll. of N. J. in 1847, and at Princeton Theological Sem. in 1855; was appointed adjunct prof. of Gr. in 1855, and prof. in 1861, at the Coll. of N. J.; was licensed to preach in 1859, and ordained as an evangelist in the Presb. (O. S.) Ch. Feb. 1, 1863; received the degree of D. D. in 1875, and has written much for various magazines and periodicals.

Cameron (JAMES), brother of Simon Cameron, b. at Maytown, Pa., Mar. 1, 1801, learned the trade of a printer, subsequently became an ed., and studied law; was col. of the 79th N. Y. Highlanders. Killed at the battle of Bull Run, July 21, 1861.

Cameron (JAMES DONALD), eldest son of Hon. Simon Cameron, b. at Harrisburg, Pa., May 14, 1833, grad. at Princeton Coll. in 1852, and has since been interested in the mining and manufacturing interests of Pa., residing at Harrisburg; in 1863 was made pres. of the N. Central R. R., which position he held until his resignation in 1874; on May 22, 1876, was appointed sec. of war in Pres. Grant's administration, and in 1877 took his father's place in the Senate.

Cameron (RICHARD), a Scot. minister, b. at Falkland, was the founder of the sect of Cameronians or "Covenanters." He opposed the establishment of the Epis. Ch. in Scot. In June 1680 he and about 20 armed adherents entered the town of Sanguhar and formally renounced their allegiance to Charles II.; was killed in a fight with the royal troops July 20, 1680.

Cameron (SIMON), b. in Lancaster co., Pa., in 1799; was elected U. S. Senator by the Dems. in 1845, and having joined the Rep. party was re-elected in 1856. He was sec. of war from Mar. 1861 to Jan. 1862, and was then sent as minister to Rus., returning in 1863. Again became Senator 1866-77.

Camero'nians, the followers of Richard Cameron. They were also called Covenanters, under the name of Reformed Presbys.

Cam'eronites were the adherents of John Cameron, a native of Scot. who went to Fr. in 1600 and became prof. of theol. at Saumur. "He devised a method," says Mosheim, "of uniting the doctrines of the Genevans, as expounded at Dort, with the views of those who hold that the love of God embraces the whole human race." They have sometimes been called Hypothetical Unitis.

Camoëns, kam'o-enz (Port. ka-mo'enz) (Luis or LUIZ), a Port. poet, b. of a noble family, probably at Lisbon, in 1524; ed. at Coimbra, and soon after he left coll. fell in love with a lady of honor at court. He was consequently banished to Santarem. Having joined the army, he served in several battles against the Moors; embarked for India in 1553; wrote a political satire called *Folies in India*, for which he was banished in 1556 from Goa to Macao, where he composed his great epic poem *The Lusiad* (*Os Lusíadas*), which celebrates the martial exploits of the Port. warriors and heroes, and is pervaded by patriotic sentiments; returned in 1569 to Lisbon, where he passed his later yrs. in great poverty. D. June 10, 1580.

Camorra, a secret society of outlaws and robbers who infested the former kingdom of Naples, having a rendezvous in every large town. Its members openly presented themselves at markets and public spectacles, where they extorted money. They were also addicted to violent crimes.

Campa'gna di Ro'ma, a plain of Central It., about 75 m. long and from 27 to 40 m. wide, surrounding Rome, which is nearly in its centre. It is unhealthy by reason of malaria, and is now almost uninhabited, although it was thickly peopled in anc. times.

Campanella (TOMMASO), an It. philos. and Dominican monk, b. in Calabria Sept. 5, 1568. He pub. in 1591 *Philos. Demonstrated by the Senses*, which opposed the scholastic philos. and gave offence to the partisans of Aristotle. On a charge of heresy and conspiracy against the Sp. govt., he was in 1599 committed to prison in Naples. Pope Urban VIII. procured his release in 1626. Retired to Fr. in 1634, where he was kindly treated by Cardinal Richelieu. Among his works are *Ueritas Solus*, etc., *The City of the Sun*, *The Idea of a Philosophical Republic*, and a *Poem on the Sp. Monarchy*. D. Mar. 21, 1639.

Campania, kam-pa'ne-a, a region of anc. It. lying between Samnium and Lucania, having the Mediterranean on the S. W. and the Apennines on the N. E., having for its chief feature Mt. Vesuvius, and traversed by the Apian Way. The soil is fertile, the climate salubrious, and during the empire it was the favorite resort of wealthy Roms., whose villas lined the shores of the Bay of Naples. It was early colonized by the Grs., and became subject to the Roms. 340 B. C. The anc. C. is now divided into 5 provs. Area, 6987 sq. m. Pop. 2,895,519.

Campbell, kam'el (ALEXANDER), D. D., a theol., b. in the county of Antrim, Ire., in June 1788, emigrated to the U. S. in 1809, after studying at the Univ. of Glasgow; founded a sect called Disciples of Chr., who accept the Bible as

their only creed; in 1841 founded Bethany Coll., West Va., of which he was pres. D. Mar. 4, 1866.

Campbell (ARCHIBALD), b. 1813 in New York, grad. at W. P. 1835, resigned 1836; com. to establish the N. W. boundary of the U. S. between Wash. Terr. and Brit. Amer. 1857-69, and to run the 49th parallel from the Lake of the Woods to the Rocky Mts. since 1872.

Campbell (SIR COLIN), LORD CLYDE, a Brit. gen., b. in Glasgow, Oct. 20, 1792; entered the army in 1808, served in the Peninsular war 1809-14, in India, and in the Crimea. In 1855 he was made maj.-gen., and created a knight grand cross of the Bath; in July 1857 commander of the army in India, then fighting against the mutinous Sepoys; relieved Lucknow in Nov. 1857, defeated the Sepoys at Cawnpore, and quelled the mutiny in 1858; was raised to the peerage as Baron Clyde in the same yr. D. Aug. 14, 1863.

Campbell (DUNCAN R.), D. D., b. in Scot. about 1797, received a univ. education; came while young to the U. S., was ordained to the Bap. ministry, and was pres. of Georgetown Coll., Ky., 1849-65. D. Aug. 11, 1865.

Campbell (GEORGE WASHINGTON), b. in Tenn. in 1768, grad. at Princeton in 1794; U. S. Senator 1811-14 and 1815-18; became sec. of the treas. in 1815, and minister to Rus. in 1818. D. Feb. 17, 1848.

Campbell (JAMES), b. in Phila. 1813, was judge and State atty.-gen., and P.-M.-gen. under Pres. Pierce in 1853.

Campbell (JOHN), LORD, b. in Fifeshire, Scot., Sept. 15, 1779, was called to the Eng. bar in 1806. He was made chancellor of Ire. and a peer of the United Kingdom in 1841, appointed chief-justice of the court of queen's bench in 1850, and lord chancellor of Eng. in 1859. *Pub. Lives of the Lord Chancellors and Keepers of the Great Seal of Eng. and Lives of the Chief-Justices of Eng.* D. June 23, 1861.

Campbell (JOHN A.), b. in Washington, Ga., June 24, 1811, was the son of Duncan G. Campbell, a lawyer of that State; grad. at the Ga. Univ. in 1826, and was admitted to the bar by special act of the legislature in 1829. He moved to Ala., where he was appointed associate justice of the U. S. supreme court by Pres. Pierce in 1853. This position he resigned in 1861. While he had opposed the policy of secession, he yet believed in its rightfulness. He was appointed assistant sec. of war of the Confed. States; was one of the coms. appointed by Mr. Davis to meet Mr. Lincoln and Mr. Seward at the Fortress Monroe conference in Feb. 1865; after the war practised law in New Orleans.

Campbell (THOMAS), a Brit. poet, b. in Glasgow July 27, 1777, was ed. at the Univ. of Glasgow, and in 1799 pub. *The Pleasures of Hope*. In 1803 he took up his residence in Lond.; wrote *Gertrude of Wyoming* and many lyrical poems, became ed. of the *New Monthly Magazine* in 1820, and was chosen lord rector of the Univ. of Glasgow 1827; wrote lives of Petrarch and Frederick the Great. D. June 15, 1844.

Campbellites. See DISCIPLES OF CHRIST.

Campachy, kam-pee'che, a state of Mex., bounded N. by Yucatan, E. by Caribbean Sea, S. by Belize and Guatemala, W. by Gulf of Campachy. Many ruins of anc. cities have been found here. Area, 26,084 sq. m. Pop. 86,299.

Campachy, city, and prin. seaport of Yucatan, on the Gulf of Mex., 90 m. S. S. W. of Mérida. The harbor is capacious, but shallow. Pop. 15,000.

Campachy Wood, a name of Logwood (which see).

Campello, Mass. See APPENDIX.

Camp'erdown, a v. of Hol., 27 m. N. W. of Amsterdam, famous for the victory gained off its coast by the Eng., under Admiral Duncan, over the Dut., commanded by Admiral de Winter, Oct. 11, 1797.

Camphene, or **Camphine**, a term applied to purified oil of turpentine, obtained by rectifying it over dry chloride of lime. C. has been burned in lamps for the purpose of illumination; it has been superseded by coal oil or rectified petroleum.

Camphilene, or **Artificial Camphor**, is obtained from the oil of turpentine, by acting on it with dry vapor of hydrochloric acid, and keeping the whole at a low temperature by immersing the vessel in a freezing mixture. A solid substance is produced in the form of white crystals, with the taste and aromatic smell of natural camphor.

Camphor a concrete substance found in many plants. The greater part of the C. of commerce is the produce of the C. laurel or C. tree, a native of Chi., Japan, Formosa, and Cochin-Chi., and which has been introduced into Java and the W. I. Every part of the tree smells strongly of C. The wood is much valued for carpenter's work. In the extraction of C. the wood is chopped up and then steeped and boiled in water, when the steam carries off the C. in vapor. C. is white, tough, solid, and slightly lighter than water. It is sparingly soluble in water, but freely soluble in alcohol, ether, acetic acid, and the essential oils. It is very inflammable, and burns with a white, smoky flame. It has a peculiar aromatic taste and a characteristic odor.

C. is used in med., internally and externally, as a stimulant. In small doses it is an anodyne and anti-spasmodic; in very large doses a narcotic poison. Its alcoholic solution (spirits of C.) and liniments in which it is an ingredient are much used in sprains and bruises, chilblains, and chronic rheumatism. Paregoric is a camphorated tincture of opium. The effluvium of C. is very noxious to insects, and it is therefore much used for preserving specimens in nat. hist., as well as clothing.

The Borneo C., sometimes called hard C., is the produce of *Dryobalanops aromatica*, a large tree of the order Dipteracæ. The C. is obtained by cutting down the tree and splitting it into small pieces, being found in crystalline masses in natural cavities of the wood. To this substance the Chi. ascribe extraordinary medicinal virtues, so that it is taken in exchange by them for more than 50 times its weight of common C. The tree yields also a pale yellowish limpid fluid, which gushes out when deep incisions are made in the tree with an axe, and which is called liquid C., C. oil, or borneole. When this oil is distilled it yields a light fragrant liquid called

borneene, which is used in perfumery. It is sometimes imported into Europe.

C. F. CHANDLER.

Campo Formio, **Campio Formio**, or **Campo Formido**, a v. of N. It., about 66 m. N. E. of Venice, where a treaty was concluded, Oct. 17, 1797, between Aus. and the Fr. republic, greatly to the advantage of Fr. who gained the Netherlands and considerable portions of It.

Cam'wood, or **Barwood**, a dyewood which yields a brilliant but not permanent red color, used with sulphate of iron as a dyestuff. It is the wood of *Baphia nitida*, a tree of the order Leguminosæ, a native of Angola.

Canaan, ká'naan or ká'na-an, a son of Ham and the ancestor of the Canaanites, who lived in Pal. before the Israelites conquered it. Pal. was called the land of C. by the Heb. writers. (See PALESTINE.)

Canada, **Dominion of**, embracing the provs. of Ont., Que., N. S., N. B., Manitoba, Brit. Columbia, Prince Edward Island and N. W. Terr., is designed to include all the Brit. possessions in N. Amer. lying N. of the U. S. Its S. boundary is nearly continuous with the N. boundary of the U. S., touching also upon the Atlantic on the E., the Pacific on the W., and stretching N. to the Arctic Ocean. Present area (including the nearly uninhabited N. W. Terr., 2,665,252 sq. m.), 3,470,692 sq. m. Cap. Ottawa.

Rivers and Lakes.—The prin. rivers on the Atlantic side are the St. Lawrence and its tributaries—the Ottawa, the St. Maurice, and the Saguenay; on the Pacific side, the Columbia and the Fraser. The Saskatchewan rises in the Rocky Mts. and falls into Lake Winnipeg in lat. 53° N. Lake Athabasca, in about lat. 58° N., receives the Peace River and the Athabasca. The Mackenzie, which falls into the Arctic Ocean, is among the largest rivers of the globe; there are also several other great Arctic rivers. Bgide lakes Ont., Erie, Huron, and Superior, which lie partly in C., there are numerous lakes, the largest being Great Slave Lake and Great Bear Lake.

Climate and Productions.—The climate of the Atlantic provs. resembles that of Nor., with great extremes of heat and cold; that of Ont. is considerably modified by the influence of the great lakes; that of Brit. Columbia, like the rest of the Pacific coast, is more equable than that of the Atlantic in corresponding lats. A considerable part of C. is covered with pine forests, which furnish great quantities of lumber. Those portions lying upon the great lakes and the valley of the Red River produce good crops of grain, and are well adapted for fruits.

Canals and Railways.—The canals of C. are principally designed to facilitate navigation between the lakes and the River St. Lawrence. Foremost among these are the Welland Ship Canal, around the Falls of Niagara, connecting lakes Erie and Ont., and the Rideau Canal, 136½ m. long, connecting Lake Ont. with the Ottawa River. The railway system of C. is very extensive. In 1882 there were 8069 m. constructed, and 3189 m. in course of construction.

Government.—The provs. were united under the "Brit. N. Amer. act," which went into operation July 1, 1867. It provided in substance that the const. of the Dominion should be similar in principle to that of G. Brit., that the executive authority should be vested in the Brit. sovereign and carried on in her name by a gov.-gen. and privy council, that the legislative power should be vested in a parl. consisting of 2 houses to be called the Senate and the House of Commons. The gov.-gen., who is appointed by the crown, has a salary of £10,000. The senators, of whom there are 77, are nominated for life by the gov.-gen.; a senator must be 30 yrs. of age, and have real or personal property of the value of \$4000. The members of the House of Commons (one for every 17,000 persons) are chosen by the people for a term of 5 yrs.; there is a slight property qualification for the right of suffrage, varying in the different provs. The provs. have also each a separate legislature and a lieut.-gov.

Religion and Education.—There is no state ch. in the Dominion, each religion being governed by its own laws. In 1881, in a pop. of 4,324,810, there were 1,791,982 R. Caths., 676,165 Presbs., 574,818 Epis., 742,981 Meths., 296,525 Baps., the remainder belonging to various communions; of 86,769 the creed is not stated. The provs. of Que. and Ont. have different school laws. In the latter prov. the tps. are divided into school dists., the schools being supported partly by local taxation and partly by gov. grants; before any teacher can receive this grant he must pass an examination or receive a license from the normal school of the prov.

Finances.—The public debt, incurred chiefly on account of public works, was, July 1, 1882, \$205,365,251, to which considerable additions have since been made. The entire revenues for the financial yr. ending June 30, 1882, was \$56,411,624.72. The expenditures (including \$12,605,252 for "redemption") were \$55,794,448.41. For the financial yr. ending June 30, 1883, the estimates for expenditure were \$45,504,145. Of the revenue nearly nine tenths is from customs and excise. The military force of the Dominion consists almost entirely of its militia—the Brit. gov. maintaining a force of only 2000, forming the garrison of Halifax. On Jan. 1, 1879, the active militia numbered 45,152, of all arms; the reserve militia comprised 655,000. Schools for artil. instruction exist in 4 of the provs., and there is a royal military coll. at Kingston.

History.—C. proper fell into the hands of the Brit. in 1760, and was divided into 2 provs.—Upper C., afterward called C. W., now Ont., and Lower C., afterward C. E., now Que. There were revolutionary disturbances in 1837. In 1869 the legislature of Newfoundland declared in favor of entering the Dominion, but the people voted against it. In that yr. the Brit. gov. purchased of the Hudson Bay Co. its vast possessions, and in 1870 a portion of this terr. was organized into the prov. of Manitoba. In 1870 Brit. Columbia and in 1871 Prince Edward Island were received into the Dominion. In 1871 the boundary disputes between the U. S. and G. Brit. were finally settled by treaty. Pop. 1881, 4,324,810.

A. H. GUERNSEY.

Canada Balsam [*Lat. Balsamum Canadense*] is a turpentine or oleoresin obtained from a species of fir which grows in Canada and the U. S. It is a pale yellow, transparent liquid, having a peculiar and agreeable odor. When it exudes from the bark it has the consistency of honey, but by age and exposure to air it becomes solid. It is used in med., in photography, in mounting objects for the microscope, and is an ingredient in varnishes. It is also valuable to opticians, who use it as a cement.

Canada Goose, or Wild Goose [*Anas Canadensis*] and its numerous forms, of the family Anatidae, is 30 to 35 inches long, brownish above, lighter beneath, with the head, neck, bill, and feet black, a white patch on each cheek; inhabits N. Amer., breeding at the N. and wintering in warmer regions. They usually fly in a >-shaped figure.

Canajoharie, Montgomery co., N. Y., on the S. bank of the Mohawk River and on the Erie Canal, opposite Palatine Bridge, which is on R. R. 55 m. W. N. W. of Albany. It has an *acad.* Pop. 1870, 1892; 1880, 2013.

Canal [*Lat. canalis*, from *canna*, a hollow "reed," or "pipe," hence a "channel"], an artificial water-course for drainage, irrigation, and especially for navigation. Whenever possible, advantage is taken of the natural river-courses for the purpose of canalization. A C. must be very nearly upon the same level. Whenever considerable elevations are to be overcome, it is usually accomplished by means of "locks." Valleys are usually crossed by means of embankments, with openings called "culverts" for the passage of streams. C-boats are usually hauled by animals who walk upon a "tow-path," upon one side of the C.

Asiatic C.—Of these the prin. is the Grand C. of Chi., connecting the Pei-Ho and the Yang-tse-Kiang rivers, which are about 500 m. apart. The C., constructed in the 8th century of our era, is about 650 m. long, and with its connecting rivers gives an inland navigation of nearly 1000 m. Its depth is about 5 or 6 ft. The boats are either rowed or dragged by hand. Differences of elevation are overcome by means of inclined planes, up and down which the boats are hauled or lowered. In India there are numerous C. of considerable importance in the aggregate.

European C.—The Netherlands are especially noted for C. Much of the land lying some ft. below the level of the sea, a large portion of the ordinary highways consists of C. upon embankments above the level of the adjacent country. There are 2 great ship-C. The N. Hol. C., constructed in the 16th century, connects Amsterdam with the Helder, an inlet of the N. Sea. It is 51 m. long, 124 ft. wide at the surface, 31 ft. at the bottom, and is available for vessels drawing 18 ft. The N. Sea or Amsterdam C., commenced in 1663, is 14 $\frac{1}{2}$ m. long, about 90 ft. wide at the bottom, and 25 ft. deep, constructed partly upon high embankments and partly through deep excavations. It connects Amsterdam directly with the N. Sea, upon which there is an immense artificial harbor which is properly a part of the C.—In Swe. the Gotha C., planned in 1716 and completed in 1832, crosses Swe. from Stockholm to Gothenburg, its greatest elevation being 308 ft. above the sea.—In Rus. there is a system of C. connecting the Baltic with the Caspian, forming with the rivers a continuous inland navigation of 1434 m.—In Den. a C. 100 m. long connects the N. Sea with the Baltic.—In Ger. a C. unites the Danube and the Rhine, and another, 112 m. long, unites the Danube and the Main.—In Fr. the Canal du Midi, 150 m. long, the summit being 500 ft. above the sea, connects the Garonne with the Mediterranean.—In Eng. the C. are numerous, but none of them separately are of great importance.—In Scot. the prin. C. is the Caledonian, a ship-C. which connects the N. Sea with the Atlantic. Its entire length is 61 $\frac{1}{2}$ m., but most of it consists of several small lakes; the artificial part is 23 m. long, is mainly of excavations 120 ft. wide at top, 50 ft. at bottom, and 17 ft. deep.—In Ire. there are 2 long C. One, 164 m. long, 40 ft. wide, 6 ft. deep, runs from Dublin to Ballinasloe; the other, 92 m. long, and much larger in dimensions, runs from Dublin to Tormansburg. In all G. Brit. there are 4713 m. of navigable C.

C. of Canada.—The St. Lawrence system consists of 6 short C. between Montreal and Lake Ont., designed to avoid the rapids of the river. They have an aggregate length of about 40 m., the usual dimensions being 120 ft. wide at top, 80 ft. at bottom. There are 28 locks, usually 200 by 45 ft., surmounting an aggregate elevation of 206 $\frac{1}{2}$ ft.—The Welland C., connecting lakes Ont. and Erie, and obviating the Falls of Niagara, consist of 2 branches, together 27 m. long. As originally constructed it varied in dimensions from 66 to 110 ft. wide at top, and from 26 to 70 ft. at bottom. In 1873 it was resolved to enlarge the C. to a uniform width at bottom, with a depth of 12 to 13 ft., having locks 270 by 45 ft., which would admit the passage of vessels of 1300 tons. The original number of locks was 27, surmounting an aggregate elevation of 846 ft. The plan of enlargement provided for 14 new locks.—The Ottawa and Rideau system consists of a number of C., connecting the Ottawa River with Lake Ont. The longest of these is the Rideau C., having a total length of 126 $\frac{1}{2}$ m., of which only 8 $\frac{1}{2}$ m. are actual C., the remainder being slack-water navigation, obtained by damming up 2 rivers.—Beside these main systems, there are in Canada several others of minor importance.

C. of the U. S.—In N. Y. the Erie Canal, 363 m. long, connects Lake Erie with the Hudson River, and the Champlain C. (66 m.) connects Lake Champlain with the Hudson.—In Pa. there is a line of C., connecting Phila. and Pittsburg, having with their navigable feeders a length of 608 m.—The Ill. and Mich. C., 96 m. long, connects Lake Mich. with the Ill. River, and thus, through the Miss., with the Gulf of Mex.—The James River and Kanawha C., when completed, will connect the O. with the James River, and thus with Chesapeake Bay and the Atlantic.

The Suez C.—This C., connecting the Mediterranean with the Red Sea, runs partly along the line of an old Egyptian C., dug probably as early as 1300 B. C., mainly for irrigation. Its construction was begun about 1858, and was opened in

1869. Its entire length is about 100 m., of which 29 m. are excavation, the remainder being through shallow lakes. The usual width is 325 ft. at top, 72 ft. at bottom, with a depth of 26 ft., and an artificial harbor at each end.

The Panama C.—Numerous projects have been formed for a ship-C. through the Isthmus of Panama, and various routes have been partially surveyed, but nothing practical was done until 1881, when a co. organized by M. de Lesseps began the work, the Pacific terminus of which is to be at Panama.

Canandaigua, a R. R. centre, cap. of Ontario co., N. Y., is 28 m. S. E. of Rochester, at the N. extremity of Canandaigua Lake, which is navigated by daily lines of steamers. The Indian original of the name, *Canandauqua*, signifies "chosen spot." It has an *acad.* and a female sem. Pop. 1870, 4862; 1880, 5726.

Canandaigua Lake, in W. N. Y., 15 m. long, with an average breadth of 1 m., is 668 feet above the sea and 437 ft. higher than Lake Ont., where its waters are discharged through Seneca River. Steamers ply upon the lake.

Canaries, or Canary Islands (anc. *Fortunate Insulae*), a group in the Atlantic, about 60 m. W. of the coast of Afr., belonging to Sp. They are of volcanic origin. The Pico de Teyde, in Teneriffe, the largest of the group, is 12,182 ft. above the sea. The meridian of Ferro, another of the group (lon. 17° 39' 51" W. of Greenwich), is usually taken as the dividing line of the E. and W. hemispheres, and by Ger. geogs. is commonly assumed, instead of Greenwich, as the starting point of lon. Area, 2943 sq. m. Pop. 1880, 280,388.

Canarium, a genus of trees of the order Amyridaceae, natives of the E. I., having compound leaves and diceous flowers. The fruit is a drupe. The *C. commune* is cultivated in Java and the Moluccas for its fruit, which is edible and yields a lamp oil.

Canary Bird (*Serinus canarius*), a well known singing-bird of the family Fringillidae, native of the C. Islands. Its color in the wild state is gray above, with darker spots; the other parts yellow. In its domesticated form the whole bird is often yellow.

Canary Grass (*Phalaris Canariensis*), a grass the seed of which is used as food for cage-birds. It is a native of the C. Islands, and is cultivated for its seed in Europe and the U. S. The reed C. G. (*Phalaris arundinacea*) is common in Europe and Amer. It yields coarse grass, nutritious when cut early. A variety with curiously striped leaves is known as *ribbon grass*.

Canary Wine, or Teneriffe Wine, is produced in the Canaries, and so much resembles Madeira wine that it is often sold for that article.

Canasto'ta, R. R. junc., Madison co., N. Y., on Erie Canal, 20 m. E. of Syracuse. Salt brine has been found by boring. There are sulphur and sulphur and iron springs within the v. Pop. 1870, 1492; 1880, 1569.

Canby (EDWARD RICHARD SPRIGG), LL.D., b. in 1817 in Ky., grad. at W. Pt. 1839; maj.-gen. U. S. volunteers May 7, 1864, and July 28, 1866, brig.-gen. U. S. A. He served in Fla. 1839-42 on quartermaster duty; in war with Mex. 1846-48, engaged at Vera Cruz, Cerro Gordo, Contreras, Churubusco, and city of Mex., and on U. expedition 1857-60. In the c. war he served in command of the dept. of N. M. 1861-62, where, after the defection of his seniors, he displayed great energy and skill in defending the country at Ft. Craig, Valverde, and Peralta against a formidable inroad from the S.; on special duty in war dept. at Wash. and suppressing New York draft riots 1863-64; in command of the expedition which captured Mobile and its defences, and Montgomery, Ala., and received the surrender of the armies of Gen. R. Taylor and E. K. Smith; in 1869 voluntarily consented to take command of the dept. of the Columbia, which he held till treacherously shot dead, April 11, 1873, by the chief "Jack" while he was endeavoring to mediate for the removal of the Modocs from their rocky fastness on the N. border of Cal.

Can'cer [from the *Lat. cancer*, a "crab," the swollen veins around it being likened to crabs' claws], the popular name for carcinoma, a disease characterized by tumors or slow ulcerations in various parts, having a malignant character, and usually ending in death. Among the tumors admitted by general consent into the order of C. there are widely different degrees of malignancy: some having the tendency to spread rapidly and infect the system at an early period, while others remain local for a considerable time, and may be removed with good hope of a permanent recovery. The most common seats of the C. are the female breast, the eye, the tongue, the lip, the male genital organs; the liver, stomach, uterus, rectum, gullet, peritoneum, and lymphatic glands. A tumor falls under the suspicion of being C. when it infiltrates the texture in which it arises and passes into the surrounding textures; when it invades the lymphatic glands; when it is attended by stinging or darting pains, or by obstinate and slowly extending ulceration; when it occurs in a person having impaired health or past middle life, and is not traceable to any known cause of inflammatory disease or local irritation, nor to any other known constitutional disease, such as syphilis or scrofula. The removal of cancerous tumors is resorted to by surgeons, and when performed early in well selected cases it has been followed by long continued exemption. Operations are rarely performed after the lymphatic glands are involved, or when there is evidence of a deteriorated constitution or of internal disease. E. D. HUNSON.

Cancer, Tropic of. C., or the crab, is the 4th sign of the Zodiac. Its first point is 90° E. of the first point of Aries, and the sun reaches it about the 21st of June, which is the date of the summer solstice. It is the northernmost point of the sun's apparent path in the heavens. The *Tropic of C.* is a circle of lat. on the earth about 23° 27' N. of the equator. It is the N. limit of all the places on the earth at which the sun can ever be vertical at mid-day.

Cancer Root, or Beech Drops, a name given to the

Epiphegus Virginiana, a parasitic plant of the natural order Orobanchaceæ. It is a native of the U. S., and grows on the roots of beech. The plant is astringent, and the root has been reputed a remedy for cancer, but it has no favorable effect upon that disease.

Candahar, or **Kandahar**, called by the Afghans **Ahmed Shahee**, cap. of Central Afghanistan, 230 m. S. W. of Cabool. It is supposed to have been founded by Alexander of Macedon, was captured by Tamerlane in 1384, by Shah Abbas in 1630, and was occupied by the Brit. 1831-42. It was again occupied by the Brit. in 1880, and several severe engagements took place in the vicinity. Pop. 30,000.

Candia. See CRETE.

Candle [Lat. *candela*, from *candeo* to "shine"], a cylinder of wax or fat with a central wick, intended for giving light, and used in various religious ceremonies. C. are made of tallow, of stearine, bleached wax, spermaceti, and paraffine. They are either dipped, molded, or rolled. "Dips" are made by hanging wicks upon a frame, at a distance from each other equal to about double the intended thickness of the candle; these are then dipped in melted tallow and hung upon a rack until cooled, then dipped again and again until the required thickness is obtained. Mould C. are cast by pouring the tallow down a tube, along the axis of which the wick has been previously adjusted. These tubes are smooth inside, and several are fitted in a frame, the upper part of which forms a trough into which the moulds all open; and by pouring into the trough all the moulds are filled at once. Wax C. are not moulded, on account of the contraction which wax undergoes in cooling, and the difficulty of drawing it from the moulds. The wicks are warmed, and melted wax is poured over them until they acquire the proper thickness; they are then rolled between flat pieces of wet hard wood.

Candle-Fish. See OULACHAN.

Candlemas, a festival to commemorate the purification of the Virgin Mary, is observed by the R. Caths. on Feb. 2. Then all the c. candles for the yr. are blessed.

Candle-Nut (*Aleurites triloba*), a tree of the order Euphorbiaceæ, a native of Java, the Moluccas, and the Pacific islands. It bears a nut as large as a walnut, having a hard shell and a kernel which is edible when roasted. It yields an excellent bland oil, which is used for food and is burned in lamps. The natives of the Society Islands use the perforated kernels on a string or rush as torches.

Candlestick (ROBERT SMITH, D. D., a Scot. preacher, b. in Glasgow Mar. 23, 1807. He was licensed as a minister in 1831, and began to preach in Edinburgh in 1834. He was one of the prominent leaders of the popular party, and co-operated with Dr. Chalmers in organizing the Free Ch. after the disruption which occurred in 1843. He acquired much distinction as a pulpit-orator and a debater in religious assemblies. Author of several religious works. D. Oct. 19, 1873.

Candlestick (*Alba*), a large tree which grows in Fla. and the W. I., and is called wild cinnamon. It has fragrant flowers and an aromatic bark, which is exported in quilled pieces of a pale buff color and a pungent taste. This is sometimes used in med. as a stimulant tonic.

Canes Venatici (i. e. the "Hunting Dogs"), the Lat. name of a constellation of the N. hemisphere.

Canicula, a name formerly given to Sirius, the dog-star, a star in the constellation Canis Major. This name signifies in Lat. "little dog."

Canidae [from the Lat. *canis*, a "dog"], a family of carnivorous Mammals, to which belong the dog, fox, wolf, etc. They have generally 42 teeth (sometimes 38 to 46)—viz., on each side in each jaw, 3 incisors, 1 large canine, 4 premolars, and 2 true molars on each side in the upper jaw and 3 in the lower.

Canis Major and Minor (the Greater and the Lesser Dog), 2 S. constellations, the former at the feet of Orion, and the latter adjacent to it and near Gemini. The prin. star of the Greater Dog is Sirius, or the dog-star, the brightest of the fixed stars. The *canicular year* of the anc. Egyptians was a year counted from the heliacal rising of the dog-star.

Canisteo, Steuben co., N. Y., on R. R. and the Canisteo River, 55 m. W. N. W. of Elmira. Pop. 1880, 1907.

Canker [from the same root as *cancer*]. C. in plants is especially injurious to fruit trees. It is a kind of gangrene, usually beginning in the young branches and gradually descending to the trunk. Varieties of fruit trees which have been long propagated by grafting and budding are most liable to this disease.

Canker-Worm (*Anisopteryx vernata*), a destructive Lepidopter of the family Phalaenidæ. The female is wingless. The male has 4 thin, silky wings, expanding about an inch and a quarter. The female lays from 60 to 100 eggs, glued in clusters to branches of trees; they hatch in the early part of May. The larvæ then feed upon the leaves, especially of apple and elm trees, and after about 4 weeks of feeding descend, by crawling or hanging down by their threads, to the ground, and therein burrow to the depth of a few inches. Within 24 hours afterward they are changed to light-brown chrysalids. From these the moths emerge after a variable time. As the female C.-W. are wingless, trees may be protected from them by leaden troughs containing tar or fish oil placed around their trunks. (See HARRIS, on *Insects Destructive to Vegetation*.)

Canabis [Gr. *kánabís*], the typical genus of plants of the order Cannabinaceæ. The only known species of it is *C. sativa*, or hemp, a tall diœcious annual with elegant palmate leaves, which grows wild in India, and is cultivated for its fibre, etc. The intoxicating drug called *hashish* by the Arabs and *bang* by the Hindoos is procured from a variety called *C. indica*. Under the name of *ganjah* the dried female flowering hemp-plants are sold in bundles for smoking. The resinous extract called *churrus* is swallowed for intoxicating effect. Several native Afr. tribes use it.

Can'ne, an anc. Rom. town, on the river Aufidus, near

its entrance into the Adriatic. Here, Aug. 2, 216 B. C., Hannibal gained a decisive victory over the Rom. army commanded by C. Tarentius Varro.

Cannel Coal (originally *candle coal*). See COAL, by Prof. J. S. NEWBERRY, LL.D.

Canning (CHARLES JOHN), EARL, an Eng. statesman, son of George Canning, noticed below, b. Dec. 14, 1812; became gov.-gen. of India in 1855. In his administration occurred the great Sepoy mutiny (1857-58). D. June 17, 1862.

Canning (GEORGE), an Eng. statesman, b. in Lond. Apr. 11, 1770, ed. at Ox., and in 1793 returned to Parl. as a supporter of Pitt, then premier. He was an under sec. of state in 1796. Pitt resigning in 1801, C. joined the opposition against the ministry of Addington. In 1807, a ministry was formed under the Duke of Portland, and C. became sec. of foreign affairs. In 1809 he fought a duel with his colleague, Lord Castlereagh, which led to his retirement from the ministry. In 1812 he was returned to Parl. from Liverpool, and was one of the most eloquent orators in the House. In 1822 he became sec. of foreign affairs in the ministry of Lord Liverpool, upon whose disablement, in Apr. 1827, he was made premier, forming a cabinet composed of both Tories and Whigs. D. Aug. 8, 1827.

Canning (STRATFORD). See STRATFORD DE REDCLIFFE.

Cannon. See ARTILLERY, by GEN. WILLIAM F. BARRY.

Canon (NEWTON), b. in Guilford co., N. C., about 1781, served in the Tenn. mounted riflemen as col. at Tallahatchie, Nov. 3, 1813, and was gov. 1835-39. D. Sept. 29, 1841.

Canon (WILLIAM), b. at Bridgeville, Del., in 1809, gov. of Del. 1864-65. D. Mar. 1, 1865.

Cannon-Ball Tree (*Conroutia Guianensis*), a large tree of the order Lecythidaceæ, a native of Guiana. It bears racemes of white and rose-colored flowers, and a fruit which has a hard woody shell and is nearly round. This fruit is about the size of a 36-lb. cannon-ball.

Canon, a Sp. word, pron. can'yon, meaning a tube, and applied to long narrow mt.-gorges, or deep ravines with precipitous slopes assuming almost a tubular form. The Rocky Mts., the Sierra Nev., and the great W. plateaus of N. Amer. furnish striking examples. The great C. of the Col., in the middle course of the river, hollowed out to the depth of 3000 to 5000 ft. below the surrounding plateaus, may serve as a type.

Canon City, cap. of Fremont co., Col., on R. R. (161 m. S. of Denver by rail) and on the Ark. River where it emerges from the Rocky Mts., 5280 ft. above the sea-level. It is a resort for invalids, having both cold and warm mineral springs and a healthful climate. It has unlimited water-power, and in the neighborhood are coal, iron, oil-wells, marble and limestone quarries, and copper and silver mines. The Col. penitentiary is here. Pop. 1870, 229; 1880, 1501.

Canonius, an Amer. Indian, chief of the Narragansetts, who, though at first hostile to the Pilgrims who landed at Plymouth in 1620, subsequently became friendly to the whites, and especially to the inhabs. of the colony of Roger Williams. D. June 4, 1647.

Canon Law, a system of rules for the discipline of the Ch., is especially applied to the rules of the R. Cath. Ch., which are also in force to some extent in the chs. of Eng., Scot., and Ger. In Scot. jurisprudence the influence of C. L. is very great, it having been originally received as of equal force, with the statutes of the realm.

Canonsburg, Pa. See APPENDIX.

Canopus, or **Cano'bus** [Gr. *Kánwpos*], a star of the first magnitude in Argo, a constellation of the S. hemisphere, never visible in the N. or Middle U. S.

Canova, kah-nó'vah (ANTONIO), an It. sculptor, b. at Possagno, in Venetia, Nov. 1, 1757. He studied art in Venice and Rome, and aspired to restore the pure and classic style of the antique. He settled in Rome in 1782, and acquired celebrity by his *Theseus and the Minotaur*. Having been invited by Nap., he went to Paris in 1802, and executed an admirable statue of that emp. Among his works are a statue of Washington. He was reputed the greatest sculptor of his age. D. Oct. 13, 1822.

Canrobert, kon-to-bair' (FRANÇOIS CERTAIN), b. at St. Céré, Lot, June 27, 1809. He served many campaigns in Algeria, and became a gen. of division in 1853. In Sept. 1854 he succeeded Marshal St.-Arnaud as commander-in-chief of the Fr. army, and began the siege of Sebastopol. He resigned the command to Gen. Pelissier in May 1855, and was made a marshal of Fr. in 1856. In June 1859 he commanded a corps at Solferino. He took a prominent part in all the battles and events preceding and attending the investiture and capitulation of Metz.

Cantab'ri, a rude race of anc. mountaineers, said to have been of Iberian origin, who lived in Cantabria, the N. part of Sp., near the Bay of Biscay. They made a brave resistance to the Romans in the Cantabrian war (25-19 B. C.).

Cantacuzenus, Anglicized as **Cantacuzene** [Gr. *Kαντακουζηνός*] (JOHN), a Byzantine emp. and historian, became emp. in 1342; was involved in a c. war with Anna, the wife of Andronicus III., and abdicated in 1355. He wrote on Byzantine hist. 1320 to 1357. D. Nov. 20, 1411.

Cantaloupe (commonly pron. kan'ta-lōp) **Melon**, or **Muskmelon**, named from Cantalupo, in It., the *Cucumis melo* of botanists, is of the same genus with the cucumber, family Cucurbitaceæ. It has round, heart-shaped leaves, a creeping stem, yellowish flowers, and fleshy fruit, which is much esteemed. It is largely cultivated in N. J.

Canterbury, a city of Eng., on the river Stour, 56 m. E. S. E. of Lond., with which it is connected by railway. It is the metropolitan see of Eng., being the seat of the abp. of C., who is primate of all Eng. and the first peer of the realm. St. Augustine became the first abp. about 597 A. D. The cathedral was begun by abp. Cuthbert, about 740, and received numerous additions in succeeding ages. The choir, having been destroyed by fire in 1174, was restored by William of Sens, and is one of the oldest parts of the present

cathedral, which comprises almost every style of Chr. arch., having a length of 345 ft., with a central tower 234 ft. high. Pop. 21,701.

Cantharides (plu.) [*Gr. κανθαρίδες*], the official name of Coleoptera of the family Meloidæ; also called Sp. flies or blister beetles. The *Cantharides* or *Lytta vesicatoria*, the most important, is about 1 inch long, and is of a bright green. Its brilliancy is of use in detecting cases of poisoning by C., golden-green particles being always seen in powders made of these insects, and these particles remaining long unchanged. The species is found in the S. of Europe and in Asia chiefly. They are imported from Sp., Fr., It., Rus., and the Levant. The perfect insect is taken by beating the branches of trees in the morning or evening, when it is comparatively lethargic, a cloth being spread below to receive the insects as they fall. Those who collect them wear gloves and veils. Unpleasant effects have been experienced from even sitting under trees on the leaves of which C. were numerous. They are killed with the vapor of vinegar, sulphurous acid, or oil of turpentine. Unless kept with great care, they lose their active properties. Other species of the family are occasionally used as vesicants. The active principle of the flies is cantharidin, of which $\frac{1}{16}$ of a grain placed on the lip rapidly causes the rise of blisters. Internally the flies cause heat in the throat, stomach, kidneys, etc., and in large doses they give rise to inflammation of a serious nature. There are various preparations of blistering flies, such as tincture of C., cantharidal collodion, etc., but that most used is blistering plaster, made by mixing powdered flies, yellow wax, resin, and lard.



Cantharis, or Spanish Fly.

Cantharides (Septuagint, *Λογία Αισμάτων*; Vulgate, *Cantharicum*, both being translations of the Heb. *Shir Ha-shirim*, "Song of Songs" i. e. "The Great Song"), called in the Eng. version **Solomon's Song**, a poem, or perhaps a collection of poems, with a dramatic arrangement, the theme being apparently a chaste human love. But an allegorical meaning has been attributed to it, by which it is made to set forth the love of God for his people, or that of Chr. for his Ch. In the book the authorship is apparently ascribed to Solomon, although doubts have been raised as to its authorship and the time of its composition.

Cantilever Bridge. See APPENDIX.

Canton [a corruption of *Quang-Tong*, the name of the prov. of which it is the cap.; *Chi. Sang-Ching*], a city of Chi., on the Canton or Pearl River, 70 m. from its entrance into the Chi. Sea. It is surrounded by a brick wall, and is defended by fts. It is divided into 2 towns, one occupied by Tartars, the other by Chi., while the European merchants live in one of the *hongs* or suburbs. The streets of the city itself are generally not more than 8 ft. wide, the houses being rarely more than 2 stories high. Until 1843 C. was the only Chi. port open to foreign commerce; and although others have since been opened, it is still the chief commercial port. In May 1841 the defenses were taken by the Brit., who retired upon the payment of £6,000,000. The city was occupied by the Brit. and Fr. forces in Dec. 1837. Pop. including suburbs, 1,600,000.

Can'ton, Dak. See APPENDIX.

Canton, R. R. junc., a city of Fulton co., Ill., 28 m. W. S. W. of Peoria, 12 m. W. of Ill. River; is situated in a coal-region, with mines within the city. Pop. 1870, 3308; 1880, 3762.

Canton, Norfolk co., Mass., on R. R., 14 m. S. of Boston, Pop. tp. 1870, 3879; 1880, 4516.

Canton, city and R. R. junc., cap. of Madison co., Miss., is 23 m. N. N. E. of Jackson. Pop. 1870, 1963; 1880, 2083.

Canton, Lewis co., Mo., on R. R. and the Miss. River, about 185 m. above St. Louis. It contains C. Univ., an inst. of the "Christian" connection. Pop. 1870, 2363; 1880, 2632.

Canton, cap. of St. Lawrence co., N. Y., on R. R., 60 m. N. E. of Watertown, and on Grass River, which affords valuable water-power; is the seat of St. Lawrence Univ. (Univ.), having law and theological schools connected with it. Pop. 1870, 1681; 1880, 2049.

Canton, city and R. R. centre, cap. of Stark co., O., situated at the confluence of the E. and W. branches of Nimi-shillen Creek, 54 m. S. E. of Cleveland. It contains an acad. and St. Vincent's Coll. (R. Cath.). Coal is abundant in the vicinity. Pop. 1870, 8660; 1880, 12,258.

Canton, Pa. See APPENDIX.

Canute, Knut, or Knud, king of Den. and the conqueror of Eng., was the son and successor of Sweyn, king of Den. After the death of Edmund Ironsides, in 1016, C. reigned as sole monarch of all Eng., having completed by arms the subjugation of the A.-S. He became the most powerful European monarch of his time. D. Nov. 12, 1035.

Can'vas-Back (*Aythya valisineria*), a N. Amer. duck, the flesh of which is highly prized. Head and neck brown, back (except the shoulders) black, rest of plumage white; the shoulders, sides, and belly dotted in transverse lines with black. Length about 20 inches.

Caoutchouc. See INDIA RUBBER.

Cape Ann, the E. point of Essex co., Mass., 31 m. N. E. of Boston; lat. 42° 38' 3" N., lon. 70° 34' 2". Here is a rocky headland, in which quarries of syenite are worked. Two stone light-houses stand on Thatcher's Island, $\frac{3}{4}$ of a m. distant, each 112½ ft. high, showing fixed white dioptric lights of the first class, 165½ ft. above the sea.

Cape Bian'co, the most N. point of Afr.; lat. 37° 20' N., lon. 9° 48' E.

Cape Blanco, or Orford, on the Pacific, the most W. point of Or.; lat. 42° 50' N., lon. 124° 32' 29" W. Its light-

house shows a fixed white dioptric light of the first order, 256 ft. above the sea.

Cape Breton, Brit'n, an island of N. Amer. in the Atlantic, belonging to G. Brit., and forming a part of the prov. of N. S., from which it is separated by a narrow strait called the Gut of Canso. Area, 3120 sq. m. Pop. 75,483.

Cape Charles, Va., the S. point of the "E. Shore," a peninsula which separates Chesapeake Bay from the Atlantic Ocean. A light-house stands on Smith's Island near this cape, with a flashing light of the first order; lat. 37° 07' 08" N., lon. 75° 53' 12" W.

Cape Clear, the most S. point of Ire., is in the co. of Cork. Here is a light-house on a cliff 455 ft. above the sea; lat. 51° 36' N., lon. 9° 29' W.

Cape Coast Castle, a Brit. settlement and town on the W. coast of Afr., in Upper Guinea; lat. 5° 6' N., lon. 1° 15' W. This is the cap. of the Brit. colonies on the coast of Guinea. It is defended by several forts. The climate is unhealthy. The chief articles of export are palm-oil, gold-dust, and tortoise-shell. Pop. about 10,000.

Cape Cod, Mass., a sandy peninsula, 65 m. long and from 1 to 20 m. wide, in shape of a man's arm bent at the elbow. On Race Point, the N. extremity, is a revolving light 47 ft. above the sea; lat. 42° 03' 7" N., lon. 70° 14' 3" W.

Cape Cod Ship Canal. See APPENDIX.

Cape Col'ony, or Cape of Good Hope, a Brit. possession forming the S. extremity of Afr., bounded N. by the Orange River, E. and S. by the Indian Ocean, W. by the Atlantic. It was founded by the Dut. in 1652; was captured in 1806 by the Brit., to whom it was formally ceded in 1815. There are several tolerable harbors; high mts. and elevated plateaus occupy the interior. C. C. has 2 provinces, E. and W.; respective caps. Grahamstown and Cape Town. But under the gen. name of Cape Colony are also included several other divisions annexed from time to time. Entire area, 240,110 sq. m. Pop. 1,249,824.

Cape Farewell, the S. extremity of Greenland, is in lat. 59° 49' N., lon. 43° 54' W.

Cape Fear, on the Atlantic, the S. extremity of Smith's Island, N. C., is the most S. point of the State; lat. 33° 52.3' N., lon. 77° 59.8' W.

Cape Fear River is formed by the Haw and Deep rivers, which unite at Haywood in Chatham co., N. C. It flows S. E., passes Fayetteville and Wilmington, and enters the Atlantic near C. F. The length, excluding the branches above named, is about 200 m. Steamboats can ascend it to Fayetteville, 120 m.

Cape Girardeau, jee-rar-dō', a city, Cape Girardeau co., Mo., on R. R. and W. bank of the Miss., 150 m. S. of St. Louis, is the seat of St. Vincent's Coll., and contains a normal school and a female acad. Pop. 1870, 3585; 1880, 3889.

Cape Guar'dafui, or Gardafui, the easternmost point of Afr., is in lat. 11° 50' N., lon. 51° 21' E.

Cape Hat'teras, the E. extremity of N. C., is a point of a low sandy island, separated from the mainland by Pamlico Sound; lat. 35° 15.2' N., lon. 75° 30.9' W. The navigation is dangerous in this vicinity, on account of shoals which extend far out into the sea. Two m. N. of the extremity stands the light-house, 190 ft. in height, showing a flashing dioptric light of the first order.

Cape Henlo'pen, Del., at the entrance of Del. Bay, 13 m. S. S. W. of Cape May; lat. 38° 46.6' N., lon. 75° 04.7' W. It has a stone light-house, showing a fixed white dioptric light of the first order, 128 ft. above the sea.

Cape Henry, Va., at the entrance of Chesapeake Bay, 12 m. S. of Cape Charles. Here is a fixed light 129 ft. above the sea; lat. 36° 55.5' N., lon. 76° 0.2' W.

Cape Horn, the S. point of Amer., is an island of the archipelago of Terra del Fuego; lat. 55° 59' S., lon. 67° 16' W. Vessels which pass between the Atlantic and the Pacific usually double this cape rather than pass through the Strait of Magellan.

Ca'pelin, or Caplin, a little marine fish of the salmon family (the *Mallotus Greenlandicus*), which visits the coasts of Labrador and Newfoundland in vast shoals, furnishing bait for the cod-fishermen.

Capel'la (i. e. the "Kid"), a double star of the first magnitude in the constellation of Auriga, is also called *Auriga*.

Cape Lookout, the S. E. extremity of the islands off N. C., has a light-house 150 ft. high near its extremity, in lat. 34° 37' 16" N., lon. 76° 31' 07" W., with a fixed white light of the first order.

Cape May, or Cape Island, a city and watering-place of Cape May co., N. J., is on a small island in the Atlantic Ocean, 81 m. by R. R. S. of Phila. The distance from that city by water is nearly 100 m. Pop. 1870, 1248; 1880, 1699.

Cape May, the S. extremity of N. J., is at the entrance of Del. Bay. Here is a revolving light elevated 152 ft. above the sea, in lat. 38° 55.8' N., lon. 74° 57.3' W.

Cape Mendocino, a lofty headland of Humboldt co., Cal., is the westernmost point of that State. It has a wrought-iron light-house, with a flashing white light of the first order, 428 ft. above the sea; lat. 40° 26' 24" N., lon. 124° 33' 27" W.

Ca'pen (ELMER HEWITT), b. at Stoughton, Norfolk co., Mass., in 1838, grad. at Tufts Coll. in 1860; studied law, and was admitted to the bar in 1863. After practising law for a short time in his native town, he began the study of theol., and was ordained in 1865. In 1875 he became pres. of Tufts Coll. (Univ.).

Cape North, a promontory in the Arctic Ocean, the northernmost point of Europe. It is the N. extremity of the island of Magerø, separated by a narrow channel from the mainland of Nor.; lat. 71° 10' 12" N., lon. 25° 46' E.

Cape of Good Hope, a promontory near S. extremity of Afr., is the termination of Table Mt., rising about 1000 ft. above the sea; lat. 34° 22' S., lon. 18° 30' E.

Ca'per, the common name of the pickled flower-buds of the *Capparis spinosa*, of S. Europe and Barbary. It is a trail-

ing shrub of the order Capparidaceæ. C. are used as a condiment and ingredient of sauces. The plant called "C." in Eng. is the C. spurge, a *Euphorbia*.

Cape Race, near the S. E. extremity of Newfoundland, lat. $46^{\circ} 39' 30''$ N., lon. $53^{\circ} 4' 30''$ W., is a point dangerous to ships sailing in foggy weather between the U. S. and Europe. It has a revolving light 180 ft. above the sea.

Capercailzie, Wood Grouse, or Cock of the Woods (*Tetrao urogallus*), a large gallinaceous bird. It is variegated with black, brown, and white, and the chest of the male is dark green. Above the eye is a scarlet patch of naked skin. The legs and feet are feathered to the toes. Found in pine-covered mts. of Europe and N. Asia.

Capernaum, an anc. city of Pal., on the N. W. coast of the Sea of Galilee. Its precise site is uncertain.

Ca'pers (WILLIAM), D. D., a preacher and bp. of the M. E. Ch. S., b. in St. Thomas parish, S. C., Jan. 26, 1790, ed. at S. C. Coll.; studied law, entered the Meth. ministry in 1809, was sent as delegate from his denomination to the Wesleyan Conference, in Eng., in 1828. He took an active part in the proceedings of the Meth. Gen. Conference of 1844, which resulted in the division of the ch., and was elected bp. by the S. division in 1846; was author of *Catechisms for the Negro Missions*. D. Jan. 29, 1855.

Cape Sa'ble, on Cape Sable Island, the S. W. point of N. S., in lat. $43^{\circ} 26' 30''$ N., lon. $65^{\circ} 38' 30''$ W. It has a light-house, and is connected by a ferry with the mainland.

Cape Sable is the S. point of Fla.; lat. $25^{\circ} 06' 30''$ N., lon. $81^{\circ} 09' 30''$ W. It is the site of Ft. Poinsett.

Cape St. Vincent (anc. *Promontorium Sacrum*), the S. W. extremity of Port.; lat. $37^{\circ} 3' 30''$ N., lon. $9^{\circ} 5' 30''$ W. Near this cape the Brit. defeated the Sp. fleet Feb. 14, 1797.

Ca'pet (HUGO), king of Fr., the founder of the Capetian dynasty, b. 940, was a son of Hugh the Great, count of Paris. The throne having become vacant by the death of Louis V., the last Carolingian king, in 987, Hugh assumed the royal power. D. 996.

Capetian Dy'nasty, the 3d dynasty of Fr. kings, was founded by Hugh Capet, who ascended the throne in 987 A. D., and is said to have been the ancestor of 32 kings of Fr. According to some, the last of the direct line of C. kings was Charles IV., who died in 1328, and was succeeded by his cousin, Philippe, who founded the house of Valois. The Bourbon line, from Henry IV. onward, were descendants of the youngest son of Louis IX., and so of Capet.

Cape Tit'mouse (*Anthoscopus Capensis*), a small bird belonging to the family Paridae, found at the Cape of Good

Afr., projects into the Atlantic between the rivers Senegal and Gambia; lat. $14^{\circ} 44' 30''$ N., lon. $17^{\circ} 33' 30''$ W.

Cape Verd or Verde (called also **Cape de Verd**) **Islands** [Port. *Ilhas Verdes*], a group in the Atlantic, 320 m. W. of Cape Verd, belonging to Port. The islands, 14 in number, of which 9 are inhabited, are of volcanic origin; the highest summit, the peak of Fogo, an active volcano, rises 9157 ft. Area, 1486 sq. m. Pop. 90,704.

Cape Wrath, the N. W. extremity of Scot., projects into the Atlantic, and is a pyramid of gneiss about 600 ft. high. Here is a light-house 400 ft. above the sea, in lat. $58^{\circ} 37' 30''$ N., lon. $4^{\circ} 58' 30''$ W.

Capillary Ac'tion primarily denotes the elevation of liquids in fine hair-like tubes, as compared with the level of liquids in equilibrium in vessels or in wide tubes. If a wide open tube be plunged into water there will be an elevation of the fluid both within and without the tube; if the tube be very fine the water within rises considerably above its level outside, and the finer the bore the higher the rise. Capillarity depends on the adhesion between the fluid and the material of the tube; while the degree of cohesion between the particles of the fluid itself must affect the result. As the size of tubes increases, the column within increases with the square of the diameter, while the attracting surface increases only with the diameter. Attraction is therefore relatively much greater in fine tubes. C. A. is also seen in all porous substances, the principle being the same as in fine tubes. It exercises an important influence upon the circulation of fluids in plants and animals.

Capital, in political economy, is that part of wealth which is employed in reproducing wealth. It is always the fruit of past labor saved, joined with present labor. It takes 4 forms—viz., materials to be worked up; implements and machinery to facilitate labor; food, clothing, and shelter for the support of laborers; and finished products waiting for a market. It takes the form of money only temporarily, while in transition. It is right that there should be some remuneration for the use of C., because it represents past labor and self-denial, and is absolutely essential to the effectiveness of present labor. That remuneration comes in the form of rent, interest, dividends, and a share of profits. C. and labor are mutually dependent, and have common interests which should bind them ever in harmonious union.

Capital Pun'ishment, the punishment of death (so called from the Lat. *caput*, "head," also "life"). As the penalty for murder it has prevailed from the earliest times in all parts of the world. In most nations treason or rebellion against lawful govt. has also been thus punished; and in Eng. and elsewhere, down to a very recent period, the same has been true of counterfeiting, forgery, mail-robbery, and several other crimes. The manner of execution varies greatly. Military criminals, in modern times, are usually shot. In civil administration the modes most prevalent have been decapitation upon the "block," used for political criminals of rank in G. Brit.; the guillotine in Fr.; in Sp. countries the garrote and hanging. In Japan, for some offences, the criminal is condemned to take his own life in the presence of officials.

In Christendom the tendency has been in the present century to limit C. P. to the greatest crimes only, and many intelligent persons believe that it should be abolished altogether. In the early training of the race such means of teaching the value of human life might be necessary. Beccaria and many others deny the expediency of C. P., asserting that it does not lessen the amount of crime. It is well known that in the crowds often assembled in Eng. to witness a public execution, manslaughter has been several times committed. There is no doubt reasonable objection to publicity on such occasions, but this is not necessary. Other objections to C. P. are the occasional uncertainty of evidence, and the frequent unwillingness of juries to convict in cases where it will follow. On the whole, while the death penalty would seem to be needful, at least in all imperfectly settled countries not provided with secure prisons, it may be regarded as an open question whether imprisonment for life might not, with advantage, be substituted for it in the great centres of advanced civilization. This experiment has been tried for a number of yrs. in one or two European countries and in some of the U. S., but not long enough for decisive results. (See BASIL MONTAGU, *On the Punishment of Death*; BOVEE, *Reasons against C. P.*) ABEL STEVENS.

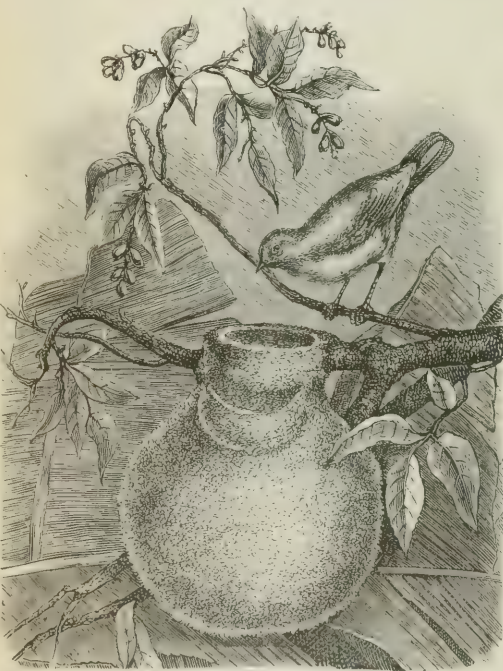
Capitoline (kap'i-to-lin) **Hill** (*Mons Capitoline* or *Mons Tarpeius*), one of the 7 hills of anc. Rome. It was occupied by the great temple of Jupiter and the citadel or capitol, with other public buildings. The steepness of its sides rendered it a natural fortress. On one side of it was the Tarpeian Rock, from which traitors and state criminals were thrown.

Cape d'Istria (JOHN ANTHONY), COUNT, the first pres. of Gr., b. at Corfu in 1776. He entered the diplomatic service of Rus. in 1808, and represented that power at the Cong. of Vienna in 1814-15; in 1816 became sec. of foreign affairs in Rus. He was elected pres. of the new republic of Gr. in 1827 for 5 yrs. Was assassinated Oct. 9, 1831, by George and Constantine Mauromichali.

Cappadocia, kap-pa-dō'she-a [Gr. *Καππαδοκία*], an anc. prov. of Asia Minor, bounded N. by Pontus and Galatia, E. by Armenia, S. by Mt. Taurus (which separated it from Syria and Cilicia), W. by Lycæonia. It was conquered by Cyrus about 550 B. C.; was ruled by independent kings from the time of Alexander, 323 B. C., to 17 A. D., when it became a Rom. prov., and is now included in the Tur. empire.

Capricorn, Tropic of, Capricorn, or the Goat, is the 10th sign of the Zodiac. Its first point is 270° E. of the first point of Aries, and the sun reaches it on the 23d of Dec., which is the date of the winter solstice. It is the most S. point of the sun's apparent path. The *Tropic of C.* is a circle of lat. about $23^{\circ} 27'$ S. of the equator. It is the S. limit on the earth at which the sun can be vertical at noon.

Capsicine, kap'si-sin, an acrid resinous alkaloid, ob-



Cape Titmouse.

Hope. It is remarkable for its nests, which are like balls of cloth, with a tubular entrance and with a pouch on the side of the neck of the nest.

Cape Town, a seaport of S. Afr., cap. of Cape Colony, is on the S. W. shore of Table Bay, and between that bay and Table Mt.; lat. of observatory, $33^{\circ} 56' 3.2''$ S., lon. $18^{\circ} 28' 45''$ E. It is intersected by several canals, is built on a regular plan, and lighted with gas. Close to the S. rise the perpendicular rocks of Table Mt. It has an exchange, a coll., a public library, and a botanic garden, and is the see of a bp. of the Ch. of Eng. C. T. was founded by the Dut. in 1652, and ceded to G. Brit. in 1815. Pop. 57,319.

Cape Trafalgar, a headland of Sp., on the Atlantic, between Cadiz and Gibraltar; lat. $36^{\circ} 10' 30''$ N., lon. $6^{\circ} 5' 30''$ E. Near this cape, Oct. 21, 1805, the Eng. fleet gained a victory over the Fr., and Lord Nelson, who commanded the former, was killed.

Cape Verd, or **Verde** ("Green Cape"), the W. point of

tained from the seed-pods of the *Capsicum annuum* or Cayenne pepper, of which it is the active principle.

Capsicum, a genus of plants of the order Solanaceae, natives of the warm parts of Amer., Afr., and Asia. They are mostly annual or biennial plants, with more or less woody stems, and have a wheel-shaped corolla, with 5 convergent protruding anthers. The fruits of *C. annuum*, *frutescens*, *fastigiatum*, *hirsutum*, *grossum*, and *crasiforme*, with perhaps those of other species, form, when pulverized, the cayenne pepper which is extensively used as a condiment. It is extremely pungent, and is often employed with excellent results in med. as a derivative and stimulant. The *C. annuum* is a hardy plant, cultivated in the U. S., where pickles are made of its unripe fruit. It is stated that the *C. toxicarium* of tropical Amer. is a narcotic poison. The *C. frutescens* grows wild in Fla., as well as in most warm countries. It is the true Cayenne pepper.

Capua [Gr. *Karvin*], a city of anc. It., on a plain about 2 m. from the river Volturnus, and 18 m. N. of Naples. It was founded by the Etruscans as early as Rome, and until about 350 B. C. was the chief city of It. It was captured by the Romans in 340 B. C., and became noted for its luxury. After the battle of Cannæ, 216 B. C., C. voluntarily opened its gates to Hannibal. The Romans punished the defection of C., reducing it to a provincial town. Its site is now partly occupied by the v. of Santa Maria di C.

Capuchin (kap-u-sheen') [Fr. *Cappucin*; It. *Cappuccino*] **Friars**, a branch of the order of Franciscan monks which originated in It. in 1525. They derived their name from a hood or head-dress (in It. *cappuccio*). They are a branch of the Minorites of the strictest observance. There is also an order of C. nuns who are also Franciscans of the strictest observance.

Capuchin Monkey, a S. Amer. cebid (*Cebus capucinus*), which receives its specific name from the cowl-like appearance of the hairy covering of its head.

Caput Mortuum [Lat. *caput*, *mors*, literally, "dead head," the inert residue of distillation and sublimation. When sulphate of iron is distilled at a red heat, it leaves a residue of red oxide of iron, which the alchemists called *C. M. triobli*. Its symbol was a death's head and cross-bones; hence *C. M.* signified also a "bugbear," a source of groundless terror.

Capya'ra, or **Capiba'ra** (*Hydrochaeris Capybara*), the largest known rodent. It is an aquatic animal, native of S. Amer., and feeds on vegetable food exclusively; has grinding teeth formed of many transverse plates. The flesh is esteemed good food. It is somewhat smaller than the common hog.

Carabidae, an extensive family of coleopterous insects. Most of them are voracious devourers of other insects and worms, and are very active in their movements. A few species have rudimentary wings.

Caracal (*Lynx Caracal*), a cat found in the warm parts of Asia and Afr., supposed to be the same animal as the anc. lynx. It is larger than a fox. The fur of the upper part is of a deep brown or wine-red, and its ears are tufted with long black hair. It is naturally fierce, but is capable of being tamed, and has been employed in hunting.

Caracalla (MARCUS AURELIUS ANTONINUS BASSIANUS), a Rom. emp., a son of Septimius Severus, b. at Lyons in 188 A. D. On the death of his father, in 211, he ascended the throne, and caused his brother Geta to be murdered. He also massacred several thousand friends of Geta, including Papinian, the great jurist, and was guilty of many acts of cruelty and infamy. Was assassinated in 217, at the instigation of Macrinus, who became his successor. The Baths of C. are among the most striking ruins of Rome.

Caracara, a tropical Amer. falconid, which feeds on carrion, like the vulture, the *Polyborus cheriway*. It also occurs along the S. border of U. S. It is black or brown, with a white, brownish barred tail.

Caracas, a city, cap. of Venezuela, is situated 12 m. S. of La Guayra, which is its seaport, and is nearly 3000 ft. above the sea. It is the seat of a R. Cath. abp. and contains a coll. and several hospitals. Earthquakes are frequent; one in 1812 destroyed 12,000 lives. Pop. 55,638.

Caractacus, or **Caradoc**, a king of the Silures, a tribe of anc. Britons who lived in Wales. He resisted the Rom. invading armies for 9 yrs., but was at length defeated, and was carried a captive to Rome in 51 A. D. His department in the presence of the emp. Claudius was admired by the Romans, who treated him with clemency.

Caraites. See KARAITES, by REV. S. ADLER, Ph. D.

Carambola, an E. I. fruit produced by the *Acerhoa* C., a small evergreen tree of the natural order Oxalidaceae. The fruit is about as large as a duck's egg, and has 5 longitudinal ribs, with a thin, smooth, yellow rind. The pulp has an agreeable flavor (sweet or acid), and is used in making sherbets, tarts, etc. It is one of the most generally cultivated fruits in India, and is sometimes called Coromandel gooseberry. The tree has irritable or sensitive leaves, and exhibits in a remarkable degree the phenomenon called sleep of plants. The acid fruit called *blimbi* grows on another species of *Acerhoa*.

Caramel [said to be from Lat. *canna*, "cane," and *mel*, "honey," or "sugar," i. e. "cane-sugar"], a name given to the dark-brown substance produced by burning sugar or exposing it to a great heat. It is also formed in the process of roasting coffee and malt. It is used to color wine and to adulterate coffee. C. is also a sort of confectionery.

Carapa, a genus of plants of the order Meliaceae, natives of warm climates. *C. Guianensis* is a large tree called anderaba, which grows in Guiana, and has large pinnate leaves. Its bark is reputed a valuable febrifuge, and is used in tanning. Masts of ships are made of the trunk. Lamp-oil is obtained from the seeds of this tree and from those of the *C. Guianensis*, which is a native of Guinea. Its oil is used to protect the bodies of the natives from the bites of insects.

Carat [from the Gr. *κερατιον*, a "little horn," a "pod"

of the locust tree; also a minute weight], a term used in weighing gold and precious stones. For diamonds a C. is $\frac{3}{16}$ troy grains, a "C. grain" being $\frac{1}{4}$ of this. In assaying gold, any quantity is divided into 24 parts, in order to designate the proportion of pure gold in an alloy with another metal or metals. That which contains $\frac{22}{24}$ of gold is said to be "22 C. fine."

Carau'sius, emp. of Brit., 286-294 A. D. He was a native of what is now the Netherlands, and was invited by the Britons to become their ruler, where he successfully resisted the Romans. He maintained himself for 7 yrs. as sovereign of Brit. and of a maritime confederacy at the mouth of the Rhine, waging wars against the Romans, on one side and the Scots and Picts on the other, and executed many important public works, traces of which still exist. He was assassinated at York, by his minister Allectus, in 294 A. D.

Caravan serai, or **Caravan'sary** [Arabic *karaadin*, a "caravan," and *serai*, a "palace"], also called **Khan**, an Oriental unfurnished inn for the shelter and lodging of travellers, who usually carry their own food with them. Each of these inns is commonly a square building of 4 wings built round a courtyard for the beasts of burden, who sometimes occupy a part of the lower story as stables. Our Saviour was born in a stall in the Khan at Bethlehem.

Caraway (*Carum Carui*), a plant of the order Umbelliferae, grows wild in S. Europe and in some parts of Asia. It is cultivated in Europe and Amer. for its aromatic seeds (carpels), which are used in med. as a carminative and tonic. They are also used as a condiment by confectioners, pastry-cooks, and perfumers. Their aromatic principles depend on a volatile oil called oil of C., which is obtained by distilling the crushed seeds with water. It is administered by phys. to correct the nauseating and griping tendencies of some cathartic meds.

Carbazotic Acid, or **Pi'ric Acid**, a bitter crystallizable acid, obtained by the action of nitric acid on indigo, on carbonic acid, and on many other organic substances. It occurs in the form of yellow crystals, which are soluble in alcohol, and dissolve in 80 or 90 times their weight of cold water. When silk which has been treated with a mordant of alum is immersed in a solution of this acid, it is dyed of a beautiful permanent yellow color. The picrate (carbazotate) of potassium, when heated, explodes with tremendous violence, and was used in the Franco-Prus. war in blowing up bridges, etc. As this salt is nearly insoluble in water, the acid has been proposed as a test for potash.

Carbides, formerly called **Carburets**, are chemical compounds of carbon with a metal; none of them occur in a natural state.

Carbine. See SMALL ARMS.

Carbohydrogens. See HYDROCARBON.

Carbolic Acid. See PHENOL.

Carbon [Lat. *carbo*, "a coal"], an important chemical element or simple substance which is abundant in the mineral, vegetable, and animal kingdoms. It occurs in a great variety of forms and combinations, being the combustible base of charcoal and fossil coal. It also occurs uncombined in the diamond, which is pure crystallized C., and in graphite or plumbago. It is extremely infusible, and unalterable at ordinary temperatures. It is the only element that is always present in animal and vegetable substances. In its ordinary forms it is a good conductor of electricity, but the diamond is a non-conductor. United with oxygen, it forms carbonic acid, which occurs in the atmosphere, in limestone, marble, dolomite, etc. (See CARBONIC ACID.) With nitrogen it forms an important compound called cyanogen. In plants and animals it occurs as one of the prin. constituents of wood, gum, starch, sugar, oil, gelatine, fibrine, etc., in which it is combined with hydrogen and oxygen. The various forms of C. are combustible, but they are not affected by any degree of heat except in the presence of air or oxygen. C. resists the action of many reagents which alter other simple substances. It is insoluble in all known liquids. A compound of C. with a metal is called a carbide or carburet. Coke and lampblack are more or less impure artificial forms of C.

Carbonari, a secret political society founded during the Fr. rule in Naples in the beginning of the present century. After the restoration of the Bourbons in Naples the society rapidly increased. In 1820 they organized branches in Fr., and Paris became their head-quarters. After the revolution of 1830 the society disappeared.

Carbonated (or **Acidulous**) **Waters** are those which contain a large proportion of carbonic acid gas. The term is applied to mineral springs, as those of Seltzer, Pyrmont, Salzbrunn, and Rehezer.

Carbonates, salts containing carbonic acid. They may be easily identified by the effervescence which results when they are brought into contact with dilute hydrochloric or nitric acid. (See POTASH and SODA.)

Carbon Bisulphide, a heavy, clear liquid compound of carbon and sulphur, very volatile and very inflammable. It is obtained by passing the vapor of sulphur over red-hot charcoal. It has great solvent power, and is largely used as a solvent of caoutchouc and other organic matters.

Carbondale, R. R. junct., a city of Jackson co., Ill., 27 m. E. of the Miss., is the seat of the S. Ill. Normal Univ. Pop. 1880, 3,213.

Carbondale, Kan. See APPENDIX.

Carbondale, R. R. junct. and city, Lackawanna co., Pa., on the Lackawanna River, 16 m. N. E. of Scranton, and at the head or N. E. end of the Lackawanna Valley. Large quantities of anthracite coal are mined in this vicinity. Pop. 1870, 6,393; 1880, 7,714.

Carbonic Acid is the popular and former scientific name of a compound of carbon and oxygen, in the proportion of 1 atom of carbon to 2 of oxygen. It is called in the new chemical nomenclature carbonic oxide, carbon dioxide, or carbonic anhydride. It is easily prepared by putting marble-dust or chalk into dilute sulphuric or hydro-

chloric acid. The latter acid, combining with the lime, sets free the C. A. as a colorless, slightly pungent gas of the specific gravity 1.224. When this gas is submitted to a pressure of 36 atmospheres at 32° F., it becomes a light limpid liquid, without acid properties, readily miscible with alcohol and ether, but not with water or fixed oils. When this liquid is allowed to evaporate in the open air, it produces cold so intense that the unevaporated residue of the liquid solidifies into a snow-like substance, below 100° F. in temperature. By evaporating this substance in a vacuum the spirit-thermometer can be made to fall to -166° F. C. A. gas is regarded by many authorities as poisonous, while others assert that it destroys life by exclusion of oxygen, like water in drowning. These last authorities state that the narcotic effects attributed to this gas are really due to the presence of carbonous oxide, which is an undoubted poison. The choke-damp of coal-mines contains both these gases. C. A. is a constant result of ordinary combustion and fermentation, and of the respiration of animals. It furnishes to plants, through their leaves, a very important part of their nourishment.

Carbonic Oxide, called in the new nomenclature **Carbonous Oxide** or **Carbon Monoxide**, a compound of 1 atom of carbon with 1 atom of oxygen. It is fatally deleterious to animals if they inhale it, and extinguishes flame, but it burns with a blue flame in contact with air, and thus forms carbonic acid. It is a colorless and insipid gas. Specific gravity, .967. It does not occur naturally, but may be obtained by the action of sulphuric acid on oxalic acid, by passing carbonic acid over red-hot charcoal, or by heating to redness chalk or pounded marble with iron filings or zinc. Even when largely diluted with air, it acts as a narcotic poison to those who inhale it. This gas does not perform any active part in natural phenomena, but in the reduction of ores, as in the blast furnace, it is of the greatest importance. C. O., in the new nomenclature, is a name for carbonic acid.

Carboniferous Lime-stone, sometimes called **Sub-carboniferous** or **Mountain Lime-stone**, is one of the lower and older rocks of the carboniferous system. It mostly contains magnesia, is of coralline formation, and is rich in organic remains. Some varieties of it are valuable for building stone.

Carboniferous System, the strata which were deposited during the carboniferous age of geol., and which are interposed between the Devonian and triassic systems, the Permian group being considered a subdivision of this system and its upper member. The name carboniferous was given to it because in Europe and E. Amer. it contains the most important beds of coal. The strata composing this system in Eng. are arranged in groups which in descending order are as follows: 1, Permian; 2, coal measures; 3, millstone grit; 4, mt. limestone; 5, lower limestone shales. In the U. S. almost precisely the same order prevails, and we have: 1, Permian; 2, coal measures; 3, carboniferous conglomerate; 4, carboniferous limestone; 5, the Waverley sandstones and shales; and to these the writer would add the Chemung group, which, judging from its lithological characters and fossils, belongs rather to the carboniferous than to the Devonian system, and in his judgment the carboniferous conglomerate should be regarded as a portion of the coal measures, since it is often split up into several conglomerates separated by beds of coal, fire-clay, etc. The fossils of the C. S. are very numerous and interesting. The plants which supplied the material for the beds of coal were chiefly conifers, ferns, lycopods, and equiseta. The animal remains include fishes and amphibians, and in the Permian true reptiles of the vertebrates; among mollusks the genus *Burdettia* is the most characteristic; among radiates the crinoids. The useful minerals of the C. S. are coal, iron ores, clays, gypsum, lead, zinc, building-stone, lime, and hydraulic cement.

J. S. NEWBERRY.

Carbuncle, kar'bunk-k'l [Lat. *carbunculus*], a beautiful mineral which mineralogists call pyrope.

Carbuncle [Lat. *carbunculus*, a "small coal"], the *anthrax* of surgical writers, is a violent and painful inflammation, larger than a boil, on any part of the skin, most frequently on the back. The part swells and hardens, and, as the disease advances, assumes a livid redness. The cuticle often rises in blisters, and a number of small openings may occur, through which matter escapes. The origin of C. seems to be constitutional, and it is usually attended by great suffering and considerable prostration. It is sometimes fatal, especially to old people. In its treatment, besides supporting the patient's strength and softening the skin by warm poultices, it is usual to divide the skin early and freely with a knife, or to destroy its surface with caustic.

E. DARWIN HUDSON, JR.

Carburet [Fr. *carbure*], the generic term formerly applied to compounds of carbon with the simple elements. (See CARBIDES.)

Carburetted Hydrogen, a chemical term applied to 2 gaseous compounds of carbon and hydrogen. The light C. H. or methane is known by the popular names of marsh-gas and fire-damp. It is a nearly odorless gas, evolved abundantly in some coal-mines, where it has caused tremendous and fatal explosions. When pure it is not poisonous. A mixture of 1 vol. of this with 3 vols. of oxygen explodes with great violence when inflamed. It is one of the prin. constituents of the coal-gas which is used for illuminating houses and streets. The bicarburetted hydrogen or ethene is the same as olefiant gas.

Carcel Lamp, one in which oil is pumped up by internal machinery, so as to be constantly overflowing the wick. The invention originated in Fr.

Cardioma. See CANCER.

Cardanomia [Lat. *Cardanomia*], a name of the capsule and seed of several species of plants of the genera *Anomum* and *Eletharia* and natural order Zingiberaceae. The capsules are three-celled, and contain numerous seeds,

which are aromatic and pungent, with a peculiar and agreeable taste. They are used as a condiment in Asia and Ger. Having mild cordial and stimulant properties, they are used in med. and in combination with cathartics. The official C. of the U. S. and Brit. Pharmacopoeias is the seed of the *Eletharia Cardanomia*, a native of India. The C. of commerce are produced in India, Ceylon, Madagascar, and the Malayan Archipelago.

Cardiff, a seaport of S. Wales, on the river Taff, 171 m. W. of Lond. It contains a fine old castle owned by the marquis of Bute. Railways extend to the mining dists. of S. Wales, the products of which are exported from C. It has a good harbor, with a magnificent basin and docks. Pop. 1881, 85,378.

Cardigan (JAMES THOMAS BRUDENELL), EARL OF, an Eng. gen., b. Oct. 16, 1797. At the battle of Balaklava Lord C. led the charge of the "six hundred." D. Mar. 27, 1868.

Cardinal [Lat. *cardinalis*, from *cardo*, *cardinis*, a "hinge"], an epithet implying importance, and applied to the prin. virtues, the 4 points of the compass, etc. The numbers 1, 2, 3, etc. are called C. numbers, to distinguish them from 1st, 2d, 3d, etc., which are called "ordinal" numbers.

Cardinal [It. *cardinale*, i. e. "principal"], the title of the highest dignitaries of the R. Cath. Ch. except the pope, by whom they are appointed. The collective body of C. is styled the Sacred Coll., and constitutes the official council of the pope. Their distinguishing costume consists of a red soutane and hat and a short purple mantle. Their number is limited to 70, but the list has been rarely, if ever, full. They may be of any nationality, and the Council of Trent (1587) directed that the pope should choose them, "as far as can conveniently be done, out of all the nations of Christendom," but practically a large majority have always been Its. Thus, in 1866, out of the 59 C. 39 were It. In Dec. 1880 there were 66 C. of whom 37 were It., 8 Fr., 6 Ger., 5 Sp., the remainder belonging to various nationalities, 1 being an Amer. Since the time of Pope Alexander III. (1159-81) the election of a pope has been vested in the C. who have invariably chosen one of their own number. When a pope dies, the C. assemble in conclave to elect a successor, and sometimes months have passed before they could agree upon the choice.

Cardinal Bird, or **Grosbeak** (*Cardinalis Virginiana*), also called **Virginia Nightingale**, a native of the S. U. S., one of the finest singing and most brilliant colored of Amer. song-birds, of the family Fringillidae, having a long crest of feathers on the crown. The male is bright vermillion red.

Cardinal Flower [so called from its bright red flowers, in color like a cardinal's hat], the name of the *Lobelia cardinalis*, a perennial herbaceous plant of the order Lobeliaceae, common in most parts of the U. S. in wet places, in the Atlantic region. There is a similar species or a new variety of it in Mex. The color is a most intense red.

Cardington, Morrow co., O., on R. R. and the E. branch of the Olentangy River, 41 m. N. by E. from Columbus. Pop. 1870, 918; 1880, 1365.

Card'well (EDWARD), an Eng. statesman, b. in Liverpool in 1813. He became sec. for Ire. in 1859, and sec. of state for the colonies in Apr. 1864; entered the cabinet of Gladstone as sec. of state for war in Dec. 1868.

Ca'rex (gen. *caricis*), [a classical Lat. word signifying "sedge"], is the botanical name of a vast genus of coarse grass-like plants of the order Cyperaceae. They abound in temperate and cold climates, and are perennial herbs, often growing in dense tufts in swamps and wet places. The genus is characterized by male and female flowers, separated (mostly monœcious), with an ovary inclosed in an inflated sac called a *perigynium*. Stamens 3, rarely 2. More than 450 species of *C.* are known, and 150 are described in Gray's *Manual of Bot.* as natives of the N. U. S. The *C. armaria* is planted in Hol. on the dikes for the purpose of binding the sandy shores with its spreading roots (rhizomes) and resisting the encroachments of the sea. Few of the species are good for pasture, but they tend to convert swamps gradually into fertile soil. In the U. S. they are harvested in large quantities from wet lands, but produce a poor quality of hay.

Ca'rey (HENRY CHARLES), a political economist and writer, b. in Phila. Dec. 15, 1793. He became in 1821 the head of the firm of Carey & Lea, pubs. He advocated a protective tariff, and wrote, beside other works, *The Principles of Political Economy* and *The Principles of Social Science*. D. Oct. 13, 1879.

Carey (WILLIAM), D. D., b. in Northamptonshire, Eng., in Aug. 1761, was a shoemaker in early life, but went to India in 1794 and founded the Bap. mission at Serampore; became in 1800 prof. of Sans., Bengalee, and Maharratta at the Coll. of Ft. William; pub. a Sans. gram., a Bengalee-Eng. dict., and other works, beside assuming the prin. labor in translation of the Scriptures into several Oriental langs. D. June 9, 1834.

Caria'midae, a S. Amer. family of birds referred to the order Alectorides or the Raptores, or intermediate between them. The chief characters are long tarsus and elevated hallux, short wings, long and graduated tail, nostrils vertically oval, and forehead with erect crest. It embraces only the 1 genus *Caria'ma*, and its 2 species, *C. cristata* and *burmeisteri*.

Caribbe'an Sea, an inlet of the Atlantic, between N. and S. Amer., and communicating with the Gulf of Mex. by a channel 120 m. wide, which separates Cuba from Yucatan, and is called the Channel of Yucatan, through which the accumulated waters of the sea flow into the Gulf of Mex., escaping by a narrow passage between Fla. and the Bahamas, forming the Gulf Stream.

Car'ibbee Bark, or **Piton Bark**, is obtained from the *Exostemma Caribbeum*, a small tree of Mex., Fla., and the W. I. It belongs to the cinchona tribe, and although possessing none of the active principles of cinchona, it re-

serenades it so much as to be sometimes substituted for it. The flower differs from that of the rhinoda in having its segments exerted, instead of included in the corolla.

Caribou, or **Cariboo**, a name applied to an Amer. variety of the reindeer (*Lemmus caribou*).

Carinariidae (Lat. *carina*, "keel"), a family of heteropodous gastropods, characterized by having the heart, liver, generative organs, etc. protruded from the body and incased in an extremely fragile and beautiful shell, which is sub-transparent, symmetrical, and compressed. The convexity of the shell is terminated by a single keel.

Carinthia, ka-rin'-the-a (Ger. *Kärnten*), a division of the Aus. empire, bounded N. by Salzburg and Styria, E. by Styria, S. by Cariola and It., and W. by the Tyrol. It is intersected by the river Drave, which separates the Noric from the Carinthian Alps. Area, 4,000 sq. m. Pop. 1880, 348,730.

Carlisle (Sir GUY), Lord DORCHESTER, a Brit. gen., b. at Strabane, in Ire., Sept. 3, 1724. He became gov. of Que. in 1772, which he defended against the Amer. army in Dec. 1775; invaded N. Y. in 1776, and fought against Arnold on Lake Champlain; he succeeded Sir Henry Clinton as commander-in-chief in N. Amer. in 1781. D. Nov. 10, 1808.

Carlisle, city, cap. of Macoupin co., Ill., on R. R., 28 m. S. W. of Springfield. It is the seat of Blackburn Univ., connected with which is a theological sem. Coal is mined here. Pop. 1880, 3117.

Carlisle, kar-ill' (anc. *Luguvallio* or *Luguvallum*), a city of Eng., at the confluence of the Eden and Calder rivers, 301 m. N. N. W. of Lond., 99 m. S. of Edinburgh, and 12 m. E. of the Solway Frith. Several R. Its. converge here, and there is steamboat connection with Liverpool and Belfast. During wars between Eng. and Scot. was an important place, and was frequently besieged. The cathedral, dedicated 1101, damaged by fire 1292, restored 1854, has one of the finest choirs in Eng., being 138 ft. long and 72 ft. high. Pop. 35,866.

Carlisle, Ky. See APPENDIX.

Carlisle, R. R. junc., cap. of Cumberland co., Pa., is situated in the valley between the Kittatinny and S. Mts., 18 m. W. by S. from Harrisburg. It is the seat of Dickinson Coll., founded in 1783. It contains also Carlisle (U. S. A.) barracks. Pop. 1870, 6650; 1880, 6200.

Carlos, Don, infante of Sp., the son and heir-apparent of Philip II., b. July 8, 1545. He was a youth of violent temper and sickly constitution, and appears to have been deficient in intellect. He attacked or menaced the duke of Alva with a poniard in 1567. The king regarded him with suspicion, and ordered him to be tried by the Inquisition, which pronounced him guilty. He d. in 1568, but the cause and manner of his death are involved in mystery. He is the subject of Schiller's tragedy of *Don Carlos*.

Carlos of Bourbon, Don, count de Molina, b. Mar. 29, 1788, was the second son of King Charles IV. of Sp. He was the heir-presumptive to the throne until the birth of Isabella in 1830. On the death of his brother, Ferdinand VII., in 1833, he claimed the throne, and was supported by a party called Carlists, between whom and the partisans of Isabella a c. war ensued. The priests and absolutists mostly preferred D. C., but his claim was rejected by the Cortes in 1836. The Carlist army was defeated in 1839, and D. C. fled to Fr. He abdicated in favor of his son, D. C., count de Montemolin, in 1845. D. Mar. 10, 1855.

Carlos, Don, count de Montemolin, a son of the preceding, b. Jan. 31, 1818. After the death of his father he was a pretender to the throne of Sp., and was recognized as Charles VI. by the Carlists, who revolted in 1860 without success. D. in 1861.

Carlos, Don, duke of Madrid, a nephew of the preceding, son of Don Juan of Bourbon and grandson of D. C., count de Molina, b. in 1848. His father, Don Juan, abdicated in his favor on Oct. 3, 1868, and from that time he was recognized by the Carlists as Charles VII. He made, in 1870 and 1872, unsuccessful efforts to overthrow the gov. of King Amadeus, and in 1873 fought against the republican gov. His eldest son, Jayme, prince of Asturias, was b. June 27, 1870.

Carlovingian (Fr. *Carlovingien*), the name of the second dynasty of Fr. or Frankish kings. The designation was probably derived from Charles Martel, who became king in all but name 714 A. D. The Merovingian dynasty ended in 752, in the deposition of Childeric III. by Pepin the Short, son of Charles Martel, who assumed the crown, and was the first of the C. dynasty, which under his son Charlemagne became the greatest power in Europe. The last C. king was Louis V. (d. 987), succeeded by Hugh Capet.

Carlsbad, or **Karlsbad** (i. e. "Charles's Bath"), a town in Bohemia on the river Eger, 76 m. W. N. W. of Prague. It is famous for its hot springs, with temperature from 117° to 165° F., and discharging 2,000,000 gals. a day. A cong. of European powers was held here in 1819. Pop. 10,579.

Carlsero'na, or **Karlskro'na** (i. e. "Charles's Crown"), sometimes called in Eng. *Carlseroon*, a seaport of Swe., on several small islands connected with each other and the mainland by bridges, 258 m. S. S. W. of Stockholm, lat. 56° 10' N. It has a good harbor, well defended, and is prin. station of Swe. navy. Pop. 18,413.

Carlsruhe, karlz'roo, or **Karlsruhe** (i. e. "Charles's Rest"), a city of Ger., cap. of the grand duchy of Baden, 46 m. S. of Mannheim and is connected by railways with all parts of Ger. The streets converge to a point occupied by the palace, connected with which is a library of 80,000 vols. and a museum. It has also a public library, botanic garden, mint, and an arsenal. Pop. 49,998.

Carludovic'a Palma'ta, a tree or shrub of the order Pandanaceae, grows in the tropical parts of S. Amer. It produces the leaves of which Panama hats are made. Those of the best quality are plaited from a single leaf without any joints. This process requires several months.

Carlyle, Ill. See APPENDIX.

Carlyle, kar-ill' (THOMAS), a Brit. author, b. near Ecclefechan, Scot., Dec. 4, 1795. He was designed for the Presb. ministry, but having grad. at the Univ. of Edinburgh he ques-

tioned the doctrines of the Kirk, and betook himself to lit., writing for the *Edinburgh Encyclopedia*, translating Goethe's *Faust*, and other Ger. and Fr. works, and was for a while a private tutor. In 1826 he married Jane Welsh (b. 1801, d. 1866), who brought a moderate fortune. In 1828 he took up his residence at Craigenputtock, a lonely farm-house belonging to his wife, where he wrote *Sartor Resartus* and the best of his critical and biographical *Essays*. In 1834 he removed to Chelsea, a suburb of Lond., which was thereafter his home. Here previous to 1845 he wrote *The Fr. Revolution: a Hist. ; Political Present, and Character*, and delivered several courses of lectures, one of which was pub. under the title of *Heroes and Hero-Worship*. In 1845 he pub. the *Letters and Speeches of Cromwell*, and in 1849 a series of *Latter-Day Pamphlets*. In 1851 he wrote the *Life of John Sterling*. In 1856 he began the *Hist. of Frederick the Great*, which occupied 15 yrs., vol. i. appearing in 1858, vol. vi. in 1864. In 1866 he was chosen lord rector of the Univ. of Edinburgh, succeeding Gladstone, the opposing candidate being Disraeli. While he was absent from Lond., in order to deliver his *Edinburgh Inaugural*, his wife d. suddenly, and C. never fully recovered from the blow. In 1875 he put forth a small vol. containing sketches of *The Early Kings of Nor.* and a paper on *The Portraits of John Knox*. His collected works comprise about 30 vols., and others not included in the collection would make several more. After his death appeared 2 vols. of *Reminiscences* of his father, of his wife, of Edward Irving, and others, most of them written when his phys. and mental powers were greatly impaired by age and infirmity. (See *Life* by FROUDE, 1884.) D. at Chelsea, Lond., Feb. 5, 1881. A. H. GUERNSEY.

Carmelites, or the **Order of St. Mary of Mount Carmel**, a monastic order, founded about 1156 on Mt. Carmel, sanctioned by Pope Honorius IV. 1224, and made their appearance in Europe in 1238. They were at first governed by the severe rule of St. Basil. In 1247 a portion of them adopted the rule of Pope Innocent IV., became mendicant friars, were known as "mitigated C.," and claimed that their order was instituted by the prophet Elijah, and that the Virgin Mary was a member of it. The barefoot C. (*Discalceati*) originated in Sp. in the 16th century, their rule being very severe. An order of C. nuns was instituted in 1452. The order is spread over nearly all Europe, and there are some convents in the U. S., the members of which devote themselves mainly to teaching.

Carmel, Mount (Heb. *karmel*, a "garden"), a range of Pal., extending from the plain of Esdraelon to the Mediterranean. Its highest point is 1740 ft. above the sea, and it terminates in a steep bluff 480 ft. above the sea. It is frequently mentioned in Scripture, especially in connection with the prophets Elijah and Elisha. Near the top of the bluff is a Carmelite convent. The military ORDER of MR. CARMEL was instituted by Henry IV. of Fr.

Car'ni, R. R. junc., a city, cap. of White co., Ill., at the head of navigation on the Little Wabash River, 150 m. S. E. of Springfield. Pop. 1870, 1369; 1880, 2512.

Carmine. See COCHINEAL.

Carnahan (JAMES), D. D., LL.D., a Presb. divine, b. near Carlisle, Pa., Nov. 15, 1775, grad. at Princeton in 1800. After holding several pastorates, he became in 1823 pres. of Princeton Coll. D. Mar. 2, 1859.

Carnahu'ba Palm, or **Caranai'ba Palm** (*Copernicia cerifera*), a beautiful palm which abounds in the N. part of Brazil. It seldom attains a height of more than 40



Carnahu'ba Palm.

ft. The fruit is edible, and the timber is valuable for several purposes. The leaves of this tree are covered beneath with wax, which is collected, and like the wax of certain other

species of palm, is an article of commerce. Its timber is exported to Eng., where it is used for veneering.

Carnallite, a hydrated chloride of potassium and magnesium, used as a fertilizer of the soil.

Carnarvon (HENRY HOWARD MOLYNEUX HEREERT), EARL OF, an Eng. conservative statesman, b. in Lond. June 24, 1831. He was appointed sec. of state for the colonies in June 1866, and framed a plan approved by Parl. for the confederation of the Brit. N. Amer. colonies.

Carnatic, **The**, a former division or region of India, on the coast of Coromandel, bounded on the E. by the Indian Ocean or Bay of Bengal, and extended from Cape Comorin to about 16° N. lat. Its other dimensions were not well defined. It contains numerous large temples, and other monuments which attest its former splendor.

Carnation, a beautiful and fragrant double-flowering variety of the *Dianthus Caryophyllus*, or clove pink. It is a universal favorite of florists, and exists only in a state of cultivation. Scarlet, purple, and pink are the prevailing colors of the flowers, which are often 3 inches in diameter. Florists prefer those in which the colors are perfectly distinct. The numerous varieties which have been produced by the florist's art are arranged in 3 classes—*flakes*, *bizarres*, and *picoles*. The flakes have only 2 colors, disposed in broad stripes; the bizarres have 3 colors, in irregular spots and stripes, and the picoles have an edging of scarlet, red, or purple, on a white or yellow ground. C. prefer a rich soil, and should have free access to the fresh air. They are propagated either by layers or *pipings*—i. e. short cuttings.

Carnades (Gr. *Karvadás*), a Gr. philos. and orator, b. at Cyrene, in Afr., in 213 B. C. He opposed the doctrines of the Stoics, and was the founder of a school called the New Acad. In 155 B. C. he was sent as ambassador from Athens to Rome, where he gained much applause by his orations. D. at Athens about 129 B. C.

Carnelian, or **Corne'lian** [Fr. *cornaline*], a fine variety of chalcedony, is composed chiefly of quartz. The color is red or flesh-color, and rarely milky white; the clear red are most valued. C. are found in India, Europe, and the U. S.

Carnio'la [Ger. *Krain*], a prov. of the Aus. empire, bounded N. by Carinthia, N. E. by Styria, S. E. and S. by Croatia, and S. W. by the Adriatic. The prin. river is the Save. The surface is generally mountainous. It contains the rich quicksilver mines of Idria. Area, 3856 sq. m. Pop. 1880, 481,243.

Carnival [from the Lat. *caro*, gen. *carnis*, "flesh," and *vale*, "farewell"], a festival in the R. Cath. countries of Europe just preceding Lent. It was formerly most brilliantly celebrated at Venice; later, especially in Rome. Like many other usages in modern Europe, the customs connected with the C. probably originated in the heathen spring-time festivals, as the Lupercalia and Bacchanalia of the Romans, and the Yule-feasts of the Gers. During the Middle Ages costly banquets with the rich, and drinking bouts among others, marked the time. Recently, the C. at Rome has lasted 8 days, during which the whole city is given up to revelry, the centre of which is the street called the *Corso*. In this all the houses are hung with crimson drapery, and each afternoon a constant line of carriages and promenaders is passing through it. Most of those who appear in the street are masked, and an incessant interchange of bouquets, *confetti*, and other harmless missiles makes a scene of extreme liveliness. At 6 o'clock, after the firing of cannon and the clearing of the Corso by troopers, a number of horses are let loose at one end of the street, and are urged by the shouts of the people to full speed. The last event of the C. week is the celebration of the *Moccolotti*. For this, after dark, all the revellers, on foot, in carriages, and at the windows of the Corso, provide themselves with a number of small lighted tapers, which each endeavors to preserve, while he puts out as many as possible of those of his neighbors. The political disturbances of It. somewhat depressed these festivities from 1859 to 1870.

Carniv'ora [Lat. *caro*, gen. *carnis*, "flesh," and *voro*, to "devour"], an order of mammals, also called *Ferae*, including the placental quadrupeds called beasts of prey. The families Felidae, Cryptoproctidae, Proteridae, Hyænidæ, Viverridæ, Canidæ, Mustelidæ, Ursidæ, Eluridæ, Cercopithecidae, Procyonidae, and Bassarididæ are the existing types of the terrestrial species, while the seals are an aquatic group.

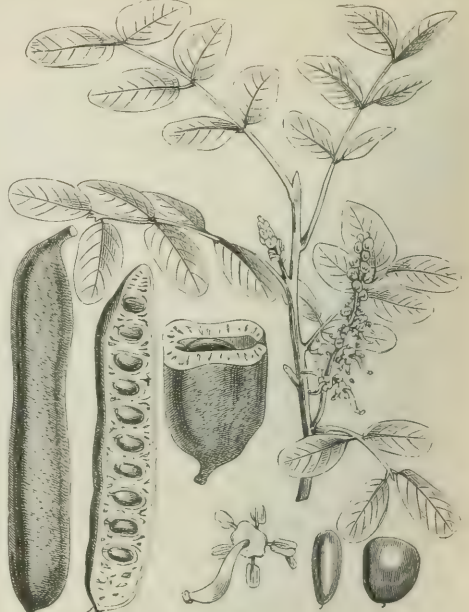
Carnochan, kar'noh-an or kar'nok-en (JOHN MURRAY), M. D., b. at Savannah, Ga., in 1817, studied med. at Edinburgh and various places on the European continent; began to practise in New York in 1847, and soon gained distinction for his bold and successful surgical operations. Thus, he excised the whole trunk of the second branch of the fifth pair of nerves for the cure of neuralgia depending upon disease in the nerve. In 1852 he tied the femoral artery, and thus ingeniously cured a disease of exaggerated nutrition, *elephantiasis arabum*, which operation has been accepted in Europe and extensively practised. He also tied the primitive carotid artery on both sides for the cure of elephantiasis of the head-base and neck. In 1851 he became prof. of surgery at the New York Med. Coll. Wrote a treatise on *Congenital Dislocations*.

Carnot, kar'no' (LAZARE NICOLAS MARGUERITE) COUNT, a celebrated Fr. statesman and geometer, b. at Nolay, in Burgundy, May 13, 1753. As an earnest friend of the popular cause he was elected to the National Convention in 1792; was chosen a member of the Committee of Public Safety in Aug. 1793; as war minister he displayed administrative abilities of the highest order. During the Hundred Days (1815) he was Nap.'s minister of the interior. He went into exile on the restoration of 1815, and d. Aug. 3, 1823.

Car'ro, cap. of Tuscola co., Mich., on the R. R. and Cass River, about 80 m. N. E. of Lansing. Pop. 1880, 1282.

Car'ob, or **Algaroba** [Arabic, *Khayrob*], (*Ceratonia Siliqua*), a tree of the natural order Leguminosæ, is a native of the countries around the Mediterranean. It has pinnate

evergreen leaves, with 2 or 3 pairs of large oval leaflets. The fruit is a brown pod, 4 to 8 inches long, having a fleshy or mealy pulp of an agreeable taste, which is extensively used as food by the Arabs, Moors, and Its. This fruit or pod is supposed to be the same as the article translated "husks"



Carob.

in the parable of the Prodigal Son; and it is thought by some that the locusts eaten by John the Baptist were these pods. They are imported into Eng. and the U. S. under the name of locust beans; also called "St. John's bread." The wood of the C. is hard and valuable.

Carolina Maria, queen of Naples, b. Aug. 13, 1752. was a daughter of Francis I. and Maria Theresa of Aus. She was married in 1768 to Ferdinand, king of the Two Sicilies, and persuaded him to join the coalition against Bonaparte, who expelled King Ferdinand from his kingdom in 1806. D. Sept. 8, 1814.

Carolina, North. See NORTH CAROLINA.

Carolina, South. See SOUTH CAROLINA.

Caroline Amelia Elizabeth, queen of Eng., b. May 17, 1768, was a daughter of the duke of Brunswick and a niece of George III. of Eng. She was married in 1795 to the prince of Wales, afterward George IV., who separated from her. On the accession of George IV. in 1820 she was prosecuted on a charge of adultery, was defended by Mr. Brougham, and was not convicted. D. Aug. 7, 1821.

Caroline Islands, or **New Philippines**, an archipelago of about 500 islands, in Oceania, between lat. 3° 5' and 12° N., inhabited chiefly by Malays, who are ruled by petty chiefs. They were discovered in 1543 by the Spaniards, who have always claimed them as part of the Philippines, but in 1888 the Brit. took possession of them. Area, 872 sq. m. Pop., estimated, 30,000.

Carp (*Cyprinus carpio*), a fresh-water fish of the family Cyprinidæ, native of Asia and Europe. It prefers still waters, and feeds on aquatic plants, worms, insects, etc. It attains a length of 2 ft. or more, but is generally less than a foot long. Some domesticated varieties—the leather and mirror C.—are extensively raised, and have been recently



Carp.

quite generally distributed throughout the U. S.

Carpathian (or **Karpathian**) **Mountains** [Ger. *Karpathen*; anc. *Carpates*], a curvilinear range, chiefly in the Aus. empire, 800 m. long, separating Hungary from Galicia, and Transylvania from Roumania, the highest points being nearly 9000 ft. above the sea. They are mostly wooded, and abound in minerals.

Carpentaria, **Gulf of**, is a broad and deep indentation of the N. coast of Australia, and is a portion of the S. Pacific Ocean. It extends from Cape Arnhem to Cape York, and is about 500 m. long from N. to S. and 350 m. wide. It is visited by vessels for the *bêche de mer*, which is found in its waters. It was named in honor of Peter Carpenter, gov.-gen. of the Dut. possessions in E. I.

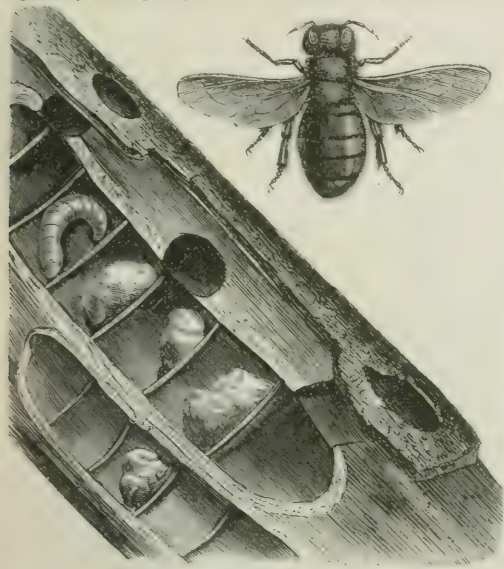
Carpenter (FRANCIS B.), an artist, b. at Homer, Cortland co., N. Y., Aug. 6, 1830. His portrait of Pres. Lincoln and his *Emancipation Proclamation* are his best works. Author of *Six Months at the White House*.

Carpenter (MATTHEW H.), a lawyer, b. at Moretown, Vt., in 1824, was at the U. S. Military Acad. 2 yrs.; admitted to the bar in 1845. In 1848 he removed to Wis.; elected to the U. S. Senate Mar. 4, 1869, and served continuously, except during one term, till his death. D. Feb. 4, 1881.

Carpenter (WILLIAM BENJAMIN), M. D., LL.D., F. R. S.,

an Eng. physiologist, a son of Dr. Lant Carpenter, b. in 1813, studied med. and grad. as M. D. in Edinburgh in 1839. His *Principles of Human Physiology* is considered by many to be the best work extant on that subject. He became prof. of med. jurisprudence in Univ. Coll., Lond. Among his works are *Zoology*, and *The Instinct of Animals*, and *The Microscope: its Revolution and Uses*. Some of his latest investigations have been in regard to oceanic currents.

Carpenter Bee is a name applied to insects of the bee family, distinguished by their skill in working wood. The *Xylocopa purpuracea* of S. Europe is of a rich blue color, and about the size of a large humble-bee. It attacks dry wood, especially when partly decayed, cutting a longitudinal canal.



Carpenter Bee.

The mother-bee divides this into many chambers with one egg in each, with pollen and honey for the future food of the larva. In due time the eggs hatch, each of the larvæ devours the food prepared for it, and then passes into the chrysalis state. At last, when the perfect insects are developed, they destroy the partitions and successively escape.

Carpentry implies the art of building structures in wood, and signifies more especially that branch of industry which is applied to the construction of wooden buildings, wooden bridges, and the framings of heavy machines. The labors of the carpenter are necessarily directed by some knowledge of the forces which may be brought to act upon the structure when completed—that is, by some knowledge of the principles of engineering.

The lesser and lighter works of wood, such as furnish the interiors of dwellings, are the products of another branch of labor, termed *joinery*. The work of the joiner is guided more or less directly by the artist, and bears less reference to strength, rigidity, and the forces concerned than to external proportion and æsthetic fitness to surroundings.

The skill of the carpenter is directed toward giving two distinct qualities to the structures he builds—viz., *strength* and *rigidity*. The first is secured mainly by *dimensions* assigned to the different parts, and the skill with which these parts are united; and the latter depends largely upon the *arrangement* of the several members. (For extended treatises on C., see TREGOLD'S *Carpentry*, by Hurst; also ERY'S *Traité de la Charpenterie*.)

Carpet-Bagger (in recent Amer. politics) is a Rep. born and reared in the N. or W., who went S. with or after the Federal armies, planted himself in one of the States lately reconstructed, and aided in organizing and drilling the negroes to vote the Rep. ticket. The term originated with those of adverse politics, who applied it as a stigma, and with considerable looseness, any one not a native of the S. being denounced as a "C.-B." if an active Rep.; if a native, he was termed a "scalawag." HORACE GREENEY.

Carpet-Bug, or Anthrenus Scrophulariæ (Linn.). This insect is popularly known as "the new C.-B.," the name having been given to it when its ravages were first de-

tected. Although, if left unchecked, it overruns houses and preys upon a variety of woollen and some other fabrics, its special home is beneath the borders of carpets, where in the larva state, shown at *a* in the figures (all enlarged), it eats large holes in the carpets, or, following the joinings of the floors, cuts in straight lines through entire breadths. The cast skins of the larvæ, *b*, are found with the living forms in the summer months. The pupa, *c*, is formed in autumn within the split skin of the larva; and the perfect insect, shown at *d*, of a black color, marked with red along the back, and with red and white spots on the wing-covers, emerges in the winter, and may often be taken on the windows of infested rooms in the month of May. It is a very difficult insect to eradicate. Kerosene oil and benzene are probably the most efficient agents for destroying it in its earlier stages. It is of European origin, introduced many yrs. ago in Cal., and later into New York. *A. Lepidus* (Le Conte) is simply a W. variety of it. J. A. LINTNER.

Car'pets. The word "carpet," denoting floor-covering, is of unknown origin; it is supposed, by some, to be derived from "Cairo," probably because Egypt is the country credited with first using floor-coverings as articles of luxury in her anc. days of splendor.

As a commercial term, "carpet" or "carpeting" is the generic name for the various grades of goods in that line, whatever their material, mode of construction, or technical appellation. The original form of the C. was that of a large rug, which was spread upon the floor when occasion required; and the E. C., the manner of whose manufacture has undergone but little change for many centuries, are invariably made so to this day. The modern way of weaving carpeting in long, narrow strips, to be sewn together, doubtless had its origin in the greater convenience and cheapness which that form admits of through its adaptation to the ordinary loom.

Before the invention of the Jacquard loom, however, C. were either of very simple pattern, or, if elaborate in their designs, necessarily very expensive. The anc. royal manufactory of the Gobelins in Paris has always occupied the first place in regard to artistic perfection. Some of the C. produced there cost from 100,000 to 200,000 francs, requiring 5 to 10 yrs. for their completion. None of them have been for sale since the yr. 1791; they have been presented to the different sovereigns of Europe, and are only to be found in the palaces of courts. The invention of Jacquard, C., together with the still more recent improvements in looms, has greatly facilitated the production of carpeting at once beautiful and durable, and at the same time cheap enough for persons of moderate means or economical tastes; so that the use of C. has probably increased more during the last 50 yrs. than that of anything of equally anc. origin. At present, the U. S., in proportion to population, is by far the greatest consumer of C. of all the nations in the world.

The C. manufacturing business of the U. S. has been rapidly growing since the close of the c. war, and is now a very important industry.

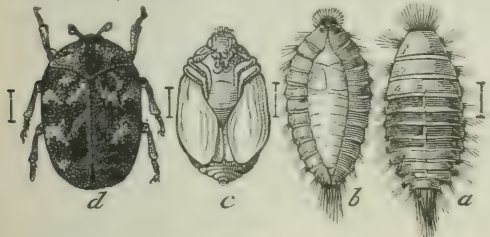
Carpoc'rates, or Car'pocras, a Jew of Alexandria, who founded a Gnostic sect about 130 A. D. He believed in the transmigration of souls, and maintained that the world was created by angels.

Carr (EUGENE A.), b. Mar. 20, 1830, in Erie co., N. Y., grad. at W. Pt. 1853. In the c. war became col. 3d Ill. Volunteer Cav. Aug. 15, 1861, and was promoted brig.-gen. U. S. volunteers Mar. 7, 1862; in command of the army of S. W. Mo. 1862, and of dist. of St. Louis 1862-63; passed through Vicksburg campaign, and in command of a division in operations against Mobile 1865. Brevt. maj.-gen. U. S. A. Mar. 13, 1865. Col. 6th cav. Apr. 29, 1879.

Carrageen', or Irish Moss, is a name given to several species of sea-weed which are not mosses, but algae. The species which yields the greater part of the C. of commerce is the *Chondrus crispus*. It is used as med., and as an article of food, and is esteemed for its emollient and demulcent properties. It grows on the rocky coasts of several countries of Europe and on the E. shores of N. Amer. It is from 2 to 12 inches long, branched, cartilaginous, flexible, and reddish-brown in color. It is considered easy of digestion. Jelly and blanc-mange are made by boiling the C. in water or milk, with an addition of sugar and spices. The Iceland moss (*Cetraria Islandica*) is a different plant, used in a similar way. It is not a true moss, but a lichen.

Carra'ra (anc. *Cararia*), a town of It., on the Avenza, near the Mediterranean, 33 m. N. W. of Pisa. Near it are the quarries of fine-grained pure white limestone, known as C. marble, used for statuary, which have been wrought more than 2000 yrs. Other varieties also occur, some of which are veined and blue. Pop. 6797.

Car'riages, Coaches, Char'iots, Wag'ons, and Carts. From the earliest ages, especially in the E., vehicles with wheels to be drawn by animals seem to have been used. They presupposed the domestication and training of the horse, the ass, or the ox, and possibly some other animals, for this purpose. The first vehicles must have been very rude—they are still in some Oriental countries—the wheels solid blocks of wood, usually segments of a tree; the axle a round stick thrust through a round hole, perhaps burned out, in the wheel, and a rough box fastened to the axle. These rude wagons may have been such as Joseph sent to Canaan (Gen. xlv. 19) to bring the families of his brethren to Egypt. The war-chariot, invented a little later, though in use more than 3000 yrs. ago, was a better and more pretentious vehicle. The roads which were used then were rough, so the chariots must be strong, and rapidly driven, but it had better wheels and axles, probably of iron, and the warrior and driver could stand in it. The wheels had hubs, spokes, and felloes, as Egyptian and Assyrian sculpture indicate. The magnificent Rom. roads made chariot-driving a pleasure, and the Gr. and Rom. chariot-races were greatly renowned. In the dark and mediæval



Carpet-Bug.

tected in the State of N. Y. in the year 1874, and its difference from the larva of the carpet-moth observed. It belongs to the destructive family of beetles known as the *Dermes*.

ages no new roads were made, and the old ones were out of repair, so that most travel and transportation was on the backs of horses or asses, and in the panniers of mules and asses. For heavy goods the broad-wheeled wain or van, drawn by 6 or 12 horses or oxen, made its way, at perhaps the rate of 1 m. an hour, over the rugged highways, and even

FIG. 1.



Assyrian War-Chariot.

this was often overturned. There is no record of a coach or chariot, even for royal persons, earlier than 1280, and the *whirligoe*, a 2-wheeled vehicle without straps or springs, with the horses attached by ropes, was not in use by royalty till the close of the 14th century. It was not until the 16th century that the coach was introduced, even for royal persons. In 1530 a few of the highest nobility in Fr. and Eng. ordered them, and for more than a hundred yrs. later their use was confined mostly to the aristocracy, though between 1625 and 1675 a few hackney-coaches were kept for hire in Lond., Paris, and Edinburgh. During nearly the whole of the 18th century the hackney-coach, the heavy and slow-going stage-coaches, and a very few post-chaises were the only vehicles in Eng. for the use of travellers, and the roads were so bad that these were often overturned. The great vans, drawn by 6, 8, or 12 huge Normandy horses, had indeed the hinder end

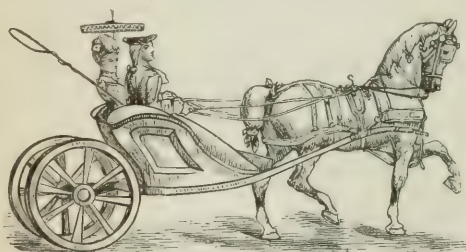
FIG. 2.



Henry IV's Coach (1610).

the cities till 1830 or 1840, and carried emigrants and their families and household goods to the W., even within the last decade. From 1810 to 1845 the stage-coach, well and strongly built, was the traveller's vehicle, as the omnibus was the favorite vehicle for the citizen from 1832 or 1833 to 1865. Both have largely given place, E. of the Miss., to the steam-car and the horse-car on the street railway. W. of the Miss., and to a limited extent E. of it, the Concord coach, a strongly built and capacious wagon on springs, has taken the place of the old stage-coach wherever the R. R. has not yet penetrated. Hackney-coaches and cabs of various patterns have been used to a great extent in cities and large towns for hire, and for funerals, parties, and weddings. The day of the heavy state C., drawn by 4 or 6 horses, with coachman, footmen, and outriders, is past in this country. The wealthy citizen may have his family C., with a pair of horses, a coachman and footman in livery, but beyond this he does not go; oftener he is found behind a pair of horses with a single servant, in a dog-cart, dos-a-dos, stanhope, or buggy. There is a variety of family C., for 1 or 2 horses, adapted to the wants of various classes, and in city or country almost every family of moderate means has its C. of some sort. Physicians have C. of special styles for their use, and almost all tradesmen have their wagons, often very highly ornamented, for their several pursuits. The express business employs many wagons of a peculiar style, and the heavy ice-wagons and coal-carts add to the demands upon the wagon-maker and the discord of city streets. The production of children's C. is an industry of the last 2 or 3 decades, and the dolls' C. are still more recent. Both employ considerable cap, and are increasing in the amount of production. The annual product of C., wagons, children's C., etc., in 1880, was about \$12,000,000, aside from R. R. cars. L. P. BROCKETT.

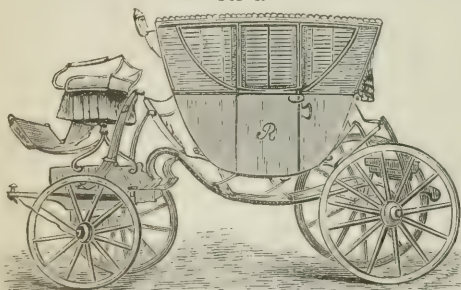
FIG. 3.



Private Carriage of the Seventeenth Century.

partitioned off, and here 6 or 8 passengers could sit on the straw in the tail of the wagon and move on, 1 or 2 m. an hour, with terrible jolts. In 1750 the stage-coach occupied 3 days and nights in going from Lond. to Birmingham, 115 m. In 1754 the Lond. and Edinburgh stages advertised to go through (400 m.) in 10 days in summer and 12 in winter. Elliptic steel springs for coaches date from about 1750.

FIG. 4.



Gen. Washington's Carriage.

With better roads came better vehicles and faster time. The famous Eng stage-coaches, described by De Quincey, date only from 1795. For the next 40 yrs. they were very popular, but in 1835 the railway car began to supersede them, as they have since the Fr. and Sp. "diligence," a more lumbering stage-coach. The number of each has greatly decreased in the last 40 yrs. Cabs, in Europe, have largely replaced hackney-coaches since 1830, and so have the omnibus, introduced from Fr. in 1831, and the horse-car, now coming into use. In this country, till the present century the prevalent mode of travelling was on horseback. A few very wealthy families in the cities kept their family coaches, heavy vehicles drawn by 4 or 6 horses. The great *onestoga* wagons—prairie schooners, as they were called later—sometimes drawn by large Normandy horses, but oftener by 6 or 8 yokes of oxen, transported goods and produce to and from

the cities till 1830 or 1840, and carried emigrants and their families and household goods to the W., even within the last decade. From 1810 to 1845 the stage-coach, well and strongly built, was the traveller's vehicle, as the omnibus was the favorite vehicle for the citizen from 1832 or 1833 to 1865. Both have largely given place, E. of the Miss., to the steam-car and the horse-car on the street railway. W. of the Miss., and to a limited extent E. of it, the Concord coach, a strongly built and capacious wagon on springs, has taken the place of the old stage-coach wherever the R. R. has not yet penetrated. Hackney-coaches and cabs of various patterns have been used to a great extent in cities and large towns for hire, and for funerals, parties, and weddings. The day of the heavy state C., drawn by 4 or 6 horses, with coachman, footmen, and outriders, is past in this country. The wealthy citizen may have his family C., with a pair of horses, a coachman and footman in livery, but beyond this he does not go; oftener he is found behind a pair of horses with a single servant, in a dog-cart, dos-a-dos, stanhope, or buggy. There is a variety of family C., for 1 or 2 horses, adapted to the wants of various classes, and in city or country almost every family of moderate means has its C. of some sort. Physicians have C. of special styles for their use, and almost all tradesmen have their wagons, often very highly ornamented, for their several pursuits. The express business employs many wagons of a peculiar style, and the heavy ice-wagons and coal-carts add to the demands upon the wagon-maker and the discord of city streets. The production of children's C. is an industry of the last 2 or 3 decades, and the dolls' C. are still more recent. Both employ considerable cap, and are increasing in the amount of production. The annual product of C., wagons, children's C., etc., in 1880, was about \$12,000,000, aside from R. R. cars. L. P. BROCKETT.

Carrick's Ford, a point on the Cheat River, near St. George, Tucker co., W. Va. The Confed. forces under Gen. R. B. Garnett, in retreat from Laurel Hill, were here attacked by 3 regiments of U. S. troops under Gen. T. A. Morris on July 13, 1861, routed, and Gen. Garnett killed.

Carrier, *kah-re-ä'* (JEAN BAPTISTE), a Fr. Jacobin notorious for his cruelty, b. at the v. of Yolai, near Aurillac, in Haut-Auvergne, in 1756. At the commencement of the Fr. Revolution in 1789 he was an obscure atty.; in 1792 he was sent to the National Convention, in 1793 to Nantes to assist in repressing the c. war commenced by the priests and royalists in La Vendée. Here he murdered multitudes of men, women, and children, by various modes. The cruelties and obscenities related of this worst of Jacobin leaders are almost incredible. More than 15,000 persons were put to death by him in a single month. Soon after the fall of Robespierre he was finally recalled by the Committee of Public Safety, and condemned by the Revolutionary Tribunal. Guillotined Dec. 16, 1794.

Carrier Pigeon, a variety of the domestic pigeon (*Columba livia*), remarkable for its swiftness of flight and for the sagacity with which it returns to its home after it has been conveyed to a distant place. They have been known to fly 1000 m., sometimes at the speed of more than 100 m. an hour, and have long been trained to carry written messages. During the Franco-Ger. war, C. P. were frequently employed for conveying news and despatches.

Carrières, kah-re-air', de (Louis), a R. Cath. theol., b. in 1662 at Chuvilé, near Angers, Fr. He became a soldier, but in 1689 joined the Congregation of the Oratory. Wrote the *Commentaire Littéral* (1701-16). Most of the comments are made in the translated words of the Bible itself. D. June 11, 1717.

Carriers, Com'mon, those who undertake for hire to transport from one place to another the goods or persons of such as choose to employ them. They are distinguished from *private C.* by this readiness to afford accommodation to the public generally, and are subjected in law to a different responsibility. They may be either C. by land or C. by water. The principles of law exhibiting the rights and duties of C. C. form a subordinate dept. under the gen. subject of BAILMENT, and, as in other varieties of the same legal relation, the degree of care necessary in the custody and treatment of whatever is received by the bailee is not dependent in all respects for its determination upon the contract of the parties, but arises by force of established legal rules. The difference in these requirements, depending upon the circumstance whether there be a carriage of goods or a carriage of passengers, demands that these two branches of the subject be examined separately.

C. C. of goods are placed under a responsibility of excessive stringency. They are held liable for all loss or damage which occurs during transportation except that occasioned by "the act of God or the public enemy." The phrase "act of God" is held to extend only to such inevitable accidents as occur without the intervention of human agency. Thus, losses directly occasioned by winds, floods, lightning, and earthquakes, would be properly included under this designation, and the C. would be relieved from liability. But robbery, even if committed unexpectedly and by an irresistible force, or fire occasioned by some incendiary, wholly without the C.'s negligence or connivance, would be causes of loss containing that element of human agency which makes the exemption inapplicable. Damage resulting from natural causes, such as frost, fermentation, evaporation, the natural decay of perishable articles, or the inherent viciousness of animals, are placed upon the same footing as losses caused by the "act of God." By the phrase "public enemies" is meant those with whom the nation is at war or pirates on the high seas. Thieves, robbers, and mobs would not be included under this term.

The responsibility of C. C. begins upon the delivery of the goods for transportation. A delivery at the usual place of receiving freight or to the employés in the usual course of business is sufficient. The responsibility terminates when the goods have reached their destination and been actually delivered. But if, upon the lapse of a reasonable time after

arrival, they are not claimed and removed, the C.'s liability is not entirely ended, but only modified in degree. It is then his duty to store the property in a safe and secure warehouse to await the owner's demand, and he is only accountable thereafter for ordinary care. Important distinctions are drawn between various classes of C. in reference to the proper mode of delivery. These are rendered necessary by the different kinds of transportation adopted in the several cases. The purpose of these various regulations manifestly is, that the interests of both C. and owner be promoted. The "reasonable time" after arrival during which the C.'s responsibility as insurer is to continue will be most speedily terminated when the owner has immediate knowledge that the goods lie at his disposal.

Questions of much importance arise as to how far a C.'s duty and responsibility may be modified by usage or custom, or by specific contract entered into with the owner, or by notice given him. It is well established that common usage, if uniform and reasonable, may be pleaded in justification of peculiar regulations adopted. But these common modes of reducing responsibility are comparatively insignificant in view of those qualifications established by contract or notice. Bills of lading and instruments of an analogous character, given by the C. on accepting goods for transportation, contain almost invariably stipulations in regard to exemptions from loss by fire and other enumerated perils, and are regarded as constituting a contract between the C. and shipper. In like manner, notice brought home to the knowledge of the owner of the goods and assented to by him will have in gen. the same effect. At this point there is a great practical difficulty. The question is, What will be sufficient evidence of assent on the owner's part to a notice? It is plain, at least, that the notice must be so given by the C. as naturally to attract the attention of the shipper, and must be so precise and clear that he can readily acquaint himself with its contents. Assuming this to be so, can the C. shake off his extraordinary responsibility by notice? It is now quite clear that he cannot. He may make in this manner reasonable regulations in the nature of by-laws, pointing out the articles that he will carry, or requiring a statement of their value, so as to know what care will be properly demanded of him, and what reasonable charge he should make. But when all this is done he cannot shake off his character of insurer by notice. To do this there must be a contract—some evidence of assent; and notice by the C. is no evidence of assent by the shipper. The notice must also be reasonable in its character.

C. C. of Passengers.—These are not held to as stringent a liability as C. of goods. They are not made insurers of the passengers' safety, but are nevertheless required to use the utmost care, and are responsible for even the slightest negligence. The C. is answerable for the acts of his agents, whether negligent or wilful, done within the scope of their employment. It is his duty to exclude lawless and disorderly persons from his conveyances, or, failing to do so, he may, according to some authorities, be held responsible for any violence they may perpetrate on the passengers. When, however, the passenger's own negligence is the proximate cause of the injury, the C. is not liable. This proposition leads to an important branch of the law termed "contributory negligence," which may be defined to be that negligence without which the injury would not have happened, while at the same time, on the part of the C., on being made aware of the passenger's negligence, there must be reasonable care used to avert its effects.

The common duties of passenger C. are, to receive all who offer to take passage as long as their vehicles suffice, to carry them the entire route, to treat all with civility and propriety, and bring them to their destination within the stipulated time. They are not, however, compelled to receive persons of offensive or disorderly conduct, or any who by reason of disease or disgusting habits are unfit associates for the other passengers. Reasonable regulations may be adopted concerning the control of passengers, such as that fares must be paid in advance, tickets must be exhibited when called for, and the like. Expulsions of persons in a suitable manner and without unnecessary force from their vehicles for refusing to comply with such rules are considered justifiable. The liability of passenger C. for baggage committed to their charge is in general the same as that of C. of goods. In other words, they are held bound as insurers.

Appropriate remedies exist in favor of C. They may detain goods for the freight. They have an action against strangers who interfere with their possession, and may even recover the full value of the goods, holding the surplus above their charges in trust for the owner.

In this brief summary of the rights and duties of C. C. attempt has only been made to exhibit common-law provisions and principles. Statutory enactments exist in Eng. and in various States relating to the subject, the details of which must be sought by reference to the acts themselves. In particular, the so-called Eng. "Carriers' Act" may be referred to. (The subject is treated in much detail in such works as *REDFIELD On Railways*, and *ANGELL On C. C.* The rules of damages will be found in *SEDGWICK* or *MAYNE On Damages*.)

T. W. DWIGHT.

Car'rington (EDWARD), b. in Va. Feb. 11, 1749, commissioned an officer of the Revolutionary army; commanded the artil. with ability and success at the battle of Hobkirk's Hill, Apr. 25, 1781, and also at Yorktown. Was foreman of jury in Aaron Burr's trial for treason. D. Oct. 28, 1810.

Carrington (HENRY B.), LL.D., b. at Wallingford, Conn., Mar. 2, 1824, grad. at Yale 1845; commenced practice of law in Columbus, O., 1848; at opening of c. war became col. 18th U. S. Inf., afterward brig.-gen. of volunteers; prof. of military science in Wabash Coll. 1869; wrote *Hist. of Battles of Amer. Revolution*, etc.

Car'ri'on Crow, or **Black Vulture** (*Catharista atrata*), also common Eng. black crow (*Corvus corone*).

Car'ri'on Flowers, a name given to the flowers of several species of *Stapelia*, the smell of which resembles that of carrion. They are natives of the Cape of Good Hope. The genus *Stapelia* belongs to the order Asclepiadaceae, and is remarkable for an excessive development of the cellular tissue of the stem at the expense of the leaves.

Car'roll, on R. R., city, cap. of Carroll co., Ia. Pop. 1870, 384; 1880, 1385.

Carroll (CHARLES), of **Carrollton**, an Amer. patriot, b. in Annapolis, Md., Sept. 20, 1737. He inherited a large estate in land, and was regarded as the richest man in Md. He was chosen a delegate to Continental Cong. in 1776, and signed Dec. of Ind. To distinguish himself from another man of the same name, he signed himself "Charles Carroll of Carrollton." He was elected to the Senate of the U. S. in 1788. He was a lawyer by profession, ed. in Fr. and Eng., and was especially honored as the last survivor of the signers of the Dec. of Ind.—D. Nov. 14, 1832.

Carroll (JOHN), D. D., LL.D., first R. Cath. bp. of the U. S. and cousin of the preceding, b. Jan. 8, 1735, at Upper Marlborough, Md., became in 1773 prof. at Bruges, in Belgium. In 1786 he was, at the instance of Franklin, appointed vicar-gen., and in 1790 was consecrated as bp. of Baltimore. In 1791 he founded St. Mary's Coll. Afterward made abp. D. Dec. 3, 1815.

Carroll (WILLIAM), b. in Pittsburgh, Pa., in 1788, emigrated to Nashville, Tenn., in 1810; capt. and brigade inspector under Gen. Andrew Jackson Feb. 20, 1813; maj.-gen. Tenn. militia Nov. 13, 1814, to May 13, 1815, famous for his services in defence of New Orleans, especially in the battle of Jan. 8, 1815; gov. of Tenn. from 1821 to 1827, and from 1829 to 1835. D. Mar. 22, 1844.

Car'rollton, a city, cap. of Greene co., Ill., on R. R., 34 m. N. N. W. of Alton. Pop. 1880, 1934.

Carrollton, cap. of Carroll co., Mo., on R. R., 207 m. N. W. of St. Louis. Pop. 1870, 1832; 1880, 2313.

Car'rot (*Daucus*), a genus of plants of the order Umbelliferae. The common C. (*D. carota*) is a biennial plant, a native of the E., but naturalized in Europe and Amer. It is used for food by man and beast.

Car'son (ALEXANDER), LL.D., an Irish clergyman, b. in 1776, grad. at the univ. of Glasgow; in 1798 became pastor of a Presb. ch. at Tubbermore; in 1805 became a Congregationalist, and soon afterward a Bap. He was an eminent scholar, and wrote several controversial works, among which are *Theories of Inspiration*, *Examination of the Principles of Biblical Interpretation*, and *Baptism in its Mode and Subjects*. D. Aug. 24, 1844.

Carson (CHRISTOPHER), an Amer. trapper, commonly called KIT C., was b. in Ky. Dec. 24, 1809. He served as a guide to Fremont in his Rocky Mt. explorations. He was an officer in the U. S. service in both the Mex. war and the c. war. In the latter he received a brevet of brig.-gen. D. May 23, 1868.

Car'son City, on R. R., cap. of the State of Nev. and of Ormsby co., near E. base of Sierra Nev., about 3 m. W. of C. River and 15 m. S. S. W. of Va. City. Pop. 1880, 4229.

Carson River and Lake. The river rises in the Sierra Nev., flows N. E., and after a course of 150 m. enters the lake, which is 15 m. long, and has no outlet.

Car'stairs, or **Carstares** (WILLIAM), a Scot. negotiator, b. near Glasgow Feb. 11, 1649. Having been sent to Eng. in 1682 as the secret agent of William of Orange, he was arrested as an accomplice in the Rye-House plot, and was put to the torture, which could not extort from him any confession, although he was the depositary of important secrets. After the accession of William to the throne, C. had great influence in Scot. affairs, and was 5 times chosen moderator of the Gen. Assembly. He became minister of Gray Friars' ch., Edinburgh, in 1704. D. Dec. 28, 1715.

Cartage'na, a seaport of Sp., on a bay of the Mediterranean, 27 m. S. S. E. of Murcia. The harbor, which is one of the best in the Mediterranean, is defended by a fortified island. It was formerly the chief naval arsenal of Sp. It has a cathedral, formerly a Moorish mosque, and an observatory. In the vicinity are mines of silver and lead. C. occupies the site of New Carthage (*Carthago Nova*), founded by Hasdrubal 242 B. C., which became a great commercial city of the Carthaginians, and was taken by the Roms. 210 B. C. Pop. 75,908.

Cartel', an Anglicized Fr. word which in Fr. signifies a "challenge." As a military term it is used to denote an agreement between two belligerents for the exchange of prisoners. A vessel used in exchanging prisoners or carrying proposals to an enemy is called a C-ship.

Car'ter (JAMES GORDON), an Amer. educator, b. at Leominster, Mass., Sept. 7, 1795, grad. at Harvard in 1820; was chairman of the committee on education in the legislature of Mass., and drafted the bill which appointed the Mass. board of education; became chairman of that board. D. July 22, 1849.

Car'teret (PHILIP), an Eng. navigator who took part in the expedition to the S. Sea commanded by Wallis, in 1766. He discovered a number of small islands, one of which he called by his own name.

Car'tersville, cap. of Bartow co., Ga., on R. R., 48 m. N. N. W. of Atlanta. Gold, copper, and other minerals are found in this vicinity. Pop. 1870, 2332; 1880, 2437.

Carte'sian Philos'ophy, a philosophical system propounded by René des Cartes, commonly written Descartes. The basis of this system, implying the idea that the act of conscious thought necessarily involves the idea of existence and is the ground of all human knowledge, is embodied in his famous dictum, *Cogito, ergo sum*—"I think; therefore I am." This system took firm hold, and during the 17th century nearly all the philos. of Fr. were classed either as Cartesians or Gassendists. It is now practically abandoned, but it has had great value as a stimulator of thought. Spinoza, Malebranche, and recent Ger. philos. owe much to it.

Carte'sians (from *Cartesius*, the Lat. name of Des-

CARTES], the name given to those who adopted his system of philas.

Carthage [Gr. *ἡ Καρχηδών*; Lat. *Carthago*], an anc. city of Afr., the cap. of the republic of C., on a bay of the Mediterranean, near the site of the present Tunis, was founded about 850 B. C. by Phœnician colonists from Tyre. The Carthaginians gradually acquired the supremacy over all N. Afr., and became the greatest commercial people of the times, the pop. in 150 B. C. being stated at 700,000. Of the insts. of C. little definite is known. The govt. was an oligarchy, composed of a few great families. The lang., of which the only remains are a number of inscriptions and a few passages preserved in Rom. writers, resembled the Heb. The first foreign possession of C. was Sardinia, which was acquired before 509 B. C. An unsuccessful attempt was made to seize Sic., but the Carthaginian fleet was almost annihilated, 480 B. C., by Gelon of Syracuse. The attempt was renewed 410 B. C., and the Carthaginians obtained possession of a part of the island, and soon after their colonies were established in Sp. The first conflict between C. and Rome, known as the first Punic war, began in 264 B. C., the question in dispute being the mastery of Sic. The Romans, were in the end successful, and the Carthaginians made peace by giving up Sic. and Sardinia. In 237 B. C. Hamilcar invaded Sp., which he had partially conquered when he d., in 229 B. C., leaving the enterprise to his son-in-law, Hasdrubal, and his own son, Hannibal, who succeeded to the command in Sp. in 221 B. C. The Romans undertook to intervene, and in 218 B. C. Hannibal crossed the Alps and invaded It., thus beginning the second Punic war, which lasted 15 yrs., until 202 B. C. The Romans, were in time determined to destroy C., and in 150 B. C. they found a pretext for opening the third Punic war. C. was besieged, and in 146 B. C., after a desperate defence, was taken and reduced to ruins. The site appears to have been uninhabited for more than a century, until Augustus (about 20 B. C.) founded there a new town. This new C., early in the 3d century of our era, was second only to Rome in pop. In 439 A. D. it was taken by surprise by Genseric, who made it the cap. of the Vandal kingdom of Afr. It was finally destroyed by the Arabs in 647 A. D. A few ruins are all that now remain of either C.

Carthage, R. R. junc., cap. of Hancock co., Ill., 13 m. E. of Keokuk; has Lutheran coll. Pop. 1870, 1448; 1880, 1594.

Carthage, a city, cap. of Jasper co., Mo., on R. R. and Spring River, in the centre of the rich lead-regions of S. W. Mo. On the morning of July 5, 1861, a force of Confeds. under Gov. Jackson and Gen. Price, numbering about 3500 men, while retreating from the army of Gen. Lyon, were confronted, about 7 m. E. of this town, by a body of about 1500 Federal troops under Gen. Sigel, and a battle ensued, the Federals at length falling back. Pop. 1880, 4167.

Carthage, R. R. junc., Jefferson co., N. Y., on Black River and its canal, 23 m. by rail E. of Watertown. It has extensive water-power. Pop. 1880, 1912.

Carthago Nova. See CARTAGENA.

Carthamine, a dyestuff obtained from the *Carthamus tinctorius*, a plant which is a native of India and Egypt and is sometimes called safflower. (See SAFFLOWER.)

Carthusians [Lat. *Carthusiani*; Fr. *Chartreux* (fem. sing. *Chartreuse*)], a monastic order founded in Fr. in 1084. It was sanctioned by the pope in 1170, and was propagated in Eng. and It. The monasteries of these monks in Eng. were called charter-houses, a corruption of the Fr. *Chartreuse*. Their rules require the performance of manual labor, abstinence from meat, and perpetual silence.

Cartier, kar-te-ā' (JACQUES), a Fr. navigator, b. at St. Malo Dec. 31, 1494. He discovered the river St. Lawrence in 1534, and ascended it as far as the site of Montreal. He returned to Fr. in 1536. D. about 1554.

Cartoon [Fr. *carton*; It. *cartone*, from the Lat. *charta*, "paper"], in the fine arts, is a design drawn on paper for a picture or for tapestry. The C. is of the same size as the work to be executed from it. The most famous C. are those of Raphael, of which there were 25, which were sent to Flanders to be reproduced in tapestry for Pope Leo X. This having been done, the C. were thrown aside, and most of them were lost or destroyed. Seven which had been preserved were purchased by Rubens for Charles I. of Eng., after whose death they were bought by Cromwell for the nation. They are now preserved at Hampton Court, Eng., and are well known by engravings. Their subjects are, *Paul Preaching at Athens*, *The Death of Ananias*, *Elymas Struck with Blindness*, *Chr. Delivering the Keys to Peter*, *The Sacrifice at Lystra*, *The Apostles Healing the Sick in the Temple*, *The Miraculous Draught of Fishes*.

Cartwright (EDMUND), an Eng. clergyman, noted as the inventor of the power-loom, b. at Marnham Apr. 24, 1743. He wrote *Arminia and Elvira* and other poems. In 1785 he exhibited his first power-loom, the introduction of which was violently opposed by the operatives, who burned a mill having 500 of his looms. D. Oct. 30, 1823.

Cartwright (PETER), D. D., a Meth. preacher, b. in Amherst co., Va., Sept. 1, 1785. He labored with great success for upward of 60 yrs., chiefly in the Miss. Valley, and is said to have preached 18,000 sermons. D. Sept. 25, 1872.

Cartwright (SAMUEL A.), M. D., a phys. of the S. W., and who was chief surgeon during Andrew Jackson's campaigns. Was b. in Va. in 1793, studied med. under the celebrated Dr. Rush, and grad. at the Univ. of Pa. He commenced the practice of his profession in Huntsville, Ala., but soon moved to Natchez, Miss. He received valuable medals and prizes on medical topics—for he was a vigorous writer—especially for his labors on yellow fever, cholera infantum, etc., and a golden testimonial from the planters of his own co. for his successful treatment of the Asiatic cholera. In 1848 he removed to New Orleans. While endeavoring to improve the sanitary condition of the S. troops stationed near Pt. Hudson and Vicksburg he contracted the disease of which he d. C.'s treatment of hemorrhoids by the sulphate of iron was generally adopted in the army, and that for pre-

vention of the constitutional symptoms of syphilis was confirmed in the New York Hospital.

Carver (JOHN), a native of Eng., came in the Mayflower to Amer. in 1620, and was elected first gov. of the Plymouth Colony. D. Apr. 1621.

Carving, a branch of sculpture, or engraving on metals, bone, stone, wood, and ivory. Ivory was the favorite material from an early period, and C. on ivory formed an important branch of early Chr. sculpture. Ornamental C. is now executed on a large scale by various machines.

Cary (ALICE), a writer, b. near Cin., O., Apr. 26, 1820. She began writing for periodicals at age of 18; in 1852 took up her residence in New York, where she wrote largely both in prose and verse. Wrote *Cloverbrook*, *Hagar*, *Married not Mated*, *Pictures of Country Life*, and *The Lover's Diary*. D. Feb. 12, 1871.

Cary (PHÆBE), sister of Alice Cary, b. near Cin., O., Sept. 4, 1824. She shared in the earlier literary work of her sister, whom she accompanied to New York in 1852. Beside hymns and occasional poems, she wrote *Poems and Parodies* and *Poems of Faith, Hope, and Love*. D. July 31, 1871.

Cary (SAMUEL FENTON), b. in Cin., O., Feb. 18, 1814, grad. at Miami Univ. 1835, at the Cin. Law School 1837; was in Cong. 1867-69, serving on important committees, and the only Republican in House of Reps. who voted against the impeachment of Pres. Johnson.

Caryatides (women from Caryæ), an architectural term denoting female figures used instead of columns as support.

Caryocar, a genus of large trees of the order Rhizobolaceæ, which comprises but few other genera. They are natives of Brazil and Guiana, and are sometimes called pekea trees and butter trees. The fruit is a drupe or nut which has a soft, edible, and delicious kernel, and is known by the names of butter-nut and souari-nut. The drupe contains, beside the kernel, a pulp which is like butter, and is used in cookery as a substitute for it. Oil of good quality is obtained from the kernels. The timber of the C. is good for ship-building. The C. *nucifera* is cultivated in the island of St. Vincent.

Caryota, a genus of palm, sometimes called the jagery-palm or sugar-palm, growing in India and Ceylon. *C. urens*, a lofty, spreading tree, yields a large amount of fermentable juice (toddy) when its spathes are incised; this is boiled down to produce sugar. Its farinaceous pith resembles sago, and its fibres are used for making ropes.

Casareep, **Cassareep**, or **Casaripe**, a condiment made of the juice of the bitter cassava or manioc root, which in a raw state is poisonous. It is used to flavor many dishes, and is the prin. ingredient in the W. I. *pepper-pot*. It is also a powerful antiseptic.

Casaubon, kah-zo-bōn' (ISAAC), a Prot. scholar and critic, b. of Fr. parents at Geneva Feb. 18, 1559, was appointed prof. of Gr. at Geneva in 1582. He edited, with valuable notes, Athenæus, Polybius, Aristotle, Strabo, and others. In 1599 he removed to Paris, where he taught Gr., and was made royal librarian by Henry IV. He was appointed prebendary of Canterbury, Eng., by James I. D. July 1, 1614.

Cascade Range, a chain of mts. in Or. and Wash. Terr., nearly parallel with the Pacific coast, from which its mean distance is about 120 m. The Columbia River breaks through this range, forming the cascades, from which its name is derived. The highest summits are Mt. Hood, about 11,200 ft., and Mt. Jefferson, in Or. Mt. St. Helen, 12,000 ft., is a volcano, and Mt. Rainier, 14,444 ft.

Cascari'la [diminutive of Sp. *cascara*, "bark"], a name given in S. Amer. to different kinds of bitter medicinal barks, including Peruvian bark. European and Amer. phys. apply the term to the bark of the *Croton Eleutheria*, a small W. I. tree.

Casco Bay, in Me., washes the shore of Cumberland co., and is about 20 m. long. The city of Portland is at the W. extremity of this bay, which incloses about 300 islands.

Casene, kâ'se-in [from the Lat. *caseus*, "cheese"], a nitrogenous organic substance allied to albumen, found in milk. It is also found (as legumine, and probably as amandine, both being regarded as identical with it) in peas, beans, almonds, and other seeds. Vegetable and animal C. behave exactly alike with chemical tests, and when pure cannot be distinguished by the taste. The proportion in cow's milk is about 4 per cent.; in dried peas, 25 per cent. C. is coagulated (curdled) by acids or by rennet, and is the chief constituent of cheese. It also forms insoluble precipitates with corrosive sublimate, with nitrate of silver, and with acetate of lead. Hence, copious draughts of milk afford a ready antidote in cases of poisoning with either of the above salts.

Casey (SILAS), b. July 12, 1807, at East Greenwich, R. I., grad. at W. Pt., 1826, and Oct. 9, 1861, became col. 4th Inf., and May 31, 1862, maj.-gen. U. S. volunteers. He served on W. and N. frontiers 1826-36, in Fla. war 1837-41, in war with Mex. 1847-48, and during the c. war he served in preparing volunteers for the field at Wash. 1861-62, in the Va. peninsula 1862, and as pres. of board for examination of officers of colored troops 1863-65. Brevet maj.-gen. U. S. A. Mar. 31, 1866. Compiled and edited a system of *Inf. Tactics* for the U. S. service 1862, and *Inf. Tactics for Colored Troops* 1863, and was retired July 8, 1868. D. Jan. 22, 1882.

Casey (THOMAS L.). See APPENDIX.

Cashel, a town of Ire., 105 m. by railway S. W. of Dublin and 49 m. N. N. E. of Cork. It is built on the slopes of an isolated limestone hill rising abruptly from a rich plain. C. was the residence of the kings of Munster, and is now a bp.'s see. The top of the hill, called the "Rock of C.", is occupied by the most interesting ruins in Ire. These consist of a round tower 90 ft. high, the palace of the kings of Munster, a chapel of Sax. and Norman arch., and a cathedral founded in 1169, and said to have been the largest in the country. It was built of limestone. Pop. 3976.

Cashew-Nut (*Anacardium occidentale*), a tree of the order Anacardiaceæ, is a native of the tropical parts of Amer., and perhaps of Asia. It abounds in a clammy,

milky, and acid juice which turns black on exposure to the air, and is used in India as a varnish. The fruit is a kidney-shaped nut attached to the larger end of a pear-shaped, fleshy stem, from which the botanical character of the genus is derived. The shell, which is double, incloses an oily kernel which is very agreeable and wholesome, and is a common article of food in tropical countries. The fleshy stem, sometimes called the C.-apple, is also edible and refreshing, having an acid taste. In size it is nearly equal to an orange. A pleasant vinous beverage is prepared from its fermented juice. The oil is used as a remedy for leprosy. C. is a corruption of the Fr. *acajou*.

Cashgar. See KASHGAR.

Cashmere, *kash-meer'* (anc. *Caspira*), a country of N. India, between 32° 30' and 34° 55' N. lat., and 72° 20' and 79° 40' E. lon. Its area is said to be 60,100 sq. m. N. N. W., W. S. W., and S. it adjoins the Punjab; on the N. N. E. and E. the Indus separates it from Tibet; S. E. and S. its valleys run into those of Tibet.

Surface.—C. consists of part of the Himalaya range of mts. and some elevated but beautiful valleys. The valley of C., 5100 sq. m., is surrounded by the Himalayas, and at its lowest depression is 5500 ft. above the sea. It contains several lakes, and is wondrously beautiful and fertile. The other valleys, though less extensive, are very attractive. The Himalayas have one peak in C. (Panjal) 15,000 ft. high; there are several passes in the mts., but none practical for carriages. The Indus half surrounds C., but the prin. river of the valley of C. is the Jhyum, which traverses the middle of the valley and escapes through the Baramoola Pass.

Productions.—The soil is mostly very fertile in the valleys; some of it requires irrigation. It yields great crops of rice, wheat, barley, maize, and excellent fruits—apples, pears, peaches, apricots, cherries, etc. The forests are of deodar (a species of cedar), pine, and walnut. Large herds of cattle and goats are pastured on the mt.-slopes, and the hair or wool of the CASHMERE GOAT (which see) is in great demand for the C. shawls made here. Firearms are made in C., and precious stones are cut.

History.—Conquered by emp. Akbar in 1586, and annexed to Mogul empire; Afghans held possession 1752-1819, and Sikhs 1819-1849; that yr. ceded to the Brit., who transferred it to Gholab Sing, whose C. empire is composed of C., Baltistan, and Ladak and Ladak.

Population about 3,000,000, mostly Mohammedans. Of these, 400,000 are in the valley of C. The people are of good stature and great physical beauty. Cap. and chief city, Serinagar or Cashmere. L. P. BROCKETT.

Cashmere Goat, a variety of the goat remarkable for its long, fine, and silky hair, from which C. shawls are made. It is found in Tibet, from which the finest hair is imported into C., to be there manufactured. The hair is longer than that of the Angora goat, and not, like it, curled, but straight. Attempts have been made to introduce the C. G. into Europe and Amer. A mixed race, produced by crossing the C. and the Angora goat, has valuable qualities, hair long, fine, and more abundant than in the parent breeds.

Casimir III., surnamed the GREAT, king of Poland, b. in 1300, was a son of Ladislaus, king of Poland, whom he succeeded in 1333. He enlarged his dominions by the conquest of Red Rus about 1366, and repelled the aggressions of the Tartars. D. Nov. 8, 1370, and was succeeded by his nephew, Louis of Hungary.

Casimir IV., son of the prince Jagello of Lithuania, b. Nov. 29, 1427, was in 1444 elected king of Poland. He carried on a war with the Teutonic Order, which in the peace of Thorn (1466) had to cede W. Prus. to Poland, and by conyoking in 1468 the nobility became founder of the Polish const. D. June 7, 1492.

Caspian Sea [Lat. *Mare Caspium* or *Mare Hyrcanum*; Gr. *Κασπία Θάλασσα*], a large inland sea forming part of the boundary between Europe and Asia. It is 690 m. long, with an average breadth of about 200 m., having an estimated area of 156,800 sq. m. In the N. it is shallow, the depth at 100 yards from the shore being not more than 3 ft.; in the S. the greatest depth is nearly 3000 ft. Its surface is about 84 ft. below that of the Black Sea. It has no outlet, and though it receives several large rivers, the water is salt. Its anc. extent was much greater than at present. Rus. steamers ply upon it, and it is indirectly connected with the Baltic by a canal between the Volga, which falls into the C., and the rivers Tvertza and Schlina.

Cass (Lewis), LL.D., a statesman, b. at Exeter, N. H., Oct. 9, 1782. He studied law, which he began to practise at Zanesville, O., in 1802; entered the army as a col. in 1812, served in Canada under Gen. Hull, and was taken prisoner; was raised to the rank of brig.-gen. in 1813, and appointed gov. of Mich. Terr. in 1814; was appointed sec. of war by Pres. Jackson in 1831; was sent as minister to Fr. in 1836, returned home in 1842, and was elected a Senator of the U. S. for Mich. in 1844. Having opposed the Wilmot Proviso, he was nominated as Dem. candidate for the presidency of the U. S. in 1848, but was defeated by Gen. Taylor, the Whig candidate, who received 163 electoral votes to 137 for Gen. C. In Jan. 1849 he was re-elected to the Senate of the U. S. He supported Douglas's Kan.-Neb. bill in 1854, and was sec. of state Mar. 1857; resigned in Dec. 1860. D. June 17, 1866.

Cassander [Gr. *Κασσανδρος*], a Macedonian prince, was a son of Antipater, regent of Macedonia. He married Thessalonice, a sister of Alexander the Great, and obtained possession of Alexander's infant son, whom he put to death in 309, and usurped the throne. He joined Seleucus and Ptolemy in a coalition against Antigonus, whom these allies defeated at the battle of Ipsus in 301 B. C. D. 297.

Cassandra [Κασσανδρία], a Trojan princess, a daughter of Priam, was celebrated for her prophetic inspiration. Apollo was said to have been enamored of her, and to have taught her the secrets of fate, but ordained that her prophecies should not be credited. She was carried away as a captive by Agamemnon.

Cassa'va, a name of the plant called manioc or manihot, and of the starch prepared from its root; known in the U. S. by the name of tapioca.

Cassel (anc. *Castellum Caltorum*), a city of Pruss., on the river Fulda, 132 m. W. of Leipsic and 28 m. S. W. of Göttingen, and is connected by railways with Leipsic, Frankfurt, and other towns. It contains a museum, with a library of 100,000 vols., an observatory, picture-gallery, acads. of painting and sculpture, and the palace of the former electors of Hesse. In the environs is the royal palace of Wilhelmshöhe. Pop. 1880, 58,200.

Casselton, Dak. See APPENDIX.

Cass'lerly (EUGENE), b. in Ire. in 1822. In 1824 he emigrated to Amer. with his parents; became a lawyer and journalist of New York; removed to Cal. in 1850, and became an ed. in San Francisco. In 1869 was chosen U. S. Senator from that State; resigned in 1873. D. June 14, 1883.

Cassia, *kash-she'a*, a fragrant bark mentioned in the Bible, and supposed to be the C.-bark of the shops, a coarse variety of cinnamon from China, Anam, and other E. countries. It is generally sold as cinnamon, which it much resembles, though cheaper and generally inferior in quality. It yields the oil of cinnamon. "C. buds" are the dried flower-buds which are brought from Chi.

C. is the name of a genus of leguminous herbs, shrubs, and trees, natives of both continents. Several Afr. and Asiatic species are valuable for their leaves, which when dried constitute the drug *senna*. The U. S. have numerous species, one of which (*C. Marilandica*) yields leaves which have the cathartic properties of senna.

Cass'ican, a name applied to the S. Amer. genus *Cacicus*, of the family Icteridae, of which the *C. citreus* is the best known, on account of its skillful nest-building.

Cass'in (JOHN), a naturalist, b. in Del. co., Pa., Sept. 6, 1813. Wrote *Amer. Ornithology: a Gen. Synopsis of N. Amer. Ornithology, containing Descriptions and Figures of all N. Amer. Birds not given by former Amer. Authors* (1856). D. Jan. 10, 1869.

Cass'ni, *kahs-see'ne* (GIOVANNI DOMENICO), an astron., b. near Nice June 8, 1625. He discovered in 1665 that Jupiter performs a rotation in 9 hours and 56 minutes, and pub. in 1668 his ephemerides of the satellites of Jupiter; in 1669 he was made director of the observatory of Paris. In 1684 he discovered four satellites of Saturn. D. Sept. 14, 1712.

Cassiodorus (MAGNUS AURELIUS), a Lat. historian and minister of state, b. at Scylacium (Squillace), in It., about 469 A. D. He entered the service of Theodoric, king of the Ostrogoths, about 497, and became his chief minister. He wrote, beside works on gram. and rhetoric, a *Hist. of the Goths* and a valuable collection of state papers entitled *Variarum Epistolarum Libri XII*. D. 575.

Cassiope'a, or *-pia*, *Cassiope'a*, or *Cassi'ope* [Gr. *Κασσιόπεια*, *Κασσιόπεια*, *Κασσιόπη*], in classic mythology, the wife of Cepheus and the mother of Andromeda; said to have been transformed into a constellation.

Cassiope'ia, a constellation in the N. hemisphere, having several stars of the third magnitude. In Nov. 1572 a new and brilliant star suddenly appeared in C., said to have surpassed all the other fixed stars in splendor. It disappeared in Mar. 1574, after a gradual diminution of lustre.

Cassiquiare, *kahs-se-ke-ah'ra*, or *Cassiquiari*, a river of S. Amer., in Venezuela, is a deep and rapid stream, forming the S. bifurcation of the Orinoco. It issues from the Orinoco about lat. 3° 10' N. and lon. 66° 20' W., and flowing south-westward about 130 m. enters the Rio Negro near San Carlos. This remarkable river opens a navigable communication between the Orinoco and the Rio Negro. It is 600 yards wide at its entrance into the latter.

Cas'sis, the Fr. name of the black currant bush and its fruit. A liqueur called *liqueur de C.* is made from the fruit, and is used in Europe very extensively.

Cassiter'ides [from the Gr. *κασσιτερος*, "tin"], the anc. name of certain islands (supposed to be the Scilly Isles) from which the Phenicians procured tin.

Cassiterite [from the Gr. *κασσιτερος*, "tin," and *λίθος*, "a stone"], native peroxide of tin, composed, when pure, of 21.62 per cent. of oxygen and 78.38 of tin. It is the common ore of tin, and the only one from which the metal is obtained.

Cas'sius Longi'nus (CAIUS), a Rom. conspirator and gen., was a friend of Marcus Brutus, whose sister he married. In the c. war that followed the death of Crassus he fought for Pompey against Cæsar. He was one of the conspirators who killed Cæsar in 44 B. C. Joining his Syrian army with that of Brutus, these two republican leaders met Antony and Octavius at Philippi in 42 B. C., were there defeated, and then killed themselves.

Cas'sius Parmen'sis, or *Ca'ius Cas'sius Seve'rus*, a Lat. poet who wrote epigrams and elegies. He was one of the conspirators against Cæsar; put to death about 30 B. C. Only small fragments of his works are extant.

Cassivelaunus, or *Cassibelaunus*, sometimes Anglicized as *Cassib'elan*, a chief of the anc. Britons who ruled over the country N. of the Thames. He resisted the invasion by Cæsar, 54 B. C., but was overcome and forced to pay tribute to the Romans.

Cassopolis, Mich. See APPENDIX.

Cas'sowary (*Casuarus*), the popular name of birds of the genus *Casuarus* and family Casuariidae, and characterized by the long crest on the forehead and crown. About 12 species are known, most of which have pendent wattles on the naked neck. These birds (the largest about 5 feet high) inhabit the Moluccas, New Guinea, and N. Australia.

Cast'lia, or *Cast'aly* [Gr. *Κασταλία*], a fountain which issued at the base of Mt. Parnassus, near Delphi, and was sacred to Apollo and the Muses. It is now called the fountain of St. John.

Castañ'os, de (FRANCISCO XAVIER), duke of Baylen, a Sp. gen., b. Apr. 22, 1756. He defeated the Fr. gen. Dupont at Baylen in July 1808, and captured his army, amounting to

18,000 men. He distinguished himself at the battle of Victoria, June 1813; was appointed cap.-gen. in 1823. D. Sept. 24, 1852.

Caste, kast, a term designating the hereditary classes of society in India, established from time immemorial. According to the *Institutes of Manu* there are 4 distinct and separate C.: (1) The *Brahmans*, or sacerdotal C., sprung from the mouth of Brahmā; (2) the *Kshatriyas*, or military C., from his arm; (3) the *Vaisyas*, or mercantile and agricultural C., from his thigh; (4) the *Sudras*, or servile C., from his foot. Beside these there are several mixed C., which are held to be not only servile, but so impure that any contact with them is pollution. The term *Pariah* is used to designate any of the degraded classes. It is not improbable that the 3 higher C. belonged originally to the Aryan race, who conquered India in pre-historic times, while the lowest C. is sprung from the subjugated aborigines. While the distinctive vocation of the Brahmans is that of the priesthood, many of them at the present day are soldiers or traders. But though every Brahman is not a priest, every priest must be a Brahman. To the Kshatriyas belong the kings, chiefs, and soldiers, although Brahmans have not unfrequently been rulers. To the Vaisyas belong properly agriculturists, herdsmen, traders, and artisans, but these occupations are often pursued by the 2 higher C. The place of the Sudras is to serve the higher C., but the lowest and most degrading work is assigned to the mixed or impure C. The lowest of all is a *Chandala*, the offspring of a Brahman woman and a Sudra, whose very shadow, falling upon a Brahman, works pollution. The person and property of a Brahman are, at least in theory, inviolate. It may be questioned whether the inst. of C. ever practically prevailed to its full extent as laid down in the *Institutes of Manu*, but it is certain that it lay at the very foundation of all Hindoo social life, and though somewhat weakened in modern times it exercises a marked influence upon the manners and customs, the habits and beliefs of the people, forming a mighty impediment to the progress of Christianity and civilization. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. J. THOMAS, LL.D.]

Castelar (EMILIO), a Sp. orator and republican, b. in 1832. He founded in 1864 a journal called *La Democracia*, in which he developed his social and political principles; was condemned to death in 1866, but escaped to Fr.; in 1868 he returned to Sp., and became a member of the Cortes and a leader of the republican party. He is considered the most eloquent political orator in Sp. He became minister of foreign affairs Feb. 12, 1873, and pres. of the Sp. republic Sept. 9, 1873, to Jan. 2, 1874.

Castile, kas-teel' [Sp. *Castilla*, the "land of castles"], a former kingdom of Sp. which occupied the central tableland of the peninsula, and was the nucleus and central seat of the Sp. monarchy. The Castilians were considered the typical Spaniards, who spoke and still speak the lang. in its purest form. The kingdom of C. was founded about 1035 by Ferdinand I., who conquered Leon and annexed it to C. By the marriage of Ferdinand and the Catholic with Isabella of C. in 1469, C. and Aragon were united into one kingdom. Subsequently separated into Old C. and New C., now divided into 12 provs. Area, 46,493 sq. m. Pop. 3,021,799.

Castile, on R. R., Wyo. co., N. Y. Pop. 1870, 712; 1880, 965. **Castilla** (DON RAMON), a gen. in the Peruvian war of independence, b. Jan. 21, 1797; after the annexation of Peru to Bolivia in 1835 he fled the country. He returned upon the restoration of independence in 1839, and became finance minister. In the second war with Bolivia he was taken prisoner and exiled; he returned in 1844, deposed the dictator Vivanco, and became pres. of Peru 1845-51; re-elected in 1855, and again in 1858. D. May 30, 1867.

Cast'ing Vote, the vote of the presiding officer of a public assembly or of a legislative body, by which the question is decided whenever the votes of the members are equally divided. The V.-P. of the U. S., who is pres. of the Senate, and the speaker of the Brit. Parl. do not vote except in case of a tie.

Castle, kas'l [Sax. *castel*; Lat. *castellum*, dimin. from *castrum*, a "camp"], a building constructed as a dwelling, as well as for the purpose of repelling attack. The name is especially given to buildings of this kind constructed in Europe in the Middle Ages. The *castella* of the Romans were constructed on the model of their stationary encampments, and may have suggested the C. of the Middle Ages, though designed for military purposes only. The protection which the C. afforded to the retainers of a baron led to the construction of houses around the moat, and to this custom a great many towns in Europe owe their origin.

Castlereagh, kas-s'l-rā' (ROBERT STEWART), VISCOUNT, marquess of Londonderry, a Brit. Tory statesman, b. in the co. of Down, Ire., June 18, 1769. He entered the House of Commons in 1794, and efficiently promoted the union of Ire. with Eng. In 1800; became sec. of state for the dept. of war and the colonies in 1805, and fought a duel with George Canning in 1809. He entered the ministry of Lord Liverpool as sec. for foreign affairs in Feb. 1812, and as such was a powerful director of the coalition against Nap. He represented G. Brit. at the Cong. of Vienna 1814, and the Cong. of Paris 1815. Committed suicide Aug. 12, 1822.

Castor. See BEAVER.

Cast'or (ANTONIUS), an anc. phys. of high reputation who lived at Rome and d. about 80 A. D. Pliny states that he had a botanic garden, the first mentioned in hist.

Cast'or and Pollux [Gr. *Κάστωρ* and *Πολυδύκης*], the 2 prin. stars in the constellation Gemini. C. is a binary star, the components of which revolve around their centre of gravity in a period of 253 yrs.

Castor and Pollux [Gr. *Κάστωρ* and *Πολυδύκης*], heroes of classic mythology, called also **Dioscu'ri** ("sons of Jove"), were twin brothers. They were supposed to be sons of Jupiter and Leda, or, as some say, of Tyndareus and Leda. They took part in the Argonautic expedition and the Calydonian hunt. C. excelled in horsemanship, and

P. in pugilistic contests. According to tradition, P. was immortal, and when C. was killed offered to share his fate, and they were permitted to enjoy life by turns. They were translated into or identified with the constellation Gemini, "The Twins."

Castoreum, or **Cast'or**, a substance secreted in 2 glandular sacs closely connected with the reproductive organs of the beaver (*C. fiber*). It was formerly esteemed a remedy for hysteria and other diseases.

Castor'idæ, a family of Rodents comprising the beaver (*Castor*), distinguished by the depressed oval and scaly tail.

Castoroid'idæ, an extinct family of Rodents allied to the beavers, represented by the genus *Castoroides*.

Cast'or Oil (*Oleum Ricini*), a fixed oil from the seeds of the C.-O. plant. The best variety is obtained by pressure in the cold, and is known as *cold-pressed* C. O. But the warm-pressed oil is the pleasantest as a med. In the Indies great quantities are prepared by boiling the seeds, but the oil is irritating, dark in color, and not fit to use as a med. Exposure to the sun's light bleaches the oil. When pure, C. O. is of a light yellow color, but when of inferior quality it has a greenish and occasionally a brownish tinge. It is sometimes thick and viscid. The prin. acid present in it is ricinolic, allied to oleic acid.

The C.-O. PLANT (*Ricinus communis*) is a native of the S. of Asia and of N. Afr., naturalized in the S. of Europe and in other warm regions. It belongs to the order Euphorbiaceæ, and has panicle flowers; the fruit a three-celled capsule, with one seed in each cell. The C.-O. plant is often cultivated in gardens in Europe and the U. S., where except in S. Fla. it is only an annual, attaining a height of 3 to 10 ft., highly ornamental by its stately growth, its large, broad, palmate peltate leaves, and its purplish hue. In warmer climates it is perennial, and becomes arborescent, attaining even 30 ft. in height.

Cas'well (ALEXIS), D. D., LL.D., b. Jan. 29, 1799; was prof. of math. in Brown Univ. from 1828 to 1864, pres. of that inst. from 1868 to 1872, and one of the incorporators of the National Acad. of Sciences. D. Jan. 8, 1877.

Caswell (RICHARD), b. in Md. Aug. 3, 1729, removed to N. C., where he served with distinction against the Brit., and subsequently became gov. of the State. He assisted in framing the Federal const. in 1787. D. Nov. 9, 1789.

Cat [a word found in various forms in many Indo-European and in some other langs.], a name sometimes extended to the whole family Felidæ, including the lion, tiger, lynx, etc., sometimes limited to the smaller species of that family, and sometimes to the genus *Felis* proper, and popularly associated with the common animal so well known under that designation. The domestic C. of anc. Egypt was the *Felis maniculata*, and this is regarded as the prin. parent stock of the common domesticated form. The races of different countries may, however, have been adulterated with the native wild species. Among the more remarkable varieties are the Manx or Cornish C., with a merely rudimentary tail; the Angora C., with long hair; the Maltese and Chartreuse C., with a bluish-slate color, etc. The wild C. of Europe is congeneric with the tame species, but that of N. Amer. is a species of lynx.

Cat'acombs [from the Gr. *κατά*, "down," and *κύμβη*, a "hollow"], a pit or excavation under ground, often used as a receptacle for the dead. The name is applied especially to those at Rome, but also to those of other places. Even the quarries under Paris, now used as charnel-houses, are often called by this name. The Rom. C. were used by the early Chrs. as hiding-places during persecutions, and abound in devotional symbols, which throw much light upon Chr. archæology.

Cat'alepsy [from the Gr. *κατά*, intensive, and *λαμβάνω*, to "take"], a condition in which a person becomes more or less completely unconscious, but does not fall. If standing at the commencement, he remains so during the attack, the countenance retaining the expression the patient wore at the outset. If the limbs of the patient be placed in a new position by attendants, the position is retained. This disease is a rare one, and indeed is probably not so much a peculiar disease as a symptom of other diseases. It has been observed in both sexes, and may occur in insane persons or in those suffering with chorea and other nervous affections. The attack is usually short, but may be indefinitely prolonged. Treatment must be addressed to the gen. condition. C. is so rare that its character is not well understood.

E. DARWIN HUDSON, J.E.

Catalonia, kat-a-lo'ne-a [Sp. *Cataluña*], an old division of Sp., bounded N. by Fr., E. by the Mediterranean, S. by Valencia, W. by Aragon. The Pyrenees extend along the N. border, which is very mountainous, the higher summits being covered with perpetual snow. C. constituted the Rom. prov. of *Hispania Tarraconensis*. It came successively under the dominion of the Goths and the Moors, and in 1137 was united with Aragon by a marriage of the sovereigns. The Catalans speak a peculiar lang., different from the Castilian and rich in lit. The old C. is now divided into 4 provs. Area, 12,514 sq. m. Pop. 1,749,708.

Catal'pa, a genus of trees of the order Bignoniaceæ. The *C. bignonioides* is indigenous in the S. U. S., and is planted as an ornamental tree in the N. States and in Europe. It has large cordate and pointed leaves, and showy flowers in open compound panicles. The fruit is a pod which is often 1 ft. long, usually remaining on the tree all winter.

Catal'ysis [from the Gr. *κατά*, intensive, and *λύω*, to "dissolve"] is a term applied in chemical physics to a force exerted by one substance upon a second, whereby the latter is subjected to change or decomposition, whilst the former, or acting substance, remains comparatively unaltered, and does not combine with it. The force, indeed, has been ascribed to the mere "action of contact." No satisfactory theory has been brought forward to account for these changes, or to define what the force of C. is.

Catamount. See PUMA.

Catania, ka-ta-ne-a (anc. *Catanæ*), a city on the E. coast of Sic., near the foot of Mt. Etna, 31 m. N. N. W. of Syracuse. It was founded, probably by the Phœnicians, about the time of the building of Rome, was taken by the Athenians 413 B. C., and was an important city under the Romans, who adorned it with magnificent edifices. It has been several times nearly destroyed by eruptions from Etna, and by earthquakes, the most destructive of which were in 1693 and 1783, but has always been rebuilt better than before. The pavements of the streets and many of the buildings are of lava. Pop. 1881, 97,355.

Catapult [Lat. *catapulta*, from the Gr. *katá*, intensive, and *ταλάω*, "to hurl"], an engine of war used by the ancients for discharging arrows. The term is sometimes used synonymously with ballista, but originally the former denoted engines for discharging bolts and arrows, the latter those for hurling huge stones.

Cat'aract [Gr. *καταράκτης*, from *katá*, "down," and *ῥήγνυμι*, "to break"], an opaque state of the crystalline lens of the eye, of its capsule, or both. C. is generally white, but sometimes is brown, black, bluish, silvery, etc., and sometimes has a pearly lustre. It begins in a gradual impairment of vision, some months generally elapsing before sight is lost. The patient sees as in a mist, but almost always can perceive at least the presence of light. One or both eyes may have C. It is most frequent in elderly persons, but may occur at any age; children are sometimes born with it. Medical treatment for C. is useless, but the skillful surgeon can treat the disease often with the happiest results. The place of the lens is supplied by a kind of spectacles called C. glasses. By these means the sight is often to a great degree restored. E. DARWIN HUDSON, JR.

Cataracts and Rapids. The regular slope of the river-bed is sometimes interrupted by more inclined and rocky planes, over which the stream, flowing with increased velocity, forms *rapids*; or is broken by abrupt and nearly perpendicular walls, from which the foaming water descends from rock to rock, or in a single leap, in imposing *cataracts* and picturesque *waterfalls*. Usage, however, often confounds these names. The famous C. of the Nile are merely rapids, which do not entirely impede navigation. The rapids of the St. Lawrence at Long Sault and Lachine, above Montreal, are among the noblest examples in our Amer. rivers. The highest waterfalls are found in mountainous regions in the upper course of rivers; the largest in their middle course. Among the first, that of the Yosemite, in Cal., falls in 3 leaps from an almost perpendicular ledge of rock over 2500 ft. high. The Keefoss, in Nor., the highest fall in Europe, has an uninterrupted descent of 200 ft.; the Staubbach, in the Swiss Alps, falls from a 900-ft. wall, and is reduced to spray before reaching the ground. Among the great C. of the middle course of rivers, Niagara takes the first rank; others equal in picturesque beauty, though not in grandeur, are the Shoshonee, in the Snake River, Id.; the Victoria Falls of the Zambesi, in the heart of S. Afr., and the Falls of the Rhine. A. GYOR.

Catarrah. See NOSTRILS, DISEASES; THROAT DISEASES.

Catasauqua, R. R. junc., Lehigh co., Pa., on the Lehigh River, 3 m. N. of Allentown. Pop. 1870, 2853; 1880, 3065.

Catawba, the name of a wine of a rich muscadine flavor, produced in various parts of the U. S. It is made of the C. grape, which originated probably near the C. River in N. C. The best sparkling C. is considered nearly equal to champagne.

Cat-Bird (*Galeoscoptes Carolinensis*), a bird common in the U. S., which derives its name from its note. The plumage is lead colored, with black cap and chestnut-red under tail coverts. Its song in the spring, sometimes imitating that of other birds, is attractive and beautiful.

Catechu, kat'e-kū [etymology uncertain], a material employed in tanning leather, as a coloring-matter, and medicinally as an astringent. The C. of commerce is derived from E. I. trees, such as the C. tree (*Acacia C.*); also from the areca-palm and various other trees. It is known in India by the name *kutt* (our cutch). C. is brittle, soluble in water, and possesses an astringent taste, but no odor. It affords permanent colors, and is employed in the dyeing of blacks, browns, fawns, drabs, and greens. It contains much tannin, which is of a peculiar kind, called mimos-tannic acid, also catechuic acid, which can be isolated in white silky crystals. It is sometimes adulterated with earthy substances, but its solubility in water and alcohol at once reveals their presence. (See GAMBIR.)

Catenary [Lat. *catena*, a "chain"], the curve assumed by a heavy cord or chain when hanging freely suspended between 2 fixed points. It is an important curve to the engineer, for its application to the theory of arches and its use in the construction of suspension bridges.

Cat'erpillar, the larval or vermiform state of lepidopterous insects—i. e. butterflies and moths.

Catesby, kät's-be (MARK), F. R. S., an Eng. naturalist and artist, b. in 1679; visited Amer. in 1710. Wrote a *Nat. Hist. of Carolina, Fla., etc.*, with colored figures drawn and etched by himself. D. Dec. 24, 1749.

Cat'fish (*Pimelodus*), a name applied to numerous fishes of the family Siluridae in the U. S. and among Eng.-speaking peoples. The N. Amer. fresh-water species belong to the genera *Amiurus*, *Ichthyurus*, *Hoplosternus*, and *Noturus*. They are also called bullheads and pouts. C. have been taken in the Miss. weighing nearly 200 lbs. The sea catfishes are *Antipops felis* and *Eleutheronotus murinus*.

Cat'gut, a material employed for the strings of violins and other musical instruments, for the cords used by clock-makers, bow-strings, fishing-lines, and for belt-stitching in mills, etc. It is generally prepared from the intestines of sheep, and sometimes from those of the horse and ass. It is prepared by an elaborate process, and preserved from putrefaction by treating it with a dilute solution of alkali. The best violin strings are manufactured in It., and are called Rom. strings.

Ca'tha, a genus of plants of the natural order Celastraceae. The *C. edulis*, which the Arabs call *khât*, is a shrub, a native of Ar., having narcotic and stimulating leaves, which are eaten by the Arabs. They also make a decoction of the leaves, which is used as a beverage.

Cath'ari [Gr. *καθαροί*, the "pure"], a name applied to various sects of Chrs., such as the Novatians of the 3d century, and to the Albigenes, Patarenes, Waldenses, and others in the 12th century. The name is analogous to "Puritans," and was apparently in some cases assumed, and in others ironically given on account of their professed aim at greater purity of life than was ordinarily attained.

Catharine de' Medici [Fr. *Catherine de Médicis*], queen of Fr., b. at Florence in 1519. She was a daughter of the duke of Urbino, who was a nephew of Pope Leo X. She was married in 1533 to a son of Francis I. of Fr., who ascended the throne as Henry II. in 1547. On the death of her son, Francis II., in 1560, she became regent of Fr. during the minority of Charles IX., who was her son. Her intrigues promoted the civil or religious war. She also appears to have been one of the instigators of the massacre of St. Bartholomew (Aug. 1572). D. Jan. 5, 1589.

Catharine Howard, ^{See} HENRY VIII.

Catharine [Rus. *Ekatérina*], empress of Rus., b. of poor parents at Ringen, near Dorpat, in Livonia, Apr. 15, 1684. Her first husband was a subaltern Swe. officer. Captured by the Rus. in 1702, and married to Peter the Great in 1711. Peter, having invaded Tur. in 1711, was reduced by want of provisions to a critical position, from which he was extricated by C., who bribed the Tur. vizier. Crowned as empress in 1724, and d. May 17, 1727. Her daughter Elizabeth became empress.

Catharine II., empress of Rus., b. at Stettin May 2, 1729, was a daughter of the prince of Anhalt-Zerbst. She was married in 1745 to Peter, a nephew and heir of Elizabeth, empress of Rus. On the death of Elizabeth, in 1761, he ascended the throne as Peter III. In July 1762 he was assassinated by conspirators, of whom C. was probably an accomplice, and she assumed sovereign power, for which she was qualified by superior talents; but she was a woman of very dissolute character. She co-operated with Aus. and Prus. in the partition of Poland in 1772, and in the second partition of 1793. D. Nov. 17, 1796, and was succeeded by her son, Paul I. "Her capacity," says Lord Brougham, "was of an exalted order. Her judgment was clear and sure."

Catharine of Aragon, queen of Eng., a daughter of Ferdinand and Isabella of Castile, b. Dec. 5, 1485. In 1501 she was married to Arthur, eldest son of Henry VII. of Eng., who d. in 1502; in 1509 she was married to Arthur's brother, Henry VIII. The king, who had conceived a passion for Anne Boleyn about 1527, expressed doubts of the legality of his marriage with C., and applied to the pope for a divorce. The disagreement between the pope and Henry VIII. on this subject was one of the causes of the prevalence of Protestantism in Eng. Crommer declared the marriage void in 1533. D. Jan. 7, 1536.

Catharine of Braganza, the queen of Charles II. of Eng., b. in 1638, was a daughter of John IV., king of Port., and brought in dower Tangiers and Bombay. After death of Charles (1685) she returned to Port. in 1683; was made regent by her brother Pedro in 1704. D. Dec. 31, 1705.

Catharine of Valois, queen of Henry V. of Eng. and daughter of Charles VI. of Fr., b. Oct. 27, 1401. After the death of the king C. became the wife of Owen Tudor, a Welsh gentleman. D. Jan. 3, 1437.

Catharine Parr, the 6th wife of Henry VIII. of Eng., b. 1513, was married to Lord Latimer, and after his death became, in 1543, the queen of Henry VIII. After the death of the king she was married to Sir Thomas Seymour. D. Sept. 30, 1548.

Cathartes Aura. See TURKEY-BUZZARD.

Cath'cart (WILLIAM SHAW), EARL OF, a Brit. gen. and diplomatist, b. Sept. 17, 1755. He commanded the land forces which, with aid of the fleet, captured Copenhagen in 1807. In 1813 he was sent as ambassador to St. Petersburg. He was raised to the rank of earl in 1814. D. June 17, 1843.

Cath'rine, SAINT, of Alexandria in Egypt, supposed to have suffered martyrdom early in the 4th century. The whole story, however, is very obscure.

Cath'olic or United Copts, that portion of the Coptic Ch. in Egypt which acknowledges the supremacy of the pope. They number about 13,000.

Catholic Apostolic Church, The, a body of Chrs. known as the *Irvingites*. (See IRVING, EDWARD.)

Catholic [Gr. *καθολικός*, "universal," from *katá*, "throughout," and *όλος*, "all"], **Church**. The phrase cath. ch. is equivalent to "universal ch." and cannot properly be limited to any particular sect or body; yet it is popularly used as synonymous with R. Cath. Ch.

Catholic Emancipation, in Br. hist., the measure enacted Apr. 13, 1829, by which the political disabilities resting upon R. Caths., especially in Ire., were chiefly removed.

Cat'line [Lat. *Catilina*], (LUCIUS SERGIUS), a Rom. demagogue and conspirator, b. about 108 B. C. In his youth he was a partisan of Sulla in the c. war. He was elected prætor in 68 B. C., and afterward aspired to the office of consul. Having been defeated in the election, he formed a conspiracy against the state. It appears that he and his numerous accomplices proposed to massacre the senators and the friends of order, and to involve Rome in a gen. conflagration. The conspiracy was discovered, and C. was denounced in the senate by Cicero. He left Rome in the next night, and went to the camp of Manlius, who was his accomplice and was at the head of an army in Etruria. The army of the senate encountered that of C. near Pistoria (now Pistoia) in 62 B. C., where he was defeated and killed.

Catlettsburg, Ky. See APPENDIX.

Cat'lin (GEORGE), an Amer. traveller and artist, b. at Wilkesbarre, Pa., 1796. He passed some yrs. among the Indians of N. Amer., made a large collection of their curios-

ties, and painted many portraits and other pictures of them. He wrote an illustrated work, *Illustrations of the Manners, etc., of the N. Amer. Indians*. D. Dec. 23, 1872.

Catmint, or **Catnip** (*Nepeta Cataria*), an herbaceous plant of the natural order Labiate, is a native of Europe, and is a common weed in the U. S., but not indigenous here. It has cordate and crenate leaves, which are whitish, downy underneath, and emit a peculiar odor. Cats are extremely fond of this plant, which they eat with avidity and signs of excitement.

Cato (DIONYSIUS), a Lat. moralist of the 3d century, of whom nothing is known; is the reputed author of a small volume of moral precepts, *Disticha de Moribus ad Filium*.

Cato (MARCUS PORCIUS), often called CATO CENSORIUS (i. e., "Cato the Censor") and THE ELDER, a celebrated Rom. statesman and patriot, b. of a plebeian family at Tusculum in 234 B. C. He fought against Hannibal in the second Punic war; then, having removed to Rome, he gained distinction as an advocate in the courts of justice, and was elected praetor in 198 B. C. He was chosen consul in 195, and commanded an army in Sp., where he displayed superior military talents, and was so successful that he received a triumph on his return to Rome. In the year 184 he was elected censor, in which capacity he acted with uncommon rigor. He lived an austere and frugal life, was a zealous assertor of old-fashioned principles, and opposed the growing tendency to luxury, and all innovations. He was an implacable enemy of Carthage, and often repeated in the senate the phrase *Delenda est Carthago* ("Carthage must be destroyed"). He wrote, beside other works, a treatise on agriculture (*De Re Rustica*), which is extant. D. 149 B. C.

Cato (MARCUS PORCIUS), surnamed THE YOUNGER and UTIENSIS (i. e., "of Utica"), a Rom. patriot and statesman, b. in 95 B. C., was a great-grandson of the preceding. He studied and adopted the doctrines and discipline of the Stoic philosophers. In 72 B. C. he served in the campaign against Spartacus. He became tribune of the people in 63 B. C., and co-operated with Cicero, who was then consul, in his efforts to defeat the treason of Catiline and his accomplices. He opposed the triumvirs, Cæsar, Pompey, and Crassus, after they had formed a coalition. He was an uncompromising opponent of corruption, and inflexible in his adherence to what he considered the right and the patriotic policy. In the c. war which began about 49 B. C. he adhered to the side of the senate and Pompey, and soon after the battle of Pharsalia was appointed commander of the army in Afr., but he resigned the command to Scipio. The republican cause being ruined by the defeat of that army at Thapsus in 46 B. C., C. killed himself at Utica the same yr.

Cats [Lat. *Catulus*], JAKOB, a Dut. statesman and poet, b. 1577; studied law and filled high civil offices, being grand-pensionary of Hol. 1636-48, and afterward keeper of the grand seal. He wrote *Moral Emblems*, a collection of songs and allegories. D. 1660.

Cat's-Eye, a variety of chalcodonic quartz of various shades of greenish-gray or brownish-red. It displays, when polished, a pearly opalescence resembling the mutable reflections exhibited by the contracted pupil of a cat's eye.

Cat'skill, cap. of Greene co., N. Y., on R. R. and W. bank of Hudson River, at mouth of C. Creek, 34 m. below Albany. The N. Y. Central and Hudson river R. R. passes on opposite side of the river. Pop. 1870, 3791; 1880, 4320.

Catskill Group, the uppermost division of the Devonian system in Amer., named from the C. Mts., which were supposed to be formed of these rocks. They are mainly red sandstones and shales, and contain as characteristic fossils the scales and bones of large ganoid fishes.

Catskill Mountains, of N. Y., a group of the great Appalachian system. The highest summit, Hunter Mt., has an altitude of 4050 ft. The scenery of this group is diversified by cascades, rocky precipices, small lakes, and deep ravines.

Cat-Tail, or **Cat's-Tail** (*Typha latifolia*), an aquatic herbaceous plant indigenous in the U. S. and Europe. It bears flowers in a long and very dense cylindrical spike terminating in the stem. Its leaves are employed with success in Fr. as a material for paper-making.

Cat'tegat, or **Kattgat** (anc. *Cadanus Sinus*), a part of the ocean which separates Den. from Swe. It communicates with the Baltic by the Great Belt, the Little Belt, and the Sound. On the other side the Skager-Rack joins it to the Ger. Ocean. It is about 150 m. long and 85 m. wide.

Cattell (ALEXANDER G.), b. in Salem, N. J., Feb. 12, 1816, became a merchant of Phila.; in 1855 he removed to N. J., and was U. S. Senator 1866-71.

Cattell (WILLIAM CASSIDAY), D. D., a brother of the preceding, b. at Salem, N. J., Aug. 30, 1827, grad. at Princeton Coll. in 1848, at Princeton Theological Sem. in 1852; was pres. of Lafayette Coll. 1864-83.

Cat'tle (Old Eng. *catel*, "chattels," "goods," because in anc. times a man's C. were his prin. goods), a collective term which in its widest sense includes all domestic animals, and in the usage of some writers includes also deer and other wild grazing animals. In Amer., however, its application is limited very generally to the *Bos taurus*, the domestic ox, the "neat C." or "black C." of Brit. writers. There are many varieties or "breeds" of C. The prin. in the U. S. are of Brit. origin. The old "native" stock is of extremely mixed descent, but of late yrs. much attention has been paid, with the best results, to the rearing of pure-blooded and "grade" stock. The best are the "short-horn" or "Durham" breed, which produce excellent beef; C.: the "Herefords," for working oxen and beef; the beautiful "Devons;" the "Ayrshires," prized for milking qualities; the "Jerseys" or "Alderneys," which yield extremely rich and excellent milk. The continent of Europe has many fine breeds which are little known in the U. S., though the "Dutch" and "Holstein" C. have been introduced. The Tex. C. are descended chiefly from Sp. stock. (See *Johnson's House-keep.* 174-1869.)

Catullus (VALERIUS), a Rom. lyric poet of high reputation, b. at or near Verona about 87 B. C. He became in early life a resident of Rome, and enjoyed the society of Cicero and Cæsar. He wrote, beside numerous odes and epigrams, a heroic or narrative poem entitled *The Nuptials of Peleus and Thetis*, and a poem called *Atys*. The date of his death is unknown. One hundred and sixteen of his poems are extant. They are admired for the exquisite grace and beauty of their style. D. about 47 B. C.

Cauca, a state of the republic of Colombia, traversed by the river Cauca, the valley of which is one of the finest portions of S. Amer., but a large part is mountainous. Area, 257,462 sq. m. Pop. 435,078.

Caucasian (i. e., "pertaining to Caucasus"), a term somewhat loosely and quite improperly used to designate the prin. white races of mankind, including not only all the Aryan races, but the Hebs., Arabs, and Phœnicians. Blumenbach used the term to designate the greatest of his 5 divisions of the human family. Cuvier used it to designate 1 of his 3 great divisions of mankind. Some later ethnologists exclude the inhabs. of the Caucasus from the European family, and class them with the Mongols.

Caucasian Provinces, or **Caucasia**, a portion of the Rus. empire situated on both sides of the central chain of the Caucasus, bounded E. by the Caspian Sea, W. by the Black Sea, being partly in Europe and partly in Asia. It is divided into 2 portions—(1) *Caucasia*, in Europe, 87,069 sq. m., pop. 2,168,904; and *Trans-Caucasia*, in Asia, 85,756 sq. m., pop. 3,472,353.

Caucasus [Gr. ὁ Καυκάσος or ὁ Κaucasus], a mt.-range, 690 m. long, which extends between the Black Sea and the Caspian, and forms part of the boundary between Europe and Asia. Connected with this central chain are several branches or transverse ridges on both sides. The culminating point of the C. is Mt. Elburz, near the middle of the central chain, 18,570 ft. high. The next highest is Mt. Kasbek, 16,552 ft., E. of which is the Dariel Pass, said to be the only one by which carriages can cross the C. The limit of perpetual snow is here about 11,000 ft. above the level of the sea. The inhabs. of the C. comprise a variety of tribes, who speak different langs. and are subject to Rus., against which they waged a long war, terminated in 1859 by the capture of their leader, SHAMYL (which see).

Caucasian Indian, See HIXDRO-KOOSH.

Caucus, a meeting, usually private, for the selection of candidates to be supported at a pending election, or to direct any political movements. Many derivations have been proposed for the term, but there can be little doubt that it originated in Boston. Some time previous to the Revolution, Boston being then a straggling maritime town, the calkers formed a numerous and active class, and they were enlisted heart and soul in the patriot cause. If they had a place for meeting as a craft, it would naturally be chosen also for their political gatherings, so that the royalists would call these assemblages "calkers' meetings," and the word, corrupted into *caucus*, came to be among the royalists a scornful designation for all patriotic meetings, especially if held with closed doors, implying that only mechanics and their like were hostile to the royal cause. The patriots seem to have accepted the term, for in the diary of John Adams, under date of Feb. 1763, we read: "This day found that the *Caucus Club* meets at certain times in the garret of Tom Dawes, adjutant of the Boston [militia] regiment." Adams adds that the town officers and representatives were chosen by this club before they were elected in town-meeting. The C. became an important part of the machinery by which the Revolution was incited and maintained. The term came to be applied afterward to gatherings of influential partisans, especially of Congressmen, for the selection of candidates for Pres. and V.-P. During the ascendancy of what was then called the "Republican" party, down to 1824, candidates for these offices were always named by a Congressional C. But in that yr. the system broke down. All the 4 candidates were Reps., but Mr. Crawford, the C. candidate, received less than 1/4 of the electoral votes. This was the last Congressional C. held for that purpose, although C. continue to be held for the choice of candidates to be supported by the body whose members make any nomination. For the selection of presidential candidates national conventions have been gradually adopted by all parties. The first nominating national convention was that of the Anti-Masons, in 1832; the first Dem. national convention in 1836; the first Whig national convention in 1839. [From orig. art. in *J.'s Univ. Cyc.*, by HORACE GREELEY, LL.D.]

Caulaincourt, KO-LAN-KOOR, de (ARMAND AUGUSTIN LOUIS), duke of Vicenza, a Fr. diplomatist, b. in Picardy Dec. 9, 1773, entered the army 1788, and obtained the rank of gen.; was the travelling companion of Nap. in his hurried journey from Rus. to Paris in 1812. He was appointed minister of foreign affairs in 1813. D. Feb. 19, 1827.

Cauliflower [Sp. *coliflor*; Ger. *Blumenkohl*, i. e., "flowering cole"], a variety of the cabbage (*Brassica oleracea*). The C. differs from the other varieties of its species, its leaves being not fit for use. The parts eaten are the flower-buds and the stalks of the plant transformed by cultivation, and forming a compact mass, generally of a white color.

Caus'tic [from the Gr. *καω*, to "burn"], a term applied to substances which exert a disintegrating effect upon animal tissues. They usually produce a sensation as of burning, whence the name. "Lunar C." is the silver-nitrate, so called because *luna* (the "moon") is the old alchemical name for silver. C. lime, potash, soda, and magnesia are so called to distinguish them from their less active carbonates. Many other chemical reagents are used in surgery as C., notably the nitric, chromic, and arsenious acids.

Cavaignac, kah-vān-yahk' (LOUIS EUGÈNE), a Fr. gen. and statesman, b. in Paris Oct. 15, 1802. He served with distinction in Algeria, to which he was sent in 1832. In Mar. 1848 he was appointed gov.-gen. of Algeria, and in the next month was invited by Lamartine to come to Paris and de-

send the govt. against the mob. He reached that cap. on the 17th of May, and was then appointed minister of war; the Socialists and communists, who began their insurrection in Paris June 23, were defeated in a battle which lasted 3 days. About the 28th of June he was chosen *chef du pouvoir exécutif*, or pres. of the republic, by the National Assembly. In the autumn of 1848 he was a candidate for the office of pres., but was defeated by Louis Nap. He was excluded from political life by the *coup d'Etat* of Dec. 1851, and by his refusal to take the oath of allegiance to Nap. III. D. Oct. 28, 1857.

Cavalry, from *caballus*, a "horse," that class of troops which served mounted. It is recognized in modern warfare as one of the 3 great arms of service, and in earlier times, when war consisted more of predatory expeditions than of regular campaigns, it occupied the chief place. But even among the ancients it appears that this arm was not used to any extent in the earliest wars of which we have any record. The Egyptians, who were the first to organize a standing army, had no C., its place being supplied by armed chariots. Later, the Carthaginians, who contended with the Romans for the conquest of the world, in the organization of their armies gave a prominent place to the C., which was made up of the most noble and distinguished citizens. Beside this body of picked troops, furnished by the city, Carthage employed vast numbers of Numidian horsemen. Such fine riders were these latter that they rode not only barebacked, as did all C. at first, but without bridles, guiding their horses in all their evolutions with the voice alone. It was to the great superiority of his C. that Hannibal, in his memorable campaigns against the Romans, was chiefly indebted for his success. At Cannæ his C. turned the issue of the day, and he owed his defeat at Zama to the superiority of Scipio's horse. In Asia an organized army was established among the Medes and Pers. about 700 B. C., and its main strength consisted in its C. Leaving the E., which was the nursery of arms, as of arts, and turning to the W., we come to the military systems of Macedonia and Gr. as the first organized, and upon which most others of antiquity were formed. In their armies both inf. and C. were used. The latter, as well as the former, was divided into heavy and light, and there was also another class which fought either mounted or on foot. In the heavy, which was composed of citizens, both horse and rider were clad in mail. Their arms were long spears pointed at both ends. Mercenaries armed with javelins and arrows made up the light C. Those wore no mail, nor did their horses, which in all cases were ridden barebacked. The organization of the Gr. C. approached that of modern times in many particulars. Their *ile*, corresponding to our troop, consisted of 64 men; the *hipparchy*, equivalent to our regiment, contained 512; while their largest formation, an *epitagma*, had 4096, being about equal to a modern division of 8 regiments. Alexander was indebted to this arm for many of his most splendid victories. He won that of the Granicus with his C., and in his 2 great battles with Darius, those of Issus and Arbela, his judicious use of his horse secured the victory. Among the Romans, even as early as the time of Romulus, each of the 3 tribes was required to furnish, beside its quota of inf., 100 horse. In the formation of the legion it was customary to allow 1 mounted man to every 10 of foot. Thus, the numbers to make up the legion, as at first constituted, were 3000 inf. and 300 C. This force was made up, as with the Grs., of the most noble citizens. The Rom. C. was trained to fight on foot as well as mounted, and the light-armed inf. would sometimes spring up behind the horsemen, dismounting when the enemy was reached. The C. were formed in 3, or sometimes 6 ranks. Their defensive arms were helmet, cuirass, and shield; their offensive, a sword fit for striking only, a dagger, and a lance. Cæsar found that the Gauls used for their C. a very broad sword, suitable for cut and thrust. The order of battle among the Romans always preserved the system of keeping the flanks covered by C. Sometimes a strong force of this arm was stationed in rear of the centre, which was always held by a Rom. legion; and on the repulse of the enemy the inf. opened to allow the C. to pass through in pursuit. After the fall of the Rom. empire there grew up the feudal system of the Middle Ages, in which the mail-clad knights, with their men-at-arms, made up the great body of C., and constituted the chief strength of all armies in the field. Their arms consisted of lance, battle-axe, and sword; the latter being generally straight and double-edged. Later, the Gers. borrowed the curved sword from the Saracens, and they too invented the spur. During the wars of the Middle Ages the C. were used in heavy masses, which by their mere weight and superiority in arms could generally ride down the ill-armed and lighter inf.; but when gunpowder was applied to small-arms, the whole system of warfare underwent a radical change. Heavy defensive armor was discarded as useless; strategy and tactics overcame mere weight of numbers, and war became a science. To be enabled to perform the great movements dictated by strategy, and to employ properly the tactics requisite on a battle-field, it was necessary to have disciplined troops; and from this need grew up the standing armies of modern times. In all of these C. occupies a prominent position. Under Ziethen, who formed the Prus. hussars, and Seidlitz, who framed the C. tactics—2 of the ablest and most brilliant C. leaders of hist.—the C. of Frederick the Great of Prus. gained for him some of his most important victories. The Prus. C. is divided into cuirassier, dragoon, hussar, and uhlan regiments. The first are armed with long straight swords; the others with curved sabres, pistols, and carbines for dragoons, and lances for uhlans. The Aus. C. is made up of the same class of troops as the Prus., but there are some differences in arms and organization. Among the Fr. the C. is divided into cuirassiers, carabiniers, dragoons, lancers, *chasseurs à cheval*, hussars, and *chasseurs d'Afrique*. Their arms are very similar to those of the Prus. Nap. used his C. with terrific effect, and his ablest gen. in this arm of the

service was Murat. The battle of Marengo was converted from a defeat into a victory by the charge of Kellermann at the head of a small force of C., and one of the most extraordinary exploits ever achieved by this arm was performed as Nap. approached Madrid in 1808. Near the city, in the mt.-pass of Somo-Sierra, were posted 20,000 men and 16 guns, which force checked the advance of the Fr. The emp., after a personal reconnaissance, ordered a small body of Polish lancers to charge the formidable works, which they did with complete success. This is an instance of the powerful moral effect produced by this arm when used with celerity and boldness. The C. of Eng. consists of life guards, which are cuirassier regiments, armed with the straight sword; dragoon guards, arms, straight sword, pistols, and carbine; heavy and light C., arms, sabre, pistols, and carbine; and lancers, arms, sabre, pistols, and lance. The organization of the C. in the smaller states of Europe is very similar to that of the great powers; and in the E. too, especially among the Turks, an effort is being made to conform to European organization, armament, and drill. In the U. S. military system the organization of the C. is, with some slight modifications, the same gen. one which prevails in Europe. A regiment consists of 10 companies or troops of 64 men each; 2 troops form a squadron. All the C. in the U. S. should be classed as dragoons, their arms being sabre, pistol, and carbine. When in active service it is usual to attach batteries of horse artill. to the C., allowing generally 1 battery to each brigade. The cannoners are all mounted for this service, and the guns used are usually light rifled pieces, though occasionally the light howitzer is employed.

During the c. war the C. was used on both sides to picket all approaches, to cover all movements, to protect advances and retreats, and to make reconnaissances. The character of the ground on which the armies operated prevented as active participation in the great battles of the contest as is usual in European warfare, but the hist. of the late war, when fully and impartially written, will show that on both sides this arm was not inferior in courage, discipline, soldiership, and achievements to any other. The use of C. was little more than to serve as mounted inf.—that is, for the purpose of conveying men rapidly from point to point, to strike some sudden isolated blow, or make what is called a *raid*. In most of the battles the men were dismounted and fought as inf., often taking an important part. At Ream's Station, Aug. 25, 1864, the dismounted Confed. C. carried a line of breastworks held by inf., and at Five Forks the Federal C. performed the same feat. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. WADE HAMPTON.]

Cavani'les y Cen'tón (DON ANTONIO), a Sp. historian, b. in 1805, became in 1841 a member of the Royal Acad. of Hist. His unfinished Hist. of Sp. is among the best historical works of Sp. lit. D. 1864.

Cave, or **Cavern** [Lat. *caverna*, from *cavus*, "hollow;" Fr. *caverne*], a hollow place beneath the surface of the earth. By far the greater number of C. are found in limestone, and they are formed by the solution of the limestone by atmospheric water, which always contains carbonic acid. The most extensive C. known are subterranean water-courses which have been excavated in limestone by the dissolving power of the stream or streams which flow or have flowed through them. Next to limestone, C. are mostly found in the strata containing rock-salt, a substance easily removed by water. They are also sometimes met with in igneous rocks; the C. of Fingal, in Staffa, is formed in basalt, and in some places recent lava contains large caverns formed by the running out of liquid lava from a mass cooled and solidified around it. C. are inhabited by peculiar species of fishes (such as the blind fish of the Mammoth C.), by remarkable reptiles, etc., and by various characteristic insects and crustaceans. They also have an interest from the occurrence in them of the remains of pre-historic men and extinct animals, having served as the dwellings of both, and the receptacles of the bones of the animals which served them as food. J. S. NEWBERRY.

Caveat Emptor ("let the purchaser beware"). This is an important rule in the law of sales of personal property. Its gen. meaning is, that a purchaser must judge for himself of the quality of goods purchased. He will accordingly have no remedy against the seller if the goods turn out to be of an inferior character and of much less value than the price paid. The common law of Eng. differs widely from the civil or Rom. law, where the rule prevailed that a "sound price warrants a sound article." The rule (C. E.) must be confined to the *quality* of the goods. In the case of failure of the *title* to chattels sold by a person in possession, there is, according to the Amer. decisions, an action against the seller, on the theory of an implied warranty. To the gen. doctrine of C. E. there are important qualifications. (1) The rule does not extend to cases of fraud. (2) When a sale is made by a manufacturer for a special purpose, the better opinion is that the rule in question has no application. In other words, there is an implied warranty that the chattel is reasonably fit for the purpose for which it is bought. Some authorities of weight maintain that there is an implied warranty in all sales by manufacturers, though they would not extend the doctrine to the materials used. (3) Wherever the reason on which the rule is founded fails, the rule itself gives way. The only rational ground of the doctrine of C. E. is, that when a purchaser has an opportunity to examine goods he should act in the way in which a prudent man usually manages his affairs, and should notice such defects as he may be able to discover. Where there is no such opportunity for inspection, or where the seller takes the burden of selection upon himself, there is no room for the application of the rule. (4) There is an exception to the rule in Amer. law resting upon peculiar grounds, and it may be maintained though there be no fraud or other special circumstances. This is the sale of

provisions for domestic use. There is an implied warranty that the goods are wholesome. The exception is not extended to sales by one dealer to another. T. W. DWIGHT.

Cavendish (HENRY), an Eng. chemist and philos., b. at Nice Oct. 10, 1731, was a son of Lord Charles Cavendish and a grandson of the Duke of Devonshire. He was one of the founders of pneumatic chem., ascertained the proportions of oxygen and nitrogen in common air in 1783, and discovered the composition of water in 1784 by burning oxygen and hydrogen in a glass vessel. He was profoundly versed in geom. and math. In 1803 he was chosen an associate of the Fr. Inst. D. in Lond. Feb. 24, 1810.

Caviare, kav'iar or ka-veer', the prepared and salted roe of the sturgeon, made chiefly in Rus., from species chiefly living in the Caspian and Black seas and their tributary streams. The roe of the sterlet (*Acipenser ruthenus*) is the best, and its C. is reserved for the imperial court. C. is proverbially disagreeable to the uneducated palate, though highly esteemed by the initiated. It is now manufactured quite extensively in the U. S.

Cavour, di, de kah-voor' (CAMILLO BENSO), COUNT, an It. statesman, b. Aug. 1, 1810, of an aristocratic Piedmontese family, the son of the marchese Michele di Cavour and his wife Adelaide Syllon d'Allamar, an accomplished Swiss lady. A younger son, he was destined for the army. In the military acad. at Turin he showed such proficiency in mathematical studies that he was made an engineer officer at the age of 16 and given responsible commands. Military life was repugnant to his tastes, and he entertained radical opinions which he did not hesitate to utter, and thereby displeased the king, Charles Albert. He therefore left the army in 1831. When in 1848 the liberal party came into power and a constitutional frame of govt. was accorded to Sardinia, C. stood at the head of the moderate republican press, and, elected to the Chamber, he took an important part in the debates. In 1850 he was appointed minister of commerce, in 1851 of finance, and in 1852 became premier. From that time forth he conducted the policy of It., bringing about finally its political consolidation amid stormy internal commotions and foreign complications. He promoted free trade and religious toleration, opposed the encroachments of the papal power, and formed an alliance with Eng. and Fr. in the war against Rus. 1854-55, and another with Fr. by which the war of 1859 with Aus. was conducted, ending with the treaty of Villafranca. He left the reputation of being one of the greatest statesmen of modern times. D. June 6, 1861.

Cawker City, on R. R. Mitchell co., Kan. It is the seat of the U. S. land-office for the N. W. dist. of Kan., and is situated at the junction of the 2 branches of the Solomon River. Pop. 1880, 1039.

Cawnpoor', or **Cawnpore**, a town of India, on the Ganges, 96 m. S. W. of Lucknow. It is an important Brit. military station, having cantonments which accommodate about 7000 men. During the Sepoy mutiny in 1857 Nana Sahib massacred here a number of captives, including women and children. Pop. 119,603.

Caxamarca, or **Cajamarca**, a town of Peru, near the E. foot of the Andes, 83 m. N. N. E. of Trujillo. Silver-mines have been opened in the vicinity. The ruined palace in which Pizarro confined the inca Atahualpa is still to be seen. Pop. 7215.

Caxton (WILLIAM), an Eng. merchant, b. about 1422, was the first to introduce printing into Eng. He translated from the Fr. a *Book of Troy*, which he printed probably in 1471, but perhaps earlier. This is said to be the first book ever printed in the Eng. lang. His printing-office in Westminster was established in 1476. D. about 1492.

Cayambe, or **Cayambe-Urcu'**, a mt. in Ecuador, a peak of the Colombian Andes, is directly under the equator, and about 45 m. N. E. of Quito. It has a beautiful conical form, and an altitude of 19,541 ft. It is covered with perpetual snow, and forms one of the most remarkable landmarks on the globe.

Cayenne, ki-en', a seaport of S. Amer., cap. of Fr. Guiana, on the Atlantic and an island of its own name at the mouth of the C. River; lat. 4° 56' N., lon. 52° 13' W. It has a shallow harbor, and is defended by a ft. and batteries. Coffee, sugar, cotton, indigo, and cacao are exported. Pop. about 6000. C. Island is about 30 m. in circumference, and is separated by a narrow channel from the mainland. C. is a penal colony to which criminals are transported.

Cayenne Pepper. See CAPSICUM.

Cayman, ki-man [a word belonging to the Guinaw lang. of S. Amer.], a common S. Amer. name for the alligators. The 3 bony plates which form each eyebrow, projecting as large knobs, and the scarcely webbed feet, form, according to Gray, the characters of a peculiar genus—*Caiman*.

Cayuga Lake, in Central N. Y., is about 38 m. long, from 1 to 3 m. wide, and 387 ft. above the sea. Its outlet flows into the Seneca River.

Cazen'be, or **Kazembe**, a country in equatorial Afr., between Lake Tanganyika and the river Zambesi. The soil is well watered and fertile.

Cazenovia, R. R. junco., Madison co., N. Y., is on a small lake 18 m. S. E. of Syracuse. It is the seat of Central N. Y. Conference. Pop. 1870, 1718; 1880, 1918.

Ceanothus America'nus, **New Jersey Tea**, or **Red Root**, a shrubby plant of the order Celastraceae, is a native of the U. S. It is about 2 ft. high, and has ovate, serrate leaves, which were used as a substitute for tea during the Revolutionary war. The shrubs called in Cal. wild lilac belong to this genus.

Cebes [Gr. Κῆβης], a Gr. philos., b. at Thebes, was a disciple and friend of Socrates. To him is ascribed the allegorical work *Phædo* (the *Talks* or *Pictures*). It is a dialogue on human life, and has been translated into many langs.

Ceb'idae [Gr. κῆβες, a "monkey"], a family of Amer. monkeys characterized by the want of an external bony auditory meatus, widely separated nostrils, and 36 teeth

(M. $\frac{3}{3}$, P. M. $\frac{3}{3}$). They represent in tropical Amer. the monkeys of the Old World. They feed chiefly on fruits, but also on eggs, insects, worms, and mollusks.

Cecil, Lord ROBERT. See SALISBURY, MARQUIS OF.

Cecil. See BURLEIGH.

Cecilia, se-sil'e-a, SAINT, a Rom. virgin who is supposed to have suffered martyrdom in the 2d or 3d century. She is regarded as the patroness of musicians and the inventor of the organ. The 22d of Nov. is St. Cecilia's day.

Cecropia, a genus of trees of the order Artocarpaceae. The *C. peltata*, a very common tree of the W. I. and S. Amer., called trumpet-wood and snake-wood, is remarkable for its hollow stem and branches, with membranous partitions at the joints. The small branches are made into wind instruments. The wood is very light, readily takes fire by friction against hard wood, and is much used by the Indians for procuring fire. The fruit is agreeable, and resembles a mulberry. The trunk and branches yield a large quantity of saline matter, employed by planters in the purification of sugar. The bark is strong and fibrous, and is used for cordage. It is also astringent, and is employed in diarrhoea and gonorrhoea. The juice yields caoutchouc.

Cecropia Moth (*Platysamia cecropia*), a lepidopterous insect of the family Bombycidae, the largest N. Amer. moth known. When expanded it often measures $6\frac{1}{2}$ inches across. It is of a dusky-gray color, variegated with white, black, and various neutral tints. It appears in the U. S. in June. Its caterpillar is over 3 inches long, of a light-green color, with red and yellow warts armed with bristles. The cocoon is of a very strong silk, which is abundant in quantity, but it cannot be reeled. It has, however, been carded and spun into an excellent thread, and but for the delicate character of the larvæ, which are hard to raise, it would become an important article of commerce.

Cecrops, or **Kekrops** [Gr. Κεκρως], a semi-fabulous hero, said to have been the first king and legislator of Attica. According to tradition, he instituted marriage and instructed the Athenians in agriculture, navigation, religion, etc. The people of Attica were sometimes called Cecropidae.

Cedar [Gr. κέδρος; Lat. *cedrus*; Fr. *cèdre*], the common name of several species of evergreen trees of the order Coniferae. They afford durable and valuable timber. The name red C. is given to the *Juniperus Virginiana*, a native of the U. S., which is prized for its durable, compact, and odorous wood, and is used by cabinet-makers. It grows mostly in dry and sterile soils. In the W. States it attains the height of 70 ft. or more, but in the E. States it is a small tree. The Amer. white C. (*Cupressus thyoides*), an evergreen tree, abounds in the swamps of the U. S., and grows from 30 to 70 ft. high. The timber of this tree will remain for a long time under water without decaying, and is an excellent material for posts of fences and for shingles. Various other coniferous trees are called C. in the U. S. The name white C. is given in Amer. to the wood of *Cupressus thyoides* and *Thuja occidentalis*—the latter throughout the N. States. The C. of Lebanon is the true and original C. It is not, like the Amer. C., related to cypress, but to the pine and larch, the foliage resembling that of the latter, but evergreen.

Cedar Creek, a small stream of N. Va., an affluent of the Shenandoah. Upon its banks was fought, Oct. 19, 1864, a battle between the U. forces under Sheridan and the Confeds. under Early, in which the latter were routed. With this battle closed military operations in this part of the State.

Cedar Falls, a city and R. R. centre, Black Hawk co., Ia., on C. River. It has a State Normal School. Pop. 1870, 3070; 1880, 3020.

Cedar Keys, Fla. See APPENDIX.

Cedar Mountain, near Culpeper C.-H., Va., at the foot of which was fought, Aug. 9, 1862, a battle between the Confeds. under Jackson and the U. forces under Banks, the latter being defeated and losing about 2000 men. The Confeds. lost about 1300.

Cedar Rapids, a city and R. R. centre, Linn co., Ia., situated on C. River, 219 m. W. of Chicago and 265 m. S. of St. Paul. It is head-quarters of Ia. R. R. Land Co., and other land and coal cos., of Sioux City and Pacific R. R., and of Burlington, Cedar Rapids and Northern R. R., whose great machine-shops are here. It has a valuable water-power, a very large oatmeal and pearl-barley manufactory, is lighted with gas and electricity, and has Holly water-works. Pork-packing is extensively carried on. Pop. 1870, 5940; 1880, 10,104; 1885, about 15,000. F. McCLELLAND, Ed. "TIMES."

Celandine, sel'an-din (*Cheledonium*), a genus of herbs of the order Papaveraceae. The common C. (*Cheledonium majus*) is a perennial, frequent in Europe and in the U. S. C. in med. is a drastic purgative, and in large doses an active poison; in small doses it is said to be useful in scrofulous diseases, disease of the glands, etc. The fresh juice, applied to warts, sometimes removes them.

Celano Lake. See FUCINO LAKE.

Celebes, self-bez [native, *Negree-Orang-Boogis*], an island of the Malay Archipelago, 75 m. E. of Borneo, from which it is separated by Macassar Strait. It extends from lat. 1° 50' N. to 5° 30' S. It is divided by deep bays into 4 peninsulas formed by chains of mts. radiating from the central part of the island. Though the area is only 72,647 sq. m., it has a coast-line of nearly 2500 m. C. was visited by the Port. in 1512. The Dut. took possession of it in 1660, and planted colonies there, which prospered. According to the census of 1880 the number of inhabs. of C. amounted to 614,356.

Celery, a plant of the order Umbelliferae. The common C. (*Apium graveolens*) is found wild in most parts of Europe, in wet saline soils. The wild plant, called smallage, has a stem about 2 ft. high, a slender root, a penetrating odor, and a bitterish acid taste. By cultivation its taste becomes agreeably sweetish, and aromatic, and either the leaf-stalks increase in thickness or the root-stalk assumes a form resembling that of the turnip. The latter variety is called

celeriæ. The stalks of the former variety, blanched, are used as a salad or to impart flavor to soups, etc. They contain sugar, mucilage, starch, and a substance resembling manna-sugar, which sometimes acts as a stimulant on the urino-genital organs. The stalks are blanched by drawing up earth to the plants, which are transplanted into richly-manured trenches, and as they grow the trenches are filled, and the earth finally raised into ridges.

Celestine (or *Celestinus*), L. SAINT, a native of Rome, became pope in 432 A. D.; d. 432, and was succeeded by Sixtus III.—**CELESTINE II.** succeeded Innocent II. in 1143; d. 1144.—**CELESTINE III.**, elected pope in 1191 as the successor of Clement III.; d. 1198.—**CELESTINE IV.** succeeded Pope Gregory IX. in Sept. 1241; d. in Oct. of the same yr.—**CELESTINE V.**, SAINT, elected July 5, 1294, as the successor of Nicholas IV.; he abdicated the office Dec. 13, 1294, and was succeeded by Boniface VIII.; d. May 19, 1306.

Celestines, an order of hermits or monks founded in 1264 by Pietro da Murrona, who became Pope Celestine V. These monks followed the rule of St. Benedict.

Celibacy, *sel'e-bace* [from the Lat. *celibis*, an "unmarried man"], the condition of a person never married; applied often to the voluntary life of abstinence from marriage assumed by religious devotees and the clergy of some chs., such as the R. Cath. C. was held in high esteem in the primitive Ch., but was not absolutely enjoined upon the clergy until the 11th century; and even after this time there were sharp contests upon this question, which were finally decided, so far as the R. Cath. Ch. is concerned, by the Council of Trent, 1563. In some parts of the Greek Ch. a priest must be a married man, though bps. and patriarchs are celibates, but he can be married only once.

Celina, O. See APPENDIX.

Cellini, *chel-leen'e* (BENVENUTO), an It. artist, b. at Florence in 1500. He was a skillful engraver, gold-worker, and sculptor. According to his own statement he killed Count Bourbon, when the latter with his army attacked Rome in 1527. Among his patrons were Pope Clement VII., Francis I. of Fr., and Cosimo de' Medici. He produced a bronze of *Perseus with the head of Medusa*. D. Feb. 25, 1571.

Celuloid, an artificial substance, the bulk of which is cellulose or vegetable fibrine. The cellulose is first reduced by acids to gun-cotton or pyroxyline. Camphor is added to the gun-cotton, and the mixture is condensed in cylinders under an hydraulic pressure of 2000 lbs. to the sq. inch. The C. is yet soft, and may be moulded by heat and pressure into various articles, useful and ornamental. C. is extensively substituted for ivory, bone, hard rubber, coral, etc., closely resembling them in hardness, elasticity, and finish.

Celulose is the term applied to the substance which forms the mass of the cell-membranes of plants. C. forms the framework or skeleton of all plants; next to water it is the most abundant substance in the vegetable kingdom. Some tissues consist almost entirely of C., as the pith of the Chi. rice-paper plant and the vegetable ivory. Cotton, linen, hemp, and unsized paper consist of almost pure C.

Preparation.—Owing to the insolubility of C. in water, alcohol, ether, dilute alkalis, and dilute acids, it is generally prepared by subjecting vegetable tissues to the successive action of these agents, by which all foreign substances—sugar, starch, gum, resins, oils, fats, etc.—are removed. It may then be bleached by the action of chlorine water. Thus prepared, it retains more or less perfectly the structure from which it was obtained. Skeleton leaves, which are made up into the beautiful "phantom bouquets," consist of nearly pure C. In the conversion of rags, straw, wood, etc., into paper the C. is rendered nearly pure by treatment with caustic soda, hypochlorite of lime, and sulphuric acid. Swe. filter-paper is almost chemically pure C. Common paper receives an addition of a considerable proportion of kaolin (china clay), and is sized on the surface. In bleaching the textile fibres cotton, flax, and hemp, the process has for its object the purification of the fibrous C. by the removal of resinous and coloring matters.

Composition.—C. usually contains about 10 per cent. of moisture, which may be removed by drying. It then contains, in 100 parts, carbon 44.4, hydrogen 6.17, oxygen 49.39. This is also the composition of starch, a body possessing totally different properties. Sugar and gum are nearly allied to C. in composition. All these bodies are called *carbohydrates*, because they consist of carbon in combination with hydrogen and oxygen in the proportions in which they exist in water.

Properties.—When pure, C. is fibrous or spongy, white, and translucent, and often silky. Under the microscope the fibrous varieties appear like spun glass. It is tough and elastic. Its specific gravity is 1.5. When pure it is unalterable in the air, but when associated with albuminous and other easily alterable bodies, it gradually decomposes (decays) in moist air, undergoing a slow combustion, and changing to a yellow or brown friable substance called touchwood, and finally to humus. C. is insoluble in water, alcohol, ether, and oils, both volatile and fixed. It is not sensibly affected by boiling in water, unless it has been derived from a very soft or imperfectly developed portion of a plant, when it becomes pulpy; and in the case of C. from Iceland moss, which is easily disintegrated and finally converted into soluble dextrine. Mulder observed that on boiling Swe. filter-paper with water under pressure at 400° F. a little glucose was produced.

Solution of C.—An ammoniacal solution of oxide of copper was discovered by Schweitzer to dissolve C. without changing its character.

Action of Acids, Etc.—Cold dilute acids and alkalis have little action on C. Long boiling with dilute hydrochloric or sulphuric acid converts C. into glucose. In concentrated hydrochloric and sulphuric acids it dissolves, exhibiting different products according to the temperature and the duration of the treatment. By dipping unsized paper for a few seconds into a mixture of 2 vols. of sulphuric acid and 1 vol. of

water, and then thoroughly washing with water and dilute ammonia, it is converted into "parchment-paper," a substance of the appearance and properties of animal parchment. Parchment-paper is an excellent material for the septa used in dialysis. Strong nitric acid, or a mixture of nitric and sulphuric acids, or of nitre and sulphuric acid, converts C. into nitro-substitution products, such as gun cotton. By heating C. with a mixture of potassium and sodium hydrates, at a temperature of 400° to 500° F., for several hours, it is converted into oxalic acid. Heated in close vessels, C., in all its forms, undergoes destructive distillation, yielding charcoal, which remains behind, and combustible gases, tar, and a mixture of water, acetic acid, and methylic alcohol, all of which distil over.

Digestibility of C.—Although wood and straw are not easily digestible by most animals, the C. of young and succulent stems, leaves, and fruits is digested to a large extent; and therefore C., which forms a large proportion of the food of herbivorous animals, contributes directly to their nutrition.

C. F. CHANDLER.

Celsius (ANDERS), a Swe. astron., b. Nov. 27, 1701. He was engaged with Maupertuis in measuring the length of a degree of lat. in Lapland; he originated the observatory at Upsala, and suggested the centigrade division of the thermometer scale. D. Apr. 25, 1744.

Celsus, a celebrated writer who lived about 150-170 A. D., and is supposed by some to have been an Epicurean philos., mentioned by Lucian as his friend. He was the reputed author of a work against Christianity and Judaism entitled *Λόγος ἀληθής*, a *True Discourse*, which is not extant, but some fragments of it have been preserved by Origen, who to confute it wrote a book, *Contra Celsum*.

Celsus (AURELIUS CORNELIUS), an eminent Lat. med. writer who is supposed to have lived at Rome in the reign of Augustus. He wrote works on various subjects, including philos. and rhetoric. These are all lost except his excellent work on med., *De Medicina*, in 8 books, the style of which is remarkably elegant and pure.

Celt [Welsh, *cellt*, a "flint"], the name given by archaeologists of Europe to certain instruments of stone or bronze which were used by pre-historic peoples. They are generally of chisel shape, but vary greatly in this respect. In length they vary from 2 inches to 2 ft., and seem to have served for axes and domestic utensils, as well as for weapons of war and the chase.

Celtiberi, or **Celtiberians**, an anc. people who inhabited the N. or N. E. part of Sp. They were supposed to have been a mixture of indigenous Iberians with Celtic people who came from Gaul. Their country was called *Celtiberia* (Gr. Κελτιβερία). They were subdued by Hannibal with great difficulty. In the second Punic war they fought for the Carthaginians, and made a long resistance to the Romans, who conquered them about 143-133 B. C.

Celts, or **Kelts** [Lat. *Celtæ*; Gr. Κελταί], one of the great divisions of the Indo-European family of mankind, itself divided into at least 2 groups, the W. Erse, or Gaelic C., and the Cymric or Kymric C., to whom belong the Welsh. Some hold that the Cimbri and Cimmerici were Cymric C. Almost all Fr. (Gallia) was inhabited by C. The Belgæ are thought to have been partially Cymric, as the anc. Britons undoubtedly were. N. It. was long so entirely Celtic as to be called Cisalpine Gaul. The C. under Brennus invaded Gr. In Asia Minor they settled and gave name to Galatia. In Ger. the Boii gave name to Bohemia and Bavaria. In G. Brit. the Cymri long had sway in Cornwall and elsewhere. Many of the Lat. and Germanic races have a strong infusion of Celtic blood. The anc. Celtic religion was a rude polytheism, and human sacrifices were common. The Celtic lit. is of very anc. origin, all the old C. having a literary class called "bards." The chief existing Celtic lit. consists of the hymns, martyrologies, annals and laws of Ire., the Welsh poems and laws, many historical and theological works, and the *Mabinogion*, a collection of tales.

Cembra Pine, called also **Swiss Stone Pine**, the *Pinus C.*, a noble and stately forest tree of Asia and Europe, cultivated to some extent in parks and arboreta in the U. S. It is prized for its seeds, which, though hard to extract from the cone, are very agreeable, and are used for dessert, and with those of *Pinus Pineæ* (the stone pine of S. Europe and Barbary) are sold under the name of pine-nuts. The C. pine yields also a thin fragrant turpentine, called Riga balsam, Carpathian balsam, or balsam of Lebanon. It is caught in bottles as it flows from the wounded twigs, and is used in med.

Cements, *sem'ents* [from the Lat. *cæmentum*, literally, a "cutting" or "chip," a name applied both to building-stone and to the fragments of marble used in making mortar], a term applied to fluid, semi-fluid, or plastic substances capable of uniting solid bodies together when interposed between the surfaces, and afterward solidifying.

Glue is an animal C. in common use. It is a hard, brittle, brownish gelatine, obtained by boiling to a soft jelly the skins, hoofs, etc. of animals. When heated gently with water it becomes viscid, and is employed for uniting solid bodies, mostly wood. In drying it becomes very tough and hard, but is easily softened again by water. A C. for iron pipe, etc., is made as follows: Mix together in a mortar 2 ounces of muriate of ammonia in powder, 1 ounce of flowers of sulphur, and 16 ounces of cast-iron filings, and keep the mixture dry for use. When the C. is to be used, take 1 part of this mixture, 20 parts of clear iron borings or filings, pound them together in a mortar, mix them with water to a proper consistency, and apply the compound between the joints. A good C. for coating the outside of buildings consists of linseed oil, rendered dry by boiling with litharge, and mixed with porcelain clay or well dried pipe-clay in fine powder, to give the consistency of stiff mortar. Oil of turpentine added in small quantity to thin the C. aids its cohesion to stone, brick, or wood. Singer's C. for joints between brass and glass is made by melting together 5 lbs. of rosin, 1 lb. of

beeswax, 1 lb. of red ochre, and 2 table-spoonfuls of gypsum. Fr. plumbers employ for the joints of glazed pottery pipes, used for distributing water, a cold C. made of quicklime, cheese, milk, and the white of eggs, or a hot C. made by melting rosin, beeswax, and lime together. Keene's C. is made by mixing powdered gypsum with an aqueous solution of alum, then heating the mixture until the water of combination is driven off. It is then finely ground in a suitable mill, and slaked with a solution of 1 part of alum to 12 or 13 parts of water, by weight.

Portland C.—When a homogeneous, argillaceous limestone contains so large a proportion of clay, usually exceeding 20 per cent., that it will not slake after calcination, it may be expected to furnish some grade of hydraulic C. The stone from which the celebrated Portland C. is derived contains from 20 to 22 per cent. of clay and 78 to 80 per cent. of carbonate of lime. The superior quality of Portland C. appears to depend in a great measure upon the presence of the double silicate of lime and alumina, which is formed only at a high heat. The weight of Portland C., as well as its hydraulic energy and its ultimate strength and hardness, is increased by augmenting the intensity and duration of the heat employed in burning, within the limit of vitrification. The initial hydraulic activity, however, is diminished by high burning, so that the best Portland C. are slowest in setting. A C. weighing 100 lbs. to the struck U. S. bushel may be burned to weigh 125 lbs. to the bushel, and its strength will be nearly doubled thereby. It is not known that any deposit of argillaceous limestone suitable for making the best quality of Portland C. exists in the U. S., and there is only one such in Europe now worked.

Artificial Portland C.—Fully nineteen twentieths of all the Portland C. used at the present day is artificial. It is made by thoroughly mixing together, in suitable proportions, clay and finely pulverized carbonate of lime (either chalk, marl, or compact limestone), burning the mixture in kilns at a high heat, and then grinding the burned product to fine powder between ordinary millstones. [From orig. art. in *J. S. Univ. Cyc.*, by GEN. Q. A. GILLMORE.]

Cemetery [Lat. *cemeterium*; Gr. κοιμητήριον, from κοιμασθαι, to "sleep," to "repose," *fr. cimetière*, literally, a "sleeping-place," a place for the interment of the dead, especially applied to a large and decorated burying-ground in the vicinity of a great city. The common instinct of mankind in all ages, and in nearly every country, has pointed to interment as the decorous and pious mode for the disposal of the remains of the dead, and tombs rank high among works of art. It was early found that the dead of great cities should be buried outside the walls. The Appian Way, the chief approach to Rome, was lined for miles with monuments and sepulchres. The Moslems locate their burial-places in rural retreats, and hold it a religious duty to embellish them. The C. in the suburbs of Constantinople are more beautiful than any part of the city itself. In Christendom the feeling of reverence led to the burial of the dead in chs. or in grave-yards closely surrounding them, and it was not until far into the present century that any considerable attempt was made in Europe or Amer. to deviate from this custom by establishing C. outside but within convenient distance of large towns. Boston led the way by establishing Mt. Auburn C. in 1831. There is now scarcely a considerable town in the U. S. which has not close at hand one or more of these great cities of the dead. Prominent among these are Trinity, Calvary, and Woodlawn of New York, Greenwood of Brooklyn, Mt. Auburn and Forest Hill of Boston, Laurel Hill of Phila., Greenmount and Loudon Park of Baltimore, etc. [From orig. art. in *J. S. Univ. Cyc.*, by JOHN JAY SMITH.]

Cenci, chen/'chee (BEATRICE), a beautiful Rom. lady whose father was very depraved and treated his children with great cruelty. Her father having been found dead under suspicious circumstances, Beatrice, her brother, and her step-mother were accused of his murder, and for that crime were executed at Rome Sept. 11, 1599. Her story is the subject of one of Shelley's tragedies and of a novel by Guérazzi.

Cenis, Mont. See MONT CENIS.

Censor [*fr. censurer*; from Lat. *censere*, to "judge or estimate"], the title of 2 magistrates in anc. Rome, who were appointed to take the census—i. e. to make an enumeration of the citizens and a valuation of their property, also to inspect and regulate their manners and moral conduct. Until 433 B. C. the functions of C. were discharged by the consuls, after which special C. were elected, at first for 5 yrs., subsequently for 18 months. Originally only patricians were eligible for C., but in 340 B. C. it was enacted that one of the C. must be a plebeian. The censorship (*censura*) was the highest office in the republic except that of dictator. The authority of the C. extended to the regulation of morals (*regimen morum*). They could expel a senator, fill vacancies in the senate, degrade persons from a higher to a lower rank, and in gen. punish any one whose conduct was deemed by them contrary to good morals. As a rule, no one was made a C. unless he had previously been a consul, and no one was eligible for a second term.

Census [a Lat. word, from *censere*, to "weigh," "determine"], an official enumeration of the inhabs. of a country, or some portion thereof, usually accompanied by additional statistics respecting industries, productions, etc. Such enumerations have been made, more or less in detail, from very early times. It is said that a C. was ordered in Chl. more than 20 centuries before the Chr. era. In Heb. hist. 4 C. are recorded. The first was taken 1491 B. C., and was ordered for religious taxation, in order that the half shekel imposed upon every man of the children of Israel might be collected. In this C. were included only males of the age of 20 and upward, the whole number of persons enumerated being 603,555. A second enumeration was made a little more than 2 yrs. after. A third enumeration was made 38 yrs. after this, just before the invasion of the land of Canaan, and showed a slight falling off from the preceding pop. The fourth census was taken by order of King David. This was somehow in

violation of the divine command, and was punished by a 3 days' pestilence, which destroyed 70,000 men. In Gr. we have no records of any C. except at Athens, the first being established by Solon about 550 B. C. It included a classification of citizens according to their wealth, public offices and taxation being upon a property basis. There are indications that a regular C. was made by the Incas of Peru.

Roman C.—This was instituted by Servius Tullius, 535 B. C. Every citizen was enjoined to give in his name, age, the name of his father, the value of his estate, and the number of his children and slaves. The enumeration was made at first by the kings, then by the consuls, and finally by two magistrates called censors. The C. was taken every 5th yr., and at its completion a solemn sacrifice of purification (*lustrum*) was offered; hence the word *lustrum* came to denote a period of 5 yrs. The taking of the C. was extended by Augustus to the provs. The functions of the censorship were in time absorbed by the emps., and during the later period of the empire the C. was taken only once in 15 yrs., and was finally wholly discontinued.

Medieval C.—During the Dark and the Middle Ages the term C. was sometimes used, but it was applied almost exclusively to the records of landed estates and the assessment of taxes. Now and then we find indications of attempts to ascertain the statistics of a people. Thus, in 780 A. D. Charlemagne appointed coms. to traverse his empire and report upon its population, soil, and productions. These reports were not continued by his successors. Something like a C. in the present sense of the word was undertaken in Eng., in 1081, by William the Conqueror, by whose orders an inquisition was made, throughout the kingdom, setting forth the quantity and quality of the land in every co., the name and degree of each proprietor, and the number of his serfs and cattle. All these were recorded in the *Domesday Book*, which is still extant. Here and there during the 14th and 15th centuries incomplete C. were instituted in Sp. and some other countries of Europe.

Modern European C.—It was not until within the last 2 centuries that any really systematic attempt was made in Europe to institute a regular C. Swe. led the way by an ecclesiastical law, still in force, which enjoined every clergyman to keep a list of all the inhabs. of his parish, of the persons removing into or from it, and of the marriages, births, and deaths. But it was not until 1749 that these separate returns were collected, and in 1762 a condensation of the statistics thus embodied was first published. Since 1775 the Swe. C. has been taken every 5th yr., the work in country districts being performed by the clergy as part of their parochial duties. In Eng. the work of preparing a C. was undertaken only in a desultory manner, at first in Lond., as early as 1572, but it was mainly performed by rude estimates; and it was not until 1790 that anything approaching accuracy was fairly attempted. The first actual C. in Eng. was taken Mar. 10, 1801; this has been continued every 10 yrs., the scope of the inquiries being enlarged at each period. The C. of 1851 was very complete in the matter contained and in the mode of arrangement. The C. taken in 1871 employed 32,000 enumerators, who were required to enumerate every person actually within their respective districts on the night of Mar. 30-31, including travellers who arrived at hotels.—In Fr. nothing like a regular C. was undertaken until 1792. In 1801 it was enacted that a national C. should be taken every 5 yrs. One was taken in 1801 and another in 1806, but no other until 1821, 6 yrs. after the restoration of the Bourbons. Since then a C. has usually been taken every 5 yrs.—The C. of Belg. is notable for its completeness and accuracy.—The first C. in Prus. was taken in 1805; since 1834 it has been taken every 3 yrs., and embraces among other things the religious status of the pop.—In Aus. up to 1851 there was no C. except such inquiries as would enable the govt. to ascertain the number of those liable to military duty. The results of the first enumeration were vague, but in 1857 a new law was enacted, which provided for a C. to be taken every 6 yrs., which should embody the statistics of pop., wealth, and industry.—In Rus. the methods of taking the C. are far from satisfactory.

—In Sp. since 1857 a C. is taken every 3 yrs.—In It. the first gen. C. was taken in 1861, and decennially since that time. In Gr. the C. was taken annually from 1836 to 1845, since then at irregular periods of from 3 to 5 yrs.

United States C.—Up to the formation of the present const. the enumerations of pop. were mainly estimates. The first actual C. was taken in 1790, being confined wholly to details of pop., the number of free whites, other free persons and slaves being noted, and the white males being put into 2 classes—those above and those below 16 yrs. In the C. of 1800-1830 the subjects of inquiry were somewhat extended. In that of 1840 an attempt was made to collect facts relating to education, commerce, industry, and productions. The C. law of 1850 created a special C. office, under the direction of the sec. of the interior, with a very much enlarged scope, including the name, age, sex, color, and nativity of each person, together with the number of deaths, of the products of agriculture, products of industry, and a variety of "social statistics." The C. of 1860 was taken upon the same gen. principles as that of 1850, but the details were better wrought out. The C. of 1870 was taken in the main under the law of 1850, but embraced many important modifications. Among these were inquiries into the parentage of every person, etc., amount of public debt of States, counties, cities, and towns. Beside these were a series of maps and charts setting forth to the eye the density of pop., the distribution of the colored and foreign pop., the dispersion over States of the natives of the prin. European countries, the comparative illiteracy and wealth of each section, the range in degree of the 4 prin. diseases, and the range in degree of the 5 chief agricultural products. The actual enumeration in this C. was begun June 1, 1870, and completed Jan. 9, 1871; and on Nov. 1, 1872, the supt. announced the completion of his report. The entire cost of

The preparation and publication of this C. was \$3,336,511.41. It forms one of the noblest contributions which has ever been made to statistical science. The 10th C. which was taken in 1880 at a cost of nearly \$5,000,000 is fully equal in value to that of 1870.

State C.—In most of the States provision is made for State C. to be taken during the intervals between those of the U. S. In some of these the researches are made with great fulness and care; in others little more is attempted than a mere enumeration of the pop. [From orig. art. in *J. S. Univ. C.*, by GEN. JAMES A. GARFIELD and B. A. HINSDALE, Pres. of *Hiram Coll.*, O.]

Cent [Lat. *centum*, a "hundred"; a coin of the U. S. worth a hundredth of a dollar. It is now coined from an alloy of copper, tin, and zinc, and is a legal tender in sums not exceeding 25 C. The Brit. C. is one hundredth of a guilder, and is worth about one third of the Amer. C.]

Cent'raurs [Gr. *Κενταυροι*; Lat. *Centauri*], fabulous animals which the anc. Gr. poets imagined to be half men and half horses, the head and anterior part being human.

Centaur'rus, (the "Centaur"), a constellation of the S. hemisphere, contains 2 stars of the first magnitude, designated respectively as α Centauri and β Centauri.

Cent'raury, a popular name of several Old World herbs of the genus *Erythraea* and order Gentianaceæ; and also of the *Sabbatia angularis*, their Amer. rep., all valuable bitter tonics, used in dyspepsia and intermittent fevers. The *Erythraea Chilensis* of Chili has similar uses. The *Erythraea acutis* of Barbary is extensively used for dyeing yellow.

Centennial Exhibition, or Exposition, held in Phila. in 1876, the hundredth yr. after the Dec. of Ind. (See INTERNATIONAL EXHIBITION, 1876, and PHILADELPHIA.)

Cent'igrade [from the Lat. *centum*, a "hundred," and *gradus*, a "step," "degree"]; **Thermometer**, the name of a thermometer having its scale between the freezing and the boiling-point of water divided into 100 equal parts or degrees, the freezing-point being taken as zero and the boiling-point as 100°. One degree C. is equal to 1.8° F., and conversely, 1° F. is nearly equal to .55° C.

Centipede, sen'ti-peed [Lat. *centum*, a "hundred," and *pedes*, "feet"], a popular name for various insects of the order Myriapoda, but properly given to those of the sub-order Chilopoda, and especially to the family Scolopendridæ. They have long slender bodies and 21 to 23 pairs of feet. Some tropical species are nearly a foot long. The bite of many species is poisonous, and dangerous.

Cent'ral City, cap. of Gilpin co., Col., on R. R., situated among the Rocky Mts., in a gold-mining region, 40 m. W. by N. from Denver. Pop. 1870, 2360; 1880, 2626.

Central City, Lawrence co., Dak., in the Black Hills, about 4 m. N. W. of Deadwood. Pop. 1880, 1008.

Central City, R. R. junc., on Platte River, cap. of Merrick co., Neb. Pop. in 1880, 648.

Central Falls, Providence co., R. I., on the Blackstone River, about 6 m. N. of Providence. Pop. 1880, not in census.

Centra'lia, city and R. R. junc., Marion co., Ill., 253 m. S. of Chicago. Pop. 1870, 3190; 1880, 3621.

Central Park, the most important public work undertaken by New York city, next to the Croton Aqueduct, was the first place deliberately provided for the inhabs. of any



Map of Central Park.

city or town in the U. S. for exclusive use as a pleasure-ground, for rest and exercise in the open air. The late A. J. Downing was the first to propose the establishment of a great public park, and in 1851 Mr. A. C. Kingsland, then mayor of New York, in a message to the common council, strongly recommended the establishment of a public park within the limits of the city, and it was at once referred to the committee on lands and places. This committee reported in favor of adopting the mayor's recommendation, but the report gave rise to an unfortunate controversy that postponed for 2 yrs. the undertaking of the so much needed improvement. On the 17th of Nov. 1853, 5 coms. were appointed by the supreme court, through Judge William Mitchell, to take the land for the C. P. The supreme court confirmed the report of the coms., and in Feb. 1856 the common council passed an ordinance for the payment of \$5,160,369.90, of which \$1,657,590 were to be paid by the owners of lands adjacent to the park, in view of the benefit they would receive from their neighborhood to it. On the 19th of May 1856 the board of aldermen adopted an ordinance appointing the mayor and the street com. coms. with full authority to govern the park, to determine upon a plan for its improvement, and to appoint such persons as they might see fit to carry out their intentions. Many plans were presented

for the improvement of the park, but nothing suitable, and matters dragged until a plan was presented by Gen. Egbert L. Viele. This plan was approved by the commission, and was formally adopted by them, and Gen. Viele was charged with the execution of the work as engineer-in-chief. On Apr. 17, 1857, the legislature appointed a new commission, consisting of 11 members, who were to hold office for 5 yrs., and who were empowered to spend a sum of money the interest on which was not to exceed \$30,000. To raise this money the common council of the city issued stock having 30 yrs. to run. On Apr. 1, 1858, 33 plans had been received. These were placed upon public exhibition, and on Apr. 21 plan No. 33, bearing the motto "Greensward," was declared on the first ballot, by the votes of 7 out of the 11 members, to be entitled to the first prize of \$2000.

The authors of "Greensward," the successful plan, proved to be Mr. Frederick Law Olmsted and Mr. Calvert Vaux, two men thoroughly fitted for the work that was put into their hands, and that work one the importance of which can hardly be estimated, not merely to the city which owns it, but to the whole country. It was our first great public park, and no matter how much it may be improved upon by other communities with ampler space and a more varied and picturesque conformation of ground to begin upon than fell to us, the C. P. will always be looked upon with a sort of affectionate pride, as having been the first to point out the way and to show us the possibility of walking in it.

The C. P. is $2\frac{1}{2}$ m. long and half a m. wide. It extends from 59th st. on the S. to 110th st. on the N., and is bounded on the E. and W. by the 5th and 8th avenues. It is thus a perfect parallelogram, but it is virtually divided into 2 unequal parts, between which are the 2 great reservoirs of Croton water—one a quadrangular basin of masonry, the other much larger, with an irregular outline, and confined in an embankment of earth lined with stone. The 2 basins cover in all nearly 150 acres. The smaller of the two is nearly a third of the short diameter of the park in width, while the larger nearly touches the E. and W. boundaries of the park, and extends N. and S. from 85th st. nearly to 98th st. The original park inclosure contains 770 acres, to which have been added 68 acres at one time, and, more recently, Manhattan Square, so that it now contains 862 acres. It follows that nearly one sixth of the ground covered by the C. P. is occupied by these unsightly embankments, which obstruct the view and offer nothing in return, since the water they contain cannot be seen except by mounting to a level with their summits.

It is a misfortune, but it is now too late to avoid it, that in time the park will be shut in by a nearly solid wall of city houses. This was easy to foresee, and it was so manifest an objection to the site that it ought to have been taken into serious consideration. However, the men who designed the park were of a practical turn, and crying after spilt milk was not in their books; they made the best they could of what they had. They drew the walks and drives as much as possible toward the long axis of the park, and kept the striking points of interest mainly on the same line. Yet they so contrived it that there should be also a circuit-drive for the pleasure of those who should come to the park rather for exercise than for sight-seeing, and who would naturally prefer as long a stretch as possible.

The sheets of water which in summer add so much to the landscape effect of the park are thronged in winter by skaters, for whose comfort and safety every provision is made by the park authorities. The ice is flooded, scraped, and swept with great skill and promptness, information as to the state of the ice is conveyed by signal to all parts of the city, temporary structures of wood, sufficiently warmed, are provided for putting on skates and for refreshment, and the means of cheap and healthful exercise are supplied to thousands of people, men and women, boys and girls.

The park has been a great civilizer, and its mission in this respect is only just begun. When it was first established it was the only park in the country; now there are a dozen, and there will be more and more. Without the C. P. we should not have had in this generation the Brooklyn Park, the Fairmount Park in Phila.—a noble undertaking—the Chicago Park; nor would those stupendous projects of the Yosemite Valley Park and the Park of the Great Cañon of the Yellowstone have been conceived and carried out. Indeed, they are Gargantua's play-grounds, and make Hyde Park and Versailles look pinched and mean. They have been laughed at as bits of bragg; but, in truth, they are the merest good sense and wise provision, with no trace of exaggeration. Would that the founders of New York could have so looked ahead, even 50 yrs. ago! We must not forget that if it was a great piece of good-fortune to get the C. P. at all—and who can doubt it?—it was an inestimable happiness that it was intrusted to the hands that have made it what we see it. Several large public parks have lately been located in the northern part of New York City, in territory formerly belonging to Westchester co.

CLARENCE COOK.

Central Provinces, The, one of the great administrative divisions of Brit. India, situated between lat. 18° and 24° N. and lon. 77° and 83° E. They were formed into a chief commissionership in 1861, and they are divided into 4 commissionerships or provs., which are traversed by the E. I. R., 1504 m. long, connecting Calcutta with Bombay. Area of the provs. directly under Brit. rule, 84,206 sq. m. Pop. 1881, 8,173,824. Beside these there are native "protected" states, having an area of 29,112 sq. m.; pop. 1,019,712.

Cent're [Lat. *centrum*; Gr. *κέντρον*]. The C. of a curve is a point that bisects every straight line drawn through it and terminating in the curve. The C. of surface is a point that bisects every straight line drawn through it and terminating in the surface. The C. of curvature of a curve is the C. of the osculatory circle.

Cent're College, Danville, Ky., was chartered as a

State inst. in 1819. An amendment to the charter gave the control of the school to the Presb. synod of Ky., upon condition of the synod's paying \$20,000 toward the endowment. The condition was fulfilled, and C. C. became a synodical school in 1831. Under the long presidency of Dr. Young the coll. rose to great eminence among W. schools. It retained both its numbers and reputation until the c. war, when the number of students was reduced from 200 to less than 50. The close of the war did not bring peace to the Ch. The synod of Ky. was rent asunder, the larger body joining the S. Presb. Ch., the smaller, and with it C. C., adhering to the Gen. Assembly. Upon the litigation which ensued, the courts, both State and Federal, decided that the Assembly had the rightful control.

Cent're of Gravity, the point in a body which is always in the line of the resultant of the weights of all the particles composing that body, no matter in what position the body be placed.

Cent'reville, R. R. June., cap. of Appanoose co., Ia., 125 m. W. S. W. of Muscatine. It is underlain with an abundant supply of coal. Pop. 1870, 1037; 1880, 2475.

Cent'reville, Md. See APPENDIX.

Century Plant. See AGAVE.

Cephalization, [from the Gr. *κεφαλή*, "head"]. As the head is the seat of power in an animal, the part that gives honor to the whole, it is natural that among species rank should be marked by means of variations in the structure of the head; and not only by variations in structure, but also in the extent to which the rest of the body directly contributes, by its members, to the uses or purposes of the head. C. is, then, simply the degree of head domination in the structure. The following are some of the ways or methods in which it is manifested:

1. With *superior C.*—that is, as species rise in grade or rank, more and more of the anterior part of the body or of its members render service to the head; with *inferior*, less and less. In many cases, part of the organs that serve as feet in the lower tribes serve as jaws in the higher, or, in other words, are transferred from the locomotive to the cephalic series, and thus the structure indicates higher C.

2. With *superior C.* the structure of the head or of the anterior portion of the body becomes more and more compacted, perfected, and condensed or abbreviated; with *inferior*, the same portion becomes more and more lax in its parts or loosely put together, and imperfect in the parts or members themselves, and at the same time the whole is more and more elongated and spaced out or enlarged.

3. With *superior C.* the posterior portion of the body becomes more and more compacted, or firmly put together and abbreviated; that is, as concentration goes on *anteriorly* there is abbreviation *posteriorly*. Even the tail shows grade; for great length or size or functional importance is actually a mark of inferior grade, other things being equal.

4. With *superior C.* there is an upward rise in the head-extremity of the nervous system; and this reaches its limit in man, in which it becomes *erect* and points heavenward. With *inferior*, there is the reverse condition, and the limit is seen in the *horizontal* fish.

5. With *inferior C.* there is not only a less and less concentrated or perfected state of the whole structure before and behind, but in its lower stages the degradation of the structure extends to an absence of essential parts, as teeth, members, senses; and often also to a gross enlargement of the body beyond the size which the system of life within can properly wield, and in this case the body is stupid and sluggish.

The laws of C. act conjointly with another principle in animal life—that of the *oppositeness* subsisting between the *cephalic or anterior* and the *posterior extremities* of the animal structure, which is a kind of antero-posterior or fore-and-aft polarity. This oppositeness or polarity is *up and down* in the plant and *fore and aft* in the animal. The fore and aft becomes strictly up and down in position in man; and this by elevating heavenward the cephalic extremity, not by a change of the axis of symmetry to that of the plant.

The following are examples of C., and of decephalization, as the reverse steps are properly designated, in some of the classes of animals:

The subdivisions of the division of brute mammals (or quadrupeds) containing the larger species are 4:—1, the Quadrumanes, or monkeys; 2, the Carnivores, or flesh-eaters, including the lion, cat, dog, bear, and the like; 3, the Herbivores, or plant-eaters, including the elephant, rhinoceros, horse, hog, ox, deer, etc.; 4, the Mutilates, including the whales, dolphins, etc., in which the limbs are degraded to the structure and uses of fins, and part are wanting, and therefore the species are in a sense *mutilated*, whence the term *Mutilates*. Such forms are appropriately styled *degradational* forms, since they correspond to a degradation of the mammalian structure or type. These several subdivisions have their distinctions, and also their naturalness, strongly exhibited in characters based on this principle of C. [From orig. art. in *J's Univ. Cyc.*, by PROF. J. D. DANA, LL.D.]

Cephalonia, sef-a-lo'-ne-a [anc. *Cephalonia*; Gr. *Κεφαλονία*], the largest of the Ionian Islands, constituting one of the nomarchies of the kingdom of Gr., in the Mediterranean near the W. coast of Gr. The surface is mountainous, the highest point about 5000 ft. above the sea. The island, which was called *Samos* by Homer, contains many anc. ruins. Area, 302 sq. m. Pop. 80,543.

Ce'pheus, a constellation of the N. hemisphere, comprises about 35 stars, the largest of which is Alderamin.

Ceram', or **Zeram'**, an island of the Malay Archipelago, the largest of the Moluccas, claimed by the Dut., in about lat. 3° S. It is nearly 200 m. long, mountainous in parts, and mostly inhabited by Malays. Area, 6500 sq. m. Pop. 67,000.

Ceram'ic [from the Gr. *κέραμος*, "potter's clay," an "earthen vessel" or "pottery"], pertaining to pottery, fic-

tile. The term *C. art.* is applied to the dept. of plastic art, which comprises all objects made of baked clay, as vases, urns, bassi-reliefs, etc. See POTTERY.

Cerastes. See HORNED SNAKE.

Cerberus [Gr. Κερεβος], the triple-headed dog which, as the anc. Grs. imagined, guarded the portal of Hades. He resisted only those who attempted to come out. Hercules is said to have overpowered and dragged him out. *C.* is the name of a *N.* constellation.

Cercaria, the larval form of various trematode worms (*Distoma*, *Bilharzia*, etc.). The perfect worm deposits an egg, which hatches into a curious little sac, formerly known as *Opalina*, itself often entozoic, and once believed to be an infusorian. The opalina in turn gives birth by internal gemmation to one or more *Cercariae*, which are oval tailed organisms which swim actively in water, and finally enter, if possible, into the bodies of insect larvæ, mollusks, fishes, etc., and are thus often indirectly, or in many cases directly, introduced into the stomachs of men and various vertebrate animals. Here they become developed into trematode worms.

Cercis Canadensis, Red Bud, or Judas Tree. See JUDAS TREE.

Cereal [Lat. *cerealis*, from *Ceres*, the goddess of agriculture]. Originally, *cerealis* signified pertaining to *Ceres* or sacred to *Ceres*. Bread or grain was called *cerealia minora* ("cereal gifts," or "gifts of *Ceres*"). In modern lang., *C.* means pertaining to edible grain or breadstuffs, as wheat, rye, maize, and barley; as a noun it denotes those articles of food.

Cerealia, or Cereal Plants, the plants which produce edible grains, and are cultivated for their seeds, which are used as breadstuffs. With the exception of buckwheat, they belong to the order Gramineæ (true grasses), but differ widely in structure and character. The most important cereal grasses are wheat (*Triticum*), barley (*Hordeum*), maize (*Zea*), rye (*Secale*), rice (*Oryza*), and oats (*Avena*).

Cerebro-spinal Meningitis. See MENINGITIS.

Cereopsis, the quasi-popular as well as scientific name of an Australian goose, remarkable for its very short and thickened bill. Unlike other geese, they seldom seek the water. The *C. Novæ Hollandiæ* is the only known species.

Ceres, s'rêz, the Rom. name of the goddess of agriculture, whom the Grs. called DEMETER, and to whom men were supposed to be indebted for the gift of breadstuffs. She was said to be the daughter of Cronos (Saturn) and the mother of Proserpine.

Ceres, the name of an asteroid discovered by Piazzi at Palermo in Jan. 1801. It was the first asteroid ever discovered. Its apparent size is nearly equal to that of a star of the 7th magnitude.

Cereus, a genus of plants of the order Cactaceæ, comprises about 100 species. The *C. speciosissimus*, a native of Mex., is cultivated in greenhouses; its flowers are of a fine scarlet color. The night-blooming *C. (C. grandiflorus)*, a native of S. Amer., bears large flowers, which expand and fade in the course of one night.

Cerigo [anc. *Cythera*; Gr. Κύθηρα], one of the Ionian Islands, in the kingdom of Gr., in the Mediterranean, and separated by a narrow strait from the Morea. The anc. *Cythera* was sacred to Venus, and said to be her favorite residence. Area, 107 sq. m. Pop. 10,637.

Cerinthus [Gr. Κηριθος], a heretic of Egyptian origin who lived in Asia Minor and Syria between 50 and 100 A. D., founder of a sect called Cerinthians. He taught that the righteous shall arise from the dead and enjoy a millennium in this world. It is supposed by some that St. John wrote his Gospel to confute the errors of *C.*

Cerium, a rare metal which is obtained from cerite. It is not employed in the arts and manufactures, but its oxalate is a valuable anti-emic med. in certain cases.

Cerro Gordo, a mt.-pass in Mex., through which the national road from Vera Cruz to the city of Mex. passes. Here Gen. Scott defeated a greatly superior force of Mex. under Santa Anna, Apr. 18, 1847. The immediate results of this battle were the occupation of Jalapa, the abandonment of the works and artill. at La Hoya, and the capture of Perote, with 54 guns and much ammunition.

Certiorari, ser-she-o-râ'ri [Lat. "to be made more certain"], a writ issued from a supreme court to an inferior court or a special body having judicial powers, such as commissioners, magistrates, assessors of taxes, etc., acting in a summary manner or in a method different from the common law. Its object is to review the proceedings of the inferior court or tribunal, or to remove them before trial and judgment, and it is applicable either to civil or criminal cases. When used as a means of review of an actual decision or determination made by the inferior tribunal, its office is to correct errors made in point of law, rather than to reconsider the subject on matters of fact. This writ may also be resorted to for the purpose of supplying any defects in the return of its proceedings by the inferior tribunal to the superior court.

Cerule [Lat. *cerulea*], a name of white lead, which is a carbonate of lead, and is extensively used by house-painters, who mix it with linseed oil. It has been employed by ladies as a cosmetic.

Cervantes Saave'dra, de (MIGUEL), a Sp. author, b. at Alcalá de Henares Oct. 9, 1547, ed. in the univrs. of Salamanca and Madrid. He enlisted about 1570 in the papal army, and was wounded at the naval battle of Lepanto in 1571. About 1575 was captured by the Algerines and detained in slavery at Algiers; in 1580 he was ransomed, returned to Sp., and served several campaigns in the Sp. army. His celebrity is founded on a satirical work called *Don Quixote de la Mancha*, which was designed to correct the taste of his countrymen, who delighted in the extravagant romances of chivalry. D. on the same day as Shakespeare, Apr. 23, 1616. (See T. Roscoe, *Life and Writings of Cervantes*, 1839.)

Cervidae [Lat. *cervus*, a "deer"], a family of ruminant ungulate mammals, of which the deer is the type, whose horns (called antlers) are periodically developed preliminary to and during the rutting season, and subsequently cast off. They are rarely entirely wanting, but in almost all developed in at least the males, and in one type (the reindeer) in the females also. The species are numerous, most abundant in Asia and Amer., and entirely absent from Australia. (See DEER, FALLOW DEER, ELK, MUNTJAK, REINDEER, and ROEBUCK.)

Cervin Mont [Ger. *Matterhorn*], a peak of the Pennine Alps, on the frontier between Piedmont and Switz., 12 m. W. N. W. of Monte Rosa, 14,825 ft. above the sea. The pass of Mt. *C.* is practicable in summer for horses and mules at an elevation of 10,938 ft.

Cesalpino, often Anglicized as **Cesalpino** (ANDREA), an It. physiologist and botanist, b. at Arezzo, in Tuscany, in 1519. He was prof. at Pisa. Wrote *Art. Medica* and a work *On Plants*; was the first who proposed a natural system of classification on philosophical principles. D. Feb. 23, 1603.

Cesnola, di (LUIGI PALMA), COUNT, LL.D., b. near Turin July 29, 1832. Di *C.* grad. at the It. Royal Military Acad., after having fought in the war of It. independence, and was afterward on the staff of Gen. Ansaldi in the Crimea. In 1860 he came to Amer., and after the battle of Bull Run in 1861 he entered the volunteer service, and was made col. of the 4th N. Y. Cav. The war over, he became an Amer. citizen, and received the appointment of consul at Cyprus. Upon reaching Cyprus, Di *C.* began his researches among tombs that had been opened yrs. before, and was rewarded with discovery of many terra-cottas. Beside many statuettes of the crowned Venus, he found a number of little figures bearing plain marks of Assyrian, Egyptian, and Phœnician influences, such indeed as the varying hist. of the island might have led him to expect to come across. His excavations were not confined to Larnica. He soon discovered the necropolis of the anc. Idalion, and in these tombs made discoveries of marbles, coins, bronzes, engraved gems, and objects in gold, with hundreds and hundreds of terra-cottas. On a site now occupied in part by the v. of Athieno were found buried in the ruins, according to Di *C.*, a thousand statues, and no less than 34 inscriptions in the Cypriote lang. It is impossible to state exactly the number of articles brought away from Cyprus by Di *C.* In Aug. 1870, when the representative of the Rus. Imperial Museum examined the collection, there were about 13,000 pieces, comprising statues and small figures, 1800 lamps, 5000 vases, 2000 coins, 600 gold ornaments, 1700 pieces of glass, 300 pieces of bronze, and 100 inscriptions. In 1872 what remained of the collection, after various sales to private persons and to public institutions, was purchased for the New York Metropolitan Museum of Fine Art, and Di *C.* came at once to New York, bringing a large part of his collections with him, the rest following not long after. During the whole of the winter of 1872-73 and the greater part of the following summer he was occupied in arranging, classifying, and cataloguing the articles, some of which had been broken in the transit. After this labor was completed, and the whole made ready for the public, Di *C.* returned to Cyprus in the autumn of 1873, and was in 1879 made director of the Metropolitan Museum of New York. CLARENCE COOK.

Cespe'des (MANUEL CARLOS), the leader of the Cuban insurrection and pres. of the Cuban republic, b. Apr. 18, 1819, ed. at the Univ. of Havana; became a lawyer at Bayamo, issued in Oct. 1868 an address to the Cubans, in which he proclaimed the republic and the independence of Cuba. On Apr. 10, 1869, *C.* was elected by the Constituent Cortes pres. of the republic. Killed by the Spaniards Feb. 27, 1874.

Cestoid Worms [Lat. *cestus*, a "band," alluding to their ribbon or tape like form], an order of entozoa, including the tapeworms. They are found in all classes of vertebrate animals, living when perfect in the intestines, but in the scolex or larva state inhabiting the living tissues. They have no mouth or digestive apparatus; the animal which they inhabit performs the operation of digestion for them, so that they have only to absorb nutriment by osmotic action. Each segment impregnates itself, becomes in time detached, passes out of the intestine, and finally bursts and discharges its numerous ova, which, scattered by wind and water over grass, etc., are devoured by various animals. Then the ovum hatches into a free embryo or "proscotex," which pierces the walls of the intestinal canal, enters the blood-vessels, finds a lodgment in an appropriate tissue, where it encysts itself, and changes into the "scolex" or "hydatid" state, as in "measly pork." Then if the living scolex is swallowed by an appropriate animal it develops into the complete tapeworm.

Cestration. See HETERODONTIDE.

Cetacea, or **Cetaceans** [Gr. κητος, a "whale"], an order of mammals characterized by a fish-like form, adapted to strictly aquatic life, and a tail which spreads horizontally. Like other mammals, they have warm blood, respire by lungs, and the young are born alive and nourished by the mother's milk. There are 2 existing sub-orders—the Toothless *C.* (Mysticete) and the Toothed *C.* (Denticete). The former comprises the Balæniidæ or right-whale family and the Balænopteriidæ or fin-backs; the latter the Physeteridæ or sperm-whales, the Ziphiidæ, the Delphinidæ or true dolphins, the Iniidæ, and Platanistidæ or fresh-water dolphins. Another sub-order (Zeuglodontia) was represented by certain only tertiary forms.

Cetus [Gr. "the Whale"], a great constellation. It contains a number of nebulae and the variable star Mira.

Ceylon, see 'lon [native *Singhala*; anc. *Taprobane*], an island in the Indian Ocean, S. E. of the peninsula of India, situated between 5° 55' and 9° 51' N. lat. and 79° 41' and 81° 54' E. lon. Area, 25,364 sq. m., or 16,232,960 acres, about ¼ the size of N. Y. Length, 366 m. from N. to S.; greatest width, 140 m. E. to W. Is 55 m. from the S. extremity of Hindostan. Surface.—Bold and rocky on the S. and E. coasts; in the in-

terior, mts., valleys, and plains; highest peak, Pedrotallagalla, 8280 ft.; next highest, Adam's Peak, 7280 ft.; the latter a perfect cone, with many sacred traditions. Mts. mostly gneiss and granite; rivers mostly mt. streams, not navigable.

Climate hot and moist, but more moderate and healthy than the mainland; average rainfall, about 80 inches.

Minerals.—Iron, tin, coal, plumbago, and salt; sapphires, rubies, amethysts, etc., are gathered; pearl fisheries on the coasts.

Vegetation and Productions.—Many and beautiful palms, coral tree, peepul or bo tree (the religious fig, deemed sacred by the natives), bread-fruit, cinnamon, satin-wood, ebony, etc. Coffee, cotton, rice, tobacco, and pepper chief crops.

Exports, coffee, cinnamon, cocoa nuts and oil, coir, hides, plumbago, and pearls.

Animals, buffaloes, bears, deer, leopards, and elephants.

Finances.—Public debt, 1886, £1,370,000; public revenue, 1879, £1,474,867; public expenditure, £1,468,783; exports and imports, 1879, £8,024,417.

Antiquities.—Colossal temples, some of them hewn in rocks, some in caves, like that of Dambool (Boddhist); ruined cities, immense tanks for irrigation, etc.

There are 7 provinces—Central, N. Central, W., N. W., S., E., N. *Cities*, Colombo (cap.), pop. 111,942; Kandy, Trincomalee, Point de Galle, Jaffnapatam, and Singapadaya.

History.—Original inhabs. Yakkhos; these conquered by Singhaliese 543 B. C.; Malabars conquered C. about A. D. 1200, but the Singhaliese partly recovered it in 1235; Port. came in 1505; driven out by the Dut. in 1658, and these by the Eng. in 1795; C. annexed to Brit. crown in 1802; whole island conquered 1815; most prosperous of Brit. colonies.

Population in 1881, 2,761,396; of these the native tribes constitute over 2,250,000; they are Singhaliese, emigrants from Hindostan 543 B. C., and Boddhists; Kandyans or Highlanders and Malabars, both Brahmans; Moormen, originally Pers. or Arabs, Mohammedans; Veddars or outcasts, of the lowest scale, without religion. The remainder are Eurasians or burghers, Romanists or Prots., and Europeans, mostly Prots.

L. P. BROCKETT.

Chacornac (JEAN), a Fr. astron., b. at Lyons June 21, 1823. He was distinguished for his discoveries of asteroids as well as for his writings on the planetary systems. He contributed the atlas to the *Annals of the Observatory of Paris*, 1858 and 1863. D. Sept. 26, 1873.

Chadbourne (PAUL ANSEL, LL.D.), b. at N. Berwick, Me., Oct. 21, 1823; elected pres. of the Univ. of Wis., and prof. of metaphysics in same 1867-70. Wrote *Natural Theol. and Instinct in Animals and Man*; ed. in chief of *The Wealth of the U. S.*; chosen pres. Williams Coll. 1872; retired in 1881; chosen pres. Mass. Agricultural Coll. 1882. D. Feb. 23, 1883.

Cheremon, ke-ree'mon, an Athenian tragic poet, from several of whose dramas passages are quoted by Athenæus, although Suidas in his brief notice of him calls him a comic poet. Little is known of his life, but he may be placed about 380 B. C. He fell below the dignity of the great tragic poets of the preceding century, and wrote dramas better fitted to be read than to be acted. There are also 3 epigrams in the *Anthology* bearing his name.

Cheremon of Alexandria, a Stoic philos. and historian who flourished in the times of the early Rom. emps. He went from Alexandria to Rome to take charge, along with Alexander of Ægæ, of the education of Nero. He wrote a work on hieroglyphics and one on the hist. and religion of Egypt. Only fragments of his writings remain.

Charonea, ker-o-nee'a [Gr. Χαίρωνεια], an anc. town of Bœotia, 5 m. N. of Lebadea, was the native place of Plutarch; here Philip of Macedon gained a victory over the Athenians and Thebans in 338 B. C., and Sulla defeated the army of Mithridates in 86 B. C. The site is occupied by the modern v. of *Kapurna*.

Chatodon tide, a family of the acanthopterous fishes, characterized by the undivided post-temporal, the incrustation of parts of the dorsal and anal fins with scales, and hair-like teeth. Their colors are often gay, and in stripes or bands. *Chelmo rostratus*, an Asiatic fish, is said to catch insects by shooting drops of water at them from the mouth.

Chaffinch, a common Old World songbird, the *Fringilla caelis*, prized for its loud song.

Chagrin Falls, O.

See APPENDIX.

Chain, or Gunter's

Chain, in surveying, is a measure 22 yards long, composed of 100 iron links, each of which is 7.92 inches long. Ten square C. make an acre.

Chalcedon, kal-sed'on [Gr. Χαλκηδών], an anc. Gr. city on the Bosphorus, opposite Byzantium, founded 685 B. C. The Romans gained possession of it 74 B. C., and during the empire it was a free city of considerable importance. Two gen. Ch. councils were held here.

Chalcedony, kal-sed'one [Gr. χαλκήρυνος], a precious stone, so named because found near Chalcedon, is identical with common quartz or siliceous in chemical composition.

Chalcididae, a family of lacertilian reptiles found in warm regions in both continents. They are popularly considered snakes, having no visible legs. They have movable eyelids, small ears, and a short thick tongue.—Also the name of a family allied to the ichneumon flies, which are of great service in the destruction of noxious insects upon which their larvae feed.

Chalcis, kal'sis, the chief town of the island of Eubœa in Gr., 18 m. N. E. of Thebes, on the Strait of Euripus (at

this point only 40 yards wide), and connected with the mainland by a bridge. Is said to have been colonized from Athens. Aristotle d. there 322 B. C. It was taken by the Venetians 1205 A. D., by the Turks 1470, and by the Grs. 1821. Pop. 6000. It is the only town in Gr. where any Mohammedans remain.—2. An anc. city of N. Syria, 10 or 12 m. S. of Chalybon (modern Aleppo), on the old caravan-route to Heliopolis (*Baalbek*); said to have been founded by Seleucus Nicator (312-280 B. C.). In 638 A. D. it was destroyed by the Arabs under Abu Obeidah, and its name was changed to *Kenüsärin*. The ruins are extensive.—3. An anc. city of Cœle-Syria, mentioned repeatedly by Josephus in connection with the Herods. Its ruins, nearly 1 m. in circuit, now called *Anjar*, are close to the post-road between Beyrout and Damascus.

R. D. HITCHCOCK.

Chaldea, kal-dee'a [Gr. Χαλδαία], the anc. name of a country of Asia, bordering on the Euphrates and the Per. Gulf, and bounded on the S. W. by Arabia Deserta. C. proper was the S. part of Babylonia, but the name was sometimes used to designate a more extensive region. The term Chaldeans was applied by the Heb. prophets to the inhabs. of the city of Babylon and all the subjects of the Babylonian empire.

Chaldean Christians, a branch of the Ch. of Rome, consisting of those Nestorians who acknowledge the pope. They are of the E. rite, and are under the patriarchy of Babylon and 12 bps.

Chaldean Language, or **East'ern Aramaic**, a Semitic dialect, in which parts of the books of Daniel and Ezra were written. It resembled the Heb. and Syriac. The Targums were written in a later C.

Chalk, chawk [Lat. *creta*; Fr. *craye*], a calcareous earth, a variety of limestone or carbonate of lime. In geol., it is a sedimentary rock of great extent and importance, and a member of the cretaceous formation. C. is a mineral of animal origin, and is mostly composed of the shells or carapaces of microscopic marine animals. According to Ehrenberg, a cubic inch of C. often contains more than a million of microscopic organisms.

Chalmers (ALEXANDER), a Scot. writer, b. at Aberdeen Mar. 29, 1759; author of a *Gen. Biographical Dict.* (1812-17). D. Dec. 10, 1834.

Chalmers (GEORGE), a Scot. antiquary and lawyer, b. at Fochabers in 1742. His greatest work is entitled *Calcutta: An Account, Historical and Topographical*, of N. Brit. D. 1825.

Chalmers (THOMAS), D.D., LL.D., D. C. L., a Scot. divine, b. at Anstruther, Fifeshire, Mar. 17, 1780, and ed. in the Univ. of St. Andrews'. In 1803 he was ordained minister of the parish of Kilmany; pub. in 1808 an *Inquiry into the Extent and Stability of the National Resources*. In 1815 he became a minister in Glasgow, and delivered a series of discourses on astron. in connection with religion, which were pub. in 1817. He obtained the chair of theol. in the Univ. of Edinburgh in 1828. Wrote the Bridgewater treatise *On the Adaptation of External Nature to the Moral and Intellectual Const. of Man*. Dr. C. was the leader of the Evangelical party, which was involved with the Moderate party in a contest in relation to patronage. This contest resulted in the disruption of the Ch. of Scot. in May 1843. Dr. C. and 470 other clergymen then seceded and organized the "Free Ch." He expended the latter yrs. of his life in perfecting his *Inst. of Theol.* and in officiating as prin. of the Free Ch. Coll. D. May 30, 1847.

Chalybeate [from the Gr. χάλυξ (gen. χάλυβος), "iron" or "steel"], containing iron in solution, applied to waters which are impregnated with iron.

Chamaeleon, ka-mē'le-on [Gr. for "ground-lion"], a name originally given to an arboreal lizard of the Mediterranean countries, famous for its changes of color (see CHALCANTIDE), and often erroneously applied to other lizards (e. g. *Anolis*) manifesting analogous changes in color.

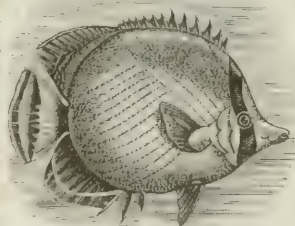
Chamaeleon, of Heraclea on the Pontus, a Peripatetic philos., a disciple of Aristotle or Theophrastus. He was the author of several philosophical treatises, chiefly on moral subjects, and of a variety of writings on the anc. Gr. poets. Titles of 15 works, with a few fragments, are preserved.

Chamaeleontidae, a family of lizards, representing a separate tribe (Dendrosauria). About 50 species are known, inhabiting Afr. and Asia, but most numerous in the island of Madagascar; one is found in S. Europe. They have a compressed body, with granular scales, the head little movable, but the eyes with a wonderful power of motion, each eye being covered by a lid pierced with one small hole; ears concealed beneath the skin; the tail prehensile; the tongue cylindrical and extensile; the toes in two opposable sets, fitted for grasping boughs, etc. The food is insects, which it catches by darting out its long, sticky tongue. Their colors are very changeable.

Chamaerops, a genus of palms having fan-shaped leaves and flowers in spathes about 6 to 8 inches long. The *C. humilis*, often called palmetto, is the only species of palm indigenous in Europe. The fruit is a triple, spongy drupe, which is edible. The leaves are used for making brooms, hats, and seats of chairs. The fibre of the leaves is a valuable material for cordage, carpets, and paper. The blue palmetto of the S. U. S. is *C. hystrix*. Other species of this genus are found in tropical countries.

Chamberlain, Dak. See APPENDIX.

Chamberlain (D. H.), b. at Worcester, Mass., 1837,



Chatodon.



Chamaeleon.

grad. from Yale and from the Harvard Law School; entered the army in 1864 as lieut. in the 5th Mass. Colored Cav., and promoted to be capt.; went to S. C. in 1866, and for 2 yrs. was engaged as a cotton-planter; became atty.-gen. of the State, and in 1874 was elected gov. by the Reps.; re-nominated in 1876, and took the oath of office Jan. 1877.

Chamberlain (JOSHUA L.), LL.D., b. in Bangor, Me., Sept. 8, 1828, grad. at Bowdoin Coll. in 1852; entered the volunteer service of the U. S. in 1862, and became a maj.-gen. in 1865; gov. of Me. 1866-70, and in 1871 became pres. of Bowdoin Coll. Resigned in 1883.

Chambers, in law. A judge is said to act at "chambers" when a legal proceeding is carried on before him out of court, either at his office or residence or other convenient place, including the court-room itself. Business done before a judge at C., as distinguished from that transacted in court, is increasing in modern times. The codes of procedure in some of the Amer. States expressly provide that certain acts shall be done by the court, and others by a judge, referring in the last instance to an act done at C. Through the same medium a great change has been worked in Eng. in the practice of the court of chancery.

Chambers (EZEKIEL F.), LL.D., b. in Kent co., Md., Feb. 28, 1788, grad. at Washington Coll., Md., in 1805; became a lawyer, served in the war of 1812-15, and was made a brig.-gen. of militia; was U. S. Senator from Md. 1826-35; also a judge in the State courts 1834-51. D. Jan. 30, 1867.

Chambers (GEORGE), LL.D., b. in 1786 at Chambersburg, Pa., grad. at Princeton in 1804; became a lawyer, was an M. C. 1833-37, and became in 1851 a justice in the supreme court of Pa. He prepared a number of valuable papers on the early hist. of the State. D. Mar. 25, 1866.

Chambers (ROBERT), LL.D., a Scot. writer and pub., b. at Peebles July 10, 1802; became a bookseller in Edinburgh, and wrote *Traditions of Edinburgh*. Pub., in partnership with his brother William, *Information for the People*, and *C's Encey*. D. Mar. 17, 1871.

Chambers (TALBOT WILSON), D. D., b. Feb. 25, 1819, at Carlisle, Pa., grad. at Rutgers Coll. in 1834; studied theol. at New Brunswick and at Princeton, N. J.; in Dec. 1849 was installed as one of the pastors of the Collegiate Dutch Ch., New York. Wrote *The Noon Prayer Meeting in Fulton St.* and *The Psalter a Witness for the Divine Origin of the Bible*. He was a member of the Amer. Committee engaged in revising the Eng. Bible.

Chambers (WILLIAM), a Scot. author and ed., a brother of Robert C., b. at Peebles Apr. 16, 1800. He founded C's *Edinburgh Journal* in 1832, and became a partner with his brother in a publishing-house of Edinburgh. Wrote *Things as They Are in Amer.* D. May 20, 1883.

Chambersburg, R. R. junc., cap. of Franklin co., Pa., on the Conococheague and Falling Spring creeks, 52 m. S. W. of Harrisburg. It is in the S. portion of the limestone valley between Blue and S. mts. It has a female sem. On the 30th of July, 1863, a body of Confed. cav. under Gen. McCausland entered the town and laid it under a tribute of \$200,000 in gold or half a million in currency; this demand not being complied with by the inhabs., McCausland ordered the town to be fired. About $\frac{3}{4}$ of the place were destroyed, 2500 persons deprived of homes, and property to the value of \$1,000,000 consumed. It has been entirely rebuilt. Pop. 1870, 6308; 1880, 6877.

Chambord, shon-bor', de HENRI CHARLES FERDINAND MARIE DIEUDONNÉ D'ARTOIS, COMTE and DUC DE BOURBON, b. in Paris Sept. 29, 1830. His father was the duke of Berry, a son of King Charles X., who abdicated in his favor in Aug. 1830. He was recognized by the Fr. legitimists as heir to the throne, and received the title of Henry V. He had no children, and was the only surviving member of the elder branch of the Bourbon family. D. Aug. 24, 1883.

Chambre Ardente [Fr. "fiery chamber"], an extraordinary court, chiefly held for the trial of heretics, was first convened by Francis I. of Fr. in 1535. Its name was given on account of the unusual severity of its sentences, burning alive being one of its most common punishments.

Chamois, sham'ine (*Rupicapra Tragus*), a goat-like antelope found especially in the Alps. It is about the size of a large goat, and is remarkable for its great speed and its ability to leap enormous chasms. C.-hunting is a favorite though perilous amusement in Switz. and the Tyrol. Its skin furnishes true C. leather, but the article generally sold under that name is made of sheep skin.

Chamomile, kam'-o-mil, a name given to several herbs of the order Compositae, but especially to *Anthemis nobilis* and *Matricaria chamomilla*, European herbs closely resembling each other. The first is common in Amer. gardens.

Chamouni, shah-moo-nee', **Valley of**, in the Alps, belonging to Fr., 3400 ft. above the sea, 15 m. long, less than 1 m. broad, and traversed by the river Arve. It contains and is surrounded by some of the magnificent scenery of the Alps.

Champagne, shon-pahn', a former prov. of Fr., bounded E. by Lorraine, S. by Burgundy, and was drained by the Marne, Seine, Aube, and other rivers. It is now divided into 5 depts. The prov. gives name to the famous C. wine.

Champagne Wine, a name applied to wines of various kinds, white or red, still or sparkling, which are produced in Champagne. Of these the sparkling and foaming varieties (*vin mousseux* and *demi-mousseux*) are best known. After the vintage-season this wine stands till Dec., is then racked off, and fined or purged with isinglass; in the following Mar. it is bottled and corked with care, the bottles being placed with the corks downward, so that the sediment may be drawn off. When this has been removed, some brandy and sugar are introduced, and the bottles are resealed. While this process is going on the breakage of bottles is often very great, and buyers estimate the value of the wines partly by the breakage—the best wines breaking the most bottles.

Even in Fr., but still more in other countries, a very large

part of the so called C. W. is factitious, being made of cider, light Rhenish and other cheap wines, and other substances. Happily, in most cases these preparations are quite as harmless and often quite as palatable as the genuine product of the Champagne vineyards; for some of the imitations are nearly perfect reps. of the appearance, taste, and bouquet of the original article.

C. W. is prized in med. as a restorative in certain low conditions, especially when the stomach is very irritable and will hardly tolerate any other stimulant. the carbonic acid present acting as a sedative to that organ.

Champaign, a city and R. R. junc. of Champaign co. Ill., 128 m. S. S. W. of Chicago. It has a young ladies' sem. Pop. 1870, 4625; 1880, 5103.

Champerty, sham-per-te [remotely from the Lat. *campi pars*, "part of the field"], in law, is the act of aiding a person in the prosecution of a lawsuit or other legal proceeding, with an agreement to share in the proceeds of the litigation or to make some profit from it. It is distinguished from "maintenance," in which there is no such element of gain. The 2 acts are, however, closely allied, and governed by substantially the same principles. C. may present itself either in the civil or criminal law. Criminal proceedings are not frequently prosecuted against champertors, as they scarcely accord with existing public opinion. The topic is of most importance in the civil law. A contract affected by C. is usually void, though sometimes this rule is modified by statute.

T. W. DWIGHT.

Champfleury, shon-fluh-re', the assumed name of JULES FLEURY, a Fr. author, chief of the realistic school, b. Sept. 10, 1821; produced in 1847 *Chien-Cailin*, immediately pron. by Victor Hugo a chef d'œuvre.

Champlain, sham-plane' (SAMUEL), a Fr. navigator and pioneer, the founder of Que., b. at Brouage, in Fr., about 1570. In 1608 he ascended the River St. Lawrence to the site of Que., where he planted a colony. He discovered Lake Champlain in 1610; was appointed gov. of Canada in 1620. D. at Que. in 1635.

Champlain, Lake, forms part of the boundary between N. Y. and Vt. It is about 125 m. long; the S. half averages less than 2 m. wide; in the N. part, where there are several islands, it is 10 m. or more broad. Its greatest depth is about 280 ft. It discharges its waters through the Sorel River into the St. Lawrence, and is connected with the Hudson River by the Champlain Canal. On this lake there was a battle fought between the Brit. and Gen. Arnold on Oct. 13, 1776, and the Amers. under McDonough gained a naval victory over the Brit. Sept. 11, 1814.

Champlin (JAMES TIFF), D. D., b. in Colchester, Conn., June 9, 1811, valedictorian of the class of 1834 Brown Univ.; from 1838 to 1841 pastor of Bap. ch., Portland, Me.; from 1841 to 1857 prof. of anc. langs. in Waterville Coll. (now Colby Univ.); from 1857 to 1872 pres. of that inst. Wrote *A Text Book on Intellectual Philos.* and *A Text Book of Political Economy*. D. Mar. 15, 1882.

Champollion, sham-pol-le-on (JEAN FRANÇOIS), a Fr. linguist and Egyptologist, b. at Figeac (Lot) Dec. 23, 1790. He studied several Oriental langs. in Paris, and became in 1809 prof. of hist. in the acad. of Grenoble. In 1814 he pub. a *Geographical Description of Egypt under the Pharaohs*. His reputation is founded chiefly on the discovery, from the inscriptions on the Rosetta stone, of a key to the symbols and hieroglyphics of anc. Egypt. In 1824 he pub. a *Summary of the Hieroglyphic System of the Anc. Egyptians*, in which he proves that the phonetic alphabet is the key to the whole hieroglyphic system. The results of the researches of C. and Rosellini in Egypt appeared in a great work entitled *Monuments of Egypt and Nubia considered in Relation to Hist. Religion, etc.* D. Mar. 4, 1832.

Chan'cellor, a law officer in some of the U. S. who has the powers of a court of equity, and whose proceedings are based on the practice and jurisdiction of the Eng. court of chancery. In other States jurisdiction in law and equity is vested in the same court, as in the State of N. Y., where the supreme court has this compound jurisdiction.

CHANCELLOR OF A UNIVERSITY is the chief officer of a collegiate inst., sometimes elected for a term of yrs. and sometimes for life.

Chan'cellorsville, Spottsylvania co., Va., S. W. of Fredericksburg, 65 m. N. by W. of Richmond, where was fought, May 2-4, 1863, one of the severest battles of the c. war, between the U. army under Gen. Hooker and the Confeds. under Gen. Lee. Hooker had fully 120,000 men at his disposal, while the force of Lee was about half as many. The result of the series of engagements, which occupied 3 days, was that Hooker was foiled in his attempt to assail the rear of Lee, and retreated back to his former position opposite Fredericksburg, having lost about 18,000. The Confed. loss was about 13,000.

Chancery, Court of. See COURTS.

Chan'cery. See SYPHILIS.

Chand'ler (Prof. CHARLES FREDERICK), Ph. D. M. D., LL.D., b. at Lancaster, Mass., Dec. 6, 1836, ed. at the Lawrence Scientific School and the univs. of Göttingen and Berlin. For 8 yrs. in charge of the chemical dept. of Union Coll., Schenectady, N. Y.; since 1864 prof. of chem. in the School of Mines of Columbia Coll., N. Y.; also prof. of chem. in the academic dept. of Columbia Coll., the New York Coll. of Pharmacy, and in the Coll. of Phys. and Surgeons. Member of the National Acad. of Sciences, the chemical societies of Lond., Paris, and Berlin, the Amer. Chemical Society, and many other learned societies. He was also pres. of the health dept. of New York city and chairman of the sanitary committee of the N. Y. State Board of Health. Has pub. many scientific, technical, and sanitary papers, and was the chem. ed. of *J.'s Univ. Cycl.*

Chandler (JOHN), b. in what is now Monmouth, Kennebec co., Me., then a part of Mass., in 1760; was apprenticed to learn the trade of a blacksmith. M. C. 1805-08, and U. S. Senator 1820-29. D. Sept. 25, 1841.

Chandler (JOSEPH R.), a philan., b. in Kingston, Mass., in 1792; was M. C. from Phila., where he was a lawyer and journalist, and was U. S. minister at Naples 1858-61. D. July 10, 1880.

Chandler (WILLIAM E.), b. at Concord, N. H., Dec. 26, 1835, grad. at Harvard law school 1855; member of N. H. legislature 1862-64, and of Rep. national convention 1880; became sec. of navy 1882.

Chandler (ZACHARIAH), b. at Bedford, N. H., Dec. 10, 1813, removed to Detroit, Mich., 1833, and engaged successfully in mercantile business; was U. S. Senator from Mich. 1857-75, and from Feb. 18, 1879, till his death; sec. of the interior under Pres. Grant 1875-77. D. Nov. 1, 1879.

Chang and Eng. See ENG AND CHANG.

Changarnier, shon-gar-ne-ä' (NICOLAS ANNE THÉODULE), a Fr. gen., b. at Autun Apr. 26, 1793. He served with distinction in Algeria, and in May 1848 was appointed gov.-gen.; he obtained the command of the national guard at Paris and of the first military division. At the *coup-d'état* of Dec. 2, 1851, he was arrested and confined for a short time, and afterward passed many yrs. in exile. D. Feb. 14, 1877.

Chang-Chau-Foo, a city in Chi., 25 m. N. W. of Amoy, on a tributary of the Kian-Long-Kiang. It is surrounded by a wall $4\frac{1}{2}$ m. in circumference. The entrance is over a bridge 780 ft. long, with 22 water-passages. In the city is a Buddhist temple built in the 8th century, which has 2 towers of 7 stories. Pop. 1,000,000.

Chank Shell, the popular name of the shell of several species of *Turbinella*, a genus of gasteropodous mollusks, natives chiefly of the Indian and Pacific oceans. These shells are worn as ornaments by Hindoo women, and some specimens are said to be valued at £100 sterling. More than 2,000,000 of them have been exported from Madras in 1 yr. Some are used as med.-cups, and are held sacred.

Chan'nel Islands, a group off the N. W. coast of Fr. belonging to G. Brit., but governed by their own laws. The chief islands of the group are Jersey, Guernsey, Alderney, and Sark. Area, 73 sq. m. Pop. 1881, 87,731.

Channing (EDWARD TYRREL), LL.D., an Amer. scholar, b. at Newport, R. I., Dec. 12, 1790. He was one of the founders of the *N. Amer. Review*; became prof. of rhetoric at Harvard in 1819, holding it nearly 32 yrs. D. Feb. 8, 1856.

Channing (WILLIAM ELLERY), D. D., a writer and Unit. minister, b. at Newport, R. I., Apr. 7, 1780. He entered Harvard in 1794, where he grad. in 1798. Soon after this, while living in Richmond, Va., in the capacity of tutor, he wrote in a letter, "Religion is the only treasure worth pursuing. I consider the man who recommends it to society as more useful than the greatest sage and patriot who adorns the page of history." In the summer of 1800 he returned by sea to Newport, and to the hardships he endured on that voyage may be ascribed the permanent indisposition with which he had to contend during all his after life. In 1802 he took the position of regent at Harvard, meantime continuing his theological studies. In 1803 he became pastor of the Federal st. ch. in Boston. In 1814 he delivered, on the fall of Napoleon, what is perhaps the finest of all his efforts as an orator—viz. a discourse on *The Goodness of God in delivering the Chr. World from Military Despotism*. He was deeply interested in the peace movement, to which he lent his support, without, however, taking the extreme ground of entire non-resistance. His *Remarks on the Life and Character of Nap. Bonaparte*, which appeared in the *Chr. Examiner* in 1828, probably contributed more than any other of his writings to carry his fame into all civilized countries. Perhaps the greatest of his theological discourses is that on the *Evidences of Christianity*, delivered in 1821 at Harvard. He gave his earnest sympathy to the anti-slavery and temperance movements. D. Oct. 2, 1842.

Channing (WILLIAM HENRY), a Unit. minister, a nephew of William E. Channing, b. in Boston May 25, 1810, grad. at Harvard in 1829, and preached in the cities of New York, Boston, Cin., and Liverpool, Eng. Wrote a *Memoir of William Ellery Channing*. D. Dec. 1884.

Chan'trey (Sir FRANCIS), an Eng. sculptor, b. in Derbyshire Apr. 7, 1781, was a son of poor parents. He learned the trade of carver in Sheffield, and removed to Lond. about 1804, after which he devoted himself to sculpture. Among his works is a statue of Washington in the State-house at Boston, Mass. D. Nov. 15, 1841.

Chanute, city and R. R. junc., Neosho co., Kan., 95 m. S. of Lawrence. Pop. 1880, 887.

Chanzy (ANTOINE E. A.), b. at Nouart, Fr., Mar. 18, 1823, served in Algeria 1843-59; distinguished in the battle of Solferino, It.; served again in Algeria from 1864 till Franco-German war of 1870, becoming brig.-gen. 1868; commanded the 2d army of the Loire, and vigorously resisted the Ger. invasion of Fr.; member of National Assembly 1871, and its pres. 1872; gov.-gen. of Algeria 1873; became life senator of Fr. 1875; ambassador to Rus. 1879. D. Jan. 4, 1883.

Chap'in (AARON LUCIUS), D. D., b. in Hartford, Conn., Feb. 6, 1817, grad. at Yale 1837, and at Union Theological Sem., New York, 1842; prof. in N. Y. inst. for deaf and dumb 1838-43, pastor of first Presb. ch., Milwaukee, 1843-50, pres. of Beloit Coll., Wis., from 1850 to the present time. Wrote text-books on political economy, review articles, and was an associate ed. of *J.'s Univ. Cyc.*

Chapin (EDWIN HUBBELL), D. D., b. in Union Village, Wash. co., N. Y., Dec. 29, 1814, ed. at the sem. in Bennington, Vt.; was made D. D. at Harvard Univ. in 1856, commenced preaching in 1837, first settled over a society of Univs. and Units. in Richmond, Va.; removed to Charlestown, Mass., in 1840, thence to Boston in 1846, to New York in 1848, where he became pastor of the Fourth Univ. ch. His speech before the Peace Convention at Frankfort-on-the-Main, in 1850, commanded great attention. Wrote *Crown of Thorns*. D. Dec. 26, 1880.

Chap'in (JEREMIAH), D. D., b. at Rowley, Mass., Jan. 2, 1776, grad. at Brown Univ. 1799; pastor of Bap. ch., Danvers, Mass., 1802-18, pres. of Waterville Coll. 1820-32. D. May 1841.

Chap'man (ALVAN WENTWORTH), M. D., b. at Southampton, Mass., Sept. 26, 1809, grad. at Amherst Coll. 1830, and removed to Apalachicola, Fla., where he attained distinction as a botanist. Held various State and U. S. offices. The genus *Chapmannia* was named in his honor. Wrote *Flora of the S. U. S.*

Chapman (GEORGE), an Eng. poet and translator, b. in 1557. He was the first translator of Homer into Eng. verse. D. 1634.

Chapman (JOHN GADSBY), an artist, b. in Alexandria, Va., and received his training as a painter in It. Executed *Baptism of Pocahontas* in capitol at Wash.

Chaptal (JEAN ANTOINE), COMTE DE CHANTELOUP, an eminent Fr. chemist, b. at Nogaret, Lozère, June 5, 1756. His chief works are *Chem. Applied to the Arts and Elements of Chem.* D. July 30, 1832.

Chapul'tepec, a fortress, about 2 m. S. W. of the city of Mex., consists of an isolated eminence about 150 ft. high, fortified by a strong citadel which crowns the hill, designed to protect the causeway forming the approach to the city. Its approaches were also strongly guarded by outworks at its base and on its acclivities. This fortress, which was strongly garrisoned, was taken by storm by the Amers. under Gen. Scott, Sept. 13, 1847. The Amer. loss was 863 killed and wounded, that of the Mex. much greater. The capture of C. virtually ended the war, the city of Mex. being entered by the Amers. the next day.

Char'ax of Pergamus, priest and philos., flourished probably in the times of Antoninus Pius and M. Aurelius. He wrote a Gr. hist. in 40 books, also a work entitled *Xponika*, in at least 16 books, and philosophical treatises.

Char'coal [Fr. *charbon*; Lat. *carbol*], a common name of a variety of carbon; a carbonaceous substance obtained by the partial combustion of wood. The term is also applied to the solid residuum which results from the destructive distillation of animal matter and peat. Except the diamond, C. is the substance in which carbon exists nearest to purity. It burns without flame or smoke, and produces a greater heat than an equal weight of wood. It is used as an ingredient in the composition of gunpowder, as an agent in clarifying liquors, and for the smelting of iron.

Charcoal Blacks are made both from animal and vegetable substances—e. g. burnt ivory, bones, vine twigs, peach-stones, nut-shells, the smoke of oil or rosin condensed, etc. Those which are derived from vegetable substances when mixed with white are usually of a blue tint.

Chardon, O. See APPENDIX.

Chares, kā-rēz, a Gr. statuary, b. at Lindus, was a pupil of Lysippus, and the founder of the Rhodian school of sculpture. He lived about 300 B. C. Among his works was the Colossus at Rhodes.

Chares of Mytilene held the office of εἰσαγγελεὺς (one who bears messages and introduces persons to the royal presence) to Alexander, of whose life and campaigns he wrote an account.

Charge, in law, a burden imposed on a thing; a duty or obligation imposed upon a person; sometimes merely a formal and distinct allegation. More specifically, it is used in the following connections: (1) A burden imposed upon land, particularly in a court of equity. It is a common course in a will to "charge" the devisee's estate with the gen. payment of debts or legacies, or with the payment of a particular debt or legacy. (2) A C. upon the person. A will or other instrument may be so drawn as to confer a benefit upon a person, and at the same time impose upon him an obligation. Should he accept the benefit, he will by implication take upon himself the burden or obligation, though it may outweigh the benefit. (3) Directions to a jury. In a jury trial, as the decision of questions of law appertains to a judge, and matters of fact belong to the jury, it is a common practice for the judge to instruct or "charge" the jury upon the questions of law. These instructions the jury are legally bound to follow. (4) In equity practice the words "charge and discharge" are found in connection with the taking of accounts in that court of moneys paid and received. The C. means the statement of debts due by the party against whom the account is rendered, and *discharge* means the items of credit presented by the latter. (5) In equity pleadings there is a statement made by the plaintiff, known as the charging part of the bill (or complaint), in which he sets forth certain facts, anticipatory of a defence which he supposes that the defendant will make. T. W. DWIGHT.

Charisius, ka-rish'e-us, an Attic orator, a contemporary of Democareus, nephew of Demosthenes. He wrote, like Isocrates, orations for others, and in this, as Cicero says in his *Brutus*, he imitated Lysias.

Charisius (AURELIUS AFRIDIUS), a learned jurist who lived under Constantine and his sons. Extracts from 3 of his writings are contained in the *Digest*.

Charisius (FLAVIUS SOSPATER), a Campanian, a celebrated grammarian, whose date is uncertain. Wrote a Lat. gram. in 5 books. *Institutionum Grammaticarum libri quinque*. Portions of the work have been found; the rest is given in the various collections of Lat. grammarians.

Charites, kā-rī-tēz (sing. **Char'is**), [Gr. Χάρις, Χάριτες; Lat. *Grætiæ*], were said to be the daughters of Jupiter. They favored poetry and art, were friends of the Muses, and presided over festivals and social enjoyments. There were 3 Graces, named Aglaia, Euphrosyne, and Thalia.

Char'iton, cap. of Lucas co., Ia., on R. R. and the Chariton River, 35 m. W. of Ottumwa. Pop. 1870, 1728; 1880, 2977.

Chariton, of Aphrodisias in Caria, was the writer of a Gr. romance which treats of the loves of Chæreas and Callirrhoe. Is in 8 books, and has come to us almost entire.

Char'ity, Sisters of [Fr. *sœurs* (or *filles*) de la charité, or *sœurs grises*, i. e. "Gray Sisters," so called from their dress], a name applied to several orders of celibate women in the R. Cath. Ch. The first congregation of this name was established at Châtillon, in Fr., by St. Vincent de Paul in 1629. This order is devoted to the care of the sick and the protec-

tion of founding or destitute children and aged persons. Several congregations of Augustinian nuns and of other R. Cath. orders are called Sisters of C. and Sisters of Mercy, and have branches in the U. S.

Charlemagne, *shar-le-man'* [Lat. *Carolus Magnus*], king of the Franks and Rom. emp., b. Apr. 2, 742, probably at Aix-la-Chapelle, was a son of Pepin le Bref. After his father's death, in 768, he reigned over the Franks, jointly with his brother Carloman, until the death of the latter in 772. From that time sole ruler, during a reign of 43 yrs., he carried on incessant wars on all his borders, extending his domains, and at the same time spreading Christianity and building up a vast dominion. In 772 he began a 30 yrs. war against the Sax.; in 774 marched 2 armies over the Alps and conquered Lombardy; returned and hastened into Sp. in 778 to help the Ar. rulers of that country against the Osman caliph of Cordova. It was in this war that the hero of romance, Roland or Orlando, fell in the pass of Roncesvalles. In 799 the Roms. revolted against Pope Leo III., and were again brought into subjection by C., who in return was crowned by Leo with the iron crown of the W. empire, on Christmas day, 800. He watched over and fostered agriculture, trade, art, and letters, clearing away forests, draining swamps, founding monasteries and schools, building up cities, constructing splendid palaces, as at Aix, Worms, and Ingelheim, and drawing to his court scholars and poets from all nations, as Alcuin, Paulus Diaconus, and Turpin. He was himself proficient in science as well as all hardy accomplishments, speaking Lat. and knowing Gr. He was tall and stately, measuring 7 of his own foot-lengths, simple in his life, "excelling all men of the time, to all alike dread and beloved, by all alike admired," as he was described by the historian Nithard. He was succeeded by his son Louis le Débonnaire. His descendants were called Carolingians. D. Jan. 28, 814.

Charles I., emp. See CHARLEMAGNE.

Charles II., emp. See CHARLES THE BALD (OF FR.).

Charles III., surnamed **THE FAT** [Fr. *Charles le Gros*], emp. of the Franks, b. in 822 A.D., was a younger son of Louis II., who at his death, in 876, divided the empire between his 3 sons, Carloman, Louis, and C. After the death of his brothers, which occurred before 884, C. inherited their dominions. He was deposed by his nephew Arnulph in 888, and d. the same year.

Charles IV., emp. of Ger., b. in 1316, was a son of John de Luxembourg, king of Bohemia. He was elected emp. in 1346 as the successor of Louis V. He issued in 1356 the Golden Bull, which for more than 4 centuries was the fundamental law to regulate the election of Ger. emps. D. 1378, and was succeeded by his son Wenceslaus.

Charles V., **DON CARLOS I.** of Sp., afterward emp. of Ger., was the eldest son of the archduke Philip of Aus., and a grandson of the emp. Maximilian I. His mother was Joanna, the daughter and sole heiress of Ferdinand of Aragon and Isabella of Castile; b. at Ghent Feb. 24, 1500, and ed. in Flanders, having as his preceptor Adrian of Utrecht. On the death of his father in 1506, he inherited the Low Countries and Franche-Comté, and in 1516 he succeeded Ferdinand as king of Sp., to which he removed his court in 1517. In 1519 he was elected emp. of Ger., defeating Francis I. of Fr., who was also a competitor for that dignity. He was crowned as emp. at Aix-la-Chapelle Oct. 22, 1530. C. and Francis I. of Fr. were then the most powerful sovereigns on the continent of Europe, and were rivals. Their ambitious designs against it led to hostilities, which commenced in 1522, and with intervals of peace and varying fortunes were continued until 1544. In 1530, to check the Prot. Ref., he assembled the Diet of Augsburg, which ordained that severe penalties should be inflicted on the Protsts. In 1535 he conducted in person an expedition against Barbarossa, whom he defeated at Tunis. Resolving to extirpate heresy among his subjects, he pub. in 1540 the ban of the empire against the elector of Sax. and the landgrave of Hesse, who were chiefs of the Prot. party. They took arms in self-defence, but were defeated at Mühlberg in Apr. 1547. Their cause, however, found an able defender in Maurice of Sax., who, as the head of a league, took arms against C. early in 1550. C., surprised by his rapid and skilful movements, was compelled to flee, and hostilities were ended by the important treaty of Passau, Aug. 22, 1552, which secured religious liberty to the Ger. Protsts. In the autumn of 1553 he formally resigned to his son Philip the sovereignty of the Low Countries, Sp., and his other hereditary dominions. He also abdicated the imperial crown, and was succeeded as emp. by his brother Ferdinand. His motive for abdicating appears to have been partly ill health. Retired to the monastery of Yuste, near Plasencia, in Sp. D. Sept. 21, 1558.

Charles VI., emp. of Ger., the second son of the emp. Leopold I., b. Oct. 1, 1685. On the death of his brother, Joseph I., in 1711, C. was chosen emp. of Ger. Having no son, he appointed his daughter, Maria Theresa, his heir by a Pragmatic sanction (1742). D. Oct. 30, 1740.

Charles VII., (**CHARLES ALBERT**), emp. of Ger., a son of Maximilian Emmanuel, elector of Bavaria, b. at Brussels in 1697. He married a daughter of the emp. Joseph I. in 1722, and a niece of Charles VI. When Charles VI. d. in 1740, he claimed part of the Aus. dominions. He was elected emp. in 1742, but his army was defeated by that of Maria Theresa. D. Jan. 20, 1745.

Charles I. (**CHARLES STUART**), king of G. Brit., b. at Dunfermline, Scot., Nov. 19, 1600, third son of James I. and Anne of Den., succeeded to the throne in Mar. 1625. The Parl., animated by a growing spirit of liberty, was sparing in its grants of supplies, and was soon involved in a contest with the court, and C. had recourse to arbitrary methods of raising money. He governed for 11 yrs. without a Parl., severely persecuted the Puritans, prosecuted the patriot Hampden, attempted to impose the Liturgy on the Scot. people, and was met by an insurrection of the Scotch, who invaded Eng., and defeated the royal army at Newburn-on-

Tyne. This disaster and the want of money induced the king to call a new Parl., which met in Nov. 1640, and was the famous Long Parl. Both houses were resolute in resistance to despotic power. Provoked by an attempt of the king, in Jan. 1642, to arrest Pym, Hampden, and 3 other members of the House of Commons, the Parl. appealed to arms. At the battle of Naseby, in June 1645, the king was so completely beaten that he soon gave himself up to the Scot. army, which transferred him in 1647 to the custody of the Eng. Parl. Having been tried and convicted in a high court appointed for the occasion, he was beheaded Jan. 30, 1649.

Charles II., king of G. Brit., son of Charles I., b. May 29, 1630. He went into exile in 1645, and joined his mother in Paris. In 1649 he assumed the title of king, and he was proclaimed king by the Scot. Parl. "on condition of his good behavior." He landed in Scot. in June 1650, and was crowned at Scone early in 1651. A Scot. army fighting for him was defeated by Cromwell at Dunbar in Sept. 1650. C., having recruited his army, led it into Eng., and was pursued by Cromwell, who defeated the royal army at Worcester, Sept. 3, 1651. C. then took refuge in Fr. After the death of Cromwell, the royalist party, which was always the most numerous, easily regained the ascendancy, and C. was restored in 1660 to almost unlimited power. D. Feb. 6, 1685, and was succeeded by his brother, James II. C. was indolent, unambitious, and depraved in morals. (See MACAULAY, *Hist. of Eng.*)

Charles I. of Fr. See CHARLEMAGNE.

Charles, surnamed **THE BALD** [Fr. *Le Chauve*], or **Charles II.**, king of Fr., fourth son of Louis le Débonnaire, b. at Frankfort-on-the-Main in 823 A.D. On the death of his father (840) he inherited all of Fr. which is W. of the Rhone. He is also styled Charles II. among the Ger. emps., having been crowned by the Pope in 875. D. 877, and was succeeded by his son, Louis le Bègue.

Charles III., of Fr., called **THE SIMPLE**, a son of Louis le Bègue, was b. in 879 A.D. Assumed the title of king in 893. D. 929, leaving a son, Louis Outremeur.

Charles IV., of Fr., surnamed **THE HANDSOME** [Fr. *Le Bel*], the third son of Philippe le Bel, b. in 1294; began to reign in 1322. He aided his sister Isabella to dethrone her husband, Edward II. of Eng. D. without male issue in 1328, and was succeeded by Philip of Valois.

Charles V., called **THE WISE** [Fr. *Le Sage*], king of Fr., b. Jan. 21, 1337, was a son of John II. He acted as regent during the captivity of John, who was taken prisoner by the Eng. in 1356. He became king on the death of his father in 1364. D. Sept. 16, 1380, his son, Charles VI., succeeding him.

Charles VI., called **THE BELOVED** [Fr. *Le Bien-Aimé*], a son of Charles V., b. in Paris Dec. 3, 1368. He was the first prince who received the title of dauphin. He became insane in 1392. D. Oct. 22, 1422.

Charles VII., surnamed **THE VICTORIOUS**, king of Fr., b. Feb. 22, 1403, was a son of Charles VI., whom he succeeded in 1422. At that time Henry VI. of Eng. was recognized as king of Fr. by a faction which had possession of Paris, and Fr. was partially occupied by the Eng. C. became master of Paris in 1436, and recovered Normandy in 1450. D. July 23, 1461, and was succeeded by his son, Louis XI.

Charles VIII., surnamed **THE AFFABLE**, king of Fr., b. at Amboise July 30, 1470, was a son of Louis XI., whom he succeeded in 1483. D. without issue Apr. 7, 1498, and was succeeded by Louis XII.

Charles IX., king of Fr., the second son of Henry II. and Catherine de Médicis, b. at St. Germain-en-Laye June 27, 1550. He succeeded his brother, Francis II., in 1560. During his minority his mother had the chief control of the govt. His reign was disturbed by civil or religious wars, which began in 1562, between the Catholics and Huguenots. Having made overtures of peace to the Huguenots, he negotiated a marriage between his sister Margaret and Henry of Navarre. On the occasion of this wedding he invited Coligni and other Prot. leaders to court, and treated them with a simulated favor which lulled their suspicions, and then was begun, Aug. 24, 1572 (St. Bartholomew's day), the massacre of the Protsts. D. without issue May 30, 1574.

Charles X., king of Fr., b. at Versailles Oct. 9, 1557, was a younger brother of Louis XVI. He emigrated in 1789, and remained in exile until 1814. He began to reign on the death of Louis XVIII. in Sept. 1824. In Aug. 1829 he formed an ultra-royalist ministry, which became obnoxious to the people, and on July 25, 1830, the Parisians appealed to arms, barricaded the streets, and after a contest of 3 days were completely victorious. C. abdicated in favor of his grandson, the duke of Bordeaux, and escaped to Eng. D. Nov. 6, 1836.

Charles I., of Anjou, king of Naples, count of Anjou and Provence, b. about 1220, was the youngest son of Louis VIII. of Fr. and a brother of St. Louis. At the instigation of the pope he attacked and defeated Manfred, king of Naples, in 1266, and usurped his throne. The Sicilians revolted and massacred a multitude of Frenchmen on the 30th of Mar. 1282. This event was called "The Sicilian Vespers." D. Jan. 7, 1285.

Charles I. of Sp. See CHARLES V. (emp.).

Charles (or **Carlos**), **II.**, king of Sp., b. Nov. 6, 1661, was the son of Philip IV., who died in 1665. Anne of Aus. became regent during the minority of C., who was her son. In 1689 he became an ally of Eng. and other powers in a war against Louis XIV. By his last will he appointed Philip, duke of Anjou, as his heir. D. Nov. 1, 1700.

Charles III., king of Sp., a son of Philip V., b. Jan. 30, 1716, ascended the throne on the death of his brother, Ferdinand VI., in 1759. He expelled the Jesuits from Sp. in 1767. In 1779 he declared war against Eng., and in alliance with Fr. besieged Gibraltar without success. D. Dec. 14, 1788, and was succeeded by his son, Charles IV.

Charles IV., of Sp., a son of Charles III., b. at Naples Nov. 12, 1748, became king in 1788. After a war with Fr. in which the Spaniards were defeated in many battles, he

made peace in 1795, and as an ally of Fr. he declared war against Eng. in 1796. In 1808 Nap. deposed him and placed his own brother Joseph on the throne. D. Jan. 19, 1819.

Charles X. (or **Charles Gustavus**), king of Swe., b. at Nyköping Nov. 8, 1622, was a son of the prince of Deux-Ponts. His mother was a sister of King Gustavus Adolphus. He was the heir-apparent in the reign of Christina, and became king when she abdicated in June 1654. Waged a successful war with Poland, and another with Den. D. Feb. 13, 1660, and left the throne to his son Charles.

Charles XI., king of Swe., the son of Charles X., b. Dec. 25, 1655. C. assumed the royal functions in 1672. He defeated the Danes who invaded Swe. in 1677, but in 1679 signed a treaty of peace and married a sister of the king of Den. D. Apr. 15, 1697, and was succeeded by his son, Charles XII.

Charles XII., of Swe., b. at Stockholm June 27, 1682, was the eldest son of Charles XI. and Ulrica Eleonora of Den. He learned Lat., Fr., and Ger., and formed in his youth simple and frugal habits of living. He began to reign in Apr. 1697. In 1700 a league was formed against Swe. by Peter I. of Rus. and the kings of Den. and Poland, who designed to aggrandize their dominions at his expense. In the war that followed he marched first against Copenhagen, and compelled the Dan. king to sue for peace. He then attacked Peter the Great, and gained a decisive victory at Narva in Nov. 1700, soon after which he invaded Poland. He defeated the Poles in several battles, and deposed Augustus, king of Poland, in 1704. In 1709 he besieged Poltava, to relieve which Peter advanced with an army of 70,000 men. The decisive battle of Poltava, July 8, 1709, resulted in the defeat of C. He retreated into Tur., and was kindly received by the sultan, who gave him a residence at Bender. Leaving Tur., he travelled *incognito* through Hungary and Ger., reaching Stralsund in Nov. 1714. He was killed at the siege of Frederikshall Nov. 30, 1718, and left a great reputation as a military genius. He was never married, and his sister Ulrica Eleonora inherited the throne.

Charles XIII., king of Swe., b. Oct. 7, 1748, was a son of King Adolphus Frederick and a nephew of Frederick the Great. In 1792 he became regent during the minority of his nephew, Gustavus IV., and retained that office until 1796. The States-General deposed Gustavus in 1809, and elected C. as his successor. Having no son, C., with the consent of the Swe. Diet, adopted Gen. Bernadotte as his son and heir in 1810. D. Feb. 5, 1818.

Charles XIV., of Swe. See BERNADOTTE.
Charles (or Carl) XV. (LOUIS EUGÈNE), king of Swe. and Nor., b. May 3, 1826. He succeeded his father, Oscar I., July 8, 1859. D. Sept. 18, 1872. The crown descended to his brother, Oscar II., Frederick, duke of Ostrogothia.

Charles I. (KARL EITEL FRIEDRICH ZEPHYRIN LUDWIG of Hohenzollern Sigmaringen), king of Roumania, the name given in 1861 to the United Danubian Principalities of Moldavia and Wallachia, b. in Ger. Apr. 20, 1839, and is the second son of the late prince Karl of Hohenzollern. On the 10th of May 1866 he was elected *domn*, or prince, of Roumania. Roumania has since become independent, and the prince assumed the title of king Mar. 27, 1881.

Charles, archduke of Aus., a gen., b. at Florence Sept. 5, 1771, was a son of the Ger. emp. Leopold II. He defeated the Fr. gen. Jourdan at Wurtzburg in Sept. 1796, and compelled Moreau to retire across the Rhine; in 1805 he defeated Massena at Caldiero. He became gen.-in-chief of the Aus. armies in 1806, and encountered Nap. at Aspern and Wagram. Wrote *Principles of Strategy*. D. Apr. 30, 1847.

Charles Albert, king of Sard., b. Oct. 2, 1798. He was a son of Prince Charles Emmanuel of Savoy-Carignan; became king on the death of Charles Felix in 1831; declared war against Aus. in the spring of 1848. Having been defeated at Novara in Mar. 1849, he abdicated in favor of his son, Victor Emmanuel. D. July 28, 1849.

Charles, surnamed the BOLD, sometimes called **Charles the Rash** (Fr. *Charles le Téméraire*), duke of Burgundy, b. at Dijon Nov. 10, 1435, was a son of Philip the Good. His dominions included the Netherlands. He waged war against Louis XI. of Fr. and other princes. He was defeated and killed at Nancy Jan. 5, 1477, and was succeeded by his daughter Mary, who was married to the emp. Maximilian I.

Charles City, R. R. junc., cap. of Floyd co., Ia., on Cedar River, 139 m. W. N. W. of Dubuque. Pop. 1870, 2166; 1880, 2421.

Charles Edward, "the Young Pretender," more fully, **Charles Edward Louis Philip Casimir Stuart**, son of James Stuart, the first "Pretender," and of the Polish princess Clementina Sobieski, b. at Rome Dec. 31, 1720. War having broken out between Fr. and Eng., and his father having abdicated his claim to the Brit. throne, he in 1745 (July 25) landed with a few attendants at Moidart. With a large following, mostly of Highlanders, he entered Edinburgh Sept. 17, destroyed Sir John Cope's army at Preston Pans Sept. 21, entered Eng., and could easily have taken Lond. but for the insubordination of the Highland chiefs, who compelled him to retreat to Scot., repulsing the royal troops at Clifton. On Jan. 17, 1746, he defeated Hawley at Falkirk. The character of his forces soon compelled his retreat to the Highlands, whither he was followed by the duke of Cumberland. He fought the latter at Culloden (Apr. 16), and was there utterly overthrown. After many months of suffering he escaped from the Western Islands by the aid of the famous Flora MacDonald. D. Jan. 30, 1788.

Charles Emmanuel I., duke of Savoy, surnamed the GREAT, b. Jan. 12, 1562. He succeeded his father, Philibert Emmanuel, Aug. 31, 1580. D. July 26, 1630.

Charles (JACQUES ALEXANDER CÉSAR), a Ft. savant and aéronaut, b. at Beaugency Nov. 12, 1746. He and M. Robert were the first persons who ever ascended in a balloon. D. Apr. 7, 1823.

Charles Martel, king of the Franks, b. about 690 A. D.,

was an illegitimate son of Pepin d'Héristal, duke of Austra. He succeeded his father as mayor of the palace in 714, and obtained royal power, while Chilperic was nominal king. In 732 he defeated the Saracens near Poitiers. For this victory he was surnamed MARTEL (*i. e.* the Hammer). This is known as the battle of Tours, and was one of the decisive battles of the world's hist. D. Oct. 22, 741, and was succeeded by his sons, Carloman and Pepin le Bref.

Charles-ton, city and R. R. junc., cap. of Coles co., Ill., 45 m. W. of Terre Haute. It is the seat of a med. coll. Pop. 1870, 2849; 1880, 2867.

Charleston, an important R. R. and commercial centre, the chief city of S. C. and the cap. of Charleston co., lat 32° 46' N., lon. 79° 57' W., about 7 m. from the Atlantic Ocean and 120 m. from Columbia, the cap. of the State. The city stands upon a tongue of land between the Ashley and Cooper rivers. Northward stretches an extended plain occupied by fruit, floral, and vegetable farms; southward the 2 rivers unite, forming a spacious and beautiful harbor, one of the safest and most commodious on the Atlantic coast. The city is the seat of a large wholesale trade carried on with the interior, and is the pt. through which the large interior cities of the neighboring States draw their supplies of merchandise from the great commercial centres. The prin. exports are in cotton, rice, naval stores, lumber, and phosphate rock (a fertilizing substance of great value). The prin. educational institutions are C. Coll., founded in 1785, and the Med. Coll. of S. C. The former has an excellent museum of nat. hist., and the latter one of the best pathological and anatomical museums in the U. S. The C. Library is the prin. inst. of that kind. Established in 1748, it formerly contained 24,000 vols., but lost about 8000 by the war. Many of its books are of great value. The Apprentices' and Minors' Library Society had a building on Meeting st., and 10,000 vols., which were destroyed by fire in 1861. It was reorganized in 1873. The benevolent insts. are the city orphan-house, the Cath. orphan asylum, almshouse, asylum for aged and infirm, city hospital, and an asylum for colored orphans, supported by the State. The Confed. Widows' Home, St. Philip's Ch. Home, Sailors' Home, Ladies' Mutual Aid Association, and Ladies' Fuel Society are among the private benevolences. The most noted public buildings are the arsenal and the citadel, the market, city-hall, c-h., city orphan-house, Charleston Hotel, Mills House, Acad. of Music, new custom-house, and the P. O. The Battery, a small park on the S. front of the city, is the chief public resort.

C. was founded in 1680 by an Eng. colony. During the first half century its growth was slow, but it attained commercial importance before the end of the second. It was taken by the Brit. in 1780, after a gallant defence, and evacuated by them in 1782. It was the State cap. until 1790, when the seat of govt. was removed to Columbia. The reduction of Ft. Sumter, its prin. harbor defence, was the first conflict of the c. war and the first triumph of the Confed. arms. In Dec. 1861 nearly half of the city was destroyed by fire. During the last 2 yrs. of the war it sustained a protracted siege and bombardment, and was finally evacuated by the Confeds. Feb. 19, 1865. Pop. 1870, 48,956; 1880, 49,984.

Charleston, or Kanawha Court-House, cap. of Kanawha co. and since May, 1885, cap. of W. Va., at mouth of Elk River, on the Kanawha River, 65 m. from its mouth and 150 m. S. S. W. of Wheeling. The Chesapeake and O. R. R. passes the city on the opposite side of the Kanawha. Steamboats navigate the Kanawha River up to this point. A considerable trade in lumber, salt, and coal is carried on. The seat of the State govt. was removed to C. in 1869, and to Wheeling in 1875. Pop. 1870, 3162; 1880, 4192.

Charleston, College of. In June 1770 a meeting of the citizens of C. S. C., was held to petition the gen. assembly for the establishment of a coll. In Oct. 1775 an act was passed providing for 3 colls., 1 of which was to be located in C. In Mar. 1789 the Rev. Dr. Robert Smith was elected pres., and the first commencement followed in 1794. In 1880 the new building (subsequently enlarged by the addition of wings) was erected.

Charlestown, formerly a city of Middlesex co., Mass., but now a part of Boston, is situated on a peninsula nearly inclosed by the Mystic and Charles rivers, and is connected with the old part of Boston and with Chelsea by 5 bridges. The ground is uneven, and rises into 2 eminences, Breed's and Bunker Hills. Charlestown has an extensive U. S. navy-yard, occupying from 70 to 80 acres, with an extensive ropewalk. A dry-dock connected with the navy-yard is built of granite and cost \$670,000. To commemorate the battle of Bunker Hill a granite shaft 221 ft. high, 31 ft. square at the base and 15 at the top, has been erected. It was commenced in 1825 and finished in 1843. It is called the Bunker Hill Monument. The corner-stone was laid by La Fayette, and at the celebration of its completion, June 17, 1843, the anniversary of the battle, was present a vast gathering of people, including the Pres. and his cabinet. C. is memorable from its associations with the Revolution. It was burned by the Brit. on the day of the battle of Bunker Hill. The city charter dates from 1847. The city of C., also the towns of West Roxbury and Brighton, were annexed to Boston Oct. 13, 1873, to become a part of that municipality Jan. 5, 1874. Pop. 1870, 28,323; 1880, pop. included in Boston.

Charlestown, Sullivan co., N. H., on R. R. and Conn. River, 50 m. W. of Concord. Pop. 1870, 1741; 1880, 1587.

Charlestown, R. R. junc., cap. of Jefferson co., W. Va. In this place John Brown was tried and executed Dec. 2, 1859. On the 18th of Oct. 1863 there was an engagement here between the Confed. and U. forces, Gen. Imboden first taking the place from the Unionists, and Col. G. D. Wells driving him out. Pop. 1870, 1593; 1880, 2016.

Charlevoix, de, de shar-leh-vwah' (PIERRE FRANÇOIS XAVIER), a Fr. Jesuit and historian, b. at St. Quentin Oct. 29, 1682. He went as a missionary to Canada in 1720, and descended the Miss. to its mouth. Wrote a *Hist. of Canada*. D. Feb. 1, 1761.

Char'lotte, a city and R. R. junct., cap. of Eaton co., Mich. 19 m. S. W. of Lansing. Pop. 1880, 2,940; 1884, 3,598.

Charlotte, a city and R. R. centre, cap. of Mecklenburg co., N. C. Gold-mines have been opened in the vicinity. There is a branch of the U. S. Mint in this city. It has 3 acads. Pop. 1870, 4,473; 1880, 7,094.

Char'lottesv'ille, R. R. junct., cap. of Albemarle co., Va., on the Rivanna River. One m. W. of this town is the Univ. of Va., founded in 1819 by Thomas Jefferson, and endowed by the State. Monticello, the residence of Jefferson, is 3 m. distant. Pop. 1870, 2,838; 1880, 2,676.

Char'lottetown, the cap. of Prince Edward Island, on the N. bank of E. River, near the S. coast. It has an excellent harbor, and is the seat of a R. Cath. bp., of Prince of Wales Coll., St. Dunstan's Coll. (R. Cath.), and a Meth. Coll. Pop. in 1881, 11,485.

Char'lton (ROBERT M.), a lawyer and author, b. at Savannah, Ga., Jan. 19, 1807. He pub. a vol. of poems in 1838, and became U. S. Senator in 1852. D. Jan. 18, 1854.

Char'nock (STEPHEN), an Eng. nonconformist divine, b. in Lond. 1628. He was a voluminous author, his chief work being a treatise on *The Being and Attributes of God*. D. July 27, 1680.

Char'on (Gr. Χάρων), in classic mythology, the ferryman who transported the souls of the dead across the rivers of the infernal regions.

Charon (κάρων) of *Lamp'sacus*, son of Pythoëdes, one of the early writers of hist., preceding Herodotus, flourished about 480 B. C. He composed a number of works on historical subjects, an account of the Pers. (Περσικά), and another of the Grs. (Ελληνικά). Only fragments of his works remain.

Charr (*Salvelinus umbla*), a beautiful European fish of the salmon family. It is not a game fish, though it will occasionally rise at the fly or take a minnow. It lives in the clear water of lakes and streams. It seldom weighs much more than a lb., and is quite variable in color and marks. Allied to this are a number of species in Europe and Amer., and among them is the common brook-trout of N. Amer., the *S. fontinalis*.

Chart [Lat. *charta*, a "paper"], a hydrographic map of some portion of the sea or coast for the use of navigators. C. are generally made on the "Mercator" projection; those prepared by the U. S. Coast Survey are, however, made on the polyconic projection.

Char'ter [Fr. *chartre* or *charte*, from the Lat. *charta*, "paper"], a formally written instrument given as evidence of a grant, contract, or other transaction between man and man; an instrument executed with form and solemnity bestowing rights and privileges. In public law the term is applied to those formal deeds or instruments by which sovereigns guarantee the rights and privileges of their subjects, or by which a sovereign state guarantees those of a colony. The founders of several of the Brit. colonies, now States of the U., obtained C. from the king of Eng. for the same. In municipal law the word is principally used to designate a grant obtained from the king of franchises, privileges, or estates by letters patent under the great seal. A leading instance is found in the creation of corporations.

Char'ter Oak, a tree which stood in Hartford, Conn. When Sir Edmund Andros came to Hartford in 1687, by



Char'ter Oak.

command of King James II., to resume the charter of the colony, the charter was concealed in a hollow of this oak, which was blown down in Aug. 1856.

Char'ter-Party [Fr. *chartre-partie*], the title given to a contract in which the owner or the master of a ship, with consent of the owner, lets the vessel or a portion of her to a second party for the conveyance of goods from one pt. to another pt.; hence the vessel is said to be "chartered." It must specify the voyage to be performed and the terms on which the cargo is to be carried. On the part of the ship it is covenanted that she shall be seaworthy, well found in rigging, furniture, and provisions, and that the crew be suitable in number and competency; that she shall be ready to receive the cargo on a given day, wait its complete delivery for a certain period, and sail for the stipulated pt. when laden, if the weather for the time permits. The freighter's portion of the contract obliges him to load and unload at suitable periods under specified penalties, and to pay the freight as agreed on. A C.-P. sometimes assumes another character, and is a mere lease of a ship, which is manned by

the charterer, who then has the usual rights and incurs the liabilities growing out of possession.

Char'tism, a political movement in G. Brit. 1835 to 1850, in which attempts were made to secure universal male suffrage, equal representation, the vote by ballot, annual parls., the abolition of property qualification for office-holders, and the payment of salaries to members of Parl.

Chartres, shart'r (anc. *Autricum*), a city of Fr., cap. of the dept. of Eure-et-Loir, is on the river Eure, and is 49 m. S. W. of Paris by R. R. It has a Gothic cathedral of the 11th century, said to be the most perfect in Fr., surmounted by 2 towers, one of them 382 ft. high, with rich ornamentation, and the other exceedingly massive. C. has 2 other remarkable chs., an epis. palace, and a public library of about 30,700 vols. During the Middle Ages C. was the cap. of the dist. of *Chartrain*, made by Francis I. a duchy, and given as an appanage to the dukes of Orleans. Hence the title duke of C. was given to the eldest son of the duke of Orleans. More recently the same title was given to Prince Robert of Orleans, grandson of King Louis Philippe and 2d son of Duke Ferdinand of Orleans. Pop. 21,080.

Charyb'dis [Gr. *Καρυβδης*], now called *Galofaro*, an incessant undulation, rather than a whirlpool, on Sicilian side of Strait of Messina, opposite rock of Scylla. It is caused by the meeting of currents, and is seldom dangerous.

Chase (DUDLEY), b. in Cornish, N. H., Dec. 30, 1771, grad. at Dartmouth in 1794; was chief-justice of Vt. 1817-21 and U. S. Senator 1813-17 and 1825-31. D. Feb. 23, 1846.

Chase (GEORGE), LL.B., b. in Portland, Me., Dec. 29, 1849, grad. at Yale 1870 and Columbia Coll. law school 1873; became assistant prof. in 1875 and prof. in 1878 in that inst.; pub. *Amer. Student's Blackstone*.

Chase (IRAH), D. D., b. at Stratton, Vt., Oct. 5, 1793, grad. at Middlebury Coll. in 1814, studied at Andover Theological Sem.; ordained to Bap. ministry 1817. From 1825 to 1845 prof. at successive periods of biblical theol. and ecclesiastical hist. in the theological inst. (which he was largely instrumental in founding) at Newton Centre, Mass. D. Nov. 1, 1864.

Chase (PHILANDER), D. D., an Epis. bp., b. in Cornish, N. H., Dec. 14, 1775, and grad. at Dartmouth in 1796. He became bp. of O. in 1819, and bp. of Ill. in 1835. He founded Kenyon Coll., O., and Jubilee Coll., Ill. D. Sept. 20, 1852.

Chase (SALMON PORTLAND), a statesman and jurist, son of Ithamar Chase, a farmer of N. H., and nephew of Dudley and Philander Chase, above noticed, b. at Cornish, N. H., Jan. 13, 1808. He was sixth in descent from Aquila Chase, who emigrated from Eng. to Mass. in 1630. His mother was of Scotch descent. The stock to which he belonged was prolific in eminent men. His grandfather, Samuel Chase, had 7 sons, 5 of whom received an education at Dartmouth Coll. During the war of 1812 Ithamar Chase engaged in the glass manufacture at Keene, N. H., but this business resulted unfortunately on the reintroduction of foreign manufactures. He died in 1817, leaving his family in straitened circumstances. Salmon's education, however, was not neglected. He was first sent to a school at Windsor, Vt., and when 12 yrs. of age went to O. to live with his uncle, the bp., who resided near Columbus. Here he divided his time between hard work on the bp.'s farm and hard study in the bp.'s acad., which was afterward removed to Cin. In 1823 he returned to N. H., and the next yr. entered Dartmouth Coll., from which he graduated in 1826. He studied law under the direction of William Wirt while teaching school in Wash. Here he obtained his license to practise in 1829, and in the spring of 1830 went to Cin. to pursue his profession. For the first few yrs., while waiting for business he occupied himself in preparing an ed. of the *Statutes of O.*, with notes and an historical introduction. This brought him into notice, and in 1834 he was appointed solicitor for the U. S. Bank in Cin.

He early engaged in the controversy respecting slavery and the slave power in the U. S., and took the then unpopular anti-slavery side. He held slavery to be against natural law and right, was for confining it within its narrowest limits of power and terr., and took the ground that Cong. had no right to impose on State officers the duty of assisting to render up fugitive slaves, nor to legislate on the subject at all—that the States were, by the const., solely responsible for the performance of that duty, and had a right to prescribe such proceedings as they saw fit to prevent unjust arrests and detentions; also that slavery was a local inst., dependent upon State laws for its existence and continuance. His great maxim was, "Slavery is sectional, freedom is national." In 1842 he was employed to defend Van Zandt, the original of Van Tromp in *Uncle Tom's Cabin*, who had been indicted, under the Fugitive Slave law of 1793, for harboring fugitive slaves and aiding them to escape. The cause was carried to the Supreme Court of the U. S., and became one of the *causes célèbres* of the country. Mr. C. was virtually the founder and leader of the Liberty party, which resulted in the formation of the Free-Soil party, and ultimately of the Rep. party, which became the means of prostrating the slave power and abolishing slavery in the U. S. Conventions of this party were held at Columbus, O., in Dec. 1841, and at Buffalo, Cin., and Columbus in 1843, 1845, 1847, and 1848, resulting in the latter yr. in the nomination of Mr. Van Buren and Charles Francis Adams as the candidates of the Free-Soil party for Pres. and V.-P. He presided over the last, and drew up the platform of principles and policy which it adopted. Most prominent among these, at this time, was that of preventing the extension of slavery into the new Terrs. Mr. C. was originally a Whig, but in the pursuit of his great object of crushing slavery and the political forces which supported it, he allied himself to any party that, for the time being, would further his aims. On the 23d of Feb. 1849 he was elected to the Senate of the U. S. by the Dems., including the Free-Soil section of the party. During his senatorial term, from 1849 to Mar. 1855, occurred those great debates in Cong. upon the question of extending slavery into the new Terrs., Cal., N. M., Kan., and Neb., which re-

sulted in the Compromise acts of 1850 and the repeal of the Mo. Compromise. These acts produced a state of feeling in the N. States which resulted in the formation of the Rep. party. Mr. C. took a leading part in the debates referred to, and became a leader in this new party.

In Oct. 1855 he was elected gov. of O., and re-elected in 1857. In 1860 he was a prominent candidate for the presidency before the Rep. convention which nominated Mr. Lincoln. In the following session of the O. legislature he was again chosen Senator of the U. S., but had scarcely taken his seat in Mar. 1861 when he was nominated by Pres. Lincoln as sec. of the treas., upon the duties of which position he immediately entered. He found the treas. empty and the govt. credit below par. But he inaugurated measures which met the pressing demands of a gigantic war, amounting to six or seven hundred millions per annum, and stimulated the industrial energies of the country. The issue by the govt., in Feb. 1862, of currency notes was recommended by Sec. C., but the making of them a legal tender originated in Cong. The national banking system, by which all notes issued were to be based on funded bonds of the govt. of equal or greater amount, was originated by Sec. C. in Feb. 1863. He hoped that it would effectually abolish a resort to State bank issues of paper currency, which, it is known, he later regarded as bills of credit within the meaning and prohibition of the const.

Mr. C. resigned the secretaryship of the treas. in the last of June 1864, and on the 6th of Dec. following he was appointed chief-justice of the supreme court of the U. S. In place of Chief-Justice Taney. As presiding officer of the court and as a constitutional judge, the chief-justice fully met the duties, responsibilities, and the dignity of his high position. In 1868 he was called upon, as chief-justice, to preside over the Senate pending the impeachment and trial of Pres. Johnson—the only instance of such a trial in the hist. of the Federal govt.

In June 1870 he had a stroke of paralysis, from the effects of which he labored more or less till his death. D. May 7, 1873. [From orig. art. in *J. S. Univ. Cyc.*, by Hon. JOSEPH P. BRADLEY, LL.D., *U. S. Supreme Court*.]

Chase (SAMUEL), judge, b. in Somerset co., Md., Apr. 17, 1741. He was a delegate in Cong. from 1774 to 1778, and signed the Dec. of Ind. In 1796 he became an associate justice of the supreme court of the U. S. He was impeached in 1804 for misdemeanor in the conduct of several political trials, but was acquitted by the Senate. D. June 19, 1811.

Chase (THOMAS), LL.D., b. at Worcester, Mass., June 16, 1827, grad. at Harvard 1848; was appointed (in 1855) prof. of philology and of classic lit. at Haverford Coll., and was made pres. in 1880. Wrote *Hellas*.

Chassepot. See APPENDIX.

Chastellux, de (FRANÇOIS JEAN), MARQUIS, a Fr. gen. and writer, b. in Paris in 1734; wrote an *Essay on Public Happiness* (1772); as maj.-gen. under Rochambeau he fought for the U. S. (1780-82). He was a friend of Washington and Jefferson. Wrote *Travels in N. Amer.* D. Oct. 28, 1788.

Chat, a name applied to several small birds of the family *Turdidae*, distinguished by a bill slightly depressed and widened at the base, and long legs. They are found in the Old World, only the wheatear (*Saxicola oenanthe*) occurring rarely in the N. portions of N. Amer. The yellow-breasted C. of the U. S. belongs to the family *Sylviolidae*.

Chateaubriand, de, *dch shah-to-bre-on'* (FRANÇOIS AUGUSTE), VISCOUNT, a Fr. author and diplomatist, b. of a noble family at St. Malo Sept. 14, 1769. Impelled by a love of adventure, he visited the U. S. in 1791, traversing the primeval forests of the S., and studying the nature and life of the aborigines. Returning to Fr. in 1792, he joined the royalist emigrants who had taken arms to fight against the dominant party; was wounded at Thionville, and became an exile in Eng. He passed nearly 8 yrs. in Eng. in extreme poverty. In 1800 he returned to Fr., and began to write for the *Mercury de France*, at the same time writing *Atala*, an Indian romance, *Genius of Christianity*, and his *Itinerary from Paris to Jerusalem*. He was admitted into the Fr. Acad. in 1811. In 1814 he expressed his implacable enmity to Nap. in a pamphlet entitled *Bonaparte and the Bourbons*. After the restoration of 1815 he became a peer of Fr., and was sent as ambassador to Berlin in 1820. In 1822 he was transferred to the court of St. James. He was appointed minister of foreign affairs in 1823, but was removed by the agency of Villèle in June 1824. In 1828 he was sent as ambassador to Rome by Martignac, but he resigned when Polignac became prime minister in 1829. His sympathy for the Bourbons was so strong that he refused to swear allegiance to Louis Philippe in 1830. D. July 4, 1848. (See VILLEMMAIN, *Chateaubriand, sa Vie, ses Ecrits et son Influence*.)

Chatfield, Minn. See APPENDIX.

Chatham, chat'am, a river-port and naval arsenal of Eng., on the Medway, 30 m. E. S. E. of Lond. It is defended by several fts. crowning the adjacent heights. The naval and military establishments are separated from the town and the country by a line of fortifications which are considered the best in Eng., except those of Portsmouth. C. has also one of the largest royal ship-building establishments in the kingdom. Pop. 1881, 46,806.

Chatham (WILLIAM PITT), EARL OF, an Eng. statesman, b. Nov. 15, 1708, and ed. at Eton and Ox., was the son of Robert Pitt, a country gentleman and grandson of a colonial gov. He entered the army as a cornet in the Blues, and soon after, in 1735, was returned to Parl. from Old Sarum, a family borough. In the House of Commons he soon became prominent. In 1755, upon the breaking out of the Seven Years' war, after the resignation of Fox, he became the head of the govt., with the nominal title of sec. of state. He pursued his plans against the Fr. vigorously, aiding Frederick the Great, capturing Canada through Wolfe, and improving the navy to such an extent that the Fr. were driven from the seas. Soon after the accession of George III. in 1761, Pitt's ministry went out. Pitt remained in the

opposition until 1766, and was then called to form a cabinet, which lasted for 2 yrs. When the war for Amer. independence began, he opposed the measures which were put in practice against the colonies; but when, in 1778, the timid policy of the duke of Richmond was gaining ground in the legislature, which favored peace with Fr. and a recognition of the Amer. States, Pitt, feeble, pale, and dying, arose in the House of Lords and summoned his fleeting powers to denounce it so eloquently that the measure was defeated. He sank back in a swoon at the close of his appeal, and 4 days afterward, Apr. 11, 1778, died. (See F. THACKERAY, *Life of Chatham*.)

Chatham Four-Corners. See CHATHAM VILLAGE. **Chatham Village, or Chatham Four-Corners.** R. R. Junc., Columbia co., N. Y., 22 m. S. E. of Albany. Pop. 1870, 1387; 1880, 1765.

Chatsworth, R. R. Junc., Livingston co., Ill., 70 m. E. of Peoria. Pop. 1870, 999; 1880, 1054.

Chattanooga, a city and important R. R. centre, cap. of Hamilton co., Tenn., situated on the left bank of the Tenn. River, 150 m. S. E. of Nashville. The river is navigable for steamboats above and below this point. This is the largest town of E. Tenn. Coal and iron are found in the adjacent hills. After the retreat of Rosecrans to C. from the battle-field of Chickamauga, Sept. 1863, the Confeds. under Bragg seized the passes which covered his line of supplies from Bridgeport, and sending a cav. force across the Tenn. above C. struck various points on the R. R., making the supplying of the army difficult and hazardous. Gen. Grant relieved Gen. Rosecrans in Oct., and assumed gen. command of the depts. of the Tenn., Cumberland, and O. Gen. Thomas was placed in immediate command of the dept. of the Cumberland, and Gen. Sherman, who had been telegraphed to bring his corps up at once from Miss., was assigned to the dept. of the Tenn. Gen. Hooker was ordered, with the 11th and 12th corps, which had been sent from the Army of the Potomac, to cross at Bridgeport and menace Bragg with a flank attack, while a force under W. F. Smith was to be thrown across the river at Brown's Ferry, a few m. below C., and secure the points of Lookout Mt. commanding the river. These operations were successfully carried out on the 27th, 28th, and 29th of Oct., and communication restored with the depot of supplies. The loss in these operations on the side of the U. S. had been about 450, while the Confed. loss is estimated as high as 1500.

Gen. Sherman's army was now coming up, and on the 23d of Nov. the movement against the Confeds. was commenced. Gen. Thomas's troops attacked the Confed. left at 2 p. m., and carried the first line of rifle-pits, which was held during the night. The battle was renewed on the 24th along the whole line. Sherman carried the end of Missionary Ridge nearly up to the R. R. tunnel; Thomas had strengthened himself in his advanced position, and repelled every attempt on the part of the Confeds. to recover their lost position at the centre; while Hooker had been fighting desperately, and had partially carried Lookout Mt., and entrenched himself in a strong position, the Confeds. abandoning the mt. entirely during the night. Fighting was resumed at early dawn of the 25th, continuing until dark. Missionary Ridge, Lookout Mt. top, and all the rifle-pits in C. valley were now in possession of the U. S. troops, having been carried after a most desperate struggle. The Confed. army was routed, and pursued by Sherman and Hooker back to Ga. A severe fight occurred at Taylor's Ridge, near Ringgold, Ga., Nov. 27, resulting in dislodging the Confeds., after which their retreat continued. Forty cannon and thousands of small-arms were captured. The loss on the part of the U. S. forces amounted to between 6000 and 7000 in killed, wounded, and missing. The Confed. loss in killed and wounded is estimated at 2500, in prisoners, 6000. The result of the battle cut off Bragg from communication with Longstreet, and forced the latter to abandon the siege of Knoxville and retreat to Va. Pop. 1870, 6093; 1880, 12,892.

Chat'tel [remotely from the Lat. *capitalis*, a man's "capital" or property], in law. This is a word of comprehensive meaning, and with certain exceptions includes all property of a personal or movable nature. Certain temporary interests in land are in law treated as C. of a peculiar nature (C. real), such as leases for a definite number of years. C. personal are usually subdivided by text-writers into two prin. classes: such as are in possession and in action. The first term needs no special explanation. It would include the common case of a movable thing, like a watch or a domestic animal, in the possession or under the control of its owner. A so-called thing in action, or chose in action, is intangible. It is a mere right, and can only be made available or reduced into possession by a legal proceeding. An instance is a note or bond, or, according to some authorities, a right to recover damages for a wrong committed. (Consult AUSTIN *On Jurisprudence*, 3d ed.; WILLIAMS *On Personal Property*; SCHOULER *on the same*; KENT's *Commentaries*.)

Chat'terer, a significant popular name often given to birds of the family *Amphelidae*, which belongs to the order Insectores and tribe *Dentirostres*. The C. have depressed bills like those of flycatchers, but rather shorter and broader in proportion. They feed chiefly on insects and their larvae. Many of them have richly colored plumage, and some of them have excellent powers of song.

Chatterton (THOMAS), an Eng. poet, b. at Bristol Nov. 20, 1752. He was a precocious youth, fond of antiquities, and was ed. at the parish school. He began to write verses at the age of 12, and was apprenticed to an atty. in 1767. Disgusted with the drudgery of legal studies and business, he removed to Lond. in Apr. 1770, and adopted the profession of author. He produced with great rapidity songs, satiric poems, letters in the style of Junius, and other works, which brought little remuneration. He was reduced to destitution, and was found dead in his lodging-room Aug. 24, 1770. Among his poems are *The Tragedy of Ella* and *The Tournament*. (See JOHN DIX, *Life of T. Chatterton*.)

Chaucer (GEOFFREY), b. in 1328, and d. Oct. 25, 1400. He was a son of John Chaucer, a vintner of London, of the year and place of his birth nothing is known, though much has been surmised or asserted. It appears from public records that he was a valet of the king's chamber—a place always filled by gentlemen—in 1357. At various times from 1370 to 1380 C. was employed on royal missions in It., Fr., and Flanders. He was elected to Parli. for Kent in 1380, but toward the end of that yr. was dismissed, for reasons unknown, from his place in the customs, which he had held from 1374; and although he received other public appointments in 1380, he lost them again, and remained in comparative poverty until the accession of Henry IV., whose favor he immediately received, but lived only a year to enjoy.

C. left behind him neither property nor descendants; a son, Lewis, to whom he dedicated a treatise on the astrolabe in 1391, is not heard of after that date. The chief work of C., and one which has secured him an immortal and still brightening fame, is *The Canterbury Tales*, a series of about 20 stories narrated by pilgrims to the shrine of St. Thomas. A society was formed in 1868 for the purpose of printing a selection of the best texts of C.'s poems, and has accomplished the larger part of its work.

Chauncy (CHARLES), B. D., 2d pres. of Harvard Univ., b. in Eng. in 1592, and ed. at Cambridge, where he was a prof. of Gr. and Heb. Came to N. Eng. in 1638 and became pres. of Harvard in 1654. D. Feb. 19, 1672.

Chauncey (ISAAC), a com. in the U. S. N., b. at Black Rock, Fairfield co., Conn., Feb. 20, 1772. He entered the merchant service about 1785, and obtained command of a ship when he was only 19 yrs. old. During one of his voyages between Charleston and New York the entire crew and all the officers were stricken down with yellow fever, and C., alone and unaided, brought the vessel safely to New York. On the organization of the navy in 1798, C. was appointed a lieut., and became capt. in 1806. He served with distinction in the war with Tripoli, and on the outbreak of the war with G. Brit. was placed in the command of the lakes. C. retained this important command till the close of the war, and won for himself the highest honors. Was pres. of the navy commission at the time of his death, Jan. 27, 1840.

Chautauqua, a noted summer resort, on Chautauqua Lake, W. N. Y. Its former name was Fair Point; the grove covering the point was occupied early as a camp-meeting ground. It was bought in 1874 by the C. Sunday-school Assembly, and is devoted to religious and educational meetings. It has cottages, hotels, and an amphitheatre.

Chautauqua Lake, in Chautauqua co., N. Y., is about 18 m. long and from 1 to 3 m. wide. It is 726 ft. higher than Lake Erie, and is said to be the highest navigable water in the U. S. The surplus water flows into Conewango Creek.

Chauvinisme. See APPENDIX.

Chay-Root, Choya, or Indian Madder (*Oldenlandia umbellata*), an herb of the order Rubiaceae, a native both of India and of Mex., cultivated in India for its roots, the bark of which affords a beautiful red dye. The coloring-matter is used to paint the red figures on chintz. Several plants of this genus abound in the U. S.

Chazy Lime-stone, a member of the lower Silurian formation, derives its name from Chazy in Clinton co., N. Y. According to Dana, the Trenton period of geol. is divided into two epochs, one of which is called the Chazy epoch.

Cheat, in law. This topic may be considered under 2 prin. divisions: 1, at common law; 2, by statute, then termed "false pretences."

1. The common law regarded a "cheat" as a crime when one person defrauded another not by mere words, but by some outward and visible means, such as a false token or sign. A mere lie was not in this sense a C., though in a civil sense and as a basis for a civil action it may amount to a fraud. Thus, the act of marking false brands upon articles sold, calculated to deceive and defraud persons in gen., would come within the scope of the criminal offence. This view led to fine-spun and artificial distinctions. For example, if a man in purchasing goods gave his own check on a bank in which he knew that he had no funds, it would be a mere lie reduced to writing, and thus not a C.; while if he gave another man's check under the same circumstances, the act would be cheating, as the paper was then a token or symbol. Cheating belongs to the lower grade of criminal offences, termed "misdemeanors."

2. *False Pretences* constitute a very reprehensible mode of fraudulent deception. The failure of the common law to provide a remedy here no symbol was employed made statutory provisions necessary for wrongs thus occasioned. Reference can here be made only to such regulations as the various States have generally agreed in establishing. False pretences may be defined as false representations, with intent to defraud, by words or acts concerning past or present facts and events. Mere expressions of opinion, however, or mere exaggerations of lang., by which no reasonable man would be influenced, cannot be considered false pretences within the statutes. It is a further rule that the deception practised must be the efficient operative cause of the injury sustained. The criterion always is, whether, if there had been no such deceit practised, the transaction between the parties would have been consummated. T. W. DWIGHT.

Cheat-ham (B. F.), a gen. in the Confed. army, b. in Tenn., served during the war with Mex. as officer of Tenn. Volunteers, and during the c. war was appointed a Confed. maj.-gen., and bore a conspicuous part at Chickamauga, Missionary Ridge, Franklin, Nashville, etc.

Cheboygan, on R. R., cap. of Cheboygan co., Mich. Pop. 1880, 2269.

Check, or Cheque, a bill of exchange drawn upon a bank or banker, or person holding a position similar to that of a banker. It has some peculiarities which distinguish it from an ordinary bill of exchange, particularly when it is payable without any specific mention of time. It is then, in point of law, payable on demand and without days of grace.

If payable a fixed number of days after date, it varies but slightly from a bill of exchange, and will follow the ordinary rules as to days of grace. It is usually said in the law-books that a C. is not accepted as a bill is. Acceptance, however, as will be seen hereafter, has recently become quite common, and is perfectly lawful. A C. may be considered under the following heads: 1, Its form and requisites; 2, the duty of the holder as to demand of payment (a) toward the drawer, (b) toward the indorser, and herein of crossed checks; 3, the effect of the C. upon the banker, and, under this, of acceptance; 4, a C. considered as payment of a debt or as cash; 5, the civil and criminal liability of drawers having no funds.

1. A C. in its ordinary form is simply an order addressed to the banker to pay a person named or his order or bearer, or the equivalent of a bearer (such as a mere numeral), a sum of money. A C. may preserve this form and be post-dated. This class of C. is not used in Eng., owing to the provisions of the stamp acts. It is quite common at the present time to make a C. payable to order, as the indorsement of the name of the payee operates as a receipt. In some instances a note may amount to a C.

2. *The Duty of the Holder as to Demand and Notice; (a) As to the Drawer.*—The drawer has a right to expect that the holder will demand payment with promptitude, as, if the banker fails to pay, recourse may be had to him. Presentment should be made, in general, as early as the next day, and if payment is not made, due notice given. However, a failure to present is not necessarily fatal to the holder's claim. Whether it is or not depends on the fact whether an injury is caused to the drawer. (b) *Demand as to Indorsers.*—Indorsements upon C. are common. An indorsement is necessary when the instrument is payable to order; it is admissible when payable to bearer. The legal effect of indorsement, as in the case of a bill of exchange, is to make the indorser liable, provided that the steps necessary to charge him are taken. These are substantially the same as in bills of exchange.

3. *Effect of the C. on the Banker on whom it is Drawn, and herein of Acceptance.*—According to the better opinion, a C. gives no right of action to the holder against the banker. Of course the latter should, in gen., pay it, but the holder has no means of enforcing this obligation if the banker refuses to perform it. Although the banker is bound to pay C. when he is in funds, it is a duty between him and the depositor or creditor. It cannot be enforced by the payee of the C., who is no party to the contract. These rules have led to a very important practice of certifying C. An officer of a bank—e. g. a teller or cashier—has by custom acquired an authority to mark such C. as are presented to him as good. This act is treated in law as an acceptance, and the bank becomes liable.

4. *A C. Considered as Payment or as Cash.*—The gen. presumption of law is that a C. is issued by a drawer to a payee in payment of debt, and not as a means of making a loan. The intention, however, may be shown by affirmative proof. Considered as payment, it is not in gen. absolute. It is rather a means of obtaining payment, whether it be the debtor's own C. or that of a third person. Accordingly, if the C. is not paid, the creditor may resort to his original claim, though if there be an agreement to receive the C. as full payment it must be followed.

5. *Civil and Criminal Liability of Drawers of C. having no Funds with the Bank; (a) Civil Liability.*—It is a gen. rule that a man who draws a C. with knowledge that he has no funds commits a fraud toward the payee. If he should purchase goods under such circumstances, the seller could rescind the sale as fraudulent. It will not be enough to sustain the sale that he has reasonable grounds to expect funds, but they must be *actually on hand* to pay the C. (b) *Criminal Liability.*—It was not a crime at common law to give one's own C. for goods bought with knowledge that it was worthless, since this was only an affirmation or a base lie reduced to writing, and there was no token or symbol of falsehood on which the common law lays stress. It might accordingly be a criminal cheat (see CHEAT) knowingly to pass off the worthless C. of another. Under the statutory offence of false pretences it is criminal to give one's own C. on such a sale, knowing that the drawer had no funds nor any reasonable grounds of expecting them. (See farther, *SHAW ON THE LAW OF BANKERS' CHECKS*, also *PARSONS ON BILLS AND NOTES*, and other text-writers on the same subject, as CHITTY, BYLES, STORY, etc.) T. W. DWIGHT.

Cheese [Lat. *ca'seus*; Ger. *Käse*; Fr. *fromage*], a variety of food prepared by coagulating milk, separating the curd, pressing it into forms, and subjecting it to a process of ripening or curing.

The material may be either cow's milk, whole or skimmed, cream, or mixtures of these, or the milk of goats or ewes. Cow's milk, which is generally used, varies considerably in composition: the following is an average of several hundred analyses, made by different chemists: Fat, 3.80; caseine and albumen, 4.37; sugar, 4.54; salts, 0.63; water, 86.66. The following analyses by Alex. Müller show the composition of cream and skimmed milk, and the whole milk from which they were obtained:

	Whole milk.	Cream.	Skimmed milk.
Whole product.....	100.	10.	90.
Fat.....	4.00	35.00	0.55
Caseine and albumen.....	3.25	2.30	3.77
Sugar.....	4.50	3.05	4.66
Salts.....	0.75	0.50	0.78
Water.....	87.50	59.25	90.64
	100.	100.	100.

MANUFACTURE OF C.—1. Curdling or coagulating may be spontaneous, as in the manufacture of cottage C., or it may be produced by the addition of rennet or of acids. *Rennet* is the 4th stomach of the sucking calf, the *gingering*. The stomachs of other animals, as the sheep, pig, etc., are sometimes used. For use, the dried rennet is usually soaked in brine, with or without the addition of spices, in the proportion of one rennet to the gal. Half a pint of the liquid is sufficient to curdle 70 gals. of milk, 1 rennet serving to curdle more than 1000 gals.

Warning the milk previous to adding the rennet is absolutely necessary. There is considerable difference of opinion, however, as to the proper temperature, some putting it as low as 72° F., others as high as 98° F. Dr. Voelcker says: "If the temperature of the milk when the rennet is added is too low, the curd remains too soft, and much difficulty is experienced in separating the whey. If, on the other hand, the temperature is too high, separation is easily effected, but the curd becomes hard and dry." He considers 72° to 75° proper for thin C., but 80° to 84° for thick C. like Cheddar.

2. Cutting the curd. Great improvements have been made in the cutting of the curd by a series of Amer. inventions. First came the introduction of a frame of crossed brass wires; then the tin breaker, formed in checks, which was pushed down into the curd, cutting it into long, square vertical strips; the final improvement consisted in the use of the steel gang-knife.

3. Cooking or scalding the curd simply means slightly raising the temperature to from 98° to 100° F. Sometimes, after the curd has settled, a portion of the whey is taken out, heated to the proper temperature, and poured back upon the curd. In other cases heat is applied to the outside of the vat by steam or direct heat.

4. Separating the whey, or "wheying off." It may be dipped out of the tub, piling the curd up against the side; the curd may be ladled out into a cloth which is suspended over the tub and serves as a strainer; a perforated strainer may be run down into the corner of the vat, and a cork drawn out of the bottom to let the whey out; the vat may be tilted up to cause the whey to drain down and out at one end. The following analyses of whey are from a large number by Voelcker (Willard's *Practical Dairy Husbandry*, p. 319):

ANALYSES OF WHEY.

	1.	2.	3.	4.
Fat.....	0.68	0.49	0.29	0.14
Caseine, albumen, etc.	0.81	1.43	0.93	0.76
Sugar and lactic acid..	5.28	4.49	5.03	5.31
Salts.....	0.58	0.64	0.90	0.69
Water.....	92.65	92.95	92.85	93.10
	100.	100.	100.	100.

5. Grinding the curd in a curd-mill or curd-breaker is resorted to in order to make it fine and uniform, for the sake of even salting and to hasten the cooling.

6. Salting the curd is practised to check and regulate the fermentation of the C. during the ripening. It is specially necessary in lean C., made from skimmed milk. Rich C., such as Stilton and cream Cheddar, may be made without salt, as the large amount of butter in them sufficiently preserves the caseine.

Salt-petre, added in small quantities, 3 or 4 lbs. to the barrel of salt, has long been used in some Eng. dairies, and is said to aid in preserving the flavor of the C., and to improve its keeping qualities.

Coloring C. is often practised to meet the demands of certain markets. The material employed is annatto, the product of the orelean tree (*Bixa orellana*).

7. Pressing expels most of the remaining whey, and consolidates the curd into the desired form. Hoops and cloths are employed, and the C. is turned during the operation and the bandage properly adjusted. Many different presses are in use: lever presses, screw presses, etc. Horizontal gang-presses are now coming into general use. Eighteen to 24 hours is the usual time of pressing. The form of the C. is determined by the diameter and height of the hoop. The C. is taken from the press to the curing-room. There it is turned occasionally and rubbed with hot whey-butter, to prevent the rind from cracking.

8. Curing or ripening. As the product comes from the press it cannot properly be called C. It is a tasteless, insipid, chalky mass, consisting of caseine, fat, and a small portion of the whey. In order that it may acquire the characteristics of C., the sharp taste and peculiar odor, it must be kept a long time, and allowed to undergo a process of fermentation or putrefaction involving a decomposition of the caseine, fat, etc. The extent and character of the changes which occur during this ripening process depend upon the character of the milk, mode of curdling, amount of whey left in the curd, proportion of salt, and, in fact, upon all the intentional or accidental conditions to which the C. is exposed from the milking of the cow to the day the C. is consumed. For the proper ripening of C., curing-rooms must be used which are well ventilated, free from dampness, and of a uniform temperature—not above 75° nor below 60° F. Moreover the C. must be turned often, especially in the beginning.

The most profitable C. for the farmer to make is shown by the experiments of Voelcker and Goessmann to be obtained by skimming off a portion of cream for the manufacture of butter. The sale of this C. together with that of the butter, yields a larger return than could be obtained by making whole-milk C. and no butter.

Poisonous C. is occasionally noticed. The chemical nature of the poison, which is very violent in its action, has never been determined: it is probably analogous to the "sausage" and "corned-beef" poisons. All of these poisons are

now supposed to be due to bacteria, and result from an unusual kind of putrefaction.

Sour-milk C., called *cottage, pot C., Dut. C., or curds*, is the curd of sour milk drained from the whey and pressed into moulds. It is sometimes flavored with sage; eaten fresh.

Full-cream C. is prepared from cream curd drained in a cloth. It must be eaten fresh, as it will not keep long. Neufchâtel, Brie, Vascrain, Cotherstone, cream Cheddar, and Yorkshire Stilton belong to this class. Neufchâtel and Brie are now manufactured in large quantities in N. J.

Half-cream C. is made from a mixture of the cream from the evening milk and the whole of the morning milk, or about 1 quart of cream to 10 quarts of milk. Stilton and rich double Gloucester C. are made in this way. Great care is required in making them.

Whole sweet-milk C. is very extensively manufactured, and includes many of the best known varieties, as the best Cheddar, Cheshire, Wiltshire, Gloucester, and other Eng. C., the Edam and Gouda C. of Hol., the Gruyère and Jura C. of Switz. Gruyère and Jura are known in the U. S. as Schweitzerkäse. This is now made in Oneida co., N. Y., in O., and elsewhere. It is a tough cellular C., with a sharp taste and strong odor. Limburg C. is a soft C., formed at a low temperature and slightly pressed. It is eaten in a state of putrefaction, and is very offensive to persons who have not acquired a taste for it. N. Y., O., Ill., and Wis. manufacture considerable quantities of it for the Ger. pop. Swiss Schabzieger C. is made by working the fermented curd into a paste with powdered zieger-kraut, *Melilotus caerulea*.

C. from partly-skimmed milk is largely manufactured under all the names mentioned under whole milk. There is always a tendency in the dairy to rob the milk of some of its cream for butter.

Skim-milk C. is also extensively manufactured in all countries, and sold often under the name of whole-milk C. It is generally harder and more translucent and horn-like than other C. Sometimes the milk is skimmed 3 times, and yields a C. which becomes so hard in a short time that a pickaxe must be used to break it. By allowing the curd of skim milk to ferment somewhat, and by leaving a considerable whey in it softer C. is obtained. Such is the offensive Ger. hand-C. Parmesan C. is made from skim milk.

Oleomargarine C., devised by H. O. Freeman of Sherburne, N. Y., has been extensively manufactured. It is made by replacing the fat removed in the cream with oleomargarine made from beef suet. The oleomargarine is melted and added to the skim milk which has been previously heated to 94° F. and colored with annatto. Rennet enough is then added to curdle in 8 or 10 minutes. Only about 1½ lbs. of oleomargarine are retained by 100 lbs. of milk. When skillfully made, this C. appears rich and well flavored, and passes for fair whole-milk C.

Lard C. is made by substituting melted lard for oleomargarine.

Goat's and sheep's milk C. is made in some localities. The most familiar C. of this kind is the Roquefort. This is a Fr. C. made from either goat or sheep milk, the special qualities of which are largely due to the peculiar caves in the Jura limestone in which it ripens at a very low temperature. (See X. A. WILLARD, *Practical Dairy-Husbandry*; C. L. FLINT, *Milk Cows and Dairy-Farming*, and L. B. ARNOLD, *Amer. Dairying*.) C. F. CHANDLER.

Cheese-Maggot, the larva of *Piophilæ casei*, a black dipterous fly of the family Muscidae. The perfect insect is $\frac{1}{20}$ of an inch long. It is a pest of dairies, laying its eggs in cracks of cheese, the destined food of its larvæ. To preserve cheeses from this pest it is of advantage to brush or rub them frequently, and to remove all injured cheeses, beside keeping them dry and in a well aired place. The same rules are applicable to their preservation from the other insects by which they are sometimes infested.

Cheese-Mite (*Tyroglyphus stro*), a species of the family Acaridae, here represented.



Cheese-Mite.

Chee'tah, or Hunting Leopard (*Gueparda jubata*), a species of the cat family having long legs and almost non-retractile claws. It is found in Afr. and in S. W. Asia. It is generally spotted like the leopard. Its intelligence, docility, and fidelity are so great that in India and Per. it is trained for the chase of antelopes and deer. It is kept leashed and hooded until

the game is found near, when it is let loose, and, drawing stealthily near its victim, it rushes suddenly upon it. In Ceylon the true leopard is called C.

Cheever (EZEKIEL), an N. Eng. school-teacher, b. in Lond. Eng., Jan. 25, 1615. He received an excellent classical education, and emigrated to Amer. in June 1637, to enjoy Chr. worship in its purity. He was one of the founders of the colony of New Haven, where he taught school for 12 yrs.; was afterward master of the grammar-school at Ipswich, Mass., and subsequently taught school in Charlestown, Mass.; removed to Boston Jan. 6, 1671, and had charge of the Boston Lat. School for 35 yrs., until his death. His *Acadence, a Short Introduction to the Lat. Tongue*, was used for over a hundred yrs. by the Lat. scholars of N. Eng. D. Aug. 21, 1708.

Cheever (GEORGE BARRELL), D. D., a divine, b. at Hallowell, Me., Apr. 17, 1807, grad. at Bowdoin Coll. in 1825 and at Andover Theological Sem. in 1830. In 1833 he became minister of a Congl. ch. in Salem, Mass. He was distinguished as a zealous advocate of temperance and as an opponent of slavery. In 1839 he took charge of the Allen st. Presb. ch., New York, and was pastor of the Ch. of the Puritans in New York 1846-67. Wrote *Wanderings of a Pilgrim in the Shadow of Mount Blanc and God against Slavery*.

Cheever (SAMUEL), b. in New Haven, Conn., Sept. 22, 1639, was the son of Ezekiel Cheever, noticed above, and grad. at Harvard Coll. in 1659. He was the first minister of

Marblehead, Mass., and began preaching there in 1668. D. May 29, 1724.

Cheloniatus. See SCHWALBER.

Cheloniatus. Gr. *χελών*, a "tortoise", or **Testudinaria**, an order of reptiles, characterized by the possession of a carapace or horny dorsal shell composed of several united pieces; a ventral shell or plastron, and a horny, bill-like mouth, without teeth. The carapace represents the blended ribs and vertebrae, the plastron the sternum of other animals, with which is united the dermal system, developed generally as corneous plates. The sea-turtles comprise the largest living species, and the *Sphargis carolinensis* of the Atlantic has been found to weigh nearly 2000 lbs. The sea-turtles are of 2 families—Sphargididae and Cheloniidae. The land-tortoises are much more numerous in genera and species, and are divided into 7 or more families. They are found in nearly all warm and temperate regions.

There are several edible species both of land and sea C., but the flesh of some others is disagreeable or even injurious. The best known is the green turtle (*Chelonia mydas*). Some species are valuable for their oil, others for that of their eggs, and one at least, the *Eretmochelys imbricata* of tropical seas, the hawksbill turtle, affords the valuable tortoise-shell of commerce.

Tracks ascribed to C. have been found in triassic rocks, but their remains are first observed in the upper oolite. In more recent formations their remains are abundant in both hemispheres.

Chelsea, a city of Suffolk co., Mass., is a N. E. suburb of Boston, and is 3 or 4 m. N. E. of Boston Common. It is separated from Charlestown by the Mystic River, which is here crossed by the Chelsea Bridge. It is bounded on the S. and S. E. by an inlet of the sea called Chelsea Creek, which separates it from E. Boston. It has a U. S. marine hospital. It is connected with Boston by the Eastern R. and by a ferry 1½ m. across. Pop. 1870, 18,547; 1880, 21,782.

Chelsea, Mich. See APPENDIX.

Cheltenham, chelt'nam, a watering-place of Eng., on the Bristol and Birmingham R. R., 121 m. by rail W. N. W. of Lond. It derives its importance from its mineral springs, which contain sulphates of soda and magnesia, with iodine, iron, and carbonic acid. Its public promenades are among the finest in Eng. It is noted for the number and excellence of its colls. and schools. Pop. 43,972.

Chemical Affinity. See AFFINITY, CHEMICAL.

Chemical Analysis is the identification and separation of the elements of chemical compounds or mixtures of any sort. When conducted simply with reference to determining what elements exist in any substance it is *qualitative analysis*. When the absolute or relative quantities of the elements are ascertained it is *quantitative analysis*.

Chemical Equivalents. See CHEMISTRY and ELEMENTS OF CHEMISTRY.

Chemistry, kem'is-tre [etymology uncertain]. The present condition of chemical science has been reached by a gradual process of evolution. The individual characteristics which it exhibits represent the results of the united labors of all the workers in its domain from the dim ages of alchemy to the present day.

Modern science regards matter as divisible into masses, molecules, and atoms. A mass of matter is any portion recognizable by the senses. A molecule of matter is the smallest quantity of any substance which can exist by itself, and which can enter into or leave a chemical change. An atom is the smallest particle of matter which can exist in combination. A molecule is made up of atoms, and a mass is made up of molecules. These divisions of matter are held together by attractions, called, respectively, mass, molecular, and atomic attraction. Mass attraction is called gravitation; molecular attraction is called cohesion; and atomic attraction is called chemism. C. may be defined as the science which treats of the atomic composition of bodies, and of those changes in matter which result from an alteration in the kind, number, or relative position of the atoms which compose the molecule.

Molecular constitution is the basis of chemical classification. In the first place, all substances are divided into 2 classes, according as their molecules are made up of like or of unlike atoms. A substance like sulphur, carbon, or iron is made up of molecules containing like atoms, and is called a simple or elementary substance; a substance like salt, water, or sugar is made up of molecules containing unlike atoms, and is called a compound substance. These two kinds of molecules are easily distinguished by the fact that upon rearranging the atoms between two contiguous molecules the former yields no new substance, while from the latter some different form of matter is obtained. Thus far, 65 substances have resisted all attempts to decompose them and to evolve from them other forms of matter. These substances, therefore, are regarded as elementary. (See ELEMENTS, CHEMICAL.) The number of atoms contained in a simple molecule is called its atomicity. It is obtained by dividing the weight of the whole molecule by the weight of a single atom. The molecular weight is generally obtained by means of the law of Avogadro or Ampère, which asserts that equal vols. of all gases contain the same number of molecules. Whence it follows (1) that the molecules of all bodies in the gaseous state must be of the same size; and (2) that the molecular weights must be as the weights of equal vols. Most of the elementary molecules are diatomic.

Atoms differ from each other (1) in weight, (2) in the quality of their combining power, and (3) in the quantity of this power. An atomic weight is the weight of an atom, referred to that of hydrogen as unity. Since an atom is the smallest quantity of an element which can enter into the composition of a molecule, it is evident that by analyzing the molecules of several different compounds of a given element, and by comparing together the quantity of this element contained in each, the atomic weight may readily be fixed. According to the quality of their combining power,

atoms are divided into 2 classes, called positive or negative, according as, in electrolysis, they go to the negative or positive pole. To the former or positive class belong the metals in general; to the latter or negative class the non-metals. This distinction is a purely relative one, since an atom may be positive when associated with one atom and negative with another. This property of atoms affects the quality of the molecule into which they enter; the hydrates of positive atoms, for example, being bases and the hydrates of negative being acids. Beside the differences now noticed, atoms differ also in their equivalence, or their power of entering into combination with other atoms. Taking the atom of hydrogen as the standard, it is found that other atoms have combining powers 2, 3, 4, 5, and even 6 times as great. Such atoms are called, therefore, monads, dyads, triads, tetrads, pentads, and hexads. The combining power of a hexad atom being 6 times as great as that of a hydrogen atom, and that of a dyad atom being twice as great, a complete molecule formed by their union must be composed of 1 hexad and 3 dyad atoms. But atomic equivalence is variable; a monad may act as a triad or even as a pentad. This variation, however, always takes place by twos; so that atoms of even equivalence (called *artiads*) remain even, and atoms of odd equivalence (called *perissads*) remain odd.

Compound molecules are built up by the union of dissimilar atoms. But since atoms do not exist free and uncombined, a direct union of these is impossible. Hence the union must take place by way of exchange. If, for instance, the two simple molecules AA and BB be brought together, the attraction of unlike atoms for each other being stronger than that of like, rearrangement will take place, and AB and AB, two compound molecules, will result. The number of atoms which a compound molecule may contain is apparently unlimited. Two classes of compound molecules are distinguished: in one the characteristic constituent atoms are united directly together; in the other they are linked together by the intervention of a third atom. The former are called binary compounds, because, whatever the absolute number of atoms present, they can never be of more than 2 kinds. The latter are called ternary, because there must always be present at least 3 atoms. It is evident that only a poly-equivalent atom can link others together; and, in fact, the dyad oxygen and the triad nitrogen perform by far the largest part of this work. Hence, ternary molecules may be divided into 2 groups, according as oxygen or nitrogen performs in them the linking function. Moreover, the quality of the chemism of atoms here comes in, and each of these groups may be subdivided into 3 classes, according as the dominant atom united to hydrogen is positive or negative, or as the molecule contains both thus united. The classification of simple and compound molecules above given may be conveniently presented in a tabular form, thus:

MOLECULES	Like atoms		Element.	
	United directly		Binary.	
	Unlike atoms		By a dyad	$\bar{R} \text{ \& H Acid.}$ $\bar{R} \text{ \& H Base.}$ $\bar{R} \text{ \& } \bar{R} \text{ Salt.}$
		United indirectly	By a triad	$\bar{R} \text{ \& H Amide.}$ $\bar{R} \text{ \& H Amine.}$ $\bar{R} \text{ \& } \bar{R} \text{ Alkalamide.}$

[From orig. art. in *J.'s Univ. Cyc.*, by PROF. G. F. PARKER.]

Chemmis, kem'mis [Gr. *Χέμμις*], the name given by Diodorus Siculus to the Egyptian king who built the great pyramid; the same as Cheops.

Chemnitz, kem'nits, a town of Ger., in Sax., at the base of the Erzgebirge Mts., on the Chemnitz River, and on the R. R. from Riesa to Zwickau, about 44 m. W. S. W. of Dresden. It is the prin. manufacturing town of Sax.; was for 4 centuries a free imperial city; was formerly fortified, but the walls have been converted into promenades. It has a castle, an exchange, a gymnasium, a school of commerce, and several technical schools. Pop. 1880, 95,123.

Chemnitz, kem'nits [Lat. *Chemnitius*], (MARTIN), an eminent Ger. Lutheran theol. b. at Treuenbrietzen, Brandenburg, Nov. 9, 1522. He was ed. at Wittenberg, and became minister of a ch. at Brunswick in 1554. In a work called *Examen Concilii Tridentini* he ably refuted the doctrines approved by the Council of Trent. C. and Mörlin were the authors of the *Corpus Doctrinae Pruthenicae* ("Body of Prussian Doctrine"), which was a standard work among the Protts. He was appointed supt. at Brunswick in 1567. He was one of the authors of the *Formula Concordiae*. Among his works is *Locis Theologicis* ("Theological Topics"), which excels most similar books in learning and method. D. Apr. 8, 1586.

Cheno'a, R. R. junc., McLean co., Ill., 48 m. E. of Peoria. Pop. 1880, 1063.

Cheops, ke'ops [Gr. *Χεῶψ*], the name given by Herodotus to the builder of the great pyramid in Egypt, now identified with Suphis I. (or Shufu) of the monuments. He was the second king of the 4th dynasty, which was established at Memphis about 2500 B. C., according to the more sober Eng. Egyptologists. Prof. C. Piazzi Smyth tries to fix the date of the great pyramid at 2170 B. C. Bunsen's date is 3280 B. C.

Cherbourg, sherburg (Fr. *shair-boor'*) [Lat. *Caroburgus*], a seaport and naval station of Fr., on the Eng. Channel, at the N. extremity of the peninsula of Cotentin, 2294 m. by rail W. N. W. of Paris. Vast sums have been expended upon the harbor and the fortifications by which it is defended. The harbor is sheltered by land on 3 sides, but on the N. is open to heavy seas and storms. To protect it from these a breakwater (*digue*) was begun during the reign of Louis XIV. and completed under Nap. III. It is the most gigantic work of the kind ever built. The fortifications are numerous. The naval port consists of an outer harbor,

776 ft. by 663, with a minimum depth of water of 58 ft. This harbor communicates by a lock with a wet dock, 957 ft. by 712. In 1858 an inner wet dock, 930 yards by 437, was completed, cut out of the solid rock. Pop. 35,691.

Cherea, kee're-a (CASSIUS), the murderer of the Rom. emp. Caligula; he was tribune of the praetorian guard, and when the emp., on Jan. 24, 41 A. D., returned from the theatre, he was the conspirator who gave Caligula the first blow. He supported the senate in its attempt to establish the republic, but the praetorian guard had declared Claudius emp., and the next day Cherea was executed.

Cherimoy'er, or **Chirimoya** (*Annona Cherimolia*), a fruit of S. and Central Amer., now common in the E. I. and other tropical countries. It is sometimes described as the finest of all fruits, and sometimes as inferior to the mango-steen only. Both flowers and fruit emit a pleasant fragrance, but when the tree is covered with blossoms the odor is almost overpowering. The fruit varies from the size of an orange to 16 lbs. or more in weight. It is roundish or heart-shaped, greenish, and covered with small knobs and scales. Internally, the fruit is snow-white and juicy, and contains a number of small brown seeds.

Cher'okee, cap. of Cherokee co., Ia., on R. R. and the Little Sioux River, 59 m. E. N. E. of Sioux City. Pop. 1870, 438; 1880, 1523.

Cherokee, Kan. See APPENDIX.

Cherry, the name of numerous trees and their fruit belonging to the genus *Prunus* and order Rosaceae, but placed by some in a separate genus or sub-genus (*Cerasus*), distinguished by having the stone or pit of the fruit round, while the plums of the genus *Prunus* proper have flattened pits; but with several species the distinction does not hold good. There is therefore no such genus or sub-genus as *Cerasus*. But those C. which have their flowers and fruit in racemes (clusters), called bird C., are properly placed in a sub-genus, *Padus*; and the evergreen species, called C. laurels, are placed in a sub-genus, *Laiuro-cerasus*.

Cultivated C. are of many varieties, and belong to 2 distinct species—*Prunus avium* and *vulgaris*—both Old World species, the former comprising the "dukes," "ox-hearts," "bigarreus," etc., and the latter the "morellos," "guignes," and sour C. The former in Europe yields valuable timber. They are useful as dessert fruit and for preserving, and are employed in the manufacture of various liqueurs (maraschino, kirschwasser, C.-brandy, etc.). There are numerous wild species of C. in both continents. Those best known in the U. S. are the choke-C. and the black C. (*Prunus Virginiana* and *serotina*); the bark of both is very useful in med.; the latter is a large tree very useful for timber.

Cherry Laurel, a name given to the evergreen cherry trees, such as the bay laurel, *Prunus Laurocerasus*, a native of Asia; the Port. laurel, *Prunus Lusitanica*, a native of S. Europe, and the "mock orange," of the S. U. S., *Prunus Caroliniana*. They are all prized as ornamental shrubs or trees, and all abound in poisonous hydrocyanic acid, especially in the kernels and leaves. They have also an essential oil, resembling that of bitter almonds. The leaves of the first-mentioned species are used in flavoring sauces, etc., and in preparing C.-L. water, sometimes used as a sedative; but its strength is variable, and it should not be used.

Cherry Vale, Kan. See APPENDIX.

Chersiphron, ker-si-fron [Gr. Χερσιφρων], an eminent Cretan arch. who flourished about 600 B. C. He designed the temple of Diana at Ephesus, one of the Seven Wonders of the World.

Cherubini, ka-roo-bee'ne (MARIA LUIGI CARLO ZENOBI SALVADOR), an It. composer, b. at Florence Sept. 8, 1760. Produced *Iphigenia in Aulide*, *Medea*, and *Anacreon*. He acquired a European reputation as a composer of sacred music. He was a prof. in the Conservatory of Paris and a member of the Royal Acad. D. Mar. 15, 1842. (See RAOUT-ROCHETTE, *Notice sur la Vie et les Ouvrages de Cherubini*.)

Cherusci, ke-rus'ci, an anc. Ger. tribe, who inhabited a country on the N. side of the Silva Bacenis (Hartz Forest). The famous Hermann (Arminius) was a chief of the C. Having formed a league with other Ger. tribes, he defeated the Rom. gen. Varus near the Lippe in 9 A. D.

Chesapeake Bay, an inlet of the Atlantic, extends from Capes Charles and Henry N. through Va. and Md. to the mouth of the Susquehanna River. It is about 200 m. long, and varies in width from 4 to 40 m. The distance from Cape Charles to Cape Henry is nearly 12 m. The bay is so deep that ships can ascend from the ocean nearly to the N. extremity. The largest rivers which flow into it are the Susquehanna, the Potomac, and the James.

Chess, or **Cheat**, a common name of *Bromus scabellus*, a plant of the order Gramineae. It is a troublesome weed which often infests wheat-fields. Many farmers believe (incorrectly) that wheat is liable to be transmuted into C.

Chester, a city of Eng., on the Dee, 16 m. S. S. E. of Liverpool. Railways converge to this point, and connect it with Liverpool, Manchester, Lond., etc. It stands on a rocky eminence, and is mostly inclosed by anc. walls. The 2 main streets were cut out of the rock by the Romans. 5 ft. or more below the level of the houses. These streets are lined with shops, over which are piazzas or "rows" for foot-passengers. It has an old cathedral 375 ft. long, with a tower 127 ft. high. Among its other edifices are a castle and St. John's ch., supposed to have been founded in 698 A. D., and now partially in ruins. Pop. 36,788.

Chester, a city and R. R. centre, cap. of Randolph co., Ill., on Miss. River, 76 m. below St. Louis, is the shipping-point for the C. coal-fields. Pop. 1870, 1615; 1880, 2580.

Chester, a city of Del. co., Pa., an important R. R. centre, on the Del. River, 15 m. W. S. W. of Phila. It was settled by the Swedes in 1643, and is the oldest town in the State. It has large ship-yards; there is an acad. in the city, and in the neighborhood is the Crozer Theological Sem. (Bap.). It was incorporated a city in 1866. Adjacent are the boroughs of Upland and S. Chester. Pop. 1870, 9485; 1880, 14,997.

Chester, R. R. June., cap. of Chester co., S. C., 65 m. N. N. W. of Columbia. Pop. 1880, 1899.

Chester, Windsor co., Vt., on R. R., 39 m. S. E. of Rutland. It has an acad. Pop. tp. 1870, 2052; 1880, 1901.

Chester (JOSEPH LEMUEL), an antiquary, b. in Norwich, Conn., in 1821. He has been engaged in the publication of all the marriage, burial, and baptismal registers of Westminster Abbey, with annotations. D. May 28, 1882.

Chester Court-House, S. C. See CHESTER.

Chesterfield (PHILIP DORMER Stanhope), FOURTH EARL, an Eng. author and courtier distinguished for his wit and politeness, b. in Lond. Sept. 22, 1694; was elected an M. P. in 1715; in 1726 he inherited the earldom and passed into the House of Lords; was appointed lord-lieut. of Ire. in 1745, and one of the prin. secs. of state in 1746. His reputation as a writer is founded chiefly on his *Letters to his Son*. D. Mar. 24, 1773.

Chestertown, a seaport on R. R., cap. of Kent co., Md., on the right (W.) bank of Chester River, about 30 m. in a direct line E. of Baltimore. It is the seat of Washington Coll. Pop. 1870, 1871; 1880, 2359.

Chestnut [Lat. *castanea*; Fr. *châtaigne*], a forest tree of the natural order Cupuliferæ. The *Castanea vesca* is a large tree growing wild in Europe and the N. U. S. Each involucre (called the bur) contains from 1 to 3 edible nuts, often compressed and flattened on one or both sides. The wood is light and coarse-grained, but durable, is a valuable material for fences, and is much prized for finishing rooms. The C. is an ornamental and stately tree, and in Europe attains a great age. A C. tree on Mt. Etna is celebrated for its longevity, and is said to have measured 200 ft. in circumference. The fruit of the Sp. C. (which some botanists call *Castanea vulgaris*) is larger than that which grows in the U. S. C. form an important article of food in Fr. and other countries of S. Europe, where they are cultivated, and used either roasted or boiled. The best variety of Fr. C. are called *marrons*. Among the other species of *Castanea* is the silvery C. of Java (*Castanea argentea*), the fruit of which is edible, and the chinapin (*Castanea pumila*), a small tree indigenous in the S. U. S. The nuts of the chinapin are good to eat, but are not so large as C. Cal. has another species of chinapin. At Totworth, in Eng., there is a C. tree which was a boundary-mark in the reign of King John (1199-1216).

Cheto'pa, or **Cheto'pah**, a city of Labette co., Kan., on the Indian Terr. line, on the Neosho River and on R. R., 72 m. S. S. W. of Ft. Scott. Pop. 1870, 960; 1880, 1305.

Chevalier (MICHEL), a Fr. political economist, b. at Limoges Jan. 13, 1806. He was sent to the U. S. in 1832 to examine the Amer. R. Rs. He became an advocate of free trade, and was appointed prof. of political economy in the Coll. of Fr. and chief engineer of mines. Wrote *On the Material Interests of Fr. and Hist. and Description of the Ways of Communication in the U. S.* D. Nov. 29, 1879.

Cheves, cheevz (LANGDON), LL.D., an Amer. statesman and lawyer, b. in Abbeville dist., S. C., Sept. 17, 1776. He was an M. C. from 1811 to 1816, and was speaker of the House of Reps. during one session (1814-15). In this position he voted against the bill to recharter the U. S. Bank, but he was afterward pres. of that bank (1819-22). D. June 25, 1837.

Chevreul, sheh-vrul' (MICHEL EUGENE), a Fr. chemist, b. at Angers Aug. 30, 1786. He pub. *Chemical Researches on Fat Substances of Animal Origin* and an important work *On the Law of the Simultaneous Contrast of Colors and the Distribution of Colored Objects*. Among his other works is *Lectures on Chem. Applied to the Art of Dyeing*.

Chewink', Ground-Finch, or **Tow'hee Bunt'ing** (*Pipilo erythrophthalmus*), a common passerine bird of the U. S. and Canada, glossy black, with breast and abdomen white, and with the sides and lower tail-coverts rufous.

Cheyenne (she-enn'), a R. R. centre, cap. of Wyo. Terr. and of Laramie co., situated 106 m. N. of Denver and 516 m. W. of Omaha. Elevation, 6075 ft. It has an extensive trade in cattle, etc., and the round-house and shops of the Union Pacific R. R. Pop. 1870, 1450; 1880, 3456.

Chiabre'ra (GABRIELLO) an It. lyric poet, b. at Savona June 8, 1552. He was an admirer and imitator of Pindar, and the founder of a new school of poetry. In his mature life he resided at Florence, Genoa, and Savona. D. Oct. 14, 1637. (See HENRY STEBBING, *Lives of the It. Poets*.)

Chiapas, che-ah'pas, a state in the S. E. part of the Mex. confederation, bounded N. by Tabasco, E. by Guatemala, W. by Tehuantepec. Remarkable ruins of an anc. city are at Palenque. Area, 16,771 sq. m. Pop. 219,735.

Chica, chee'kah, or **Pito**, a fermented liquor made from maize by the Indians in some parts of S. Amer.; that produced by chewing the grains is esteemed the best. Its strength and flavor are improved by putting it into an airtight jar with a piece of beef, which is buried in the ground for yrs. When a child is born, such a jar is buried, the C. to be drunk at the child's marriage.

Chicago, she-kaw'go, an important R. R. and commercial centre, cap. Cook co., Ill., the largest city on the great lakes, also the largest interior city, and the fourth in the U. S. Lat. 41° 52' 20" N., lon. 87° 35' W.; 18 m. N. of the S. end of Lake Mich. Site determined by the Chicago River, through which, Mud Lake, and the Ill. River was the Indian transit for ages by canoes. Situation flat, 10 to 18 ft. above the lake, but rendered dry and healthy by sewers; on the dividing ridge between the St. Lawrence and the Miss., about 600 ft. above the sea. Has 15 m. of dockage on the river running through the centre of the city.

The growth of the city in business, in wealth, and in commercial facilities has more than equalled its increase in pop. Here are a few facts: The first shipment of grain of any kind, 78 bushels of wheat, was made in 1838; in 1883, total grains of all kinds shipped, 141,720,259 bushels—the largest grain pt. in the world. In 1883, 1,878,944 cattle and 5,697,163 hogs were received, making this by far the largest meat and animal product market in the world. The same is true of lumber, the receipts in 1883 being 1,909,910,000 ft.; shingles,

1,004,876,000. Value of manufactured articles, \$249,022,948; clearings of the banks, \$1,725,084,894. The value of the manufacturing, mercantile, and gen. business of the city for 1880 was \$200,000,000. The packing business is immense, and the storage capacity of the warehouses is over 20,000,000 bushels.

Railways connect the city with all parts of the U. and of Canada. The first railway of 16 m. was opened in 1849, but not till 1852 did railway progress really commence. Now C. has 14 great trunk lines, the N. W. R. R. has 2 and the St. Paul 1 extra, making in all 17; 127 passenger and about 100 freight trains leave every day, and of course as many arrive. The summing up of 30 yrs. is more than 450 trains daily. Water transit is afforded by the great lakes and the Erie and Welland canals to the ocean, and by canal also with the vast river system of the Miss. and its branches. The coast line of the great lakes extends more than 3000 m.

The public school system is modelled after that of N. Eng.; the income is ample for the free education of every child in the city. The public library is maintained by a tax, and the historical and other societies are active and prosperous. Theatres and places of amusement abound, chs. of all denominations are numerous and efficient, while the newspapers are considered among the most enterprising and valuable in the U.

The Fire.—On Oct. 9, 1871, the largest fire on record destroyed all the business part of the city, burning over 2100 acres, rendering 100,000 people homeless, and about \$200,000,000 worth of property was consumed. Nearly \$5,000,000 were contributed to the suffering city, every civilized and some heathen nations joining in this most benevolent and generous gift. Hardly a trace of this great calamity remains, and the city is now (1883) growing more rapidly and is far more prosperous than ever before in all its eventful hist.

History and Pop.—Marquette first white man here, in 1673; Ft. Dearborn built in 1804, destroyed by the Indians 1812; detachment of gov't. troops massacred at that time. City laid out in 1820; first map dated 1820; incorporated as a town Aug. 10, 1833; city gov't. organized first Tuesday in May 1837, 703 votes being cast; pop. July 1, 1837, 4170. The census has given the following figures: 1840, 4179; 1850, 28,200; 1860, 112,172; 1870, 208,977; 1880, 503,185.

WILLIAM BROSS.

Chic'ory, or Suc'ory, an herb of the order Compositae, sub-order Liguliflorae. The common C. or S. (*Cichorium Intybus*) is a perennial plant, found wild in most parts of Europe and naturalized in the U. S., growing in waysides, borders of fields, etc. It has a long, carrot-like root of a dirty or brownish-yellow color, and white within. The stem rises 2 to 5 ft., the leaves resembling those of the dandelion; the flowers rather large, beautiful, and generally blue. C. is extensively cultivated in Europe for its roots and for feeding cattle with its leaves. The blanched leaves are sometimes used as a salad. To this genus belongs also the endive. C. is much used with coffee.

Chickadee [a name derived from its note], the popular name of several Amer. titmice. The common C. (*Parus*



Chickadee.

atricapillus) here figured is frequent all the yr. round throughout a great part of N. Amer.

Chickahom'iny, a river in the E. part of Va., rises about 20 m. N. W. of Richmond, flows S. E., and after a course of about 75 m. enters the James River. It forms the boundary between Henrico and Charles City cos. on the right, and Hanover, New Kent, and James City on the left. Along the margins of the C. is found the theatre of operations of Gen. McClellan operating against Richmond during May and June 1862. In close proximity to this river occurred the battles of Seven Pines and Fair Oaks, May 31–June 1, 1862; Mechanicsville, June 26; Gaines's Mill, June 27; Savage's Station, June 29; White Oak Swamp, June 30, 1862, and Cold Harbor, June 3, 1864.

Chickamauga, Battle of. This battle, fought between the forces of the U. S. under command of Gen. W. S. Rosecrans and those of the Confeds. under Gen. Braxton Bragg, commenced on the morning of Sept. 19, 1863, about 9 o'clock. Of Rosecrans's army Gen. McCook commanded the right wing, Thomas the left, and Crittenden the centre, while Gen. Polk held chief command of the Confed. right and Hood of the left. The Confeds. first attacked the extreme left of the U. army, the endeavor being to turn it and thus gain possession of the roads to Chattanooga. A desperate conflict was continued during the day, but Thomas maintained his position. On the right the conflict had been severe at times, but on the whole the day closed with the advantage on the U. side. The attack was renewed by the Confeds. on the morning of the 20th against the left and centre, but Bragg was unable to turn Thomas's flank and occupy the coveted passage to Chattanooga. The fight

along the left centre had been equally bloody and indecisive. But on the right a fearful disaster had fallen. In answer to Thomas's call for aid, Rosecrans had despatched Negley's and Van Cleve's divisions from the right and centre. Wood was directed to close up on Reynolds on the right centre, and Davis to close on Wood. According to Rosecrans's report, Wood overlooked this direction, but supposed that he was to support Reynolds, and attempted to do so by withdrawing from the line and passing in the rear of Brannan, thus opening a gap in the line of battle, which being quickly perceived by Longstreet, a decisive charge was made, striking Davis in flank and rear, and throwing the whole division into confusion. Pouring in through this gap, the Confeds. cut off the Federal right and centre and attacked Sheridan's division. They were broken and sent flying in disorder toward Chattanooga, with terrible loss. But Sheridan and Davis rallied and re-formed their commands on the way, and halted at Rossville. Rosecrans, being unable to join Thomas, hastened to Chattanooga to prepare that place for defence in case of a total rout of his army, which now seemed imminent. But Gen. Thomas still remained immovable in his position. His line had now assumed a crescent shape, with its flanks supported by the lower spurs of the mt.; and here he repulsed the furious onsets of the Confeds. About sunset they made their last charge, when they were met and driven back at the point of the bayonet, and returned no more. Gen. Thomas then determined to retire on Rossville, where he arrived and took post before morning of the 21st, receiving supplies from Chattanooga, and offering battle during the day, but the attack was not seriously renewed. On the night of the 21st he withdrew within the defences of Chattanooga; and thus that place and E. Tenn., the prize for which the battle was fought, still remained in possession of the U. forces. The U. loss is reported at 16,000, killed, wounded, and missing; the Confed. loss, 18,000.

Chick'en-Pox, a contagious febrile disease, chiefly of children, and bearing some resemblance to a very mild form of smallpox. C.-P. is distinguished by an eruption of vesicles or blebs, which rarely become pustular or yellow, and leave only a very slight incrustation, which falls off in a few days, without any permanent mark or pit as in smallpox. It is a disease of little or no danger, the fever being often hardly perceptible, and never lasting long. It usually occurs but once in any one patient.

Chick-Pea (*Cicer*), a genus of plants of the order Leguminosae, having pinnate leaves and 2-seeded pods, inflated like bladders. The common C.-P. (*Cicer arietinum*) grows wild in the countries around the Mediterranean. It is an annual, of a stiff upright habit. The seeds abound in farina, and have a slightly bitterish taste. They are about the size of common peas, and curiously wrinkled. They are used as food, either boiled or roasted, and are the common pulse of the E. They are an important article in Fr. and Sp. cookery. They have been in general use from the earliest times, and the plant is extensively cultivated in Egypt, Syria, India, Europe, Mex., etc. The herbage affords nutritious food for cattle. Drops exude from this plant, which, on drying, leave crystals of almost pure oxalic acid. In Fr., in India, and in Mex. the free use of the C.-P. as food is said sometimes to lead to paralysis.

Chico, chee'ko, cap. of Butte co., Cal., on R. R. and Chico Creek, 96 m. N. of Sacramento, with which it has steamboat connection. Pop. 1880, 3300.

Chic'opee, R. R. junc., Hampden co., Mass., on Conn. River, at the mouth of the Chicopee, 4 m. N. of Springfield. The Ames Co. have here a manufactory of swords. Pop. of tp., including C. and C. Falls, 1870, 9607; 1880, 11,286.

Chicopee Falls, Hampden co., Mass., on R. R. and the Chicopee River, 5 m. N. of Springfield and 1½ m. E. of Chicopee. It has extensive water-power. Pop. 1870, about 3000; 1880, not in census.

Chi'goe, or Jig'ger (*Sarcophylla penetrans*), a species of flea, much smaller than the common flea, found in the W. I. and N. and S. Amer., attacking any exposed part of the human body, effecting a lodgment between the skin and flesh, often under the nails of the toes, and also infesting dogs and mice. At first its presence is indicated by a slight itching, but ulceration is likely to result, which is not only painful, but even dangerous when the female C. is allowed to remain and deposit her eggs, about 60 in number. The ulcer speedily contains a great colony of C. Death has followed neglect to remove the C.

Chi- or She- Hoang-Ti, called also **Tsin-Chi-Hoang-Ti**, and sometimes **Ching-Wang**, an emp. of Chi. who reigned 246–210 B. C. Before his time Chi. was divided into 8 feudatory principalities, which he subjugated and consolidated into one empire, being probably the first monarch to assume the title of *hoang*, "emp.," his predecessors having borne that of *wang*, "king." He was the constructor of the Great Wall of Chi. In order to destroy the influence of the learned class, and to weaken the national reverence for antiquity, he undertook the destruction of the anc. books of the country.

Chihuahua, che-wah'wah, a State of Mex. bordering on Tex., bounded N. by the Rio Grande and drained by the Conchos. The W. part is occupied by the Sierra Madre Mts., E. of which is a high table-land, arid and sterile, but abounding in minerals. Area, 105,300 sq. m. Pop. 180,758.

Chilblain. See FROST BITE.

Chil'cott (GEORGE M.), b. at Trough Creek, Pa., Jan. 2, 1828, member of Neb. legislature 1856–57; removed to Denver, Col., 1859, and was member of constitutional convention; member 1st Territorial legislature; register of land office 1863; delegate to Cong. 1867; member of legislature 1878; U. S. Senator 1882–83.

Child (FRANCIS J.), Ph. D., b. in Boston Feb. 1, 1825, grad. at Harvard in 1846. He was tutor in math. at Harvard and subsequently in rhetoric and hist. Prof. C. is especially distinguished for his thorough acquaintance with early Eng.

lit. As a Chaucer scholar he has perhaps no superior in Amer. or Europe. He contributed to *J.'s Univ. Cyc.* the admirable article on BALLAD POETRY.

Child (LYDIA MARIA), a writer, b. at Medford, Mass., Feb. 11, 1802. Her maiden name was Francis; married in 1828 David Lee Child, a lawyer; became ed. of the *National Anti-Slavery Standard* in 1841. Wrote *The Hist. of Women*, *Philodora, a Grecian Romance*, and *The Progress of Religious Ideas*, D. Oct. 20, 1880.

Childbirth. See OBSTETRICS.

Chil'dermas (from *child* and *mass*), or **Holy Innocents' Day** (Dec. 28th, or in the E. the 29th), is observed in various chs. as a festival in honor of the children killed by Herod.

Children (JOHN GEORGE F. R. S.), an Eng. electrician, b. at Tunbridge in 1777. He demonstrated that the quantity of electricity is in proportion to the size of the plates in a galvanic battery, and its intensity depends on their number. D. Jan. 1, 1852.

Childs (HENRY HALSEY), M. D., b. in Pittsfield, Mass., June 7, 1783, grad. at Williams in 1802; was pres. of the Berkshire Med. Coll., and was lieut.-gov. of Mass. in 1843. D. Mar. 22, 1868.

Chili, chil'lee, a S. Amer. republic, W. of the Andes. It extends S. to Cape Horn, and includes part of Patagonia; on the N. the Bolivian sea-coast has been ceded to it, and it claims a part of Peru. Area, including additions from Patagonia, etc., 218,925 sq. m. Its lat. is 21° 30' to 56° S., and its lon. 70° to 74° W.

Topography and Surface.—The great chain of the Andes forms its E. limit; gen. elevation, 13,500 ft.; summit of Aconcagua, 22,422 ft.; numerous other peaks, 20,000 to 21,500. The coast-line is rocky and bold, with some good harbors and many active volcanoes, Antuco, near Concepcion, being 8917 ft. Mt.-spurs extend from Andes to coast, with some fertile valleys between. No long rivers; the Maule, Biobio, and Calacalla navigable for a few m. Earthquakes often occur, sometimes raising the coast and producing great destruction.

Climate very healthy; rain falls June to Sept., and hail and terrible thunderstorms are frequent in these winter months. Jan. and Feb. (the summer in C.) are the hottest months; maximum thermometer, 95° F. in shade.

Minerals.—Gold, silver, copper, and coal mines; lead with silver and alone, excellent iron, bismuth, quicksilver, antimony, cobalt, agate, jasper, rock crystal, etc. The coal is bituminous, and the copper contains gold.

Animals.—Cougars and pumas, the tapir, llama, guanaco, chinchilla, etc.; the condor, eagle, and other birds of prey; many song-birds and game birds; a few reptiles.

Vegetation and Productions.—The N. portion is a waterless desert with large deposits of nitrate of soda and alkalies; farther S. the mt.-slopes and some of the valleys have vast forests of laurel, myrtle, cypress, and other evergreens of gigantic size. The mts. and hills are adapted to grazing; the valleys yield great crops of cereals, hemp, potatoes, and all the best fruits of a temperate and semi-tropical region.

Exports.—Nitrate of soda, hides, copper, gold, silver, wool, wheat, and tallow; **imports**, woollen and cotton goods, iron, hardware, agricultural implements, petroleum and lard oils, silks, and linen goods.

Manufactures.—Earthen and copper wares, cordage, soap, brandy, wines, linens, etc.

Finances.—Public debt in 1880, including railway debt, \$74,582,050; revenue, 1881, \$16,920,000; expenditure, 1881, \$17,057,720; imports, 1880, \$30,345,725; exports, \$51,083,810.

Railways.—About 1122 m. in operation in 1880; 2483 m. of telegraph lines.

History, Government, Etc.—A part of the Inca's dominion when Peru was conquered by Pizarro; Almagro and Valdivia conquered it, except the Araucanians, 1535-1541; remained subject to Sp. till 1810, when a revolution took place, and after 8 yrs. of war independence proclaimed Jan. 1, 1818; Chiloe captured in 1826; first const. adopted 1824, second 1828; war with Peru 1837-1839, and 1879-82; with Sp. 1866-69; Sp. acknowledged independence of C. in 1844. C. has had less trouble from revolutions than the other S. Amer. states, and though the brave and warlike Araucanians have often risen for their rights, she has made more progress in education and material advancement than any of the Sp. states. Her pres. have generally been able and upright. The pres. is elected for 5 yrs., the 20 senators for 9, and the 114 deputies for 3 yrs. By a treaty between the Argentine Confederation and C. in 1881, all E. of E. crest of the Andes, including most of Patagonia and a part of Terra del Fuego, was ceded to the Argentine Confederation. After the brilliant war with Peru, 1879-82, the northern frontier of Chili was moved from lat. 24° S. to lat. 19° S.

Population.—In 1882, 2,400,396, beside 70,000 Araucanians. The Indians and mixed races predominate, but the Sp. race, more or less pure, governs. There are 17 provs.—Chiloe, Llanquihue, Valdivia, Arauco, Concepcion, Nuble, Maule, Linares, Talca, Curico, Colchagua, Santiago, Valparaiso, Aconcagua, Coquimbo, Atacama, and Biobio. There is also the terr. of Angol, the settlement of Arauco, and the land of the Araucanians. Prin. cities, Santiago (cap.), 180,000; Valparaiso, 97,775; Valdivia, Concepcion, Coquimbo, Talca, Caldera, and Constitution are towns of some importance. The R. Cath. religion is established. L. P. BROCKETT.

Chiliasts. See MILLENARIANS.

Chillicothe, city and R. R. Junc., cap. of Livingston co., Mo., 76 m. E. of St. Joseph. It has an acad. Timber, water, and coal abound in vicinity. Pop. 1870, 3978; 1880, 4078.

Chil'icth'e, or Chilicoth'e, a city and R. R. centre, cap. of Ross co., O., on the Scioto River and the O. and Erie Canal, about 99 m. E. by N. from Cin. C. was the cap. of O. from 1800 to 1810. Pop. 1870, 829; 1880, 10,938.

Chil'ingworth (REV. WILLIAM), an Eng. divine and controversialist, b. at Ox. in Oct. 1602; in 1628 became a fellow of Trinity Coll., Ox. In 1630 was converted to Cathol-

icism and entered the Jesuit Coll. in Douay, Fr. In 1631 he reconsidered the question and returned to Ox. Wrote *The Religion of Prots. a Safe Way to Salvation*, a work of singular acuteness and ability. He became chancellor of Salisbury and prebendary of Erixworth. D. Jan. 30, 1644. (See DES MAIZEAUX, *Life of Chillingworth*.)

Ch'lo, or Ch'lon (Gr. Χίλων or Χείλων), a Spartan who is enumerated among the Seven Wise Men of Gr. He became one of the ephori of Sparta in 556 B. C. Among the maxims ascribed to him is "Know thyself."

Chimara, ke-mé'ra (Gr. Χίμαρα), a monster of classic mythology, described by Homer as having the head of a lion, the body of a goat, and the tail of a dragon; said to exhale flames of fire.

Chimeride, a family representing a peculiar order of cartilaginous fishes (Holocephali), characterized by a naked skin, 2 dorsals, of which the first is short and high with a spine in front, the second long; a short posterior anal, a slender diphycercal tail, and a peculiar system of muciferous lines. The best known species is *C. monstrosa* of the European seas, sometimes called the "king of the herrings." It pursues the shoals of herrings, and is therefore sometimes taken in the herring-nets. It is seldom more than 3 or 4 ft. long. A deep-water N. Amer. species is *C. plumbea*.

Chimborazo, a mt.-peak of S. Amer., the culminating point of the Equatorial Andes, 90 m. S. by W. from Quito. Its height, according to Humboldt, is 21,422 ft., 12,000 of which is above the adjacent table-land. It was formerly supposed to be the loftiest peak of the globe, but its height is now known to be exceeded by many peaks of the Himalayas and by several in the Andes.

Chim'ney [Fr. *cheminée*], a flue or cluster of flues for carrying off smoke or for other purposes. There are no remains of C. in the ruins of anc. cities. The principle of the draught of C. is that a column of heated air is lighter than a column of cool air of the same height, and the greater the height of the heated column, the greater the difference of weight between the column of air within and without the flue. In towns C. are liable to be overtopped by neighboring buildings, and to become smoky during high winds. Various C.-tops have been devised to remedy this trouble. Another cause of smoky C. is insufficient ventilation. If air cannot enter a room rapidly enough to supply the draught of the C., the draught will be diminished.

Chimpan'zee (*Anthropopithecus niger*), an anthropoid ape of tropical Afr., noteworthy as one of the species most closely related to man. It is nearly 5 ft. high, covered with dark hair, is gregarious, and in defence uses clubs and stones. It can be tamed and taught to walk, sit in a chair, and eat like a human being. Its arms are much longer than a man's, and it has 13 dorsal vertebrae and pairs of ribs.

China. See CHINESE EMPIRE.

China, kí'na, a name of cinchona bark often to be met in books, and in common use on the continent of Europe. It is especially used by homœopathic practitioners. The name is derived, not from the empire of Chi., but from *kina* or *quina*, the Peruvian name of cinchona.

China, or Chinaware. See POTTERY AND PORCELAIN MANUFACTURE, by PROF. C. F. CHANDLER, Ph. D., LL. D.

China Clay. See KAOLIN.

Chi'na Grass, or Chinese' Grass, a vegetable fibre which the Chi. manufacture into a beautiful fabric called "grass cloth." It is also manufactured in Europe to some extent. It is obtained mostly from the *Bahmeria nivea*, a plant of the order Urticaceæ. Grass-cloth has a glossy appearance and a silky lustre. The plant yielding this excellent fibre flourishes in the S. parts of the U. S. under proper cultivation.

China, Great Wall of, built by the emp. Chi-Hoang-Ti, and completed in 211 B. C. Its purpose was to protect the N. and N. W. frontier from the inroads of the barbarians. The construction is said to have occupied 10 yrs., and to have cost the lives of half a million of the laborers. Its length is about 1250 m., the height being from 20 to 25 ft., towers 40 ft. high at intervals of about 300 ft. The walls are thicker at the base than at the top, which is broad enough for the passage of 6 horsemen abreast. Each face of the wall is of brick or hewn stone, the space between being filled in with earth. It has been calculated that the material employed would build a wall 6 ft. high and 2 ft. broad twice round the globe. The stones were well fitted together, and the arches were admirably constructed, but a large part of the wall is now in a ruinous condition.

China, Pride of (*Melia Azedarach*), a small and beautiful tree of the order Meliaceæ, a native of S. and W. Asia, naturalized in the U. S. It is often called "pride of India," "China tree," and "bead tree." The bark of its root is used as a vermifuge, and constitutes the drug azedarach. It has a sweetish fruit about the size of a cherry, often eaten by children without harm, though considered poisonous. Its wood is hard and beautiful. This tree is naturalized in the S. of Europe. An allied species, the *Melia Azedarachia*, the margosa or neem tree of India, yields a febrifugal bark, and a sap (toddy) used as a beverage, while the pulp of its fruit, like the olive, affords a useful oil.

China Root, the rhizome of *Smilax China*, a climbing shrubby plant allied to sarsaparilla, a native of Chi., Cochinchina, and Japan. The stem is round and prickly, the leaves thin and roundish oblong; the rhizome tuberos and large, sub-astringent and diaphoretic. It is occasionally used in med. in Europe, but is also employed in the E. as an article of food, for it abounds in starch.

China Sea [Chi. *Tong Hai*], that portion of the Pacific which extends between Chi. and Siam on the W., the Philippine Islands on the E., and Borneo on the S.

China Wax, a substance like beeswax, produced by an insect (*coccus*) which lives on the *Fraxinus Chinesensis*, an ash tree of Chi. The wax is scraped from the branches, melted, and strained. Chi. also exports Japan wax, obtained from the fruit of *Rhus succedanea*, a sort of sumach tree.

Chin'cha Islands.—3 small islands in the Pacific Ocean, about 14 m. from Peru, to which they belong: lat. 13° 39' S., lon. 76° 28' W. Here are large deposits of guano, and here multitudes of penguins and other oceanic birds build nests and breed. None of these islands is more than 1 m. in extent. They present cliffs 300 ft. high and perpendicular, with numerous caves into which the sea dashes. The entire supply has been recently exhausted. The exportation of this manure from Peru in 1871-72 was 1,187,327 tons.

Chinch-bug. *Rhyssolochus leucopneus*, a hemipterous insect of the family Lygaeidae. It is a great pest to the wheat crops of the U. S., attacks also Indian corn, grass, and the various kinds of grain and garden vegetables. The mature bug is $\frac{3}{16}$ of an inch long, has white fore wings, each having a black spot on the middle of its edge; the body is mainly black, and the wingless young are at first red, with a white band on the back. The C.-B. attacks the tender parts of plants, sucking the juices, and apparently poisoning the part which is bitten.

Chinchil'la [S. pron. chin-cheel-yah], (*Chinchilla lanigera*), a S. Amer. rodent typical of a peculiar family, the Chinchillidae, distinguished in part by the 5 toes (the fifth rudimentary) of the fore feet and 4 of the hind feet. The fur constitutes an important article of commerce. The anc. Peruvians were accustomed to employ this fur as wool for the manufacture of fine fabrics. The C. is about the size of the common rat.

Chin'se' Em'pire, the second empire on the globe in size, occupying more than $\frac{1}{12}$ of the land surface of the earth, and nearly $\frac{1}{4}$ that of Asia. It extends from 18° 20' to 53° 30' N. lat., and from 70° to 135° E. lon.; bounded N. by Asiatic Rus., E. by Japan, Yellow, and Chi. seas and Pacific Ocean, S. by India, Farther India, and Siam, W. by Turkistan. Area variously estimated at 4,540,000, 4,098,823, and 3,922,317 sq. m.: area of Chi. proper (excluding Manchuria, Mongolia, Thibet, Corea, and Liaotung, dependencies of the empire) is 1,279,072 sq. m.

Topography and Surface.—The C. E. has within its limits 4 great mt. ranges and 6 or 8 of lesser elevation—viz. the Himalayas, Thian-Shan, Kuen-Lun, and Altai. The Kin-gan in the N., the Peh-ling in N. Chi., and the Nan-ling in S. Chi. are prolongations of the Altai and Himalayas.

Rivers.—Amoor, 2400 m.; Brahmapootra, 1000 m. within the empire; Hoang-Ho, 2000 m., and draining 715,000 sq. m.; and the Yang-Tse-Kiang, 2900 m., and draining 950,000 sq. m. All are navigable, and have many large affluents. The Pei-Ho in the N. and the Chu-Kiang in the S. are also important rivers. Five large lakes—Tung-ting-hu, Poyang-hu, Hung-tsin-hu, Tsau-hu, and Tai-hu. W. of 113° E. lon. is the mountainous country, extending to and through Thibet: E. of that meridian and S. of the Yang-Tse-Kiang, the hilly country; E. and N. the Great Plain, extending to the Great Wall, and thence N. E. to the Amoor. The Grand Canal, connecting Tien-tsin and Hang-chow (650 m. long), facilitates internal navigation. The Great Wall—1250 m. long, 30 ft. high, 15 to 25 ft. thick—traverses the N. boundary of Chi. proper, and was built 220 B. C.

Minerals.—Coal is found in all the 18 provs. of Chi. It is both anthracite and bituminous, but possibly belongs to the tertiary age. Gold, silver, copper, lead, mercury, zinc, and iron abound; jade and other precious stones; salt, kaolin, and the feldspar clays are largely worked; petroleum exists, but little is produced.

Vegetation and Productions.—The forest trees are not abundant except on the mts. Among the most useful trees are the cocco-nut and other palms, 63 varieties of bamboo, the mulberry, funeral cypress, C. banyan, C. pine, the camphor tree, varnish tree, tallow tree, the gingko tree, the camellia, azalea, gardenia; of fruit trees, apples, pears, pomegranates, mangoes, 3 species of orange, the lichi; and of shrubs, the grape, pineapple, banana, etc. Agriculture is regarded as the highest pursuit. So vast is the pop. that it is difficult to supply the food demand. The soil of the valleys and Great Plain is fertile, and is kept in the highest productiveness by skilful cultivation. Tea is its largest crop, the export alone amounting to 110,000,000 lbs. in 1880; rice, maize, barley, wheat, tobacco, and fruits, silk, both reeled and manufactured, cotton, camphor, varnish, indigo, and rhubarb are also largely produced. Ornamental horticulture is largely practised.

Animals.—Elephants, rhinoceroses, bears, tigers, wolves, wild cats, monkeys, antelopes, moose, musk-deer, wild camels, and all our domestic animals, together with the camel and elephant. Of gallinaceous birds, several beautiful species of pheasant; some birds of prey, and many song-birds and birds of rich plumage; cormorants are trained to fish. Fish of all edible kinds are abundant, and form a valuable addition to food-supply. Not many reptiles, but tortoises, turtles, and lizards abound in the S. Of insects, there are many spiders; locusts often destroy crops; silkworms are reared in vast numbers.

Climate various; 3 zones—N., Central, and S. N. like N. Eng. and the N. of the U. S., extremes of heat and cold; Central like Middle States, fine climate, produces tea, silk, and cotton; S. tropical, yields all tropical and semi-tropical products. Generally, rainfall sufficient; in some dists. irrigation practised.

Industries.—The Chi. are the most industrious of people. They cure their teas, reel and manufacture silk in all forms, as well as cotton and linen; make the most beautiful pottery and porcelain; invented and have practised printing since about 900 A. D.; have been famous for many centuries for their delicate work in gold, silver, copper, and bronze, and in engraving precious stones, carving ivory and jade, making and decorating lacquered ware, making paper out of various materials and for almost every purpose, painting with brilliant colors on pith paper, dressing and making up furs, making umbrellas, etc.—in all these arts they were skilled centuries before the W. nations had attempted them. But in modern times they had made no progress till recently.

Finances and Commerce.—Chi. had no foreign debt till 1874, when a loan of \$3,135,000 was contracted at 8 per cent.; a second was contracted in 1878, and her foreign debt is now \$11,159,755. The revenues are from taxes, licenses, and customs duties; these last are mostly collected on exports. The total revenues of late yrs. amount to about \$125,000,000, and the expenditures are generally less than the receipts. The exports are principally of tea, raw and manufactured silk, rice, fruits, bamboos and bamboo wares, lacquered goods, porcelain and pottery, paper and fans, etc.; the imports cotton and woollen goods, metals, opium, petroleum, clocks and watches, and silver coin. The total amount of imports is about \$105,000,000, of exports about \$110,000,000. The U. S. import from Chi. largely of tea and reeled silk, and send her cotton goods, woollen goods, petroleum, and clocks, with some specie. Eng. sends her \$40,000,000 worth of opium every yr. Chi. has now a steam mercantile marine as well as steam navy. Her steamships ply to San Francisco and other ports. Twenty-two Chi. ports are thrown open to the trade of civilized nations.

Education is very gen.; all govt. officials must be educated; most of the people can read and write; methods and textbooks not of the best; many young men of the higher classes sent to Europe and U. S. for instruction in Eng. and in sciences.

Principal Cities.—These are too numerous to be named. Peking (cap.), has 1,000,000 or more pop.; Tien-tsin, Hankow, Nanking, Shanghai, Ningpo, Foochow, Amoy, Swatow, Canton, and 30 or 40 more have a pop. from 800,000 to 1,500,000.

Religions.—The prevalent religion of Chi. is Booddhism (see BOODDHA), modified socially by the teachings of Confucius (see CONFUCIUS), and including worship of ancestors. The Taoists (see TAOISM and LAO-TSE), a sect somewhat akin to Spiritualists, are also numerous. There are some Jews and more Mohammedans. The R. Caths. have perhaps 300,000 followers. The Nestorians introduced Christianity in the 7th century, but it was suppressed in the 14th, though not entirely extinguished. Prot. missionaries have been very successful, and there are from 80,000 to 100,000 Prot. Chrs. There is no question that the morality of the masses of the people is low; that neither Confucianism, Booddhism, nor Taoism has availed to keep them from vices which sap the foundations of society; but there is enough of good left in the nation to warrant the effort to save it. The customs of the people are peculiar, but they are in no sense barbarians.

History. Government, Etc.—The legendary hist. of Chi. would make it the oldest of nations. There is good reason to believe that it has an authentic hist. exceeding 4200 yrs. The exact age when Fo-Hi, the benefactor of his country and the founder of the silk industry, flourished cannot be told, but it was before 2735 B. C. The name of the country among all the W. nations has been always associated with silk. The Chi. of that early time were astrons.; they recorded phenomena which occurred 2735 B. C., and their record has been proved correct. The emp. Yu (1991 B. C.) rendered the Great Plain habitable by running the Hoang-Ho into a new channel. Confucius lived and taught 571-544 B. C. Shi Hoang-Ti (246-210 B. C.) is the greatest of their heroes; he expelled the Mongols, built the Great Wall, and burned most of the national lit. He was the founder of the Tsin dynasty, and the first emp. of the whole of Chi. Booddhism was introduced A. D. 65. The next 1200 yrs. were prolific of wars between the Chi. and the Mongols, the latter conquering in 1279 and holding the country till 1368. Then the Ming (native) dynasty regained power, and held it till 1644, stamping out the Nestorians, but receiving the Port. The Manchus succeeded, and have held the power till now, but not without great struggles. Distrusting the Port., they also distrusted other W. nations, and restricted them to Canton. In the present century they have had wars with G. Brit. and Fr. (1857-1860); the great Taeping rebellion, lasting 14 yrs.; a Mohammedan rebellion in Yunnan, lasting 23 yrs., and another in E. Turkistan, lasting 11 yrs. They have made treaties with the U. S. and European govt., and are fast taking rank with civilized nations. The govt. of Chi. is autocratic; the emp. is absolute in the empire, the gov. in the prov., the magistrate in the dist. The imperial power is not hereditary, each emp. if he chooses selecting his successor, but always in his own family; but good govt. alone gives the divine sanction to the choice. Though absolute, the emp. must reign and govern according to the law; he is also the highest judicial court of the empire. The administrative power is committed to 2 councils, an inner or privy council of 6 high officers and 10 assistants, and a gen. or strategical council, answering to our cabinet. There are also 6 *yamuns* or public officers, each charged with a dept. of the govt., and over all a court of gen. inspection composed of the highest mandarins or nobles. The gov. of each prov. is absolute in his prov., but subject to the central power at Peking. There are 17 grades or classes of mandarins or nobles; promotion to official position is by competitive examinations made triennially; about 200 out of 10,000 examined attain the degree of Dr., which insures immediate preferment.

Population variously estimated at from 250,000,000 to 450,000,000; probably over 300,000,000 in Chi. proper and 20,000,000 in the dependencies. Chi. proper is divided into 18 provs., answering to our States and Terrs., though nearly 10 times as populous; they are: Chikli, Shantung, Shansi, Honan, Kiangsee, Anhwei, Kiangsi, Chèhkiang, Fukien, Hupeh, Hunan, Shensi, Kansu, Szechuen, Kwangtung, Kwangsi, Kweichow, Yunnan. Some add a 19th prov., Shèng-King, larger in extent but smaller in pop. than any of the others.

L. P. BROCKETT.

Chinese Language and Literature. The Chi. lang. is spoken by a pop. variously estimated at from 200,000,000 to 400,000,000. The things which first attract the notice of a foreigner are its monosyllabic character and the apparent absence of grammatical forms. It has not anything like what we style parts of speech. The same word may be a verb, a noun, an adjective, or an adverb.

Thus the word *sin* must sometimes be translated by "believe," sometimes by "fidelity," "faithful," or "faithfully." The vocabularies are simply word-roots, their number varying in different dialects from 500 to 1000; this limited number is, however, practically doubled or trebled by the use of "tones," corresponding mainly to what we call emphasis. This poverty in words is in a measure compensated for by several expedients. There are numerous dialects of the spoken lang., of which only the one designated as the "mandarin" or court dialect is understood in any considerable part of the empire, the others being intelligible only in the provs. where they are respectively vernacular. But this diversity does not extend to the lang. as written. The written character conveys the same idea, no matter how differently it may be represented in utterance, just as the figures 1, 2, 3, etc., and any possible combination of them, convey the same idea to an Englishman, a Frenchman, an Arab, or a Hindoo. The original Chi. characters were doubtless ideographic. Thus, a circle with a dot in the centre was the sign of the sun, a crescent that of the moon, and so on. The combination of two or more signs to represent a single idea was an obvious step. Thus the sign for an "eye" and that for "water" stood for a tear. But by far the greater part of the immense number of characters which constitute the written lang. has been gradually formed upon quite different principles. The number of these has been variously stated, but the most complete dict. contain from 40,000 to 60,000, of which perhaps one half are obsolete; still, there are some 25,000 having the sanction of good usage, of which from 5000 to 10,000 are sufficient for almost all the needs of a scholar. In spite of all these obvious deficiencies, the Chi. lang. has been made an instrument of great value for the expression of thought, even upon the most abstruse topics.—The Chi. lit. is of great extent and of very considerable variety. In few countries has the cultivation of letters been so general. In theory, at least, no position beneath the throne is beyond the reach of the scholar, and official promotion is made to depend directly upon scholarship. The oldest of the Chi. books date back at least 3000 yrs., perhaps even more. The first period of marked literary activity began with Confucius (d. 478 b. c.) and ended in 212 b. c., when the emp. Shi Hoang-ti ordered the destruction of all books except those upon med., divination, husbandry, and the records of his own dynasty. The golden age of Chi. poetry was that of the T'ang dynasty (618-905 A. D.); of philos., the Sung dynasty (960-1279), while the Yuen dynasty (1290-1367) was the most flourishing period of the drama, and also produced some good novels, and the Ming and later dynasties have been prolific in works of an encyclopaedic character. One of the most admirable bibliographies in any lang. is the catalogue of the imperial library, pub. in 1790 in 200 books. It contains notices of 10,500 works (a single one of which, the encyc. of the Ming, is composed of 22,877 books), giving the author, the hist., and the contents of each, together with an estimate of its merits; and from this catalogue the drama and novels are excluded. [*From orig. art. in J. S. Univ. Cyc., by Prof. ARBON VAX NABE.*]

Chinese White, a name sometimes given to the white oxide of zinc, used as a pigment as a substitute for white lead. It is not liable to be changed much by atmospheric action.

Ching-Kiang-Foo, or **Tchang-Kiang**, a fortified city of Chi., on the Yang-Tse-Kiang, near its junction with the Imperial Canal, and about 42 m. E. of Nanking. It was taken by the Brit. in 1842, and by the Tae-Pings in 1859. Pop. 1877, 140,000.

Chin-In'dia, or **Farther-India**, a name given by Malte-Brun to the region between Chi. and Hindostan, also often called the Peninsula beyond the Ganges.

Chio, See *Scio*.

Chio, Chinupin, a dwarf species of chestnut (*Castanea pumila*) of the Atlantic U. S. from Maryland to Tex., bearing a small but sweet edible nut.

Chionides, ki-on'i-déz, a Gr. poet of the old comedy, who began to exhibit, according to Suidas, in b. c. 487. He was regarded as the leader of the old Attic comedy. The titles of 3 plays are preserved.

Chip'man (NATHANIEL), LL.D., a soldier and jurist, b. at Salisbury, Conn., Nov. 15, 1752, grad. at Yale in 1777. He was an officer of the Revolutionary army, but was admitted to the bar in 1779. He was chief-justice of Vt., afterward judge of the U. S. dist. court for Vt. (1791-93), and U. S. Senator 1797-1803. Wrote on the laws of Vt. D. Feb. 15, 1843.



Chipmunk.

Chip'munk, a popular name for the *Tamias striatus*,

or striped ground-squirrel of the U. S., especially common in the N. It is 5 or 6 inches long, with a tail of 4½ inches.

Chippawa, a v. of Canada, on the Niagara River, about 3 m. above Niagara Falls. Here, July 5, 1814, the Amers., under the command of Maj.-Gen. Joseph Brown, gained a victory over the Brit. under Gen. Rial. The Amer. loss was 308, that of the Brit. 505.

Chippewa Falls, city, cap. of Chippewa co., Wis., on R. R. and the Chippewa River, about 88 m. E. of St. Paul, Minn. It has water-power and a trade in lumber. Pop. 1870, 2507; 1880, 3982.

Chipping-Sparrow, a common little N. Amer. bird (*Spizella socialis*), with back and sides ashen, whitish underneath, and crown chestnut.

Chiquichi'qui Palm, or **Piassa'ba** (*Leopoldinia Piassaba*), one of the palms which yield the piassaba fibre, used for making coarse brushes and brooms for sweeping streets, for cables, etc. It grows on the banks of the rivers of Venezuela and the N. of Brazil, and has very large, regularly pinnate leaves, much used for thatching. The commercial fibre is obtained from the marginal processes of the leaf-stalks, which split into fine fibres, hang down 5 or 6 ft., and entirely conceal the stem. It has long been used for cables on the Amazon, and has now become an important article of commerce.

Chrisophus, ki-ris'o-fus, a Lacedæmonian officer who joined Cyrus the Younger in his expedition against Artaxerxes (b. c. 401) at Issus with 700 heavy-armed men. He first appeared prominently after the death of Clearchus, when he was, at the suggestion of Xenophon, appointed to lead the van of the retreating Grcs.

Chiselhurst, chis'el-ur'st, a parish of Eng., in Kent, 11 m. S. E. of Lond. The emp. Nap. III. fixed his residence at C. early in 1871, after he was released from captivity by the emp. of Ger., and here, Jan. 9, 1873, d.

Chitin, ki'tin [from the Gr. χιτών, a "tunic"], in chem., the name of the substance which forms the skeleton of all insects and crustaceans, as well as of some mollusks and other inferior animals. In insects it constitutes the external skeleton, the scales, and the tracheæ, and penetrates into the most remote portions; one of the layers of the intestinal canal consists of C.

Chiton'ida, a family of gasteropodous mollusks, whose shell is composed of 8 transverse calcareous pieces, overlapping each other, and strongly attached to the mantle, which is leathery and fibrous. Most have the power of rolling themselves up into a ball. The oval foot extends the whole length. More than 200 species are known; they occur in all climates, most abundantly on rocks at low water, but some of them at great depths. The species found along the E. Amer. coasts are small, but some attain a considerable size.

Chit'tenden (MARTIN), a son of the following, b. in Salisbury, Conn., Mar. 12, 1769, grad. at Dartmouth in 1789. He was for several yrs. a judge in the courts of Vt., an M. C. from that State 1803-13, and gov. 1813-15. D. Sept. 5, 1841.

Chittenden (THOMAS), a statesman, b. at E. Guilford, Conn., Jan. 6, 1730. He was one of the founders of the State of Vt., of which he was chosen first gov. in 1778. Was several times re-elected. D. Aug. 24, 1797.

Chit'ty (JOSEPH), an Eng. writer on law, b. in 1776, and called to the bar in 1816. Wrote *Pleadings and Parties to Actions*, a *Treatise on Med. Jurisprudence*, and *Gen. Practice of the Law in all its Depts.* D. 1841.

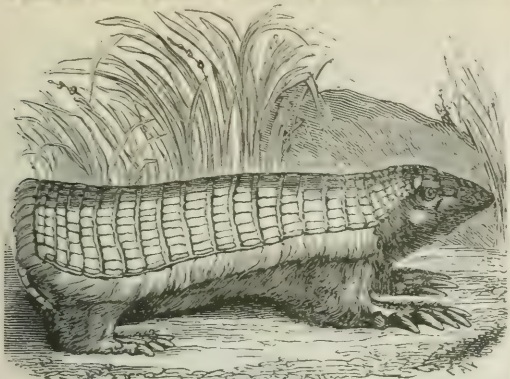
Chivalry, shiv'al-re [*Fr. chevalrie*, from *cheval* (Lat. *caballus*), a "horse"], a term applied to the system or dignity of knighthood, but originally denoting a body or assembly of knights or horsemen. The word has the same etymology as *cavalry*, and in it. and Sp. the same term is used for both. C. may be more fully defined as a peculiar inst. originating in the Middle Ages, and including with the rank and dignity of knighthood all those customs, manners, and sentiments which were deemed appropriate to a noble and accomplished knight.

Chives, chivz, or **Cives** (*Allium Schoenoprasum*), a plant of the same genus with the onion, a perennial, 6 inches to 1 ft. in height, with very small, flat, clustered bulbs. The leaves are tubular and radical: the flower-stem is terminated by a cluster of bluish-red flowers. This plant grows wild in Europe, Asia, and W. N. Amer. C. are sometimes cultivated in kitchen-gardens, and are used for flavoring soups and dishes. Their properties are very similar to those of the onion. The part used is the young leaves. There are several varieties.

Chizerots and **Burins**, races in Fr. who are despised, living in the arrondissement of Bourg-en-Bresse, in the dept. of Ain. They are believed to be descended from the Saracens. Although industrious and prosperous, they, like the Cagots, are held in the utmost detestation by their neighbors. They are looked upon as covetous and malicious; they marry among themselves. From time immemorial they have been field-laborers, cattle-dealers, butchers, etc. Many of them are very good-looking.

Chladni (ERNST FLORENS FRIEDRICH), b. at Wittenberg, Ger., Nov. 30, 1756, was the founder of the science of acoustics. Wrote a *Treatise on Acoustics*. D. Apr. 3, 1827.

Chlamydophoridae Gr. χλαμύς, a "cloak," and φέρω, to "carry," a family of edentate mammals of S. Amer., related to the armadillos, but differing in being covered with a shell of square plates on the head, neck, and back, with



Chlamydophorus.

another similar shell on the posterior extremity. Its tail is carried under its belly. There are 2 known species, of which one is the *Chlamydophorus truncatus*, called picichico by the natives.

Chlamydosaurus. See FRILLED-LIZARD.

Chloral, klō'al, a name composed of the first syllable of *chlorine* and the first syllable of *alcohol*, designating a liquid composed of chlorine, carbon, hydrogen, and oxygen, obtained by the action of chlorine on absolute alcohol. With water it forms a solid hydrate known as C. hydrate or hydrate of C. This article is now much used in med. as a hypnotic. It enters the circulation, and is, by the alkalies contained in the blood, converted into formic acid and chloroform. The chloroform doubtless is the prin. source of the hypnotic effect of the med. The dose is from 20 to 40 grains to an adult. Much larger doses have been given with no bad results, but well authenticated fatal cases of C. poisoning indicate the necessity of caution in its use. The sleep produced by C. is wonderfully sweet and refreshing to most patients. C. sometimes increases hysterical symptoms, and unless well diluted is irritant to the stomach. It is peculiarly valuable in tetanus. Given in large doses, C. powerfully diminishes reflex action, and is a physiological antidote in poisoning by strychnia.

Chlorate, a salt of chloric acid. Potassium C. is the best known salt. With combustible substances, such as sulphur, charcoal, etc., it forms highly explosive mixtures, which ignite by a blow or by friction. It is also a useful med.

Chlorhydric Acid. See HYDROCHLORIC ACID.

Chloric Acid, one of the acids of chlorine. It contains 1 atom of hydrogen, 1 of chlorine, and 3 of oxygen. It forms chlorates. (See CHLORATE.)

Chloride, a binary compound of chlorine.

Chloride of Lime, or bleaching-powder, is produced by causing chlorine gas to be absorbed by slaked lime. It consists of calcium hypochlorite and calcium chloride. To the former salt it owes its powerful bleaching and deodorizing properties.

Chlorine [from the Gr. χλωρός, "pale green"], a non-metallic gaseous chemical element, discovered by Scheele in 1774. It occurs in common salt, sodium chloride, also combined with potassium, calcium, magnesium, etc., chiefly in solution in sea and others waters. It is prepared by the action of hydrochloric acid on manganese dioxide, by heating cupric chloride, etc. It is a heavy, yellowish-green gas, having a suffocating odor. It is not combustible, supports the combustion of hydrogen and many metals, but not of carbon. It is easily liquefied by pressure, and dissolves in water. It is a powerful disinfectant, but cannot be used in hospitals and vessels, as it attacks metals and fabrics. It is a powerful bleaching agent, both in solution in water and in the form of gas, and is extensively used for cotton, linen, and paper stock. It is usually applied in the form of bleaching-powder, "chloride of lime." (See BLEACHING.) It cannot be used for silk or straw. When breathed it has a most irritating action on the lungs and air-passages. With hydrogen alone it forms hydrochloric acid; with hydrogen and oxygen it forms hypochlorous, chlorous, chloric, and perchloric acids. C. F. CHANDLER.

Chloroform [a term derived from the first syllable of *chlorine* and the first syllable of *formyl*]. It is a remarkably limpid, volatile, mobile, colorless liquid, which has a characteristic odor and an agreeable sweetish taste. It dissolves camphor, amber, resins, wax, caoutchouc, iodine, and bromine, as well as many alkaloids. The employment of C. as an anæsthetic has already been considered under ANÆSTHESIA; but it may be here observed that numerous cases of death from its use have occurred, even when administered by skillful phys. It is sometimes administered by the stomach as an anodyne, and when applied to the surface of the body is a powerful blistering agent, very useful as a derivative.

Chlorophyl, klō'ro-fil [from the Gr. χλωρός, "green," and φύλλον, a "leaf"], the green coloring-matter of the leaves of plants. It is soluble in alcohol, but insoluble in water, and is somewhat similar to wax. Light is indispensable to its formation, and hence arises the phenomenon of blanching which occurs when plants are deprived of light. It is also called endochrome, especially in the lowest orders of plants.

Chloroxylon [from the Gr. χλωρός, "green," and ξύλον,

"wood"], a genus of plants of the order Cedrelaceæ, its fruit having only 3 cells and splitting into 3 parts. C. *Swietenia* is the satin-wood of India, a tree which grows about 60 ft. high. The satin-wood is exported, and is used by cabinet-makers and brush-makers.

Choate, chōt (RUFUS), LL.D., an advocate and orator, b. in Essex, Mass., Oct. 1, 1799. Both his parents were distinguished for quickness of intellect as well as weight of character. He entered Dartmouth in 1815. He commenced the study of law at Cambridge, and subsequently studied under the distinguished orator and lawyer, Wm. Wirt, then U. S. atty.-gen. at Wash. He began the practice of law in his native State at Danvers, whence he removed to Salem and afterward to Boston. While at Salem he was elected to Cong. (1832), and later (1841) he was chosen Senator as successor to Mr. Webster, who had been appointed sec. of state under Pres. Harrison. After Webster's death Mr. C. was the acknowledged leader of the Mass. bar. D. July 13, 1859. (See *Works of Rufus Choate*, with a *Memorial of his Life*, by S. G. Brown.)

Cho'card, or Choquard (*Pyrrhocorax*), a bird of the family Corvidæ, differing from the chough in having a shorter bill, but resembling it in its habits. The only European species is the alpine C. called alpine chough and alpine crow. It is about the size of a jackdaw, of brilliant black, with yellowish bill and red feet.

Chorilus, ker'e-lus (Gr. Χορίλος), an Athenian tragic poet who flourished about 500 B. C. He was a competitor of Eschylus in a tragic contest, and gained prizes for 13 of his dramas. None of his works are extant.

Chorilus of Iassus, an inferior poet, was an attendant of Alexander on his march to the E., and sought to flatter him by his verses. To him, according to the scholiast on Horace, Alexander said, "He would rather be the Thersites of Homer than the Alexander of Chorilus."

Chorilus (or Choril'us) of Samos, b. about 470 B. C., was the author of an epic poem which treated of the wars of the Grs. with Darius and Xerxes. Only fragments of his works are preserved. He died in Macedonia, not later than 399 B. C.

Choiseul, de (ÉTIENNE FRANÇOIS), DUC DE CHOISEUL ET D'AMBOISE, a Fr. statesman, b. June 18, 1719. He gained the rank of lieutenant-general and was sent as ambassador to Vienna in 1756; became prime minister and favorite of Louis XV., but was removed in 1770. D. May 7, 1785.

Choke-cherry, the *Prunus Virginiana* and its fruit, a species of bird-cherry, a native of N. Amer., having small fruit in racemes; the fruit is rather agreeable, but astringent. The bark is used as a febrifuge and tonic, under the name of wild-cherry bark; and by distilling it with water a volatile oil is obtained, associated with hydrocyanic acid.

Choke Damp. See CARBONIC ACID.

Cholera, kol'e-ra [Gr., probably from χολή, "bile"], a disease characterized by purging and vomiting, followed by great prostration, and in many cases by fatal collapse. Comparatively mild cases occur with frequency even in temperate latitudes, and are known as sporadic C. or C. morbus; and such cases, though very distressing, are seldom fatal, while the more severe or epidemic form (known as Asiatic C.) appears to arise in India, where it is endemic, and to be carried by ships, caravans, religious pilgrimages, etc., westward to Egypt, Pers., and Ar., and thence to Europe and around the world by the regular channels of commerce. The disease is probably of miasmatic origin, and local conditions may favor or check its local development; whether the disease ought to be called contagious or not is one of the most warmly disputed points in med.

Without describing the various stages of the fatal disease—the premonitory painless diarrhœa, the alarming and profuse purgation which follows, carrying off the fluids of the body, the profound collapse, the reaction, with the dangerous febrile condition which may follow—it is enough to say that treatment should be chiefly preventive. No diarrhœa in a C. season should be neglected. Opium will usually control the precursory diarrhœa. During the active stage of the disease cold compresses to the bowels are sometimes useful. The administration of diffusive stimulants in small doses during the stage of collapse should be persisted in. Friction by the hand may relieve the spasm of the muscles. Great care should be taken for a long time lest a relapse should occur. The food of convalescents should be of the very lightest and blandest character for some days.

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Chol'era Infan'tum, or Acute Intes'tinal Catarrh'. This intense and dangerous form of infant diarrhœa is mostly found in hot climates, the hot season, and close air; more among the poor than the rich. The usual cause is improper feeding in hot weather. The former is a direct injury; the latter, by debilitating the nervous system and lowering the functions of all the digestive organs, diminishes the general strength and power of endurance. Nursing infants are but seldom affected; many infants will recover from an attack by being returned to the mother's or nurse's breast. Weaned infants, however, and such as are brought up on artificial food, are mostly attacked. The first passages in C. I. contain undigested food of all sorts, particularly lumps of coagulated milk, which is also brought up by vomiting. Afterward the passages are very thin, watery, of an acid or fetid smell, very copious and frequent; vomiting accompanies this diarrhœa, more or less. Moaning and crying are soon replaced by debility, and even complete collapse; the body is rapidly deprived of a large portion of the water contained in it, and emaciates; the eyes lie deep in the orbits; the sutures and fontanelles of the skull sink; the skin becomes dry, the feet and hands cold, while the temperature of the trunk is rising; the face looks shrunk and senile; the pulse becomes weak and frequent, the voice feeble, the expression of eyes and face listless, and stupor or coma or convulsions set in. Death is a frequent result. The prin. preventive consists in supplying the well infant

with proper artificial food when no breast-milk is available, and at regular times, and in attending to its general health. When the disease has made its appearance the prin. means of checking it are the following: during the first few (3-6-8) hours no food or drink ought to be given. The irritated stomach must be kept at rest; vomiting will cease on that condition only. After that time give a teaspoonful of ice-water or a small piece of ice (size of a bean), with or without a few drops of brandy, every 5 or 10 minutes, as long as the tendency to vomit persists. When feeding is to be recommended, avoid milk (except breast-milk) in whatever form. Barley-water, oatmeal gruel (strained), in tea or table-spoonful doses, now and then, with the white of eggs (1-3 in 24 hours), will readily be taken and well digested. Many cases will get well with this dietetical treatment. At the same time the air must be kept as cool and fresh as possible, day and night. The infant will recover faster out of than in doors. The medicinal treatment, which is, under all circumstances, the domain of a physician, varies according to the nature of the case. Mercurial remedies (calomel) can be avoided. Sub-nitrate of bismuth, with opium in small doses, and preparations of chalk, nitrate of silver, astringents, such as tannic or gallic acids, and catechu, are frequently resorted to, the latter principally in cases which threaten to become chronic. [From orig. art. in *J. s. Univ. Cnc.*, by PROF. A. JACOB, M. D.]

Cholera Morbus, acute gastro-intestinal catarrh in the adult. It is chiefly caused by errors of diet during the summer season, the stomach and intestines being irritated by indigestible food, acrid juices of fruits, or cold liquids at a time when the body is overheated. Vomiting, purging, paroxysms of painful colic, and physical prostration are the chief symptoms. Relief is obtained by anodynes, stimulants, warm enemata, and external use of mustard draughts and hot water.

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Cholestérin [from the Gr. *χολή*, "bile," and *στεαρ*, "fat"] was originally discovered in gall-stones, but is an ordinary constituent (in very minute quantity) of bile, blood, the tissue of the brain, and of pus and other morbid fluid products.

Chopin, sho-pan' (FRÉDÉRIC FRANÇOIS), a Polish pianist and composer, b. near Warsaw Mar. 1, 1809, removed to Paris about 1832. He composed concertos, waltzes, nocturnes, preludes, and mazurkas, and was one of the first of pianists. D. Oct. 17, 1849. (See LISZT, *Chopin*, 1852.)

Chorea, ko-rē'a [Gr. *χορεία*, a "dance"], or **St. Vitus's Dance**, a disease characterized by irregular, involuntary, and often grotesque muscular action, without appreciable organic change in any tissue, and generally without pain or any known derangement of mental action or of sensation. It is most common in children after the second dentition and before puberty; much more common in girls than in boys; sometimes attacks pregnant women and other adults, though some cases once called adult C. would now be recognized as locomotor ataxy, a very different disease. C. is sometimes hereditary, sometimes epidemic. Many writers have classed the dancing mania (the original "St. Vitus's dance"), tarantism, and the strange excesses of certain religionists (dervishes, Fr. prophets, "jumpers," and "convulsionists") all as varieties of C. Stammering has been called a C. of the vocal organs. The disease is sometimes associated with rheumatism and with anæmia. Such complications should receive special treatment. The metallic tonics are generally useful, and so are systematic gymnastics, life in the open air, and a kind and unobtrusive discipline, which shall teach the young patient the power of the will over the movements of the body.

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Chough, chuf (*Graculus*), a name used for species of the crow family. The beak is long, arched, and pointed.



Chough.

The Cornish C. (*G. eremita*) dwells on high cliffs in the Old World. The alpine C. is a *CHOCARD* (which see).

Chouteau, shoo-tō' (AUGUSTE and PIERRE), 2 brothers noted as the founders of St. Louis, Mo. They removed from New Orleans to the site of St. Louis in 1764. Auguste d. in 1829, and Pierre in 1849.

Christ [Gr. *Χριστός*; Lat. *Christus*], a word which was at first a title of our Saviour, now in gen. use as part of his name. It signifies *anointed*, and corresponds exactly in meaning and use with the Heb. word *Messiah*.

Christadelphians ("brothers of Christ"), a religious body in some parts of the U. S. They believe that the Creator will recall to immortal life all who love him in this life; all who have not caught the immortal principle perish in death. Chr., they believe, is the Son of God, deriving from the Deity moral perfection, but from his mother the common nature of Adam.

Christian II., king of Den., a son of John, b. July 2, 1481; began to reign in 1513. He usurped the throne of Swe., but was expelled by Gustavus Vasa in 1522. His Dan. sub-

jects also revolted, deposed him, and elected his uncle, Frederick I., in 1523. C. retired to Flanders, and returned with an army in 1531, but was defeated and kept in prison until his death, Jan. 25, 1559. (See BEHRMANN, *Kong Christian II. Historie*, 1815.)

Christian IV., king of Den., b. Apr. 12, 1577, was the son and successor of Frederick II., who d. in 1588. He became in 1625 the commander of the Prot. armies in the 30 Years' war against the emp. of Aus. In 1626 he was defeated by the imperialist gen. Tilly at Lutter. D. Feb. 28, 1648. (See RASMUS NYERUP, *Charakteristik af Kong Christian IV.*)

Christian VII., king of Den., b. Jan. 29, 1749, was a son of Frederick V. His mother was Louisa, a daughter of George II. of Eng.; began to reign in Jan. 1766; was so feeble and morbid that he was incapable of reigning. D. Mar. 13, 1808, and was succeeded by his son, Frederick VI., who had been regent since 1784.

Christian VIII., king of Den., b. Sept. 18, 1786, was a cousin of Frederick VI. He was chosen king of Nor. in 1814, but being unable to defend it against the invasion of Bernadotte, he abdicated in Oct. 1814. He succeeded Frederick VI. in Den. in 1839. D. Jan. 20, 1848, leaving the throne to his son, Frederick VII.

Christian IX., king of Den., a son of Friederich Wilhelm, duke of Schleswig-Holstein, b. Apr. 8, 1818. He ascended the throne Nov. 15, 1863, and was soon involved in a war against the Ger. confederation, which disputed the right of the king to incorporate Schleswig with Den. The Danes were defeated, and Christian IX., in Aug. 1864, ceded the duchies of Schleswig, Holstein, and Lauenburg to Aus. and Prus.

Christian Commission, or, more fully, **The United States Christian Commission**, an organization during the c. war, the object of which was to supplement the work of the Sanitary Commission, by caring for the spiritual welfare of the soldiers.

Christian Connection (or simply **Christians**), a denomination which arose in the U. S. early in the present century, composed originally of persons who seceded from the Meth., Bap., and Presb. chs., who finally united. They have no creed except the Bible; practice immersion, reject infant baptism, and invite all believers to their communion. As a rule, they are Unit. in doctrine. The denomination known as "Campbellites" and "Disciples" also style themselves "Christians."

Christianity (ISAAC P.), b. at Jamestown, Montgomery co., N. Y., Mar. 12, 1812; went to Monroe, Mich., in 1836, and was admitted to the bar in that place in 1838; was a delegate to the Free-Soil convention which nominated Martin Van Buren to the presidency, and was one of the founders of the Rep. party in Mich.; in 1857 was elected a judge of the supreme court of the State; was re-elected in 1865, and again in 1873. In Jan. 1875 he was elected U. S. Senator from Mich. Resigned Feb. 10, 1879.

Christian Era [Fr. *ère Chrétienne*], the great era from which Chr. nations compute their time, once supposed to correspond to the date of the birth of Chr. But, according to some of the best authorities, Chr. was b. about 4 yrs. before the commencement of our era. The practice of reckoning time from the supposed birth of Chr. appears to have been introduced in the 6th century, but did not become universal throughout Christendom until about the middle of the 15th century.

Christiania, kris-te-ah'-ne-a, the cap. of Nor., at the head of the Christiania Fiord, about 55 m. from the sea; lat. 59° 55' N., lon. 10° 43' E. It contains a cathedral, a citadel, a royal palace, an arsenal, a town-hall, an exchange, an asylum for lunatics, and a univ., which has a library of 150,000 vols. The harbor is closed by ice 3 or 4 months in the yr. It was founded in 1624, on the site of the burned city of Opslo. Pop. 1882, with communes, 122,036.

Christianity, krist-ye-an'-e-te [from the Gr. *Χριστιανός*, a "follower of Christ"], a system of religion which claims to be of divine origin, and to be founded upon immediate revelation from God. Its basis is the affirmation that there is one God, the Creator, Sovereign Ruler and final Judge of all things, who has revealed his will in the Holy Scriptures, and whose Son, Jesus Chr., is the Saviour of the world. For the different forms in which these cardinal principles have been developed, see the various Chr. denominations under their respective heads.

Christians (a religious denomination). See CHRISTIAN CONNECTION.

Christians of St. Thomas, an anc. Chr. sect of India, found especially along the Malabar coast. They claim to be descendants of converts made in India by the apostle Thomas, but are generally believed to have been converted by Per. missionaries in the early ages of the Ch. In 1599 the greater part were induced to unite with the Ch. of Rome, and at present about ¾ of their number are R. Caths., of whom more than ¼ have a Syriac ch.-service, while the remainder are of the Lat. rite. Those who are not united to the Ch. of Rome acknowledge the supremacy of the Jacobite patriarch of Antioch.

Christian Union Churches is the name adopted by a denomination which first came together in convention at Columbus, O., in 1863, though the organization was not completed until 1865. Their principles, as stated by themselves, are—(1) the oneness of the Ch.; (2) Chr. the only head; (3) the Bible the only rule of faith and practice; (4) good fruits the only condition of fellowship; (5) the repudiation of controversy; (6) each local ch. governs itself; (7) no preaching of partisan politics. Their motto is, "In things essential, *unity*; in non-essentials, *liberty*; and in all things, *charity*." They practise baptism as a condition of membership, but are practically unrestricted in their communion. They have about 30,000 members and an adherent pop. of about 150,000, principally in O., Ind., Mich., Ia., Ill., Mo., Ark., Tex., Neb., and Kan.

Christina, kris'tee-nä, queen of Swe., b. Dec. 6, 1626, was the only surviving child of Gustavus Adolphus. She received a solid and masculine education, and learned Lat., Gr., Heb., politics, etc. She succeeded her father in 1632 under the regency of Oxenstierna. In 1644 she assumed royal power, and in 1648 concluded the treaty of Westphalia, by which Pomerania was annexed to Swe. Her mind was strong and her character eccentric. Her subjects wished that she should choose a husband, but she manifested a constant aversion to marriage. In 1650 her cousin, Charles Gustavus, was designated as heir to the throne by the states of Swe. with the assent of the queen. In June 1654 she abdicated, reserving supreme power over her suite and household, embraced the R. Cath. religion, and became a resident of Rome. In 1657 she caused her grand equerry, Monaldeschi, to be put to death for treason. It is said she wished to recover the crown when the king d. in 1660, but she did not succeed. D. Apr. 19, 1689. (See ARCHENHOLZ, *Memoirs of the Life of Christina*, Stockholm.)

Christlieb (THEODOR), D. D., b. in Würtemberg in 1833, studied at Tübingen, taught in Fr. and became a preacher in Lond., and pub. *Modern Doubt and Chr. Belief*. In 1868 became univ. preacher and prof. of theol. at Bonn. In 1873 he visited the U. S. as a delegate of the Evangelical Alliance. Here he delivered an address of great ability upon the rationalism of the present day.

Christmas, kris'mas [so called because an especial mass, the "mass of Christ," was celebrated on that day; Fr. *Noël*; Ger. *Weihnachten*; It. *Natale*, i. e. "birthday"], the day on which the birth of the Saviour is celebrated. The observance of the 25th of Dec. is ascribed to Julius, bp. of Rome, A. D. 337-352. The E. Ch. had previously observed the 6th of Jan. in commemoration both of the baptism and of the birth of Chr. Before the end of the 4th century the E. and the W. had exchanged festivals, the W. adopting Jan. 6 in commemoration of our Lord's baptism, and the E. adopting Dec. 25 in commemoration of our Lord's birth. Among the causes that operated in fixing this period was the fact that most heathen nations regarded the winter solstice as the beginning of the renewed life and activity of the powers of nature. C. is now observed, more or less religiously, by all or nearly all Chr. chs. (See CASSELL, *Weihnachten*, Ursprung, Brauche und Aberglauben, 1892.)

Christmas Carols [Fr. *carole*; It. *carola*, a "round dance," perhaps from the Lat. *corolla*, a "ciclet"; Welsh, *corols*, to "dance," the name being thence applied to the music or song accompanying such a dance]. The word carol signifies a song of joy. The practice of singing sacred songs in celebration of the nativity of Chr. as early as the 2d century is considered as established. C. C. are believed to have been devised as a substitute for the songs of the old heathen festivals.

Christophe, krēs'tof' (HENRI), a negro king of Hayti, b. Oct. 6, 1767. He joined in 1790 the insurgents who were fighting against the Fr., and early in 1811 was made king of Hayti and crowned in 1812 as Henri I. He instituted orders of nobility with such titles as duke of Marmalade and count of Lemonade. Unable to quell a rebellion of his subjects, he killed himself Oct. 8, 1820. Boyer succeeded him.

Christopher, PORZ, deposed and succeeded Leo V. in 903, and was himself deposed and put to death in the following year. He was succeeded by Sergius III.

Christopher, SAINT, a native of Syria or Pal., supposed to have suffered martyrdom about 250 A. D. Many wonderful legends are told of his gigantic size and his miraculous deeds, but modern antiquaries are disposed to doubt whether this popular hero ever existed.

Chromate of Lead, a fine yellow pigment often called chrome yellow, extensively used by painters.

Chrome. See CHROMIUM.

Chrome Green, an oxide of chromium useful in coloring porcelain and enamel. Also a mixture of C. yellow and Prus. blue, which is used as a pigment and for printing bank-notes.

Chrome Yellow. See CHROMATE OF LEAD.

Chromic Acid, a compound of chromium trioxide with water. It forms several colored compounds, which are used as pigments or dyes. Among these are the chromate and bichromate of potash and the chromate of lead. The ruby derives its color from this acid. C. A. is used in surgery as a caustic.

Chromic Iron, or **Chro'mite**, is the most abundant ore of chromium, and is found in the Shetland Isles, Scot., Fr., Md., Pa., and in other regions. It is composed chiefly of the oxides of chromium and iron.

Chromium, or **Chrome** [from the Gr. *χρῶμα*, "color"], a metal discovered by Vauquelin in 1797, and so named from the many colored compounds it produces. C. is not used in a metallic or separate state, but several of its compounds are valuable pigments and dyestuffs. The oxide of C., which is green, is useful in enamel-painting. The chromate and bichromate of potash are salts largely used by dyers and calico-printers.

Chronograph, kron'o-graf [Gr. *χρόνος*, "time," and *γράφω*, to "write"], in astron., an instrument for recording time by means of an electro-magnet. The record is made on a sheet of paper stretched on a cylinder which is revolved uniformly by clock-work. The recording pens, of which 2 are used, are moved uniformly in the direction of an element of the cylinder. One of the pens, under the control of the clock, records the beat of the clock, and the other, under the control of the observer, is made, by means of a portable key, to record the instant at which the observation is made. The cylinder revolves once in a minute, and the record is made along a spiral reaching from one end of the cylinder to the other. W. G. PEARCE.

Chronology [from the Gr. *χρόνος*, "time," and *λόγος*, a "treatise"] is the science of the dates of events in hist. Mathematical C. deals with units of time. In historical C. dates are fixed by their distance from some arbitrary point

of time, usually chosen because of some remarkable occurrence which signaled it. Such a point, or epoch, forms the beginning of an era. The mathematical or astronomical units of time have not been the only units used in historical C. In early times vague periods, as "a generation" or the life of leading persons in a nation, such as kings, were assumed as units in C. The era of the Grs. began with the yr. of the Olympiad in which Corebus was victor, being the first of those games at which the victor's name was recorded (776 B. C.). From this point the Grs. reckoned time by Olympiads or periods of 4 yrs. The Romans reckoned from the founding of the city (753 B. C.), which is believed the first fixed point from which time was ever computed. The Mohammedan era commences with the flight of Mohammed (622 A. D.), called the Hedjra. The Rom. and Gr. methods of recording time continued in use long after the birth of Chr. After 312 A. D. the authorized system in the Rom. empire was by indictons, periods of 15 yrs., and this mode was at one time almost universal in the W., though the Olympiads were followed in the E. till 440 A. D. The Chr. era, first proposed in 527 A. D., is now universally used in Christendom (except among the Oriental Chrs., many of whom profess to reckon time from the creation). The Chr. era is attended by this inconvenience, that we must count backward for the dates of occurrences prior to the birth of Chr.

Of sacred C. there have been various schemes. In these the epochs are the Creation of the World and the Flood, but the MSS. of the Bible do not agree as to the dates of these events. The C. of Ussher reckons 4000 yrs. from the creation to the birth of Chr., and to the flood 1656 yrs.; the Samaritan makes the former much longer, though it counts from the creation to the flood only 1307 yrs.; the Septuagint removes the creation of the world to 6000 yrs. before Chr., and 2250 yrs. before the flood. These differences have never been reconciled. It is now, however, universally admitted that the first chapter of Genesis leaves the period of the creation quite indefinite, and the most generally approved scheme interprets the *days* of creation as periods of indefinite length. (Manuals of C. have been written by IDELER, BRINCKMEIER, BEAIRE, and L'ECLUSE.)

Chronometer [Gr. *χρόνος*, "time," and *μετρον*, a "measure"], a watch of great accuracy, used in astron. instead of an astronomical clock. The C. differs from an ordinary watch in the form of escapement and in the method of constructing the balance-wheel, which is compensated with respect to the effect of temperature on the wheel itself, and also with respect to its action on the hair-spring.

Chronoscope [from the Gr. *χρόνος*, "time," and *σκοπέω*, to "see"], an instrument invented in 1835 by Wheatstone for measuring the duration of the electric spark. It consisted essentially of a plane mirror revolving with a high but known velocity, the elongation of the image of the spark as seen in this mirror furnishing the measure of the duration. In 1858 Feddersen substituted a concave for the plane mirror, with better results. In 1867 Rood replaced the concave mirror by a set of achromatic lenses and a plane mirror, and succeeded in measuring intervals of time as small as 40 one-billionths of a second. A chronoscopic apparatus was constructed by Fizeau for measuring the velocity of light. In this there was employed a rotating circular disk with sectors alternately open and closed. A ray from a luminous source transmitted through one of the open sectors, and reflected back from a distant mirror, is, with a certain velocity of rotation, intercepted by a closed sector, and with a higher velocity is transmitted through the next following open sector.

Chrysalis, kris'a-lis [Gr. *χρυσάλλis*, from *χρῶς*, "gold,"], a name originally applied to those pupæ of butterflies which have golden-yellow spots, but extended to the pupæ of lepidopterous insects generally, and even to those of other orders. The chrysalides of lepidopterous insects are enclosed in a horny case, sometimes angular, sometimes round, generally pointed at the posterior end, sometimes at both ends. Before the caterpillar goes into this state it often spins a silken cocoon, with which foreign substances are sometimes mixed, in which the C. is concealed. Chrysalides are often suspended by cords, and generally remain nearly at rest; some bury themselves in the earth. Most of them have at least a slight power of motion.

Chrysanthemum [from the Gr. *χρῶς*, "gold," and *ἄνθεμον*, a "flower"], a genus of herbs and shrubs of the order Compositæ, tribe Senecionideæ. The species of this genus are annuals, perennials, or shrubby, and all have leafy stems. They are natives chiefly of the temperate parts of the Old World. C. *carinatum*, an annual species with white ray florets and dark-red disk, a native of Barbary, is frequently cultivated. C. *indicum*, the Chi. C., a native of E. Asia, has long been cultivated as an ornamental plant. Its colors are various—red, lilac, rose-color, white, yellow, orange, or variegated. It flowers in autumn and winter, is easy of cultivation, and is easily propagated by cuttings, suckers, or parting the roots.

Chrysippus [Gr. *Χρυσίππος*], an eminent Stoic philos., b. at Soli, in Cilicia, in 280 B. C., was a son of Apollonius of Tarsus. He was a pupil of Cleanthes, and was distinguished for his skill in dialectics and his subtlety as a disputant. He wrote a great number of works, none of which are extant. D. 207 B. C.

Chrysoberyl [from the Gr. *χρῶς*, "gold," and *βήρυλλος*, "beryl"], a gem of green color inclining to yellow, semi-transparent, with a double refraction. Some specimens exhibit a beautiful opalescent play of light.

Chrysolite [Gr. *χρυσόλιθος*, from *χρῶς*, "gold," and *λίθος*, a "stone"]; Fr. *chrysolite*, a transparent crystalline silice, magnesia, and protoxide of iron, of a fine green color, used as an ornamental stone, but not highly valued.

Chrysoprase [Gr. *χρυσοπράσιος*, from *χρῶς*, "gold," and *πράσιον*, a "leek," from its peculiar tint], a very rare variety of chalcedony. It is of a fine apple-green color in choice specimens, but inferior ones exhibit other shades.

The C. of the anc. is not certainly identified by modern authorities.

Chrysostom (Gr. χρυσόστομος (*i. e.* "golden-mouthed") (JOHN), the most accomplished orator of the anc. Gr. Ch. b. at Antioch in Syria about 347 A. D. Quitting the legal profession, upon which he had entered, he was ordained deacon by Bp. Meletius in 381, and presbyter by Bp. Flavian in 386. His fame as a preacher spread throughout Christendom. On Feb. 26, 398, he was consecrated abp. of Constantinople. His boldness as a reformer brought him into trouble. In 404 he was banished. He was little of stature, with a large, bald head, hollow cheeks, and deep sunken eyes. The best ed. of his works is the Benedictine. D. Sept. 14, 407. (See STEPHENS, *Life of Chrysostom*, 1872.)

Chub (*Leuciscus cephalus*), a European fish of the family Cyprinidae, which sometimes attains a weight of 5 lbs. or more. It is not in great esteem for the table, but as it rises well at a fly and takes freely a variety of baits, is a popular angle-fish. The name is erroneously applied to various fishes in the U. S.

Chuck-Will's-Widow (*Antrostomus Carolinensis*), a species of Caprimulgidae, native of the S. parts of the U. S., which has received the name from its note.

Chunam, the name of a fine quicklime made in India from calcined shells or from very pure limestone, and used for chewing with betel; also used for cement and plaster. When C. is used for plaster it is mixed with fine river sand and thoroughly beaten up with water; coarse sugar and eggs are sometimes added.

Chuisaca, choo-ke-sah-kah (golden bridge), **Su'ere**, or **La Pla'ta**, at present the seat of government of Bolivia, is on a plateau near the Andes, 9343 ft. above the sea. It has a cathedral, a president's palace, a univ., a coll., and several monasteries. Pop. 23,979.

Church [from the Gr. κυριακόν, *i. e.*, the "Lord's house" (from κύριος, the "Lord"); A.-S., *cyric* or *circ*; Ger. *Kirche*; Scot. kirk; Lat. *templum*; Fr. *église*; Sp. *iglesia*; It. *chiesa*]. The primary signification of the Eng. word church is the "house of the Lord"; it came afterward to denote a collective body of Chrs. meeting in such a house for worship, and also the entire body of Chr. people, as when we speak of Chr. as "the Head of the Church." In this last sense it corresponds to the Gr. ἐκκλησία, (Lat. *ecclesia*, whence the Fr. *église*, Sp. *iglesia*, and It. *chiesa*), from ἐκκαλέω, to "call out," to "summon," to "assemble."

Church (ALBERT E.), LL.D., a math., b. in Salisbury, Conn., 1807, graduated at the U. S. Military Acad. 1828. He served 10 yrs. in the army, and was prof. of math. at the Military Acad. for 40 yrs. He was an eminent teacher, and pub. many valuable works. D. Mar. 30, 1878.

Church (Rev. ALONZO), D. D., LL.D., a Presb. divine, and pres. of the Univ. of Ga. from 1829 to 1859. He was a native of Vt. and a grad. of Middlebury Coll.

Church (BENJAMIN), a famous Indian fighter, b. in Plymouth (now in Mass.) 1639. He commanded the colonists in the battle in which King Philip was slain. He also led 5 expeditions against the Fr. and Indians in Me.; removed in 1674 to Little Compton, R. I. D. Jan. 17, 1718.

Church (FREDERICK EDWIN), a landscape-painter, b. at Hartford, Conn., May 14, 1826. Produced *View of Niagara Falls from the Canadian Shore*, *The Heart of the Andes*, and *Jerusalem*.

Church (SAMUEL), LL.D., a jurist, b. at Salisbury, Conn., in 1785, grad. at Yale in 1803; was judge of probate, judge of the superior court in 1833, and chief-justice of Conn. 1847-54. D. Sept. 12, 1854.

Church (SANFORD E.), LL.D., a jurist, b. in Milford, Otsego co., N. Y., Apr. 18, 1815, studied law, and rose to prominence in his profession. He was chosen lieut.-gov. of the State of N. Y. in 1850, and again in 1852, and comptroller in 1857. In 1870 was elected chief judge of the court of appeals, which position he held till his death. D. May 14, 1880.

Church History. See ECCLESIASTICAL HISTORY, by PROF. PHILIP SCHAFF, S. T. D., LL.D.

Churchill (CHARLES), an Eng. poet and satirist, b. at Westminster in Feb. 1731. In 1758 he succeeded his father as curate at St. John's, Westminster. His parishioners were scandalized by his dissipated and licentious habits and by his negligence of his duties. He produced in 1761 *The Rosciad*, a satire on theatrical managers and performers. About this time he quitted the profession of clergyman. He defended himself against certain critics by a poem entitled *The Apology*. Wrote *The Prophecy of Famine*, a satire on the Scots; *Gotham*, and *The Author*. D. Nov. 4, 1764. (See TOOKE, *Life of Churchill*.)

Church Methodists. See PRIMITIVE WESLEYANS.

Church of England and Wales. See ENGLAND. CHURCH OF, by REV. BEVERLEY R. BETTS.

Church of God, a denomination organized at Harrisburg, Pa., in 1830. They hold the Bible to be a revelation from God; believe in the Trinity, a vicarious atonement, human depravity, and the freedom of the will. They baptize adults only, and by immersion; invite all believers to the Lord's Supper, and maintain that the washing of the feet is one of the divine ordinances.

Church of Scotland. See SCOTLAND, REFORMED CHURCH OF, by DAVID INGLIS, LL.D.

Church of Scotland, Free. See FREE CHURCH OF SCOTLAND, by DAVID INGLIS, LL.D.

Churubusco, choo-roo-boos'ko, a v. about 6 m. S. of the city of Mex., where the Mex. under Santa Anna was defeated, Aug. 19-20, 1847, by the Amers. under Gen. Scott. Simultaneous with this action was fought a battle at Contreras, about 8 m. distant, the 2 forming parts of one gen. plan of operations. The Amer. loss was 1053 killed and wounded; the Mex. lost 4000 killed and wounded, 3000 prisoners, and 37 guns.

Chytraeus, ke-trä'us (DAVID KOCHHAFF), a Ger. theol., b. in Swabia Feb. 26, 1530, was a scholar of Camerarius and Melancthon, prof. at Rostock, and member of the Diet of

Augsburg, of which he wrote an account (1576), and various other religious conferences. He was one of the framers of the *Formula Concordiae*, and wrote *Chronicon Saxonie*, and *De Lectione Historiarum*. D. June 25, 1600.

Ciald'ni (ENRICO), an It. gen., b. in Modena Aug. 8, 1811. He entered the Sp. army in 1835, and fought in several campaigns against the Carlists. He served Victor Emmanuel as a gen. in the Crimean war 1854-55, fought the Aus. at Palestro in 1859, and took Gaeta in Feb. 1861. He accompanied Amadeo as ambassador extraordinary to Madrid, and was ambassador in Paris 1876-81.

Cibber (COLLEY), an Eng. dramatist and actor of Ger. extraction, b. in Lond. Nov. 6, 1671. He began to act comedies in 1689. Wrote *Love's Last Shift*, or *the Fool in Fashion*, and *An Apology for the Life of Colley Cibber*. In 1730 he was appointed poet-laureate. D. Dec. 12, 1757.

Cica'da (Gr. τέττις), the Lat. name of a well known European insect, called also **Cica'la** [It.], which gives its name to a genus of Hemiptera noted for the shrill noise which it makes. The C. of the anc. classic poets was chiefly admired for its shrill song. The C. frequent shrubs and trees, and feed on their juices, having an apparatus for piercing the bark and sucking out the juice or sap. Their organ of sound is situated on each side of the under and anterior part of the abdomen. C. abound in tropical and sub-tropical regions. They mostly have transparent and veined wing-covers. We have several species of C. in the U. S., of which the best known is the "17-year locust," *C. septendecim*. The C. *canicularis* is a well known species with a W-shaped mark on the back. Its appearance was once said to be a forerunner of wars.

Cicely, sis'e-le (*Myrrhis*), a genus of umbelliferous plants, of which one species, sweet C. (*Myrrhis odorata*), is common in Central and S. Europe and in Asia, but in G. Brit. it appears to have been introduced. It is a branching perennial, 2 ft. high or upward, with large triply pinnate leaves and pinnatifid leaflets, somewhat downy beneath; the fruit and the whole plant powerfully fragrant, the smell resembling that of anise. The seeds, roots, and young leaves are used in soups, etc. The plant was formerly much in use as a medicinal aromatic. The U. S. have at least 4 wild plants somewhat resembling the above—the rough and the smooth sweet C., *Osmorrhiza brevistylis* and *longistylis* of the Atlantic States, and *Myrrhis occidentalis* and *Osmorrhiza nuda* of the far W. The roots are sometimes eaten, having an agreeable taste, but several poisonous umbelliferous plants closely resemble C., and caution should be observed in gathering it.

Cicero (MARCUS TULLIUS), an illustrious Rom. orator, author, and statesman, b. at Arpinum (now Arpino), about 70 m. E. S. E. of Rome, on Jan. 3, 106 B. C. He is often called TULLY by Eng. writers. He was liberally ed. by his father, an opulent eques of the same name, and became deeply versed in Gr. lit. and philos. His constitution was naturally delicate, his disposition genial and amiable, his habits temperate and exemplary. In the yr. 91 he assumed the manly gown (*toga virilis*), and began to study law. According to Plutarch, "he was regarded as the best poet as well as the greatest orator in Rome." At the age of 25 he began to plead in the Forum, and, according to the custom of Rom. advocates, his services were always gratuitous. In 75 B. C. he obtained the office of quaestor, the first step in the gradation of public honors, and it was decided by lot that he should perform the duties of quaestor in Sic. The integrity, moderation, and humanity of his official conduct excited gen. admiration among the people of Sic. In the yr. 74 he returned to Rome, and soon rose to the foremost rank in his profession. His chief forensic rival was Hortensius. C. excelled in sarcasm and witticisms, with which he often seasoned and enlivened his orations and arguments. It was his habitual practice to act as counsel for the defence in criminal trials, but he deviated from this rule in the case of Caius Verres, who was prosecuted by the Sics. in 70 B. C. for nefarious acts of cruelty and rapine. He was elected ædile in 69, and in that capacity had the charge of the temples and public edifices. In 66 he was elected prætor, the next office in the ascending scale of public honor. The duty of prætors was to preside as judges over the highest courts. In 64 he and C. Antonius were elected consuls. C. entered upon the office on Jan. 1, 63, at a time when the republic was in a critical condition in consequence of the prevalence of corruption, sedition, and treasonable designs, and now defeated the conspiracy of Catiline. He incurred, however, the enmity of many persons by the capital punishment of Lentulus, Cethegus, and other accomplices of Catiline. In 62 he returned to the senate as a private individual. He opposed the triumvirs Cæsar, Crassus, and Pompey, whose coalition he considered to be dangerous to the peace and liberty of the state, and he endeavored, without success, to detach from that coalition Pompey, who was his personal friend. In 59 his malignant enemy Clodius obtained power as tribune of the people, and proposed a law "that whoever has put to death a Rom. citizen without due trial shall be interdicted from fire and water." As the consuls were hostile to him, he went into exile in Apr. 58 B. C. A law was then speedily enacted to interdict C. from earth and water, and his house on the Palatine Hill was burned by Clodius. The excessive violence of his enemies tended to produce a speedy and strong reaction. The new consuls and tribunes elected for the yr. 57 were friendly to C., and in Aug. 57 a bill for his restoration was adopted by an overwhelming majority of the voters, who had come from various parts of It. to the *comitia centuriata* at Rome. Between 57 and 52 he found leisure to write two important works, entitled *De Republica* and *De Legibus*.

For a term of 1 yr. (51 B. C.) he acted as proconsul or gov. of Cilicia and Pisidia, where his administration was a model of moderation, purity, and probity. He returned to It. in the yr. 50, and found that a c. war was imminent between Cæsar and the senate. He hesitated whether he should take

an active part in the coming contest, and wished to act as a mediator, but eventually he joined the army of Pompey, who fought for the senate. After the battle of Pharsalia (Aug. 48 B. C.) Cato offered the command of the army to C., but he declined it, and, returning to It., submitted to the power of Cæsar, who treated him with clemency. In the ensuing period of 3 or 4 yrs (47-44) he produced numerous works on philos. and rhetoric, which are admirable monuments of his profound and varied learning as well as of his immense mental activity. As a philos. he preferred the principles of the New Acad. In the yr. 45 he lost his accomplished daughter Tullia, whom he regarded with the fondest affection. He approved the assassination of Cæsar, and denounced the conduct of Mark Antony in a series of orations called *Philippics*, the first of which was spoken in the senate in Sept. 44. For a few months in the yr. 43, while Octavius co-operated with the senate against Antony, C. was the most prominent statesman in Rome; but the republican cause was soon ruined by the coalition of Octavius with Antony and Lepidus. C. was proscribed by them, and was killed by the soldiers of Antony near his Formian villa, in Dec. 43 B. C. He left one son, Marcus Tullius. The moral character of C. is admitted to be excellent even by those who censure his public conduct. His worst foible was vanity, exhibited in a habit of self-laudation. According to Niebuhr, "The predominant and most brilliant faculty of his mind was his wit. In what the Fr. call *esprit*—light, unexpected, inexhaustible wit—he is not excelled by any of the ancients." As an orator he surpassed all the ancients, except Demosthenes. His *Letters*, of which more than 800 are extant, are models of exquisite Latin, and are highly prized for the light which they throw on the hist. and antiquities of the Rom. republic. Among his works which remain entire are about 50 orations and 7 treatises. (See PLUTARCH, *Life of Cicero*, and W. FOSTER, *Life of M. T. Cicero*.) WILLIAM JACOBS.

Cicero (MARCUS TULLIUS), the only son of the preceding, was b. in 65 B. C. He is said to have been dissipated, indolent, and intemperate. In the yr. 49 Pompey gave him the command of a squadron of cav. Having been appointed a military tribune by Brutus in 44 B. C., he defeated C. Antonius, and did good service in the Macedonian campaign. By the favor of Octavius (Augustus) he became consul in the yr. 30, and was gov. of Asia (Syria) in 29-28.

Cicero (QUINTUS TULLIUS), a brother of Cicero the great orator, b. about 102 B. C., was elected prætor for the year 62; in 55 was appointed legate (*legatus*) to Cæsar, whom he attended in an expedition to Brit., and in 54 commanded a legion, and defended his camp with success against the attack of a large army of Gauls. In the C. war he took arms for the senate against Cæsar, but he made his peace with him in 57 B. C. He was proscribed by the triumvirs, and killed in 43 B. C.

Cicuta, the anc. Lat. name of the *Conium maculatum* (hemlock), a poisonous plant which was used at Athens as means of capital punishment. This is the plant which is popularly called C. in the U. S. and Europe. C. is also the name of a genus of umbelliferous plants which are poisonous. The *C. maculata* (spotted cowbane) grows in swamps in the U. S. Its root is a very deadly poison. Other equally poisonous species grow in the U. S. and in Europe.

Cid [Ar. *seid*, a "lord"], surnamed EL CAMPEADOR (the "champion"), the most celebrated national hero of Sp., was a Castilian whose proper name was RODRIGO (or RUY) DIAZ DE BIVAR, b. at Burgos about 1040. He became commander of the army of Sancho II. of Castile, who reigned from 1065 to 1072. About 1085 he was banished by Alfonso VI. Even while in exile he was the commander of a retinue of knights and vassals, and he waged war with success against several princes. He gained a victory over the Moors, and became sovereign of Valencia in 1094. D. 1099. (See R. SOUTHEY, *Chronicle of the Cid*, 1808.)

Cider [Fr. *cidre*; It. *cidro*], the fermented juice of apples. It contains from 54 to 10 per cent. of alcohol, and is intoxicating when drunk in large quantities. C. quickly turns sour, becoming *hard C.* owing to the development of acid, and great difficulty is experienced in the attempt to keep it sweet; is much used in the manufacture of VINEGAR (which see, for PROF. C. F. CHANDLER, LL.D.).

Cilicia [Gr. *Κίλικία*], an anc. division of Asia Minor, bounded N. by Mt. Taurus, E. by Mt. Amanus, S. by the Mediterranean, W. by Pamphylia. The surface is partly mountainous and partly occupied by fertile plains adjacent to the sea. In early ages C. was an independent kingdom. It was afterward a part of the Per. empire, and was reduced to a Rom. prov. in the time of Pompey.

Citley (JONATHAN), a lawyer and politician, b. at Nottingham, N. H., July 2, 1802, grad. at Bowdoin Coll. 1825; admitted to the bar of Me. in 1829, was elected to Cong. in 1837, and Feb. 24, 1838, was killed in a duel by William J. Graves of Ky. The combatants fought with rifles, 80 yards apart, and fired 3 times each. C.'s friends declared the duel to have been unfairly conducted.

Cimbri [Gr. *Κίμβριοι*], a people of anc. Europe who were regarded as Gers. by Cæsar and Tacitus, and by most moderns; others suppose that they were Celtic, and that C. is another form of *Cymri*. In 113 B. C. the C. and Teutones issued from Ger., crossed the Alps, and invaded It. A little later they crossed the Rhine, pillaged a part of Gaul, and passed into Sp., gaining repeated victories over the Roms. In 102 the Teutones were defeated by Marius in Gaul. The C. in It. gained a victory on the Adige, but in July 101 B. C. they were defeated in a great battle at Vercelli, 50 m. N. E. of Turin, in which they are said to have lost 100,000 men. About 100 A. D. they dwelt near the N. Sea, in Jutland, which was called the Cimbric Chersonese.

Cimmerians [Gr. *Κίμμεριοι*], according to the Homeric legends, were a people dwelling where the sun never shines and perpetual darkness reigns. Hence the proverbial expression, "Cimmerian darkness." The historical Cimmerians were a nomadic race who lived between the Dnieper and

the Don. According to Herodotus, they were expelled from that region by the Scythians, and migrated to Asia Minor. The Strait of Yenikale derived from them the name of C. Bosphorus.

Cimon, or **Kimon** (*Κίμων*), an Athenian, b. about 502 B. C., was a son of Miltiades, who commanded at Marathon. He served with distinction at the great battle of Salamis, 480 B. C. He defeated the Pers. on the Strymon, and in 466 gained a great naval victory at the mouth of the Eurymedon; was for some time the most prominent statesman of Athens, and a rival of Pericles. D. 449. (See GROVE, *Hist. of Gr.*)

Cinalo'a, or **Sinalo'a**, a state of Mex., bounded S. W. by the Gulf of Cal. Area, 25,928 sq. m. Pop. 178,527.

Cinchona, commonly pron. sin-ko'na [for etymology see below], a genus of trees of the order Rubiaceæ, tribe Cinchoneæ, producing the bark commonly known as Peruvian bark, Jesuits' bark, etc., and from which the alkaloids quinia (quinine) and cinchonia are obtained. The trees of this genus are sometimes of great magnitude, but some of them in high mt.-regions are shrubs with stems only 8 or 10 ft. in height. They are all natives of S. Amer., between lat. 20° S. and lat. 10° N., and chiefly grow on the E. slopes of the Cordilleras. Other tropical countries have of late been stocked with C. trees, especially Java and some other Dut. colonies. The Brit. govt. has successfully introduced them into India and St. Helena, and the bark produced on the Neilgherry hills is remarkably rich in quinia. All C. are evergreen, with laurel-like, entire opposite leaves, and generally with beautiful fragrant flowers. Of more than 30 species, several are comparatively worthless in med.

Much difficulty has been experienced in ascertaining the species by which the different varieties of C. bark are produced. The commercial names are derived partly from the color of the kinds, and partly from the districts in which they are produced or the ports whence they are shipped. The best sort, known as *Calisaya* or royal yellow bark, is chiefly the product of *C. Calisaya*, a large tree, growing in hot mt.-valleys of Bolivia and Peru. The proper discrimination of the different kinds requires experience. The taste is always bitter, but it is possible to distinguish by the taste those varieties which contain quinia most largely from those in which cinchonia is the prin. alkaloid. It is a med. of great value in the cure of intermittent fevers and diseases attended with much debility, also in certain diseases of the nervous system.

The active principles of C. are the alkaloids quinia, cinchonia, and several other alkaloids of less importance. The alkaloid quinia is now extensively in use in med. in the form of disulphate of quinia, and is given in doses of from 1 to 20 grains in almost all the cases to which the bark is applicable, and for this reason the bark itself is much less used than formerly.

Cinchonine, one of the alkaloids of cinchona.

Cincinnati, sin-sin-nah'tee, the "Queen of the West," an important R. R. and commercial centre, cap. of Hamilton co. and metropolis of the State of O., is one of the largest and most important inland cities of the U. S., and is situated in lat. 39° 6' 30" N. and lon. 84° 24' W., 764 m. from New York and 610 m. from Wash., in the valley of the O., extending along the N. bank of the O. River and over the adjacent hills for miles. The main portion of the city is in the valley, and is built on two plateaus. The terr. of the city has an area of 24 sq. m., on which regular streets, mostly 66 ft. in breadth, are laid out. Clifton, Avondale, Mt. Auburn, and E. Walnut Hills are now included in the city. Among the suburban towns are Covington, Newport, Dayton, and Ludlow in Ky., which are situated right opposite C., and connected with it by bridges and ferries.

C. occupies a prominent position as a commercial and manufacturing city, and is the native place of many prominent men. Its position on the O. River, extensive R. R. connections, and numerous factories make it the commercial emporium of the adjacent fertile and densely settled States and the centre of W. manufacture. Among the public buildings the most prominent are the Cin. Coll., the C. h., the city hall, the Ohio and Miami med. colls., the Public Library, the Masonic Temple, Odd Fellows' Hall, the workhouse, house of refuge, the new city hospital, the U. S. govt. building, the Music Hall, and the house of the Jesuits, while Pike's and Robinson's opera-houses, the Grand Opera-house, the Wesleyan Female Coll., and the Grand Hotel may be ranked among its finest private structures. C. has literary colls., acads. of the sisters of Notre Dame, med. colls., a law school, a coll. of dentistry, commercial colls., and a univ. Among its numerous libraries, the most prominent are the Public Library, open to everybody; the Young Men's Mercantile Library, and the Historical Library. Among the benevolent insts. under the control of the city govt. are the house of refuge, the poorhouse, the hospital, and the lunatic asylum. Beside these city insts., private charity supports orphan asylums, hospitals, a widows' home, a children's home, a home for the friendless, House of the Good Shepherd for fallen women, Union Bethel, a protectory for fallen boys, and a vast number of benevolent aid societies. It has 3 med. societies, an astronomical society, an historical and philosophical society, a society of nat. hist., a zoological society, an acclimatization society, a society for prevention of cruelty to animals, and a horticultural society.

The commerce of C. is very large; imports, 1883, \$284,339,878; exports, \$290,907,330. Its chief article of exportation, pork, has given it the name of "Porkopolis." The manufactures of C. (products, 1883, \$194,572,536) are not less important than its commerce.

Spring Grove Cemetery is the finest and largest burial-place. One of its parks is the Garden of Eden. The beautiful Tyler Davidson fountain on 5th st., surrounded by an esplanade, and cast in Müller's bronze foundry in Munich (Bavaria), after designs by Albert von Kreling, by order of Henry Probasco, is one of the grandest ornaments of the city. Since 1853 C. has been the seat of a Catholic abb.

C. was founded by N. J. men in 1780, and laid out by Col. Ludlow, who plotted it on a plan similar to that of Phila. The nucleus was formed by Ft. Washington, below which the village of C. was mainly built. For yrs. it did not promise to rise much above the ordinary v., and not until 1816, when steamboat navigation was introduced on the W. rivers, did it push forward. From that date, however, it made rapid strides to prominence, and occupied in a few yrs. the first rank among W. cities, which it maintained for a long while. It was incorporated as a town in 1802 and as a city in 1819. Its first mayor was Major Ziegler. Toward the middle of the century it attracted a vast Ger. immigration, and several parts of the city, called "Over the Rhine," are almost entirely settled by Gers. While the pop. of the city in 1800 amounted only to 800, it had increased in 1870 to 216,239, and in 1880 to 255,139. [From orig. art. in *J.'s Univ. Cyclopæd.*, Brit. M. D.]

Cincinnati, Order of [named from Cincinnati], a society founded in 1783 by the officers of the Revolutionary army, whose object was to perpetuate feelings of fraternity and to relieve the wants of the families of such as had fallen in the war. The privilege of membership was extended to a number of Fr. officers. The membership at first was limited to the eldest male posterity, together with their kindred. Popular jealousy was roused by the privilege granted to primogeniture, and in 1784 some change was made in the const. as a concession to the popular sentiment. Washington accepted in 1787 the office of pres., which he continued to hold until his death. Branches of the order were organized in each of the States; of these some have been discontinued, but others remain and hold annual meetings.

Cincinnatus (Lucius Quinctius), [so called because he wore his hair in long curling locks, *cincinni*], a Rom. patriot and dictator, b. about 519 B. C., belonged to the patrician order. He cultivated a small farm with his own hands, and was regarded as a model of pristine virtue and simplicity of habits. About 458 he became consul. He was appointed dictator 2 yrs. later, and gained a victory over the Equi. He was chosen dictator in 439 B. C., to oppose the machinations of Spurius Mælius, accused of treason. Much of what is related of him by Livy is now thought to be legendary.

Cinæas [Gr. Κινέας], a Thessalian orator, became a confidential minister of Pyrrhus, king of Epirus, who, in 280 B. C., sent him to Rome to negotiate a treaty of peace or alliance. His artful and plausible speeches were frustrated by Appian Claudius. D. after 278 B. C.

Cinçrary Urn [Lat. *urna cinçraria*, from *cinis* (gen. *cineris*), "ashes"], a vessel anciently used to contain the ashes of the dead gathered from the funeral pile. The embers were drenched with wine and placed in the urn, which was then deposited in a family mausoleum. Slaves and inferior persons were burned and their ashes placed in a clay pot, which was stored in a columbarium. C. U. were of marble, clay, glass, alabaster, or sometimes of gold.

Cinna (C. HELVIUS), a Rom. poet and friend of Catullus. He wrote an epic poem called *Smyrna*, of which only a few lines are extant.

Cinna (LUCIUS CORNELIUS), a Rom. patrician, became consul in 87 B. C., while Marius was in exile and Sulla was conducting a campaign in Asia. Endeavoring to reinstate Marius, he was driven out of Rome, but he and Marius soon returned with an army and obtained the mastery in that cap. They massacred many friends of Sulla. C. was re-elected consul as a colleague of Marius, who d. in 86 B. C. He marched to oppose Sulla, who was returning from Asia, but was killed by his own mutinous soldiers in 84 B. C. His daughter Cornelia was married to Julius Caesar.

Cin'nabar [Fr. *cinnabre* or *cinnabre*; Ger. *Zinnober*; Lat. *cinnabaris*; Per. *kanbar*], a red pigment sometimes called vermilion, is an ore of mercury, from which nearly all the mercury of commerce is obtained. It is a sulphide of mercury, composed, when pure, of 86.2 per cent. of mercury and 13.8 of sulphur. It occurs massive and crystallized in six-sided prisms; has an almost metallic lustre and a carmine color. Specific gravity, nearly 8.5. The term vermilion is usually applied to this mineral when it is reduced to powder to be used as a pigment. The most productive mines of C. are those of Chi., of Almaden in Sp., New Almaden in Cal., and Idria in Carniola.

Cin'namon [Lat. *cinnamomum*] is the aromatic bark of certain trees of the genus *Cinnamomum*, which belongs to the order Lauraceæ, natives of tropical and sub-tropical parts of the E. C. is mentioned in the O. T. by a name almost the same as that which it still bears. True C. is chiefly produced by the *Cinnamomum Zeylanicum*, which grows in the island of Ceylon; introduced into the W. I. in 1782, it is now cultivated there also. The tree attains the height of 20 to 30 ft., and is 18 inches in thickness. The leaves are oval, 4 to 6 inches long, with a blunt point; they have the taste of cloves. The fruit is somewhat like an acorn in shape; it is a small drupe, brown when ripe. The branches of 3 to 5 yrs. growth being cut down, the epidermis is scraped away; the bark is split longitudinally with a knife and taken off. The pieces are then exposed to the sun, when it curls up into quills, the smaller of which are thrust into the larger, and the whole tied up in bundles.

Cinnamon Stone is a variety of lime garnet of a clear cinnamon-brown color, and is a silicate of alumina and lime. Many of the stones sold as hyacinths are in reality C. S. They are found most abundantly in Ceylon.

Cinq-Mars, sank-marss', de, (HENRI COIFFIER DE RUZÉ), MARQUIS, b. in 1620; came to the court in 1639 as a protégé of Richelieu, who intended to make him the favorite of the king, in order to use him as a spy. The cardinal, however, mistook the young man. C.-M., proud, noble, and brilliantly gifted, had an ambition of his own, and a deadly hatred soon sprang up between the favorite and the minister. C.-M. joined the Orleans party in a conspiracy to overthrow Richelieu. Meanwhile the cardinal had watched the movement from the very beginning, and had C.-M. arrested.

He was executed at Lyons Sept. 12, 1642. His life and character are described in the romance, *Cinq-Mars, ou une Conjuraison sous Louis XIII.*

Cione di Andrea. See ORAGNA.

Circassia, sir-kas'she-a, a region in the W. Caucasus belonging to Rus., extending from lat. 42° 30' to 45° 40' N., lon. 37° to 46° E. The Circassians are a warlike people, addicted to plunder. The nobles are mostly Mohammedans; the religion of the masses is a mixture of Christianity and paganism. They are a handsome people, chiefly known through their struggles to maintain their independence against Rus. and for their custom of selling their daughters to the Turks and Pers. Area, 33,000 sq. m. Pop. 600,000.

Circe, sir'se [Gr. Κίρκη], a sorceress of classic mythology, celebrated for her skill in magic arts. According to Homer, she was a daughter of the Sun, and lived on the island of *Ææa*, where she transformed many men into swine and other beasts by her drugs and incantations.

Circle [Lat. *circulus*, from *circus*, a "round form"], a plane figure bounded by a line all of whose points are equally distant from a point within called the centre. The bounding line is called the *circumference*. The area of a C. contains as many sq. units as there are linear units in its semi-circumference. This number is usually denoted by π , and is approximately equal to 3.1416, also to the fraction $\frac{22}{7}$.

In astron. the C. of *perpetual apparition* is a small C. of the celestial sphere parallel to the equinoctial, and at a distance from the elevated pole equal to the lat. of the place. The C. of *perpetual occultation* is a similar C. about the depressed pole. The stars between the former and the elevated pole are *always* above the horizon; those between the latter and the depressed pole are never above the horizon.

Circleville, a city and R. R. centre, cap. of Pickaway co., O., situated on the Scioto River and the O. Canal, 104 m. E. N. E. of Cin. and 25 m. S. of Columbus. It occupies the site of highly interesting anc. works, consisting of a circle and square, perfect in form, fully described in Howe's *Hist. of O.* It is a leading market for broom-corn. The celebrated speech of Logan the Indian chief was made 4 m. S. of C. Camp Charlotte, where Lord Dunmore encamped in 1774 and made a treaty of peace with Indians, is 7 m. S. E. of C. Pop. 1870, 5407; 1880, 6046.

Circuit court, a court of the U. S. next inferior to the supreme judicial court. The U. S. are divided into circuits, and in each circuit one of these courts is held. The C. C. has jurisdiction, direct or appellate, both in law and equity; criminal cases may also in some circumstances come before it. Several States of the U. have C. C.

Circular Notes. See LETTERS OF CREDIT.

Circular Parts. In a right-angled spherical triangle, the 2 sides about the right angle, the complements of the other 2 angles, and the complement of the hypotenuse are called *C. P.* Napier showed that if these 5 parts be arranged circularly and in their natural order, the sine of any part is equal to the product of the tangents of its *adjacent parts*, and also to the product of the cosines of its *opposite parts*.

Circulation of the Blood. In all animals, even the simplest and lowest, there is a movement, more or less regular, of blood, or of a fluid equivalent to it, furnishing material for the formation and repair of the body. All typical vertebrate animals have a closed circulatory system, consisting of a heart, arteries, capillaries, and veins, and there is also a portal system, composed of veins going from the digestive and sometimes other organs to the liver—in fishes to the kidney also—whence veins again convey the blood to the heart. All mammals have a double heart, consisting of 2 auricles and 2 ventricles—a respiratory and a systemic heart conjoined, the right auricle and ventricle constituting the respiratory or pulmonary heart, the left, the systemic; and after birth, although closely adherent together, no direct communication exists between them. In man and some of the anthropoid (man-like) apes the heart inclines to the left side; in other animals it is usually median. There is only a single aortic arch over the root of the left lung; this, giving off branches above, becomes in its descent the abdominal aorta. The manner of origin of the ascending branches (subclavian and carotid) of the aorta differs. In man it is least symmetrical; 2 arterial trunks passing upward from the aorta on the left side (left carotid and subclavian), while there is 1 (*arteria innominata*) only on the right, soon subdividing into 2.

Being composed of spirally arranged muscular fibres, the heart, by its rhythmical contractions and relaxations, empties itself and becomes filled with blood alternately, in an adult man or woman between 65 and 75 times a minute while at rest in health. From the right ventricle the venous blood (poured into it from the right auricle, which receives it from the great *vena cava*) is sent through the pulmonary artery and its branches to the capillaries which ramify minutely throughout the lungs. These combine to form small veins whose union into larger trunks finally constitutes the 4 pulmonary veins, which empty the (now aerated or arterialized) blood into the left auricle. This conveys it into the left ventricle, whence it is impelled through the aorta, by the branches of which it becomes distributed all over the body in capillary networks, to return to the heart by means of the veins; all of which empty at last into the ascending and descending *vena cava*.

The velocity of the movement of the blood through the arteries averages from 12 to 20 ft. in a second; in the capillaries, about 2 inches in a minute; in the veins, from 6 to 12 ft. in a second. Experiments prove that the whole round of the circulation is accomplished in a little less than half a minute during rest and health.

The discovery of the C. of the B., as now understood, was made by Dr. William Harvey in 1619, first pub. by him, however, in 1628. He was partially anticipated by Servetus, Realdus Columbus, and Cæsalpinus; almost entirely so by Paolo Sarpi, whose claim in this respect has been generally

even soaked. The discovery was completed by the demonstration with the aid of the microscope of the blood corpuscles and the capillaries, between 1658 and 1687, by SWAMMERDAM, MARSH, and LEECHENHOEK. [From orig. art. in *Sci. Unit.*, 1890, by PROF. H. H. WATSON, M. D.]

Circulation of Sap in plants is its ascent from the roots to the leaves and other green parts, and its partial descent after elaboration in these organs. The sap drawn from the ground by the roots ascends in exogenous plants especially through the albumen. The descent takes place chiefly through the fiber or inner bark. Much of the water which is taken up by the roots is thrown off by the bark and leaves.

Circumcision, sir-kum-sizh'un [Lat. *circumcisio*, from *circum*, "around," and *cado, cisum*, to "cut," the cutting off of the prepuce, a religious or sanitary practice in many anc. and modern nations. C. was common in Egypt long before the birth of Abraham. The Jews circumcise their children on the 8th day after birth; the Ars. in the 13th yr., in remembrance of their ancestor Ishmael. The Copts and Abyssinians are perhaps the only people professing Christianity among whom it is practised.

Circumpolar [Lat. *circum*, "around," *polaris*, the "pole"]. In astron., the stars that lie between the circle of perpetual apparition and the elevated pole, and which therefore revolve about that pole, neither rising nor setting, are called *C. stars*.

Circumstantial Evidence. See EVIDENCE.

Circus (pln. *Circi*), originally, a "circle" or "circular space." The C. of anc. Rome was a large structure without a roof, for chariot and horse races, athletic exercises, and gladiatorial conflicts. The Circensian games, according to tradition, originated in the time of Romulus, when they were dedicated to the deity Consus, and called *Consualia*. The prin. Circensian games were held annually in Sept., and lasted 5 days. All the C. in Rome are nearly obliterated; but one on the Appian Way, about 2 m. from the city, known as the C. of Maxentius, is still in a state of preservation.

Cirripeidia (pln., or *Cirripedes* [Lat. *cirrus*, "curl," and *pes, pedes*, "foot"], an order of crustaceans characterized by the development of the feet (generally 6 pairs) as cirri. Barnacles are familiar examples of C., but many species are now known, and all in their mature state are attached to objects of various kinds, as rocks, sea-weeds, shells, etc., or are parasitic. Some are found in the skin of whales, some in the flesh of sharks. They are divided into the sub-orders Rhizocephala, Apoda, Abdominales, and Thoracica. The last are either pediculated or sessile, the former family supported on a flexible stalk, which is wanting in the latter. Barnacles (Lepadidae) are pediculated C., and Balani (acorn-shells, sessile barnacles) are without a stalk. Almost all are hermaphrodite, but in a few genera the sexes are distinct, the males being not only very small in comparison with the females, and more short-lived, but in their mature state parasitic on the females or attached to them; while in some appear complementary males attached to hermaphrodites. The young swim freely in the water, and are furnished with eyes, which disappear after they have permanently fixed themselves. They have also shells differing from those of their mature state. The shelly coverings of the C. differ extremely in the number of pieces of which they consist, some having only 5 valves, and others have more than 100 additional pieces.

Cisalpine Republic, a former state in the N. of It., founded by the Fr. in 1797, comprised Lombardy, Rovigo, the duchy of Modena, the Venetian terr. S. and W. of the Adige, the Valtellina, and the legations of Bologna, Ferrara, and the Romagna, having Milan for its cap. In 1802 it took the name of the It. Republic, and chose Nap. as pres. In 1805 it was transformed into the kingdom of It., and was subject to Nap. until 1814. Area, about 16,000 sq. m. Pop. 3,500,000.

Cisco, Tex. See APPENDIX.

Cispadane Republic, a former state of It., was organized by the Fr. after the battle of Lodi in 1796. It was bounded N. by the river Po (anc. *Padus*), and comprised Modena, Reggio, Bologna, and Ferrara. In 1797 it was merged in the Cisalpine Republic.

Cisplatine Republic, from Oct. 1828 to July 1831 the name of the republic of Uruguay. Previously this republic had been, under the name of C. Prov., a part of Brazil.

Cissampelos [Gr. *κισσάμπελος*, the name of a kind of vine, from *κισσός*, "ivy," and *άμπελος*, a "vine"], a genus of plants of the order Menispermaceæ, of which some possess valuable medicinal properties, particularly *C. Pareira*, a native of the warm parts of Amer., the root of which is known by the name of Pareira Brava.

Cissey, de (ERNEST LOUIS OCTAVE), a Fr. gen., b. in Paris Dec. 23, 1811. He served against the Commune in the siege of Paris in Mar. and Apr. 1871, and was minister of war from July 1871 to Aug. 1876. D. June 16, 1882.

Cissoïd [Gr. *κισσώδης*, "ivy-like"], a curve invented by Diocles for the purpose of constructing 2 geometrical means between any 2 given lines. The C. of Diocles is one of a large family of cissoidal curves.

Cisterciens [from *Cistercium*, now *Cîteaux*, their first abbey], or **Bernardines**, an order of Benedictine monks and nuns, founded in 1098. Among the fraternities of C. were the nuns of Pt. Royal, the Recolets, and the Trappists.

Cities of Refuge, The Levitical law set apart 6 C. of R. for the manslayer, in which he might be safe from the avenger of blood. The manslayer was protected in the C. of R. until the death of the high priest, after which the avenger of blood had no claim against him.

Citizen, literally, a resident in a city; then, as the people in the country had usually fewer rights, a person having civic rights, or in modern times political rights, such as the elective franchise and eligibility to office. Generally in anc. times these rights were by birth, and in some states to confer citizenship by vote on an alien was a special privilege. At Rome there were complete and less complete C.; and

so, in modern times, women and minors may be said to be of this latter class. At Rome under the emp. Caracalla citizenship was extended to the whole Rom. world.

Citizen, in modern law, is used to indicate the class of persons who owe an indefeasible allegiance to a state, and are entitled to certain rights and privileges appertaining to free men. The subject may be considered under the following gen. divisions: I. The mode of becoming a C.; II. The obligations, rights, and privileges of a C., with special reference to the const. of the U. S.

I.—1. The leading mode of acquiring citizenship is by birth in the country or under a state of allegiance. Birth in the country confers citizenship without reference to the citizenship of the parent, who at the moment of birth owes at least a local allegiance and, though an alien, is temporarily a subject, except in the case of foreign ambassadors and ministers.

2. A more difficult question is as to the citizenship here of children born abroad of Amer. parentage. It should be noted in the discussion of this question that allegiance is twofold—perpetual and local. When an Amer. C. goes to a foreign country, he cannot by his own act put off his citizenship. It would seem on principle that as the mutual obligation from which citizenship springs still exists, his child would still be a C., though not born within the terr. of the state to which allegiance is due. The strictly legal authorities are, however, hopelessly in conflict. The proposition that the foreign-born children of C. are aliens is argued with great force and power by Mr. Horace Binney in his well known article on the *Citizenship of the U. S.*, 2 *Amer. Law Register*, 163, 3, 1, 1874. Opposed to this view of Mr. Binney is a recent and carefully considered case in the N. Y. court of appeals (*Ludlam vs. Ludlam*, 26 N. Y. R. 356). It holds that the true test of the allegiance of the child is parentage, that it is transmitted from the father to the child, and that, accordingly, the state may claim allegiance from the children of its C. wherever born. On this subject Cong. enacted, Feb. 1855: "Persons heretofore born, or hereafter to be born, out of the limits and jurisdiction of the U. S., whose fathers were or shall be at the time of their birth citizens of the U. S., shall be deemed and considered, and are hereby declared to be citizens of the U. S.: Provided, however, that the rights of citizenship shall not descend to persons whose fathers never resided in the U. S." If the theory of Mr. Binney be correct, this statute conferred citizenship where it did not before exist; if that of *Ludlam vs. Ludlam* be sound, then it restricted the rights of the foreign-born descendants of C. perhaps unnecessarily.

3. *Citizenship by Naturalization*.—An alien may be made a C. by the act of a state or a nation co-operating with his own act. Sometimes this citizenship is complimentary or honorary; usually it is attended with true or intended renunciation of foreign citizenship. The question thus recurs, Whether a person can by his own act put off his citizenship? The prevailing opinion of jurists, with some dissent, is that he cannot. For the purpose of settling the perplexing and irritating questions that frequently arise, the U. S. have entered into treaties of naturalization with a number of foreign powers. Naturalization may take place either by a mere law of a gen. nature, such as that which provides that every alien woman who marries a C. of the U. S. shall be deemed and taken to be a C., or it may occur in special instances affirmative on the part of the individual to be naturalized. In this country the power to naturalize is exclusively vested in Cong. by a provision in the U. S. const. Interesting questions concerning citizenship arise in case of the union of two separate nations, or of the division of a single nation into two separate states. In respect to the result of our own Revolution, opinions differ as to the time when the separation between Eng. and the U. S. became complete, though they substantially agree as to the effect of the division. The Amer. view is that the separation took place at the Dec. of Ind., July 4, 1776; the Eng. that it was consummated at the treaty of peace in 1783.

II.—The const. as originally adopted made no provision concerning C. of the U. S., except an incidental direction that senators, representatives, and the executive should be such citizens. There were, however, distinct clauses concerning the rights and privileges of the C. of the several States. Under the clause which provided that the judicial power should extend to controversies between C. of different States the question arose in the now famous case of *Scott vs. Sandford* (19 Howard's Reports, 39), whether an emancipated negro could be considered as a "citizen of a State;" and it was decided that he could not be so regarded, and accordingly that he could not maintain an action on that basis in the Federal courts. The division of public opinion occasioned by this decision, and the desire to settle by a positive rule the condition of the slaves emancipated by the 13th amendment to the const., as well as that of the colored race in gen., led to the 14th and 15th amendments, by which all persons born or naturalized in the U. S. are declared to be C. of the U. S. and of the State in which they reside; and it is provided that "no State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the U. S.," and also that the "right of citizens of the U. S. to vote shall not be denied or abridged by the U. S. or by any State on account of race, color, or previous condition of servitude." Though the condition of the colored race led to these amendments, their construction is not to be confined to it.

T. W. DWIGHT.

Citric Acid [from the Lat. *citrus*, a "citron"], a vegetable acid present in limes and lemons, and to a less extent in gooseberries, currants, and other fruits. It is used in med. as an antiseptic and refrigerant, and by the silk-dyer to heighten the colors of safflower and cochineal, and by the calico-printer for discharging mordants.

Citron [Gr. *κίτρον*; Lat. *citrus* and *citrus*; It. *cedro*; Fr. *citron*], the fruit of the C. tree (*Citrus medica*), which is cultivated in the S. of Europe and other warm countries. It is a native of India. By some botanists it is regarded as

perhaps the original type of the species which produces the lemon, sweet lemon, lime, and lime; but by others some of these are regarded as distinct species. The C. tree has oblong leaves; the fruit is large, rough, and furrowed; the rind thick and tender; the pulp sub-acid and refrigerant. The part chiefly valued is the rind, which has a delicious odor and flavor, and is made into preserves. The juice is employed to make a syrup for flavoring liquors. The cedrat is a variety of the C. from which chiefly the fragrant oil of cedrat, used by perfumers, is procured. The varieties of C. are numerous. The fruit of the largest kinds is sometimes 9 inches long and 20 lbs. in weight.

Citronella [Fr. *citronelle*], a perfume prepared from the *Melissa officinalis*, or common balm; also a liquid prepared from the rind of the citron, and used for flavoring brandies. The name is also given in Fr. to the common southernwood (*Artemisia Abrotanum*). It is chiefly applied by perfumers to an oil imported from Ceylon, which is the product of *Andropogon Schoenanthus*, a kind of grass.

Citron Melon. See MELON.

Citron'sma [from the Gr. *κίτρον*, "citron," and *δασύ*, "smell"], a genus of trees of the order Monimiacæ, natives of the tropical parts of S. Amer. The leaves abound in an oil similar to the oil of citron.

City Island, N. Y. See APPENDIX.

Cives. See CHIVES.

Civet [Fr. *civette*; Ar. *zubaid*], a brown substance of a strong, offensive odor, which is used in perfumery, because when mixed in small proportions with certain other perfumes it is considered to improve them greatly. It is quite costly, and is consequently much adulterated. It is produced by carnivorous animals called civets or civet-cats (*Fiveria zibetha*, etc.) inhabiting tropical Asia and Afr. They feed upon birds, small quadrupeds, and reptiles. Some are kept in confinement for the sake of the perfume, which is removed from a glandular sac about twice a week by means of a spatula, and is obtained most abundantly from the male, and especially after he has been irritated. A dram is a large quantity to obtain at a time. The C. kept for this purpose are fed on raw flesh, the young partly on farinaceous food. Enfras, in Abyssinia, is a prin. seat of the C. trade.

Civiale (JEAN), a Fr. surgeon, b. July 1792. He was the inventor of lithotomy. D. June 1867.

Civil Death, in law, is the cessation of legal rights while the physical life remains. The person loses his civil rights and becomes, as it were, *dead* in law. In N. Y., the sentence of a criminal to imprisonment for life causes C. D.

Civilis (CLAUDIUS), a chief of the Batavi who served for many yrs. in the Rom. army. Having raised a large army, C. revolted in 69 A. D., was joined by many Gers., and defeated the Romans in several battles. In 70 he was defeated by Cerealis, a gen. of Vespasian. Tacitus states that negotiations ensued between Cerealis and C., but his hist. here ends abruptly.

Civil Service is a name for the duties rendered to the state, other than naval and military service. The reform of C. S. has received of late much attention in G. Brit. and the U. S., and in the former country much has already been accomplished. At the head of the Brit. C. S. are placed the officers of the royal household, under several depts. Then come the officers of the House of Lords and the House of Commons, and a vast number of depts. which cannot here be enumerated. The gen. designations for the civil servants of the Crown are coms., secs., and clerks. Nearly all enter the service as clerks, and they rise chiefly by seniority. Those officials belong to the C. S. who receive annual salaries and whose chief occupation is writing. This class does not include men to whom weekly wages are paid; they come under a different category.

In the U. S. C. S. a much needed reform has been inaugurated. Office-seeking has become one of the most corrupting trades in our country, and there has long been a demand for a system of competitive examinations for those offices which are non-elective. Such a system has been introduced, and it is hoped that it may lead to greater efficiency in the performance of official duties, and prevent, to some extent, the alarming evils which result from a wrong use of govt. patronage.

Civil War of the United States. See CONFEDERATE STATES, by Hon. HORACE GREELEY, LL.D.

Claf'in (WILLIAM), LL.D.; b. at Milford, Mass., Mar. 6, 1818, was gov. of Mass. 1869-71.

Clairborne (WILLIAM CHARLES COLE), a lawyer and statesman, b. in Va. in 1773, was an M. C. from Tenn. 1797-1801, gov. of Miss. Terr. 1802, gov. of La. Terr. 1804, and of the State of La. 1812-16. He was chosen U. S. Senator in the latter year. D. Nov. 23, 1817.

Claiborne, Clayborne, or Cleborne (WILLIAM), b. in Eng. about 1585, was the second son of Sir Edmund Cleburne of Cleburne Hall, Westmoreland; was appointed by Charles I. his sec. of state for the dominion of Va. Mar. 4, 1626, and treas. of Va. for life Apr. 6, 1642. He discovered, purchased, and planted Kent Island in 1631, and owned a large portion of the land upon which Annapolis now stands. He battled for his rights against Lord Baltimore with varying success until 1651, when he withdrew into Va., and was appointed by Cromwell a com. for the reduction of the colonies. He has been styled "the champion of Va." and the "evil genius of Md." D. about 1676.

Claims, Court of, a court of the U. S. for the relief of those persons who have claims against the govt. Before the yr. 1855 such claims could be settled only by act of Cong. In that yr. this court was created, consisting of 3 judges appointed by the Pres. with the advice and consent of the Senate.

Clairaut, kla-rô' (ALEXIS CLAUDE), a geometer, b. in Paris May 7, 1713. His reputation was increased by his predicting the return of Halley's comet in 1759. D. May 17, 1765.

Clairvoyance [Fr. from *clair*, "clear," and *voir*, to "see"]. The existence of a somnambule or sleep-walking

state, induced by unknown causes and accompanied by peculiar phenomena, is generally admitted. It is also admitted that a state similar to it is not identical with these can be induced by artificial means, as fasting, drugs, or by an operator making what are termed magnetic passes. The records of C. are as old as hist. Vols. might be easily filled with quotations showing that it has been manifested and received as a truth by profound thinkers in every age. Perhaps for purposes of investigation the artificially induced mesmeric state has advantages over the spontaneous, which presents itself at undetermined times, although its spontaneous exhibition is more reliable in its results. C. presents many gradations from semi-consciousness to profound and death-like trance. The condition of the phys. body is that of deepest sleep. In passing into the clairvoyant state the extremities become cold, the brain congested, the vital powers sink, a dreamy unconsciousness steals over the faculties after a time the perceptions become intensified. The mind sees without phys. organs of vision, hears without organs of hearing, and feeling becomes a refined consciousness. The more death-like the condition of the body the more lucid the perceptions of the spirit or mind. If C. depends on the unfolding of the spirit's perceptions, then the extent of that unfolding marks its perfection. However great or small this may be, the state itself is the same, differing only in degree. The disclosures made have also a gen. resemblance, but they are so colored with surrounding circumstances that they are extremely fallible. The tendency of the clairvoyant is to make objective the subjective ideas he has acquired by education, somewhat as dreams reflect the ideas of wakefulness. Yet there is a profound condition which sets all these aside, and the mind appears divested of all phys. trammels and to come in direct contact with the thought-atmosphere of the world. C. is no miraculous power, but an inherent faculty, a foregleam in this life of the next spiritual life. For if man exists as a spirit after the dissolution of the phys. body, his present life is that of a spirit clad in flesh, and should manifest some of the characteristics of the next untrammelled condition. [From *orig. art. in J. S. Univ. Cyc.*, by HEDSON TUTTLE.]

Clam, a common name for bivalve mollusks. The common C. N. Eng. is *Mya arenaria* (family Myidae); it is much used as food and as bait for the fisheries. The common C. of N. Y. (quahog) is *Venus mercenaria* (family Veneridae), so called because its shells were made into wampum by the N. Amer. Indians and used as money. The fresh-water C. are Unionidae.

Clap (THOMAS), a Congl. divine, b. at Scituate, Mass., June 26, 1708, grad. at Harvard in 1722; was pres. of Yale from 1739 to 1766. He was an eminent natural philos. and astron. Wrote *The Nature and Foundation of Moral Virtue*. D. Jan. 7, 1767.

Clapperton (HUGH), CAPTAIN, a Scot. traveller and explorer of Afr., b. at Annan in 1788. His chief object was to discover the course of the Niger. He penetrated to Saccato, where he was detained nearly a yr. by the sultan. D. near that place in Apr. 1827. (See R. LANDER, *Records of Capt. Clapperton's last Expedition*.)

Claremont, Sullivan co., N. H., on R. R., 54 m. W. by N. from Concord. C. junction is 2 m. farther W. Pop. tp. 1870, 4053; 1880, 4704.

Clarendon (EDWARD HYDE), FIRST EARL OF, an Eng. statesman and historian, b. at Dinton, Wiltshire, Feb. 18, 1609; ed. at Ox., and studied law. He acted at first with the popular party, but when the c. war broke out in 1642 he attached himself to the royalist cause. In 1643 he was appointed chancellor of the exchequer and privy councillor. On the restoration of Charles II. in 1660, Hyde became prime minister and lord chancellor of Eng., and in 1661 he was created earl of Clarendon. In Aug. 1667 he was removed from office and impeached by the House of Commons, which condemned him to perpetual banishment. D. Dec. 9, 1674. His daughter, Anne Hyde, was married to the Duke of York (James II.). He left a *Hist. of the Rebellion and C. Wars*. (See T. H. LISTER, *Life of Lord Clarendon*.)

Clarendon (GEORGE WILLIAM FREDERICK VILLIERS), FOURTH EARL OF the Villiers family, b. Jan. 12, 1800; in 1840 became lord privy seal in the Whig ministry; appointed lord lieut. of Ire. in 1847 by the new ministry of Lord John Russell; entered the ministry of Lord Aberdeen in 1853, as sec. of foreign affairs. He retained this office in the cabinet of Lord Palmerston, who became premier early in 1855; resigned with his colleagues in 1858, and again became sec. of foreign affairs in 1865; in 1866 resigned with the liberal ministers; in 1868 was appointed sec. of foreign affairs by Mr. Gladstone. D. June 27, 1870.

Clar'et [Fr. *vin de Bordeaux*], a name given in Eng. and the U. S. to red Fr. wines produced near Bordeaux.

Clarinda, R. R. junc., cap. of Page co., Ia., on Nodaway River, 62 m. S. E. of Council Bluffs. Pop. 1870, 1022; 1880, 2011.

Clarion, on R. R., cap. of Clarion co., Pa., is on the C. River, about 75 m. N. N. E. of Pittsburgh. Carrier Sem. is located here. Pop. 1870, 709; 1880, 1169.

Clarion, Iowa. See APPENDIX.

Clark, Dak. See APPENDIX.

Clark (ABRAHAM), b. at Elizabethtown, N. J., Feb. 15, 1726; was a delegate to the Continental Cong. in 1776, and signed the Dec. of Ind. D. Sept. 15, 1794.

Clark (ALONZO), M. D., a phys. of New York, grad. at Williams Coll. 1828, took the degree of M. D. in the Coll. of Phys. and Surgeons of New York in 1835; became prof. of pathology and practical med. in that inst. in 1855. In 1853 was elected pres. of the N. Y. State Med. Society. Author of valuable professional papers.

Clark (ALVAN), b. at Ashfield, Mass., Mar. 8, 1804, was an ingenious farmer's boy who became in youth an engraver for calico print-works at Lowell, Mass.; became a portrait painter, but when over 40 yrs. old took up, with his sons, the construction of refracting telescopes. He was the first Amer. who successfully made large achromatic lenses; invent-

ed a valuable double eye-piece for measuring small areas, and received in 1833 the La Lande prize of the Fr. Acad. of Sciences for his discoveries.

Clark (DANIEL, a jurist, b. at Stratham, N. H., Oct. 29, 1802, grad. at Dartmouth in 1834; U. S. senator from N. H. 1857-66, and judge of U. S. dist. court 1866.

Clark (Rev. DANIEL A.), a Congl. preacher of uncommon pungency and power, b. at Rahway, N. J., Mar. 1, 1779; was settled (1820-24) in Amherst, Mass., and rendered valuable service in starting the coll. there. D. Mar. 3, 1840.

Clark (JAMES WASHINGTON, D. D., a bp. of the M. E. ch., b. in Me. Feb. 25, 1812, grad. at Wesleyan Univ. in 1836; ed. of *Ladies' Repository* 12 yrs. Became a bp. in 1864. Author of an *Alphabet and Map of the Immortal*. D. May 23, 1871.

Clark (GEORGE WHITEFIELD, D. D., a clergyman, b. Feb. 15, 1831, at South Orange, N. J., grad. at Amherst Coll. in 1853, and Rochester Theological Sem. in 1855; was a Bap. pastor. Wrote *New Harmony of the Four Gospels*.

Clark (Sir JAMES), BART., K. C. B., F. R. S., a phys., b. at Cullen, Scot., Dec. 14, 1788. He was appointed phys. in ordinary to queen Victoria in 1837. Wrote *Treatise on Pulmonary Consumption*. D. June 29, 1870.

Clark (Dr. JOHN), b. in Bedfordshire, Eng., Oct. 8, 1609, emigrated to Mass., but was driven to R. I. in 1638, and in the same yr. founded the first Bap. ch. at Newport. This ch. claims to be older than the first ch. at Providence, and therefore the first of that faith in the New World. C. visited Eng. in company with Roger Williams, and together they obtained from Charles II. the charter which secured civil and religious liberty to R. I. While he was pastor at Newport he preached once at Lynn, Mass., for which he was imprisoned and fined £20, under the act of Nov. 15, 1644. D. Apr. 20, 1676.

Clark (LABAN), D. D., a Meth. Epis. minister, b. at Haverhill, N. H., July 19, 1778. He was one of the founders of the Wesleyan Univ. at Middletown, Conn. D. Nov. 28, 1868.

Clark (LEWIS GAYLORD), a writer, b. at Otisco, N. Y., in 1810; was ed. of the *Knickerbocker Magazine*. D. Nov. 3, 1873.

Clark (THOMAS M.), D. D., LL.D. See APPENDIX.

Clark (WILLIS GAYLORD), a poet, b. at Otisco, N. Y., in 1810, was a twin-brother of Lewis Gaylord, noticed above. He wrote for the *Knickerbocker Magazine*. Among his poems is *The Spirit of Life*; became chief ed. of the *Phila. Gazette*. D. June 12, 1841.

Clarke (ADAM), LL.D., a celebrated Wesleyan divine and commentator, b. at Moybeg, Ire., in 1760 or 1762, ed. at Wesley's Kingswood school; sent out by Wesley as an itinerant preacher in 1782; pres. of the Wesleyan Conference in 1806, 1814, 1822; became eminent for his Oriental and biblical learning. Wrote a *Bibliographical Dict., Commentary on the Bible*, and *Rymer's Fœdera*. D. Aug. 26, 1832.

Clarke (GEORGE ROGERS), a gen., b. in Va. Nov. 19, 1752. He took a Brit. ft. at Vincennes in 1779; after peace was concluded in 1783, settled in Ky. D. Feb. 13, 1818.

Clarke (JAMES FREEMAN), D. D., a Unit. preacher, ed., and author, b. at Hanover, N. H., Apr. 4, 1810; since 1841 settled in Boston, Mass. Wrote *Steps of Belief, Ten Great Religions*, and *Events and Epochs in Religious History*.

Clarke (MARY COWDEN), an Eng. authress, a daughter of Vincent Novello, the composer, b. in Lond. June 22, 1809; married in 1828 Charles CowdenClarke. Wrote *The Complete Concordance of Shakespeare*.

Clarke (SAMUEL), D. D., an Eng. philos. and theol., b. at Norwich Oct. 11, 1675; was ed. at Cambridge, and wrote *Demonstration of the Being and Attributes of God*, his chief work. He became in 1706 chaplain to Queen Anne and rector of St. James, Lond.; he pub. *The Scripture Doctrine of the Trinity*, on which point his opinions were semi-Arian. D. May 17, 1729.

Clarke (WILLIAM), a gen. and explorer, b. in Va. Aug. 1, 1770, a brother of George Rogers Clarke. Associated with Capt. Lewis, he conducted an exploring expedition across the continent to the mouth of the Columbia River in 1804; was gov. of Mo. Terr. from 1813 to 1820. D. Sept. 1, 1838.

Clarke (WILLIAM TRAVIS), b. at Walpole, Mass., Oct. 1, 1829, ed. for the pulpit at Meadville and Cambridge; ordained at Hingham, Mass., in 1855, and afterward preached at Haverhill and Chelsea; removed to New York in 1866, and edited *Liberal Christian* till 1870; associate and afterward sole ed. of *Golden Age* till its discontinuance, 1875; gathered a Liberal society, the Unity Chapel Congregation, in 1869, of which he was the pastor till close of 1876; editorially connected with *Daily Graphic* from its start, 1873; afterward with *Evening Express* and the *Star*. D. Dec. 11, 1883.

Clarke River, or Flathead River, rises in the Rocky Mts. in the W. part of Mont. It flows north-westward, traverses the N. part of Id., and enters Wash. Terr. Near the N. boundary of Wash. it enters the Columbia; length, about 650 m. Gold is found near this river in Mont.

Clarksburg, R. R. junc., cap. of Harrison co., W. Va., on the Monongahela, at the confluence of the Fork and Elk rivers, in a coal region, with 2 acads. Pop. 1880, 2307.

Clarkson (ROBERT A.). See APPENDIX.

Clarkson (THOMAS), an Eng. philan., b. at Wisbeach, in Cambridgeshire, Mar. 28, 1760; ed. in the Univ. of Cambridge, where he wrote in 1786 a Lat. prize-essay on the question, *Is Involuntary Servitude Justifiable?* He devoted his life chiefly to the abolition of the slave-trade and the relief of the oppressed. He became an associate of several members of the Society of Friends, who had previously formed themselves into an anti-slavery committee. Mr. Wilberforce co-operated, and was the chief advocate of the cause in Parl. Their efforts excited violent opposition, and were several times defeated in Parl., but finally an act to abolish the slave-trade was passed in Mar. 1807. Wrote *The Hist. of the Abolition of the Slave-Trade*. D. Sept. 26, 1846.

Clarksville, city, cap. of Montgomery co., Tenn., on R. R. and the Cumberland River, 199 m. N. E. of Memphis. It has a male and female acad., and is a tobacco centre. There are iron-mines near. Pop. 1870, 3200; 1880, 3880.

Clarksville, Tex. See APPENDIX.

Clarry (*Salvia Sclarea*), a plant of the order Labiata, and of the same genus with sage; it is a native of S. Europe, and cultivated in gardens for its aromatic properties. The seed is sown in spring, and the plants flower in the second year. C. is stimulating and antispasmodic. It is used for seasoning soups and for flavoring.

Claude Lorrain. See GELÉE (CLAUDE).

Clau/dius, or more fully, Tiberius Claudius Drusus Nero, the fourth emp. of Rome, b. at Lugdunum (Lyons) in 10 B. C. He was a son of Drusus Nero and a nephew of the emp. Tiberius. On the death of Caligula (who was his nephew) he was proclaimed emp. by the army in 41 A. D. He began his reign with a show of clemency, but his wife, the infamous Messalina, acquired great power, which she abused by acts of cruelty. He built a great aqueduct called Aqua Claudia, and successfully invaded Brit. in person. He was poisoned in 54 A. D. by his wife Agrippina. (See Suetonius, *Claudius*.)

Claudius (APPICUS), surnamed CRASSUS, a Rom. patrician and decemvir, was elected consul in 451 B. C. He rendered himself infamous by an attempt to enslave and dishonor Virginia.

Claudius (MARCUS ATRILIUS), surnamed GOTHICUS, an emp. of Rome, b. in Illyricum in 214 A. D. He was proclaimed emp. by the army on the death of Gallienus (268 A. D.). He gained a victory over the Goths or Scythians in Servia in 269. D. 270, and was succeeded by Aurelian.

Clau/dius Cæ/cus (APPICUS), a Rom. patrician who was censor about 310 B. C. He constructed the great road Via Appia from Rome to Capua; was afterward consul, and became blind (hence his name Cæcus).

Clau/dius Pul'cher (APPICUS), a Rom. patrician, became consul in 53 B. C., and censor in the yr. 50. During his censorship he expelled Sallust the historian from the senate. D. about 48 B. C.

Claudius Pulcher (PUBLIUS), a Rom. gen. During the first Punic war he was elected consul for 249 B. C.; was defeated by the Carthaginians in a naval battle.

Clau/sius (RUDOLF JULIUS EMANUEL), a physicist, b. Jan. 2, 1822; became in 1855 prof. at the Polytechnic Inst. of Zurich, in 1867 at the Univ. of Würzburg, and in 1869 at that of Bonn. He obtained distinction by math. calculations based upon the dynamical theory of heat—calculations which, it is claimed, show the necessity of a Creator and the possibility of miracles.

Clay [A.-S. *clæg*; Fr. *argille*; Lat. *argilla*], those kinds of earth which when moist have a notable degree of tenacity and plasticity. C. are not easily definable as minerals, but they appear to owe their origin to the decomposition of other minerals, such as felspar, etc., and consist largely of alumina, with silica and water. They owe their plasticity to the alumina which they contain. C. are largely used for brick-making, pottery, etc. Argillaceous earth sometimes contains 40 per cent. of alumina. The felspar which yields the alumina of C. soils contains also soda and potash, which render C. fertile under cultivation. C. soils have remarkable powers for absorbing ammonia and other substances, and dry argillaceous earth is an excellent disinfectant.

Clay (CASSIUS MARCELLUS), statesman, b. in Madison co., Ky., Oct. 19, 1810, grad. at Yale in 1832. In 1845 he became ed. of the *True American*, an anti-slavery paper issued at Lexington, Ky. He was attacked by mobs, against which he defended himself bravely in several bloody conflicts. He served as a capt. in the Mex. war (1846-47), supported Abraham Lincoln in 1860, and became a brig.-gen. in 1861. He was minister to Rus. 1862-69.

Clay (CLEMENT COMER, JR.), b. in Madison co., Ala., in 1819; became a lawyer in 1840, a judge in 1844, was U. S. Senator from Ala. 1854-61, in which latter yr. he entered the Confed. Senate. D. Jan. 1882.

Clay (HENRY), an Amer. statesman, b. not far from Richmond, Va., Apr. 12, 1777. His father, a poor Bap. preacher, d. in 1782; his mother married again 10 yrs. afterward, and migrated to Ky., leaving this son (the 5th of 7 children) a clerk in a retail store in Richmond, which he soon left for employment as a copyist in the office of the clerk of the high court of chancery, passing thence after 4 yrs. to the office of Robert Brooke, then atty.-gen., afterward gov. Licensed as a lawyer in 1797, though not yet of age, he went to Ky., opened a law-office at Lexington, and soon achieved a lucrative practice. Ky., separating from Va., soon called a convention to frame a State const., and young C. besought her to provide therein for a gradual abolition of slavery, but was overruled.

Ky. sympathized with Va. in its opposition to John Adams's administration, and idolized Jefferson, for whom she cast her first presidential vote in 1800. C. was one of her favorite orators in that canvass, and was elected to the legislature of 1803-04. Late in 1806, when scarcely eligible, he was chosen to fill a vacancy in the U. S. Senate caused by the resignation of Gen. Adair. His term expired with his first session, but he had already made his mark as a champion of internal improvement. He was again chosen to the legislature in 1807, and elected speaker of the House. He now proposed that each member should clothe himself wholly in Amer. fabrics, which was stigmatized by Humphrey Marshall as the project of a demagogue—lang. which led to a duel wherein both were slightly wounded. At the session of 1809 C. was again chosen to fill a vacancy in the U. S. Senate—this time for 2 yrs. In Aug. 1811 he was elected to the House, and on the first day of his service was chosen its speaker. This Cong., in June 1812, declared war against G. Brit., C. being one of its foremost advocates, as he remained until despatched to Europe by Pres. Madison as one of the negotiators of peace. Returning in Sept. 1815, and having been re-elected to the House in his absence, he was rechosen speaker without opposition. He had been conspicuous in defeating the recharter of the first bank of the U. S. in 1811; he was equally active and influential in

promoting the charter of the second in 1816. He was still a champion of protection to home industry, and of national internal improvements, and was foremost in effecting the compromise whereby Mo. was admitted as a slave State, on condition that all Federal terr. N. of lat. 36° 30' should be consecrated to free labor.

In 1845 candidates were started for Pres.—William H. Crawford of Ga., who had the caucus nomination; John Quincy Adams of Mass., then Monroe's sec. of state; Andrew Jackson of Tenn., then a U. S. Senator; John C. Calhoun of S. C., then sec. of war, and Henry Clay of Ky., then speaker of the House. Mr. Calhoun withdrew, and was made V.-P. by general consent, while Jackson, Adams, and Crawford (no one having a majority) were the 3 highest on the electoral vote, which compelled the House to choose between them. C. having received the votes of Ky., O., and Mo. only, with 4 of those cast from N. Y., was 4 votes behind Crawford, and so could not be voted for in the House. He and his friends cast their votes for Adams, electing him by the vote of 13 States, to seven for Jackson and 4 for Crawford. Adams made C. his sec. of state, whereupon a cry of "Bargain!" was raised; Jackson was at once proposed for next Pres., and was elected over Adams, Calhoun being again chosen V.-P. At the next choice of Pres. (1833) C. was run against Jackson, and was defeated. He had just been returned to the U. S. Senate, in which he played a leading part for many yrs. ensuing, especially in the tariff compromise of 1833, whereby a conflict with S. C. was averted, and in resistance to the new financial policy of Pres. Van Buren in 1837, whereby the treas. was to be divorced from all connection with banks.

C. was again a candidate for Pres., before the first Whig national convention in Dec. 1839, but Harrison was nominated and elected. His death and Tyler's course brought C. forward as the choice of his party in 1844, when an unsuccessful effort was made to elect him; James K. Polk of Tenn., carrying N. Y. and Pa. by a handful of votes, when N. Y. alone would have elected C. The annexation of Tex., and the resulting war with Mex. were fruits of this election. C.'s name was once more presented to the Whig national convention of 1848, but Taylor was nominated over him and elected. He had in 1842 bidden farewell to the Senate, but was persuaded to return to it after 1844, and bore a leading part in effecting the slavery compromise of 1850. He returned to Wash. from Ky. for the last time near the close of 1851, and was soon prostrated by disease, under which he gradually sank until his death. Though not successful as an aspirant to the presidency, he was a gallant party chief, an admirable orator, a skillful legislator, wielding unequalled influence, not only over his friends, but even over his political antagonists. D. June 29, 1852. [From orig. art. in *J's Univ. Cyc.*, by Hon. HORACE GREELEY, LL.D.]

Clay (HENRY, JR.), son of the distinguished orator and statesman of the same name, b. Apr. 10, 1811, in Ashland, Ky., grad. at W. Pt. 1831; resigned Nov. 1, 1831. Counsellor-at-law 1833-46; Lieut.-col. 2d Ky. Volunteers in the war with Mex. 1846-47; was mortally wounded at Buena Vista, and in that condition lanced to death, Feb. 23, 1847.

Clay (JAMES B.), brother of the preceding, b. in Ky. in 1817, chargé d'affaires to Lisbon 1849, elected to represent his father's dist. in Cong. 1857; espoused the Confed. cause, and d. in Montreal, Canada, Jan. 26, 1864.

Clay Centre, city and R. R. centre, cap. of Clay co., Kan., on Republican River. Pop. 1880, 1753.

Clayton (JOHN MIDDLETON), LL.D., a statesman, b. in Sussex co., Del., July 24, 1796, graduated at Yale in 1815; studied law, practised in Del., and gained a high reputation. He was elected a Senator of the U. S. in 1829, joined the Whig party, and was re-elected to the Senate in 1835; in 1845 was again chosen, and in Mar. 1849 became sec. of state in the cabinet of Pres. Taylor; negotiated the Clayton-Bulwer treaty in 1850; resigned on the death of Pres. Taylor in July 1850; chosen U. S. Senator 1851-57. D. Nov. 9, 1856.

Clayton (POWELL) was before the c. war a lawyer of Leavenworth, Kan. In 1862 became Lieut.-col. of the 5th Kan. Cav., and afterward a brig.-gen. He was gov. of Ark. 1866-71, and was chosen U. S. Senator in 1871.

Clayton (THOMAS), a jurist, b. in Del. 1778, was a Whig member of Cong. from his native State 1813-17, and U. S. Senator 1823-26, and again 1837-47. He was for a time chief-justice of the court of common pleas and of the supreme court of Del. D. Aug. 21, 1854.

Clayton-Bulwer Treaty. See APPENDIX.

Claytonia [named in honor of John Clayton, noticed above], or **Spring Beauty**, a well-known genus of Amer. and Asiatic flowers of the order Portulacaceae. These beautiful flowers open in early spring, and are common in most of the U. S., one species being found in Alaska. The tubers of *C. tuberosa* are eaten in Siberia. Some of the species are naturalized in Europe.

Cleanthes (Gr. Κλεανθης), a Gr. Stoic philos., b. at Assos, in Asia Minor, about 300 B. C. He studied under Zeno at Athens, and succeeded him as the head of the Stoic school, about 260 B. C. His numerous works are lost except a hymn to Jupiter.

Clearchus, κλεαρχός [Gr. Κλεαρχος], a Spartan gen. who commanded a body of Grs. for Cyrus against Artaxerxes, king of Per., at Cunaxa, 401 B. C. C. was captured by treachery and put to death in 400 B. C.

Clearfield, cap. of Clearfield co., Pa., on R. R. and the W. Branch of the Susquehanna River. It has an acad. Pop. 1870, 1361; 1880, 1809.

Clearing-House, the place where the exchanges or clearings are made. The C.-H. system was first established in Lond. about the beginning of the present century. It was introduced into this country by the banks of the city of New York, which established the New York C.-H. by organizing an association and commencing operations Oct. 11, 1853. At that time it consisted of 52 banks, and the number is now greater. Each of these banks in its daily dealings

receives large amounts of bills of and checks on other banks, so that at the close of the day's business every bank has in its drawers various sums due to it by other banks. It is in like manner itself the debtor of other banks, which have during the day received its bills and checks drawn upon it. Before the establishment of the C.-H. it was necessary for each bank every morning to make up its account with every other bank, and to send its porter to present the bills and checks so received to the debtor banks for payment. The balances of their indebtedness were adjusted by payments in gold, which became so laborious, dangerous, and complicated that the balances were settled only weekly instead of daily. This was obviated by the C.-H. system, through which the settlements are so simultaneously and almost instantly effected that the transactions adjusted through it have amounted in one day to \$295,821,422.37, in adjusting which the exchanges were settled in the space of an hour. The establishment of the C.-H. system closed 2500 bank ledger accounts, with numerous daily entries in each, and enabled the banks to settle every day with each other without delay or loss.

It is doubtful if without the aid of the banks of the city of New York the U. S., upon the breaking out of the c. war in 1861, could have raised the loans necessary to carry on the war in time to have prevented the success of the enemies of the U. It is certain that without the C.-H. Association the banks could not have furnished the funds which at once established the credit of the govt., and enabled it, by the restoration of confidence, to negotiate its bonds to the amount of over \$2,000,000,000. The panic of 1873 was only checked by similar action, the experience of the war enabling the banks to act with such promptness in combining their entire resources by the use of loan certificates to the extent of over \$25,000,000, as to sustain themselves against a panic, the serious results of which were greatly modified by their action.

The method by which these clearances are effected, though apparently complicated, is really one of great simplicity. There are about 60 banks whose mutual accounts have to be adjusted every morning; and the preliminary operation, occupying exactly 10 minutes, accomplishes what could not otherwise be done in less than 6 or 8 hours. Various methods are resorted to for discovering errors, and the manager, from long experience, generally is enabled to anticipate the nature of the error, whether in entry, footing, or transposition, and thereby facilitate its discovery by applying at once the best method of examination. The entire business of the morning is usually accomplished in 1 hour. The debit banks are required to pay to the manager in legal-tender notes or coin, previous to 1½ o'clock the same day, and the credit banks receive immediately after that hour the amounts due by or to them respectively, thus by one process settling exactly the entire transactions of all the banks of the day previous. [From orig. art. in *J's Univ. Cyc.*, by WILLIAM A. CAMP, Manager of N. Y. C.-H.]

Clearing-Nut, the seed of *Strigulus polatorum*, a small tree of the same genus with that producing the nuxvomica. These seeds being rubbed on the inside of a vessel, any muddy water put into it very quickly becomes clear, all impurities settling to the bottom.

Clear Lake, Iowa. See APPENDIX.

Cleave-land (PARKER), LL.D., a mineralogist and chemist, b. in Rowley, Mass., Jan. 15, 1780. In 1805 he was chosen prof. in Bowdoin Coll., and in all the 53 yrs. of his connection with the inst. missed on his own account only 3 recitations. His work on *Mineralogy and Geol.*, which earned for him the title of "father of Amer. mineralogy," was pub. in 1816. D. Oct. 15, 1858.

Cleburne, R. R. junce, cap. of Johnson co., Tex., is 317 m. N. W. of Galveston. Pop. 1870, 686; 1880, 1855.

Cleburne (PATRICK R.), a gen., b. in Ire. Mar. 17, 1828, removed to Ark., where he was a lawyer; commanded a division of the Confed. army at the battle of Stone River, which ended Jan. 2, 1863, and at Chickamauga in Sept. of that yr.; killed at battle of Franklin, Tenn., Nov. 30, 1864.

Clematis [Gr. κληματις, from κλημα, a "shoot of the vine," so called from its resemblance to a vine]. The white-flowered species, such as *C. flammula* of Europe and *C. virginiana* of the U. S., have the popular name of virgin's bower. The very large-flowered blue and purple species, recently introduced into common cultivation, are varieties of *C. florida* and *C. patens*, natives of Japan. There are about 20 species indigenous to the U. S. The herbage abounds in the acrid and vesicant watery juice which is common in the family, and has been used as a rubefacient in rheumatism. Some species of the U. S. have very thick and leathery sepals, whence the name of "leather-flower."

Clemens (Hon. JEREMIAH), b. at Huntsville, Ala., Dec. 28, 1814, became a lawyer in 1834; served in the Mex. war, and became col. in 1848; was U. S. Senator from Ala. 1849-53; held office under the Confederacy. He advocated the re-election of Lincoln in 1864. D. 1865.

Clemens (SAMUEL LANGHORNE), better known as MARK TWAIN, a humorist, b. in Monroe co., Mo., Nov. 30, 1835; became a journalist at Virginia, Nev., in 1862, and subsequently followed the same profession at San Francisco and at Buffalo, N. Y. Wrote *The Innocents Abroad*.

Clemens Romanus. See CLEMENT I.

Clement [Lat. Titus Flavius Clemens or Clemens Alexandrinus] of Alexandria, an eminent Father of the Chr. Ch.; is supposed to have been a native of Athens, and originally a pagan. He passed the greater part of his life at Alexandria, where he became a disciple of Pantenus, a Chr. philos. He was ordained a presbyter, and in 206 A. D. became a teacher of catechumens at Alexandria, succeeding Pantenus at his death. C. was more addicted to speculative philos. than most of the Fathers of the Ch. Wrote *Pedagogus* and *Stromata*. D. about 230. (See KAYE, *Account of the Writings, etc.*, of Clement of Alexandria.)

Clement I. (or **Clemens Romanus**), the earliest

of the Apostolic Fathers, a bp., accounted by R. Cath. writers as fourth in the order of succession at Rome. Origen (254) identifies him with the Clement of Phil. iv. 3, but this may be only a conjecture. Irenaeus (202) makes him the third after the apostles Peter and Paul. Linus being the first and Cletus (or Anacleto) the second. Eusebius says he d. in the 3d yr. of Trajan, "having for 9 yrs. superintended the preaching of the Divine word." Accordingly, he presided over the Ch. from 91 or 92 to 100 or 101 A. D. His Epistle to the Cor., written about 95 A. D., consists of 65 short chapters, and in bulk is about $\frac{1}{2}$ larger than St. Paul's First Epistle to the Cor. It used to be read in many anc. chs., but was not included in any of the anc. lists of authoritative books. Other writings ascribed to C. are not his.—**CLEMENT II.**, elected pope in 1046; d. 1047.—**CLEMENT III.**, elected 1187; d. 1191. There was also an anti-pope of this title, who d. in 1100.—**CLEMENT IV.**, succeeded Pope Urban IV. in 1265; d. 1268.—**CLEMENT V.**, chosen 1305, as successor to Benedict XI.; d. 1314, and was succeeded by John XXII.—**CLEMENT VI.**, succeeded Benedict XII. in 1342; d. 1352, and was succeeded by Innocent VI.—**CLEMENT VII.**, in 1378 was elected anti-pope in the time of Urban VI.; with him began the great Western schism; d. 1394.—**CLEMENT VII.**, succeeded Adrian VI.; d. 1534, and was succeeded by Paul III.—**CLEMENT VIII.**, chosen in place of Innocent IX. in 1592; d. 1605, and was succeeded by Leo XI.—**CLEMENT VIII.**, anti-pope, elected in 1424; his resignation in 1429 ended the great schism of the West.—**CLEMENT IX.**, chosen 1667 as the successor of Alexander VII.; d. Dec. 1669, and was succeeded by Clement X.—**CLEMENT X.**, became pope 1670; d. 1676, and was succeeded by Innocent XI.—**CLEMENT XI.**, succeeded Innocent XII. in 1700; d. 1721; Innocent XIII. was his successor.—**CLEMENT XII.**, became pope in 1730, as the successor of Benedict XIII.; d. 1740, and was succeeded by Benedict XIV.—**CLEMENT XIII.**, succeeded Benedict XIV. 1758; d. 1769, and was succeeded by Clement XIV.—**CLEMENT XIV.**, succeeded Clement XIII. in 1769; d. 1774.

Clemen'ti (McZio), an It. pianist and composer, b. at Rome in 1752. At the age of 18 he composed his *Opus 1*, which is regarded as the basis on which the whole fabric of modern sonatas for the piano has been founded. D. Mar. 10, 1832.

Cleom'brotos [Gr. Κλεόμβροτος], a Spartan gen., was a brother of Leonidas, who fell at Thermopylae; commanded the army in 480 B. C., after the death of Leonidas; was the father of Pausanias, who defeated the Pers. at Plataea.

Cleombrotos I., king of Sparta, a grandson of the preceding, began to reign 380 B. C.; defeated and killed by Epaminondas at Leuctra 371; left 2 sons, Agesipolis II. and Cleomenes II.

Cleome'des [Gr. Κλεομήδης], an anc. Gr. astron., whose native place and period are unknown. He wrote a treatise on astron. entitled *The Circular Theory of the Heavenly Bodies*. It contains several scientific truths, as the spherical figure of the earth and the revolution of the moon about the earth. The refraction of light was noticed by him.

Cleom'enes, or Kleomenes [Gr. Κλεομένης], **I.**, king of Sparta, succeeded his father Anaxandrides, about 518 B. C.; liberated Athens from the domination of the Pisistratidae in 510. D. 489 B. C., and was succeeded by his half-brother, the heroic Leonidas.

Cleomenes III., king of Sparta, of the Agidae line, was a son of Leonidas II.; began to reign in 236 B. C., and resolved to restore the anc. Spartan virtue and discipline; declared war against the Achaean League, and defeated Aratus at Megalopolis in 226 B. C. Antigonus, king of Macedonia, who was an ally of the Achaeans, defeated C. at Selasia in 222. He fled to Egypt, and killed himself in 220.

Cleopa'tra [Gr. Κλεοπάτρα], a queen of Egypt, b. in 69 B. C., was a daughter of Ptolemy Auletes. She was distinguished for her personal charms and mental gifts. Her father, dying in 51, left the throne to her in partnership with her brother Ptolemy. The latter deprived her of royal power, but Julius Caesar interposed in 48 and restored her to the throne after her brother Ptolemy had been killed in battle. She captivated the affection of Caesar, and accompanied him to Rome in 46. After he had been killed in 44, she returned to Egypt. Soon after the battle of Philippi (42 B. C.) she was summoned by Antony to appear before him in Cilicia. He became fascinated by her, neglected public affairs, and spent much time with her in Alexandria. Her fleet fought against Augustus at the battle of Actium, at which she was present, 31 B. C. She was the first to order a retreat. Was eventually taken prisoner by Augustus, who intended to exhibit her in a triumphal procession in Rome. D. 30 B. C. That she killed herself by the poison of an asp is now considered improbable.

Cleopatra's Needle, an obelisk of red granite, first erected about 1600 B. C., at Heliopolis, Egypt, near the delta of the Nile, by Thothmes III. The obelisk is covered with hieroglyphics, each side having 3 perpendicular lines, the central one on each side referring to Thothmes, and the others to Rameses II., the supposed Sesostris; it was dedicated to the god Ra, or the Sun, and stood before the temple of Tum in Heliopolis till removed to Alexandria in Egypt, and set up there 23 B. C., where it remained till it was transported to Central Park, New York, in 1880, having been presented to the U. S. by the khedive of Egypt. It bears its name, "Cleopatra's Needle," on account of a false tradition that it was brought to Alexandria in the time of Cleopatra; it is about 70 ft. high, exclusive of the pedestal, about 7 ft. square at the base, and has a sharply-pointed pyramidal top; weighs 196 tons, and is all in one piece; its pedestal, 6 ft. 10 inches high and about 9 ft. square, is in one piece and weighs 44 tons. (See OBELESK.)

Clepsy'dra [Gr. κλεψύδρα, to "steal," ὕδωρ, "water"], an instrument once used to measure time. Its best form consists of a reservoir kept full of water, from the lower part of which a small stream is allowed to flow into a vertical cylindrical vessel. The increase of depth in this cylinder is

proportional to the time of flow, and may be read off on any suitable scale.

Clerc (LAURENT), a deaf-mute, b. at La Balme, near Lyons, Fr., Dec. 26, 1785. When 1 yr. of age he lost his hearing in consequence of a severe burn. He was instructed by the Abbé Sicard at Paris. He came to the U. S. in 1816 with Gallaudet, and was one of the founders of the Hartford asylum for the deaf and dumb, opened in 1817. He was a laborious and successful teacher. D. July 18, 1869.

Clerk (JOHN), a Scot. naval tactician, b. at Eldin about 1730. He is said to be the inventor of the manœuvre in naval tactics called "breaking the line." This plan was first tried by Lord Rodney in 1782, when he gained a victory over the Fr. admiral de Grasse. Wrote *Essay on Naval Tactics*. D. May 10, 1812.

Clermont', a city of Fr., cap. of the dept. of Puy-de-Dôme, 208 m. S. by E. from Paris, with which it is connected by R. R. It has a Gothic cathedral of the 13th century, a coll., a public library of 1600 vols., a theatre, a normal school, and a botanic garden. C. occupies the site of the anc. cap. of the Arverni, which was originally called *Nemosis*, and afterward *Augustonemetum*. It became a bp.'s see about 250 A. D. The great council in which the crusades originated was held here by Pope Urban II. in 1095. C. was the cap. of Auvergne for several centuries. Pop. 1881, 43,033.

Cleveland, an important R. R. and commercial centre, the second city of O., is situated upon the S. shore of Lake Erie, at the mouth of the Cuyahoga River, in lat. 41° 30' 5" N., and lon. 81° 42' 6" W., and is the seat of govt. for Cuyahoga co. Its R. R. distance from Columbus, the cap. of the State, is 138 m. Its area exceeds 27 sq. m., more than 17,000 acres of terr. being included within its limits. It was founded in 1796, and named in honor of Gen. Moses Cleveland. No permanent settlement was accomplished earlier than 1800. Dec. 23, 1814, an act was passed incorporating the v. of C.; in 1836 a city charter was obtained; in 1855 a union was effected with O. City, upon the W. side of Cuyahoga River. The pop. in 1810 was 57; 1820, 350; 1830, 1000; 1840, 6071; 1850, 17,084; 1860, 43,417; 1870, 92,829; 1880, 160,146. With R. Rs. converging from all directions except the N.; with the chain of great lakes opening communication with the iron and copper mines of Lake Superior; with the O. Canal connecting Lake Erie with the O. River, and the O. and Pa. Canal penetrating the coal-fields of O. and Pa., its commercial facilities are second to no city in the West. Its harbor consists of 2 piers, extending from the mouth of Cuyahoga River 1200 ft. into the lake, between which is a channel 200 ft. wide and of sufficient depth for the entry of the largest vessels. The U. S. govt. is constructing a harbor of refuge at this point.

The C. Med. Coll. was established in 1843; the Eye, Ear, and Throat Inst. is conducted under its sanction; the C. Homœopathic Coll. was founded in 1850; the med. dept. of the Univ. of Wooster was established in C. in 1864. The C. Public Library was opened in 1869; it is supported by a tax of $\frac{1}{4}$ of a mill on the assessed valuation of the city. The C. Library Association, chartered in 1848, and subsequently united with the Mercantile Library, enjoys an endowment of \$23,000, and possesses the title to the building which it occupies, valued at \$300,000. The C. Law Library was established in 1870 by a joint-stock company. In addition to these are the libraries of the Western Reserve Historical Society, Kirtland Society, Y. M. C. A., and the Bethel Free Reading-Room.

Charity (St. Vincent's) Hospital, opened in 1866, was built by gen. subscription and donations; it is supported by donations and the revenue derived from paying patients. The City Infirmary is maintained at an annual cost of about \$50,000. The City Hospital, to which the first patient was admitted 1866, has no endowment; in 1875 it was consolidated with the U. S. Marine Hospital. The Foundling Hospital, established in 1873, is without endowment, and is supported by donations. The House of Maternity is managed in connection with the Charity Hospital. The Homœopathic Hospital was founded in 1868 as an adjunct to the C. Homœopathic Coll. The Women's and Children's Free Med. and Surgical Dispensary was founded in 1878 by the lady phys. of the city; it relies upon the charity of ladies for support. The U. S. Marine Hospital was opened in 1852, and consolidated with the C. City Hospital in 1875. The patients are supported by the U. S. govt. at the City Hospital, and have a U. S. surgeon provided for them.

The Bethel Home for the Destitute provides food and temporary shelter for needy residents of the city and strangers; it is sustained by donations. The C. Prot. Orphan Asylum, organized 1852, has an endowment of \$50,000, its income being \$9000 per annum. The Home for the Aged Poor was founded in 1870 by the Little Sisters of the Poor; it has no endowment, and is supported by solicited charity. The Valiant St. Boarding-house, opened in 1869 and enlarged in 1872, is conducted by the Women's Chr. Association, and is without endowment, but the association owns the buildings and grounds, valued at \$40,000, a present from a gentleman of the city; its object is to furnish a home to respectable young ladies dependent upon their own labor for support, and at a cost corresponding to their means. The Retreat is also conducted by the Women's Chr. Association. It was opened in 1867, and in 1873 took possession of an extensive building presented to it by generous friends. The Home for Aged Women is under the same management; its building was erected in 1876 by a citizen, who also provided an annual income of \$1000. Trinity Ch. Home is conducted and supported by the congregation of Trinity Epis. Ch. St. Mary's Female Orphan Asylum was founded in 1857, with a small endowment. St. Joseph's Female Orphan Asylum is tributary to St. Mary's, and is devoted to the care of a younger class of orphans; it was founded in 1859, and has no endowment. St. Vincent's Male Orphan Asylum, founded in 1852, without endowment, is supported by fairs held throughout the diocese and contributions. The Jewish

Orphan Asylum was founded in 1868, without endowment, but receives strong support from the order of I. O. B. B., private subscriptions, and donations. The N. O. Insane Asylum, a State inst., is also located at C.

C., noted as the "Forest City," is liberally provided with parks. The Public Square contains 10 acres, is centrally located, adorned with fountains, etc., and has an elegant monument to Com. Perry in commemoration of his victory on Lake Erie in 1813. Lake View Park comprises 8½ acres; it is situated upon the shore of the lake. The South Side Park contains 8 acres. There are also several less important public and many elegant and extensive private parks. The Viaduct, a bridge and elevated street built by the city, spans the valley of the Cuyahoga, connecting the E. and W. sides of the city. Its length is 3211 ft., width 64 ft.; the pivot span, or draw, is 332 ft. in length and 68 ft. above the ordinary water-surface of the river. The structure consists of iron trusses, girders, walls of masonry, and stone arches. It was commenced in 1874 and completed at the close of 1878, the entire expenditure, Jan. 1, 1879, having been \$2,135,000. The city is abundantly supplied with pure water from Lake Erie by extensive water-works, upon which had been expended, to Jan. 1, 1879, \$2,472,978.63. To avoid the impurities imparted to the water by the drainage of the city, a tunnel is employed, extending 1¼ m. into the lake.

F. H. BRADNER, COMMERCIAL ED. "LEADER."
Cleveland, R. R. Junc., cap. of Bradley co., Tenn., 29 m. E. by N. from Chattanooga. It has a female inst. Pop. 1870, 1658; 1880, 1874.

Cleveland (CHARLES DEXTER), LL.D., a scholar and writer, b. at Salem, Mass., Dec. 3, 1802, grad. at Dartmouth in 1827; prof. of Lat. and Gr. in Dickinson Coll., Pa., in 1830, and of Lat. in Univ. of New York in 1832. He opened in 1834 a sem. for young ladies in Phila.; pub. a *Compendium of Amer. Literature* and a *Compendium of Classical Literature*. D. Aug. 18, 1869.

Cleveland (CHAUNCEY F.), LL.D., b. at Hampton, Conn., in 1799, was admitted to the bar in 1819; was gov. of Conn. in 1842 and 1843, and M. C. 1849-53.

Cleveland (GROVER), b. in Caldwell, N. J., Mar. 18, 1837, removed to Buffalo, N. Y., at 17; was admitted to the bar in 1859; assistant dist. atty. Erie co. 1863; sheriff 3 yrs. from 1870; mayor of Buffalo 1881; nominated by Dem. party for gov. of N. Y., and elected in 1882; nominated July 11, 1884, for pres. of the U. S. by Dem. convention at Chicago, and elected Nov. 4, 1884.

Clifford (JOHN HENRY), LL.D., a lawyer, b. at Providence, R. I., Jan. 16, 1809, grad. at Brown Univ. in 1827; was gov. of Mass. 1853-54, and atty.-gen. of that State 1849-53 and 1854-58. D. Jan. 2, 1876.

Clifford (NATHAN), LL.D., a jurist, b. at Rumney, N. H., Aug. 18, 1803; became a citizen of Me. in 1827, M. C. 1839-43, U. S. atty.-gen. 1846-47; was subsequently U. S. minister to Mex. He became a justice of the U. S. supreme court in 1858, and was the author of 2 vols. of *U. S. Circuit Court Reports*. D. July 25, 1881.

Clifton, a watering-place of Eng., is a suburb of Bristol. Here are tepid springs which contain carbonic acid and salts of magnesia; temperature of 73° F. Pop. 28,695.

Clifton, Ariz. See APPENDIX.

Clifton Springs, Ontario co., N. Y., on R. R., 10 m. E. N. E. of Canandaigua. It has copious sulphur springs, and the "C. S. Sanitarium." Pop. 1870, 746; 1880, 902.

Climacteric Year [from the Gr. κλιμακτηρικός, from κλίμας, a "ladder"], certain yrs. in the life of man long supposed to constitute critical points in his health and fortune. The number 7 multiplied into 3, 5, 7, and 9 produced crises of this kind. The 63d yr., called the "grand climacteric," was the most important, its influence being ascribed to the fact that it is the multiple of the 2 mystical numbers 7 and 9.

Climate, the condition of any place in respect to temperature, moistness or dryness; the phys. agencies fostering life and acting through the atmosphere. Heat and water are the 2 elements of which every plant and animal require a certain share. The laws of the distribution of heat and rain, therefore, are here the most important. To them we must add the course of the winds, which play a prominent part in both. The temperature may be considered as the most fundamental of the phenomena of C., for the winds are essentially due to differences of temperature, and the rains are regulated both by changes of temperature and the course of the winds.

Distribution of Heat.—All heat available for the purposes of organic life comes from the sun. Its distribution over the globe, however, depends upon both astronomical and physical causes. To the first belong the spherical form of the earth, its rotation on itself, its revolution around the sun, and the inclination of its axis; to the second, the difference in the absorbing power of land and water, the action of the winds and marine currents, and the elevation above the sea. The climatic condition derived from the first constitutes the astronomical C., which, modified by these secondary phys. agencies, becomes the phys. or actual C.

Astronomical C.: Influence of the form of the Earth.—The most gen. law in the distribution of heat is its gradual decrease from a maximum at the equator to a minimum at the poles. The cause of this inequality is the spherical form of the earth. The rays of the sun fall most thickly and produce their full effect when perpendicular, as in the equatorial regions; less thickly and with diminished intensity when slanting, as in the intermediate lats.; when tangent, as at the poles, they lose their heating power. Each day testifies to this fact. The horizontal rays of the rising and setting sun have but little heating power; the heat increases with the ascending sun; it is greatest at noon, when the sun is highest. To this cause, therefore, we must trace those permanent differences of temperature which carry with them corresponding differences in the system of winds, rains, and organic life, and establish the great zones of C.—tropical, temperate, and frigid.

Influence of the Movements of the Earth.—To the rotation on its axis is due a daily period of light and darkness. While the sun shines the earth receives more heat than it emits by radiation; during the night it loses more than it receives. Hence this period of day and night is one of heat and cold, the coldest part of which is the end of the night, or sunrise.

The revolution of the earth around the sun combined with the inclination of its axis on the plane of revolution causes these periodic variations of heat and cold which are called the seasons. If the axis of the earth were perpendicular on the plane of its orbit, the sun would always be opposite the equator. The days and nights being then of equal length on all parallels, all the year round, the mean temperature on each parallel would be constant, and no seasons of heat and cold would exist.

But the axis being inclined 23½°, an ever varying inequality of days and nights and of temperature is the consequence. Only twice a yr., on the 20th of Mar. and the 22d of Sept., is the sun opposite the equator. It is then the time of the equinoxes and average temperature. On the 21st of June, the N. pole being inclined 23½° toward the sun, the sun's rays fall perpendicular on the Tropic of Cancer, and the border of the lighted hemisphere reaches the opposite side of the Arctic Circle, 23½° beyond the pole. This is the time of the solstice, or of the longest day and shortest night and of the highest sun in all the N. hemisphere. It is therefore the summer season, while the S. hemisphere has the shortest day, the longest night, the lowest sun, and the winter season. On the other solstice, the 21st of Dec., the reverse takes place. The difference in the length of days and nights increases very slowly in the tropical regions, then more and more rapidly to the Arctic Circle, where the longest day is 24 hours, and the sun does not set on the 21st of June. Beyond that limit to the pole the sun makes the circuit of the horizon without disappearing for months in succession, and at the pole the yr. is divided into 1 day and 1 night of 6 months each. The reverse again occurs in the opposite season. Thus in the tropical regions the temperature is nearly constant throughout the yr., while the increasing inequality of days and nights toward the pole causes an increasing difference between the temperature of summer and winter.

The length of the days, however, in the high latitudes compensates for the diminished intensity of the sun's rays, and so it happens that the accumulated heat of a long summer day in the temperate regions may be equal to, or greater than, that of a day in the tropical regions. A summer day of nearly 19 hours in Labrador or St. Petersburg may be as warm as a day of 12 hours under the equator, but these N. lats. have only a few such days in the yr.

Toward the equator the number of warm days gradually increases. Thus the polar regions have short summers and long winters, passing rapidly from one to the other with great differences of temperature. In the temperate regions summer and winter are about of equal length, with long transition seasons of spring and autumn and variable temperature. An everlasting summer reigns in tropical regions.

Physical C.—According to the laws of astronomical C., we should expect the same average temperature and the same periodic changes in all places situated on the same parallel of lat., but thermometric observations prove it to be quite otherwise. On the W. side of the Atlantic Ocean, Labrador has a frozen and treeless C., while on the other side in the same lat. we are greeted by the mild atmosphere, rich verdure, and fertile fields of the Brit. Isles. New York with its icy winter is in the same lat. as Naples with its orange groves. On the W. coast of our continent, San Francisco, with its mild, snowless winters and cool summers, is on the parallel of Wash., with a frozen Potomac in the cold season and a burning summer sun.

Isothermal Lines.—To render visible to the eye the actual distribution of heat, as given by observations of the thermometer, Humboldt introduced the *isothermal lines*, or lines which connect all places having the same mean temperature, either of the yr., of a season, or of any particular month. The annual isothermal lines show the average amount of heat belonging to each place; the monthly and season isothermals, its distribution throughout the yr. To eliminate the local influence of altitude, the temperatures are reduced to what they would be at the level of the sea.

Such lines show a wide departure from the course of the parallels. It is evident that the greater their difference is from the parallels, the greater also the deviation from the astronomical temperature arising from phys. causes. To understand aright the meaning of these differences, we must remember that when the isothermal lines, in either hemisphere, bend away from the equator toward the poles they indicate heating influences; when they bend from the poles toward the equator they indicate a cooling influence.

The prin. facts to be noted here are the following: On the whole, the greater disturbances occur in the N. hemisphere, which has the most land; the isothermal lines are far more uniform in the S. hemisphere, which has most water. The greatest deviations are found on the opposite coasts of the Atlantic Ocean. The isothermal line of 50° F. of temperature, which passes near New York in the 40th degree of lat., reaches Ire. and Lond. and on the other side of the Atlantic, 11 degrees of lat. farther N. The isothermal of 40°, which passes through Central Canada and N. S. about the 46th degree of lat., touches the S. part of Iceland and the coast of Nor. in the 64th degree of lat., or 18 degrees farther N. The isothermal of 30° passes through Central Labrador and Cape North in Europe, though their lats. differ by 21 degrees. In higher lats. the difference is still greater. From these remarkable deviations of the isothermal lines, we see that not only W. Europe is a great deal warmer than E. Amer. in the same lat., but that the difference increases more and more toward the pole. It is also evident from the bending of the lines that the heating influences bear toward the N. E.

Similar modifications of the annual isothermal lines take place in the N. Pacific. Here also the E. (or Asiatic) is colder than the Amer. coast, and the climate of Cal. and Or. much milder than that of a corresponding lat. in Asia; but all these differences are reduced to nearly $\frac{1}{2}$ of what they are on the opposite coasts of the Atlantic.

It can thus be accepted as a law that in the 2 great land masses of the N. hemisphere the W. coasts are warmer than the E. coasts. Moreover, while the average temperature of the oceans is higher, the bending of the lines southward in the interior of these continents shows a lower temperature than that due to their lat.

In the S. hemisphere the law of the temperature of the opposite coasts seems to be reversed. In Amer. and in Afr. the W. is colder than the E. coast, and in this hemisphere the average temperature of the continents is rather higher than that of the ocean.

Influence of Winds and Marine Currents.—The cause of these apparent anomalies in the distribution of heat is found in the course of the gen. winds and marine currents which carry the temperatures of one astronomical zone into another. Equatorial winds from the S. bring us a share of heat from the tropics; polar winds, the chilling breath of a N. atmosphere. If, from any cause, one of these great currents becomes prevailing throughout the yr. in a particular region, a certain amount of heat or cold is added to or subtracted from the solar heat, considerably modifying the astronomical temperature. The great marine currents perform the same functions, carrying tropical and polar temperatures far into the middle lats. Thus it is that the S. W. winds, which blow almost $\frac{3}{4}$ of the yr. over W. Europe, and the constant flow of the warm waters of the Gulf Stream, greatly increase the average temperature of that continent, and strongly deflect the course of its isothermal lines. In the S. hemisphere the great Antarctic currents cool the W. coast of S. Amer. and W. Afr., while the tropical marine currents warm the E. coasts of both continents. (See WINDS, and CURRENTS, MARINE.)

Land and Sea C.—Water has a great capacity for heat, but a feeble conducting power; it grows warm slowly in the rays of the sun, and gives up its heat slowly. Thus the heating and cooling do not reach extremes. Land rapidly absorbs the solar rays; the surface layer is quickly heated and soon attains a high temperature, but loses it by radiation with equal rapidity. It thus reaches great extremes of heat and cold. The sea or oceanic C., therefore, is characterized by equableness of temperature and moisture; the land or continental C., by extremes of temperature and dryness. Owing to the same cause, the continents in winter are cooler, and in summer warmer than the oceans. ARNOLD GUYOT.

Climbers (in ornithology). See SCANSORES.

Climbing Fern (*Lygodium palmatum*), a rare species of fern of the sub-order Osmundineæ, is remarkable for its habit of climbing or twining upon shrubs and weeds. It occurs in the U. S. from Mass. to Fla. and westward.

Climbing Perch. See ANABANTIDÆ.

Climbing Plants, or Climbers, the popular term for those plants which seek support from other objects in order to ascend from the earth, as the vine, etc. This end is accomplished in different ways. Some climb by means of rootlets growing from the stem, as the ivy; some by the coiling of their petioles or leaf-stalks, as *Clematis* and *Nasturtium*; some by means of tendrils, as the grape-vine and passion-flower; and some tendrils, instead of taking hold by their coiling tips, adhere by expanded disks, as the Va. creeper. In twiners the stem itself coils around the support, either from right to left (against the sun), as in the pole-bean, or from left to right, as the hop-vine. Tendrils are sometimes of the nature of leaves or parts of leaves; more commonly they are transformed branches. It is only recently that the movements through which plants climb in these various ways have come to be understood.

Clinch River rises in the S. W. part of Va., flows S. W., and enters E. Tenn.; flows between two ridges called Clinch Mt. and Powell Mt., and unites with the Holston at Kingston to form the Tenn. River. Length, about 300 m.

Clingman (THOMAS LANTER), b. in Surrey co., N. C., grad. at the Univ. of N. C. 1832; was sent to Cong. in 1843, and 6 times re-elected; twice chosen U. S. Senator; became a brig.-gen. in the Confed. service.

Clingman's Dome, in Jackson co., N. C., is the highest peak of the Great Smoky Mts., between N. C. and Tenn. It rises to 6660 ft. above the sea, and is the second in height in the Appalachians. It was named after Thomas L. Clingman, who ascended it in 1858.

Clinkstone, a felspathic rock of a grayish-green color, having such a tendency to lamination that it sometimes furnishes tiles for roofing. It is a compact, homogeneous rock, passing gradually into gray basalt. The slab gives a metallic "clink" when struck with a hammer; whence its name.

Clinton, city and R. R. junc., cap. of De Witt co., Ill., 23 m. S. of Bloomington. Pop. 1870, 1800; 1880, 3709.

Clinton, a city, cap. of Clinton co., Ia., a R. R. centre, situated on the Miss. River, 42 m. above Davenport. The river is here crossed by an iron bridge which is about 4000 ft. long and cost \$600,000. The cars of the Chicago and N. W. R. R. pass over this bridge. Pop. 1870, 6129; 1880, 9052.

Clinton, R. R. centre, Worcester co., Mass., on the Nashua River, 16 m. N. E. of Worcester. Pop. of pt. 1870, 5429; 1880, 8929.

Clinton, R. R. junc., cap. of Henry co., Mo., 40 m. S. W. of Sedalia. It is called the "model town" of W. Mo. Pop. 1870, 640; 1880, 2808.

Clinton, R. R. junc., Oneida co., N. Y., 9 m. W. by S. of Utica, and on Chenango Canal. It has a sem. for boys and 4 for young ladies. It is also the seat of Hamilton Coll. In the vicinity are large quarries of good building-stone. Pop. 1870, 1640; 1880, 1236.

Clinton, R. R. junc., Rock co., Wis., 73 m. N. W. of Chicago. Pop. of pt. 1870, 1943; 1880, 2126.

Clinton (CHARLES), the father of George Clinton (1738-1812), b. in Longford co., Ire., in 1690, of Eng. stock. In 1729 he emigrated to Amer., settled in Ulster co., N. Y., became a judge, and a lieutenant-col. in the Fr. and Indian wars, and was the founder of the distinguished Clinton family of N. Y. State. D. Nov. 19, 1773.

Clinton (DE WITT), a statesman, b. at Little Britain, Orange co., N. Y., Mar. 2, 1769, was a son of Gen. James C. and a nephew of Gov. George C. His mother's name was Mary De Witt. He grad. at Columbia Coll., N. Y., in 1786, studied law, and became in 1790 private sec. to his uncle, then gov. of N. Y. He entered public life as a Rep. or Anti-Federalist, and was elected a member of the lower house of the State legislature in 1797, and of the State senate in 1798. In 1801 he was elected a Senator of the U. S.; in 1803 the gov. and council appointed him mayor of the city of New York, subsequently reappointing him. He also served as lieutenant-gov. (1811-13), and was one of the coms. appointed in 1810 to examine and survey a route for a canal from the Hudson to Lake Erie. In 1812 he differed from Pres. Madison in relation to the war against G. Brit., and became his competitor for the presidency. Mr. C. was nominated by the Rep. members of the legislature of N. Y., and was supported by many Federalists. He received 89 electoral votes, cast by Mass., Conn., N. H., R. I., N. Y., N. J., Del., and Md., but was not elected. His course and policy at this period offended many of the Reps. (or Dems.), and he was removed from the mayoralty about the end of 1814. In 1815 he composed an able argument for the construction of the Erie Canal, of which enterprise he was the prin. promoter. This argument was in the form of a memorial to the legislature of the State, which early in 1817 passed a bill authorizing the construction of that canal. He was elected gov. of N. Y. in 1817, but his former political opponents organized against him a party who were called "Bucktails," and who denounced the projected canal as visionary and impracticable. In 1820 he was re-elected gov., Daniel D. Tompkins being the defeated candidate; he was again elected gov. in 1824. The Erie Canal was completed in 1825, and when the opening of the canal was celebrated in Oct. of that yr. Gov. C. was conveyed in a barge with triumphal demonstrations from Lake Erie to the city of New York. He was re-elected gov. in 1826, and d. at Albany before the expiration of his term of office, Feb. 11, 1828.

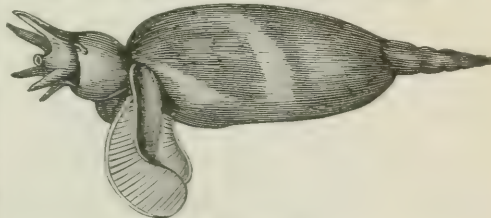
Clinton (GEORGE), the 4th V.-P. of the U. S., b. in Ulster co., N. Y., July 26, 1739. He was an uncle of De Witt Clinton. He practised law in his youth, and was elected in 1775 to the Continental Cong., in which he voted for the Dec. of Ind., but he was absent when it was signed, having been called to take command of a brigade of militia. He was chosen gov. of N. Y. in 1777, and continued in that office, by several re-elections, until 1795. In 1788 he presided over the State convention called to ratify the Federal const., which instrument he disapproved, because it gave too much power to the central govt. He was afterward the prin. leader of the Rep. party in the State of N. Y., and was chosen gov. of that State in 1801. In 1804 he was elected V.-P. of the U. S. by the Dems., who elected Jefferson as Pres. He was re-elected V.-P. in 1808 when Mr. Madison became Pres. D. Apr. 20, 1812.

Clinton (Sir HENRY), an Eng. gen., b. in 1738. He served as maj.-gen. at the battle of Bunker Hill, June 1775, and was appointed commander of the Brit. army in N. Amer. early in 1778. He evacuated Phila. in June 1778, and moved his army by land to New York. He conducted an expedition against Charleston, S. C., which he besieged and took in May 1779. In Oct. 1781 he sailed from New York with about 7000 men to relieve Cornwallis, but the latter surrendered at Yorktown before the arrival of C. He was superseded by Gen. Carleton in 1781. D. Dec. 24, 1795.

Clinton (JAMES), a gen., b. in Ulster co., N. Y., Aug. 9, 1736, was a son of Col. Charles C. and the father of the statesman De Witt C.; served under Gen. Montgomery in Canada, and took part in Sullivan's operations against the Indians in N. Y. in 1779. In Oct. 1781 he assisted at the siege of Yorktown. D. Dec. 22, 1812.

Clio (Gr. Κλέω), one of the 9 Muses, presided over history, and was represented as holding in one hand a half-opened roll or scroll, and in the other a cithara.

Clioidea, a family of Pteropods. The *Clio borealis* is a prin. part of the food of whales in the Arctic seas. It is



Clio Borealis.

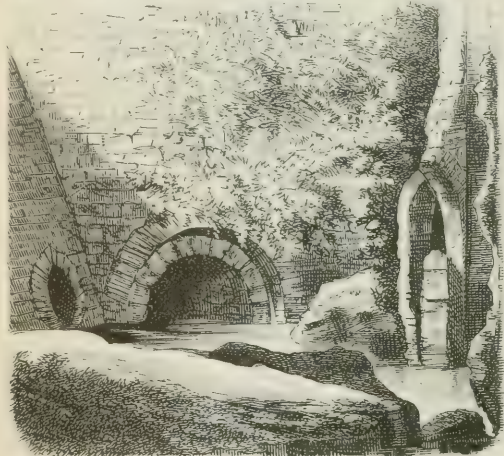
scarcely an inch long. They are sometimes so numerous that a whale cannot open its mouth without engulfing them in great numbers. *Clio australis* is very abundant in S. seas.

Clisthenes, or **Cleisthenes** (Gr. Κλεισθένης), an Athenian statesman, the grand-uncle of Pericles, lived about 500 B. C. He increased the number of the tribes of Attica from 4 to 10, and rendered the const. more democratic.

Clive (ROBERT) LORD, the founder of the Brit. supremacy in India, b. at Styche in Shropshire, Sept. 29, 1725. He went to Madras in 1744, and became a clerk in the service of the E. I. Co., then a trading corporation possessing only a few acres of land. War having broken out between the Eng. and Fr., he entered the service as an ensign in 1747.

His military genius and resolute spirit procured his rapid promotion. In 1750 and 1751 he defeated the Fr. at Arcot and other places. In 1755 he was appointed gov. of Ft. St. David. He waged war with success against the nabob Surajah Dowlah, and took Calcutta in 1757. In June of that yr., with 3000 men, he gained a decisive victory over the nabob's army of 60,000 men at the battle of Plassey, and was rewarded with the office of gov. of Bengal. In 1760 he returned to Eng., and was raised in 1761 to the Irish peerage as baron of Plassey. In 1764 he was again sent to India, with authority to rectify disorders, and proved himself an able administrator, and restored discipline; returned to Eng. in 1767. His enemies in Parl. accused him of having enriched himself by a tyrannical abuse of power. An inquest resulted in his acquittal. He became addicted to the excessive use of opium, and committed suicide in Lond. Nov. 22, 1774. (See Sir JOHN MALCOLM, *Life of Lord Clive*.)

Cloaca Maxima [Lat. the "largest sewer"], a subterranean passage through which a great part of the sewage of anc. Rome was conveyed to the Tiber. Its construction is attributed to Tarquinius Superbus (about 550 B. C.). Passing



Mouth of Cloaca Maxima at Rome.

from the Forum it terminated in the Tiber, where the mouth of it is still to be seen. Notwithstanding its great age, the C. M. is in admirable preservation.

Clocks. From the earliest periods of human hist. man has sought to measure time. To pastoral or agricultural nations, where the duties of each day were monotonous and bounded by the 4 great divisions of sunrise, mid-day, sunset, and midnight, extreme accuracy was not important. The first measure of time was the sun-dial, but this being of no service at night or in cloudy days, the hour-glass was invented, next the clepsydra, subsequently improved by the addition of a toothed wheel and index, or sort of dial driven by the water which flowed from the bottom of the jar. These have been in use 2000 yrs. The next improvement was the substitution of a weight, for the water, to turn the wheel. This has been attributed to Archimedes. Some contrivance was necessary to regulate the weight so as to make the index pass over equal spaces in equal times. This must be accomplished by a pendulum or escapement of some kind, and a rude escapement is attributed to Gerbert, about A. D. 1000. A better one was that of De Vick in 1379. Accuracy in marking time was not attained, however, by this, although it was a great improvement. For 270 yrs. there was no advance; but between 1641 and 1658 the idea of attaching the pallets of the escapement to the pendulum-rod and making the escapement horizontal occurred both to Harris, an Eng. clock-maker, and Huyghens, a Dut. philos. The anchor escapement of Dr. Hooke, invented in 1666-80, and the dead-beat escapement of Graham in 1700, gave a new impulse to clock-making. There has been no material change in the principles on which C. are made except in the substitution of steel springs for weights and in the finer movements, and the addition of the hair-spring to regulate still further the action of the escapement or pendulum, since 1700. There have been a great variety of escapements invented, and much more attention paid to accuracy in the details and perfection of finish, but the principles are the same. The tall, old-fashioned C., with its long pendulum and heavy weights, seems a very different thing from the little "nutmeg lever" which stands on the shelf, but both depend upon the same principle.

In the U. S. the only C. now imported, except by the antiquarians, are the Fr. mantel or parlor C., and the importation of these is falling off. Our manufacturers make C. for the world. About 2,500,000 are made annually, and the number is increasing. The value of these at the factories is probably \$6,000,000 or more. The C. manufacture in the U. S. began about 1787. Eli Terry of Windsor, Conn., was probably the first clock-maker here. His C. were made entirely of wood. In 1807 he undertook to make 500 C. at one time, but this overstocked the market and reduced the price from \$25 to \$15, and at last to \$10. It was not till 1837 that brass-wheel C. were made in the U. S. After many vicissitudes the business of clock-making is now in the hands of not more than 15 houses, of which 11 of the largest are in Conn. and the rest in Mass. and N. Y. They manufacture common one and eight day C.; levers, one and eight day, with and without strike and alarm; office, hanging, and

calendar C.; clock movements, mantel or parlor C. equal to the best Fr. in accuracy and elegance, and tower and pillar C. All of these are superior in quality to and lower in price than the best foreign C.

The remarkable Amer. astronomical C. produced by Felix Meier by 4 yrs. labor (1876-80, fully described in *J. S. Union Cyc.*, vol. ii. p. 116), and which is pronounced by good judges greatly superior to the famous Strasbourg C., is a signal triumph of inventive genius. It is 18 ft. high, 8 wide, and 5 deep; has 2000 wheels, its weights weigh 700 lbs., and it is wound up once in 12 days. It strikes the quarter hours by appropriate figures, Death tolling the full hour. At each hour a large music-box begins to play, and there is a procession of the Presidents in file before Washington, who stands, holding the Dec. of Ind., upon a marble dome over the main body of the C. The C. represents all the divisions of time from seconds to years, the seasons, signs of the Zodiac, revolutions of the earth, moon, and planets around the sun, etc.

L. P. BROCKETT.

Clo'dius (PUBLIUS), surnamed PULCHER (i. e. "handsome"), a profligate Rom. tribune and patrician, was a brother of Appius Claudius Pulcher. In 62 B. C. he committed sacrilege by intruding himself, disguised as a woman, into the mysteries of Bona Dea. At his trial for this offence he attempted to prove that he was not in Rome at that time, but Cicero testified that he saw C. in Rome on that day, and thus incurred his enmity. C. was acquitted by means of bribery, and was elected tribune of the people in 59 B. C. He persecuted Cicero by the enactment of a law that he should be interdicted from fire and water, and drove him into exile. He was killed in 52 B. C. in an encounter with Milo.

Clothaire I., b. in 497 A. D., was the fourth son of Clovis, king of the Franks. He became king of Soissons in 511, and by murdering 2 of his nephews obtained the sovereignty over all the former dominions of Clovis. D. 561, leaving 4 sons, who divided the realm between them.

Clothaire II., a son of Chilperic I. and grandson of Clothaire I., inherited the kingdom of Soissons in 584 A. D. He put to death Brunehaut, queen of Austrasia, and in 613 became sovereign of all Fr. D. 628.

Clothes-Moth (*Pinea fluvicronellata*), a tined of an iridescent buff color, and wings narrow, acutely pointed, and delicately fringed. The moths appear in the N. States about May, lay their eggs by preference in woollen cloth, and the caterpillars develop in June, having woven cylindrical cases in the cloth. Carbolic acid or benzine is one of the best preventives of their ravages.

Clotho, in classic mythology, one of the Parcae.

Clotho (a serpent). See PUFF ADDER.

Clothildas, SAINT, queen of Fr., was a daughter of Chilperic, king of Burgundy. She was married to Clovis I., and induced him to profess the Chr. religion in 496. D. 545.

Clouds [Lat. *nebulae*] are collections of minute particles of water suspended in the atmosphere. These particles are often, in consequence of the great elevation at which they float, in a frozen state, even in summer. When masses of air fully charged with aqueous vapor, but at different temperatures, come in contact with each other and mix, the space occupied by the resulting mass will be overcharged, and the vapor, which was invisible so long as completely mingled with the air, becomes precipitated in the form of water-dust, and then takes the appearance of fog or cloud. The only difference between fog and cloud is that while the latter remains high in the atmosphere, the former seems to rest upon the earth; in other words, fog is simply cloud close at hand.

Clough, RUF (ARTHUR HUGH), an Eng. poet, b. at Liverpool Jan. 1, 1819, was ed. at Rugby. He was one of Dr. Arnold's favorite pupils. From Rugby he passed to Ox., where "he carried away the Balliol scholarship with a renown beyond that of any of his predecessors." From Balliol he was elected to a fellowship at Oriel, and he remained at Ox. until 1848. In 1848 appeared his first pub. poem, *The Bottle of Tobacco-Pouch: a Long Vacation Pastoral*, which was quickly recognized as a work of remarkable power and beauty. After his withdrawal from Ox. in 1848, C. spent a yr. or two in travel on the Continent, going as far as the It. lakes. On his return he pub. poems, of which the earliest date back to 1840, under the title of *Ambarvalia*.

His tutorship at Ox. relinquished, he passed from one employment to another; was warden of Univ. Hall, Lond.; came to Amer., and resided here for a few months in 1852; returned to Eng. to accept an appointment in the education dept. of the privy council office; went to Fr. and Vienna in 1856 on duties connected with the secretaryship to the commission of report on military education; and in leisure hours gradually completed the long revision of Dryden's translation of Plutarch, begun in Amer. D. Nov. 13, 1861.

CLARENCE COOK.

Clover [from a root akin to *cleave*, *cloven*, because the leaves are parted or cleft], or **Trefoil** (i. e. "having three leaves") (*Trifolium*), a genus of plants of the order Leguminosae, containing many species, some of them very important in agriculture. The name is popularly extended to plants not included in this genus, but belonging to the same order, and having the leaves formed of 3 leaflets.

C. is now very frequently cultivated in alternation with grain crops. The kinds most generally sown are the common red, white, and alsike. The common red C. is the finest and most valuable. It frequently grows well on sandy loams, though sown every alternate yr. on the same land. But in some places the land becomes "clover-sick" when sown too frequently with this crop. From 10 to 20 lbs. of seed are usually sown upon an acre. Their leaves gather food from the atmosphere, which they store up in their roots and stems, and these on decomposing afford food for crops which are more dependent on the soil itself. The chief profit in raising C. is in the increased value of the manures it yields, which are highly nitrogenous.

Cloves [from the Sp. *clavo*, a "nail," so called from its resemblance to a nail], the smoked and dried flower-buds of the clove tree (*Caryophyllus aromaticus*), of the order Myrtaceae. The tree is from 15 to 40 ft. high; the flowers are produced in great profusion. Leaves, flowers, and bark have an aromatic odor. The fruit sometimes appears in commerce in a dried state under the name of "mother cloves;" it has an odor and flavor similar to C., but weaker. The flower-buds are gathered, and are dried by the smoke of wood-fires, and afterward by the sun, or by the latter alone. The C. tree is a native of the Moluccas, and the Bencoolen and Amboyna C. are the best; but they are now cultivated in Sumatra, Zanzibar, Mauritius, the W. I., Brazil, and Guiana. The Dut., to secure to their colonists a monopoly of this spice, once destroyed the trees in the other Molucca Islands, and confined the cultivation to the isle of Ternate. Before the discovery of the Spice Islands merchants brought them from Ar., Per., and Egypt to the Mediterranean.

Their aromatic qualities depend on 2 essential oils, which together form $\frac{1}{2}$ of the weight of the C. The oil is obtained by repeatedly distilling with water, when 2 oils pass over—one of which is lighter and the other is heavier than water. The oil has a hot, acrid taste, is of a light yellow color when pure, and brown when not carefully prepared. It is a mixture of eugenic acid and a hydrocarbon isomeric with oil of turpentine. It is soluble in ether, alcohol, and the fixed oils. It is useful in med. to check nausea and griping caused by the administration of purgatives and as a remedy for toothache. C. F. CHANDLER.

Clovis [Lat. *Clodarius*] **I.**, called also **Chlodwig** probably allied to the Ger. *Lodwig*, "Lewis," king of the Franks, b. in 465 A. D. He was the son and successor of Childeric, who reigned at Tournay. By a victory over the Romans and Gauls in 486, C. obtained possession of Soissons, which then became his cap. About 496 became a Chr. In 507 he defeated Alaric, king of the Visigoths, in a great battle near Poitiers, thus acquiring Aquitaine. He chose Paris as his cap. in 507. D. Nov. 27, 511 A. D. His descendants are called Merovingians, from Merovig, the grandfather of C.

Cloves, *klouz* [Pawnee], L.L.D., an Epis. divine, grad. at Columbia Coll. in 1808; in 1823 he became pres. of Washington Coll., Md. D. 1847.

Club-mosses, or **Ground-Pines** (*Lycopodiaceae*), a natural order of cryptogamous plants (acrogenae), in some species resembling the Coniferae in gen. aspect, but frequently having something of the habit of the mosses. They also approach the ferns through *OphioGLOSSUM*, in their reproduction. The genera are few, the living species quite numerous. The genus *Lycopodium* yields the drug lycopodium, a fine inflammable powder consisting of the spores of the plant. This article is much used in pharmacy and in pyrotechnics. Many of the tropical species have active poisonous properties, and some have been used in med. Many of our native species are very beautiful, and are much used in Christmas decoration. The fossil plants of this order were often mighty trees (*Lepidodendron*), and seem to have furnished much material for the oldest coal deposits. At the other extreme must be placed the curious grass-like quill-worts (*Isotles*), which are mostly small aquatic plants of singular habit.

Cluniacs, or **Congregation of Clugny**, a Benedictine congregation, founded in 910 at Cluny in Fr. It rapidly spread, and at one time had more than 2000 convents, with immense wealth. It was finally suppressed in 1790 by the Fr. Constituent Assembly.

Clupeidae [from *Clupea*], a family of malacopterous fishes, including the herring, shad, etc. The maxillary bones consist of 3 pieces; the air-bladder is large; the roe consists of a vast number of eggs. Some of the species ascend rivers, others are exclusively marine. They generally appear in shoals, and some of them periodically visit certain coasts in great numbers. They are found in all parts of the world, and some species have a wide range.

Cluseret, *klüz-zeh-rä* (GUSTAVE PAUL), a Fr. revolutionist, b. June 13, 1823, resigned in 1858 his place as capt. in the Fr. army because he had adopted the principles of Mazzini. In 1861 he entered the volunteer army of the U. S., in which he became in 1862 a brig.-gen. In Mar. 1871 the Communists of Paris appointed him chief of the war dept.; on May 1 he was deposed, arrested, and impeached, but after a few days set free, and fled to Eng.

Clusia, *klüz-sä* [so called in honor of the botanist L'écluse or Clusius], the name of a genus of small tropical trees and shrubs of the order Clusiaceae. Some of them are called balsam trees, from their resinous or balsamic products. They are often epiphytes, growing on larger trees, over the bark of which they send their roots in search of decayed parts from which they may extract nourishment; sometimes a root is sent to the ground, and becomes a kind of stem. According to good authorities, they are sometimes parasitical. *C. rosea*, a native of the W. I. and tropical Amer., yields an abundant resin, which is used in med. and for covering boats instead of pitch. A resin which exudes in large quantities from the disk of the flowers of *C. insignis*, known as the wax-flower of Demerara, is used to make a gently stimulating and soothing plaster. *C. flava*, or yellow balsam tree, grows in S. Fla. and the W. I. It abounds in a yellow resin or balsam, which has medicinal qualities, and is largely used in the W. I. instead of pitch.

Clyde, a river of Scot., rising in the Lowther and Moffat Hills, and flowing at first in a gen. N. W. direction. Near Lanark occur the Falls of the C., a series of cascades and rapids, in which the river descends 230 ft. in a course of 6 m. over sandstone rocks. The highest of these cascades is Corra Linn, forming 3 distinct leaps, in all 84 ft. high. At Glasgow the C. becomes navigable for large vessels, and at Greenock it is 4 m. wide. Below Greenock it flows S., and expands into the Frith of C., which is about 30 m. wide. Length, 75 m., not including the frith.

Clyde, *klüz*, See APPENDIX.

Clyde, Wayne co., N. Y., on the Erie Canal, and on the Clyde River where it is crossed by R. R., 44 m. E. of Rochester. Pop. 1870, 2735; 1880, 2826.

Clyde, R. R. June., Sandusky co., O. Pop. 1880, 2380.

Clyde, Lord. See CAMPBELL (COLIN).

Clymer (GEORGE), a statesman, b. in Phila. in 1739. He was elected to the Continental Cong. in 1776, and signed the Dec. of Ind. He was re-elected in 1780, and was a member of the convention which formed the Federal const. in 1787. D. July 23, 1813.

Clytia, *klit-ä*, or **Clytie** [Gr. *Kaúria* or *Kaúrtis*], a mythical personage, said to have been a nymph loved by Apollo, the god of the sun, but who, being forsaken by him, pined away with her eyes fixed on the sun, and was turned into a flower, which (from its ever turning toward the sun) was called *heliotropium* (*heliotropion*).

Cnidus [Gr. *Knýdos*], sometimes written **Gnidus**, an anc. Gr. city of Asia Minor, on the Aegean Sea and on the promontory of Triopion; was built on a small island connected by a causeway with the mainland; one of the 6 cities of the Doric league. Here were several temples of Venus, in one of which was her statue by Praxiteles.

Coahuila, *ko-ah-wee-lah*, a state in the N. part of Mex., bordering on Tex., bounded N. and E. by the Rio Grande del Norte. Area 50,890 sq. m. Pop. 130,026.

Coal, a gen. name given to several carbonaceous substances derived from vegetable tissue, and constituting different varieties of mineral fuel. The vagueness of the term has given rise to much discussion in scientific books and courts of law. These substances have no definite composition, but form part of an unbroken series which begins with woody fibre and ends with graphite. They are all derived from the decomposition of vegetable tissue in the changes which it undergoes when buried under water, earth, or rock. The different products of this progressive change are peat, lignite, bituminous and anthracite C., graphite, and asphaltum, which are solids; petroleum and water, which are liquids; carbonic acid, carburetted hydrogen, etc., which are gases. Of these, all the solids, excepting asphaltum, are residual products, while that substance and the liquids and gases are the evolved products or distillates. The first mineralized solid formed from vegetable tissue is called lignite, if derived from wood; peat, if from herbaceous vegetation. Neither of these substances has any definite formula of composition, as each individual specimen may represent a distinct stage of the process of bituminization. The nature of the change which takes place in the formation of peat and lignite from vegetable tissue will be best understood by the comparison of typical examples of each given below:

Vegetable tissue.	Loss.	Peat.
Carbon	49.1	21.50
Hydrogen	6.3	3.50
Oxygen	44.6	29.10
Wood.		
Carbon	49.1	18.65
Hydrogen	6.3	3.25
Oxygen	44.6	24.40
		Lignite.
Carbon	49.1	30.45
Hydrogen	6.3	3.05
Oxygen	44.6	24.40

In this process the evolved products represented by the loss are water, carbonic acid, carburetted hydrogen, or petroleum. Where peat and lignite have been longer buried in the earth they have suffered still further loss and change, and are converted into what is termed bituminous C., as will be seen in the following example:

Lignite.	Loss.	Bituminous coal.
Carbon	30.45	12.35
Hydrogen	3.05	1.85
Oxygen	20.20	18.13
		2.07

This is the condition in which we find most of the beds of peat and lignite which accumulated in what is called the carboniferous age millions of yrs. ago, and which, deeply buried, have been subjected to a slow and general distillation, resulting in the formation of the different varieties of bituminous C. Where exposed to peculiar influences, as to heat from volcanic eruptions, or in the elevation of mt. chains, where all the strata are baked and hardened, the volatile constituents of bituminous C. are partially or perfectly driven off, giving us, first, semi-bituminous C., then anthracite, and finally graphite. The process by which anthracite and graphite are formed from ordinary C. is indicated in the succeeding formulae:

Bituminous coal.	Loss.	Anthracite.
Carbon	18.10	3.35
Hydrogen	1.20	0.93
Oxygen	2.07	1.32
Anthracite.		
Carbon	14.53	1.42
Hydrogen	0.27	0.27
Oxygen	0.65	0.65
		Graphite.
Carbon	14.53	13.11
Hydrogen	0.27	0.00
Oxygen	0.65	0.00

All the varieties of C. mentioned above shade into each other, and we have lignites which exhibit every degree of approach to bituminous C., semi-bituminous C. intermediate between these latter and anthracite, and graphitic anthracites by which the anthracites are connected with the graphites.

The geological position of the different varieties of C. accords with the theory of their origin given above. For example, the oldest rocks known contain comparatively little carbonaceous matter, as they date from a period when the vegetation of the globe was scanty and mostly marine. Here we have only the residual products of the distillation of vegetable tissue, graphite and anthracite. In the carboniferous age the terrestrial vegetation was luxuriant over large areas, and conditions prevailed favorable to the formation of beds of peat. These, submerged and deeply buried under sediments which were deposited upon them, have as a gen. rule been changed to our beds of bituminous

C.—to anthracite where local causes have carried the process of distillation further. In formations more modern than the carboniferous the accumulations of vegetable matter are usually classed as lignites. These contain more water and oxygen, and are less valuable fuels, than the true C., but shade into them imperceptibly. In the present period we see the formation of C. only in its initial stages—viz, the growth of vegetation and the accumulation of bituminized vegetable tissue in marshes, where oxidation is prevented or retarded by water. By artificial processes we can, however, hasten the changes in vegetable tissue, and by properly conducted distillation produce lignite, bituminous C., and anthracite. We find, too, that Nature is locally accelerating her processes, and by volcanic heat distilling lignites and bituminous C. to anthracite. Near Santa Fé, N. M., and on Queen Charlotte's Island, excellent anthracite has been produced by volcanic heat from cretaceous lignites. At Los Bronces, in Sonora, triassic C. is converted into anthracite by a similar cause. In E. Amer. all the C. strata, except those of the small triassic basins of Va. and N. C., are of carboniferous age. In the valley of the Miss., where they have suffered no local metamorphosis, they are all of the bituminous class. In the Alleghanies the same strata, having been somewhat affected by the causes which resulted in the upheaval of the mountains, have lost a portion of their volatile matter, and have become what are known as semi-bituminous C. To this group belong the C. of Blossburg, Broad Top, Frostburg, and a belt running down to Ala. Still farther E. the carboniferous strata are more metamorphosed, and the C. which they contain is converted into anthracite. In R. I. a C.-basin of limited extent, and of the same age with those of Pa., seems to have been still nearer the focus of metamorphic action; and here the C. is partially converted into graphite, forming the variety known as graphitic anthracite.

The value of C. in the economy of civilization is now understood and appreciated. C. may indeed be considered as the mainspring of our civilization. In its combustion the heat of the sun, absorbed in the growth of the plants from which it is derived, is all given out again, subject to human control; and, as heat is but another name for phys. force, C. becomes the most important source of power at our command. The power developed in the combustion of a lb. of C. is theoretically equal to 11,580,000 foot-lbs. But by our imperfect methods of utilization not more than 1,500,000 foot-lbs. are made available for our purposes. This is about the amount of power exerted by a man of ordinary strength during a day of labor. Hence 300 lbs. of C. will represent the labor of a man for a yr. The production of C. in the British Islands during 1882 was 158,500,000 tons. Of this, aside from all exported or employed for heating, lighting, smelting, etc., it is estimated that 30,000,000 tons were devoted to the development of motive-power, and that this is equivalent to the labor of 200,000,000 men who are producers and not consumers. Such being the value of C., its geographical distribution becomes of great interest and importance. Among the nations of Europe the Eng. occupy a pre-eminent position, not only from the extent of their C.-fields, but from the industries dependent upon them. The Brit. C. area is estimated to be 11,859 sq. m., and the C. production in 1881 was 154,184,300 tons. The C. area of Fr. is about 2000 sq. m., and the production in 1882 was 19,800,000 tons. Belg. has a C. area estimated at 500 sq. m., and in 1881 produced 17,500,000 tons. In Prus. the C. area has been considerably increased by the cession of the Rhine provs., and she now has probably 2000 sq. m. of very deep and valuable C. strata. The production of C. in Prus. and the other Ger. states in 1881 was 61,540,475 tons. The C. area of Sp. is not definitely known. Her C.-field in the prov. of Asturias is one of the most important on the continent of Europe, but as yet her C. production is small. Aus. has about 1800 sq. m. of C., and in 1880 produced 16,500,000 tons. Recent discoveries show that Rus. has a large C. area, estimated at from 20,000 to 30,000 sq. m., but her production is small.

C. also occurs in Chi., India, Australia, Japan, and Borneo. So far as known, it is all of mesozoic age, though in Chi. and Japan anthracite and well formed bituminous C. are found, and have been worked for centuries.

When we turn to the U. S. we find a C. area which throws all those which have been mentioned into insignificance. And yet it should be said that the C.-basins of the U. S. are shallow as compared with those of Europe, and the vertical thickness of C. they contain considerably less. Their importance cannot, therefore, be accurately measured by their superficial extent. Even with this qualification, however, the C.-fields of Amer. are by far the most extensive and richest in the world. The C. area of the U. S. is divided into several distinct basins, of which the most important are the following: 1st, the Alleghany C.-field, bordering the Alleghany Mts. on the W. side, and reaching from the N. line of Pa. to the middle of Ala. Its area is computed at 58,737 sq. m.; 2d, the Ill. C.-field, which covers a large part of Ill. and portions of Ind. and Ky. Its area is estimated at 64,887 sq. m.; 3d, the Mo. C.-field, lying W. of the Miss. in the States of Ia., Kan., Ark., Mo., and Tex., and supposed to extend over 47,138 sq. m. To these great expanses of C. terr. must be added the anthracite basins of Pa. and R. I., the C.-fields of Va., Mich., and N. C., and the numerous and extensive deposits of cretaceous and tertiary C. of the far W. Combining all these, the productive C. area of the U. S. will be seen to exceed 200,000 sq. m. The production of C. in the U. S. was by census of 1880, 70,481,426 tons.

The different chemical and phys. properties exhibited by the various kinds of C. fit them for a wide range of uses in the arts. C. are primarily divided into 2 great groups—the hard and soft, or the anthracite and bituminous C.—but each of these groups is capable of subdivision into several varieties. For example, we have at the base of the series—1, *Graphite*, which is a C. deprived of all its volatile matter, and consisting only of a portion of its carbon mingled with

all its ash. This is practically incombustible, and is never used as a fuel nor classed as a C. 2, *Graphitic anthracite*, containing 1 or 2 per cent. of gaseous matter, igniting with difficulty, and forming an inferior fuel. This is the prevailing variety of C. in the R. I. C. basin. 3, *Anthracite*, containing from 3 to 10 per cent. of volatile matter, sometimes 95 per cent. of carbon, igniting with some difficulty, but producing in combustion an intense local heat. When burning it gives off a little blue flame (carbonic oxide), is valueless for purposes of illumination, but the best of all fuels for smelting iron, and is extensively used for the generation of steam and for household purposes. 4, *Semi-bituminous C.*, containing from 15 to 20 per cent. of gaseous matter, but generally caking in the fire; of little value as an illuminator, but kindling readily, with high heating power. It is the most highly valued of all C. for the generation of steam. The semi-bituminous C. produce a dense and excellent coke, and in the raw state are preferred to all others for blacksmiths' use, as they form a hollow fire and produce intense heat in combustion. 5, *Bituminous C.*, which have been subjected to no local metamorphic action, but are the natural product of the slow and gen. distillation of vegetable tissue buried in the earth since the paleozoic ages. In bituminous C. the volatile matter varies in quantity from 30 to 50 per cent. of the mass. They are subdivided into *coking*, *furnace*, and *cannel* C. Of these the coking C. melt and adhere in burning, and when the gaseous matter has escaped a mass of "coke" is left which has the properties of anthracite, but is cellular or spongy from the expansion of the gases. Most bituminous C. belong to this variety, of which the Pittsburg C. may be taken as a type. They are extensively employed for the generation of steam, as household fuels, and, when coked, for smelting the metals, their adhesive character preventing their being used for this purpose in the raw state. Coking C. which are sufficiently free from sulphur, their great contaminating ingredient, are termed "gas C.," as they are chiefly employed for the production of illuminating gas. In the vol. and illuminating power of their gas they are exceeded by the cannel C., but their deficiency in this respect is more than compensated for by the greater value of the coke which is derived from them. The furnace C. are those bituminous C. which do not melt or adhere in the fire, and can therefore be employed in the raw state in the blast furnace. These are termed "open-burning," and sometimes "splint C.," but the latter term is more appropriately applied to a kind of cannel C. which contains a large percentage of carbon, comparatively little gas, and has high heating power. The famous Brier Hill C. of O. and the Brazil C. of Ind. are typical furnace C. The cannel C. have a more homogeneous texture, and are less pitchy and brilliant than the other bituminous C. They represent the carbonaceous mud which accumulated in the open lagoons of the C. marshes, while the surrounding mass of spongy vegetable tissue formed the cubical C. The cannels are rich in gas, but have comparatively low heating power. They are favorite household fuels, are employed for the production of oil by distillation, but are nearly valueless for metallurgical purposes. Nearly all C.-fields contain more or less cannel, which is either interstratified with the cubical C. or gradually passes into it in one or another direction. As a gen. rule, the cannels contain more ash than the furnace or gas C.; and as the earthy matter increases in quantity, they shade off imperceptibly into bituminous shale. The most esteemed household fuel in our Atlantic cities is the Eng. Wigan cannel, which is preferred to the Amer. cannels, since it generally contains much less ash. (See ANTHRACITE, LIGNITE, and PEAT.)

J. S. NEWBERRY.

Coal-Fish (*Pollachius carbonarius*), a gadoid fish, blackish above, found both on the European and Amer. sides of the Atlantic. Although a coarse fish, the C.-F. is much used for food in N. parts. The liver abounds in oil, which is used for various purposes. It is known as pollock in the U. S.

Coal Gas. See GAS-LIGHTING, by PROF. CHANDLER.

Coal Oil. See PETROLEUM, by PROF. C. F. CHANDLER.

Coast Range, or Coast Mountains, a range in Cal. extending nearly parallel with the coast of the Pacific from Or. to the S. boundary of Cal. San Bernardino, one of the summits, is 8500 ft. above the sea.

Coast Survey. Importance of the Work.—An accurate acquaintance with the phys. features of the coast that bounds its terr. is an economical necessity to every commercial nation. Among the dangers to which the mariner is exposed, the most formidable are those which beset him when he approaches the land. Against these dangers no absolute security can be provided, but they can be much diminished by supplying accurate charts of the coasts and their approaches, and by maintaining light-houses and buoys to mark available channels or warn against hidden dangers. Cong. in 1807 passed an act authorizing a survey to be made of the coasts of the U. S. The plan of survey adopted was submitted by Prof. F. R. Hassler, a native of Switz., who was appointed to superintend its execution.

Progress up to 1843.—Various circumstances prevented active operations from being undertaken until 1817, when a commencement was made near New York. But the work had been hardly begun when Cong. failed to provide funds for its continuance. In 1832 a small appropriation was made, and the survey was resumed, Mr. Hassler continuing to direct the work until his death, in 1843, when a base-line had been measured in the vicinity of New York; the triangulation had extended E. to R. I. and S. to Chesapeake Bay, the primary triangulation crossing N. J. and Del., while a secondary triangulation skirted the coast of N. J., meeting with another series which extended down Del. Bay. The hydrography of New York bay, of L. I. Sound, of Del. bay and river, and the off-shore soundings from Montauk Point to the capes of the Del. were substantially completed. The triangulation covered an area of 9000 sq. m., furnishing determinations of nearly 1200 stations for the delineation of 1600 m. of shore-line.

Progress from 1843 to 1861.—The responsibility of expanding the work to a scale commensurate with the growing demands of commerce fell mainly upon Hassler's successor, Prof. A. D. Bache. Upon his recommendation Cong. provided the means for carrying on the work in many places at once, but all designed to form a continuous chain of triangulation and a homogeneous survey of the whole coast. On the annexation of Cal. the Pacific coast was at once included in the operations. The gen. coast-line of the Atlantic, including the large open bays, is 3,000 m., that of the Gulf of Mex. 2,100, and that of the Pacific coast exclusive of Alaska, 1870 m.; a total of 7,060 m. An approximate measurement of the shore-line, including bays, sounds, islands, and rivers, gives similarly for that of the Atlantic coast, 14,725 m.; of the Gulf of Mex. 10,400 m.; and of the Pacific coast, 4250 m.; a total of 29,375 m. At the outbreak of the c. war the extent of coast-line surveyed and mapped was about $\frac{3}{4}$ of the Atlantic, $\frac{1}{2}$ of the Gulf, and nearly $\frac{1}{2}$ of the Pacific coast.

Progress since 1861.—After the close of the war the work enjoyed the increased favor of Cong., and the regular operations of the C. S. were resumed on a moderate scale of expenditure, which was gradually increased. Prof. Bache d. in 1867, and was succeeded by Prof. Benjamin Peirce, who was followed by C. P. Patterson, and he d. in office Aug. 15, 1881. Prof. J. E. Hilgard was appointed supt. Dec. 22, 1881, and is continuing the C. S.

Maps and Charts.—The results of the surveys are embodied in charts, the main series giving a continuous representation of the coast on a scale of 1:80,000, or about $\frac{3}{4}$ of an inch to a mile. On these charts are exhibited all natural and artificial features of the shore, such as streams, hills, houses, and roads, together with the depth of water and configuration of the sea-bottom, the channels and shoals, as also the light-houses, buoys, and other aids to navigation. A series of 112 of these charts will comprise the whole coast from the N. E. boundary to the Rio Grande. The same range of coast is also covered by a series of 16 other charts on a smaller scale, that of 1:400,000, known as "off-shore charts," and intended for use in sailing along or approaching the coast. Another still more gen. chart of the coast, on a scale of 1:1,200,000, and reaching farther out to sea, is pub. to serve the purpose of navigating on courses between distant points. There are also many charts of separate harbors, bays, rivers, anchorages, passages, and dangers, on scales of from 1:5,000 to 1:60,000, according to the character of the subject and amount of detail to be represented.

Subsidiary Work.—The accurate determination of the lon. of some point in the C. S. from the prin. observatories in Europe has been one of the great probs. of the work. The difference of time between the observatories of Greenwich and Cambridge has been determined within a limit of uncertainty no greater than $\frac{1}{20}$ of a second. The variation of the compass being an important element in navigation, observations have been made at several hundred places. A magnetical chart has been constructed, from which the surveyor can learn the variation of the needle at any place with considerable accuracy. The subject of the tides has received great attention. Tidal registers are kept up at selected points for the purpose of ascertaining the laws governing the tides in the different seas that wash our shores. A hydrographic survey of our coast would be incomplete if it did not embrace the investigation of the Gulf Stream, and much thought and labor has been bestowed upon the subject. The U. S. C. S. is a national work of which Amers. may justly be proud, it having been declared, by the most competent foreign scientific authorities, to stand in the very front rank of similar works of other nations, and to be one of the most perfect examples of applied science. [From orig. art. in *J. S. Civ. Eng.*, by SEPT. J. E. HILGARD, U. S. C. S.]

Coatesville, R. R. junc., Chester co., Pa., on Brandywine Creek, 39 m. W. of Phila. Pop. 1870, 2025; 1880, 2766.

Coati, ko-at'e [a word of Brazilian origin], a name applied to the species of *Nasua*, a group of the raccoon (Procyonidae) family, remarkable for the long snout, which is employed in rooting up the earth to obtain worms and insects. Two species are known—*N. narica*, the Mex. C., and *N. rufa*, the Brazilian C.

Coat-of-Arms. See HERALDRY.

Cobalt, ko'bawit, a hard white metal of sp. gr. 8.5 to 8.9, with a granular fracture, quite malleable at red heat, attracted by the magnet, and even capable of receiving weak magnetic power when rubbed with a magnet, though arsenic destroys this property. It is unalterable in air and water at ordinary temperatures, though at red heat it decomposes water. In the arts the compounds of C. are applied for coloring either as pigments or enamels. The prin. preparation is small, or azure blue, which is a double silicate of C. and potassium, prepared by fusing the roasted ore with carbonate of potassium and clean white quartz sand.

Cobb (HOWELL), b. in Jefferson co., Ga., Sept. 7, 1815; was elected an M. C. in 1843, 1845, and 1847. In 1849 he was chosen speaker of the House of Reps. He became gov. of Ga. in 1851, and was appointed sec. of the treas. by Pres. Buchanan in 1857. He resigned near the end of 1860, and was pres. of the Cong. of secessionists which met in Feb. 1861; was a maj.-gen. of the Confed. army. D. Oct. 9, 1868.

Cobb (THOMAS W.), a lawyer, b. in Columbia co., Ga., in 1784, was an M. C. from Ga. 1817-21 and 1823-24. U. S. Senator 1824-28, and a State judge 1828-30. D. Feb. 1, 1830.

Cobbett (WILLIAM), b. at Farnham, in Surrey, Mar. 9, 1762. He enlisted in the army, served 8 yrs. in Amer., and returned to Eng. in 1791. Having obtained a discharge, he emigrated to the U. S. in 1792, and settled in Phila., where he edited a Federalist paper called *Peter Porcupine's Gazette*. He returned to Eng. in 1800, and began to issue in Lond., in 1802, *The Weekly Political Register*, which he continued to pub. until his death. Wrote *Letters to Young Men and Women*. In 1832 he was elected an M. P. D. June 18, 1835.

Cobden (RICHARD), an Eng. statesman, b. at Dunford, near Midhurst, in Sussex, June 3, 1804, was the son of a

farmer who owned a small estate. He learned mercantile business in the warehouse of his uncle in Lond., and became a partner in a firm of cotton manufacturers in Manchester. He advocated free trade, and was the most prominent member and orator of the Anti-Corn-Law League, formed in 1839. In 1841 he was returned to Parl., and again in 1847. He was one of the leaders of the Manchester party or school, which advocated electoral reform, a pacific foreign policy, and non-intervention in foreign quarrels. He opposed Lord Palmerston's Chi. policy. In 1857 he was again elected to Parl. In 1860 he negotiated an important commercial treaty with Fr. in the interest of free trade. He was one of the few Brit. statesmen who sympathized with the U. C. rise in the Amer. c. war. D. Apr. 2, 1865. (See J. McILCHRIST, *Life of Richard Cobden*, 1865.)

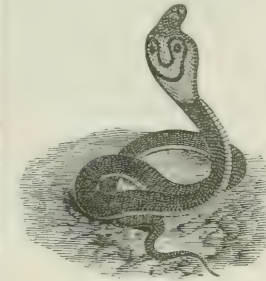
Cobleigh (NELSON EBENEZER), D. D., LL.D., a divine of the M. E. Ch. b. in Littleton, N. H., Nov. 24, 1814, grad. at the Wesleyan Univ., Conn., in 1843; was elected prof. in McKendree Coll., Ill., 1853, prof. at Lawrence Univ., Wis., 1854, pres. of McKendree Coll. 1858, ed. of *Zion's Herald*, Boston, Mass., 1863, pres. of E. Tenn. Wesleyan Univ., Athens, Tenn., 1867, ed. of the *Methodist Advocate*, Atlanta, Ga., 1872.

Coblentz (anc. *Confluentes* or *Confluentia*), a fortified city of Rhenish Prus., at the confluence of the Rhine and the Moselle, 50 m. S. S. E. of Cologne, with which it is connected by rail. Here are handsome chs., a gymnasium, a palace, and an old castle of the electors of Treves. The ch. of St. Castor was commenced about 836 A. D. On the opposite side of the Rhine is the strong fortress of Ehrenbreitstein. C. is said to be the strongest place in Prus. Pop. 30,548.

Cobleskill, Schoharie co., N. Y., on R. R. and Cobleskill Creek, 45 m. W. of Albany. Pop. 1870, 1030; 1880, 1222.

Cob-nut, the name given to different varieties of the cultivated hazel-nut. In the W. I. the name C.-N., also called hog-nut, is given to the fruit of *Omphalea triandra*, a tree of the natural order Euphorbiaceae. A white juice is obtained from the tree which turns black in drying, and in Guiana is used instead of ink. The fruit is a 3-celled capsule, each cell containing one nut, which, if the embryo is retained, has cathartic properties, but after its extraction is wholesome and palatable.

Cobra de Capel'lo [a Port. term signifying "hooded snake"], a venomous serpent of the family Viperidae, the *Naja tripudians*, native of India. The term C. de C. refers to the faculty of expanding and elevating the skin of the back of the neck into the resemblance of a hood. This phenomenon is shown when the creature is angry or excited. The back of the hood is usually ornamented with 2 eye-like spots joined by a curved dark stripe, the whole resembling a pair of spectacles; hence it is often called the "spectacles snake." The cobra attains a length of from 3 to 5 or more ft. It is sluggish in



Cobra de Capello.

its habits, and easily destroyed. It feeds on lizards and other small animals.

Coc'ca, the leaves of a shrub (*Erythroxylon Coca*) of the order Erythroxylaceae, a narcotic and stimulant used by the inhabs. of Peru, Brazil, and Bolivia, and especially by the Indians of Ecuador and of the Peruvian Andes. The leaves are chewed with a little unslaked lime or alkaline ashes. The effects resemble those of opium, although less narcotic; it dilates the pupil of the eye, while opium contracts it. It lessens the desire for food, and enables the person who uses it to endure greater and more protracted exertion than he otherwise could, and with less food. It possesses the remarkable property of preventing the difficulty of respiration common in the ascent of great elevations. Used in excess, it weakens the digestion, produces various disorders, and finally impairs both body and mind. It is supposed that about 30,000,000 lbs. of the dried leaf are consumed in a year, about 10,000,000 of the human race habitually using it. Its powers are believed principally to depend upon an active principle called cocaine.

Coc'caine, an alkaloid extracted from coca leaves. It crystallizes in colorless, odorless prisms, having a slightly bitter taste, and resembling atropine in its properties.

Cocce'jus, **Cocceius**, or **Cock** (JOHANN), a Ger. theol., b. at Bremen 1603; was prof. of Heb. at Franeker 1636-50, afterward prof. of theol. at Leyden. He wrote commentaries on most of the books of the O. T., and was founder of what is called the "Federal School" of theol. His prin. work is *Summa Doctrinæ de Fœdere et Testamento Vet.* D. Nov. 5, 1669.

Coc'co Root is the product of plants of the nearly allied genera *Colocasia* and *Caladium*, of the order Araceae, cultivated in tropical countries for their flat corms, which abound in starch, and are used as food after being roasted or boiled to remove the acidity. The above names strictly belong to *Colocasia antiquorum*, a stemless plant with ovate leaves, and flowers inclosed in a cylindrical erect spathe. *Colocasia esculenta* is a much cultivated plant of tropical Amer. *Colocasia macrorrhiza* is the taro of the S. Sea Islands. *Colocasia Himalensis* forms the prin. food of many of the inhabs. of the Himalaya Mts.

Coc'culus Ind'icus, the very poisonous seed of the *Anamirta Cocculus*, a beautiful climbing plant of the order Menispermaceae. The seed is brought from the E. I., and is sometimes used for medicinal purposes, and illegally in the preparation of malt liquors. It possesses acrid and intoxicating qualities. It is used for stupefying fish, that they may be taken by the hand; in some of the U. S. this prac-

tice is forbidden by law. An ointment made with it is very efficacious for ringworm. It contains a poisonous principle, called picrotoxin, while the pericarp contains another called menisperm, equally poisonous. It imparts to beer a bitter taste, and at the same time an apparent richness, but renders it very deleterious in its effects.

Coccyde [Gr. *κόκκος*, "berry"], a hemipterous insect allied to the aphides, sometimes called "scale insects" and gall insects, but not to be confounded with the gall-formers (Cynipidæ). They are numerous, and attach themselves to plants, often producing much mischief by their punctures. The destructive coffee-bug belongs to this family. The females are wingless; they have a beak, which they insert into plants to suck their juices. Some species are of great value for the beautiful dyes which they yield. Among them are cochineal and kermes.

Cochabambá, or **Orope'sa**, a city of Bolivia, about 150 m. N. W. of Chuquisaca, and 840 ft. above the sea; founded in 1565. Pop. 14,705.

Cochin China. See **ANAM**.

Cochineal, *kochi-nel* [Sp. *cochinilla*, originally the name of the coccus insect used in dyeing; see **KERMES**], a substance used in dyeing crimson and scarlet and in the preparation of the colors carmine and lake. It consists of the bodies of the females of the *Coccus cacti*, which feeds on plants of the cactus family. The coloring principle of C. is carminic acid, known in an impure state as *carmine*, and combined with alumina as *carmine lake*. C. is used for dyeing wool and silk scarlet and crimson. The colors are very brilliant, but not durable. They are easily spotted by water and alkalis. The mordants used are alum, cream of tartar, and tin salt.

Cochituate Lake, in Middlesex co., Mass., 18 m. W. from Boston, about 3 m. long, and has an area of 650 acres. It is connected by an artificial channel with Sudbury River, and is one of the prin. sources of water-supply for Boston.

Cochran (JOHN WEBSTER, an inventor), b. at Enfield, N. H., May 16, 1814, removed in 1832 to Boston, Mass.; patented in 1833 a steam-heating apparatus, and in 1834 a revolving cannon; also invented valuable machinery for the curvilinear sawing of timber.

Cockrane (JOHN), GENERAL, b. at Palatine, Montgomery co., N. Y., Aug. 27, 1813, grad. at Hamilton Coll., N. Y., in 1831; became a lawyer and removed to N. Y. city in 1846; was surveyor of the port of New York for 4 yrs.; Dem. M. C. 1856-62; brig.-gen. of volunteers 1862-63, and in 1864 was nominated for V. P. on the Fremont ticket. He was atty.-gen. of N. Y. in 1865, and was a delegate to the Phila. "National Union Convention" of 1866, and to another, of the same name, in Chicago in 1868. He was appointed revenue collector for 6th dist. of N. Y. in 1869.

Cock [Fr. *coq*], the male of the common domestic fowl, which has been under the protection of man from time immemorial; some of the earliest historical records—the curious paintings of the Egyptians—show that it was as completely domesticated at that early period as in our own time. The name is also applied to the males of many other kinds of birds. There is reason to believe that the domestic fowl is the descendant of more than one recognized species of the genus *Gallus*.

Cockatoo, a word [derived from the cry of these birds] applied to a group of the family Psittacidae, distinguished by the great height of the bill and by the crest on the head. The C. have generally whitish or blackish plumage. The group embraces, beside some of the largest parrots, also the smallest species of the family, the *Nabieria pygmaea*, being of the size of the crested wren. The species are natives of Australasia and the Malay Islands. The black C. (*Microglossum aterrimus*), noted for its enormous bill and its short and peculiar tongue, is a native of New Guinea.

Cockatrice [called in Lat. *basiliscus* and *cocatrice*], a fabulous monster or venomous serpent, which has been sometimes identified with the basilisk. It was said to be hatched from a cock's egg, and its breath and look were fatally poisonous. The word occurs in the Eng. version of the O. T. as the name of a venomous serpent.

Cockburn, KÖ'BERN (SIR ALEXANDER J. E.), BART., an Eng. judge, b. in 1802, grad. LL.B. at Trinity Hall, Cambridge, in 1829; was called to the bar, and subsequently became Q. C. in 1841. In 1856 he became chief-justice of the court of common pleas, and in 1859 lord chief-justice of the court of queen's bench. He was selected by the Brit. ministers to act as an arbitrator of the tribunal which was organized for the settlement of the "Alabama claims" at Geneva, in 1871-72. D. Nov. 20, 1880.

Cockburn (SIR GEORGE), G. C. B., a Brit. admiral, b. Apr. 22, 1772, entered the navy in 1781; was made lieut. in 1793, capt. of a frigate in 1794, distinguished himself in many engagements, among which were the battle off Cape St. Vincent in 1797, the reduction of Martinique, the defence of Cadiz against the Fr., etc. He was made rear-admiral in 1812, and assisted in the capture of Wash. D. C., in Aug. 1814; in 1815 he received the order of the Bath, K. C. B., and conveyed Nap. Bonaparte to St. Helena; received the grand cross of his order, G. C. B., and was M. P. for Portsmouth in 1818, lord of the admiralty in 1818 and 1828, vice-admiral in 1819, privy councillor 1827, and admiral in 1837; commanded the W. I. and N. Amer. naval stations 1832-36; M. P. for Ripon in 1841, and senior lord of the admiralty; retired from the admiralty in 1846; admiral of the fleet 1851; succeeded to the baronetcy on the death of his brother in 1852. D. Aug. 19, 1853.

Cockchafer, the common name of *Melolontha vulgaris*, a European beetle of the family Melolonthidae, famous for its ravages, the winged insect feeding on the leaves of fruit and forest trees, the grub devouring the roots of pasture-grasses and corn. It is an inch in length, and pitch black, with a whitish down; the grub is $\frac{1}{2}$ inch long, whitish, with a red head and 6 legs. The whole grass of a field has

been destroyed in a short time by the grubs, and the beetles themselves strip the trees like locusts. This insect does not occur in the U. S., but others of the same family and of similar habits abound.

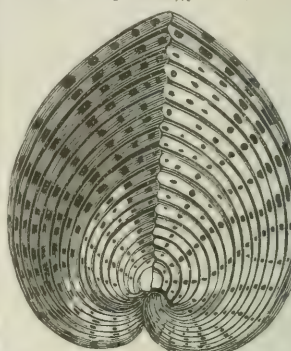
Cocke (JOHN), GENERAL, b. at Brunswick, Nottoway co., Va., in 1772, emigrated in early life to Tenn.; became a lawyer; was a member of its first legislature in 1796; speaker of the House in Tenn. for many yrs. and was also a member of the Tenn. Senate; maj.-gen. of volunteers in the Creek war (1813), and served as col. at the battle of New Orleans (1815); was M. C. from Tenn. 1819-27. D. Feb. 16, 1854.

Cocke (WILLIAM), b. in Va., was engaged in the military, civil, legislative, and judicial services of that State; removed to Tenn., and became a gen. of militia, judge of circuit court; U. S. Senator from Tenn. 1797 and 1799-1805.

Cock'er, a small spaniel, somewhat resembling the setter, much employed in pheasant and woodcock shooting; it cannot easily be trained to wait for the sportsman.

Cock-Fighting, a barbarous sport said to have originated with the Athenians. It was a favorite sport in Eng. until the time of the Commonwealth, a pit having been erected in Whitehall, which was patronized by royalty. It was prohibited in 1654, and numerous acts were subsequently passed against it. It is still practised in Eng. and Amer. Peoples of Sp. origin are specially addicted to it.

Cock'le [Gr. *κοκχύλιον* (from *κόκχῃ*, a "shell"); Lat.



Cockle-Shell: *Cardium Junonis*.

occurs as a weed in the wheat-fields of the U. S., and produces black seeds, which are injurious to the appearance and quality of wheat flour. The lobes of the calyx are linear, and longer than the corolla, which is purple-red.

Cock'roach, or **Roach**, a name of several orthopterous insects of *Blatta* and allied genera, with a flattened body, the head beneath the plate of the prothorax, and wings folded longitudinally. The elytra are parchment-like, and the wings sometimes imperfectly developed. The larvæ are similar in form to the perfect insects, and, like them, very voracious. C. are numerous in warm countries; the common C. (*Blatta orientalis*) was imported from abroad, but its native country is uncertain.

Cocks'comb [named from the resemblance of its head of flowers to the comb of a cock], a name applied to various amaranths, but especially to the *Celosia cristata*, native of the E. I., and a familiar inmate of conservatories, often also planted in borders. Its upright stem becomes flattened, expands, and forms a crest, bearing on its surface many very small and brilliant flowers, so crowded as to present a rich velvety appearance.

Cocoa. See **CACAO** and **THEOBROMA**.

Coco'a-nut, the fruit of the *Cocos nucifera*, a tree of the order Palmaceæ, which is indigenous or cultivated in nearly all tropical countries. It has pinnate leaves, from 12 to 20 ft. long. The trunk or stem is branchless, and grows to the height of 60 to 90 ft., bearing at its summit a crown of leaves. These trees prefer a sandy soil, and are seldom found growing far from the sea, unless they have been planted by man. The thick and hard shell of the nut is well adapted to preserve the seed when it is carried by the waves to some distant shore or sand-bank; hence the C.-palm is one of the first large plants that usually appear on a new island of coral formation as soon as sufficient soil has been collected there. It affords a large variety of useful products. The nut, which is an important article of food to the people of tropical countries, is eaten both ripe and unripe. The young unripe fruit contains a pleasant milky fluid, which is used as food and is prepared in various ways. The kernel yields about 70 per cent. of a fixed oil called *C. oil*, which is an important article in the manufacture of stearine candles and marine soap. In tropical countries it is used as lamp oil and as an article of food. It can be separated by compression in the cold into a more liquid portion called oleine, and a more solid part termed coco-stearine or cocosine.

The terminal bud (palm-cabbage) of *Cocos nucifera* is edible and is considered a delicacy, but its removal causes the death of the tree, which is sometimes cut down for its sake. The stem abounds in a saccharine sap called "toddy," which is esteemed as a pleasant beverage, either in the state in which it is drawn from the tree, or after fermentation, which takes place in a few hours. From the fermented sap (palm wine) a spirituous liquor called "arrack" is obtained by distillation. The dried leaves of the C.-palm are useful for thatching houses, for making mats and baskets, and for other purposes. The wood of the lower part of the stem is very hard, takes a beautiful polish, is employed for a variety of purposes, and is imported for ornamental joinery under the name of porcupine-wood. The most important fibrous product of this tree is coir, the fibre of the husk of the im-

mature nut. The shell of the nut is made into cups, ladles, etc., and is often finely polished and ornamented by carving. The double C. N. is the product of the *Laudonia* *S. m. m.*, a palm growing in the Seychelle Islands.

Cocoa Plum, the edible fruit of the *Crocodolopos* *L.*, a shrub of the order Rosaceae, growing in the S. part of the U. S. and the W. I. The fruit resembles a large plum, yellow, purple, or black in color.

Cocoon. See SILKWORM and CHRYSALIS.

Cod (*Gadus aegleus*), a fish of great commercial importance, of the family Gadidae, abundant in the N. seas. It sometimes reaches a weight of 100 lbs. The roe of a female may contain from 4,000,000 to 9,000,000 eggs. The productiveness of the banks of Newfoundland excels that of all other known regions, but the C.-fisheries near Hol., Nor., Iceland, and the N. of Scot. are also productive. The C.-fisheries of Alaska promise to become important. The Dut. and the Eng. engaged in the C.-fishery in the 14th century, about the same period. The fishery is carried on partly by long lines and partly by hand lines. Small fishes, shell-fish, etc., are used for bait. The C. is used as food either fresh, salted, or dried. Great quantities of dried C. are carried from Newfoundland to the W. I. and the S. of Europe. C.-tongues and sounds (or air-bladders) are esteemed a delicacy, and are often salted and sent to market.

Coddington (WILLIAM), b. in Lincolnshire, Eng., in 1601, came to Salem, Mass., in 1630; was a merchant of Boston, and fled to R. I. in 1638 in consequence of his defence of Anne Hutchinson and others. He soon became a Quaker and an advocate of liberty of conscience; was elected a judge, and became gov. 3 times—1640-47, in 1651, and again 1674-75. D. Nov. 4, 1678.

Code [Lat. *codex*], a collection of laws made by public authority. In modern law, it more commonly means a methodical arrangement of law, either customary or statutory, in chapters and sections. In a number of the Amer. States the gen. statutes are arranged in this manner under the title of "Revised Laws," "Revised Statutes," or "Codes." How far it is practicable to accomplish useful results in the codification of customary or common law is a subject of much controversy among jurists.

Some of the leading C. may be referred to.

1. *Justinian's Law*.—Justinian, emperor of the East, is used here as describing the whole mass of codified Rom. law under the order of the emp. Justinian, including the "Code" of that system, the "Institutes," "Pandects," and "Novels." These, taken together, constitute the *corpus juris civilis*, or whole body of civil law. The Theodosian C. of Rom. law may also be referred to, which is of comparatively little interest. See *European Quarterly Review*, Vol. ix. 374.

2. *French C.*—Of these there are 5 prin. ones.—the civil C., of civil procedure, of commerce, of criminal procedure, and of criminal law. There are also C. upon special subjects. Fr. codification is largely due to the emp. Nap.

3. *C. of La.*, based on the C. Nap., and principally prepared by Edward Livingston. It is divided into 3 books, and is concerned with the civil as distinguished from the criminal law. Mr. Livingston also prepared a draft of a penal C. for the State, which was not adopted, as well as one for the U. S. (These are to be found, together with introductory reports explaining the grounds of them, in a work pub. by the National Prison Association, with an introduction by the late Chief Justice S. P. Chase, A. D. 1873.)

4. *N. Y. C. of Procedure*.—The object of this is to assimilate law and equity, and to have but one form of action. It assumes to regulate in a gen. way both pleadings and practice, and to state in a condensed form the gen. rules. A large body of case law has grown up in connection with the C. regulations. The results of these decisions are collected in "Annotated Codes" or in works of practice. The system has been adopted in substance in a considerable number of the States. Coms. in N. Y. have also reported a political, a civil, and a penal C.

Mention may also be made of various collections of maritime rules, such as the *Consolato del Mare*, *Laws of the Hanse Towns*, *Ordonnance de la Marine* (of the time of Louis XIV. of Fr.), *Laws of Oleron*, and the *Laws of Wisby*, which will be noticed again in connection with maritime law, as well as of the C. of Prus., etc.

T. W. DWIGHT.

Codeia [from the Gr. *κωδη*, a "poppy-head"], one of the alkaloids to which opium owes its hypnotic powers.

Codex (plu. **Codices**) [Lat. the "trunk" of a tree; later applied to wooden tablets covered with wax, used for writing upon]. In modern Lat. the term indicates a MS., and is especially applied to an anc. MS. copy of the Scripts. The following are the most important of these C.:

C. Alexandrinus, now in the Brit. Museum, generally referred to the beginning or middle of the 5th century, contains the Septuagint version of the O. T. (with some deficiencies in the Ps.), and all the books of the N. T., with a few chasms, where leaves are wanting. To these it adds the one genuine and a fragment of the apocryphal epistle of Clement of Rome to the Corinthians. It is written on vellum, in quarto form, about 13 inches high and 10 broad, each page being divided into 2 columns of 50 lines having about 20 letters each. It is written in uncial characters, very clear and distinct, with no spaces between the words, without accents or breathings, and with only an infrequent attempt at punctuation. This MS. is of great importance to the critic, as it exhibits a text more nearly approaching that found in later copies than is read in others of its high antiquity.

C. Bezae, or *Cantabrigiense*, an uncial MS. probably of the 6th century, containing the 4 Gospels and the book of Acts in Gr. and Lat. on opposite pp. It presents some peculiar features. The Gospels are arranged thus: Matthew, John, Luke, Mark. In the text there are sentences recast, interpolations, and some omissions. This MS. was found in 1562 in a monastery at Lyons by Theodore Beza, and presented by him in 1581 to the Univ. of Cambridge, Eng.

C. Ephraemi, styled also *C. Ephraemi Syri Rescriptus*, because the original writing had been partially rubbed out about the 12th century, in order that the vellum might be used for transcribing some Gr. works by the Syrian Father Ephraem. It is an uncial MS., containing portions of the Gr. Bible, belonging probably to a date as early as the 5th century, showing traces of at least 3 correctors. The original writing is read with difficulty. The deciphering was not fully accomplished until Tischendorf undertook it, the labor lasting from Dec. 1840 to Sept. 1841. This MS. was brought from the E. by Andrew John Lascar, a learned Gr. patronized by Lorenzo de' Medici, and was taken to Fr. by Catharine de' Medici. It is among the treasures of the National Library at Paris. In critical authority Tregelles places it next to the Sinaitic and the Vatican MSS.

C. Sinaiticus.—This is the most recently discovered of the uncial MSS. of the Gr. Bible, and inferior to no other in antiquity, authority, and completeness. The discovery of this invaluable MS. by Constantine Tischendorf in the Gr. convent of St. Catharine on Mt. Sinai, and the immense labor which it cost him to procure it for the emp. of Rus., forms one of the most interesting passages in bibliographical hist. The MS. is beautifully written on vellum. Some leaves have been destroyed, but there remain 346 leaves, of which 199 contain 22 books of the O. T. and the Apocrypha, in the Septuagint version, beginning at the first book of Chronicles. The remaining 147 leaves contain the whole of the N. T., the Epistle of Barnabas, and a part of the Shepherd of Hermas. The question of its antiquity rests wholly upon internal evidence. At any rate, we can assign it with moral certainty to the 4th century of our era, and with the highest probability to the first half of the same. The C. Sinaiticus has been pub. in a style worthy of its importance and value. The sovereign of Rus. was persuaded to signalize the one thousandth anniversary of the establishment of his empire, in 1862, by bringing out an ed. of the MS., in a style surpassing in splendor and in accuracy of imitation any previous work of the kind. The text is printed in 3 folio vols., the leaves of the shape and size of those in the MS. itself. Only 300 copies were printed, 200 of which were distributed by the emp. himself as presents to various public bodies and learned men; the rest were given to Tischendorf for sale. Several of the colls. and libraries in the U. S. possess this valuable work, in a few instances as a donation from its imperial patron.

ΧΕΤΕΔΕΛΠΟΤΩΝ
ΑΝΩΝΠΑΡΑΔΩ
COYCINΓAPYMA
EICCYNΕΔΡΙΑΚΑΙ
ΕΝΤΑΙCCYNΑΓΩ
ΓΑΙCAYTONMAI
ΓΩCOYCINYMA
ΚΑΙΕΠΙΗΓΕΜΟΝΑ
ΔΕΚΑΙΚΑCΙΛΙCΑ
ΧΘΗCΕCΘΑΙΕΝΕ
ΚΕΝΕΜΟΥΕΙCΜΑΡ

Codex Sinaiticus (Matt. x. 17, 18).

ΧΕΤΕ ΔΕ ΑΠΟ ΤΩΝ ΑΓΓΕΛΩΝ ΠΑΡΙΣΤΟΜΕΝΑ ΥΠΟ ΤΗΣ ΕCΘΕΡΕΙΑC, ΚΑΙ ΕΝ ΤΑΙC CΥΝΑΓΡΑΦΑΙC ΑΥΤΗC ΑΝΑΓΡΑΦΟΜΕΝΑΙC ΚΑΙ ΕΝ ΤΗ ΕΡΕΜΩΝΑC ΔΕ ΚΑΙ ΒΥΣΣΙΔΙC ΑΓΓΕΛΩΝ ΕΙΣΕΙCΙΝ ΕΝΤΕC ΕCΘΕΡΕΙΑC

C. Vaticanus, a beautiful uncial MS. of the Gr. Bible in the Vatican library, dating from the 4th century. It presents 3 narrow columns on a page, except in the poetical books of the O. T., which, as in the C. Sinaiticus, are written in verses clause by clause, according to the sense, in 2 columns. It is written on fine, thin vellum, in a square, plain, and noble style of handwriting. It contains the greater part of the

‘ΚΑΛΥΜΜΑΕΠΙΤΗΝΚΑΡ’
ΣΙΝΝΑΥΤΩΝΚΕΙΤΑΙ‘ΗΝΗ’
ΚΑΔΑΝΕΠΙCΤΡΕΨΗΠΡΟC
ΚΗΠΕΡΙΕΡΕΙΤΑΙΤΟΚΑ

Codex Vaticanus (1 Pet. ii. 1).

καὶ ἐν ταῖς συναγραφαῖς αὐτῆς ἀναγραφόμεναις καὶ ἐν τῇ ἐρημῶνᾳ δὲ καὶ βύσσιδι ἀγγέλων εἰσεῖσιν ἐν τεσθερεῖᾳ. O. T. and the New as far as Heb. ix. 14. It appears to have belonged to the Vatican Library from the latter part of the 15th century. Its earlier hist. is unknown, but Tischendorf regards it as the work of an Alexandrian scribe. In critical authority it is inferior to no other MS.

Cod'icell, an addition or supplement to a will, for the purpose of explaining, altering, or adding to its contents. The validity of a codicil depends upon exactly the same rules as that of a will in general.

Cod'lin Moth (*Pyralis Pomonae*), a moth of the family Tortricidae; small, with short and broad wings. It is very destructive in apple-orchards, laying its eggs in the eyes of the newly formed fruit, within which the larva feeds.

Cod-Liver Oil (*Oleum Morrhuae*), an oil obtained from the liver of the cod, also from many allied species, as pol-

lock, dorse, ling, hake, haddock, etc. In these fish, as in the shark tribe, the tissue containing oil is almost entirely confined to the liver. C.-L. O. is prepared largely in G. Brit., Nor., Newfoundland, and the U. S. There are 3 varieties sold in commerce—pale, pale-brown, and dark-brown oil.

Codrington (Sir EDWARD), G. C. B., an Eng. admiral, b. in 1770. He commanded the Eng., Fr., and Rus. fleets which defeated the Turks at Navarino in 1827. D. Apr. 28, 1851.

Codrington (Sir WILLIAM JOHN), G. C. B., a gen., a son of the preceding, b. in 1800. In Nov. 1855 he became commander-in-chief of the Eng. army in the Crimea, a member of Parl. in 1857; in 1859 gov. of Gibraltar; gen. in 1863; retired, 1877; d. Aug. 8, 1884.

Co'drus, [Gr. Κόδρος], the last king of Athens, is supposed to have reigned about 1060 B. C. According to tradition, an oracle having predicted that the people whose king was slain by the enemy should be victorious, C. went in disguise to the Dorian camp, provoked a quarrel and was killed.

Coehorn, ko'horn (MENNO, BARON COEHORN), a military engineer and soldier, b. in the Netherlands 1641, was early distinguished in math.; became capt. at 16, and col. at 33. In 1674 he invented the small mortar which bears his name. He signalized himself in numerous sieges and battles, notably at Fleurus (1690), where, as brig.-gen. with 8 battalions, he withstood the Fr. cav. and covered the retreat of the defeated allied army. In 1695 he retook the strong fortress of Namur; in 1696, as lieutenant-gen. in the field, he made himself master of Givet, and burned the immense supplies which the Fr. had accumulated there. In 1702 he destroyed the Fr. lines near Sluys; captured Bonn in 1703, and broke through the Fr. lines at Hanuy. By these and other achievements he gained for himself the title of the "prince of engineers." D. Mar. 17, 1704.

Cœn'obites [from the Gr. κοινός, "common," and βίος, "life"], or **Synodites**, the name given to those monks who live in communities, in contradistinction to the anchorites or hermits, who withdraw from all society and live in absolute solitude.

Cof'fee [from the Arabic *kahwah*; Fr. *café*; It. *caffè*; Ger. *Kaffee*], the seeds of the tree *Coffea Arabica*, of the order Rubiaceæ; also an infusion of these seeds used as a beverage. There are a number of species of *Coffea*, but this one only is known to possess valuable properties. It is a native of W. Afr., Abyssinia, and perhaps of Ar., but is now naturalized in many tropical countries. The C. tree in a wild state attains a height of from 12 to 20 ft., and bears but few branches. In cultivation the tree is topped at from 6 to 10 ft. in height, and made to assume a pyramidal form, with branches almost from the ground. The leaves are oblong-ovate, and 4 or 5 inches long; they are evergreen, opposite, shining, and leathery. The flowers are small, snow-white, and very fragrant, and are clustered in the axils of the leaves. It has a succulent fruit of a dark-red color when ripe, in which are two cells lined with a cartilaginous membrane, each containing a single seed. The seeds are hard, semi-elliptical in shape, and are commonly called C.-beans or C.-berries.

Coffee Leaves are sometimes used as a substitute for tea. They contain 1.2 per cent. of caffeine and considerable cafetaninic acid. When dried and treated with boiling water, they yield an infusion of a deep brown color, resembling in taste and odor a mixture of tea and coffee.

Coffeine. See CAFFEINE.

Cof'feville, city, Montgomery co., Kan., on R. R. and the Verdigris River, 141 m. S. by W. of Lawrence. Pop. 1880, 753.

Cof'in [from the Gr. κόφινος, a "basket," and allied to *coffer*, a "casket"; Fr. *cercueil*; Ger. *Sarg*], a box in which the dead are placed for burial. The Gr. and Rom. C. were composed of various materials, the most common being baked clay or earthenware. A kind of stone brought from Assos, in the Troad, was used for C.; it was said to consume the body, except the teeth, in 40 days, and from this circumstance was called *sarcophagus* ("flesh-eater"). The Sax. used wooden C., though the common people were simply wrapped in cloth. C. of lead were used in the Middle Ages, as well as in more recent times.

Coffin (JAMES HENRY), LL.D., scientist, b. at Northampton, Mass., Sept. 6, 1806, grad. at Amherst in 1828. He was prof. in Williams Coll., Mass., 1838-43, and in Lafayette Coll., Easton, Pa., 1846-73. Wrote a treatise on the *Winds of the N. Hemisphere and Solar and Lunar Eclipses*. D. Feb. 7, 1873.

Coffin (JOHN H. C.), LL.D., b. at Wiscasset, Me., Sept. 15, 1815, grad. at Bowdoin Coll. 1834; in 1836 was appointed prof. of math. in U. S. N. He was prof. of math. or prof. of astron. and navigation in the U. S. Naval Acad. 1853-65, and since 1866 has been in charge of the preparation of the *Amer. Ephemeris and Nautical Almanac*.

Cogs'well (JOSEPH GREEN), LL.D., b. at Ipswich, Mass., Sept. 27, 1786, grad. at Harvard in 1806; visited the E. I., after his return studied law, and became a tutor in Harvard in 1814. He afterward studied in Europe, and became a librarian and prof. of mineralogy at Harvard (1820-23). With the historian Bancroft he founded the celebrated Round Hill School at Northampton, Mass. He was, from 1848 to 1860, supt. of the Astor Library. He enriched the botanical and mineralogical collections at Harvard Univ. with thousands of European specimens. D. Nov. 26, 1871.

Cogswell (WILLIAM), D. D., a Congl. divine and author, b. at Atkinson, N. H., June 5, 1787, grad. at Dartmouth in 1811; became pres. of Gilmanton Theological Sem. in N. H. 1844. D. Apr. 18, 1880.

Cognac, kôn-yak, a town in the dept. of Charente, Fr., is celebrated for the excellent quality of brandy made there; about 6000 butts are annually produced. Pop. 14,087.

Cohoes, ko-hôz', or **Cahoes**, R. R. centre, a city of Albany co., N. Y., situated on the right bank of the Mohawk River, at its junction with the Hudson River, on the Erie and Champlain canals, 9 m. N. of Albany. The C. Falls are in the city limits. Pop. 1870, 15,357; 1880, 19,416.

Co'hort [Lat. *cohors*; Fr. *cohorte*], in the armies of anc. Rome, was the tenth part of a legion, and consisted usually of 600 men. The praetorian C. was a body of picked troops who attended the commander of the army, and at a later period formed the guard of the emp. The term "cohort" is applied by some botanists to groups or assemblages of natural orders.

Coimbra, ko-eem'brah, a city of Port., cap. of the prov. of Beira, on the river Mondego, 115 m. N. N. E. of Lisbon. It is on the railway from Lisbon to Oporto, and is the seat of a Catholic bp. It derives its importance from its univ., the only one in Port., with 1200 students and an old library of 30,000 vols. It was founded in 1307. C. was founded by the Goths, and afterward occupied by the Moors, from whom it was taken by Ferdinand I. of Castile in 1064. It was the cap. of Port. in 1139. Pop. 13,369.

Coin'age [Fr. *coin*, a "stamp" or "die," remotely from the Lat. *cuneus*, a "wedge"]. The precious metals were first employed as currency in the form of unstamped bullion, and values and amounts were then determined and expressed by weight; but the gradual advance of civilization led to the invention of coins. A coin is a piece of metal of known weight and composition, possessing real exchangeable worth, its denomination and value being stamped upon its face and guaranteed by the govt. (For the mode in which our coins are produced, see MINT.)

The Precious Metals.—Gold and silver are peculiarly adapted for C. They are capable of exact mechanical subdivision and reunion with comparative ease and without waste; they are durable, readily identified, and comparatively indestructible. They possess values in the market less fluctuating (at least at the present time) than that of any other available commodity. There has not indeed always been assigned by law to given quantities of the precious metals the same nominal value as now. Thus, in Eng., a lb. troy of pure gold about the yr. 1363 was required to be coined into £15 sterling, while the same weight of standard gold at the present day is rated at £46 14s. 6d. A troy lb. of silver at the former period was coined into 25 shillings, but of late yrs. the same weight of standard silver is coined into 62 shillings. The market values of gold and silver relative to each other have also undergone considerable changes. In the early part of the 12th century the value of equal weights of gold and silver was as 9 to 1. But within the past 60 yrs. the value of gold has fluctuated only from 15½ to 18½ times that of silver (averaging about 16 times), and never falling so low as that of 15 times.

A Single or Double Standard.—Until within comparatively few yrs. the money of account of nearly all European nations, as well as of the U. S., was based either upon a silver standard, or upon one of gold and silver both. But many now hold that it is preferable that gold be the sole standard. In their view the standard coin which is to be legal tender in payment of unlimited amounts should be made of the more valuable of the 2 metals. Silver is about 15½ times as heavy and about 28½ times as bulky as gold of equivalent value. According to them a double standard, based upon the assumption that the relative value of gold and silver is invariable, must be imperfect, resting as it does upon a false basis. Whenever the relative market value differs appreciably from the arbitrarily fixed coin standard the relatively dearer metal is driven from circulation. It is admitted that it is desirable that both gold and silver should be in simultaneous circulation. This, they hold, can only be accomplished by making gold the standard of account and legal tender of payment in all amounts, and by so fixing the relation of silver to gold that the silver shall be relatively *overvalued*, and admitted as legal tender of payment only in limited amounts. This question of a single or double standard is now (1885) of the highest financial importance.

An International C.—The monetary systems of the different nations are in gen. heterogeneous in their character, and their relations to each other not unfrequently exceedingly complex. This want of harmony has attracted merited attention, and earnest attempts are being made to establish an international C. system on a comprehensive and simple basis. There seems to be no difference of opinion as to the immense advantages to be derived from the establishment of a simple correlated system of international C., and that the standard units of the system should possess simple numerical relations as to weight with the metric unit of weight—the gramme. It is also important to adopt a standard fineness. The generally approved standard is that of 9 parts pure metal (gold or silver) to 1 part of copper alloy. Several systems have been proposed to accomplish this end, all agreeing in gen. principles, and differing mainly in points of detail.

Value of Foreign Coins.—The following is the value, measured by weight and fineness, of the prin. gold and silver coins of the nations of the world, as established by the U. S. Mint, which purchases them at this rate for recoinage, with a deduction of ¼ of 1 per cent.:

Gold Coins.—Aus., ducat, \$2.28.3; souverain, \$6.75.4; 4 florins, \$1.93.5.—Belg., 25 francs, \$4.72.—Bolivia, doubloon, \$15.59.3.—Brazil, 20 milreis, \$10.90.6.—Central Amer., 2 escudos, \$3.68.8; 4 reales, \$0.48.8.—Chili, old doubloon, \$15.59.3; 10 pesos, \$9.15.4.—Den., 10 thaler, \$7.90.—Ecuador, 4 escudos, \$7.55.5.—Eng., sovereign (average), \$4.85.1.—Fr., 20 francs (average), \$3.84.7.—Ger., 10 thaler (Prus.), \$7.97.1; 20 marks, \$4.76.2.—Gr., 20 drachms, \$3.44.2.—Hindustan, mohur, \$7.08.2.—It., 20 lire, \$3.84.3.—Japan, 20 yen, \$19.94.4; old cobang, \$4.44 (or \$3.57.6).—Mex., doubloon (new), \$15.61.1 (average \$15.53); 20 pesos (Max.), \$19.64.3; (repub.), \$19.51.5.—Naples, 6 ducati (new), \$5.04.4.—Netherlands, 10 guilders, \$3.99.7.—New Granada, old doubloon (Bogotá), \$15.61.1; (Popayan), \$15.37.8; 10 pesos, \$9.67.5.—Peru, old doubloon, 15.55.7; 20 soles, \$19.21.3.—Port., gold crown, \$5.80.7.—Rus., 5 rubles, \$3.97.6.—Sp., 100 reales, \$4.96.4; 80 reales, \$3.86.4; 10 escudos, \$5.01.5.—Swe., ducat, \$2.23.7; carolin (10 francs), \$1.93.5.—Tunis, 25 piastres, \$2.09.5.—Tur., 100 piastres, \$4.36.9.

Silver Coins.—Aus., old rix dollar, \$1.023; old scudo, \$1.024; florin before 1856, \$0.511; new florin, \$0.486; new minor dollar, \$0.731; Marie Theresa dollar, 1780, \$1.024; 1 franc, \$0.98; 2 francs, \$0.964.—Bolivia, new dollar, \$0.81.—Brazil, double milreis, \$1.025.—Canada, 20 cents, \$0.189; 25 cents, \$0.236.—Central Amer., dollar, \$1.002.—Chili, old dollar, \$1.068; new dollar, \$0.982.—Chi., dollar (Eng.), \$1.062; 10 cents, \$0.106.—Den., 2 rigsdaler, \$1.107.—Eng., shilling (average), \$0.224.—Fr., 5 franc (average), \$0.98; 2 franc, \$0.364.—N. Ger., thaler before 1857, \$0.727; new thaler, \$0.729.—S. Ger., florin before 1857, \$0.417; new florin, \$0.417.—Gr., 5 drachms, \$0.881.—Hindustan, rupee, \$0.466.—It., 5 lire, \$0.98; lira, \$0.182.—Japan, itzebu, \$0.876; new itzebu, \$0.338; 1 yen, \$1.008; 50 sen, \$0.446.—Mex., dollar (average), \$1.062; 1 peso of Maximilian, \$1.065.—Naples, scudo, \$0.353.—Netherlands, 2½ guilders, \$1.063.—Nor., specie daler, \$1.107.—New Granada, dollar of 1857, \$0.98.—Peru, old dollar, \$1.062; dollar of 1858, \$0.948; half dollar of 1858 and 1858, \$0.383; sol, \$0.982.—Port., 500 reis, \$0.496.—Rome, scudo, \$1.058.—Rus., ruble, \$0.794.—Sp., 5 pesetas (dollar), \$0.98; peseta (pistareen), \$0.182.—Swe., riksdollar, \$1.115.—Switz., 2 francs, \$0.364.—Tunis, 5 piastres, \$0.625.—Tur., 20 piastres, \$0.87.—[From orig. art. in *J. de l'Éclair.* *Éclair.* by E. B. ELLIOTT, V. S. *Trans. Inst.*]

Coir, the fibre of the cocoa-nut, gomuti, and other palms, is a valuable material for ropes, mats, etc. The husks are steeped in water in pits for 6 months or more, and then beaten with a stick till the fibre readily separates. C. is one of the best materials for cables on account of its lightness, elasticity, and strength.

Coit (THOMAS WINTHROP), D. D., LL.D., an Epis. divine, b. at New London, Conn., June 28, 1803, grad. at Yale in 1821; was pres. of Transylvania Univ., Lexington, Ky., and became a prof. at Trinity Coll., Hartford, Conn., in 1849. Wrote *Parables*.

Coke (probably allied to the verb "cook"), the charcoal obtained from bituminous coal by distillation or by heating with an almost entire exclusion of air. The former, called gas-C., is abundantly produced in gas-works; the latter process is conducted in heaps or in ovens. C. is largely employed in the smelting of metallic ores, etc., where great heat is required.

Coke (Sir EDWARD), an Eng. jurist and judge, b. at Mileham, in Norfolk, Feb. 1, 1552; grad. at Cambridge, studied law in the Inner Temple, and was called to the bar in 1578. His legal learning and tact in conducting causes soon procured for him a large practice. He became speaker of the House of Commons in 1593, and atty.-gen. in 1594. In 1606 he was appointed chief-justice of common pleas, in which position he resolutely opposed illegal encroachments of the Crown. To still his unwelcome decisions, he was made chief-justice of the king's bench, but was found no less independent and freedom-loving than before. Among other bold judicial acts, he decided that the king had no right to stay proceedings in a court of law, for which he was deprived of the justiceship in 1616. He sided with the popular party in Parl., and for his intrepid course was imprisoned in the Tower in 1622. He had a prin. part in framing the Bill of Rights, and in carrying it through Parl. His *Reports* far excelled any that had preceded them. Wrote the *Institutes*. D. Sept. 3, 1633.

Coke (THOMAS), D. D., LL.D., the first bp. of the M. E. Ch., b. at Brecon, Wales, Sept. 9, 1747, ed. at Ox., and became a minister of the Ch. of Eng., but subsequently joined Wesley, and became a most laborious and faithful itinerant. He was made a bp. for Amer. by Wesley in 1784. He founded the Wesleyan missions in the E. and W. I., and expended a fortune in the undertaking. Wrote *Hist. of the W. I.* D. May 2, 1814. See STEVEN'S *Hist. of Methodism*.

Cola, or **Kola-Nut**, the seed of the tree *C. acuminata*, of the natural order Sterculiaceæ, a native of the W. tropical parts of Afr. Guinea negroes believe that to eat a portion of one of these seeds before meals improves the flavor of whatever they may eat, and that when sucked or chewed they will render even putrid water agreeable.

Colbert, kol-bair' (JEAN BAPTISTE), a Fr. statesman and financier, b. at Rheims Aug. 29, 1619. He entered the service of Cardinal Mazarin in 1648, and became sec. to the queen in 1654. Mazarin at his death recommended C. to the king, who in 1661 appointed him controller-gen. of the finances, which were then in a ruinous condition. The annual revenue exacted from the people in 1660 was about 84,000,000 livres, but only 32,000,000 were received into the treas., the rest being kept by the farmers of the revenue. C. established order and economy, and in the course of 20 yrs. raised the gross revenue to 115,000,000, while the expense of collecting it was reduced to about 30,000,000. He promoted commerce and manufactures, opened canals and roads, and founded colonies in Amer. He was the founder of the Acad. of Inscriptions and Acad. of Sciences. D. Sept. 6, 1683. (See GOURDAULT, *Colbert, Ministre de Louis XIV.*)

Colby University, a Bap. coll., incorporated by the legislature of Mass. in 1813 as "The Maine Literary and Theol. Inst.," was first established near Bangor, but subsequently (1818) transferred to Waterville, Me. In 1820 it was chartered by the State of Me. as "Waterville Coll.," which name it bore till 1867, when, having been endowed by Gardner Colby, Esq., a merchant of Boston, the name was changed to that of Colby Univ.

Colchicine, an alkaloid prepared from colchicine by the action of acids.

Colchicine, a very powerful alkaloid extracted from *Colchicum autumnale* (meadow saffron). It produces, even in very small doses, violent vomiting and purging.

Colchicum, a drug much valued in the treatment of neuralgic gout and rheumatism and some other diseases. It is the seed and root of *C. autumnale*, or meadow saffron, a European herb of the order Melanthaceæ. It has sedative, diuretic, cathartic, and diaphoretic properties, and when given in an overdose is a dangerous poison.

Colchis, kol'kis [Gr. Κολχίς], an anc. prov. of Asia, bounded N. by the Caucasus. S. by Armenia. W. by the Black Sea. It was celebrated in fable and poetry as the place to which the Argonauts sailed for the golden fleece. It is now part of the Rus. dominions.

Colcothar Vitrioli, or **Crocus Martis**, a brownish-red sesquioxide of iron, obtained by the calcination of copperas (sulphate of iron) in the manufacture of Nordhausen sulphuric acid. It is used as a polishing powder.

Cold, [Lat. *frigus*; Ger. *Kälte*], the absence or want of heat. The distinction between heat and C. is merely relative. Thus, if any substance coming in contact with the human body is of a lower temperature than the body, it absorbs heat from the latter, producing the sensation of C.; if of a higher temperature, it imparts a feeling of heat or warmth. Since gases are found to expand $\frac{1}{273}$ of their vol. for every increase of one degree F., it has been inferred that the temperature of —458 F., or —273 C., is an absolute zero, because at that temperature there would be no gaseous tension, and no possibility of detecting any further decrease of heat. The lowest temperature yet recorded is —230 F. C. is a powerfully depressing agent, and in certain conditions causes disease and death. Its most obvious effects occur in freezing of parts of the body.

Col'den (Caldwallader), lieut.-gov. of the prov. of N. Y., from 1761 to 1775, repeatedly acting as gov. in the absence of the chief executive, b. in Scot. in 1688, emigrated about 1708 to Pa., where he practised med.; invited to N. Y. in 1718 by Gov. Hunter, was the first surveyor-gen. of the colonies. Wrote a memoir on Amer. plants, entitled *Planta Coldenhamiæ*, etc., which was pub. by Linnæus in the *Acta of the Upsala Acad. of Science*, and is perhaps the earliest botanical treatise written in N. Amer. D. 1776.

Cold Harbor, a locality in Va., on the N. E. bank of the Chickahominy, about 10 m. N. E. of Richmond, near which occurred 2 important battles during the c. war. The first of these (sometimes called the battle of GAINES'S MILL, and by Gen. Lee the battle of the CHICKAHOMINY) was fought June 27, 1863, between the Confeds. under Gen. Lee and a portion of the U. army of the Potomac under the immediate command of Gen. Fitz John Porter. Gen. McClellan having taken $\frac{2}{3}$ of his army across the Chickahominy, the remainder were here attacked by a Confed. force of nearly twice their number. The action was fairly opened about 2 P. M., and at nightfall the U. force was driven from its position and retreated across the river. The U. loss was about 4000 killed and wounded and 3000 prisoners. The Confeds., attacking strong batteries, lost more severely, probably about 9000 killed and wounded.—The second battle (or series of battles) of C. H. was fought early in June 1864, between the U. army under Gen. Grant and the Confeds. under Gen. Lee. For several days there had been sharp fighting in this vicinity, and on the morning of June 3 Grant ordered a gen. assault to be made upon the entrenched lines of the Confeds. Some advantages were at first gained at different points, but in the end the assaults were repulsed. The decisive action lasted about half an hour, during which the U. loss was fully 7000, that of the Confeds. not more than $\frac{1}{2}$ as many. The entire U. loss during the period in which these actions occurred was reported at 13,153, of whom 1705 were killed, 9042 wounded, and 2406 missing. The Confed. loss is not officially stated, but it was probably not more than half as great.

Cold Spring, Putnam co., N. Y., on R. R. and the E. bank of the Hudson, 52 m. N. of New York, among the Highlands, 1 m. above W. Pt. Pop. 1870, 3086; 1880, 2111.

Coldwater, a city and R. R. centre, cap. of Branch co., Mich., situated on Coldwater Creek, midway between Detroit and Chicago. The State school for pauper children is in C. Pop. 1870, 4381; 1880, 4681.

Cole (THOMAS), a landscape painter, b. in Lancashire, Eng., Feb. 1, 1801, was taken to O. by his parents when he was a child. Produced 4 allegorical pictures of the *Voyage of Life* and a *Traveller's Almanac*. D. Feb. 11, 1848. See his *Life*, by L. L. NOBLE, 1855.)

Colebrook (HENRY THOMAS), an Eng. Orientalist, b. June 15, 1765, went to India in 1782, and was employed in the civil service of the E. I. Co. He became prof. of Sans. in the Coll. of Ft. William. Author of a *Dict. of the Sans. Lang.* and *On the Sacred Books of the Hindoos*. D. Mar. 10, 1837.

Coleman (LYMAN), D. D., a scholar, teacher, and author, b. at Middlefield, Mass., June 14, 1796, became prof. in Lafayette Coll., Easton, Pa. Wrote *Antiquities of the Chr. Ch. and Prelacy and Ritualism*. D. Mar. 16, 1882.

Coleman (JOHN WILLIAM), D. D., an Eng. theol., b. Jan. 24, 1814, grad. at Cambridge in 1836. He was appointed bp. of Natal in S. Afr. in 1854. Wrote *The Pentateuch and Book of Joshua Critically Examined* (1862), which was condemned by the Houses of Convocation. He maintained that some O. T. books are not divinely inspired. He was deposed from his see by his metropolitan, an act whose validity was denied by the privy council. D. June 20, 1883.

Coleoptera (from the Gr. *κόλεος*, a "sheath," and *πτερόν*, a "wing"), the name of an extensive order of insects, including all those popularly termed beetles, having 4 wings; the first pair, of a horny consistency, serve as defensive coverings to the second pair, which are larger in size and folded transversely beneath the elytra or wing-covers when the beetle is at rest. In some species the membranous wings are wanting, but the elytra are always present. The C. and their larvæ are very voracious, feeding on both animal and vegetable substances.

Coleridge, kol'rij (SAMUEL TAYLOR), an Eng. poet and critic, b. at Ottery St. Mary, in Devonshire, Oct. 21, 1772, was a son of the vicar of that parish. In 1791 he entered Jesus Coll., Cambridge, where he attained great proficiency in classical learning. He abruptly quitted Cambridge in 1792, and enlisted in a regiment of dragoons under the assumed name of Silas Tomken Comberbatch. His relatives soon procured his discharge from the army. He visited Bristol in

1794, and became an associate of Robert Southey and other young men who, like himself, had adopted democratic and revolutionary ideas. In 1795 he became a resident of Nether Stowey (Somersetshire), where he associated with the poet Wordsworth, and remained nearly 3 yrs. During this period he composed the *Ancient Mariner* and other poems. He held Socinian views in this early part of his mature life, and began to preach in the Unit. chs., but his success as a preacher was hindered by his instability and want of punctuality. He removed to Keswick, in the Lake country, in 1800, and resided with Southey and Wordsworth. In 1808 he lectured on poetry and the fine arts in Lond., and in 1809 commenced the publication of the *Friend*, a periodical. His wife and family remained at Keswick, dependent on Southey, while C. led a wandering life, and formed many speculative and literary projects which he failed to realize. Wrote *Zanucka*, a drama (1818); *Aids to Reflection* (1825), and *Osorio, a Tragedy*. D. July 25, 1834. (See GILLMAN, *Life of S. T. Coleridge*, 1838.)

Coles (EDWARD), a statesman, b. in Albemarle co., Va., Dec. 15, 1786, was minister to Rus. 1817-18. Soon after his return he set free his slaves. He was gov. of Ill. 1823-26. Wrote a *Hist. of the Ordinance of 1787*. D. July 7, 1868.

Colfax, cap. of Whitman co., in S. E. part of Wash. Terr. Pop. 1880, 444.

Colfax (SCHUYLER), a statesman, b. in the city of New York Mar. 23, 1823, was a grandson of Gen. William Colfax, who commanded Washington's life-guards. In 1836 he removed with his mother, who was then a widow, to N. Ind. He settled at South Bend, and studied law, and became in 1845 ed. of the *St. Joseph Valley Register*, a Whig paper issued at South Bend. In 1850 he was a member of the convention which formed a new const. for Ind., and opposed the clause that prohibited colored men from settling in that State. Was an M. C. from 1855 to 1869; was chosen speaker of the House in 1863, 1865, and 1867; in 1868 he was elected V.-P. on the same ticket with Gen. Grant, receiving 214 out of 294 electoral votes. D. Jan. 13, 1885.

Colic (Lat. *colica*; Fr. *colique*; from the Gr. *κολικός*, "pertaining to the colon"), a term applied to diseases attended with severe pain of the abdomen; its supposed particular connection with the large intestine is not always certain. The disease is caused, at least in part, by irregular contractions of the muscular coat of the intestines. This complaint arises from various causes and exhibits different symptoms. It is sometimes attended with constipation, and ceases when the regular action of the bowels is restored. A good remedy in such cases is a dose of castor oil (about 1 ounce for an adult), with 20 or 25 drops of laudanum. Warm baths and fomentations are often necessary. When C. resists mild and simple remedies, med. assistance should be procured, for C. is closely allied, as a symptom, to several severe and dangerous diseases. Painter's C. arises from the absorption of lead into the system, and therefore attacks persons employed in lead-mines or using preparations in which lead is used. This latter disease is often called *colica Pictonum*, or "colic of the Pictones," the latter being the anc. name of the inhabs. of Poitou, where this disease was once common. (See ENTERALGIA; also URINARY CALCULI AND DEPOSITS.)

E. DARWIN HUDSON, JR.

Coligny, ko-leen-y, de (GASPARD), a Fr. admiral and Huguenot, b. at Châtillon-sur-Loing Feb. 16, 1517. He served with distinction at the battle of Cériseles in 1544, and became admiral of Fr. in 1552. He was the second in command of the Prot. army in the c. war which began in 1562, and when the prince of Condé was killed at Jarnac in 1569 he succeeded him as commander-in-chief. The war was suspended in 1570 by a treaty of peace, in which the court acted a treacherous part. C. went to Paris to attend the marriage of Henry of Navarre in Aug. 1572, and was received with feigned kindness by Charles IX. He was wounded in the street by a partisan of the duke of Guise, and was killed, 2 days later (Aug. 24), in the general massacre of St. Bartholomew. (See PÉRAULT, *Vie de Coligni*.)

Colima, ko-lee-mah, a state of Mex., on the W. coast. The interior is mountainous, the volcano Pico de Colima, the highest point, 10,800 ft. Area, 2393 sq. m. Pop. 65,829.

Coliseum, or **Colosseum** [so called on account of its colossal size], a name of the Flavian Amphitheatre in Rome, dedicated 80 A. D., now one of the most magnificent ruins in the world.

Coltamer (JACOB), LL. D., a lawyer, b. at Troy, N. Y., in 1792. He emigrated to Vt. in his youth, grad. in 1810 at the Univ. of Vt., was admitted to the bar in 1812. He was a judge of the supreme court of Vt. from 1833 to 1841, was elected an M. C. in 1843, 1844, and 1846, and was appointed P. M.-Gen. by Pres. Taylor in Mar. 1849, resigning in July 1850. Was elected a U. S. Senator in 1854, and re-elected in 1860. D. Nov. 9, 1865.

Collateral Security, an additional and separate security given for the repayment of borrowed money or for the performance of an obligation. A person who borrows money often gives a promissory note signed by himself, and deposits in the hands of the lender a note or notes signed by another party, or other property, such as stocks of corporations, or even tangible chattels. These collateral notes or other property are to be returned if the loan is repaid.

College (Lat. *collegium*, from *collegere*, to "collect"), in the Rom. law, signified a number of persons associated together by common functions—a body of colleagues—and was in many respects what we should now call a corporation. Its later meaning applied to any union of persons. C. might exist for religious, political, or industrial purposes; examples: C. of augurs, of pontiffs, of tribunes, and of artisans, like modern guilds. The body of cardinals, consisting of 3 orders—bps., priests, and deacons—is a collegiate corporation, called the Sacred C. A union of electors is sometimes called an electoral C. The term has been applied to organizations of instructors—e. g. C. of Professional Teachers, Cin., 1832-47, and the C. of Preceptors, Eng. In

Ger. it is applied to the union of the teaching corps (*Lehrer-collegium*) of a gymnasium or other school. The term is now, however, usually applied to corporations and insts. for instruction, especially in Fr., Eng., and the U. S. C. for academic purposes appear to have originated at the Paris univ., some time after its foundation, at the beginning of the 13th century.

C. were originally not a part of the univ. proper, and appear to have grown out of the voluntary association of students and teachers, and were at first designed primarily for alimnt and habitation, some of them being foundations for the poor, and others pension (boarding) insts. for students in easy circumstances. It required the slow evolution of centuries to develop these primitive boarding clubs into great insts. of instruction and of studious retirement.

With the exception of Ger., the mediæval C. finally obtained a preponderance over the univ. proper. On the Continent they did not, however, become independent of the univ., as their regents were appointed from the faculties, and were always under their control. The C. as a place of abode and study in connection with the univ. has disappeared from continental Europe.

In the Fr. system of public instruction, the schools leading to the baccalaureate of letters and of science are the state classical C., now called *lycées*, 86 in number (2349 profs. and 40,995 students), and the municipal C. (*collèges communaux*), numbering 252, with 3430 profs. and teachers and 38,236 pupils. Provision has recently been made to establish non-classical C. (*établissements de l'enseignement secondaire spécial*), leading to the baccalaureate of science, and also secondary schools for girls. The Coll. de Fr. is an inst. of the highest order for the cultivation of pure science, with no prescribed courses of study. Its 40 profs. give lectures which are open to the public.

The mediæval C. at Ox. and Cambridge obtained control over the univs. in consequence of the large authority with which Laud invested their heads. An Ox. or Cambridge C. is a corporation consisting of a head or master, fellows, and scholars. The governing body is in all cases the head and fellows. No one C. has the least control in any other, but the plan is much the same in all. These corporations give board and lodging on various terms to such students as choose to enter them and comply with their rules in order to receive their assistance in obtaining the univ. honors. Each C. holds lectures and examinations, awards prizes, and makes its own requirements of its students. At Ox. there are 21 C. and 5 halls or non-corporate C., and at Cambridge 17 C. The whole body of C. taken together, at Ox. and Cambridge, alike constitutes the univ., whose power and functions are practically limited to holding examinations and conferring degrees, and providing, to an inconsiderable extent, courses of lectures, at which attendance is optional. Of late yrs. C. have combined their forces for providing common systems of lectures, and there has been a strong desire to reconstruct the teaching power of these univs. Other important C. in G. Brit. are Eton, Winchester, Dulwich, Wellington, Univ. King's, Owen, and Liverpool. In Ire. there are 4—the anc. Trinity C. and the 3 located at Belfast, Cork, and Galway. Several C. for women have lately been established, the chief of which are Girton, at Cambridge; Cheltenham Ladies' C., and City of Lond. C. for Ladies.

The C. of Amer. are modelled on the pattern of those at Ox. and Cambridge; but our C. have from the beginning conferred degrees in all the faculties, which in Eng. is a function belonging only to the univs. In the U. S. there is no fixed distinction between the terms *college* and *university*, and there is as yet no univ. pure, in the Ger. sense. By establishing the faculties of theol., law, and med., some of our C. have acquired some of the forms and functions of univs. Others, by annexing a preparatory dept., approach the character of the Fr. C., which receive pupils at 9 or 10 yrs. of age. The old "colleges" of Harvard, Yale, and Columbia, and the new "universities" of Mich., Cornell, and Johns Hopkins, approach more nearly to the character of a true univ. than any others of our insts. for higher education. Many of the C., especially the younger ones, are open to both sexes. There is a considerable number of C. exclusively for women, the most important of which are Vassar, Smith, and Wellesley. The number of "universities" and C. in the U. S. is 364, with 4,241 instructors and 60,011 students.

JOHN D. PHILBRICK.

Collegiants, a sect of Chrs. in Hol., so called from their assemblies, which they called "colleges." They rejected all creeds, had no regular ministry, and no form of ch. govt. Their communion was open to all. The name *Rhynsburgers* is sometimes given them, from the town of Rhynsburg, where they had annual meetings.

Colleton (JAMES), gov. and landgrave of S. C. 1686-90, called a colonial parl. in 1687, and proposed radical alterations of the laws. He became exceedingly unpopular with the High-Ch. party, and was impeached and removed from office in 1690, and driven from the prov.

Collier, kol'yer (HENRY WATKINS), b. in Lunenburg co., Va., Jan. 17, 1801, became judge of Ala. circuit 1827-37, chief-justice for Ala. 1837-49, gov. 1849-53. D. Aug. 26, 1855.

Collieries. See MINES AND MINING.

Collimation, Line of [Lat. *collimo*, to "aim"], a straight line drawn from the optical centre of the objective of a telescope to the intersection of the middle cross-hairs of the reticle. It indicates the direction in which the telescope is pointed.

Collingwood (CUTHBERT), LORD, an Eng. admiral, b. at Newcastle-upon-Tyne Sept. 26, 1750, entered the navy in 1761. He was an intimate friend of Lord Nelson, and was distinguished as a naval tactician. He was the second in command at the battle of Trafalgar, Oct. 1805, and the chief command devolved on him before the end of the action in consequence of the death of Nelson. For his part in this victory he was raised to the peerage. D. Mar. 7, 1810.

Collin'ic Acid, an aromatic acid produced by the action of oxidizing agents on gelatine and similar bodies.

Collins (CHARLES), D. D., b. in N. Yarmouth, Me., Apr. 17, 1813, grad. in 1835 at Middletown, Conn.; was pres. of Emory and Henry Coll., Va., Dickinson Coll., Pa., and of the State Female Coll., Memphis, Tenn. Wrote *Methodism and Calvinism Compared*. D. July 10, 1875.

Collins (JOHN), b. in 1717, gov. of R. I. 1786-89, and a member of the first Cong. under the const. D. 1795.

Collins (WILLIAM), an Eng. lyric poet, b. at Chichester Dec. 25, 1721, ed. at Ox. Wrote in 1747 an admirable ode on *The Passions*. D. June 12, 1759. (See JOHNSON, *Lives of the Poets*.)

Collins (WILLIAM WILKIE), a novelist, b. in Lond. in 1824. He was first articled to a tea-merchant; then entered Lincoln's Inn. He is the author of numerous popular novels, among which are *The Bond Secret* and *Woman in White*.

Collinsville, R. R. June, Hartford Co., Conn., on Farmington River, 25 m. W. N. W. of Hartford. Pop. 1880, 1376.

Collinsville, Ill. See APPENDIX.

Colloidion. See ROAD, LAW OF THE.

Colloidion (from the Gr. *καλλώδης*, "sticky," from *κόλλα*, "glue"), a clear, colorless, gummy liquid, insoluble in water or alcohol, but soluble in ether, consisting of pyroxyline or gun-cotton dissolved in a mixture of alcohol and ether. When dried it gives a transparent residue, becoming electric by friction, and exploding less readily by heat, percussion, etc., than ordinary gun-cotton. It is used principally in photography, though also in surgery and med. for covering wounds to exclude the air, coating caustic substances, etc.

Collyer (REV. ROBERT), D. D., b. at Keighly, Eng., Dec. 8, 1823. In 1847 he came to the U. S. and became a Meth. preacher. Three yrs. later he embraced Unit. views. In 1850 he became pastor of Unity ch., Chicago, and in 1879 pastor of Ch. of the Messiah in New York.

Colocynth, *kol'o-sinth* [Gr. *κολοκύνθης*; Lat. *colocyntidis*], a well known purgative med., the dried and powdered pulp of the C. gourd, a fruit about the size and color of an orange, with a smooth, thin, solid rind. *Cucumis Colocynthis*, the plant which produces it, is nearly allied to the cucumber. It is common in S. Europe, Asia, and Afr., and is grown also to some extent in the U. S., especially by the Shakers. The fruit, when it begins to turn yellow, is gathered, peeled, and dried quickly. It is chiefly in the form of "compound extract of C." that it is used in med. In large doses it is a drastic, irritant poison. It owes its cathartic properties to a bitter neutral principle called colocynthin. The seeds of the plant have no cathartic principle. The extract of C. is used in pills in combination with other purgatives, and frequently with extract of hyoscyamus. In small doses C. acts as a safe and useful purgative, and when associated with hyoscyamus the latter prevents much of the pain which usually results from the use of C. by itself.

Colocynthin, the bitter principle of colocynth.

Cologne, *ko-lon'* [Ger. *Köln*; anc. *Oppidum Ulpianum*, afterward *Colonia Agrippina*], a city of Prus., on the Rhine, 24 m. S. E. of Düsseldorf, at the intersection of several R. Rs., is connected with Deutz by an iron bridge and a bridge of boats, and is a fortress of the first rank. The streets are narrow and filthy, but outside the walls are fine gardens and promenades. It has an abp.'s palace, an observatory, a botanic garden, an arsenal, and a fine town-house. Among the chs. are St. Mary's, founded about 1000 A. D.; St. Peter's, containing Rubens's painting of the crucifixion of St. Peter, and St. Ursula's, said to hold the bones of 11,000 virgins who were massacred by the Huns. The Gothic cathedral, founded in 1248, is one of the noblest in Europe. It is cruciform, 500 ft. long, 231 ft. wide, with 2 towers about 525 ft. high. The construction was suspended by the Ref., but early in the present century large sums were raised for its completion, the work being finished in 1890. C. is especially noted for the production of the perfume known as *eau de cologne*. It was annexed to the Ger. empire in 870 A. D., became one of the chief cities of the Hanseatic League, and its abps. were for several centuries princes and electors of the empire. Pop. 144,772.

Cologne Water. See *EAU DE COLOGNE*.

Colombia, United States of, a S. Amer. republic, in the N. W. part of the continent, bounded N. by Central Amer. and the Caribbean Sea, N. E. and E. by Venezuela and Brazil, S. by Ecuador, W. by the Pacific Ocean. It includes the Isthmus of Darien or Panama, and has a coast-line on both oceans, between which there is a tidal difference. It is situated between 0° 36' and 12° 25' N. lat. and 69° 14' and 83° W. lon. Its area is estimated at 320,638 sq. m.

Surface.—C. is intersected by 3 great ranges of the Andes (see *ANDES*), the W., Central, and E. Cordilleras; the last is much the largest, and consists of a series of vast tablelands, cool and pleasant. The highest peak is Tolima, 18,317 ft. above the sea. These plains, called *llanos*, are fertile and populous. The river valleys are lower, and, though very fertile, hot and humid. The chief rivers are the Magdalena and its affluent, the Cauca; the Meta and Guaviare, affluents of the Orinoco, and the Yapura and Apaporis, branches of the Amazon. There are some mt.-streams W. of the Andes.

Minerals.—Gold, silver, platinum, lead, copper, iron, coal, and precious stones.

Soil and Vegetation.—The soil is generally rich: the forests contain mahogany, cedar, wax palm, cinchona, caoutchouc, fustic, Brazil-wood, and other dyes and medicinal plants; the productions are tobacco, coffee, cocoa, wheat and other cereals, cotton, rice, sugar-cane, plantains, bananas, indigo, vegetable ivory, and tropical fruits. The plains have vast herds of cattle and horses, and many hides and much jerked beef are exported.

Animals.—The jaguar, puma, tapir, monkey or lemur, alligator, armadillo, deer, llama, etc.

Climate hot and unhealthy in the lowlands and river valleys; yellow fever is endemic at Cartagena and other places on the coast, and Chagres or Panama fever, a deadly ma-

larial disease, on the isthmus; there are heavy and almost constant rains in the forests of Darien; the highlands have a temperate and healthy climate.

Finances.—Public home debt in 1880, \$30,000,000; foreign debt, Jan. 1878, \$53,000,000; revenue, 1880, \$4,910,000; expenditure, \$6,266,930.

Railways and Canal.—There were 66 m. of railway open in 1880, 47 m. across the Isthmus of Panama. Count de Lesseps has undertaken a ship-canal across the isthmus.

The imports from C. to the U. S. in 1880 were \$8,441,972, mostly free of duty; the exports from the U. S. to C. in 1880, \$5,328,836; the total imports and exports are about double these sums. The transit trade across the Isthmus of Panama is nearly \$30,000,000, and is increasing.

History.—First settled by Spaniards in 1510; called New Granada; subject to Sp. until 1811, when it revolted; united with Venezuela and Ecuador in the Republic of Colombia, but this dissolved in 1831, and each became an independent republic; a c. war between Federalists and Liberals continued 30 yrs.; in Sept. 1861 name of New Granada changed for U. S. of C.; const. adopted May 1863; a free republic, all religions tolerated; govt., a pres. and v.-p. elected for 2 yrs.; senate of 27 members, 3 from each state; house of reps., 66 members; other regulations much like U. S.; almost constant revolutions since 1863.

Population, 2,951,323, of whom more than one half are whites and half-castes. There are 9 states—Antioquia, Bolivar, Boyaca, Cauca, Cundinamarca, Magdalena, Panama, Santander, and Tolima. *Principal towns*, Bogotá (cap.), pop. 40,883; Panama, 18,378; Cartagena, 7800; Santa Marta, 3500; Aspinwall, 4000. L. P. BROCKETT.

Colombo, a seaport and cap. of Ceylon, on its W. coast, near a rocky headland. It is fortified and defended by batteries, bastions, etc. The harbor is small, and is only safe during the S. E. monsoon. It has a light-house, a military hospital, a govt.-house, and chs. for the Eng., Dut., and Port. Was occupied by the Port. in 1517, taken by the Dut. in 1603, and conquered in 1796 by the Brit. Pop. 111,942.

Colombo Root, the root of *Cocculus palmatus*, a menispermaceous vine from E. Afr. It contains colomin, berberine and colombic acid, starch, coloring-matter, etc. It is one of the most useful of the mild tonics.

Colonization Society, The American, an association formed in 1816 for the purpose of transporting negroes from the U. S. to Afr. Many yrs. earlier Samuel Hopkins, D. D., had advocated such an enterprise. Among the prin. founders of the society were Charles F. Mercer of Va., the Rev. Doctor Finley of N. J., and Bp. Meade. The const. of the society was adopted at a meeting held in Dec. 1816. In 1820 the society sent out 86 colonists to Liberia, which became in 1847 an independent republic.

Colonna (VITTORIA), an It. poetess, a daughter of the constable of Naples, b. in 1490. She married in 1507 the marquis of Pescara, afterward a famous gen., killed in battle in 1525. She was eminent for virtue and beauty as well as poetical genius. She composed poetical lamentations on the death of her husband, and many religious poems (*Rime Spirituali*, 1548). In 1541 she retired into a convent at Orvieto. D. Feb. 1547. (See MRS. HENRY ROSCOE, *Vittoria Colonna; her Life and Poems*, 1808.)

Colony [Lat. *colonia*, from *colonus* (from *colo*, to "till," to "cultivate"), a "husbandman," a "settler"], a term denoting a settlement formed in a distant region or country by emigrants who are under the protection and supreme govt. of the mother-country. The Brit. colonies in Australia and Amer. are practical instances of the colony in this sense; but there are other dependencies (like the Indian empire) which deviate more or less from the true characteristics of a colony. Terr. have afforded profitable residence without being colonies; the most conspicuous of this class is the Brit. empire in Hindostan, where the Brit. people scarcely hold land or concern themselves in agriculture, from which the term colonist is taken. The Grs. established communities in Asia Minor, Afr., It., and Fr.

Colophony, *ko-lof'o-ne* [Gr. *Κολοφώνια ῥητιν*—*i. e.* "Colophonian resin," from its place of export, Colophon], the chemical name of resin of pine, or rosin.

Color [Lat. *color*; Gr. *χρῶμα*]. According to the classification of Newton there are 7 primary colors—red, orange, yellow, green, blue, purple, and violet—which, when combined together in their proper proportions, produce white light; but according to other authorities the number of primary C. may be reduced to 3—red, yellow, and blue (or green)—all the other C. being produced by different combinations of those 3 elements. The cause of the appearance called C. may be simply stated thus: If a body absorbs every other kind of light and reflects or transmits red light only, it will appear red; if it absorbs every kind except yellow light, it will appear yellow, and so on. Again, if it absorbs nearly all the rays, reflecting or transmitting scarcely any, it will appear dark or black; and if the greater part of the light is absorbed except a little red and a little yellow, the object will appear dark-brown.

Colorado, a river of Tex., rises in the high table-lands in the N. W. part of the State. Its gen. direction is S. E. It enters Matagorda Bay near Matagorda. Steamboats ascend above Austin City. Total length, estimated at 850 m.

Colorado, or **Rio Colorado** (*i. e.* "Red River"), a river of the U. S., rises among the Rocky Mts. by 2 branches—Green and Grand rivers—which unite in Utah about lat. 38° N. It flows generally S. W., and passes through the N. W. part of Ari. to the S. E. border of Nev. It afterward runs nearly S., forms the boundary between Ari. and Cal., and enters the N. end of the Gulf of Cal. The entire length, including Green River, is estimated at 1200 m. It is navigable for small steamboats for 300 m. or more. Among the most wonderful natural objects in N. Amer. is the Great Cañon of the Colorado, more than 300 m. long, between lon. 112° and 115° W. Here the river flows between walls of rock nearly vertical, which are in some places 6000 ft. high.

Colorado, kol-oh-rah'do, called the "Centennial State," because admitted into the U. in 1876, a central State of the "New West," between 37° and 41° N. lat. and 102° and 109° W. lon.; 280 m. from N. to S., and 370 from E. to W. Area, 103,645 sq. m., equal to N. Y., Pa., N. J., and Del.

Topography and Surface.—The Great Plains, from the Mo. River to the Rocky Mts., rise gradually till at the foot-hills they are 6000 to 7000 ft. high. The E. third of C. belongs to this lofty plateau; the Rocky Mts. and their parks and the valleys beyond occupy the rest of the State. The Rocky Mts. here spread out into many chains and spurs, with many lofty peaks. The prin. chains are—Col. Front range; N. Col. or main range, uniting at S. Park with Front and Saguache ranges, and forming Sangre de Cristo range, which extends into N. M.; the Park range, W. of the great parks; the Saguache or Sawatch range, which with its continuations and spurs is now conceded to be the Great Divide or main range of the Rocky Mts.; W. of this, numerous spurs and short chains running N. W., W., and S. W., and beyond and between them a lofty plateau extending to the E. wall of the great Utah Basin. Through this plateau the Grand, Green, and Gunnison rivers, affluents of the Col. of the W., cut their deep canyons. The parks, of which the N., Middle, S., San Luis, Egeria, Estes, Animas, and Huerfano are the largest, are broad valleys, originally the beds of inland lakes or seas. There are 42 peaks in C. over 14,000 ft., and some hundreds between 11,000 and 14,000 ft. The rivers of C. are the N. fork of Platte, S. Platte, Republican, Arkansas, Rio Grande, San Juan, Gunnison, Grand, White, Green, and their affluents. None of these are navigable. The canyons of the Ark., Rio Grande, San Juan, Gunnison, Grand, and Green are from 2000 to 5000 ft. deep, and of wonderful and terrible magnificence. There are numerous small lakes; San Luis is the largest.

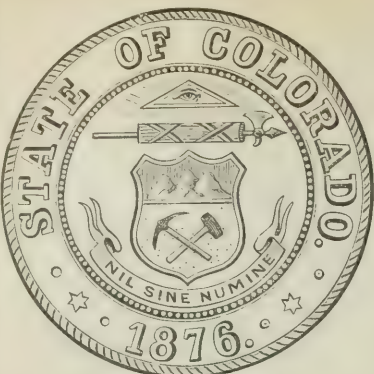
Minerals.—Gold and silver are found in 21 of the 33 cos. of the State; copper alone and with gold, lead alone and with both silver and gold, zinc alone and with silver, iron with gold and alone in great quantities; platinum, quicksilver, tellurium in combination with gold, silver, and copper; coal, both bituminous and anthracite (the latter probably from the tertiary altered by volcanic action); gypsum, salt, kaolin, pottery clays, and many precious stones.

Vegetation and Soil.—The arable lands of C. comprise 15,000 m. or more of its area, and the grazing lands at least 70,000 m. or more. The arable lands are generally fertile, but most of them require irrigation, and produce enormous crops under its influence. The grazing lands require less water—only enough to water the flocks and herds. Some of the irrigating canals, both in the N. and S. parts of C., are very large and long. One, of an Eng. co., is 54 m. long; another, 34 m.; others less. The mt.-slopes are generally covered with forests of pine, spruce, fir, etc., but the consumption of timber is enormous. The native grasses of C. are rich and nutritious; the flowers mostly sub-alpine, but very beautiful. The yield and quality of the cereal and root crops are excellent. Fruits are liable to be winter-killed. The crops, by census of 1880, were: Wheat, 1,425,014 bushels; Indian corn, 455,968; oats, 640,900; barley, 107,116; rye, 19,465; potatoes, 383,123; hay, 85,062 tons. The value of live stock in 1880 in C. was \$8,703,342.

Animals.—The grizzly bear W. of Rocky Mts., the black and brown bear and the jaguar in the W., the cougar in the N. W., the gray wolf E. and W., the prairie wolf E. of Rocky Mts.; the buffalo, not in large herds, E. only; the mt. or wood buffalo rarely in mts.; the elk (wapiti), Va. and mule deer are numerous; antelope on the plains, big-horn or mt.-sheep and the Rocky Mt. goat-antelopes in the mts., and all the rodents and munchers. Birds of prey and game birds are very plentiful, and song-birds in the mts. The Rocky Mt. locust and the C. beetle or potato-bug, if originating here, do most of their mischief elsewhere. There are remarkable fossils of mammals and reptiles now extinct in Fremont and other cos., which have attracted the attention of naturalists. The wonderful results of ages of erosion seen in the "City of the Gods" in the N. W., the "Garden of the Gods," "Temple Cañon," etc., will well repay investigation.

Climate.—Owing to the gen. elevation, the climate of C. is temperate; rather too cool than too hot. The mean annual temperature of the towns, which range from 5000 to 11,000 ft. above the sea, is from 48.5° to 49.3°; summer mean, 64.6° to 69.2°; winter mean, 31.3° to 32.8°; extremes, 93° to 99° maximum in summer, with from 6 to 30 days, according to elevation, above 90°; minimum in winter, -3° to -12°, with an average of 6 to 20 days below zero. The nights are always cool; average rainfall, 18.84 inches, and is increasing. Consumptives will do well, if they do not seek an elevation much above 6000 ft., and if they will stay there; a return E. is often fatal.

Industries.—The largest industry of C. is the mining, smelt-



Colorado Seal.

ing, and reducing of the precious and other metals. Gold-mining has passed through 3 stages since 1859—placer and hydraulic mining; refractory ores, sulphurets, and tellurides of gold and iron; and the present era of free milling gold and easily reducible ores. In silver-mining there has been a constant succession of surprises. Sulphurets of lead and silver, the argentiferous galena so common elsewhere, do not abound in C., but instead there are silver and copper, silver and zinc, silver and iron, ruby silver, horn silver, silver with manganese and iron, chlorides of silver, tellurides, and, largest and best of all, carbonates of lead and silver. Then, too, the way in which the silver ores occurred was new; there were some pockets, some fissure veins, some chloride belts, and in and around Leadville no fissure veins, but blankets or layers of carbonate of lead charged more or less with silver, and of great extent, but not of great depth. These new conditions have made silver-mining very interesting in C. Prior to 1870 the gold product of C. had been \$27,213,081; that of silver, \$330,000; of copper, \$40,000. It was not till 1872 that the annual output of silver exceeded that of gold; and though the gold product is 4 times that of 1874, it is now only 1/2 that of silver. The entire output of gold, silver, copper, and lead from 1859 to 1881 is \$120,600,000, of which \$62,000,000 was gold, \$55,000,000 silver, \$950,000 copper, \$2,650,000 lead. The product of silver in 1880 was nearly \$16,000,000, that of gold about \$5,500,000. In 1881 the output of bullion was stated at \$22,957,160. The carbonates of silver and lead have built up since 1877 one city (Leadville), with its suburbs, of over 30,000 inhabs., and the newly discovered mines a dozen more of from 4000 to 10,000. The coal industry is acquiring much prominence; cattle-herding, sheep-raising, and the wool traffic also engage much capital and many hands. The smelting and reduction of metals and the stamping and amalgamating of the free milling gold also employ large numbers. The census of 1880 shows 599 manufactories; total value of manufactures for the year, \$14,260,159.

Railways.—In 1883 there were 2356 m. of railway in operation in C.; cost of R. S. and equipment, \$89,304,648; dividend on stocks, \$436,121. More than \$9,000,000 were expended in railway construction in 1881.

Finances.—State debt, net, in 1880, \$212,814; local debt, net, \$3,381,482; total debt, State and local, net, \$3,594,296. The assessed valuation in 1880 was—real estate, \$35,604,197; personal, \$38,867,496; total, \$74,471,693; total taxation, \$2,152,008.

Banks.—In Nov. 1881 there were 12 national banks in operation in C., having \$1,070,000 cap.; 51 private banks and banking-houses, with \$547,827 reported cap. and \$2,705,441 deposits. About \$50,000,000 invested in trade and banking.

Education.—There is an excellent public school system in C. and a rapidly growing school fund; graded and high schools in all the larger towns; a State univ. at Boulder, a coll. at Colorado Springs, a State agricultural coll. at Ft. Collins; special schools and collegiate schools of high character.

Churches.—All the religious denominations are well represented, the Catholics perhaps leading in adherent pop., but the Meths., Congls., Baps., Episcopalians, Presbs., Lutherans, etc., following very closely.

Population.—In 1870 C. had 39,864 inhabs., beside 7480 tribal Indians; in 1880, 194,327 (white 191,126, colored 3201, including 612 Chi. and 154 Indians), beside 2530 Ute (tribal) Indians; 1700 were removed to Utah in 1880. Pop. 1883, about 300,000.

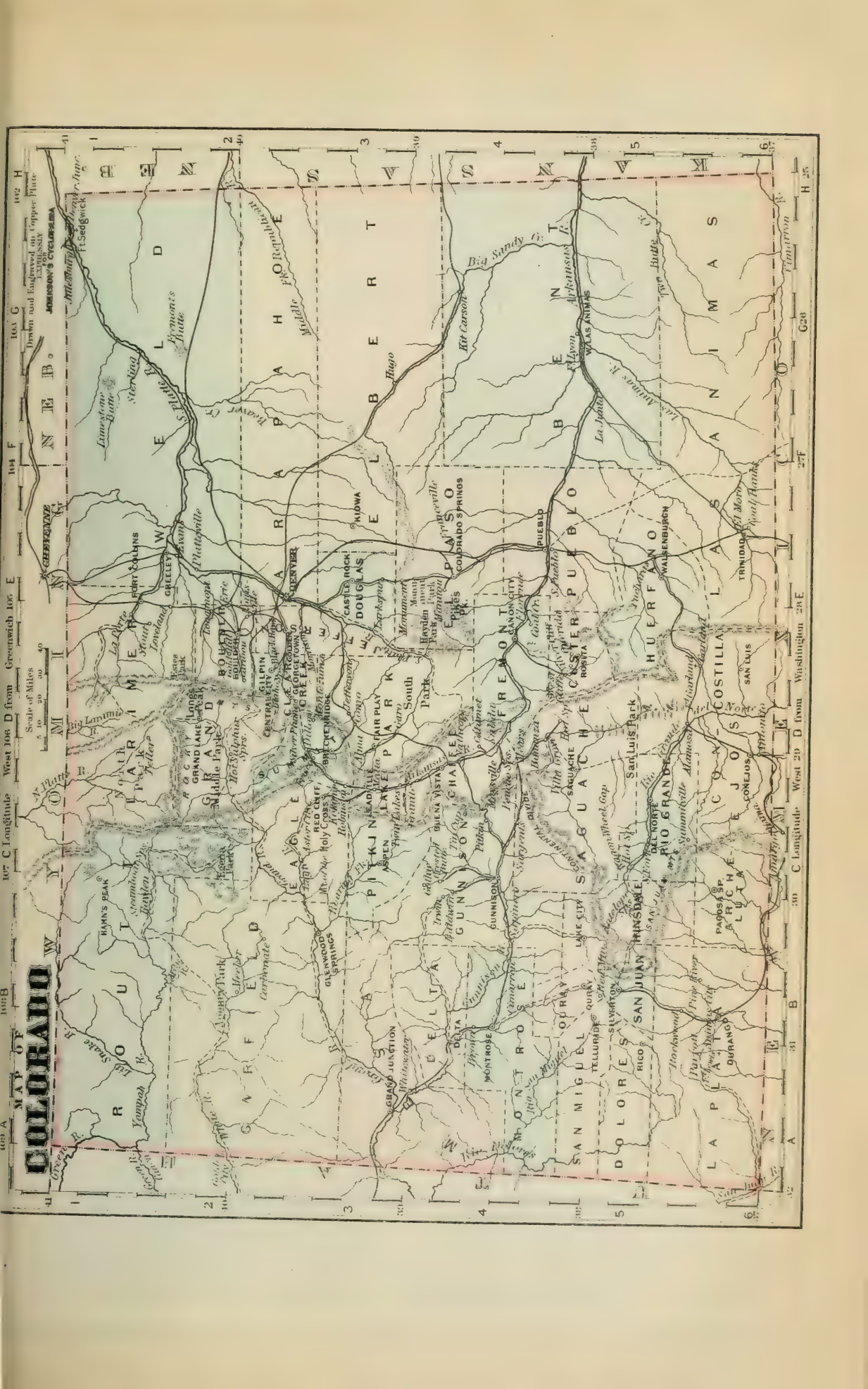
The principal towns are Denver (cap.), pop. in 1880, 35,629; Leadville, 14,830; Silver Cliff, 5040; Colorado Springs, 4226; Georgetown, 3294; Boulder, 3069; Pueblo, 3217; Golden, 2730; Central City (with Black Hawk and Nevada), 5250; Trinidad, 2226; Buena Vista, 2141; Pitkin, 1891; Breckinridge, 1657; Greeley, 1297; Rosita, 1008.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Arapahoe	2-3	6,229	28,644	Denver	35,629
Bent	4-6	592	1,654	W. Las Animas	454
Boulder	2-6	1,869	9,723	Boulder	3,069
Chaffee	4-D	.....	6,512	Buena Vista	2,141
Clear Creek	3-D	1,596	7,833	Georgetown	3,294
Conejos	6-C	2,304	5,605	Conejos	359
Costilla	6-D	1,779	2,879	San Luis	341
Custer	5-D	.....	8,090	Rosita	1,008
Delta	3-B	.....	.....	Delta	.....
Dolores	5-B	.....	.....	Rio	894
Douglas	3-E	1,385	2,486	Castle Rock	85
Elbert	4-B	.....	.....	Roll Cliff	.....
El Paso	4-E	987	7,949	Kiowa	.....
Fremont	4-D	1,064	4,735	Colorado Springs	4,226
Garfield	2-B	.....	.....	Canon City	1,501
Gilpin	2-D	5,490	6,489	Glenwood Spgs.	.....
Grand	2-D	.....	417	Central City	2,626
Gunnison	4-B	.....	8,235	Grand Lake	.....
Hinsdale	5-C	.....	1,487	Gunnison	888
Huerfano	5-E	2,250	4,124	Lake City	.....
Jefferson	3-E	2,390	6,804	Walsenburg	377
Lafayette	3-C	522	2,563	Golden	2,730
La Platte	6-B	.....	1,110	Leadville	14,830
Larimer	1-D	838	4,892	Durango	.....
Las Animas	6-G	4,276	8,903	Fort Collins	1,358
Mesa	3-A	.....	.....	Trinidad	2,226
Montrose	5-B	.....	2,669	Grand Junction	.....
Ouray	5-B	.....	2,669	Montrose	.....
Park	3-D	447	3,970	Ouray	864
Pitkin	3-C	.....	.....	Fair Play	430
Pueblo	5-E	2,265	7,617	Aspen	.....
Rio Grande	5-A	.....	1,344	Pueblo	3,217
Routt	1-B	.....	140	Del Norte	729
Saguache	5-C	304	1,973	Hahn's Peak	.....
San Juan	5-B	.....	1,087	Sagehen	325
San Miguel	5-A	.....	.....	Silverton	264
Summit	2-B	258	5,459	Telluride	.....
Weld	1-G	1,636	5,646	Breckinridge	1,657
Total	.....	39,864	194,327	Greeley	1,297

* Reference for location of counties. See map of Colorado.

† Organized since census of 1880.

History.—Civilized Cherokees attempted to explore it in 1857, but were driven back by Indians; in 1858 explored at 2

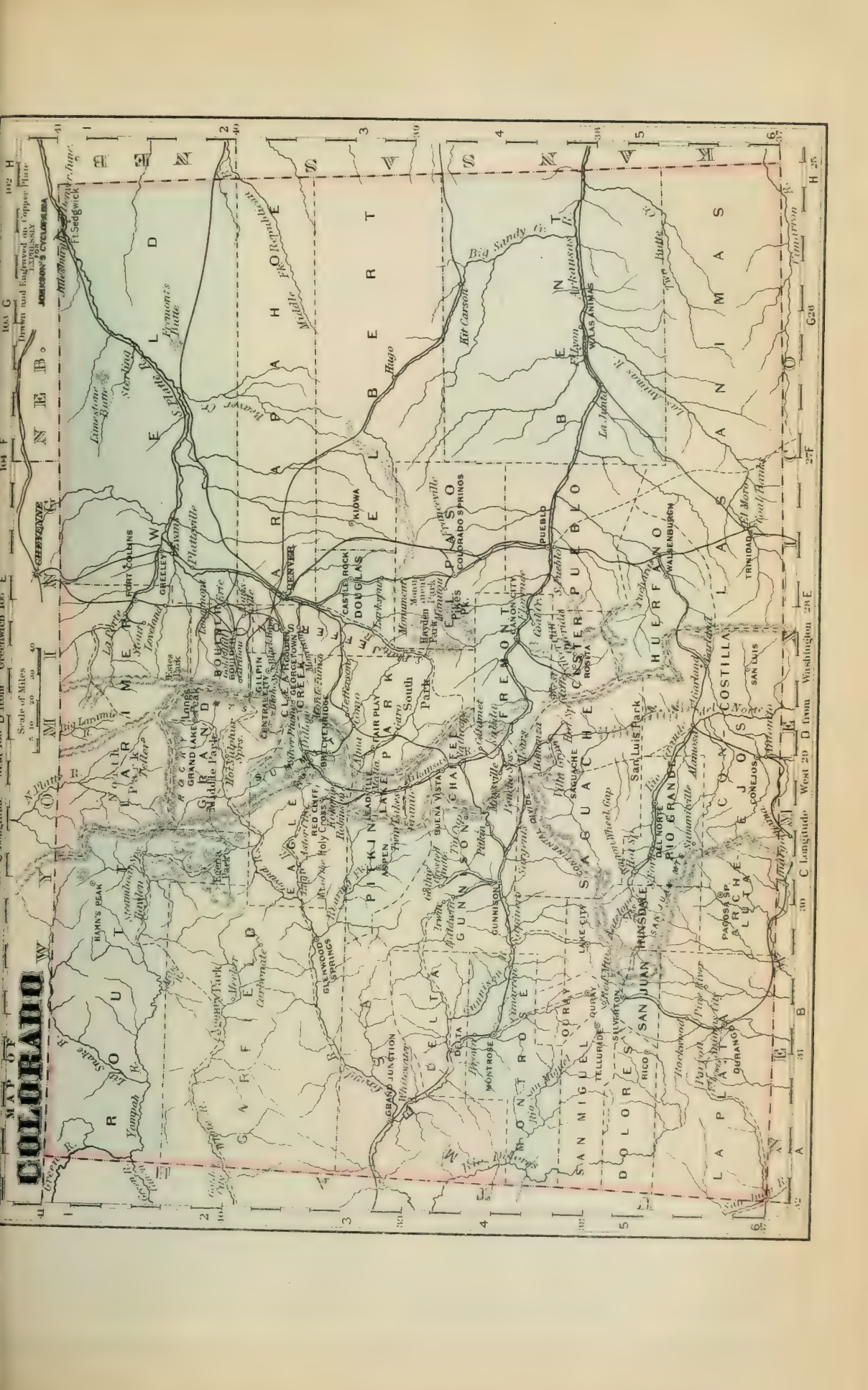


COLORADO

MAP OF

Scale of Miles
0 10 20 40

Drawn and Engraved on Copper Plate
J. JOHNSON'S CYCLOPEDIA



points—near Pike's Peak by a company from Kansas, and in the S. W. by Georgians under Baker, who was afterward killed by the Indians at the Col. River: both found gold. In 1839 Clear Creek gold deposits discovered: great emigration in 1859, '60, and '61: Terr. organized in 1861: gold plenty, but difficult of extraction; not much silver till after 1870: fine climate and fine grazing lands; soil very rich and productive when irrigated; irrigation practised in the N., herding in the E., and gold-mining in the central part of Terr. C. contributed its full quota for the c. war. Attempts were made for its admission as a State in 1865-67, but were vetoed by Pres. Johnson, and in 1873 denied by Cong.; admitted in 1876, and soon after great discoveries of carbonates of lead and silver in Lake co., which turned the tide of immigration there, and have tripled its pop. in 5 yrs. Similar but less important discoveries were made in adjacent counties in 1878 and 1879.

Governors.

STATE.

TERRITORIAL. William Gilpin. 1861-62 John L. Routt. 1876-Jan. '79 John Evans. 1862-65 Frederick W. Pitkin. 1879-83 Alexander Cummings. 1865-67 James B. Grant. 1883-85 A. Cameron Hunt. 1867-69 Benjamin H. Eaton. 1885-87 Edward M. McCook. 1869-73 Samuel H. Elbert. 1873-74 John L. Routt. 1874-76

L. P. BROCKETT.

Colorado, Tex. See APPENDIX.

Colorado College. See APPENDIX.

Colorado Springs, a city, cap. of El Paso co., Col., on R. R., 75 m. S. of Denver. It is close to the mineral springs at Manitou. It has a coll., an Institute for the Mute and the Blind, and is a health resort. Pop. 1880, 4226.

Colos/sus [Gr. Κολοσσός] of Rhodes, a bronze statue of Apollo, executed by Chares and completed in 280 B. C., was one of the Seven Wonders of the World. It was 105 ft. in height, and was ascended by a winding staircase. It was overthrown by an earthquake about 224 B. C., and was never re-erected. Its fragments remained on the spot till 672 A. D.

Colquitt (WALTER T.), a lawyer, b. in Halifax co., Va., Dec. 27, 1799; removed to Ga., and was elected an M. C. in 1838, and a Senator of the U. S. in 1842. D. May 7, 1855.

Colt (SAMUEL), b. at Hartford, Conn., July 19, 1814. He invented a pistol called a revolver, for which he obtained a patent in 1835, and began about 1848 to manufacture revolvers at Hartford. D. Jan. 10, 1862.

Colubridæ (Coluber, a genus), a family of serpents, variously limited, but, according to the best authorities in the U. S., containing most of the non-venomous apodal typical snakes. Nearly 150 species and varieties inhabit the U. S. Among the best known are the king snake (*Ophibolus getulus*), black snake (*Buconian constrictor*), and garter snake (*Eutania sirtalis*), etc.

Columbia or Oregon River is the largest Amer. stream which falls into the Pacific. It rises in the Rocky Mts., in Brit. Columbia, in about lat. 50° N., flows N. W. nearly 150 m., then S. to Wash. Terr., where it unites with Clark's River, and pursues a tortuous course to the N. boundary of Or.; thence W. in nearly a direct line, forming the boundary between Wash. Terr. and Or., until it enters the Pacific, receiving in about lat. 46° 20' the Lewis or Snake River. It passes through many mt.-gorges, and its navigation is obstructed by falls. The tide ascends to the Cascades, a series of rapids 140 m. from its mouth, up to which vessels of 300 tons can ascend. At the Dalles, in Or., it is contracted to a channel about 100 yards wide, between basaltic rocks, above and below which steamboats ply. At its mouth is a bar with 20 ft. of water at low tide. Length, about 1400 m.

Columbia, Dak. See APPENDIX.

Columbia, city, R. R. junc., cap. of Whitley co., Ind., 19 m. W. N. W. of Ft. Wayne. Pop. 1870, 1663; 1880, 2244.

Columbia, cap. of Boone co., Mo., 24 m. E. of Booneville, and on R. R. It is the seat of the State univ. and the Chr. and Bap. female colls. Pop. 1870, 2236; 1880, 3326.

Columbia, R. R. junc., Lancaster co., Pa., on the left bank of the Susquehanna River (here nearly 1¼ m. wide), 80 m. by R. R. W. of Phila. and opposite Wrightsville. It contains a female inst. Pop. 1870, 6461; 1880, 8312.

Columbia, cap. of S. C. and of Richland co., and an important R. R. centre, on the left (E.) bank of the Congaree River, just below the confluence of the Saluda and Broad, 137 m. by R. R. N. W. of Charleston; lat. 33° 57' N., lon. 81° 7' W. It is the seat of S. C. Coll., called since 1865 the S. C. Univ., founded in 1804. C. has a State-house, penitentiary, an asylum for the insane supported by the State, a Presb. theological sem., a Meth. female coll., an orphans' home, and large libraries connected with the theological sem. and S. C. Univ. It is at the head of steamboat navigation. It was taken by Gen. Sherman's army Feb. 17, 1865, and was then much injured by fire. Pop. 1870, 9298; 1880, 10,636.

Columbia, R. R. junc., cap. of Maury co., Tenn., on Duck River, 46 m. S. S. W. of Nashville. It is the seat of Jackson Coll. and has 2 female sems. Pop. 1870, 2550; 1880, 3400.

Columbia College, an institution of learning in New York city, originally chartered as "King's College" by George II., Oct. 31, 1754. After the Revolution the name was changed to Columbia. At present (1885) it embraces, beside the academic dept., School of Arts, a School of Mines, a School of Law, a School of Political Science, and a School of Med. In its several faculties it has about 40 profs. and more than 30 instructors, lecturers, tutors, and assistants. It is very richly endowed, and its scientific apparatus, collections, and libraries are valued at more than \$300,000. The present pres., Rev. F. A. P. Barnard, LL.D., was elected in 1864.

Columbian College, Wash., D. C., was incorporated by an act of Cong. in 1821. Its founders were mainly members of the Bap. denomination. It has a med. and a law dept. By act of Cong., approved Mar. 3, 1853, the corporation of C. C. was changed into "The Columbian Univ."

Columbine (*Aquilegia*), a genus of perennial plants of the order Ranunculaceæ. The *Aquilegia vulgaris*, or common C., a native of Europe and of the Rocky Mts. in the U. S., is cultivated in gardens for its showy flowers. The *Aquilegia Canadensis*, a native of the U. S., has beautiful scarlet flowers of curious structure.

Columbus, a city and R. R. centre of Ga., cap. of Muscogee co., situated on the E. bank of the Chattahoochee River, which here forms the boundary between Ga. and Ala. It is 100 m. W. S. W. of Macon. Steamboats ply at all seasons between C. and Appalachicola, Fla., light draughts only being used in summer. The falls of the river at this point afford a water-power. Pop. 1870, 7401; 1880, 10,123.

Columbus, a R. R. junc., cap. of Bartholomew co., Ind., on the E. Fork of White River, 41 m. S. S. E. of Indianapolis. Pop. 1870, 3359; 1880, 4813.

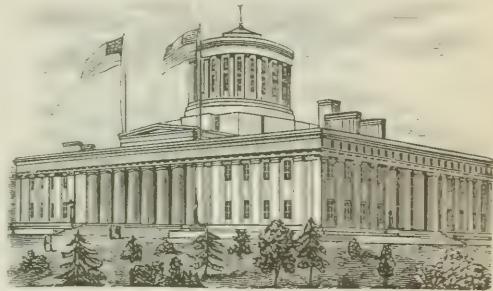
Columbus, R. R. junc., cap. of Cherokee co., Kan., 50 m. S. of Ft. Scott. Pop. 1870, 402; 1880, 1164.

Columbus, cap. of Lowndes co., Miss., on R. R. and the Tombigbee River, 235 m. by rail from Mobile. It has a female sem., a univ., and 2 acads. Pop. 1870, 4812; 1880, 3955.

Columbus, a city, cap. of Platte co., Neb., on R. R. and Platte River, 92 m. west of Omaha. Pop. 1870, 526; 1880, 2131.

Columbus, an important R. R. centre, cap. of O. and of Franklin co., situated on each side of the Scioto River, but principally on the E. side, and 70 m. from its mouth, 110 m. N. E. of Cin. and 350 m. from Wash., D. C. It is in lat. 39° 57' N. and lon. 83° 3' W. from Greenwich. At the time C. was laid out as a town in 1812, it was an almost unbroken forest, with no resident within its limits. Its shipments and receipts are by rail and canal, principally by rail. The leading commodity is coal. Here is a State penitentiary. C. is the seat of Capitol Univ. (Lutheran), the O. Agricultural and Mechanical Coll., the Starling Med. Coll., St. Mary's of the Springs (R. Cath.), St. Aloysius's Sem. (R. Cath.), and business colls.; also of several public libraries. There are several hospitals, an asylum for the insane, a deaf and dumb asylum, an inst. for idiotic and imbecile youth, and a blind inst. The State-house is of great solidity and magnitude, Doric in its style of arch. It covers 2 acres of ground, is a bold and noble structure, and is built of beautiful gray limestone. The cost of the building complete was \$1,359,121. The architectural character is Eng., of the later period of Elizabeth. The central arched portico is of cut stone, flanked on either side by cast-iron piazzas of the same gen. character.

C. was selected for the cap. of O. in 1812, as the State wanted a cap. at or very near the centre. Chillicothe was originally the seat of govt. In Feb. 1810 the legislature appointed 5 coms. to examine and select the most eligible site. In their report to the legislature, dated Sept. 12, 1810, the coms. recommended a site 12 m. above Franklinton, now a part of C. (made so by annexation in 1872). At the session in 1812 a company composed of Lyne Starling, John Kerr, Alexander McLaughlin, and James Johnston proposed that the legislature establish the seat of the State govt. on



State Capitol (Columbus, O.).

the high bank E. of the Scioto River, nearly opposite Franklinton. The same company made proposals for the erection of a State-house, penitentiary, and other public buildings, the same to be completed by 1817. An act was passed Feb. 14, 1812, accepting the proposals and bond of the co., and permanently establishing the seat of govt. on the lands named therein, the legislature to commence their sessions there on the first Monday of Dec. 1817, and there continue to May 1840, and from thence until otherwise provided by law. The refugee lands upon which the State cap. was located comprised a narrow tract of 4 m. wide from N. to S., and extended 48 m. E. from the Scioto River. On the 18th of June 1812, the same day on which the U. S. declared war against G. Brit., the first public sale of lots took place. In 1814 the *Western Intelligencer* was removed from Worthington to this city, and the title changed. The first saw-mill was built in 1813. The first tavern was opened in 1813; the first school in 1814; the first census taken in 1815; the first market-house erected in 1814; the first bridge over the Scioto River was built in 1813. Two chs. were built in 1814—a Meth. and Presb.—both log cabins. The town was incorporated on the 10th of Feb. 1816. A U. S. c. h. was erected in 1820. Pop. 1870, 31,274; 1880, 51,647; 1882, 60,103. (See STUBBS, *Columbus, its Hist., Resources, and Prospects*.)

Columbus, a city, cap. of Colorado co., Tex., on R. R. and the W. bank of the Colorado River, 95 m. S. E. of Austin City. It is the seat of Colorado Coll. Pop. 1880, 1959.

Columbus, Columbia co., Wis., on R. R. and the Crawfish River, 63 m. W. N. W. of Milwaukee. Pop. 1870, 1888; 1880, 1876.

Columbus [It. *Colombo*; Sp. *Colon*]. (CHRISTOPHER), the discoverer of Amer., b. at Genoa about 1436. His origin was humble and obscure, and accounts of his early life are mea-

gre. His father, Dominico Colombo, in a will made 1594, calls himself "formerly a weaver" (*olim tector pannorum*). His mother's name was Susanna Fontanarossa. There were 3 sons, and a daughter who married a butcher. He studied at the Univ. of Pavia, and went to sea at 14. There is an account of a cruise upon 4 Venetian galleys, richly laden, when C. jumped from his burning ship and swam 2 leagues by the aid of an oar to the Port. coast, and walked to Lisbon, where he found several Genoese. Some say that he went to Lisbon voluntarily in 1470, attracted by the fame of the Port. prince, Henry. C. supported his family and helped sustain his father and educate his brothers by making maps and charts. He went on expeditions to W. Afr. He lived some time at Porto Santo, where his wife bore a son named Diego. Here he heard of great reeds and a bit of carved wood seen out at sea floating from the W. The idea of a W. ocean-way to India gradually occupied his mind, fed by anc. tradition and contemporary speculations. He applied for means to accomplish this voyage to Genoa and to John II. of Port., who long kept him waiting with half promises. His wife died, and he left Port. in indignation. He lived (1484-86) at the Franciscan convent of St. Mary's of Rabida in Andalusia, whither he had wandered, impoverished, with his son. The prior took an interest in his plans, and gave him letters to Fernando de Talavera, confessor to Queen Isabella. He plied the court with untiring solicitations, following the king and queen on all their expeditions against the Moors, until he was granted 2 small vessels, with the title of viceroy or gov.-gen. of all the lands that he might discover. On the 3d of Aug. 1492 he sailed from Palos, with 120 men, in the Niña, Pinta, and Santa Maria. He stopped several weeks at the Canary Islands. After he had sailed a great distance over an unknown sea, the crew became dismayed, impatient, and finally mutinous. They had begun to talk of throwing him overboard when land was discovered, on the 12th of Oct. 1492. This was San Salvador (Cat Island), or perhaps Watling's Island, one of the Bahamas. He soon discovered Cuba and Hispaniola (Hayti), and returned to Sp. in Mar. 1493. He was received with abundant demonstrations of honor and joy by the public and the court, which gave him the title of admiral. On 2 subsequent voyages he discovered Jamaica, Porto Rico, and other islands, founded a colony in Hispaniola, and visited the Terra Firma at the mouth of the Orinoco. In 1500 Francisco de Bobadilla was sent to the W. I., with power to supersede C. as gov. By his order C. was carried in chains to Sp. in 1501. The public expressed such indignation at this ill-treatment that King Ferdinand disavowed the conduct of Bobadilla, but declined to reinstate C. in his office. Having sailed on his 4th voyage in May 1502, he explored the coasts of Honduras and Costa Rica, but was shipwrecked and escaped to Jamaica, which island he left, after long hardships, for Sp., June 28, 1504. D. May 20, 1506, at Valladolid. The authenticity of his discoveries has of late been sharply questioned. (See *BARCIA'S Historiadores Primitivos* (1749), also his Life by IRVING.)

Columbus Grove, O. See APPENDIX.

Columbus Junction, Ia. See APPENDIX.

Colusa, city, cap. of Colusa co., Cal., on the Sacramento River, 50 m. in a direct line N. W. of Sacramento. Pop. 1870, 1051; 1880, 1779.

Colver (NATHANIEL), D. D., a Bap. divine, b. at Orwell, Vt., in 1794, entered the ministry in 1836, became eminent as a preacher and as an opponent of slavery. He preached in Boston, Detroit, Cin., and Chicago, and founded, after the c. war, the Colver Inst., at Richmond, Va., for educating young colored men for the ministry. D. Sept. 25, 1870.

Comatula. See FEATHER STAR.

Comayagua, formerly **Valladolid**, a city of Central Amer., the old cap. of Honduras, on river Humuva, about 180 m. E. of Guatemala. It is the seat of a bp. and has a cathedral, a coll., a hospital, and several convents. It was founded in 1540 by Alonso de Cáceres. It was once much larger, but has been visited repeatedly by war and pestilence. Pop. 7,500.

Comb [from the Lat. *como*, to "comb or dress the hair," and more remotely from *coma* (Gr. *κομή*), "hair;" A.-S. *camb*; Ger. *Kamm*; Lat. *pecten*; Fr. *peigne*], an implement used for cleaning the hair, as well as for adjusting and keeping it in place. C. are made of tortoise-shell, ivory, horn, wood, bone, metal, and India rubber. The old method of cutting the teeth was by a saw, which had 2 blades parallel to each other, with a space between equal to the thickness of the intended tooth. By this process the material corresponding to the spaces between the teeth was wasted; but C. are now made by a method in which the otherwise wasted material is made to form the teeth of a second C. India-rubber C. are made by pressing the material into the required form in moulds, and "vulcanizing" or combining it with sulphur afterward.

Combe (ANDREW), M. D., b. in Edinburgh Oct. 27, 1797; wrote *Principles of Physiology Applied to the Preservation of Health and Physiology of Digestion*. D. Aug. 9, 1847.

Combe (GEORGE), a phrenologist, a brother of the preceding, b. in Edinburgh Oct. 21, 1788, practised law in his native city for many yrs. He produced *Essays on Phrenology and The Const. of Man Considered in Relation to External Objects*. D. Aug. 14, 1858.

Combustion [Lat. *combustio*, from *con*, intensive, and *uro*, *ustum*, to "burn"], the process of burning, which usually consists in the union of oxygen with the combustible substance. The evolving of heat and light which attends the process of C. announces intense chemical action. (See SPONTANEOUS COMBUSTION.)

Com'et (Gr. *κομήτης*, "long-haired"), a body that revolves about the sun in a very elongated orbit. C. differ from planets not only in the forms and in the inclinations of their orbits, but also in their phys. characteristics. It has been demonstrated that the orbit of a C. may be any one of the conic sections; of those whose orbits have been determined with more or less accuracy, some have been

shown to move in ellipses, others move in parabolas or in ellipses so eccentric that they can hardly be distinguished from parabolas, and a few have been supposed to move in hyperbolas, though this is still open to doubt. Cometary orbits make almost every possible angle with the ecliptic from 0° up to 180°; if the inclination is less than 90° the motion of the C. is *direct*; if it is greater than 90° the motion is *retrograde*. If a C. is bright enough to be visible to the naked eye—and more than 500 such have appeared since the beginning of the Chr. era—it usually consists of 3 parts—the *nucleus*, a bright star-like point, which may or may not be solid; the *coma*, a nebulous or cloud-like envelope which surrounds the nucleus, and the *tail*, a nebulous prolongation of the coma, generally in a direction away from the sun, and sometimes of enormous extent. The quantity of matter in a C. is very small, as is shown by the great perturbations they experience from the action of the planets, while their action on the planets is imperceptible. Recent investigations seem to indicate that there is a very close relation between C. and meteor streams; it has even been suggested that a C. may under certain circumstances be so disintegrated as to form a meteoric stream. Beside the C. visible to the naked eye, there are a far greater number that can only be seen by the aid of the telescope. These are often devoid of both tail and nucleus. Several such C. are discovered every yr., sometimes 6 or 8. W. G. PECK.

Com'fort (GEORGE FISK), A. M., a Meth. educator, b. Sept. 30, 1833, in Berkshire, N. Y., grad. at Wesleyan Univ., Middletown, Conn., in 1857; was prof. of modern langs. and aesthetics in Alleghany Coll., Meadville, Pa., 1866-68; was one of the prin. movers in founding the Metropolitan Museum of Art, New York (1869-73); was appointed prof. of modern langs. and aesthetics and dean of the Coll. of Fine Arts in Syracuse Univ., N. Y., 1873. Author of a series of text-books for the study of the Ger. lang.

Comines, ko-mén', de (PHILIPPE), lord of Argenton, an historian and statesman, b. near Menin, in Flanders, in 1445. He entered the service of Charles the Bold, who employed him in important diplomatic business. About 1472 he proved untrue to the duke, forming a secret compact with Louis XI., and became a minister of the Fr. king, his enemy. After the death of Louis XI. C. was an adherent of the duke of Orleans, aiding that prince in his ambitious plans against the Fr. govt. He wrote memoirs of historical events from 1464 to 1498. D. Oct. 17, 1509.

Comitia, ko-mish'-e-a [from the Lat. *com* (for *con*), "together," and *eo*, *itum*, to "go"], in Rom. hist., were political assemblies, of which there were 3 kinds. The C. *curiata* were assemblies of the patricians, and were so called because in them the vote was by *curia*, or subdivisions of the tribes, each curia casting a single vote. The C. *centuriata*, instituted later, were assemblies of the whole people, including plebeians as well as patricians, so called because the vote was cast by *centurie* or groups. After the inst. of this C. the functions of the *curiata* were little more than nominal. The C. *tributa* were assemblies in which only such business was transacted as pertained to the plebeians.

Commandments. See DECALOGUE.

Commandments of the Church are rules imposed upon the laity of the R. Cath. Ch., which are regarded as just as binding as the Decalogue. They are frequently called the 5 commandments, and are variously given; those most commonly taught are as follows:

1. The Catholic Ch. commands her children on Sundays and holy days of obligation to be present at the holy sacrifice of mass, to rest from servile works on those days, and to keep them holy.
2. She commands them to abstain from flesh on all days of fasting and abstinence, and on fast days to eat but one meal.
3. She commands them to confess their sins to their pastor at least once a year.
4. She commands them to receive the blessed sacrament at least once a year, and that at Easter or during the paschal time.
5. To contribute to the support of their pastor.
6. Not to marry within the fourth degree of kindred, nor privately without witnesses, nor to solemnize marriage at certain prohibited times.

Common/surable [Lat. *com* (for *con*), "with," and *mensura*, "measure"], applied to magnitudes measurable by a common unit. It is one of the inscrutable things in geom. that there are magnitudes of which the relations to each other are determinate, yet incapable of numerical expression. Such magnitudes are said to be incommensurable, while magnitudes, of which the relations to each other can be numerically expressed with exactness, are called C.

Commenda. See APPENDIX.

Com'merce [from the Lat. *commercium*, *merc*, "traffic, merchandise"], the exchange of commodities with foreign nations. Common usage distinguishes between trade and C. by assigning the former to the land and the latter to the ocean. Trade includes every kind of exchange or sale of property, while C. refers more appropriately to trade carried on by ships. Water-transport on the great lakes of N. Amer. is called inland C. C. owes its rise to the necessity of exchanging the surplus of our commodities for those we stand in need of, and may be defined the interchange of the produce of gen. labor to provide for the wants of all.

Origin of C.—The earliest authentic date assigned to the rise of C. is about 1000 B. C. The Phœnicians were remarkable for intellectual activity and industry, and their proximity to the sea disposed them to maritime adventure. Their commercial expeditions extended to India, and they are said to have doubled the Cape of Good Hope in a voyage of 3 yrs., returning home by the Straits of Gibraltar. They carried on C. with the Brit. Isles and the shores of the Baltic. They established colonies in Crete and Cyprus, in Sic., Sard., the S. of Sp., and on the coast of Afr., of which Carthage was the most celebrated. But when the genius of Rome

grounded on the ruins of Carthage the conquest of the world, the sources of wealth were dried up in Europe, in Asia, and in Afr., because those countries had no longer any commercial communication. The treasures which Rome had gathered by the plunder of all nations did not prove a source of wealth to any country. They fertilized no lands, improved no kind of industry, and did not extend the bounds of civilization.

The Middle Ages.—From the destruction of Carthage to an advanced period in the Middle Ages, an interval of more than 13 centuries, the sources of wealth were dead throughout the Rom. empire. It was not till the 12th century, when Venice, Genoa, and Pisa were greatly enriched by the crusades, that those sources revived, and Europe was again indebted to foreign C. for prosperity and wealth. The introduction of the mariner's compass gave a new impulse to maritime adventure. The Port. were the first to avail themselves of this great aid to navigation, and to push out from the shores on the broad and unknown ocean.

Discovery of Amer.—But the maritime enterprise which was destined to exert a greater influence over the world than any other of anc. or modern times, was that of Christopher Columbus, who hoped to find a passage to the Indies by a due W. course round the globe. The result of this expedition was the discovery of Amer. One of the consequences of this discovery was an immense addition to the amount of gold and silver, whereby the values of C. underwent a material change. The trade of the world was led into new currents. Port., Sp., the Netherlands, and G. Brit. became centres of wealth and C.

C. of the U. S.—The C. of the U. S. originated with the separation of the colonies from the mother-country. While they were subject to Brit. domination the people were prohibited by act of Parl. from engaging in any kind of manufactures; and among the grievances in the Dec. of Ind. was that "the king had cut off our trade with all parts of the world."

Some Results of C.—In political economy C. is the coefficient of both production and consumption. But for it production would be limited to the extent required for the mere subsistence of the people. All beyond that would be dead and valueless. Consumption likewise would be limited, since each country would have nothing to consume beyond a supply for immediate wants. In our own time C. has set in motion those immense tides of emigration which are transplanting the excess of pop. in the older countries of Europe to Amer. and Australia. It has joined the navigation of European waters with that of the Indian Ocean, and has brought the countless pop. of E. Asia into contact with the influences of modern thought and the improvements of modern science. It has changed not only the phys. relations, but the social and moral destiny of more than half the inhabs. of our globe. There are, in reality, few great achievements of modern enterprise that do not owe their conception to the incitements of C. [From orig. art. in J.'s Univ. Cyc., by J. S. GIBBONS.]

Commerçon, ko-mér-sôn' (PHILIBERT), a Fr. botanist, b. at Châtillon-les-Dombes Nov. 18, 1737. He accompanied as naturalist the expedition of Bougainville, which sailed in 1767, and he visited S. Amer. and explored Madagascar, etc. C. was a man of profound science. D. 1773.

Commission Merchant. See FACTOR.

Commodus (LUCIUS ELIUS AURELIUS), a Rom. emp., b. in 161 A. D., was the son of Marcus Aurelius and Faustina. He succeeded his father in the year 180, and soon manifested the excessive cruelty and sensuality of his disposition. His wife Crispina and many other innocent persons were put to death by his order. Assuming the title of Hercules, he claimed from his subjects divine honors. His officers Eclectus and Lætus caused him to be strangled in 192. He was succeeded by Pertinax.

Common Carriers. See CARRIERS, COMMON.

Common Pleas, Court of. See COURTS.

Common Schools, the name given in the U. S. to public schools for elementary instruction. A rural C. S. for a certain district in a town is called a *district school*. In some cities the C. S. are called district schools, and in some others *ward schools*. C. S. in villages and cities, composed of pupils in the upper classes of the course of elementary instruction, are called *grammar schools*, and the schools composed of pupils belonging to the lower classes of the course are denominated *primary schools*. The C. S. in other countries are designated by different names: in Eng. they are called *public elementary schools*, in Scot. *parish schools*, in Ire. *national schools*; in Fr. and Belg. they are called *écoles primaires* (primary schools), and the names given to them in the other Lat. nations have the same signification; in the prin. Ger. states they are named *volkschulen* (people's schools). The C. S. dates from the Ref., and Ger., the country of Luther, is its cradle. It is true indeed that the Chr. Ch. from the earliest times recognized the duty and asserted the right of organizing and controlling public education, and professed the obligation to provide not only epis. schools for the clergy, but also schools of a humbler order for the poor laity. But the ch. schools for popular instruction bore little fruit. They were mostly confined to the populous towns, and served chiefly to train boys for the service of the choir. Nothing was attempted in them of the nature of school-learning beyond a little oral instruction in the Catechism and the rudiments of religion. To fulfil their religious duties the people had no need to know how to read and write. Hence the attempts made here and there by public authorities to establish schools for teaching these branches were discontinued by the Catholic Ch. The Ref., on the contrary, demanded popular instruction. The main principle of Protestantism involves the necessity of gen. education. In rendering man responsible for his faith, and in placing the source of that faith in the Scriptures, Protestantism contracted the obligation to put each person in condition to read and understand the Bible. Moreover, Protestantism involves the principle that every man has the right to moral and intellectual as well

as religious education, and consequently that it is the duty of the state to provide for the instruction of all youth. Hence the Prot. Reformer maintained that it is the right and duty of the state rather than of the Ch. to establish and support schools for the children of the people. This may fairly be regarded as the origin of the C. S. The Ref. demanded it, and it was rendered possible by the simultaneous discovery of printing, which placed books in the hands of the poor. Through the influence of Luther public elementary schools were established in Sax. as early as 1627. Wherever the Ref. was carried the popular school followed. The Reformers were everywhere zealous advocates of C. S. In Scot. the result was particularly striking. John Knox urged the founding of schools in every parish, with no little success. In the beginning of the 17th century James VI. ordered a school to be set up in every parish, and near the end of the century the Scottish Parl. passed an act "for the settling of the schools," "of which," says Macaulay, "the effect could not be immediately felt. But before one generation had passed away it began to be evident that the common people of Scot. were superior in intelligence to the common people of any other country in Europe." No less remarkable was the early success of the C. S. in Puritan N. Eng. The first public school was established in Boston in 1635, the second in New Haven in 1639, and the third in Hartford in 1642. The first school law was enacted by the Legislature of Mass. in 1647, requiring every town of 50 families to maintain a school for teaching reading and writing, and every town of 100 families to maintain a "grammar school" to fit youth for the univ. At the close of the colonial period Conn. had a C. S. in every dist., and Mass. and N. H. had an elementary school whenever there were children enough to constitute one. Elementary instruction was practically universal in these colonies, few adult persons being unable to read and write. Nor was their reading confined to the Bible, but, said Burke in 1755, "all who read, and most do read, endeavor to obtain some smattering in that science [the law]." For a long period little was done to elevate the character and enlarge the scope of popular instruction. During the 16th, 17th, and 3/4 of the 18th centuries the instruction was confined to one or two studies and those were taught in the most imperfect and mechanical way. The schools were essentially reading schools, reading the mother tongue being the first and prin. study; next came the singing of psalms, tunes and the memorizing of texts, hymns, and the Catechism. The teachers were for the greater part choristers and sextons, and nobody made pretension to much educational skill. Each child read by himself; the simultaneous method was not known. Yrs. usually passed before any facility had been acquired in reading. To understand what was read was little thought of. There were no school-books distinctively so called; the pupils learned their lessons, and read either in the O. or the N. T. or in the Psalter. The discipline was severe; the rod, the cane, and the rawhide were necessary apparatus in the school. The school-rooms were mostly cold, dark, small, and shabby. But imperfect as the primitive C. S. confessedly was, it may be doubted whether modern civilization had given the people a more precious boon.

The reform of the national system of education in Prus., after the disaster of Jena in 1806, may be fairly regarded as the commencement of the modern epoch of the C. S.—the epoch of improvement and propagation. King William III. sounded the key-note of this movement, so far-reaching in its results, in saying, "The state must regain in intellectual force what it has lost in phys. force." The preceding third of a century had been a period of preparation and transition, opened by the remarkable ordinance decreed by Frederick the Great at the close of the Seven Years' war, which created the first systematic organization of C. S. instruction. Maria Theresa, the first Catholic sovereign to adopt the C. S., magnanimously followed the example of her great antagonist. In 1771 she established in Vienna a normal school, which still survives, and 3 yrs. later decreed a school law of the most advanced type of the time. The unprecedented political events in Fr. and the U. S. near the close of the century, turned the attention of statesmen to the necessity of popular education as a guaranty of free insts. Rousseau's *Emile* and Pestalozzi's experiments had developed the principles and methods of a new education for the people. It would require much space to describe all the elements that went to make up that improved Prus. system. The 2 chief instrumentalities of progress employed were the normal school and the Pestalozzian methods, and these are now the essential instrumentalities of the improved modern C. S. wherever it exists.

The area of the C. S. has now become coextensive with the civilized world. Eng. adopted it only in 1870, but compulsory instruction is now as rigidly enforced in Lond. as in Berlin. In 1872 a complete system of popular instruction was adopted by the govt. of Japan, and it is now in successful operation with 25,000 schools, attended by 2,000,000 pupils, taught by 60,000 teachers. As the Ger. nation was the first to establish C. S., so it has kept the lead in improving them. Pestalozzi became the school-master of the world, and opened the normal school of the world at Yverdon, to which during his life teachers from far and near, and especially from Ger., made pilgrimages. And thus the Pestalozzian C. S. were set in operation throughout all Ger., and ever since, whoever has desired to study the best C. S. has resorted to Ger., and especially to Prus. What is the perfected C. S. of to-day? The school-house combines the requirements of taste, convenience, and health; the cabinets of the school-rooms are filled with books, apparatus, and collections of nat. hist.; its walls are hung with maps, charts, and pictures; the blackboard has the first place. The teacher is no longer a menial, but an officer of the state; he is an ed. man, trained in a sem. established and maintained for the purpose by the state; he knows the science and art of teaching, loves his profession, and is de-

voted to it for life. The course of study comprises what is most useful for knowledge and training. Every child has the best of school-books for each branch. There are no absences except for sickness. The intuitive method awakes the intelligence and secures the attention of all the pupils. The moral and religious sentiments as well as the intellects of the pupils are developed and cultivated, and their bodies are strengthened by gymnastics. Order, activity, and cheerfulness reign. Each pupil has his individual chair and desk, but all learn together everything that is taught. The simultaneous method in the modern C. S. is what the R. R. is in transportation. Hence the time for studying so many branches, including singing and drawing. The discipline is a process of teaching self-government, but it exacts implicit obedience with firmness and love. The ideal of this school is the ennobling of mankind by education and culture. Such was the model Prus.-Pestalozzian C. S. of 50 yrs. ago, and such is now the model C. S. in all countries, and to this ideal the schools of the people are everywhere tending. There is no longer any occasion to prove the necessity of having schools, of having them everywhere, and of having good ones. This necessity is accepted by every enlightened friend of human progress. The people which has the best schools is the first people; if it is not so to-day it will be tomorrow. There is no country which has expected so much from the C. S., or that is so much indebted to it as the U. S. Nor is there any other country where the people are so liberal in affording the means, by voluntary taxation, for the establishment and support of C. S. At the close of the Revolution there were few C. S. out of N. Eng. Within 50 yrs. the area of our C. S. has been increased twentyfold, and it now extends from ocean to ocean and from the Lakes to the Gulf. In every State there is a system of free C. S. Although the Federal govt. has no control over popular education, it has granted in aid of C. S. about 70,000,000 acres of public lands. The expenditures for public schools, elementary and high, for 1879, were \$78,294,155; the permanent school funds amounted to \$113,030,027; the number of pupils enrolled, 9,424,086, and the number in daily attendance, 5,282,337; number of teachers, 272,686.

The schools are not only all free, but they are also unsectarian. A number of States have enacted laws to compel attendance. The revenues for the support of the schools are chiefly derived from local taxation, these being supplemented by State taxes and the income of State school funds. In the rural dists. and in most of the cities, especially the newer ones, the schools are mixed.

JOHN D. PHILBRICK.

Commons, House of. See PARLIAMENT.

Commonwealth, a state, a body politic; properly a free state, a republic. The official title of C. is used by the States of Mass., Ky., Pa., and Va.

Commonwealth of England, in hist., the form of govt. established in Eng. on the death of Charles I. in 1649, and which existed during the protectorate of Oliver Cromwell and his son Richard, until the restoration of Charles II. in 1660. The substitution of a democratic for a monarchical form of govt. was provided for and enjoined by 2 successive charters. The first charter of the Commonwealth was drawn up in Dec. 1653, by the council of officers who on the voluntary resignation of the Parl. in the early part of the same yr. had declared Cromwell "Protector;" it was styled the "Instrument of Govt." The second charter, called the "Petition and Advice," was framed in May 1657 by the Parl. which the Protector had assembled in the previous yr. Under the first charter the Eng. govt. may be classed among republics, with a chief magistrate at its head; under the second it became substantially a monarchy, and Oliver Cromwell from 1657 to his death was virtually king of Eng.

Commune of Paris, originally applied to the body of the people of Paris, who were organized by law May 21, 1790, and came to be for a time the leading political power in Fr. The term is now generally used to designate the socialists and proletaires who, Mar. 18, 1871, revolted against the newly organized govt. of Pres. Thiers. After the evacuation of Paris by the Gers, the national guard had been permitted to retain their arms, and a large part of them fraternized with the socialist leaders, among whom were Pyat, Cluseret, Blanqui, Rochefort, Rossel, and Delescluze. An election for members of the C. was held Mar. 26. Most of the citizens who were in favor of law and order refrained from voting, and the insurgent candidates received a large majority. The govt. assembled an army under MacMahon, to put down the insurrection, and after several conflicts outside the walls the troops, 90,000 strong, entered Paris May 22, and hemmed the insurgents within a portion of the city, where they defended themselves behind barricades. They committed acts of great atrocity, setting fire to the finest public buildings, and endeavoring to destroy the monuments and works of art. Delescluze, who commanded, was killed May 26, and the contest closed the next day. According to Pres. Thiers, 25,000 of the Communists were made prisoners. Most of the ringleaders were captured and executed, and several thousand others were deported to the penal colonies.

Communicatio Idiomatum ("conjoint possession of attributes"), the name marking the doctrine that the One person of Chr. has conjoint possession of the attributes of the two natures—that the attributes of the two natures are so held together in the One person as *in it* to have fellowship with each other; the person which conjoins the nature conjoins their attributes in itself. The two natures are inseparable, both actively and passively. What is proper to either nature in the abstract belongs to Chr. in the concrete; and what the divine, which is the assuming nature, has in itself, the human, which is the assumed nature, has in and through its personal conjunction with the divine.

Communism, the theory which teaches that property should be held in common—a theory which Plato advocates in his *Republic*, and which was probably practised before his time. The first Chr. ch. at Jerusalem for a time practised

a partial and voluntary communism, and certain monastic and semi-monastic organizations had their possessions in common. Buddhism and other Oriental religious systems have for ages had followers who have practised a rude C. In Europe there have from time to time been numerous able advocates of a more or less absolute community of property. Among the modern advocates of this gen. idea are St. Simon, Fourier, Robert Owen, and Louis Blanc.

Co'mo, Lake [It. *Lago di Como*; anc. *Larius Lacus*], a lake of It., an expansion of the river Adda. It is divided into 2 branches, one of which is called the Lake of Lecco. It is 698 ft. above the sea, and about 35 m. from Como to the N. end, and is nearly 3 m. wide. Its greatest depth is 1925 ft., the superficial extent 62 sq. m. It is celebrated for the beautiful scenery of its shores.

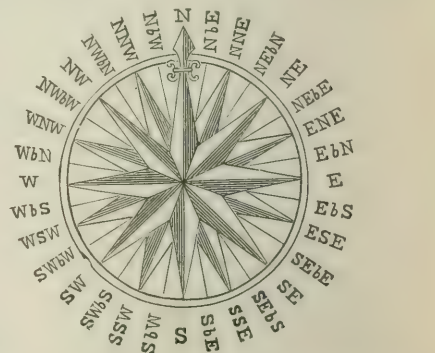
Comonfort (IGNACIO), a Mex. gen. and pres., b. at Puebla Mar. 12, 1812. He co-operated with Alvarez against Santa Anna in 1854, and became provisional pres. on the resignation of Alvarez, Dec. 1855. The clergy and conservatives raised an unsuccessful revolt against C., who in 1856 issued a decree to confiscate the property of the Ch. He was proclaimed constitutional pres. Dec. 1857, but was driven into exile Jan. 1858. In 1863 he commanded a republican army against the Fr. invaders. Killed by bandits Nov. 13, 1863.

Com'oro Isles, a group of 4 volcanic islands in the Mozambique Channel, between Afr. and Madagascar. They are mountainous, and the highest peaks rise about 6000 ft. above the sea. The inhabs. are of mixed Arab and negro blood. Area, 761 sq. m. The soil is fertile. The prin. exports are palm-oil and tortoise-shells. The greater part of the people are Mohammedans, but fetishism is practised among them. Mayotte, one of these islands, is a Fr. colony. The island of Johanna is celebrated for its beauty. Pop., with Mayotte, 62,600.

Comparative Anat'omy, the science of the structural const. of animals; so called because it is based upon the comparison of the anat. of different animals. (See *J.'s Univ. Cyc.* for an exhaustive article on it by PROF. E. D. COPE.)

Comparative Philology is that branch of the science of lang. which examines and classifies langs. as undivided wholes—not, like etymology, tracing individual words through the various langs. in which they occur, but comparing langs. chiefly by the study of the gen. character of their vocabularies. It, however, does not confine itself to the mere collation of vocabularies and to the study of grammatical forms. By the study and comparison of lit., of the literary hist. of nations, of popular traditions, mythologies and creeds, and of the dialectic variations of time or place, it seeks to discover the marks which integrate langs. into groups, and which differentiate these groups from each other. It thus renders important service to the nearly related science of ethnology, since, with some limitations, kinship in lang. implies kinship in blood—a doctrine the truth of which is now generally admitted, though formerly opposed by eminent philologists.

Compass, kum'pas [perhaps a corruption of the Lat. *circum*, "around," and *passus*, a "step," originally "that which goes round" or "embraces," because it embraces, so to speak, the entire horizon with its circle; Fr. *compas*, also *boussole*], the name of an instrument used to show the magnetic meridian or the position of objects with reference to it. Among its various forms are the *mariner's C.*, the *azimuth C.*, and the *variation C.* These several applications each demand a special construction, but the essential parts are invariably the same. These parts are the needle, which consists of a magnetized bar of steel, and, fitted to its centre, a cap, which is supported on a pivot upright and sharp at the point to lessen the friction, and on which the needle may move with the slightest attraction. A circular card is attached to the needle of the *mariner's C.*, which turns with it, and indicates the degrees, which with the 32 points, divided into $\frac{1}{2}$ and $\frac{1}{4}$ points, are all marked on its circumference. The pivot is fastened to the bottom of a circular box, which contains the needle and card, and has a glass cover to protect the needle from the air. This is called the C.-box, and is suspended in a larger box or binnacle by 2 concentric brass circles called gimbals; the outer one is attached by horizontal pivots to the inner circle and to the outer box, the two sets of axes being at right angles to each other. Thus, the inner circle, carrying the C.-box, needle, and card, is sustained in a horizontal position, and is not subject to the rolling of the ship.



"Boxing the C." is the enumeration, by name, of the 32 points which are marked upon the C.-card. These points are N., N. by E., N. N. E., N. E. by N., N. E., N. E. by E., E. N. E., E. by N., E., etc. The point "E." is frequently marked O on

C. This is from the Ger. *Ost*, "east." The steering of ships is much more difficult since the introduction of iron-plated ships. These vessels, being highly magnetic, produce much disturbance of the needle, and it requires all the skill of science to counteract it. It is found best to build the ship with her head S., but to change it to the N. during the process of plating, as the magnetism acquired during building is modified by the hammering attendant on the plating. It is found requisite to often change the first adjustments.

Compass Plant, the *Silphium laciniatum*, a remarkable plant of the order Compositae. It grows on the rich prairies of the Miss. Valley, and its radical leaves have, while growing, especially in midsummer, the property of pointing quite nearly to the N. and S. It was first made known to the scientific world by Gen. Benjamin Alvord in communications to the National Inst. in Aug. 1842 and Jan. 1843. The accuracy of his statement being questioned by the botanists, he made another communication in Aug. 1849 to the Amer. Association for the Advancement of Science. The truth of his observation was then admitted by Dr. Asa Gray, who attributed its polarity to the action of light. W. F. Whitney, in the *Amer. Naturalist* for Mar. 1877, gives the result of a microscopic examination of the leaves, showing on each face an equal number of "stomates" or "breathing-pores," which confirms the conclusion that its position, facing the rising and setting sun, is due to the action of light. All the other experiments confirm this theory. (See article "Compass Plant" in *Nature* for Feb. 1, 1877.) B. ALVORD.

Complementary Colors. Each of the 3 primary colors is complementary to that secondary color which is produced by blending the other 2. The secondary colors have also each their C. C. Colors complementary to each other are always harmonious. The following are some of the prin. colors which are complementary to each other: Red is complementary to green, blue to orange, yellow to purple, red-purple to yellow-green, blue-purple to yellow-orange, dark-purple to citron-yellow, blue-green to red-orange, olive to dark-orange, russet to dark-green.

Complutensian Bible, a polyglot in 6 vols. folio, so called from *Complutum*, the Lat. name of Alcalá in Sp., where it was printed. It was projected by Cardinal Ximenes, who spent about \$120,000 upon it. It was begun in 1502, printed between 1514 and 1517, authorized by Pope Leo X. in 1520, but apparently not pub. before 1522.

Compositæ [from the Lat. *com* (for *con*), "together," and *pono, positum*, to "put," referring to its compound flowers], the largest natural order of exogenous plants, distinguished by heads of flowers which are composed of florets crowded together upon a common receptacle, and surrounded by an involucre, so as to resemble single flowers. The order is divided into 3 sub-orders—the Tubulifloræ, the Labiatifloræ, and the Ligulifloræ. The artichoke, thistle, daisy, chamomile, sunflower, dandelion, chicory, and lettuce are well known plants of this order.

From the seeds of some a fixed drying oil is expressed, the oil of the sunflower, the *Madia*, and the *Guzifolia* being among the most important. Many are valuable for their medicinal properties, as chamomile, arnica, wormwood, tussilage, etc. Not a few are characterized by bitterness and by stimulating properties; also anodyne, narcotic, diaphoretic, and diuretic properties. Some, as arnica, are poisonous. A large number are ornaments of our flower-gardens, especially in the latter part of summer and in autumn. Among these are the xeranthemum, dahlia, aster, and chrysanthemum. This order is called Asteraeæ by Lindley and others.

Composited Order, in arch., a style of building characterized by the employment of pillars designed to combine the lightness and grace of the Ionic order with the ornate finish of the Corinthian. In many cases the Ionic volute was blended with the Corinthian acanthus leaf. This union is regarded by most critics as an incongruous one, and was employed chiefly in the Rom. empire in its decadence. Many writers consider the C. O. a mere variety of the Corinthian.

Composition, in bankruptcy, a percentage which creditors agree to receive from a bankrupt instead of full payment. (See *INSOLVENCY*, by PROF. GEORGE CHASE, LL.B.)

Compost [from the Lat. *com* (for *con*), "together," and *pono, positum*, to "place"], a mixture of substances adapted to the fertilization of the soil, which substances, being allowed to undergo chemical changes for a considerable time in heaps, become more valuable than they could have been if applied separately. C. are made of farmyard manures and earth, road-scrappings, peat, leaves, and clearings of ditches. By allowing these to lie for 6 months in heaps of from 3 to 4 ft. in depth, food is prepared for plants. The action of frost upon C. is highly beneficial, especially when peaty earth is used.

Compounding of Felony, in Eng. and the U. S., is the act of taking, or agreeing to take, a reward for forbearing to prosecute a felony, and is punishable with fine and imprisonment. A note or other promise taken on such a consideration is illegal in its inception, and cannot be enforced in a court of justice by the promisee. (See *FELONY*.)

Compressed Air, as a means of the transmission of motive-power, has been thoroughly tested in the railway tunnels of Mont Cenis and the Hoosac Mt. in Mass. At the Hoosac Tunnel the air was compressed partly by water-power (as at Mont Cenis), and partly by steam. The C. A. is transmitted through tubes, and gives motion to drills by means of pistons somewhat as in steam-engines. The exhaust air aids in ventilation and in keeping down the temperature; perfect ventilation may at any time be secured by turning on a blast directly from the reservoirs.

Compton (HENRY), an Eng. prelate who had a large share in the revolution of 1688. b. 1632; held first a commission in the army, then entered the Ch.; became bp. of Ox. in 1674, was transferred to the see of Lond. in 1675, was the instructor of the daughters of the duke of York (afterward

James II.), who became consequently attached to the Prot. faith. For which reason, James, through Judge Jeffries, deposed him from his epis. functions. This was one of the grievances done to the Prot. religion alleged by William in his proclamation on landing. James, in alarm, re-established C., who, however, openly joined himself to the party of the invader, and with his own hands crowned him king. D. July 7, 1713.

Comptrol'ler [for pronunciation and etymology see *CONTROLLER*], a name applied in the U. S. govt. to 3 highly important officers in the treas. dept.

The FIRST C. countersigns warrants drawn by the sec. of the treas. upon the treas., examines the accounts of the first and fifth auditors, receives appeals from the sixth auditor, superintends unsettled accounts of the treas., navy, war, and interior depts., prosecutes all debts and delinquencies in behalf of the U. S., etc.

The SECOND C. examines the accounts of the second, third, and fourth auditors, countersigns warrants for the pension and Indian bureaus, and performs duties in the navy and war depts. analogous to those of the first C. in the treas. dept.

When a claim has been granted by the proper C. there is no revision or appeal allowed. When a claim has been refused by the C., appeal may be made to court of claims.

The COMPTROLLER OF THE CURRENCY issues printed notes to the national banks, exchanges new currency for that which is worn out, superintends the national banks, reports their condition annually to Cong., and has numerous other important duties. He gives heavy bonds when entering upon his duties, and is allowed no share in the profits of any banking association.

Comstock (CYRUS B.), b. in 1831 in Mass., grad. at W. Pt. in 1855; lt.-col. engineers 1881, assistant prof. at the Military Acad. 1859-61; chief engineer Army of the Potomac 1862-63; in 1863 engaged at Vicksburg (brevet major), and as chief engineer Army of the Tenn.; assistant inspector-gen. of the military division of the Miss. 1863-64; in Richmond campaign 1864-65, engaged at Wilderness (brevet lieutenant), chief engineer of the expedition to Cape Fear River, N. C., 1865, engaged at Ft. Fisher (brevet col. U. S. A. and brevet col. and brig.-gen. U. S. volunteers); senior engineer in Mobile campaign 1865 (brevet brig.-gen. U. S. A. and brevet maj.-gen. U. S. volunteers); supt. of geodetic survey of the N. lakes, 1870-83; pres. of Miss. River commission, 1882.

Comstock (JOHN HENRY). See *APPENDIX*.
Comstock (JOHN LEE), an author, b. at East Lyme, Conn., in 1780, served as an army surgeon in the war of 1812-15. Wrote *Nat. Philos.* D. Nov. 21, 1858.

Comstock Lode. This gigantic and famous silver- and gold-bearing lode is situated in the W. part of the State of Nev., in Storey co., at a point about 12 m. N. E. of Carson City and about 19 m. E. of the Cal. State line, in lat. (about) 39° 32' N. and lon. 119° 39' W. from Greenwich. It lies on the E. slope of the Virginia Mts., a nearly due N. and S. offshoot of the Sierra Nev., near the base of Mt. Davidson, the loftiest peak of this secondary range, which is 7827 ft. above the sea-level. The most important portion of the lode is within the limits of Virginia City, which at C. st. is 1635 ft. below the summit of this peak, or about 6192 ft. above the sea.

Character of the Lode.—The C. is probably a true fissure-vein.

The jaws of the fissure at the surface are from 250 to 1100 ft. apart, gradually approaching each other in descending, forming a V-like section, until the fissure is reduced to an average width of 150 ft. or less; in many places, however, swelling out to 500 ft. in thickness, and in others contracting to not more than 20 ft. in width. Its outcrop is not by any means continuous. In fact, the C., though properly characterized as a single lode, is rather a broad metalliferous belt or ore-channel, carrying a congeries of subordinate lodes, bunches, and chimneys of ore, all reposing in as many distinct clefts, separated by "horses" and dikes of porphyry, belts of quartz, seams of clay, making up a body of vein-matter unparalleled for magnitude and complexity in the hist. of mining. "In point of geological time," Clarence King says, "the system of fissures which constitutes the C. L. are subsequent to the propylite outflow, and belong in all probability to the dynamical disturbance connected with the eruptions of andesite. It is considered certain that the whole series of volcanic outbursts are since the Miocene epoch, and we may safely call the C. a tertiary lode." In gen. terms, the course or "strike" of the lode may be said to be N. 25° E. (true meridian), to pitch or "dip" toward the E. at an angle of from 35° to 50°, and to have been definitively traced along a linear extent of more than 4 m. in the gen. direction (a little E. of the magnetic meridian) of the Virginia range of mts. The productive portions of the veins, however, cover scarcely over 2 m.

Character of Ores.—The ores of the C. L. consist chiefly of native gold, native silver, vitreous silver ore (argentine), stephanite, and argentiferous galena imbedded in a quartz gangue. Beside these, ruby silver, horn silver, polybasite, pyrrargyrite, and sternbergite occur in small quantities; also iron and copper pyrites, zinc blende, and several carbonates and sulphates. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. JOHN LE CONTE, M. D.]

Comte, KONT (SIDORE AUGUSTE MARIE FRANÇOIS XAVIER), a Fr. philos. and math., founder of the system of Positivism, b. Jan. 19, 1798, at Montpellier. He entered in 1814 the Polytechnic School in Paris. He became in 1820 a disciple of St. Simon, and contributed articles to his journal, *L'Organisateur*. In 1832 he was appointed a tutor of math. and an examiner of candidates at the Polytechnic School, which posts he resigned in 1852. Wrote *Cours de Philosophie Positive* and *Catechisme Positiviste*. A clearer exposition of his doctrines is contained in Littré's *Comte et la Philosophie Positive*. D. Sept. 5, 1857. (See LEWES, *Exposition of the Principles of the Positive Philos.*)

Co'nant (HANNAH O'BRIEN CHAPLIN), wife of T. J. Conant, b. in Danvers, Mass., in 1812. Wrote a *Hist. of the Eng. Bible*. D. Feb. 18, 1865.

Conant (THOMAS J.), D. D., b. at Brandon, Vt., Dec. 13, 1802, grad. at Middlebury Coll. in 1823; appointed in 1835 prof. of biblical lit. in the Theological Sem. at Hamilton, N. Y. From 1850 to 1859 he occupied a similar position in the Theological Sem. at Rochester, N. Y. Is an accomplished Hebraist, and author of a new version, with notes, of *The Book of Job*.

Conception, in physiology. See EMBRYOLOGY.

Conception, Immaculate, Doctrine of the. See IMMACULATE CONCEPTION OF THE VIRGIN MARY.

Conception, Orders of the Immaculate. Among the orders of the R. Cath. Ch. there have been the following: (1) The Knights of the Immaculate Conception of the Blessed Virgin, founded in 1618, at Vienna, with the intention of bearing arms against heretics and infidels; but the brotherhood was soon extinct. (2) The Nuns of the Immaculate Conception of Mary, founded at Toledo, Sp., in 1484, by Beatrice de Sylva. They afterward joined the Clarisses, and took their rule, which rule was changed by Pope Julius II. in 1511. They are often called Conceptionists. (3) The Congregation of the Immaculate Conception of the Blessed Virgin is the appellation of the lay sisters attached to the nuns of Notre Dame, who were established by Peter Fourier (1565-1610).

Conceptualism, a doctrine of the Schoolmen intermediate between realism and nominalism. The Realist asserts that genera and species have an independent existence. The Nominalist asserts that nothing exists but things and names of things. The Conceptualists assign to universals an existence which may be called psychological—that is, independent of single objects, but dependent on the mind of the thinking subject in which they exist as conceptions. Abelard is considered the founder of this doctrine.

Conchology [from the Gr. *κογχή*, a "shell," and *λόγος*, a "discourse," a "treatise"], a treatise on shells; also the science which treats of shells and their inhabs. The soft parts of the Mollusca were almost unknown to the earlier naturalists, hence their external coverings or shells were separately classified, without reference to the contained animals. The more scientific modern method requires that the species shall be thoroughly investigated, as well as regards their soft as their hard parts. **MALACOLOGY** [from the Gr. *μαλακός*, "soft," and *λόγος*, a "discourse," a "treatise," i. e. a "treatise on soft animals"] is a more proper designation for this science, but the word Conchology has become so well known in this connection that it has been found difficult to supersede it. Thus, the latter name is still commonly used, but with the enlarged signification that it is the science or classification and description of molluscan animals, including their shells.

MOLLUSCA (from the Lat. *mol'lis*, "soft") is the second of the 5 great divisions or structural types of the animal kingdom. An external shell, in nearly all cases, protects the animal, and may be regarded as an exo-skeleton, replacing the bones of the Vertebrata. Occasionally, as in the cephalopods or cuttle-fish, the shell is internal, and in some of the gasteropods it is rudimentary or entirely wanting; still, the absence of the internal skeleton, and consequently of the bony envelopes protecting the great nerve-chord, will, even in such cases, sufficiently distinguish the Mollusca from the Vertebrata. Shells are composed principally of carbonate of lime, with but little other mineral or animal material, and are therefore much harder than the bones of the vertebrates, which contain a large proportion of gelatine. The Mollusca also have colorless blood, while that of the vertebrates is red. A few molluscan animals possess red blood, but, viewed with a microscope, the entire fluid is found to be colored, whereas in vertebrate blood the color is due to red corpuscles floating in a colorless fluid.

The Mollusca do not attain the size and strength or exhibit the complex structure of the vertebrates, but they cannot justly be said to be of inferior or lower type; their plan of conformation is more simple, but it is just as perfectly adapted to the purposes of their existence. The greater number of individuals of the more simple organisms seem to compensate, in the economy of nature, the superior individual force of the more complex ones.

Geol. reveals to us that in the early ages of the world shells were among its first inhabs., flourishing in its waters almost to the exclusion of other types of animal life, and leaving their imperishable coverings on the geological shores, to become in our day the great record of the succession of strata by the aid of which the geologist reads so unerringly the hist. of the past. [From orig. art. in *J.'s Univ. Cyc.*, by G. W. TRYON, JR.]

Conch-shell, a popular name for the shells of certain carnivorous gasteropods of the genera *Triton*, *Strombus*, etc., found chiefly in tropical seas. The finest are used in cutting shell-cameos, and the rest are useful in the porcelain manufacture.

Conclave [from the Lat. *con* (for *cum*), "with," and *clavis*, a "key," originally, a room that may be locked up]. This term is applied either to the apartment in which the cardinals of the R. Cath. Ch. assemble to elect a new pope, or more frequently to the assembly itself. The usages of the Ch. require that the C. must be held in a single apartment having only one door, which is locked after the entrance of the cardinals, in order that they may have no intercourse with the public while the election is going on. When a pope dies, 9 days are allowed for the funeral solemnities. The cardinals assemble on the 10th day, and voting begins on the 11th. From their separate cells, into which they are locked every night, the cardinals come together twice a day till some one of their own number is made pope by a majority of $\frac{2}{3}$ of all the votes. Each cardinal is attended by 2 or 3 waiters, called *conclavists*, sworn to secrecy like the cardinals. This method, in its main features, dates from 1274. Since Gregory XV. (1621-23), the choice has been either by scrutiny (ballot), by inspiration, or by compromise—usually the first. Since 1823 the place of meeting has

been in a long wing of the Quirinal Palace in Rome; for nearly 400 yrs. before that, in the Vatican.

Concom'itance, Sacramen'tal, the doctrine of the R. Cath. Ch., that the body and blood of Chr. sacramentally accompany each other, so that both are sacramentally received under either species, whether of bread or wine; hence, that the communion in one kind imparts all that is received sacramentally in both kinds.

Con'cord, a tp. and R. R. junc., Middlesex co., Mass., on Concord River, 20 m. N. W. of Boston. Incorporated in 1635, it was the first settlement in N. Eng. off tide-water. The first Provincial Cong. of Mass. assembled in its old ch. Oct. 1774, and made the town the place of deposit for the military stores of the colony. On the 19th of Apr. 1775, at the North Bridge, in an affair known as Concord Fight, a body of Amer. soldiers, organized under legal authority, advanced against the Brit. troops who had been sent to seize those stores, received their fire, by command of their officers returned it, forced the enemy to retreat, and by this first attack under military orders upon the soldiers of the king began the war of the Revolution. Pop. of tp. 1870, 2412; 1880, 3922.

Concord, a city, cap. of the State of N. H. and of Merrimack co., on the right bank of Merrimack River, 75 m. by rail N. N. W. from Boston, 474 N. N. E. from Wash.; lat. 43° 12' 20" N., lon. 71° 29' W. It is one of the largest R. R. centres in N. Eng. The streets are wide and beautifully



State Capitol (Concord, N. H.).

shaded. It was granted by Mass. as Penacook 1725, incorporated Rumford 1730, came under jurisdiction of N. H. and was incorporated Concord 1765, became State cap. 1816, city 1853. Its chief buildings are the State capitol, built of Concord granite at a cost of \$350,000; Historical Library building, State asylum for the insane, a new State prison, U. S. building for P. O., pension office, U. S. courts, etc., and a county c-h. and jail. It has a public library and good schools, including St. Paul's. Granite is very extensively quarried and dressed here, and there are important manufactures of cotton, woolen, coaches, etc.; valuation of C., \$11,000,000. Pop. 1870, 12,241; 1880, 13,843; 1885, over 14,000.

Concord, cap. of Cabarrus co., N. C., on R. R., 20 m. N. E. of Charlotte. It has 3 acads. There are large mines in the vicinity. Pop. 1870, 878; 1880, 1264.

Concordat [Lat. *concordata*, "things agreed upon," from *concordo*, "to agree;" Fr. *concordat*; It. *concordato*], a treaty in relation to the ecclesiastical affairs of a R. Cath. state, between the pope, as head of the ch., and the govt. of that state. The treaties between the pope and Prot. powers are usually called *conventions*. The name concordat was first given to the treaties made by Pope Martin V. with Ger., Fr., and Eng. in 1418. The usual subjects of C. were the right claimed by the popes to fill vacant benefices, to appropriate the whole or a part of the revenues during the vacancy, and to regulate certain immunities claimed on behalf of the clergy. The "Calixtine C.," concluded in 1122 between the emp. Henry V. of Ger. and Pope Calixtus II., has been regarded as part of the fundamental law of the R. Cath. Ch. in Ger. In 1446 the electors of Ger. made formal demands for a redress of certain grievances which were acceded to by Pope Eugene IV. in the "Frankfort C." Among recent C. is that between Nap. and Pius VI. (1801), which regulated the relations between the Gallican Ch. and the Rom. see. In 1855 a C. was entered into between the emp. of Aus. and the pope, by which the whole system of national education, the regulation of marriages, except so far as civil consequences were concerned, and other important matters were placed in the hands of the Ch. This C. was set aside, without the consent of the pope, in 1870.

Con'cord, Book of (*Concordia*, *Concordien-Buch*), the collection of the Confessions which are received either by the entire Lutheran Ch. or by the larger part of it. It was pub. in 1580, and supplanted a great number of bulky Corpora Doctrinae. It contains—1, the 3 Gen. Creeds, the Apostles', Nicene, and Athanasian; 2, the Augsburg Confession; 3, the Apology of the Confession; 4, the Schmalkald Articles; 5, the Smaller and the Larger Catechism of Luther; and 6, the Formula of C., to which the "Book of C." is related as the whole to a part, though the two are often confounded. (See KRAUTH'S *Conservative Reformation*, art. vii.)

Concord, Formula of (*Concordia Formula*), the last part of the "Book of Concord," in which it appeared, for the first time, in 1580. It consists of 2 parts, of which the first may be said to be the text, the second the commentary, and has an appendix of testimonies. It was occasioned by the vacillations of MELANCHTHON (which see), real and seeming, the Crypto-Calvinistic and other controversies, and the appearance of a number of Corpora Doctrinæ objectionable in various respects. Protracted and patient conferences and labors, in which the greatest divines of the Lutheran Ch., especially Andreae and Chemnitz, took part, preceded and accompanied the preparation of it. Eighty-six of the states of the empire united in it. Augustus of Sax. was among its most important promoters. Its topics are—the Rule of Faith and the Creed, Original Sin, Free-Will, Justification, Good Works, the Law and the Gospel, Third Use of the Law, the Lord's Supper, the Person of Chr., the Descent into Hell, Ceremonies, the Adipaphora, Predestination, various sects and heresies. "The war of the Formula was fought for great principles; it was bravely and uncompromisingly fought, but it was fought magnanimously under the old banner of the Cross. It was crowned with victory, and that victory brought peace." (See KRAUTH'S *Conservative Reformation and its Theology*, art. vii.)

Concordia, a goddess of the Rom. mythology, may be considered a personification of domestic concord and of harmony between several classes of the body politic. Several temples were erected to her in anc. Rome.

Concordia, city, cap. of Cloud co., Kan., on R. R. and the Republican River, about 70 m. N. W. of Junction City. It has a normal school. Pop. 1880, 1853.

Concubinage [Lat. *concubinatus*, from *con*, "together," and *cubo*, to "lie"], a term denoting the relation of a man and woman who habitually cohabit without lawful marriage; or, more frequently, a kind of inferior marriage, which does not give the woman the legal position of a wife. C. was regarded as lawful among the anc. Hebs. In anc. Rome it was often a union between persons who could not legally intermarry on account of difference in rank. In gen. the children of a concubine were illegitimate among the Romans. The only relic of legalized C. in enlightened countries is morganatic marriage.

Concussion of the Brain [Lat. *concomotio cerebri*] sometimes causes alarming symptoms, even to suppression of the functions of the brain, yet without any apparent organic disease. Slight C. of the B. (popularly called "stunning") causes vertigo, loss of memory, thimtus aurium, and stupefaction; but these are temporary. When more severe there is loss of sensation and volition, with vomiting, the patient being apparently in a sound sleep, but without stertorous breathing. The pulse is variable, being more rapid and feeble than in compression of the brain; the extremities are cold. Little can be done until reaction occurs, when the case can be treated according to gen. principles. In some cases of C. it is necessary to use local or gen. stimulants, but usually moderate heat applied to the surface, abundant supplies of air, and proper adjustment of the injured parts are all that are required until consciousness is partly restored, when a small potion of wine or other stimulant may be useful. The effect of these should be carefully noted, and the patient should be placed in a comfortable position in bed during the process. In all cases absolute rest is essential. If the C. has been severe, the patient is often not secure until a long time after, even though apparently well, for serious nervous lesions may be slowly developed.

E. DARWIN HUDSON, JR.

Condé, kôn-dâ', de (HENRI I. DE BOURBON), PRINCE, b. Dec. 9, 1552, was a son of Louis I. He was a cousin of Henry of Navarre, and joined the Prot. army about 1584. He left a son, Henry II., who was the father of the great Condé. D. Mar. 5, 1588.

Condé, de (LOUIS HENRI JOSEPH), PRINCE, styled also DUKE OF BOURBON, the last of the line of Condé, b. Apr. 13, 1756. He was the father of the duc d'Enghien, murdered in 1804. C. fought against the Fr. Republic (1792-1800). D. 1830.

Condé, de (LOUIS I. DE BOURBON), PRINCE, a Fr. gen., b. at Vendôme May 7, 1530, a son of Charles de Bourbon, duc de Vendôme, and uncle of Henry IV. He was the gen.-in-chief of the Huguenots in the c. war which began in 1562. In 1567 he commanded at the battle of St. Denis. Having been defeated and wounded at the battle of Jarnac, Mar. 15, 1569, he was killed after he had surrendered. (See DESORMEAUX, *Histoire de la Maison de Condé*.)

Condé, de (LOUIS II. DE BOURBON), PRINCE, styled THE GREAT CONDÉ, a Fr. gen., b. in Paris Sept. 8, 1621, was a son of Henri II., prince of Condé, and was the first prince of the blood. In his youth he was called the duc d'Enghien. In May 1643 he gained a signal victory over the Spaniards at Rocroi, and defeated the Bavarian gen. Mercy at Nordlingen in 1645. In 1646 he inherited his father's title. He gained a decisive victory over the Spaniards at Lens in 1648. Early in 1650 he was arrested by Mazarin, whom he offended by his haughty conduct. After he had been confined nearly a yr. he was released, and raised an army to fight against the court. He marched in 1652 against Paris, which was defended with success by Turenne. In 1653 he was condemned to death, and entered the service of the king of Sp., who gave him command of an army in Flanders. He was there opposed to Turenne, over whom he could not gain much advantage. The war was ended by a treaty between Fr. and Sp. in 1659. The prince of C. was then pardoned, and returned to the service of the Fr. king. In 1674 he fought an indecisive battle at Seneffe against William, prince of Orange. D. Dec. 11, 1686. (See LORD MAHON, *Life of the Prince of Condé*, 1840.)

Condensed Milk. See MILK.

Condict (JOHN), a surgeon in the Revolutionary war, b. in 1755, was an M. C. from N. J. 1790-1803 and 1819-20, and U. S. Senator 1803-17. D. May 4, 1831.

Condillac, kôn-de-yahk', de (ÉTIENNE BONNOT), ABBÉ DE MUREAUX, a Fr. philos., b. at Grenoble in 1715. He associated in his youth with J. J. Rousseau and Diderot. In 1746 he pub. an ingenious *Essay on the Origin of Human Knowledge*. His reputation was widely extended by his *Treatise on Sensations*. He adopted the theory that our knowledge and ideas are derived from the operation of the senses. In *The Art of Thinking* he argues that man owes the development of his faculties to the use of signs. D. Aug. 3, 1780. (See ROBERT, *Les Théories logiques de Condillac*.)

Conditioned, Philosophy of the, a name given to the system of Sir William Hamilton. It is a development and application of the gen. principle of the Antinomies of Kant. It regards the judgment of causality as derived from an impotence of the mind—the principle of the conditioned—the law that the conceivable has always 2 opposite extremes, and that the extremes are equally inconceivable. We conceive of existence as conditioned in time, and thus expressing at once and in relation the 3 categories of thought which afford us in combination the principle of causality, the law of which is that when an object is presented phenomenally as commencing, we cannot but suppose that the complement of existence which it now contains has previously been.

C. P. KRAUTH.

Condonation [Lat. *condonatio*], in the law of divorce, means the conditional forgiveness of an offence for which, without such forgiveness, a divorce may be obtained. In form it may be either express or implied. It is sometimes difficult to decide whether the acts are of such a nature as to justify an implication of forgiveness. Cohabitation of the parties with knowledge that the offence has been committed, and with the means of establishing its commission in a court of justice, will lead to an implication of forgiveness. C. is conditional in this sense, that a repetition of the offence revives the original charge. According to some authorities, the original charge may be revived by the commission of an offence of an inferior grade. The forgiveness is said to imply that the innocent party shall in all respects be treated kindly. The point, however, is not fully settled. When an offence has been condoned and not repeated, it must be treated as though it had never existed. The original charge is blotted out conditionally.

Condor, the *Sarcophagus gryphus* of the Andes, one of the largest known birds of prey. The average expanse of wing is about 9 ft. The crop and the entire neck are bare;



Condor.

the head and neck of the male has fleshy caruncles. In N. Amer. it is represented by the Cal. C. (*Pseudogryphus californianus*), of the same size, but lacking the caruncles, and having the crop feathered. It inhabits the Pacific coast region from the Colorado to the Columbia.

Condorcet, kôn-dor-sâ, de (MARIE JEAN ANTOINE NICOLAS CARITAT), MARQUIS, a Fr. philos. and math., b. at Ribemont, in Picardy, Sept. 17, 1743, of an anc. family of Dauphiné. He studied in the coll. of Navarre, and became in 1762 a resident of Paris. He had a large share in the *Encyclopédie*. He favored the popular cause in 1789, wrote several able political treatises, and pub. the influential *Feuille villageoise*, and was elected to the National Convention in 1792. Having been proscribed by the Jacobins in May 1793, he remained secreted in the house of a friend in Paris for 8 months. During this period he wrote a *Historical Sketch of the Progress of the Human Mind*. This is regarded as his greatest work. He believed in human perfectibility, and had noble ideas of human destiny. He quitted his place of refuge early in 1794 in order to enjoy a rural excursion, was arrested and confined in prison at Bourg la-Reine, where he took poison and d. Mar. 28, 1794. (See D. F. ARAGO, *Biographie des Contemporains*, 1849.)

Condotterie, an It. word signifying "conductors," was applied to the mercenaries who during the It. wars in the 14th and 15th centuries took service under any prince or govt. that chose to engage them. They consisted principally of cav., and for a long period the wars of It. were left entirely to them. There came to be an understanding between them to spare their troops as much as possible, until at length battles were fought with little hazard.

Cone [Gr. *κωνος*; Lat. *conus*], in geom., a vol. that may be generated by a right-angled triangle when revolved around

one of the sides adjacent to the right angle as an axis. The hypothenuse then generates the convex surface, and the other side generates the base. In gen. geom. a *convex surface* is one that may be generated by a straight line moving so as to pass through a fixed point and intersect a given line. The fixed point is the *vertex*, the given line is the *directrix*, and any position of the moving line is an *element*. The elements on the side of the directrix make up the *first nappe*, and their prolongations beyond the vertex make up the *second nappe*. Any plane section that cuts all the elements is a *hyperbola*.

W. G. PECK.

Coney Island, situated on the W. end of L. I., in the tp. of Gravesend, Kings co., N. Y., is 5 m. long from E. to W., and averages less than 1 m. in width. It is separated from the mainland by a narrow creek which runs from Gravesend Bay to Sheepshead Bay. It is one of the most popular watering places in the world. Until 1874 it was a comparatively neglected waste, only the W. end being used to any extent for bathing and recreative purposes. Its sudden rise and growth have been phenomenal, for in few yrs. rude restaurants and bathing-houses on a desolate beach have been replaced by splendid hotels, covering the shore for miles, the intervening spaces being filled with concert-halls, fine bathing-houses, and the minor amusements suited to great and varied congregations of people. Its great attraction is its fine beach, 5 m. long, fronting the Atlantic Ocean. The water deepens gradually, there is but little undertow, and the surf is rarely boisterous.

Confederate States, or Southern Confederacy. The right of a State to withdraw from the U. was early though vaguely asserted both at the N. and the S., the theory being that the U. was merely a compact, which was broken by the failure of either party to fulfil its conditions. The question first came practically into consideration upon the election of Abraham Lincoln as Pres., in Nov. 1860. This election was regarded by many to be a menace against the existence of negro slavery, and a vehement opposition ensued, S. C. taking the initiative. A convention assembled, Dec. 20, 1860, which passed an ordinance of secession; other States soon followed, and before the inauguration of Lincoln (Mar. 1861) 7 States had seceded and sent delegates to Montgomery, Ala., by whom a provisional govt. was organized, Jefferson Davis of Miss. being Pres. and Alexander H. Stephens of Ga. V.-P. Other States before long acceded to the Confederacy, which finally comprised 11 States—Ala., Ark., Fla., Ga., La., Miss., N. C., S. C., Tenn., Tex., and Va. It was expected that Ky., Md., and Mo. would soon join the Confederacy. In May the seat of govt. was removed to Richmond, Va. Before this, possession had been taken of many places in the S., and fruitless attempts had been made to negotiate for a peaceable separation of the sections.

Actual hostilities were opened Apr. 12, 1861, when Ft. Sumter, in Charleston harbor, held by a small force under Major Anderson, was fired upon, and taken after a bloodless bombardment of 3 days. Pres. Lincoln issued a call for 75,000 militia to "repossess the forts, places, and property which had been seized from the U.," Pres. Davis accepted this as a virtual declaration of war, and issued letters of marque and reprisal (May 17).

The leading phases of the 4 years' war which ensued will be considered, minor details being omitted. Troops from the far S. were hurried to N. Va., the bulk of them being concentrated at Manassas Junction. Gen. McDowell was ordered to dislodge them, and the battle of Bull Run was fought, July 21, 1861, the U. troops being defeated. Gen. Scott, worn by age and infirmity, resigned the command of the army, which was conferred upon Gen. McClellan, who had conducted successful operations in W. Va. The autumn and winter of 1861 were passed by McClellan in organizing a great army, active operations in Va. not commencing until Apr. 1862, when an attempt was made to assail Richmond by way of the Peninsula. Desultory fighting had meanwhile been going on in Mo. and Ky., States of which the Confeds. were eager to take possession. McClellan landed at Fortress Monroe early in Apr., having been preceded or immediately followed by a force of nearly 100,000. At this time the enemy had not more than 15,000 men, mostly at Yorktown, to oppose the march to Richmond, but the number was soon increased to about 40,000, by concentrating most of the force in Va. Siege was laid to Yorktown, which was abandoned as soon as McClellan was ready to open fire, the Confeds., under Gen. J. E. Johnston, falling back toward Richmond; their rear was assailed, and a sharp action ensued at Williamsburg; the pursuit was checked, and the U. army did not reach the banks of the Chickahominy until late in May. A third of the force was pushed across the stream; these were attacked, May 28, at Fair Oaks, where an indecisive engagement ensued, in which Johnston was severely wounded and the command of the Confeds. devolved upon Gen. R. E. Lee. McClellan had sent $\frac{2}{3}$ of his force over the river when (June 26) the remainder were assailed by Lee. The operations which ensued are known as "The Seven Days," the prin. engagements being at Cold Harbor, where the U. troops were defeated; Frazer's Farm, which was indecisive; and Malvern Hill, which would have been a decisive U. victory had the advantage been followed up. But McClellan fell back still further, to Harrison's Landing, where he remained until late in Aug., when he was ordered to leave the Peninsula with his army.

In the meanwhile Gen. Halleck had been made commander-in-chief, McClellan remaining in command of the Army of the Potomac, that of the other forces in Va. being given to Gen. Pope, against whom Lee advanced. After minor engagements Pope was utterly defeated (Aug. 30), upon almost the spot where the battle of Bull Run had been fought. He was relieved from the command, which was given to McClellan. Lee now entered upon the invasion of Md., an enterprise which was brought to a close by the battle of Antietam (Sept. 17), after which the Confeds. recrossed the Potomac into Va., slowly falling back toward

Richmond, followed, after many delays, by McClellan, who was superseded (Nov. 7) by Gen. Burnside. Burnside proposed to march upon Richmond by way of Fredericksburg. Lee threw his army in the way, taking up a strong position on the S. bank of the Rappahannock, where he was unsuccessfully attacked (Dec. 13) by Burnside, who lost nearly 14,000 men, the enemy losing not more than 5000. With the battle of Fredericksburg closed the active operations in Va. during 1862.

But there had been important events at the E. The Confed. iron-clad Virginia destroyed the frigates Cumberland and Congress in Hampton Roads (Mar. 8), but was next day foiled by the Monitor. New Orleans was captured (Apr. 24) by the navy under Farragut, opening the whole lower course of the Miss. as far as Vicksburg, and a foothold was gained by Burnside in N. C.

In the W. the war was vigorously carried on during 1862. Grant captured Ft. Henry (Feb. 6) and Ft. Donelson (Feb. 16). The abandonment of Nashville soon followed. The Confeds. under A. S. Johnston retreating to Corinth, Miss. Large forces under Grant and Buell moved in that direction, but before they could be concentrated Grant was attacked at Pittsburg Landing (Apr. 6), where the Confeds. at first gained the advantage, but were severely repulsed the next day, falling back to Corinth, and finally to the centre of Miss. By a series of land and naval operations the Miss. was opened nearly to Vicksburg. Other notable events were the defeat of the Confeds. at Iuka (Sept. 19) and at Murfreesboro, Tenn. (Dec. 31).

The yr. 1863 was full of important events. Hooker, who had superseded Burnside in command of the Army of the Potomac early in Feb., suffered a great defeat at Chancellorsville, near Fredericksburg (May 2-3). Lee, collecting all his available force, marched toward Pa. Hooker was superseded by Meade (June 27). Lee advanced as far as Carlisle, Pa., then turned back. The two armies by accident encountered at Gettysburg, where a decisive action was fought (July 2-3); the defeated Confeds. pursued their retreat without serious molestation, and succeeded in crossing the Potomac into Va. In this quarter nothing notable occurred during the remainder of the yr.

In the W. the operations were numerous. Vicksburg, after a long siege, surrendered to Grant (July 4); Banks undertook a disastrous expedition to the Red River region of La. in May; the Confeds. were upon the whole successful in Ark., and made headway in Tenn., defeating Rosecrans at Chickamauga (Sept. 20), and soon after threatening Burnside at Knoxville. Grant took command and defeated the enemy at Chattanooga (Nov. 25).

In Mar. 1864 Gen. Grant was made Lieut.-gen. and placed in command of all the U. armies. Leaving Sherman in command at the W., he took immediate charge of operations in Va. He crossed the Rapidan May 4-5, outflanking Lee, and threatening a movement upon Richmond. While moving through the "Wilderness," in which the battle of Chancellorsville had been fought, Lee fell upon his line, and a severe battle took place, lasting 2 days. After this there were almost continuous engagements, the prin. ones being at Spottsylvania C. H. (May 11-13), on the North Anna (May 17), and at Cold Harbor (June 3). The fighting had brought the forces to the Chickahominy, within 10 m. of Richmond. Grant now changed his plan, crossed the Chickahominy and the James, proposing to besiege Richmond from the S. side. The siege, which took the ostensible form of an investment of Petersburg, lasted from June 16, 1864, to Apr. 1, 1865, when Lee abandoned Petersburg and Richmond, hoping to retreat and unite with Johnston in N. C. His retreat was intercepted; his army, greatly outnumbered and destitute of supplies, surrendered at Appomattox C. H., Apr. 9, 1865.

This surrender virtually put an end to the Confederacy. Pres. Davis and his cabinet went southward. He was made prisoner in Central Ga. (May 11), imprisoned for several months in Fortress Monroe, under arraignment for treason, but was not tried, being finally released upon bail.

Sherman's operations in the W. began simultaneously with those of Grant in Va. The Confed. forces under Johnston were encamped at Dalton, Ga. Upon the approach of Sherman they fell back, taking up one strong position after another, from which they were successively forced, mainly by flanking movements which threatened their communications with Atlanta, their base of supply, which was the immediate objective point of Sherman. When near Atlanta Johnston was superseded by Bragg (July 17), who vainly undertook to defend Atlanta. The city was abandoned by the Confeds. Aug. 31. Some manoeuvring and fighting ensued. Hood at length moved toward Nashville, where he was finally defeated by Thomas (Dec. 15).

Sherman in the meanwhile had resolved to leave Atlanta and move through Ga. to the sea. This march, beginning Nov. 14, was almost wholly unopposed, Savannah being its aim. The city was evacuated Dec. 20. Sherman remained there until Feb. 1, 1865, when he began his movement through the Carolinas, in order to unite with Grant, who was still before Petersburg. Gen. J. E. Johnston was now placed in command in the Carolinas, but he could not muster sufficient forces to impede the march of Sherman. Some resistance was made at favorable points, but by the 10th of Apr. Sherman had advanced as far as Goldsboro, N. C. Here tidings were received of the surrender of Lee's army. Negotiations were opened for the capitulation of Johnston's army. These were interrupted by various considerations, the surrender not being definitely made until Apr. 26. The other Confed. forces soon laid down their arms.

Southern writers, among whom is Jefferson Davis, have proposed various theories to account for the overthrow of the Confederacy, but they all resolve themselves into the inferiority of phys. force. Not only was the pop. far less than that of the U., so that they could rarely bring an equal force into the field, but, especially toward the close of the war, they found great difficulty in clothing, feeding, and equip-

ping their troops: paying them came to be wholly out of the question. There were no large accumulations of gold and silver, and when the rigid blockade at last precluded the export of cotton, the means of purchasing arms and munitions from abroad were scanty. At Petersburg and Richmond Lee's army had rarely at any time rations for a week in advance. Confed. paper depreciated rapidly, and in time became practically worthless. One consequence of all this was the frequency of desertions. For many months there were "present for duty" in the army of N. Va. less than $\frac{1}{4}$ of the number of men whose names were borne upon the muster-rolls. Destitute of a navy, they could obtain few supplies from Europe, while the destruction of the R. Rs., partly by the enemy and partly by wear and tear, continually widened the distance between the armies in the field and the regions where food still existed. Moreover, the opening of the Miss through its whole course—begun by the capture of New Orleans and completed by that of Vicksburg—severed the Confederacy into 2 parts, neither of them able to aid the other. Mr. Davis, indeed, believed to the very last that if he could have escaped beyond the Miss, he might have carried on the contest for an indefinite time, and brought it to a successful close, by which the independence of the Confederacy should be acknowledged. Much also was for a time hoped for from the intervention of Fr. and G. Brit., for it was believed that these nations would not long submit to the interruption of the supply of cotton, upon which their industries were so largely dependent. In reviewing the hist. of the Confed. States, one cannot but wonder that they were able for 4 yrs. to maintain a war of such magnitude against such odds. [From orig. art. in *J.'s Univ. Cyc.*, by HORACE GREELEY, LL.D.]

Confederation [Lat. *confederatio*, from *con*, "together," and *federus* (gen. *federis*), a "league"], a league, a federal compact, an alliance of princes, states, or nations. It is nearly synonymous with confederacy. The republic of Mex. is called the *Mexican C.* The numerous states of Ger. were united in 1815 by the cong. of Vienna, and formed the Germanic C. (*der Deutsche Bund* in Ger.). Before the adoption of the Federal const. in 1788, the gov't. of this country was a weak C. of 13 independent States, which recognized no superior or central authority.

Confederation, Articles of, a document drawn up by the Cong. of the U. S., Nov. 15, 1777, and adopted finally July 9, 1778, by which the several States united in a league of perpetual friendship "for the common defence, the security of their liberties, and their mutual and gen. welfare." These articles, 13 in number, were soon ratified by all the States, but the confederation proved almost an utter failure from the fact that Cong. had very limited powers. There was indeed no executive authority of any kind. For these reasons a convention called by Cong. met at Phila. May 14, 1787, with Washington as its pres., and on Sept. 14 of that yr. the convention closed and reported the const. of the U. S.

Confederation of the Rhine [Ger. *Rheinbund*], the name of a league formed, in July 1806, by 16 Ger. states under the protection of Nap. The princes of these states signed an act of confederation, dissolving their connection with the Ger. empire, and forming an alliance with Fr. Afterward at intervals 20 other petty states joined the C., which in 1808 had an area of 126,075 sq. m., with a pop. of 14,608,877. In 1810 a part of the C. was annexed to Fr., leaving it an area of 114,467 sq. m. Upon the downfall of Nap. the C. was dissolved in 1813, the members uniting with other states to form the Ger. C.

Confession, in criminal law, an acknowledgment by a person that he has committed or participated in a crime. It is either judicial or extra-judicial. It is said to be judicial when made in the course of legal proceedings. An instance is the plea of guilty. An extra-judicial C. does not have the same weight as one that is judicial, and is insufficient for conviction unless corroborated by proof of the actual commission of the offence (*corpus delicti*). A C. must be voluntary—that is, not the result of hopes or fears held out or caused to the prisoner by one having authority, such as a public official or the party against whom the act was committed (prosecutor). It is not necessary that it should be spontaneous. The question of the admissibility of a C. in evidence is decided by the judge; its effect after its admission is determined by the jury. Questions on the admissibility of C. frequently arise when taken by magistrates making an examination of a prisoner charged with crime.

Confucianism, the state religion of Chi., a religious, or rather philosophical, system, which has greatly modified the destinies of Chi. It is professed at present chiefly by the learned classes, though it has much influence upon the Boodhism of the common people.

Confucius, the Latinized form of **Kong-Foo-Tse**, or **Khoong-Foo-Tse**, the greatest of Chi. philos., b. according to the best authorities, in 551 B. C., in Loo, a kingdom or state which now forms part of the modern prov. of Shang-Toong. He was of illustrious descent, and his father, Shuh-Liang-Heih, was a soldier remarkable for strength and courage. After the death of his first wife, Shuh-Liang-Heih, then in advanced age, married a young lady of remarkable virtues, who became the mother of an only son, the subject of this notice. In childhood C. was, we are told, singularly obedient, gentle, and modest, and possessed wonderful intellectual quickness. He married when at the age of 19, and was made a mandarin of an inferior grade at about the same period. In discharging the duties of his office he showed great intelligence and faithfulness, and studied to promote the welfare of the people. At the age of about 22 C. first appeared as a public teacher, giving his instructions, however small the fee offered him, to all who had the ability and a true desire to learn. Having once shown them how to acquire wisdom, he expected his pupils to be able to pursue their studies alone and without further assistance from him. He is said to have studied music when 12 yrs. old, and to have acquired wonderful skill in that art.

In 490 B. C. we find C. one of the ministers of the king of Loo, and in this position he showed capacity, foresight, and resolute courage. At length the king of Loo having found the precepts of his minister too high and difficult to be conveniently practised, C. perceived that his services were no longer desired, and retired from public life. From this date he appears to have passed most of his time in travelling from place to place, spreading his doctrines as he went, and always accompanied by his disciples. He spent the last 5 yrs. of his life in his native state of Loo, teaching and completing the work which he had before begun.

C. had one son, Pê-Yu (or Pih-Yu), who died before his father, leaving a son named K'ung Keih, also called Tse-Sse (or Tsze-Sze), who was distinguished as a philos., and who wrote a famous work called *Chang-Yung*. Through all the changes of the Chi. dynasties, by whatever causes brought about, his descendants have received peculiar honors. They number more than 11,000 males, and are said to constitute the only hereditary nobility in Chi. From his own time to the present his writings have been the prin. objects of study in all the schools of that vast empire. It has, however, been justly observed that the aim and scope of the Confucian philos. were limited to this present life, and none of his sayings indicates that he had any definite belief in a continued existence after death. His life and teachings tended to the promotion of the useful and practical only. "There is a total difference in the attitude of the philos. of C. and the philos. of Plato, Aristotle, Bacon, and Locke. The Chi. sage did not aim to investigate the mysteries of the universe, or even the hidden laws of nature or of the human mind. His great object was to lay down such rules as would best promote the happiness and virtue of the community at large. And it must be acknowledged that in the practical wisdom of his precepts, both to rulers and subjects, he has never been surpassed by any philos. of any age or nation. That thought which is the basis of Chi. gov't.—that the ruler or officer should be as a father, and the people as children—dates, there is reason to believe, from a very remote antiquity. C. did not originate this idea, but he did everything in his power to give it practical efficacy." D. 478 B. C. (See LEGGE'S *Life and Teachings of Confucius*. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. J. THOMAS, LL.D.]

Con'ger, or Con'ger Eel,



European Conger Eel.

the popular as well as scientific name of a genus of marine fishes, having the tail longer and more pointed than the fresh-water eels, the dorsal fin commencing nearer the head, and the teeth of the upper jaw placed together, so as to form a cutting edge. The species are not at all numerous. One species (*C. vulgaris*) is a native of European and E. Amer. seas. It is brownish, with fins whitish edged with black, and the lateral line almost white. It sometimes becomes 5 to 10 ft. long and weighs 100 lbs. It is very strong, and a formidable antagonist when hauled into a boat by the fisherman's line. The prin. C.-fishery of G. Brit. is on the Cornish coast.

Conglomerate [Lat. *conglomeratus*, from *con*, "together," *glomero*, *glomeratum*, to "wind," as on a ball, to "gather"], or **Pudding-Stone**, the name of a rock consisting of rounded, water-worn pebbles cemented and compacted together. These pebbles are fragments of quartz and other hard rocks, the rubbing and polishing of which must have required a long period of time. They are united by a silicious, calcareous, or ferruginous cement, sometimes so loosely that they are easily separated by a blow with a hammer. In other cases they are very firmly united, so that the rock breaks as if it were a homogeneous mass. C. occurs in various formations and several geological ages.

Con'go, or Zaire, is, with the Nile, the most remarkable river of Afr. Its upper course was discovered by Livingstone, its middle and lower course by Stanley in 1877. Its head-waters, like those of the Nile, are found on high tablelands, in the heart of the tropical lake region, 4500 ft. above the sea. The longest branch, the Chambezi, rises in the plateau S. of Lake Tanganyika, about 10° S. lat., enters the large lake of Bangweolo, 3700 ft. above the sea, flows N. to Lake Mweru, thence N. W. under the name of Lualaba, to 2° beyond the equator, soon to curve back to the S. W., and after breaking through the border highlands at the cataracts of Yellala, reaches the Atlantic Ocean in 6° S. lat. Its basin occupies a long central depression over 700 m. from E. to W., and 1100 to 1600 ft. in altitude, between plateaus of 4000 to 5000 ft. which surround it on all sides. Its main tributaries come from the S. Its situation, wholly within the region of the most abundant equatorial rains, makes it a purely tropical stream, and explains the great abundance of its waters, which are said to exceed several times those of any other river of Afr. The C. is for Afr. what the Amazon is for S. Amer., making a land of exuberant vegetation and great fertility. Length estimated at 2900 m.; area drained, 860,000 sq. m. (See APPENDIX.)

Congo, a large country of W. Afr., bounded N. by Loango, S. by Angola, W. by the Atlantic Ocean. The coast-region is level and hot. In the central portion are fertile uplands. Among the animals are lions, leopards, elephants, buffaloes, hogs, and monkeys. The inhabs. are divided into petty tribes, each with a chief, and all subject to the Lindy N' Congo, who resides at Banza Congo or São Salvador.

Congregationalism is a system of administering ch. affairs which secures to each congregation the right of regulating the details of its worship and discipline according to its own understanding of the principles of the N. T.

According to its fundamental principle any association of believers, united by formal covenant for the maintenance of divine worship, the observance of Chr. rites, and combined efforts to promote the kingdom of God, is a ch. of Chr., and as such is competent to elect and ordain its own officers, admit or reject applicants for membership, exclude unworthy members, and transact its own business. The orderly prosecution of ch. work calls for the appointment of various officers, on whom is laid the special responsibility of oversight and direction; and long usage recognizes the office of pastor and that of deacon as needing to be perpetuated in the Ch. The pastor holds the office of a bishop or elder. The deacons are not technically ministers, but they are helpers of the pastor, and have special charge of receiving the charities of the ch. and making distribution for the relief of the poor. The congregational system holds to the Holy Scriptures as the exclusive rule of ecclesiastical polity, recognizes no organized and visible ch. apart from local and particular assemblies of believers, and repudiates all claims of superior bodies to exercise legislative or judicial authority over the brotherhood.

As a system of ch. order, C. is not necessarily connected with any school of theol. or any class of doctrine. Its methods of administering ch. affairs may be adopted alike by Calvinists, Arminians, Socinians, and Arians. The ch. govt. of the different denominations of Baps. is, for the most part, simply congregational. Some Meths. have followed the same order. The chs. in this country known as the Unit. are built upon the same platform. This is true also of Chrs. and Univts. But the chs. which are generally known as Congl. are Calvinistic rather than Arminian, Trinitarian rather than Socinian or Arian, accepting the doctrine of a future state of endless retribution, recognizing the families of believers as fit subjects of baptism, and regarding the mode of administering baptism as of comparatively small importance. Each ch. has its own articles of belief, which with greater or less fulness indicate the system of doctrine taught from the pulpit and accepted by the members. [From *orig. art. in J. S. Univ. Cyc.*, by E. W. GILMAN, D. D.]

Congress [Lat. *congressus*, from *congruere*, *congressus*, to "go together," to "meet." Fr. *congrès*], in politics, a meeting of the sovereigns of states or their representatives for the purpose of arranging international matters.

CONGRESS, the title of the national legislature of the U. S. of Amer. It consists of a House of Reps. and of a Senate. The former is composed of members chosen every second yr. The qualification of electors is the same as that required in their respective States for electors to the lower house in the State legislature. The number of reps. is apportioned according to the pop. of each State, and a new apportionment is made every 10 yrs. after the census is taken by authority. The Senate is composed of 2 members from each State; the senators are chosen for 6 yrs. by the legislature of the State. The House of Reps. chooses its own speaker; the V.-P. of the U. S. is *ex-officio* pres. of the Senate. Bills for revenue purposes must originate in the House of Reps., but are subject to the proposal of amendments by the Senate. The Senate has the sole power of trying impeachments, but it can only convict by a majority of $\frac{2}{3}$ of the members present, and its sentence extends only to removal from office and disqualification to hold any office of honor or profit under the U. S. The regular meeting of C. is on the first Monday in Dec. annually. Every bill which passes the 2 houses is sent to the Pres. for approval or disapproval; in the latter case he returns it, with his reasons, to the house in which it originated; if on reconsideration it is passed again by a majority of $\frac{2}{3}$ in each house, it becomes law. The powers of C. are limited, and separated from those of the State legislatures by the const. Members of C. cannot legally have any interest in any contract with or claim against the govt.; they are forbidden to prosecute cases before the court of claims, or to present claims to any of the depts. No person is eligible to the Senate under the age of 30 yrs., nor to the House of Reps. under the age of 25.

Congressman at Large, a member elected to the House of Reps. by the voters of the entire State instead of by districts in accordance with the ordinary plan. By the act of Feb. 2, 1872, a new apportionment was made of members of that House, the number being fixed at 292. A specific number of members was assigned to each State. It was then provided that in each State entitled under the apportionment to more than one rep. the number to which such State may be entitled in the 43d and each subsequent Cong. shall be elected by dists. composed of contiguous terr., and containing as nearly as possible an equal number of inahs., etc.; but on the election of members to the 43d Cong. in any State to which an increased number of reps. is given by this apportionment, the additional rep. or reps. may be elected by the *State at large* [Revised Statutes Cong., § 20-22.] It will thus be seen that the office of "Congressman at large" was a mere makeshift, devised in order to carry into effect the Apportionment act of 1872. The purpose having been accomplished, the office has ceased to exist. T. W. DWIGHT.

Congress Spring, at Saratoga, N. Y., a saline mineral spring whose waters are highly charged with carbonic acid gas. When fresh, C. water contains more than its own bulk of this gas, 100 cubic inches of water holding in solution 116 inches of the acid. Its saline ingredients are the carbonates, chlorides, iodides, bromides, etc. of potassium, sodium, lime, iron, magnesia, strontia, and other bases. These solid matters are found in the proportion of nearly 33 grains to a lb. of the water, which possesses valuable tonic and deobstruent qualities.

Congreve (Sir WILLIAM), BART., F. R. S., an Eng. officer and engineer, b. in Middlesex May 20, 1772. He invented several improvements in canal-locks, and in 1804 the C. rocket. D. May 14, 1828.

Congreve (WILLIAM), a witty Eng. dramatic poet, b. near Leeds Feb. 1670. He was ed. at the Univ. of Dublin, and entered the Middle Temple as a student of law, but he

never devoted much time to the study or practice of that profession. His first drama, *The Old Bachelor*, was performed with great success at Drury Lane when C. was not yet 19 yrs. of age. The *Double Dealer*, in the following yr., did not succeed. He produced in 1695 a comedy called *Love for Love*, which added much to his fame and fortune, and in 1697 *The Mourning Bride*, a tragedy, which was greatly admired. He obtained several lucrative civil offices. His comedy called *The Way of the World* (1700) failed so completely that he renounced the drama in disgust. He affected to depreciate his dramatic triumphs, and was more ambitious to pass for a man of fashion than a poetical genius. D. Jan. 19, 1729.

Conic Sections, in math., the sections of a right cone by a plane. If the cutting plane is perpendicular to the axis, the section is a *circle*; if it is parallel to one side of the cone, the section is a *parabola*; if it makes a greater angle with the base than is made by the side of the cone, the section is a *hyperbola*; if it makes a less angle with the base than the side does, the section is an *ellipse*. The circle, the line, and the point may each be regarded as particular cases of the ellipse; the line as a particular case of the parabola; the triangle as a particular case of the hyperbola. The study of C. S. is specially interesting and important on account of its connection with the laws of moving bodies. The orbits of planets, the paths of projectiles, the undulations of light and sound, are all either circular, elliptic, parabolic, or hyperbolic.

Conifereæ [from the Lat. *conus*, a "cone," and *fero*, to "bear"], an important natural order of exogenous plants, comprising the pines, firs, etc. They agree with the other exogens in the structure of the stem and in the mode of vegetation, but differ remarkably from most of them in fructification. Their ovules are not inclosed in an ovary, but are fertilized by the direct application of the pollen to the *foramen*, with no style or stigma; and for this reason they, with the Cycadaceæ, are called gymnosperms. The flowers are unisexual, the male and female being sometimes on the same, sometimes on different plants. The male flowers have either one stamen or one bundle of stamens, the anthers often crested. The female flowers are in cones or solitary. The place of ovaries is supplied by the flat scales of the cones. The ovules are usually in pairs. The fruit is either a cone, a berry-like fruit, or a solitary naked seed. The seed has a hard, crustaceous integument. The embryo is surrounded by fleshy, oily albumen. The cotyledons are either two or numerous and whorled. The C. are trees or shrubs, mostly with resinous juice, and awl-shaped or needle-shaped leaves. Some of the C. attain a height almost unrivalled among other forest trees. The *Sequoia* of Cal. affords the most striking example.

Coniline, also called **Conine**, **Conicine**, and **Cicutine**, a volatile alkaloid constituting the poisonous principle of the *Conium maculatum*, or poison hemlock.

Conington (JOHN), a distinguished classical scholar and literary writer, was b. Aug. 10, 1825, in Boston, Eng., and ed. at Ox., where he became a fellow of Univ. Coll. in 1848. In 1854 he was appointed to the chair of Lat. in the univ., and from this time to his early death in 1869 his pen was constantly busy. His works are chiefly eds. of Gr. and Lat. classics—of the *Agamemnon* and *Choephore* of Æschylus, of the poems of Virgil, 3 vols., and of Persius; he also translated the *Æneid* of Virgil and the works of Horace. Two vols. of miscellaneous writings, with a memoir prefixed, were issued in 1872, the second vol. containing a prose translation of the *Ecloques*, *Georgics*, and *Æneid* of Virgil.

Coniostres [from the Lat. *conus*, a "cone," and *rostrum*, a "bill"], a tribe of birds of the order Insectores (perchers), characterized by a strong conical bill without notches. It comprises numerous species, among which are crows, finches, larks, buntings, sparrows, starlings, and birds of paradise. Many recent systematists reject the term altogether, and group these birds in the section Oscines (singers), of the order Passeres and sub-class Insectores.

Conium (Gr. *κωνιον*), the leaves of the poisonous hemlock, *C. maculatum*, an Old World umbelliferous plant naturalized in the U. S. It is in med. a useful sedative, hypnotic, and anodyne. In overdoses it produces a dangerous paralysis. With this drug Socrates and Phocion were poisoned. Stimulants and emetics are the best antidotes.

Conjugate Diameters [Lat. *conjugatus*, "yoked together"], Two diameters of either an ellipse or an hyperbola are *conjugate* when each is parallel to the chords bisected by the other.

Conjunction [Lat. *con*, "with," *jungo*, to "join"], In astron., 2 bodies are in C. when they have the same geocentric lon.

Conkling (ALFRED), father of Roscoe C., b. at East Hampton, N. Y., Oct. 12, 1789, grad. at Union Coll. in 1810; became a lawyer, M. C. 1821-23, U. S. dist. judge for N. Y., and was minister to Mex. in 1852. D. Feb. 5, 1874.

Conkling (ROSCOE), LL.D., b. at Albany, N. Y., Oct. 30, 1829, studied and practised law. In 1846 removed to Utica, of which place he was elected mayor in 1858; was elected to represent his dist. in the U. S. Cong. 4 times, and in 1867, 1873, and 1879 to the U. S. Senate; May 16, 1881, resigned as U. S. Senator. Declined office of associate justice U. S. supreme court 1882.

Conneaut, Ashtabula co., O., on R. R. and Conneaut Creek, 68 m. E. N. E. of Cleveland and 2 m. from Lake Erie. Here the first settlers of N. O. landed in 1796. The mouth of creek makes a good harbor. Pop. 1870, 1163; 1880, 1256.

Conneautville, Pa. See APPENDIX.

Connecticut, kon-net'e-kut, a river of the U. S., rises in the N. part of N. H., near the frontier of Canada. Its W. bank forms the entire boundary between N. H. and Vt. It flows in a gen. S. S. W. direction until it enters Mass. It afterward intersects Mass. and Conn., flowing nearly S. to Middletown, Conn., below which its course is S. E., and enters L. I. Sound at Saybrook. Length, about 450 m.

Connecticut, one of the original 13 of the Amer U., between 41° and 42° 3' N. lat. and 71° 55' and 73° 50' W. lon.; bounded N. by Mass., E. by R. I. S. by L. I. Sound, W. by N. Y. Area, 4,845 sq. m.; coast-line, 100 m.; length, E. to W., 86 m.; average breadth, N. to S., 55 m.

Topography. Rivers, Etc.—No mts. in the State; the highest elevation not exceeding 1000 ft. Numerous ranges of hills; in the E. rounded and fertile, in the W. often broken and precipitous, with bold bluffs of trap-rock. Three prin. rivers, with their affluents and some smaller ones, drain the State—viz. the Conn., Thames, and Housatonic. The river valleys generally very fertile, but the Sound shore sandy. The hills furnish good grazing lands. The Conn., Housatonic, and Thames are navigable to the head of tide-water. The numerous falls on the smaller streams afford abundant water-power. No lakes, but many ponds in the State.

Minerals.—Copper and lead, both combined with silver, in considerable quantities, but not worked profitably hitherto; bog iron-ores, hematite in the N. W. yielding excellent iron, and nickel; limestone for lime, marble, and the brownstone (old red sandstone) of the Portland quarries; flagstones, granite, and gneiss; sulphate of barytes, hydraulic lime, verd-antique, tiling slate, fire-clay and kaolin, and many mineral springs.

Vegetation and Vegetable Products.—There is yet considerable timber in C., including hickory, white, red, and yellow oak, chestnut, butternut, tulip tree, beech, birch, hop-hornbeam, 4 species of maple, ash, elm, wild cherry, sassafras, and many shrubs and small trees. The soil is good in the valleys, and with judicious cultivation yields liberal crops. Tobacco is the largest crop in the Conn. Valley, and Indian corn, oats, rye, and buckwheat are largely grown, with some wheat and barley; potatoes and hay are large crops; orchard fruits are plentiful. The W. and S. W. parts of the State produce large quantities of market vegetables and small fruits for the New York market. Dairy, cattle, and sheep farming are favorite pursuits, and the milk, butter, and cheese of W. C. are famous.

Animals.—There are few wild animals in C. except the smaller game and game birds. The domestic animals are of excellent quality.

The climate is not so harsh in winter as that of the States bordering on the ocean, the extreme range of the thermometer for the yr. not exceeding 90° F.; maximum 93°, minimum 3°; summer mean about 68° or 69°, and winter mean from 27° to 29°; mean annual rainfall, from 51 to 52.5 inches. The State is generally healthy, pulmonary complaints being somewhat prevalent, and zymotic diseases occurring in the river valleys. Miasmatic fevers, formerly unknown, now prevail in most parts of C., but are not severe.

Manufactures.—C. is essentially a manufacturing State, and excels any other in the variety of its industries, while the amount of manufactured products is large for its pop. All descriptions of textiles; wares of gold, silver, brass, copper, zinc, nickel, iron, steel, leather, wood, etc.; clothing, clocks, watches, carriages, books and printing, firearms and ammunition, sewing-machines and other machinery, flour and food preparations, glass and lamps, hats, hooks and eyes, hoop-skirts and hosiery, jewelry, musical instruments, needles and pins, paper and perfumery, spectacles, straw goods, varnish, veneering, vinegar, and whips are a few of the varied productions of its factories. Statistics for 1880 for some of the principal manufactures were as follows: Cotton, 82 manufactories, products, \$16,069,771; woollen, 78 manufactories, products, \$16,892,354; mixed textiles, 43 manufactories, products, \$5,919,505; silk, 28 manufactories, products, \$5,438,075; paper, 65 manufactories, products, \$4,337,550. The total number of manufactories was 488; total products, \$185,697,211.

Railways.—C. is traversed by railways in all directions; there were 959 m. in operation in Dec. 1881.

Finances.—The State debt, net, in 1880 was \$4,967,600; local debt, net, \$17,034,061; total debt, State and local, net, \$22,001,661. The assessed valuation in 1880 was—real estate, \$228,791,267; personal, \$98,386,118; total, \$327,177,385.

Commerce.—The direct foreign commerce from the ports of C. in 1880 was \$1,441,770 imports, \$1,312,873 domestic exports, and \$247 foreign exports. The commerce through the port of New York was more than a hundredfold this amount, the business of C. covering an immense import and export trade. The internal commerce and coasting trade are also very large. In 1880 the registered, enrolled, and licensed vessels in C. were 823, of 82,876 tons; of these, 116 were steam craft, of 29,323 tons. In foreign commerce, 233 vessels, of 49,226 tons, entered and cleared in 1880.



Connecticut Seal.

Banks, Etc.—Number of national banks in operation in C. Nov. 1, 1881, 85; cap., \$25,539,620; outstanding circulation, \$19,508,037. There are also 14 State banks and trust cos., with \$4,125,928 cap. and \$4,549,167.71 deposits, 10 private banking-houses, with \$1,140,936 deposits, and 85 savings banks, with \$80,522,300 deposits. There are 29 fire and marine insurance cos.—13 joint stock, 16 mutual; the assets about \$14,000,000. There are also 8 life and 2 accident insurance cos., with aggregate assets of nearly \$90,000,000.

Education, Libraries, Etc.—C. has a school pop. of 138,428, of whom 119,382 are enrolled in the public schools, with an average attendance of 75,678. There are also 11,215 pupils in other than public schools. Number of school dists., 1498; of schools, 1638; of depts. in schools, 2564. There are 286 graded schools, with 1212 depts.; schools were taught an average of 9 months. There are 2741 teachers—men 1773, women 968; average monthly pay of men, \$57.19; of women, \$35.27; whole income for public schools, \$1,390,973; whole expenditure, \$1,375,880; amount of State school fund, \$2,030,000. There are high schools in all the cities, a State normal school with 122 pupils, and 7 teachers' insts. There are many collegiate schools and sems. for both sexes, 3 univs. or colls., all well endowed, and 1 (Yale Coll., at New Haven) having schools of law, med., theol., phys. science, engineering, agriculture, art, and philos. The 3 colls. had 1273 students in 1879. There are 2 schools for deaf-mutes, one the first established in this country; 1 for the feeble-minded, and 2 reform or industrial schools. There are in the State 130 public libraries of over 300 vols. each, with an aggregate of 432,000 vols. By the census of 1880 there were in C. 139 newspapers and periodicals, 17 of them dailies; aggregate circulation for the year, per issue, 237,660.

Churches.—There are about 1000 chs. of all denominations, and over \$15,000,000 of ch. property. The Congls. are the leading denomination, followed in their order by the Meths., Episcopalians, Baps., R. Caths., Univts., Presbys., Lutherans, Jews, etc.

Population.—Constant emigration has prevented a very rapid growth in C. In 1790 the pop. was 237,946; in 1820, 370,792; in 1870, 537,454; in 1880, 622,700 (white 610,769, colored 11,931, including 129 Asiatics and 255 Indians). The prin. towns are Hartford (cap.), 42,015; New Haven, 62,882; Bridgeport, 27,643; Norwich, 21,143; Waterbury, 20,270; Meriden, 18,340; Norwalk, 13,956; Middletown, 11,732; Derby, 11,650; New London, 10,537; New Britain, 13,979; Stamford, 11,297; Danbury, 11,666; Greenwich, 7892.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Fairfield.....	6 C	95,276	112,942	Bridgeport.....	27,643
Hartford.....	4 D	109,067	125,382	Danbury.....	11,666
Litchfield.....	4 C	48,727	52,044	Hartford.....	42,015
Middlesex.....	6 E	36,099	35,789	Litchfield.....	452
New Haven.....	6 D	121,257	158,553	Haddam.....	5,419
New London.....	6 F	66,570	73,152	Middletown.....	11,732
Tolland.....	4 E	22,000	24,112	New Haven.....	62,882
Windham.....	4 F	38,518	43,526	New London.....	10,537
				Norwich.....	21,143
				Tolland.....	11,666
				Brooklyn.....	2,008
Total.....		537,454	622,700		

History.—First white settlement, June 8, 1633, by Dut., at Dutch Point, Hartford; 2d, also 1633, by a party from Plymouth colony, at mouth of Tuxis (Windsor); 3d, Wethersfield, 1634, autumn; 4th and 5th at Saybrook, 1635, and additions to Windsor and Wethersfield; 6th, Hartford, 1636; the last three united in 1637, and in May of that yr., under Capt. Mason, attacked and destroyed Pequod fl., near New London. In 1638 Quinnipiac (afterward New Haven) settled by Davenport, Eaton, etc.; with adjacent towns remained a separate colony till 1665, when, through fear of the Dut., it united with the river towns, known as Connecticut, under charter of Charles II., granted in 1662 to John Winthrop 2d. In 1685-87 James II. attempted to annul all the N. Eng. charters and put the colonies together under a royal gov.—Sir Edmond Andross—appointed by the crown. The demand was made on C. in Oct. 1687, but after some debate the lights were extinguished and the charter secretly conveyed away and hidden in the hollow of a large oak on the Wyllys estate, ever after known as the Charter Oak. Sir E. Andross took possession of the gov't. and for 14 yrs. ruled tyrannically, but was deposed on the fall of James II., and the charter of 1662 continued to be recognized as the supreme law of the colony for 129 yrs. thereafter. The gen. court or colonial legislature held 2 sessions a yr., and from 1701 to 1875 these and the annual sessions which succeeded them were held alternately in Hartford and New Haven. Hartford is now the sole cap. During the 1st and 2d Fr. wars the colony of C. furnished her full quotas promptly, and in the Revolution she furnished more men and more money in proportion to her pop. than any other colony. Her gov. (Jonathan Trumbull) was Washington's wisest counsellor, and her gen. assembly were among the earliest petitioners for the Dec. of Ind. C. was the 5th State to adopt the const. of the U. S., Jan. 9, 1788. C. suffered severely from the events which preceded the war of 1812, but furnished her full quota of men and means for the war. The so-called "Hartford Convention" of Dec. 1814, composed of delegates from all the N. Eng. States, was not, as is often alleged, an unpatriotic or treasonable body, but their action was rendered unnecessary by the speedy conclusion of the war. In 1818 C. adopted her present const., which abolished all relics of slavery and of a State ch. It has been modified of late yrs., but never abrogated. The State took part in the Mex. war, and early dedicated its W. lands in Ohio to an educational fund for all its children. In the C. war of 1861-65 C. was conspicuous for patriotism, and her soldiers were distinguished on all the battle-fields.

* Referred to by numbers in the text.

Governors of the State.

Samuel Huntington.....	1785-86	C. H. Pond (acting).....	1853-54
Oliver Wolcott.....	1796-98	Henry Dutton.....	1854-55
Jonathan Trumbull.....	1798-1800	William T. Minor.....	1855-57
John Treadwell.....	1800-11	Alexander H. Holley.....	1857-58
John Griswold.....	1811-13	Wm. A. Buckingham.....	1858-66
John Cotton Smith.....	1813-18	Joseph R. Hawley.....	1866-67
Oliver Wolcott.....	1818-27	James E. English.....	1867-69
Gideon Tomlinson.....	1827-31	Marshall Jewell.....	1869-70
John S. Peters.....	1831-33	James E. English.....	1870-71
Henry W. Edwards.....	1834-35	Charles R. Ingersoll.....	1871-73
Samuel A. Foot.....	1835-38	Richard D. Hubbard.....	1873-77
Henry W. Edwards.....	1838-42	Chas. B. Andrews.....	1877-79
William W. Ellsworth.....	1842-44	Hobart B. Bigelow.....	1879-81
Chauncey F. Cleveland.....	1844-46	Thomas M. Waller.....	1881-83
Roger S. Baldwin.....	1846-47	Henry H. Harrison.....	1883-85
Isaac Toucey.....	1847-49		
Clark Bissell.....	1849-50		
Joseph Trumbull.....	1850-53		
Thomas H. Seymour.....	1850-53		

L. P. BROCKETT.

Connellsville, R. R. Junc., Fayette co., Pa., on the Youghiogheny River, 57 m. S. E. of Pittsburg. It has extensive mines of bituminous coal, and manufactures immense quantities of coke. Pop. 1870, 1292; 1880, 3609.

Connersville, city and R. R. Junc., cap. of Fayette co., Ind., on the Whitewater River, 67 m. N. W. of Cin. Pop. 1870, 2496; 1880, 3228.

Connor, called also **Gilt-head** or **Golden Maid**, a small European marine fish, the *Orelinabrus tinca*. A somewhat similar fish is the conner, blue perch, chogset, or bergall of the Atlantic waters of the U. S. (*Otenolabrus cæruleus*). It is a tolerable fish for the table.

Connor (SELDEN), b. Jan. 25, 1839, at Fairfield, Me., grad. at Tufts Coll., Medford, Mass., in 1859; studied law, but before commencing practice enlisted as a private in a Vt. regiment at the commencement of the c. war; became a lieut.-col. in a Me. regiment, then a col., and was wounded in the battle of the Wilderness; then became a brig.-gen.; was appointed a collector of internal revenue in 1873, and was gov. of Me. 1876-79.

Conon of Samos, a Gr. geometer and astron., lived at Alexandria about 250 B. C. He invented the curve called the spiral of Archimedes. His works are all lost.

Conrad I., of Ger., was elected emp. in 911 A. D. He was previously Duke of Franconia. His dominions were invaded by the Maygars. D. Dec. 23, 918.

Conrad II., called the **SALIC**, was a son of Henry, duke of Franconia. He was elected king of Ger. in 1024, and was crowned as emp. by the pope in 1027. He is said to have been the author of the written feudal law of Ger. D. June 4, 1039, and was succeeded by his son Henry III.

Conrad III., of Ger., b. 1093, was the first of the Hohenstaufens and a grandson of Henry IV. He was elected emp. in 1138, and waged war against Henry the Proud, duke of Sax. The party names of Guelph and Ghibelline originated in this war. In 1147 he led a crusade. D. Feb. 15, 1152, and was succeeded by Frederick Barbarossa. (See GUNDLING, *Geschichte und Thaten Kaiser Conrads III.*)

Conrad IV., son of Frederick II., emp. of Ger., b. in Apulia 1228. He was crowned king of the Romans, 1237, and in 1250 assumed the title of emp. He was supported by the Ghibellines, but the pope and the Guelphs recognized his competitor, William of Hol. D. May 27, 1254.

Conrad V., or **Conradin**, the son and heir of Conrad IV., b. in 1252. The kingdom of Naples was usurped by his uncle Manfred. Charles of Anjou waged war against Manfred and conquered Naples. C. was defeated and captured at Tagliacozzo in 1268 by Charles, and beheaded Oct. 26 or 29.

Conrad (CHARLES M.), a native of Winchester, Va., was taken in childhood to Miss., and thence to La. In 1828 he was admitted to the bar, was U. S. Senator from La. 1842-43, M. C. 1849-50, and sec. of war 1850-53. He was a Confed. brig.-gen. and member of the Confed. Cong. D. Feb. 11, 1878.

Consanguinity [from the Lat. con, "with," and sanguis, sanguinis, "blood"], in law, is relationship by blood, or that subsisting between persons descending from a common ancestor, or where one descends from the other. It is either lineal or collateral. It is said to be lineal when one of the persons whose relationship is to be traced is descended from the other. It is said to be collateral when they are descended from a common ancestor, and one is not descended from the other. There are 2 prin. modes of reckoning collateral C. One method is to count the degrees intervening between the one farthest removed from the common ancestor and such ancestor. Thus, the son of the nephew of A on that system of computation is related to A in the third degree, as being 3 removes from the common ancestor, the father of A. This is the method of the canon and common law. The civil law reckons the degrees from one relative to the other, ascending, on the one hand, from one of the parties to the common ancestor, and then counting downward to the other. On that theory A would be related to the son of his nephew in the fourth degree. The civil law method is generally employed in this country. In reckoning lineal C. the 2 systems do not differ. Thus, the father and son are related in the first degree, the grandfather and grandson in the second. It frequently becomes necessary to resort to these rules not only in considering the transmission of estates, but in ascertaining persons who are disqualified to act as judges or jurymen by reason of relationship.

Conservation of Force. See CORRELATION OF FORCES, by PRES. J. H. SEELYE, LL.D.

Conshohocken, Montgomery co., Pa., on R. R. and the Schuylkill River, 13 m. N. W. of Phila. Pop. 1870, 3071; 1880, 4561.

Consideration. See CONTRACT.

Consnee. See BILL OF LADING.

Consols, a contraction of "consolidated annuities," the common name given to the annuities of 3 per cent.

which the Brit. gov't. pays as interest on the national debt. This debt was contracted by loans negotiated at different times and at various rates of int. To obviate the confusion which arose from the variety of stocks thus created, they were consolidated, in 1757, into one fund.

Conspiracy [Lat. *conspiratio*, from *conspirare*, to "blow together," to "harmonize, agree, plot"]. As a criminal offence, C. is defined as a combination or confederacy of two or more persons to accomplish some unlawful purpose or a lawful purpose by some unlawful means. An act which is entirely lawful when committed by a single person, or if not lawful, at least not criminal, may be indictable as a C. if committed by 2 or more persons. But the act, though lawful, must be such as is particularly adapted to injure the public or some individual by reason of the combination. Thus, though a single person may not be legally responsible for hissing an actor on the stage, yet if several combine previously to do this, and thus to injure or ruin his professional reputation, the act is indictable as a C. The offence is complete when the confederacy with wrongful intent is proved, and no overt act in pursuance of the common design need be proved. But this rule has been changed in some States, proof of an overt act being required.

The various forms of criminal C. have been conveniently classified as follows by Mr. Bishop in his work on criminal law: (1) C. to defraud individuals; (2) C. to injure individuals otherwise than by fraud, as to injure a trader by secretly spoiling his wares, or to hiss an actor; (3) C. to disturb the course of gov't. and of justice, as to procure a false indictment against a person; (4) C. to create public breaches of the peace; (5) C. to create public nuisances and do other like injuries; (6) C. against both individuals and the community, as when workmen combine upon a "strike" and coerce other workmen to unite with them.

A C. requires at least two confederates. If two are jointly indicted, an acquittal of one operates as an acquittal of the other also. In many of the States there are special statutory provisions on the subject of criminal C.

A C. may also in many cases be made the subject of a civil action for damages by the person who suffers special injury or detriment therefrom. But the civil wrong differs in some important respects from the criminal offence. Thus, it is a gen. rule that a C. cannot be made the subject of a civil action unless something is done which, without the C., would give a right of action. In criminal law, moreover, the mere fact of conspiring is ground for an indictment, but a suit for damages is only sustainable when injury has resulted from the attempted fulfilment of the wrongful design. Besides, one of the defendants in a civil action may be acquitted and the other convicted. GEORGE CHASE.

Constance, a fortified city of Baden, is on the Rhine and the S. W. shore of the Lake of Constance, 35 m. N. E. of Zurich. It is one of the oldest towns in Ger., and was formerly a free imperial city. It has a magnificent cathedral, founded in the 11th century. Here was held, in 1414-18, an important council of the Ch. Pop. 13,372.

Constance, Council of [Lat. *Concilium Constantiense*], the 17th of the so called œcumenical councils of the R. Cath. Ch., was convened by writ of the Ger. emp. Sigismund, and opened on All Saints' Day, 1414, by John XXIII., one of the 3 claimants of the papacy. One of the objects of this council was the ending of the schism caused by the rival popes (John XXIII., Gregory XII., and Benedict XIII.), which was accomplished by deposing all 3 and choosing Martin V. in their stead. The council condemned the opinions of Wickliffe and Huss. The reform of certain acknowledged abuses was also attempted, with no great success. The 45th and last session was held Apr. 22, 1418.

Constance, Lake of [anc. *Brigantinus Lacus*; Ger. *Boden See*], bordering upon Bavaria, Switz., the Tyrol, and Württemberg, 1290 ft. above the ocean-level. Area, 184 sq. m. It is about 40 m. long, and 9 m. wide at the broadest part. The greatest depth is 912 ft. The Rhine enters this lake near the S. E. end and issues from the N. W. extremity.

Constans (FLAVIUS JULIUS) I., b. about 320 A. D., third son of emp. Constantine I. On the death of his father, in 337, became sovereign of It., Afr., etc. His brother Constantine invaded It., and was killed in battle in 340, after which C. was master of all the W. empire; was defeated and killed by Magnentius early in 350.

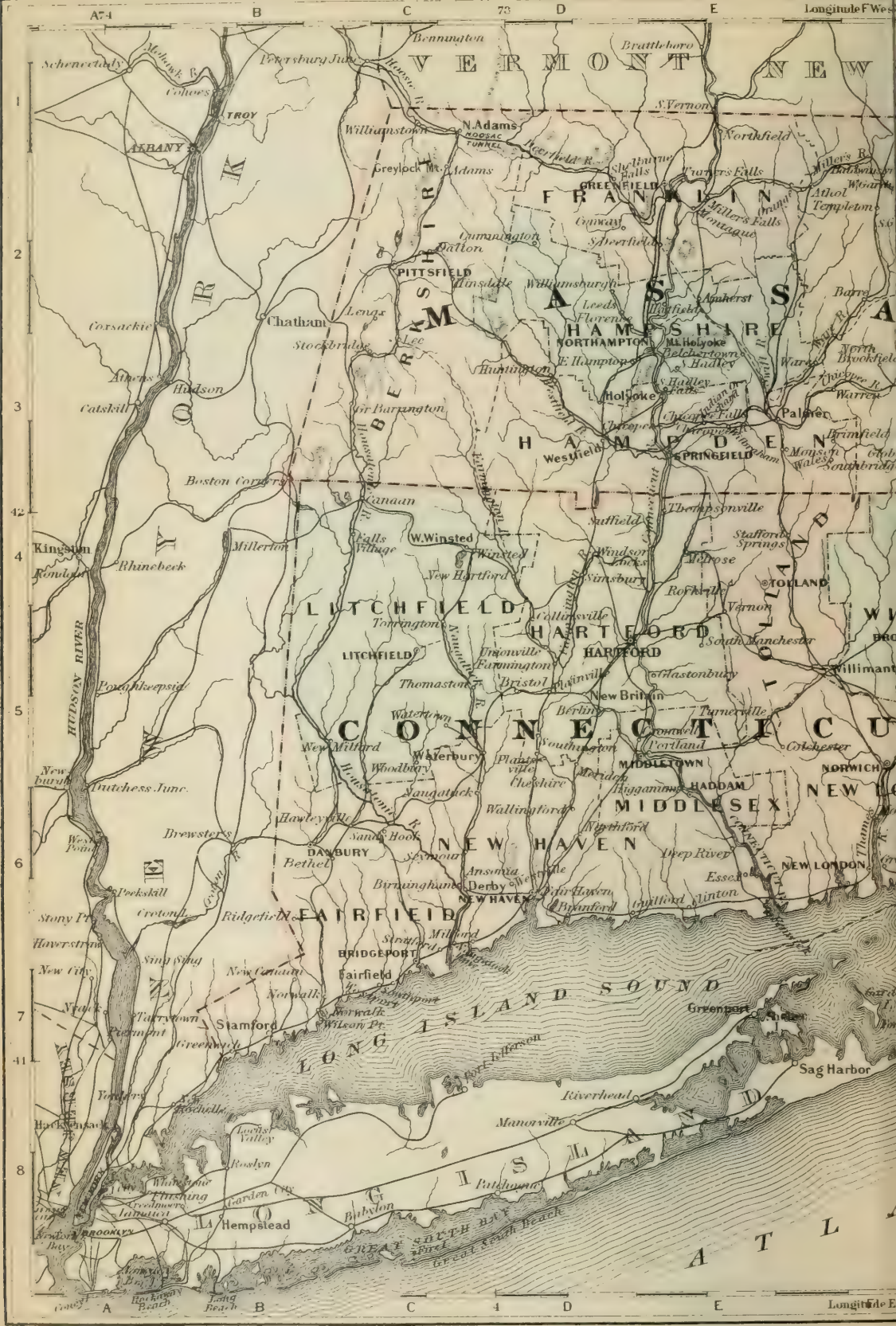
Constant de Rebecque (BENJAMIN), a Fr. political writer, b. at Lausanne Oct. 25, 1767. In 1799 he became a member of the Fr. tribunal, but, having opposed the ambitious designs of Bonaparte, he was banished from Fr. with Madame de Staël in 1801. He wrote in 1813 a pamphlet on *The Spirit of Conquest and Usurpation*; was a member of Nap.'s council of state during the Hundred Days. In 1819 he was elected to the Chamber of Deputies. Wrote *Cours de Politique Constitutionnelle* and a treatise *On Religion, considered in its Source, its Forms, and its Developments*. D. Dec. 10, 1830. (See L. DE LOMÈNE, *B. Constant*.)

Constantia, kons-tan'she-a, a superior wine from the Cape Colony, S. Afr., produced upon the 3 Constantia estates, 12 m. S. of Cape Town. It is free from the earthy taste which characterizes ordinary Cape wines. It owes its excellence to the highly alkaline soil, the choice variety of grape employed in making it, the genial exposure of the estates, and perhaps more than all to care and skill in its preparation. There are white and red C. wines.

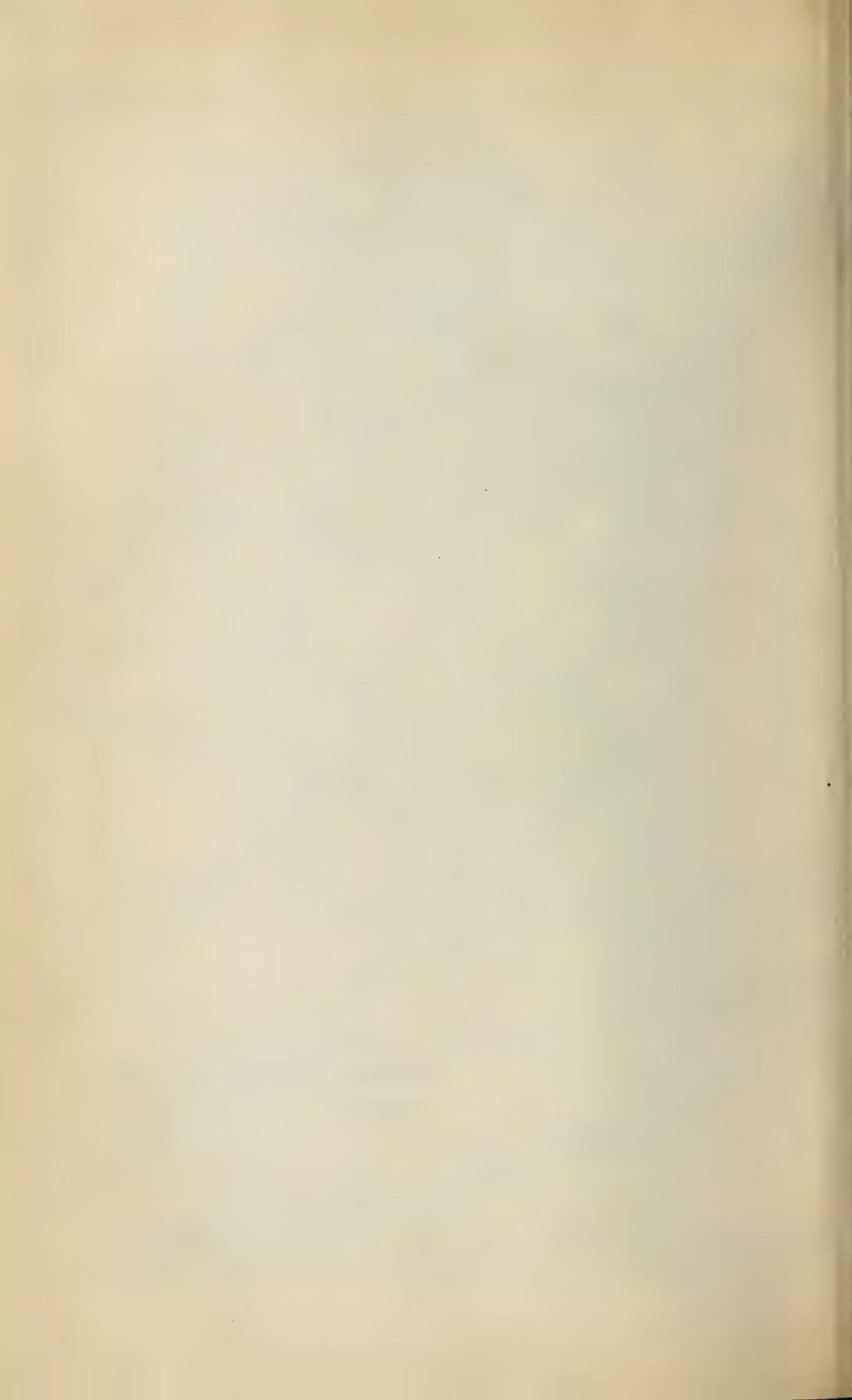
Constantine, St. Joseph co., Mich., on R. R. and the St. Joseph River, 94 m. by R. R. S. W. of Lansing. Pop. 1870, 1290; 1880, 1405.

Constantine (FLAVIUS VALERIUS AURELIUS), surnamed the GREAT, the first Christian emp. of Rome, b. Feb. 27, 274 A. D. He was a son of Constantius Chlorus and his wife Helena, and was originally a pagan. In the reign of Diocletian he gained distinction by his military talents. He was at York when his father d., in July 306, and was then proclaimed emp. by the army under his command. Galerius granted to him the title of cæsar, and conferred the higher









rank of augustus on his own son, Severus. Maximian and his son Maxentius assumed imperial power at Rome. After the death of Galerius (311), Licinius and Maximian were masters of the E. provs. of the empire, and C. reigned in Gaul. In 312 Maxentius was defeated and killed by the army of C., who then entered Rome and became master of the W. part of the empire, including It. and Afr. On the eve of this decisive battle he is said to have seen a sign of the cross in the sky, bearing the inscription, "ΕΥ ΤΟΥΤΩ ΝΙΚΑ" ("By this conquer"). He afterward devoted himself to political reforms and adopted a more humane code of laws, which recognized Christianity as the religion of the state. In 323 he defeated Licinius near Adrianople, and after another decisive victory became sole master of the Rom. empire. In 325 he assembled at Nicea the first gen. council of the Ch. C. selected Byzantium as his cap., and enlarged or rebuilt that city, to which he gave the name of New Rome or Constantinople—"City of Constantine"—in May 330 A. D. A week before his death he was baptized by an Arian bp. D. May 22, 337, having divided the empire between his 3 sons, Constantine, Constantius, and Constans. (See JOSEPH FLETCHER, *Life of Constantine the Great*.)

Constantine (or Constantinus) VII., emp. of the E., surnamed PORPHYROGENITUS [Gr. Πορφυρογεννητος, i. e. "born to the purple" or "born in purple"], was b. in 905 A. D. He was a son of the emp. Leo VI., and began to reign in 944. Wrote several works. D. Nov. 15, 959.

Constantine XIII., surnamed PALEOLOGUS, the last emp. of Constantinople, b. 1394. He succeeded his brother, John VII., Jan. 6, 1449. In 1453 Mohammed II. besieged Constantinople with an army of 250,000 men, and took it by storm. C. was killed, fighting bravely, May 29, 1453.

Constantine [Lat. *Constantinus*], POPE, a native of Syria, succeeded Sisinnius in 708. D. 715.

Constantine (NIKOLAEVITCH), grand duke of Rus., second son of emp. Nicholas, b. Sept. 21, 1827, became grand admiral of the fleet. In the Crimean war (1854-55) he commanded the Baltic fleet and acted on the defensive; gov.-gen. of Poland in 1862, but resigned in 1863.

Constantine (PAVLOVITCH), grand duke, the second son of the emp. Paul of Rus., b. May 8, 1779. He commanded a corps at the battle of Austerlitz 1805; in 1814 was appointed generalissimo of the Polish troops and viceroy of Poland. When Alexander d. without issue in 1825, C. was the legitimate heir, but he renounced the throne in favor of his younger brother, Nicholas; by his tyranny he provoked the Poles to revolt in 1830. D. June 27, 1831.

Constantinople [Tur. *Stamboul* or *Istamboul* in common lang. and *Constantinople* in documentary writing; modern Gr. *Istanbul*; Gr. *Κωνσταντινούπολις*; Lat. *Constantinopolis*, i. e. "city of Constantine"], a city of Tur. in Europe, cap. of the Ottoman empire, originally called Byzantium, on the Bosphorus, at its entrance into the Sea of Marmora. It occupies a peninsula, is surrounded by water except on the W. side, and stands upon 7 hills rising one behind the other. The Bosphorus, here nearly 1 m. wide, separates it from the Asiatic suburb of Scutari. The harbor, known as the "Golden Horn," is safe and commodious, with sufficient depth to admit the largest vessels. On the W. or land side there is a lofty stone wall 4 m. long, built during the Byzantine empire, but is now in a ruinous condition. The streets are narrow, crooked, and filthy.

Principal Buildings.—The Seraglio, or palace of the sultan, occupies the N. E. point of the peninsula, and, including gardens, groves, and govt. buildings, has a circuit of nearly 3 m.; the prin. entrance is called the Sublime Porte ("Lofty Gate"), which is the official designation of the court of the sultan. The prin. edifices are the mosque of St. Sophia, originally a Chr. cathedral, built 531-538 A. D., one of the finest specimens of Byzantine arch.; the mosque of Solyman the Magnificent, of Selim II., and of Mustapha III.; that of Achmet, having 6 minarets, and that of Mohammed II., connected with which are 8 rounded acads. Among the antiquities are the "Burnt Column," erected by Constantine the Great, the pillar of Marcian, the aqueduct of Valens, and an obelisk brought from Thebes. The numerous cemeteries around the city are among its prin. ornaments.

History.—C. became the cap. of the E. empire after the division of the Rom. empire; was repeatedly menaced by the barbarians; was captured by the crusaders 1204, and finally by the Turks 1453. It is said to have been besieged in all 29 times, mostly without success. Pop. about 700,000.

Constantinus I., called **Constantinus Chlo'rus** (FLAVIUS VALERIUS), a Rom. emp., b. about 250 A. D., was the father of Constantine the Great. The emps. Diocletian and Maximian chose C. and Galerius in 292, and gave to each the title of cæsar. C. ruled over Gaul, Brit., and Sp. and became emp. in 305, when Diocletian abdicated. D. July 25, 306.

Constantinus II. (FLAVIUS JULIUS), the second son of Constantine I. and Fausta, b. at Sirmium in 317 A. D. He inherited the Asiatic provs. and Egypt in 337. In 355 he gave the title of cæsar to his cousin Julian. D. Nov. 3, 361, and was succeeded by Julian.

Constellation [Lat. *con*, "together," and *stella*, a "star"]. The anc. divided the stars into groups called constellations. According to the *Almagest*, by Ptolemy, there were at that time 12 zodiacal, 21 N., and 15 S. constellations. To these several have been added in modern times. The stars in the several C. are now designated by letters of the Gr. alphabet. The brightest star in each C. is usually (but not always) called α , the next brightest β , and so on; when the letters of the Gr. alphabet are exhausted those of the Eng. alphabet are drawn upon; thus, the brightest star in Lyra is called α Lyrae, the next brightest β Lyrae, and so on. The grouping of stars into C. is often a matter of convenience, much in the same way that the division of the earth into countries facilitates the study of geog.; thus, it is more convenient to say that α Cygni is the brightest star in Cygnus than to describe it by giving its right ascension and declination.

W. G. PECK.

Constipation [from the Lat. *con*, intensive, and *stipo*, to "stow," to "crowd," referring to that state of the rectum in which it is impacted with fecal matter], a condition of the system marked by sluggish action of the bowels upon their contents, due either to diminished secretion of the juices of the mucous membrane or to a want of action of the muscular coat of the intestines. Sedentary habits predispose to C., and so does too large a proportion of animal food. Brown bread, ripe fruits, fresh vegetables, and active exercise tend to avert this disorder. An abdominal compress of cold water, covered with a flannel bandage, sometimes proves beneficial. For many cases the use of mild cathartics is necessary. They may be taken in proper doses for many years without bad effects. The use of nux vomica in small daily doses is often useful, and the same is true of belladonna in some constitutions. It is frequently advisable to employ enemata of warm or cold water, and also kneading or careful manipulation of the abdomen. But perhaps the most rational treatment is a careful readjustment of the diet and the adoption of active habits of life. Ill chosen and ill cooked food, perhaps the most frequent cause of intestinal troubles, should be especially avoided. There is no doubt also that habitual C. may in some instances be overcome by the persistent and systematic attempt to perform the impaired function at a regular time each day.

E. DARWIN HUDSON, JR.

Constitution of the United States, the fundamental or organic law of the union of the States, thereby enacted. This, with all acts of the States in Cong. assembled, and all treaties made in pursuance of its provisions, constitutes the supreme law of the land throughout the U. The first C. of the U. S. was the Articles of Confederation, adopted by the States during the war for their independence. (See CONFEDERATION, ARTICLES OF; also see CURTIS'S *Hist. Const. U. S.*, p. 139; SPARKS'S *Writings of Washington*, letter to Henry Lee, Sept. 22, 1788; to Benjamin Lincoln, Oct. 26, 1788, and to James Monroe, Feb. 22, 1789; also see GOVERNMENT.)

ALEXANDER H. STEPHENS.

Consumption [Lat. *consumo*, *consumptum*, to "wear away"], the popular name of various diseases characterized by a wasting of the body, such, for example, as "anæmia" (known as "consumption of the blood"), but applied especially to *phthisis pulmonalis*, a very common and very fatal disease of the lungs. It has long been taught, that the characteristic symptoms of pulmonary C. depend upon the presence in the lung-tissue of a new growth, or neoplasm, called tubercle. The first subjective symptoms are usually dull pains about the collar-bones, tightness across the chest, and there is frequently a dry, hacking cough in the morning and late at night. Headache, weariness, dyspepsia, and loss of appetite are often present. The pulse increases permanently, in most cases exceeding 90 or 100 beats in a minute. The rapidity of breathing is usually increased. An early symptom is a high evening temperature—103° or 104° F. In the second stage night-sweats are often extremely severe. Pus is freely expectorated, hectic fever is decidedly present, the pulse is more frequent. In the third stage, when considerable cavities often form in the lung, the preceding symptoms are much intensified; colliquative diarrhoea supervenes, and yet in many cases the patient continues serene and hopeful, and the mind is remarkably clear and active.

The causes of C. are very numerous. Any depressing circumstance may tend to the establishment of C. An hereditary tendency is one of the most important of these circumstances, but any depressed state of the parent, especially of the mother, whether C., starvation, anæmia, scrofula, or any other dyscrasia, appears to have a nearly equal effect on the offspring. It is most frequently observed in places where the air and soil are charged with moisture. A very changeable temperature is one of its most fruitful causes.

C. is not a contagious disease. On the offspring of the C. the effect of hard drinking is confessedly deplorable. Overstudy at school appears to develop the disease in some young people. Overwork, factory-life, the grinding of metals, cabinet-making, and all kinds of dusty or sedentary work are undoubtedly prolific sources of the disease. Mental trouble, excessive care, too frequent child-bearing, and sexual excess are to be reckoned in the list of causes. C. frequently follows measles, typhoid fever, and whooping-cough, not improbably resulting from the bronchitis which accompanies those diseases.

In the treatment of C. one of the first requisites is the establishment, if possible, of normal nutrition—a process which is usually much impaired in those liable to this disease. The use of such tonics as quinia and strychnia in some conditions, the administration of cod-liver oil, either as food or for its assumed alterative powers, and judicious change of climate, are among the most useful measures. Alcoholic stimulants benefit some patients, the hypophosphites of soda and lime appear to cause increase of weight and diminution of cough and expectoration in many cases; thorough counter-irritation of the chest-walls is a very important adjuvant; the wearing of sufficient clothing to protect the body from sudden changes of temperature is not less important. Systematic, and even severe, physical labor benefits some patients. Special symptoms, like diarrhoea and night-sweats, will require palliative treatment. Life in the open air is advisable, except in wet and bleak weather. The dry air of the W. plains and of the Rocky Mt. region, the equable weather of Fla., and the dry, sandy soil and balsamic exhalations of the great pine forests of the S. are believed to afford favorable conditions for recovery in many cases. [From *orig. art. in J. S. Univ. Q. Rev.*, by CHARLES W. GREENE, M. D.]

Contagion [from the Lat. *con*, "with," "together," and *tango*, to "touch"], the transmission, direct or indirect, from one person to another, of disease. If of a given number of healthy persons exposed to association with the sick, a larger proportion becomes ill than is observed among persons not exposed to this cause of disease, it is said to be

propagated by C. It was formerly called "common C." when the disease might possibly arise from some cause other than direct or indirect personal contact; while, if the characters of the disease are well marked, and traceable to no cause except infectious contact, it is said to be due to a specific C., which may be in some cases shown to be capable of reproducing the primary disease to an unlimited extent, being conveyed either through the secretions or through exhalations. Contagious diseases are sometimes epidemic, travelling from place to place, but there are epidemic diseases which are by no means contagious. No question in the etiology of disease is more difficult than that of the boundary line between contagious and non-contagious diseases; and, simple as the definition of the term may appear, the nature, conditions, and limitations of contagious influence are as yet almost unknown.

Contarini, kon-tah-ree'ne, the name of a noble family of Venice that produced numerous doges and senators.

Contempt [Lat. *contemptus*, from *contendere*, *contendendum*, to "despise"], in law, is a wilful disregard or disobedience of a public authority. By the const. of the U. S. each house of Cong. may punish its members for disorderly behavior, and with the concurrence of $\frac{2}{3}$ expel a member. The power to punish for C. is also possessed by either house of Cong. in cases where it has constitutional authority to exercise powers of a judicial character, as in determining the qualifications of members, etc.; but it has no right to inquire into the private affairs of citizens, and cannot, in such inquiry punish a witness for C. in refusing to answer.

Courts of justice have also an inherent power to punish all persons for C. of their rules and orders, for disobedience of process, and for disturbing them in their proceedings. This subject is often governed by statute.

Conti, kon'tee, de (FRANÇOIS). LOUIS DE BOURBON, PRINCE, a Fr. gen., b. in Paris 1604. He had so high a reputation for valor and other popular qualities that he was chosen king of Poland by a large party in 1697, but Augustus of Sax. obtained the throne. He received the command of an army in Flanders in 1709. D. Feb. 22, 1709.

Continent, a continuous or unbroken tract of land. The dry land is divided into several large bodies, or continents, and innumerable much smaller ones, or islands. As all are surrounded by water, the difference would seem, at first sight, to be only one of size. This, however, is incorrect. A C. is not simply a larger piece of land; it has a gen. structure found in all, but not in islands, which consists of 2 series of highlands of unequal height on 2 opposite borders, with one or more central depressions between. The C. of N. Amer., with the Pacific and Atlantic border highlands and the great central valley between, may be considered as a type. In S. Amer. the Andes on one side and the Brazilian and Guyana highlands on the other inclose the vast central plains of the Orinoco, Amazon, and La Plata. In Asia the main body of the C. is made up of the gigantic highlands of the Himalayas and Kuen Lun on the S. and the Thian Shan and Altai ranges of mts. on the N., between which stretch for 2000 m. the plains of E. Turkistan and Mongolia, 10,000 ft. below the mt.-tops. In Afr. and Australia also the highlands are near the border and the lower plains to the interior. Islands, even the largest, such as Borneo, New Guinea, or the Brit. Isles, have only one high border, and are but fragments of one of the neighboring C. As these border lines converge toward each other, all C. have a tendency to a triangular form.

Beside this similar fundamental structure, each C. has secondary features of configuration and a diversity of climate, plants, and animals which distinguish it from every other and give it a stamp of individuality. In this view we must recognize 6 C., each with a special character: N. and S. Amer. in the W. hemisphere; Asia, Europe, Afr., and Australia in the E. It is wrong, therefore, to speak, as is too often done, of N. and S. Amer. as one—the W. C. They are 2 well marked individualities, with certain common characters, which combined form the New World. It is erroneous to count Asia, Europe, and Afr., so unlike each other, as one—the E. C.—classing Australia, notwithstanding its continental structure, among the islands. (See EARTH.)

A. GUYOT.

Continental [originally applied in contradistinction to *provincial*; belonging to the whole Amer. continent, and not to any one prov. or colony], a term applied to the money and troops of the revolting colonies during the Revolutionary war. The "Continental Congress" was the Cong. of the colonies, and after the Dec. of Ind. it was the Cong. of the U. S. previous to 1788. It had only 1 house.

Continental System, a name given to Nap.'s plan for excluding Brit. merchandise from all parts of the continent of Europe. It commenced with the Berlin Decree (Nov. 21, 1806), which declared the Brit. Islands in a state of blockade, and treated as prisoners of war all Englishmen found in the terrs. occupied by the armies or allies of Fr. The Brit. ministers issued an "Order in Council," Jan. 1807, which prohibited all neutral vessels from entering any port belonging to Fr. or her allies.

Contract [Lat. *contraho*, to "draw together"], an agreement in which a party undertakes to do or not to do a particular thing. C. are distinguished, according to their form, either as contracts of record, specialties, or simple contracts. Contracts of record are such obligations as are evidenced by judicial records, as, for example, recognizances and judgments. Specialties are contracts under seal such as deeds, bonds, and covenants. Simple or parol C. include those agreements which are not comprised within the first 2 classes, and may be either oral or in writing. As regards the mode of their creation, C. are further distinguished as express or implied. They are express when stated by the parties thereto consenting in direct and formal terms; implied, when they derive their origin and validity from construction of law, as being of such a nature that reason and justice dictate their fulfilment. C. are still differ-

ently classified in reference to the time of their performance, as executed and executory. They are said to be executed when the obligations therein created have been already carried out; executory, when their fulfilment is yet to be accomplished. C. of every variety include 4 essential constituent elements—1, there must be appropriate parties; 2, there must be mutual consent to the terms of the agreement; 3, there must be a valid consideration, either actual or presumed; and 4, there must be a definite subject-matter to be acted upon. As regards the first point, all persons are capable of binding themselves by their contracts except certain important classes of individuals who labor under some natural infirmity, either from want of sufficient age (as infants), or from lack of requisite mental soundness (as idiots and lunatics), or who are placed arbitrarily under disability in consequence of their legal status (as married women). Drunkards, seamen, aliens, and bankrupts are also incapacitated in certain instances.

As regards the nature of the obligations which they assume, parties to C. may act either severally or jointly, or jointly and severally. The right to enforce agreements against others may also be either several or joint—that is, it may inhere in a single individual or in 2 or more collectively. No right of this kind, however, can be both joint and several at the same time, and in this respect it differs from the corresponding liability. Parties may also act on their own behalf, or in a representative capacity as agents or partners. For the purpose of making a C., a corporation, however numerous its members may be, is regarded as a single person. The second element of C., assent, is necessarily implied in the term "agreement"—a meeting of minds. Assent must be mutual, and have reference to exactly the same stipulations. There must not only be a proposal, but an acceptance, and if any modification in the terms of the original offer is made by the party by whom it is received, no C. is established.

The element of consideration is that which gives C. a legal, as distinguished from a moral, validity, for, as a rule, promises are not enforceable in law which do not rest on such a basis. The consideration is the cause of a C., the return for a stipulation, the price for a promise. It may be something actually rendered, as is requisite in nearly all simple C., or its existence may be conclusively presumed, as in negotiable paper which has passed into circulation, and in C. under seal. The care and deliberation with which the latter are usually formed are considered a sufficient substitute for an actual consideration.

The gen. principle in regard to the subject-matter of C. is, that parties may enter into agreements of any character they may choose. Certain important exceptions are, however, established on grounds of public policy. Thus, the subject-matter must not contemplate any illegal or immoral undertaking. Such agreements are necessarily nugatory, and if attempted to be enforced their illegality may be alleged as a valid defence. But when the terms of the parties' stipulations are not thus contravened, it is the object of the courts to arrive at the exact meaning of the language employed as expressing the intentions of the persons contracting, and to enforce all unfulfilled obligations thence resulting. For this purpose certain definite rules of interpretation and construction have been established, which are adapted to remove ambiguities and resolve uncertainties. These are principally applicable to agreements in writing. If the application of these shows a comprehensible agreement, and no defences alleged prove its invalidity or that its terms have been satisfied either wholly or in part, an adequate remedy will be given for its violation. In courts of law this consists of pecuniary recompense or damages for the injury sustained, while courts of equity, in proper instances, will decree a specific performance of the engagements undertaken.

Certain C. are required to be in writing, for the better prevention of fraud and convenience in proving their stipulations. This requirement depends upon the so called "statute of frauds." The prin. classes of agreements within its provisions are C. made upon consideration of marriage, C. to answer for the debt, default, or wrongful act of another, C. which are not to be performed within 1 yr., C. for the sale of any interest in land, and C. for the sale of personal property of a specified value—usually \$50 and upward. In all these cases the agreement, or some memorandum thereof, when written, must also be signed, or in some States subscribed, by the party charged therewith or his agent. In the sale of goods, the delivery by the seller and the acceptance by the purchaser of a portion of the goods will render a reduction of the contract to writing unnecessary.

The remedy upon C. by action at law is confined by "statutes of limitations" within certain prescribed periods after their maturity. The provisions generally made are that no action can be brought upon a simple C. after the lapse of 6 yrs., or upon sealed instruments after 20 yrs., from the time when they become due.

The const. of the U. S. provides that "no State shall pass any law impairing the obligation of C." Much discussion has arisen upon the effect of this prohibition. It has been decided that it applies as well to executed C. or grants as to those which are executory. Not only agreements between individuals, but with States, as the charters of corporations, confer privileges which are inviolable, unless there is some prior reservation of a power to make alterations.

T. W. DWIGHT.

Contrayer'va [Sp. *contrayerba*, a "counter-herb" or "antidote"], a drug once in repute as a diaphoretic and stimulant, derived from the root-stocks of 4 different species of *Dorstenia*, of the order Urticaceæ. *Dorstenia* C. is a perennial Mex. herb with irregularly-lobed leaves. *Dorstenia Houstonia* and *Dorstenia Drakena* also grow in Mex. The root-stock is about $\frac{1}{2}$ inch thick, sending out on all sides many slender fibres covered with small knots. It has an

aromatic odor, and a bitter, astringent taste. *Portulaca Brasiliensis*, a stemless species, with heart-shaped leaves and a circular receptacle, a native of the W. I. and Brazil, furnishes much of the C. of commerce. These plants have been represented as efficacious for serpent bites, and hence the name C., an "antidote," "like our "snake root," is given to many different plants.

Controller (originally written **Comptroller**. [Fr. *contrôleur*], an officer appointed to control or supervise the accounts of other officers, and to certify whether the matters confided to his care have been controlled or examined. In the State of N. Y. a C. is elected by the people. His title is written comptroller.

Contusion. See WOUNDS.

Convention-Parliament, in G. Brit., a parliament convened without the authority of the sovereign, when the crown is in abeyance. Two C.-P. have occurred—the first met in Apr. 1690 and restored Charles II. to the throne; the second met in 1688 and declared that King James II. had abdicated the crown, which was transferred to William and Mary.

Conversion [from the Lat. *con*, intensive, and *verso*, *versum*, to "turn"], in metallurgy, the process by which steel is produced from iron or from iron carbide (cast iron). Iron is converted into steel by long heating in contact with carbon. Cast iron is converted by "puddling," or by the process of Bessemer.

Conversion, in law. This word has two significations; 1. In equity jurisprudence it means the theoretical change of land into money or money into land. The will of an owner of property thus to change it, expressed in legal forms, is in some instances equivalent to an actual change, as where a testator directs his land to be sold and converted into money. It is deemed to be sold from the moment of his death, and to have the qualities of personal property. This is termed *equitable U.* 2. In the law-courts the word "conversion" is applied to an unauthorized exercise of acts of ownership over the personal property of another. It is deemed to be a wrong or "tort," and the owner of the property may either reclaim it or treat the wrong-doer as having become owner and recover the value of it. C. lies at the foundation of the common-law action of trover, which word is derived from the Fr. word *trouver*, to find. There is a legal fiction that the defendant found the plaintiff's property and converted it to his own use. The material part of the case is the C. To constitute a case of C. it is not necessary that there should have been any intent to deprive the owner of his interest. It is enough if there were an intent to appropriate the goods or to exercise an act of ownership over them, even though that were done in entire ignorance of the owner's right. T. W. DWIGHT.

Convocation. See APPENDIX.

Convolvulaceæ [from *Convolvulus*, one of the genera], a natural order of exogenous plants which mostly have twining stems and a milky juice. It comprises nearly 700 known species, many of which are natives of tropical countries, and have beautiful flowers with 5 stamens. The corolla is monopetalous, and the fruit a capsule. The roots of some species possess purgative qualities, as jalap (*Eriogonum purga*). Among the valuable products of this order is the sweet potato. Some of the species are cultivated for the sake of the flowers, as the *Ipomœa purpurea*, or morning-glory.

Convolvulus [from the Lat. *con*, "together," and *volvo*, to "roll"], a genus of plants of the natural order Convolvulaceæ, containing many species, herbaceous or shrubby. The stems are usually twining, the flowers often large and of various beautiful colors; the fruit a capsule, somewhat succulent. Some are cultivated as ornamental plants. The *C. scammonia* yields scammony. *C. scoparius*, a shrubby species, native of the Canary Isles, yields the "oil of rhodium" and one of the kinds of wood called rosewood, which has an odor somewhat like that of roses. The original genus is for convenience divided into several sub-genera. Most of the genuine species belong to the Old World. The showy morning-glories, etc., chiefly Amer., belong to *Ipomœa*.

Convoy [Fr. *convoy*, from *convoier*, to "carry" or "conduct"], a name given to one or more ships of war employed to protect a fleet of merchant vessels against an enemy. If a ship part company with the C. or neglect to obey the signals, all claims for insurance are forfeited. C., in the military service, is a train of wagons laden with provisions or warlike stores, or a detachment of troops appointed to guard such a train.

Convulsions [from the Lat. *convellere*, *convulsus*, to "pull violently"], an acute nervous affection occurring in paroxysms, during which the patient loses consciousness, the muscles of the body are spasmodically contracted, and the limbs first stiffened and twisted, then agitated by irregular involuntary movements. The face is distorted, the eyeballs rolled upward, the teeth clinched, biting the tongue, which protrudes at the beginning of the attack. Respiration is arrested by the stiffening of the chest-muscles and by closure of the glottis; the patient grows black in the face, and froth oozes from the mouth, and sometimes from the nostrils; the veins of the neck swell. After some time the muscles relax again, respiration is restored, the agitation of the limbs ceases, the patient either returns entirely to consciousness or falls into a heavy sleep, which may last several hours. C. occur in diseases of the nervous centres; in diseases of other organs of the body that transmit irritation to these centres; finally, in morbid conditions of the blood which interfere with their nutrition.

C. dependent on transmitted irritations occur principally in children. They may occur spontaneously, owing to a congenital predisposition, or they may be excited by inflammation of the gums in dentition, by indigestion, by worms, by the invasion of acute diseases, as pneumonia or eruptive fevers; by some accidents, as extensive burns. Women in childbirth are liable to C. of a similar character, more frequently, however, associated with an alteration of the

blood that is liable to occur during pregnancy, and due to transient kidney disease (nephritis). They occur also in genuine nephritis or Bright's disease, and in that which often complicates the second and third stages of scarlet fever. Any C. may prove fatal if the arrest of respiration be sufficiently prolonged.

The treatment of C. may sometimes be addressed exclusively to the cause. In the other cases, where life is liable to be endangered by the duration or rapid repetition of convulsive attacks, these urgently demand relief. Compression of the carotids has been used principally in idiopathic epilepsy. Cold applications are used for the same purpose. Venesection may be indicated by extreme lividity of the face and distension of the veins of the neck. It is most often needed in puerperal C. Large doses of chloral are especially useful for infantile C., or for those of scarlet fever, or during the interval of attacks to prevent their renewal. The warm bath may be used in nearly all cases, except perhaps in puerperal C., where it may be contra-indicated by the difficulty and danger of moving the patient.

An hysterical C. may be treated with the nervous stimulants formerly called antispasmodics, especially assafoetida, valerian, ether (internally). [From orig. art. in *J.'s Univ. Cyc.*, by PROF. ABRAHAM JACOB, M. D.]

Con'way (THOMAS), COUNT DE, a gen., b. in Ire. in 1733, removed to the U. S. in 1777. He became a brig.-gen. in the Amer. army; was a partisan of Gen. Gates, and took an active part in the intrigues against Gen. Washington; afterward entered the Fr. service, became a count, a field-marshal, and gov. of the Fr. E. I. D. about 1800.

Co'ny, an animal mentioned in the Bible, is supposed to be the same with the HYRACIDÆ (which see).

Cony (SAMUEL), a lawyer, b. at Augusta, Me., Feb. 27, 1811, grad. at Brown Univ. in 1829; was a judge of probate 1840-47, and gov. of Me. 1864-67. D. Sept. 5, 1870.

Conybeare, KUN'E-bair (JOHN), b. at Pinbay, Eng., Jan. 31, 1692, became bp. of Bristol in 1750. He wrote a *Defence of Revealed Religion*, in answer to Tindal. D. July 13, 1755.

Cook (CHARLES), D. D., a Wesleyan divine, chief founder of Methodism in Fr., b. in Lond. in 1787; entered the Wesleyan ministry in 1817, went to Fr. in 1818, travelled there, founding Meth. societies and aiding in the revival of the Huguenot chs. till his death in 1858.

Cook (CLARENCE CHATHAM), a journalist and art-critic, b. at Dorchester, Mass., Sept. 8, 1828; graduated at Harvard in 1849, and studied arch. in the office of A. J. Downing and Calvert Vaux at Newburg. In 1863 he contributed to the *New York Tribune* a series of articles on Amer. art, based upon the exhibition of pictures at the New York Sanitary Fair of that yr. In 1869 he went as correspondent of the *Tribune* to Paris, but resigned that position upon the outbreak of the Franco-Ger. war, passed some time in It., and on his return to Amer. resumed his former connection with the *Tribune*. Wrote *The Central Park* and the text to accompany Dürer's *Life of the Virgin*, and was one of the assistant eds. of *J.'s Univ. Cyc.*

Cook (CAPTAIN JAMES), an Eng. navigator, b. of very poor parents at Marton, Yorkshire, Oct. 27, 1728. He entered the navy in 1753, and served as master of a sloop at the capture of Que. in 1759. He commanded an expedition sent to the S. Pacific in 1768 to observe the transit of Venus. After he had observed the transit with success on the island of Tahiti, he visited New Zealand and explored the coast of New S. Wales. In 1772 he conducted another exploring expedition in order to discover the *Terra Australis*, a continent supposed to exist in high S. lats. He circumnavigated the globe, discovered the island of New Caledonia, and penetrated southward as far as 71° S. lat., but did not find the *Terra Australis*. In July 1776 he sailed on a third voyage, the object of which was to discover a N. W. passage by way of Bering's Strait. He discovered the S. I. in 1778, and explored Bering's Strait. Having returned to Hawaii to pass the winter, the natives of that island stole one of his boats. Capt. C. with a few men went on shore to recover it, and was killed by the savages Feb. 14, 1779. (See A. KIPPIS, *Life of Capt. James Cook*.)

Cook (REV. JOSEPH), A. M., b. Jan. 26, 1838, at Ticonderoga, N. Y., grad. at Harvard Univ. in 1865; studied theol. at Andover Sem. and in Ger.; wrote *Boston Monday Lectures*, *Biology*, and *Transcendentalism*.

Cooke (AMOS STARR), REV., a Congl. missionary, b. in Danbury, Conn., in 1810, grad. at Yale in 1834. Entered the service of the Amer. Board of Foreign Missions, and reached the S. I. in Apr. 1837. In that yr. he took charge of the education of the royalty and nobility of the realm, and exerted a controlling influence in shaping the character of the rising kings and nobles; the last 3 Kamehamehas were ed. by him. D. Mar. 20, 1871.

Cooke (EDWARD), D. D., b. at Bethlehem, N. H., Jan. 19, 1812, grad. at Middletown in 1838; in 1864 was elected prin. of the Wesleyan Acad., Wilbraham, Mass., one of the oldest Meth. literary insts. in Amer.

Cooke (JAY), a financier, b. in Sandusky, O., Aug. 10, 1821, went to Phila. in 1838, and became a clerk in the banking-house of E. W. Clark & Co., and afterward a partner. He established the firm "Jay Cooke & Co." in 1861, and became well known as a successful govt. agent for the war-loans during the c. war.

Cooke (JOSIAH PARSONS, JR.), a chemist, b. at Boston, Mass., Oct. 12, 1827, grad. at Harvard in 1848. He became in 1851 Erving prof. of chem. and mineralogy in Harvard Univ. Wrote *Chemical Physics*, *Religion and Chem.*, and *Principles of Chemical Philos.*

Cooke (NICHOLAS), b. at Providence, R. I., Feb. 3, 1717, deputy-gov. of his native State in 1775, and gov. 1775-78; was a personal friend of Gen. Washington. D. Sept. 14, 1782.

Cook'man (GEORGE G.), an eminent pulpit-orator of the M. E. Ch., b. at Hull, Eng., 1800. While engaged in business he was a local preacher in the U. S., and afterward in Eng. Having returned to the U. S. in 1825, he entered the itiner

ant ranks in 1826, and soon became distinguished as a preacher of great ability and success; was chaplain to the House of Reps. 1838-39. He was lost at sea on the steamer *President*, which left N. Y. for Liverpool Mar. 11, 1841.

Cooley (THOMAS M.), a jurist, b. at Attica, N. Y., Jan. 6, 1824, removed to Mich. in 1843, and became a lawyer in 1846. Author of legal reports, digests, and compilations. He became prof. of law in Mich. Univ. in 1850, a justice in the supreme court of Mich. in 1864, and chief-justice in 1867.

Coollidge (CARLOS), LL.D., a lawyer, b. at Windsor, Vt., in 1792, grad. at Middlebury in 1811, became gov. of Vt. 1849-51. D. Aug. 15, 1866.

Cooley, or **Coollie**, a Hindostanee word of Arabic origin, signifying a "slave" or "common laborer," has of late been applied to emigrants from India and Chi., who have superseded the negroes in large numbers since the abolition of slavery in the W. I.

Coontie, or **Coont'a** [an Indian word], the popular name of the *Zamia integrifolia*, a plant of the natural order Cycadaceæ, a native of S. Fla. Its stem abounds in starch, from which a part of the Fla. arrowroot is prepared. Other species of the genus are cultivated in the Bahamas and in Asia for their starch, which, however, is usually classed as sago. Fla. once produced great quantities of this commodity, of which the quality is often excellent.

Cooper (ANTHONY ASHLEY). See SHAFESBURY.

Cooper (SIR ASTLEY PASTON), F. R. S., LL.D., D. C. L., an Eng. surgeon, b. at Brooke, in Norfolk, Aug. 23, 1768; became prof. of anatomy at Surgeon's Hall in 1792, and surgeon to Guy's Hospital in 1800. He gained distinction by a work on hernia (1804-07), and practised surgery in Lond. His annual income is said to have amounted to £21,000. Wrote *The Principles and Practice of Surgery*. D. Feb. 12, 1841. (See B. B. COOPER, *Life of Sir Astley P. Cooper*.)

Cooper (JAMES), b. in Frederick co., Md., May 8, 1810, grad. at Washington Coll., Pa., 1831; studied law, was a rep. in Cong. from Pa. 1839-43, and a leading opponent of the reparation movement in Pa. in 1847; was atty-gen. of Pa. in 1848, U. S. Senator 1849-53, appointed brig-gen. of U. volunteers in 1861. D. Mar. 28, 1863.

Cooper (JAMES FENIMORE), a novelist, b. at Burlington, N. J., Sept. 15, 1799, was a son of Judge William Cooper. The latter removed to Otsego co., N. Y., about 1790, and founded Cooperstown. Young C. entered Yale in 1802, and became a mdpn. in the U. S. N. in 1806. In 1811 he quitted the naval service. In 1822 he produced *The Spy, a Tale of the Neutral Ground*, which had great success, was republished in various parts of Europe, and translated into several langs. This was followed by *The Pioneers*, *The Pilot*, *The Last of the Mohicans*, *The Red Rover*, *The Pathfinder*, *Afloat and Ashore*, and *Oak Openings*. D. Sept. 14, 1851.

Cooper (MYLES), LL.D., Oxon., an accomplished scholar, second pres. of King's Coll. (now called Columbia Coll.), New York, b. in Eng. in 1735, and ed. at Ox.; came to Amer. in 1762, as assistant to Dr. Samuel Johnson, first pres. of King's Coll., and was made pres. in May 1763. In the revolt of the colonies he remained loyal to the Crown, and was compelled to flee the country. He became one of the ministers of the Eng. chapel in Edinburgh. D. May 1, 1785.

Cooper (PETER), LL.D., a manufacturer, inventor, and philanth., b. in New York Feb. 12, 1791. His early life was one of labor and struggle, as it is with most of the successful men in this country. He commenced in early boyhood to help his father as a manufacturer of hats. He attended school only for half of each day for a single yr., and beyond this very humble instruction his acquisitions were all his own. At the age of 17 he was placed to learn the trade of coachmaking, and completed his apprenticeship to the satisfaction of his master. The foundation of Mr. C.'s fortune was laid in the opportune invention of an improvement in machines for shearing cloth. This was largely called into use during the war of 1812 with the Eng., when all importations of cloth from that country were stopped. The machines lost their value, however, on the declaration of peace. Mr. C. then turned his shop into the manufacture of cabinet-ware. He afterward went into the grocery business in New York, and finally he engaged in the manufacture of glue and isinglass. Mr. C. in 3 particulars—as a capitalist and manufacturer, as an inventor, and as a philanthropist—was connected with some of the most important and useful accessions to the industrial arts of this country, its progress in invention, and the promotion of educational and benevolent institutions intended for the people at large. In 1830 he erected works for the manufacture of iron in Canton, near Baltimore. Subsequently he erected a rolling and a wire mill in the city of New York, in which he first successfully applied anthracite to the puddling of iron. In 1845 he removed the machinery to Trenton, N. J.; in these works he was the first to roll wrought-iron beams for fire-proof buildings.

While in Baltimore, Mr. C. built, in 1830, after his own designs, the first locomotive engine ever constructed on this continent. Next we find Mr. C. taking great interest and investing large capital in the extension of the electric telegraph, serving as pres. or director of several telegraph cos., and he took part actively in the first expedition that laid the Atlantic cable in 1854. Before the water was let into the Erie Canal it was a question what was the best propelling power for the boats to be employed on the canal. Mr. C. then made an experiment of propelling a boat by means of an endless chain 2 m. long, supported on posts and rollers, which was driven by the force of elevated water, and might be driven by any other power. By means of this he propelled a boat 2 m. in 11 minutes. This method of propulsion has since been successfully and very usefully applied in passing boats through the locks of the Del. and Raritan Canal.

Mr. C. has served in the New York common council, and also as a school com. But the most cherished object of Mr. C.'s life, early conceived and faithfully carried out as soon

as his means permitted, was the establishment of an inst. for the instruction of the industrial classes, during their leisure from work or in the evenings, when they might obtain higher attainments in the practical arts in which they happened to be engaged, or learn some industrial pursuit they might desire. Accordingly, in the yr. 1854 he laid the corner-stone of a large building at the junction of the 3d and 4th avenues in New York, "to be devoted forever to the union of art and science in their application to the useful purposes of life," where instruction free of charge has been given since to many thousands of pupils in math., practical engineering, practical chem., natural philos., and every branch of drawing and painting. Beside these free schools, there is a large free reading-room and library for the use of all comers.

On May 18, 1876, the Independent party nominated him for Pres. of the U. S., and he received nearly 100,000 votes. D. Apr. 4, 1883. [From orig. art. in *J.'s Univ. Cyc.*, by J. C. ZACHOS, *Curator of Cooper Union*.]

Cooper (THOMAS), M. D., LL.D., a natural philos., phys., and lawyer, b. in Lond. Oct. 22, 1759. He accompanied Dr. Priestley to the U. S. in 1792. In 1820 he was chosen pres. of S. C. Coll. at Columbia. D. May 11, 1839.

Co-operation (from the Lat. *co* (com), "together," and *operor*, *operatus*, to "work"), the name given to attempts made within the last 45 yrs. to introduce into the ordinary avocations of life principles which should bring about a beneficial change in the organization of society. The systems propounded by St. Simon, Fourier, and Owen had the common character of claiming to be a code by which the whole life of man should be transformed, and a state of order and prosperity take the place of our present imperfect civilization. Louis Blanc proposed to start from things as they are, and suggested a scheme by which govt. should take upon itself the regulation of industry and the task of putting an end to the evils of competition. To effect this, govt. should raise a loan, the products of which were to be applied to the creation of social factories in every important branch of national industry. The govt. should draw up the regulations, which should be discussed and voted for by the reps. of the people. Every workman of good character should be admitted to labor in these factories, so far as the cap. would admit, the wages of all to be the same. During the first yr. of the existence of any factory, govt. should regulate the hierarchy of functions; after that, this should be regulated by the workers themselves. Every yr. the profits should be divided into three parts: the first to be equally distributed among all the members; the second to be for the support of the sick, aged, and infirm, and for special aid to any branch of industry which should temporarily require it; the third to be devoted to furnish means of work to those who desire to join the association. Capitalists might be admitted, and receive interest, which should be guaranteed, but should not share in the profits except as workers. This gen. idea of the organization of labor, divested of some of its less practicable features, and with the addition of others, has been carried out to some extent in Europe and the U. S. It was early perceived that if workers were to live by the sale of articles which they could not eat, a market must be found for these sales. This led to the organization of co-operative stores by the union of consumers, who furnish the cap. and divide annually among themselves the profits arising from the sales, the ordinary selling price being fixed upon each article, thus practically doing away with those middlemen who, producing nothing, stand between the producer and the consumer and absorb much of the product. More actual progress has indeed been made in organizing the distribution than the production of articles of supply, although the latter has been attempted with encouraging success. This co-operative system has this radical distinction from the socialist and communist associations, that the net proceeds of one's labor belong to each member, to be disposed of at pleasure, instead of constituting a common fund belonging to the collective body. [From orig. art. in *J.'s Univ. Cyc.*, by HON. THOMAS HUGHES.]

Cooperstown, on R. R., cap. of Otsego co., N. Y., at the S. end of Otsego Lake, 69 m. W. of Albany. It has an acad. Pop. 1880, 2199.

Cooper Union. See COOPER (PETER).

Coosa, a river of the U. S., formed by the Etowah and Oostaula, which unite at Rome, Ga. It crosses the E. boundary of Ala., flows S. W., then S., until it unites with the Tallapoosa; the stream thus formed is the Alabama River. Length of the C. estimated at 350 m.

Coos Bay, the prin. seaport of S. Or. Its entrance is good, and its bar has 14 ft. of water at high tide. The Coos River flows into it. The bay is important chiefly for its tertiary lignitic coal, which is found on the S. side over a large area. Pop. 1880 of Coos City precinct, 307.

Coot, a name in Eng. generally applied to the *Fulica atra*, a wading bird allied to the rails and to the *Fulica americana* of N. Amer. The name should be restricted to this country. It is, however, applied in Amer. to several ducks. Among these are the box C. or surf duck of the E. and W. coasts of N. Amer., the broad-billed C., the white-winged C. or velvet duck, and other species. In the S. the name is given to the sora rail (*Ortygometra caroliniana*).

Copaíba [a word of Brazilian origin], **Balsam** of, a stimulant, diuretic, oleo-resinous drug, which has decided value in diseases of the mucous membrane, is obtained chiefly from Pará in Brazil, though the trees which produce it grow extensively in many parts of tropical Amer. These trees are of many species or varieties, belonging to the genus *Copaifera* and the order Leguminosæ.

Copal [a term of Mex. origin], applied to several resins used in preparing varnishes. The C. of commerce is usually a nearly colorless substance imported from tropical Amer., India, and E. and W. Afr. The Amer. C. comes from leguminous trees of the genus *Hymenoclea* and allied genera. Zanzibar C. is the best.

Copan', a ruined city of Central Amer., in Honduras, on the Copan River, about 30 m. E. of Chuquimula. The remains, which extend nearly 2 m. along the river, comprise a temple 624 ft. long and several pyramidal structures, with sculptured idols resembling those of the anc. Egyptians. (See STEPHENS, *Central Amer.*)

Co-partnership. See PARTNERSHIP.

Cope (EDWARD DRINKER), a naturalist, a grandson of Thomas P. Cope, noticed below, b. in Phila. July 28, 1840. In 1864 he was appointed prof. of natural science in Haverford Coll., which position he resigned on account of ill health in 1867. Wrote *Systematic Arrangement of the Lacertilia and Urodela* and of the *Class Reptilia*, *On the Hypothesis of Evolution*, *Physical and Metaphysical*, and *The Extinct Vertebrata of the Eocene Formations of Wyo.*, describing many of the most remarkable types of Mammalia ever discovered, being the oldest known from the tertiary formations.

Cope (THOMAS FYM), a merchant of Phila., b. in Lancaster co., Pa., in 1768. He commenced business in Phila. in 1790, and in 1821 established the first line of packets between that city and Liverpool; took a leading part in procuring the supply of water from the Schuylkill and in the establishment of the Mercantile Library. D. Nov. 22, 1854.

Copece', or **Copeck**, a Rus. coin. They were originally made of silver, but afterward of copper. The value of the C. at present is equal to one one-hundredth part of a ruble.

Copenhagen [Dan. *Kjøbenhavn*, i. e. "merchants' haven"], the cap. of Den., partly on the E. coast of the island of Seeland and partly on the island of Amager, in lat. 55° 40' N., lon. 12° 34' E. It has a spacious harbor, and is the chief naval station of Den. It was formerly strongly fortified, but the walls have been partially demolished, and the ditches filled up and transformed into a promenade. Among its places are the Rosenborg and the royal palace. There are several fine chs.; the Erue Kirke, or metropolitan ch.; St. Peter's, the Ger. ch., with a spire 250 ft. high, and the ch. of the Saviour, with a spire of 288 ft. The Univ. has a library of 300,000 vols. The fine museum for natural objects has 2 observatories and a botanic garden. There is a royal library containing 400,000 vols. and 15,000 MSS. The Museum of N. Antiquities is unique; Thorwaldsen's Museum consists of 4 buildings, in which originals or casts of all his works are exhibited. C. is the great centre of N. lit. and art. It was founded in 1168, became the cap. of Den. in 1443, and in 1807 was bombarded by the Brit. for 3 days. Pop. 1880, 234,850. (with suburbs, 273,323).

Copernicus System, The, the correct explanation of the gen. plan of the solar system. Up to the time of Copernicus astrons. regarded the earth as the prin. body of the system, and supposed that the other bodies revolved around it; they explained the irregularities of apparent motion by a complex system of eccentrics and epicycles. Copernicus adopted the simpler idea that the sun was the central body, and that the earth was a planet revolving around it like the other planets.

Copernicus (NICOLAS), a Polish astron., b. Feb. 19, 1473. He studied in It. and was prof. of math. at Rome in 1501. His great work, *De Orbium Cœlestium Revolutionibus*, was not pub. till the yr. of his death. D. June 11, 1543.

Copley (JOHN SINGLETON), an historical and portrait painter, b. in Boston, Mass., July 3, 1737. He visited It. in 1774, settled in Lond. in 1776, and became a member of the Royal Acad. in 1783. *The Death of Lord Chatham* is called his masterpiece. D. Sept. 25, 1815.

Coppée (HENRY), LL.D., b. Oct. 15, 1821, at Savannah, Ga., grad. at W. Pt. 1845, was lieut. of artil. till he resigned, June 30, 1855. He served in the war with Mex.; was prof. of Eng. lit. and hist. in the Univ. of Pa. 1855-56; wrote *Elements of Logic* and of *Rhetoric* and several military works; compiler of *Songs of Praise in the Chr. Centuries*, and in 1866 became pres. of Lehigh Univ., Bethlehem, Pa.

Copper [Lat. *cuprum*; Ger. *Kupfer*; Fr. *cuivre*], an elementary metallic substance, was known at a very early period. Before iron was used it was the prin. ingredient in domestic utensils and weapons of war. C. is distinguished from all other metals by its peculiar reddish color. It is very ductile and malleable, and requires a temperature somewhat lower than gold but higher than silver for its fusion. Next to silver it is the best known conductor of electricity. The specific gravity of C. is between 8.91 and 8.95; atomic weight, 63.5. It is very hard, elastic, and tough, with a tenacity only less than that of iron. The prin. ores of C., beside the native metal, are the sulphides of C. either alone or combined with other metals, oxidized C. ores, and C. salts. It is found also in small quantities in most soils, in sea-weed, and in the animal body. C. forms 2 oxides, the protoxide and the suboxide. The blue vitriol so extensively used in dyeing and calico-printing is sulphate of C. The alloys of C. are of great value. Brass is C. alloyed with from 25 to 34 per cent. of zinc; gun-metal consists of 90 parts of C. and 10 of tin; bell and speculum metals contain a larger proportion of tin. Bronze is sometimes made of 91 parts of C., 2 parts of tin, 6 parts of zinc, and 1 part of lead. C. is found in G. Brit., Australia, S. Amer., and Cuba. It exists in great quantities on the shores of Lake Superior.

Copperas, the commercial name of the hydrated protosulphate of iron, sometimes called "green vitriol." It is used in med., in the dyeing of black, and in making ink.

Copperhead (*Ancistrodon contortrix*), a venomous serpent of the rattlesnake family, furnished with loral plates on the head, but without rattles. When full grown it is about 3 ft. long, of a light copper color, with darker transverse bars. It has many local names, is nowhere abundant, but is more common in the S. than in the N. States. Its bite is much dreaded and often fatal.

Copperhead, a name which was applied to a party in the N. States of Amer. supposed to favor the secessionists during the c. war which divided the U. S. from 1861 to 1865. The epithet was given because this party was regarded as an insidious and secret foe to the U.

Copper-Mines. See MINES AND MINING, by PROF. F. L. VINTON, E. M.

Copper-Smelting. See METALLURGY, by PROF. J. A. CHURCH, E. M.

Coprolite [from the Gr. *κόπρος*, "dung," and *λίθος*, a "stone"], a name given to the fossil excrement of animals. It was originally applied to certain deposits found in the lias and determined to be the fossil remains of the gigantic saurians of that period. The term has since come into universal use, owing to the discovery of similar large deposits in rocks of various ages. The true C. of the lias are formed like kidney potatoes, of earthy texture, black or ash-gray color, and glassy fracture. They are twisted, showing the mark of the intestine. Beside the C. of the lias, phosphatic nodules bearing the same name, but far more abundant, have been found. The value of these minerals is derived from the phosphate of lime of which they are partly composed. It is used with great advantage as manure.

Copt [Ar. *Ghipt* and *Kooht*; Coptic, *Kibt*; Fr. *Copte* or *Coptite*; Ger. *Kopt*; probably derived from the root of the last syllable of *Egypt*]. The Copts are a Chr. people of Egypt, descended from the anc. inhabs., their blood being, however, mingled with that of Grs., Arabs, and Nubians. Their numbers have been officially estimated at 500,000. The Coptic Church proper is under the patriarch of Alexandria, who has resided at Cairo since the 11th century. It is monophy-site, has 7 sacraments, baptizes infants by trine immersion, and circumcises male children. Its liturgy is in the Coptic lang., which few even of the priests now understand. There are also a few "United Copts," who acknowledge the supremacy of the pope, and are nominally under a patriarch of Alexandria, who resides at Rome. The Gr. or "Melchite C." have also a patriarch at Alexandria. The Coptic lang. is supposed to be derived from the anc. Egyptian, with a large admixture of Gr. and Ar. words. It prevailed in Egypt until the 10th century. The alphabet is taken mainly from the Gr., with some additional characters for sounds not existing in that lang. The lit. consists of homilies, lives of the saints, and versions of some parts of the Scriptures. (See the Egyptian Grammar of the celebrated Champollion, and Peyron's and Benfey's grammars of Coptic lang.)

Cop'way (GEORGE), a chief of the Chippewa tribe of Indians: pub. the *Acts of the Apostles* and a *Hist. of the Ojibway Nation*.

Cocuil'la-Nuts [Sp. *coquillo*, a diminutive of *coco*, "cocoa-nut"], the seeds of *Attalea funifera*, a S. Amer. palm. The shells of the seeds or nuts are hard, have a close texture, and are susceptible of a fine polish. This shell is much used in turnery for the heads or handles of umbrellas, for toys and ornamental articles.

Coral [Gr. *κοράλλιον*; Lat. *corallum*], a calcareous secretion of various polyps (alcyonarians, actinarians, and madre-pores), and of certain tabulate aculeates. Carbonate of lime constitutes the prin. chemical ingredient. It is an important factor in the accretion of lands in tropical regions. The Fla. reefs are also based upon C., and along parts of the coast of Brazil the reefs are very dangerous to navigation; but it is in the Pacific and Indian oceans that the C. formation is most important. Among the more remarkable kinds may be mentioned the red C. (*Corallium rubrum*) of the Mediterranean and Red Sea, which is of value in the manufacture of ornaments; the black C. (*Antipathes*), the *Millepora*, etc. (produced by aculeaphs, and not by polyps), the tree C., the Meandrinae, etc., called brain C., the Astræas or star C., the Madreporæ, and many others.

Coral Islands are among the most striking phenomena of the tropical seas. Whitsunday Island, in the Low Archipelago in the midst of the Pacific, may serve as an example. Rising a few ft. above the surface of the ocean, it forms a narrow unbroken ring, nearly circular, which surrounds a central lagoon of shallow water. When approaching it from the windward side, the voyager first perceives the line of angry surf breaking on the white beach of coral sand, in strong contrast with the deep-blue color of the sea. Behind, a garland of luxuriant verdure, its tropical forms enhanced by the noble cocoa-nut palm, extends around the island, inclosing the quiet waters of the lagoon; beyond, the broad ocean again. The island of Natuspe, in the same archipelago, is likewise unbroken, but elongated and much larger, the longer axis measuring some 12 m. Usually, however, the ring is broken by numerous channels, affording entrances into the lagoon, and transforming the ring into a circular line of islands or reefs inclosing the lagoon. Such a group is called an *atoll*, a local name in the E. I., which has been adopted to designate these curious structures. Soundings have proved that the lagoon is always shallow, seldom exceeding a few scores or hundreds of ft. in depth, while outside of the atoll the depth rapidly increases to thousands of ft. at a short distance from the shore, showing that such an atoll is only the top of a large submarine mountain. Atolls are often clustered together in great numbers, and form archipelagoes. That of Paumotu, or Low Archipelago, counts 80 C. I., having nearly all central lagoons. The Caroline (together with the Tarawan and Marshall) Islands contain 84 atolls. The Laccadives and Maldives are 2 long series of atolls, in a double row, stretching 800 m. from N. to S., from the S. W. extremity of India, and continued still farther S. in the Chagos Archipelago.

The low islands are associated with the high in a peculiar



Red Coral.

and very interesting way. A large number of volcanic islands in the Pacific are girdled by coral reefs, forming either a fringe near the shore or a barrier around the island at a distance in the sea, leaving between a lagoon often miles broad, and communicating with the outer ocean by deep channels. Bolabola, one of the Society Islands, offers a beautiful example of such a combination. From its high volcanic top the eye, stretching over the quiet waters of the surrounding lagoon to the outer garland of green islands which separates it from the ocean beyond, beholds a spectacle as strange as it is lovely. That arrangement, in fact, differs from an atoll only in having the centre of the lagoon occupied by one or more mountain-tops. A. GUYOT.

Coralline [so called from their resemblance to the corals, to which they were formerly referred], the name of certain plants classed with the red algae, and usually referred to the order Corallinaceæ. They constitute the genus *Corallina* and several other genera. These plants differ from all others in being of a rigid, stony character, and from the presence (in most species) of a large proportion of carbonate of lime.

Coralline, a dyestuff. See ROSOLIC ACID.

Corcoran (W. W.). See APPENDIX.

Cordey d'Armands, de MARIE ANNE CHARLOTTE, b. in Normandy in 1768, and ed. in a convent, was pious, intellectual, and enthusiastic. She sympathized with the Girondists, who were proscribed in May 1793. Having resolved to kill Marat for the public good, she came to Paris, and was admitted to his house. She found him in a bath, and plunged a knife into his heart July 13, 1793. She was guillotined a few days after. "In beholding her act of assassination," says Lamartine, "history dares not applaud; nor yet, while contemplating her sublime self-devotion, can it stigmatize or condemn." (See CHÉRON DE VILLIERS, *M. A. Charlotte de Cordey d'Armands, sa Vie, &c.*)

Cordeliers, or **Cord-Wearers** [from Old Fr. *corde*, a "cord" or "rope," so called from their girdles of knotted cord], a minor order of Franciscan or Gray Friars, was founded by St. Francis of Assisi in 1223.

Cordeliers' Club, a society of republicans formed at Paris in Dec. 1790, received this name because their meetings were held in a chapel built by the Cordeliers. Danton was the first pres. The society was dissolved in 1794.

Cor'dova [Sp. *Coridoba* or *Cordova*; anc. *Colonia Patricia*], a city of Sp., on the river Guadalquivir, 71 m. N. E. of Seville, with which it is connected by a R. R. The river is here crossed by a stone bridge of 16 arches built by the Moors in the 8th century, and defended by a Saracenic castle. The cathedral, originally a mosque, founded in 786 A. D., presents a labyrinth of columns of many orders, brought from various anc. temples. The anc. *Corduba*, built 152 B. C. by the Romans, was second only to Gades among the cities of Hispania. It was taken by the Moors 672 A. D., was long the cap. of the W. caliphs, and in the 10th century contained nearly 1,000,000 inhabs. It was captured and almost destroyed by Ferdinand III of Castile 1236. Pop. 49,855.

Cor'dova, de (FERNANDO FERNANDEZ), a Sp. gen., b. at Madrid in 1792. Was an opponent of Espartero in 1841, and became capt.-gen. of Cuba in 1851. He was exiled by revolution of July 1854, and returned to Sp. in 1856.

Core'a [native, *Cho Sen*, i. e. "morning brightness"], a peninsula, reaching down from the mainland between Chi. and Japan, borders on the N. the prov. of Mantchooria, touches Rus. Asia in the N. W.; on the E. coast is the Corean Archipelago with its numberless islands, on the W. and S. W. the Japan Sea. C. was settled by an overflow of the people inhabiting the belt of country from which the Huns and the Mantchoos swarmed, and is believed to be the parent country of Japan, the Coreans being very different from the Chi., and resembling the Japanese in phys. structure and religion. For centuries they have excluded foreigners, the Coreans being a suspicious people; through a little port on the E. they trade with Chi., through 2 other small ports with Japan. The S. portion is densely populated, the N. sections sparsely inhabited. From Chi. the Coreans have derived the Confucian system of ethics, the Chi. classics, and Buddhism. Formerly C. was divided into 3 kingdoms or provs., which were constantly at war with each other, but about the yr. 960 the peninsula became a political unit, and the division into 8 provs. was made. At present C. is in a ferment; her people want to know about steam and electricity, and there is a powerful party in favor of intercourse with the outside world.

The houses of the common sort are built with 3 rooms—a gen. gathering room, the women's apartment, and the kitchen; it is death for a man to enter the women's apartment. Marriage is conducted through a marriage broker, and a goose is the prin. gift. Corean etiquette centres around marriage and burial as the 2 chief events in life. Between the hours of 8 and 1 o'clock at night no male citizen is allowed to be out of doors, and is punished if found abroad, but the women may roam about as they please. Torture prevails, and barbarous modes of punishment are common. Corean art is beautiful; Japanese art is based upon it. In 1871 the U. S. sent an expedition to avenge the murder of an Amer. missionary, the Rev. Dr. Thomas, and bombard and captured a ft. Area, 79,400 sq. m. Pop. 8,500,000.

ALFRED FLINCH.

Corfu [an It. corruption of *Κορυφά*, the Byzantine name for the island, from the two "peaks" (*κορυφαί*) on which the citadel stands; modern Gr. *Κορφοί*; anc. *Corcyra*], one of the Ionian Islands, belonging to Gr. and separated from Albania by a channel from 2 to 12 m. wide. An engagement between the fleets of Corcyra and Corinth, 665 B. C., is mentioned by Thucydides as the first recorded naval battle. Area, 227 sq. m. Pop. 1879, 106,109.

Corin'na [Gr. *Κόριννα*], a Gr. lyric poetess, b. at Tanagra, in Boeotia, flourished about 500 B. C. She is said to have instructed Pindar in the art of poetry, and was a successful competitor of that poet in 5 poetical contests.

Corinth [Lat. *Corinthus*; Gr. *Κόρινθος*], an anc. city of Gr., on the Isthmus of Corinth and near the *Sinus Corinthiacus* (Gulf of Lepanto), about 50 m. W. by S. from Athens. The position of C., commanding the passes between the Peloponnesus and N. Gr., made it an important place. Its early hist. is mixed with fable. The Bacchidæ reigned from 747 to 657 B. C. Periander, one of the Seven Wise Men of Gr., became ruler about 625 B. C., and reigned 44 yrs. During the Peloponnesian war (431–404 B. C.) C., as an ally of Sparta, fought against the Athenians. In 395 it united with other Gr. states in a war against Sparta, which lasted till 387, after which the old alliance was renewed. The battle of Charonea (338 B. C.) made Philip of Macedon master of C., which was ruled by his successors until 243 B. C., when it joined the Achaean league. At this period C. was the richest and most luxurious city of Gr. In 146 B. C. it was pillaged and burned by the Rom. consul Memmius, and remained in ruins until 46 B. C., when it was restored by Julius Cæsar. The stupendous anc. citadel, called the Acrocorinthus, stands upon a steep rock rising 1886 ft. above the sea. The site of C. is partly occupied by the little town of Gorthio. It was severely injured by an earthquake Feb. 1858. A project, often entertained, has recently been revived for cutting a canal through the narrow isthmus, thus making a direct passage between the Ionian and Ægean seas. Pop. 4248.

Corinth, R. R. junc. and cap. of Alcorn co., Miss., was the centre of important military operations during the C. war. After the abandonment of Nashville, Feb. 1862, the Confeds. concentrated here, whence they sallied out to attack the U. forces at Pittsburg Landing, Apr. 6, 1862. They fell back to C. after that battle, and evacuated it upon the approach of Gen. Halleck, near the end of May. Gen. Rosecrans was placed in command at C., from which an attempt was made to dislodge him by the Confeds. under Van Dorn and Price. Sharp encounters took place Oct. 3, the main attack being made on the 4th, in which the Confeds. were unsuccessful. The U. loss was 315 killed, 1812 wounded, 232 missing. The Confed. loss was much larger. Pop. 1870, 1512; 1880, 2275.

Corinth, Gulf of. See LEPANTO, GULF OF.

Corinth, Isthmus of, a neck of land connecting Attica with the Morea, and separating the Gulf of Corinth from that of Ægina. Its width varies from 4 to 8 m. This isthmus was the scene of the celebrated Isthmian games and the site of a famous temple of Neptune. It has been proposed to cut a ship-canal through the isthmus.

Corinthian Order. This order gets its name from Corinth, where it is said to have been invented by the architect Callicrates. It is more probable that it was an importation from Asia Minor. It was not generally used in Gr. before the age of Alexander the Great, and the few examples remaining there do not agree sufficiently with one another to enable us to deduce rules from them for its construction. The Romans greatly affected the C. O., and brought it to perfection. Yet even with them it was not always the same thing, and there are more than 50 varieties of the C. cap. to be found either in Rome itself or in various parts of the Rom. empire, all executed within the 3 centuries during which Rome continued to be the imperial city. The cap. resembles a vase covered with an abacus and surrounded by one tier of acanthus leaves above another, from among which stalks spring out, terminating in small volutes at the angles of the abacus and in the centre of each of its sides. The column is sometimes fluted, as in the temple of



Corinthian Capital.

Jupiter Stator in Rome, or as in the fine example here given from the Porta Aurea of Pola in Istria, and sometimes without flutings, as in the Pantheon. The flutings are separated by a fillet. The architrave is usually profiled with 3 fasciæ of unequal height, though sometimes there are only 2. The frieze is often sculptured with foliage and animals, but it is sometimes left quite plain, as in the temple of Jupiter Stator. The cornice is richly decorated with modillions, dentils, and carving upon the mouldings. Among the prin. remaining examples of the order at Rome are the temple of Mars Ultor and Jupiter Stator, and the Pantheon. The celebrated little temple at Nîmes in Fr., called the Maison

Carrion, is a beautiful specimen of the C., though it probably owes its excellence to having been built by Gr. hands.

CLARENCE COOK.

Corinthians, THE EPISTLES OF ST. PAUL TO THE CHURCHES OF THE N. T. The first Epistle was written from Ephesus, in the spring of 57 A. D., the object being to rebuke certain practices which had sprung up in the ch. The second Epistle was written from Macedonia in the autumn of the same yr., the writer taking occasion to set forth his apostolical authority.—There are extant in the Armenian a spurious Epistle of Paul to the C., and an Epistle of the C. to St. Paul.—There are also what purport to be 2 Epistles of Clement of Rome to the C. The first is probably genuine, but the other is only a fragment of a homily.

Coriolanus (CAIUS MARCIUS), a Rom. and patrician hero, who, according to tradition, received the surname *Coriolanus* because he defeated the Volsci at Corioli about 490 B. C. During a famine he advised that grain should not be distributed gratis among the plebeians unless they abandoned the right or privilege of electing tribunes of the people. For this offence he was banished. Having obtained command of a Volscian army, he marched against Rome. He was at length appeased by a deputation of Rom. matrons, led by his mother Veturia and his wife Volumnia.

Corippus (FLAVIUS CRESCONTIUS), a literary *dux grammaticus* who was b. in Afr. and flourished probably in the 6th century, is known as the author of an extravagant panegyric upon Justin the Younger, a Byzantine emp., and of a poem called *Johannis*, celebrating the exploits of Johannes, a proconsul in Afr. in Justinian's time.

Cork [from the Lat. *cortex*, "bark;" Sp. *corcho*], the bark of the *Quercus suber*, a species of oak growing in Sp., It., and the S. of Fr. The bark may be removed annually without injuring the tree. C. is used as stoppers for glass, and in the construction of life-preservers and life-boats. When rasped C. is digested in water and alcohol, it leaves about 75 per cent. of insoluble matter, called *suberine*.

Cork, a river-port of Ire., on the river Lee, 11 m. from the sea and 130 m. S. W. of Dublin by rail. It is partly built on an island of the river, which is here crossed by 9 bridges. The harbor is large and safe. There are a c.-h., mansion-house, exchange, and custom-house; a bp.'s palace, Epis. and R. Cath. cathedrals, Queen's Coll., and a med. school. It is supposed to have been founded in the 6th century. Pop. 1881, 78,492.

Cor Leonis (i. e. "heart of the lion"), a name of the star α in the constellation Leo. It is also called *Regulus*.

Cormorant [It. *corromarino*, i. e. "sea crow"], the popular name of species of *Phalacrocorax*, birds which have the 4 toes united by a full web, a strongly hooked bill, and stiff tail feathers. The species are distributed over the whole world. The common C. (*Phalacrocorax carbo*) is found on the E. coast of N. Amer.

Corn [A.-S. *corn*; Ger. *Korn*; Lat. *far* or *frumentum*], a gen. name given to cereal and farinaceous grains which grow in ears and are used for food, as wheat, barley, rye, and maize. In Eng. C. signifies "wheat;" in the U. S. the term is commonly applied to maize or Indian C.

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Corn (*clavus*), [from *cornu*, a "horn"], a horny accumulation of epidermic cells upon the surface of the human foot, produced by the pressure of the boot or shoe. C. may be softened by hot water or poultices, and the horny part can be carefully removed with the knife. When painful, they may be generally much relieved by the occasional application of a solution of nitrate of silver.

Cornarists, a name applied in the 16th century to the followers of Diedrik Cornhart. After the rise of the Arminian party in the Dut. Ch., the C., who nearly agreed with them, disappear from hist.

Cornbury (EDWARD HYDE), LORD, afterward third earl of Clarendon. He deserted the service of James II. in 1688, and became an adherent of the prince of Orange (William III.), who appointed him gov. of N. Y. in 1702. He was removed in 1708. D. Apr. 1, 1723.

Corn-Crake, or **Land Rail** (*Crex pratensis*), a European bird of family *Rallidae*; a rare visitant of the U. S.

Corneille, *kor-nal'* (PIERRE), a Fr. dramatist, b. at Rouen June 6, 1606, is regarded as the founder of the Fr. drama. He was ed. by the Jesuits, studied law, which he practised unsuccessfully for some yrs. In 1629 he produced *Médée*, a successful comedy, which was followed by several others. His first tragedy, *Medea*, was produced 1635, the *Cid* 1636. *Les Horaces* and *Cinna* 1639, and *Polyeucte* 1640. He was admitted to the Acad. 1647. D. Oct. 1, 1684.

Cornelian. See **CARNELIAN**.

Cornell (ALONZO B.), b. at Ithaca, N. Y., Jan. 22, 1832, son of Hon. Ezra Cornell, founder of Cornell Univ.; ed. at the acad. in Ithaca; telegraph-operator for some time; 1864-69 cashier and v.-p. of First National Bank of Ithaca; afterward first v.-p. of W. U. Telegraph Co.; was chief officer of Amer. Dist. Telegraph Co.; in 1868 Rep. candidate for lieut.-gov. of N. Y.; surveyor of port of New York 1869-72, speaker of assembly in 1873, 1875-76, and 1878; naval officer of New York in 1876; gov. of N. Y. 1880 to 1883.

Cornell (EZRA), b. at Westchester Landing, N. Y., Jan. 11, 1807; devoted his attention to the telegraph, became very wealthy, and in 1865 founded the Cornell Univ. D. Dec. 9, 1874.

Cornell College, Mt. Vernon, Ia., is under the aus-

pices of the M. E. Ch. It was established in 1850, and first called the Iowa Conference Sem. In 1857 the name was changed to C. C. The Wash. govt. has selected this coll. as the one in Ia. to which to detail a prof. of military science and civil engineering. Mt. Vernon, on the C. and N. W. R. R., is 66 m. W. of the Miss.

Cornell University, a collegiate inst. at Ithaca, Tompkins co., N. Y. In July 1862 Cong. granted to each State 30,000 acres of public land for every senator and representative it was entitled to, the income to be applied forever to colls. "where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts. . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." One tenth of this may be used for experimental farms, but no portion for buildings. N. Y.'s share was 990,000 acres. By charter of 1865 and 1867 she established the C. U. with a foundation of \$500,000 given it by Hon. Ezra Cornell of Ithaca, and secured to it the entire income of the land-grant so long as it should use the whole effectively in aid of the objects intended by Cong. It has since received nearly \$1,000,000 more, from the founder, from the pres., Hon. Andrew D. White, and from trustees McGraw, Kelley, Sibley, Sage, and others. Opened Oct. 1868.

By the charter no officer or student can be admitted or excluded for any political or religious opinions, but "at no time shall a majority [of the trustees] be of one religious sect or of no religious sect." Each of the State's 128 assembly dists. may send yearly 1 student for 4 yrs.' free tuition; the choice to be made by competitive examination from the best scholars, male and female, in the different acads. and public schools, but subject to the usual entrance-examination at the univ. Since June 1872 both sexes are admitted on equal terms, except that lady students must be at least 18 yrs. of age, while boys may enter at 16, and must, unless excused, receive military instruction. To promote variety of culture, and to guard against academic seclusion from the world's actual interests, the resident faculty is supplemented by non-resident lecturers, men eminent in their special depts., and often in public life.

There are three "gen. courses." That in arts has the usual classical curriculum; that in lit. replaces Gr., and that in science, Gr. and Lat., by other studies. It has also special courses.

Cornhart, or **Koornhart** (DIEDRIK), a Dut. author and reformer, b. at Amsterdam in 1522. He efficiently promoted the Prot. Ref., but opposed Calvinism; wrote a *Treatise against the Capital Punishment of Heretics*. He gave valuable assistance to the prince of Orange in his contest against Sp., and became sec. of state in Hol. in 1572. His followers in theol. were called Cornarists. D. Oct. 20, 1590.

Corniferous Period [from the Lat. *cornu*, a "horn," and *fero*, to "produce," referring to the "hornstone" or imperfect flint found in its strata], in Amer. geol., the second of the 5 great divisions of the Devonian age.

Corn, Indian. See **MAIZE**.

Corning, cap. of Adams co., Ia., on R. R., 211 m. W. of Burlington. Pop. 1880, 1526.

Corning, a half shire town and R. R. junc., Steuben co., N. Y., on the Chemung River, 390 m. N. W. of New York. It is the terminus of the Chemung Canal feeder. Pop. 1870, 4018; 1880, 4802.

Corning (ERASTUS), b. at Norwich, Conn., Dec. 14, 1794, became a wealthy iron-merchant and capitalist of Albany, N. Y., and was an M. C. from the last-named State 1857-63 and 1865-67. D. Apr. 9, 1872.

Cornish Language, a lang. closely akin to the Breton (Armorican) and to the Welsh. It ceased to be a spoken lang. about the beginning of the present century. Its use within historic times appears to have been limited to Cornwall and W. Devonshire, in Eng. Among the extant remains of this lang. are a poem on the *Passion of our Lord*, and a mystery entitled the *Creation of the World*. (See *NORRIS*, *Cornish Language*.)

Corn Laws, in Eng., certain former statutes for the regulation of the trade in grain. The C. L. date as far back as 1360. There appears to have been no prohibition against importation till in 1463 an act was passed prohibiting it so long as the price at home was below 6s. 8d. a quarter. An act was passed in 1670 prohibiting importation till the price had reached 53s. 4d. a quarter, and laying a heavy duty on it above that point. The price at which importation might begin was raised in 1814. There had been a tendency to what is called a "sliding scale" in the duties on importation, and this arrangement, by the act of 1838, reached what was regarded as a state of perfection. In 1843 Sir Robert Peel tried a modification of the sliding scale, and in 1846 carried a measure to abolish the C. L.

Cornplanter (Iroquois, *Garianwachia*, the "planter"), a half-breed Seneca Indian and chief of the Six Nations, b. about 1732, was the son of John Abeel, a white trader. He fought the Eng. at Braddock's defeat, and was a deadly foe to the colonists during the Revolutionary war, but afterward became the steady friend of the white people. D. Feb. 18, 1836.

Corn Snake, the *Scotophis guttatus*, a colubrine serpent of the S. States, of a brown color, about 5 ft. long. It is generally not seen except mornings and evenings. It enters houses, devours young chickens and other small animals, but is of gentle and familiar disposition.

Cornstone, the lower member of the old red sandstone or middle palaeozoic series of rocks, as developed in Herefordshire, Eng., and the adjoining cos. The name C. is said to have been given because the soil derived from it is fertile and adapted to the production of corn (wheat).

Cornwall (BARRY). See **PROCTER (BRYAN W.)**.

Cornwallis (CHARLES, MARQUIS OF, a Brit. gen., b. Dec. 31, 1738, was the eldest son of the first earl, whose title and



Corn-morant.

estate he inherited in 1762. With the rank of maj.-gen. he took part in the battles of Brandywine and Germantown in 1777, defeated Gen. Gates at Camden, S. C., Aug. 16, 1780, and Mar. 15, 1781, gained some advantage over Gen. Greene at Guilford C. H.; then invaded Va. and occupied Yorktown, which he entrenched, and remained on the defensive. Gen. Washington besieged Yorktown, and compelled Lord C. to surrender his army of about 8000 men, Oct. 19, 1781. In 1786 he was appointed gov.-gen. of Bengal and commander-in-chief of the army in India. He defeated Tippoo Saib at Seringapatam in 1792; in 1798 he became lord lieut. of Ire., which was then the scene of a rebellion. He negotiated the treaty of Amiens in 1802, and was appointed gov.-gen. of India in 1805. D. in India in the same year, Oct. 5.

Cor'nwall on the Hudson, Orange co., N. Y., is a place of summer resort. Pop. 1870, 200; 1880, not in census.

Coro'na [Lat. *corona*, a "crown"], a solar appendage, seen only at the time of a solar eclipse, when it appears as a brilliant halo surrounding the sun. It consists of 2 parts: that next the sun is very brilliant and tolerably uniform in



Corona as seen at Syracuse, in Sic., Dec. 1870. R is the bright "inner corona," in which may be seen a "sierra" of glowing hydrogen. C is the "outer corona."

outline; that farthest from the sun is less brilliant, very irregular in outline, and seemingly made up of radiating beams or filaments. The nature of the C. is not well understood; the inner portion appears to be a highly attenuated and somewhat disturbed solar atmosphere, while the peculiarities of the outer portion are suggestive of matter acting under the influence of powerful projectile forces.

W. G. PECK.

Coro'na Australis, or **Southern Crown**, a constellation of the S. hemisphere.

Coro'na Borealis, or **Northern Crown**, a constellation of the N. hemisphere.

Corpora'tion [Lat. *corporatio*, an "embodiment," the assumption of a form], in law, an artificial person, consisting of one or more individuals, having certain legal capacities, such as succession of members, power to sue or to be sued, and to act, no matter how numerous its membership may be, as a single individual. It must be carefully distinguished from a partnership, in which there is merely a collection of persons, no artificial person being constituted. A contract made with the C. is not made with the members, nor do they, in a legal point of view, own its property, though they may have an interest in its management on the theory of a trust. C. may be considered under the following divisions: I. Their various kinds; II. Their mode of creation; III. Their powers; IV. Visitation; V. Dissolution.

I. When considered as to numbers, they are either aggregate (more than one) or sole. When regarded as to the objects to be accomplished, they are ecclesiastical or lay, while lay C. are either civil or eleemosynary. It can scarcely be said that there are any "ecclesiastical" C. in the U. S., in the proper sense of the term. They rather belong to the Eng. law under the rules of an established Ch. Our C. may be said to be lay. The term "eleemosynary" is substantially equivalent to "charitable," and embraces those established to promote religion or learning, to relieve the sick or the poor, and in gen. to accomplish meritorious public objects. Another division of C. is public and private. A public C. is designed for governmental purposes, as a city or a village. Others are private. A public C., being a mere instrument of a govt., can be created or dissolved by the law-making power at will, while a private C. only comes into existence by the *conjunction* of the will of the sovereign power and that of the corporators. Its charter is in the nature of a contract, and it can only be dissolved by an observance of the rules governing the dissolution or impairment of the obligation of contracts. As to the completeness of its powers, a C. may be either one of full powers or imperfect in its character. In the last case it is termed a *quasi* C. Towns in the N. Eng. States are true C.; in N. Y. they are political divisions with certain specified powers, being *quasi* C.

II. A C. may be created either by prescription, royal charter, or by legislative act. It is said to be created by prescription when it has exercised corporate powers for an indefinite period without interference on the part of the sovereign power. By a fiction of law it is then presumed to

have had a charter. Of course the leading mode of creation is an act of the legislature, and C. may be created under gen. laws as well as organized under special acts. It should have a name whereby to act or to contract, which may be from time to time changed as the law may prescribe.

III. A C., being by fiction of law a person, may have the power to make contracts and to do most other acts possessed by natural persons, and like a natural person it may transgress the rules prescribed by law for its action. This fact has caused many perplexing questions to arise as to the effect of an unauthorized act. This subject is known as the doctrine of *ultra vires*—transgression of power. The ordinary powers of a C. are to make such contracts as are necessary to the accomplishment of its purposes, to hold and acquire property, both personal and real, to have a common seal, to make by-laws for the govt. of its members or of others, and to elect new members or officers in the place of such as may resign, die, or be removed. The act of removing a member is termed *disfranchisement*; the same act exercised toward an officer is called *amotion*. It is a gen. rule that a C. cannot acquire land by will except for charitable purposes, and it is not uncommon for a State statute to limit the amount which a testator may bestow, or to require that the will shall be made a certain time before his death. A C. may, like a natural person, act through agents beyond the limits of the State where it is organized, unless restrained by law. C. sometimes are made trustees for estates, guardians for minors, etc.

IV. By "visitation" is meant the power of superintending the C. and controlling its action. The subject is peculiarly applicable to the management of charitable C. The founder is allowed to provide rules for the govt. and discipline of the coll. or other inst. which he has established, and to designate some person or persons (visitors) who shall see that the rules are properly observed. The exercise of this power of visitation is summary, and in gen. without review by the courts of justice, though in extreme cases of unjust exercise or of waste, mismanagement, or perversion from the purposes intended by the donors, a court of equity would exercise a necessary control.

V. A C. may be dissolved either by compulsory legislation, by surrender of its franchises, coupled with acceptance of it by the state, and by judicial decree. In Eng. an act of Parl. is boundless in its operation, and a C. may be arbitrarily dissolved by law. In the U. S. a distinction has been taken between private and public C., and the power of the State legislature cannot be exercised so as to materially change the provisions of the charter of a private C. without the consent of the corporators. (*Dartmouth College vs. Woodward*, 4 Wheaton.) Every franchise is accepted on the implied condition that it shall be properly exercised. If there be abuse or neglect to make use of corporate powers, a proceeding may be instituted in behalf of the State to forfeit the charter. The U. S. statutes of bankruptcy are extended to business C. T. W. DWIGHT.

Corpulency. See OBESITY.

Corpus Christi [Lat. signifying the "body of Chr.," Fr. *Jête Dieu*], a festival of the R. Cath. Ch. celebrated in honor of the Host (which is held by that Ch. to be the veritable body of our Lord). It was first established by a bull of Urban IV. in 1264, and is observed on the Thursday after Trinity Sunday.

Corpus Christi, city, cap. of Nueces co., Tex., situated on a bay of the same name, and on R. R., 8 m. below the mouth of the Nueces River, about 200 m. S. W. from Galveston. Its harbor is not surpassed on the coast. Pop. 1870, 2140; 1880, 3257.

Correggio, kor-red'jo, da (ANTONIO ALLEGRI), a celebrated It. painter, was b. at Correggio, a small town between Modena and Reggio, most probably in 1494. His father, Pellegrino Allegri, was a small merchant, the owner of a moderate property in houses and lands. By his father's care Allegri was well ed., and afterward put to study the arts of drawing and painting. From teachers he learned the rudiments of his art, but whence came the influences that formed his peculiar manner is a question not yet answered. At one time he was said to have studied with Andrea Mantegna, but Mantegna d. when C. was only 12 yrs. old. It is, however, possible C. may have lived in Mantua in his younger days, and have studied Mantegna's pictures there, among them the magnificent *Victory* now in the Louvre. But the influence of Mantegna was widely spread through the N. of It., and it is not necessary that Allegri should have lived in Mantua to have been moved by him. Nor does he inherit as strongly from the great Mantuan as from Leonardo, and perhaps from certain Venetians. He was in great favor with the duke of Mantua, for whom he painted several of his most famous pictures—the *Education of Cupid* in the Brit. National Gallery, the *Jo and the Leda* in the Berlin gallery, the *Danaë* in the Borghese gallery, Rome, and the *Antiope* in the Louvre. Whether C. ever visited Rome is uncertain; his work bears no evidence of his ever having been there, and it is most likely that he never went so far from home. The story, too, that he visited Bologna, and there exclaimed, on seeing the picture of St. Cecilia by Raphael, "Anch' io son pittore!" ("And I too am a painter") cannot be traced to any authority, and seems to have no foundation in fact. C. d. in his native town suddenly, Mar. 5, 1534. The prin. works of C. are the frescoes on the dome of the ch. of San Giovanni, and those on the dome of the cathedral at Parma, reckoned his greatest performances. For an exhaustive account of C.'s life and works, see the article (since reprinted as a separate work) *Antonio Allegri*, by Dr. Julius Meyer, in his new ed. of NAGLER, Leipzig.

CLARENCE COOK.

Correla'tion [from the Lat. *correlatio*, "mutual relation"] of **Forces** (otherwise called **Transmutation of Force or Energy**), a phrase of recent origin employed to express the theory that any one of the various forms of phys. force may be converted into one or more of the other

forms. The cardinal point in this theory is the doctrine of heat and its relation to other agents, especially to mechanical motion—the doctrine commonly known as the mechanical theory of heat, and which is of very recent date. In the number for May 1842 of a Ger. scientific journal *Annalen der Chemie und Pharmacie* there appeared a short article of only 13 pp. by Julius Robert Mayer, a phys. of Heilbronn, entitled *Observations concerning the Forces of Inanimate Nature*. In this article it was affirmed, for the first time, that there exists a connection between mechanical work and heat by which the one could be converted into the other, mechanical work being obtained by the expenditure of heat, and heat being also obtained by the expenditure of work; there being, under all circumstances, one constant ratio between the quantity of heat and the amount of work. Soon afterward, though apparently without any connection with the Ger. statement, an Eng. physicist (Joule of Manchester) experimentally demonstrated what Mayer had only asserted, and the scientific world came into possession of a new principle, now technically known as the principle of the equivalence of heat and work.

J. H. SEELYE.

Corrosive Sublimate, a name of mercuric chloride (bichloride of mercury), a virulent and corrosive poison.

Corrugated [from the *Lat. con*, intensive, and *rugosus*, to "wrinkle" (from *rug*, a "ridge" or "fold")]. **Iron**, a name applied to iron in thin plates or sheets which are passed between rollers, producing grooves and ridges in the iron. In this manner the strength of the material is greatly increased, while the square surface of the iron is of course reduced. C. iron is of great value in the construction of buildings, especially for roofs, where lightness and strength are to be combined. It is much used for covering the walls of frame buildings, both within and without. It is frequently "galvanized"—i. e. covered with a thin layer of zinc by dipping it in a bath of the fused metal.

Corry, a city and R. R. centre, Erie co., Pa., 37 m. S. E. of Erie. Pop. 1870, 6849; 1880, 5277.

Corsica, kor'-se-ka [anc. *Cyrrus*, afterward *Corsica*; Fr. *La Corse*], an island in the Mediterranean, belonging to Fr., 55 m. from It. and 110 from Fr., separated from Sard. by the Strait of Bonifacio, 9 m. wide. It is 110 m. long N. and S., and 53 m. at the broadest part. The W. coast is deeply indented by gulfs. The interior is traversed by a mt.-chain, the highest peak of which, Monte Rotondo, rises near the centre of the island, 8504 ft. above the sea. The rearing of cattle and mules is the chief branch of industry. Ajaccio, the cap., is the birthplace of Nap. Bonaparte. C. was first colonized by the Phœnicians, who called it *Cyrrus*; was conquered by the Carthaginians, and wrested from them by the Romans, soon after 237 B. C. The Genoese became masters of it in 1481. It was ceded by the Genoese to Fr. in 1768. Area, 3377 sq. m. Pop. 362,701.

Corsicana, a city and R. R. Junc., cap. of Navarro co., Tex., 180 m. N. N. E. of Austin City. It is the seat of Corsicana Military Inst. Pop. 1870, 80; 1880, 3373.

Corson (HIRAM), a scholar, b. in Phila. in 1828, became a teacher, and was (1849-53) connected with the Library of Cong. and that of the Smithsonian Inst. He was prof. of hist. and rhetoric in Girard Coll. 1865-66, and held a similar position in St. John's Coll., Annapolis, Md., 1866-70, when he became prof. of Eng. lang. and lit., etc., in Cornell Univ. Author of *Handbook of A.-S. and Early Eng.* and a *Thesaurus of Early Eng.*

Corsen (WILLIAM PAUL), an eminent Ger. philologist and antiquary, b. at Bremen in 1820, prof. at the gymnasium at Stettin, and subsequently at the Landesschule at Pforta until 1866, when he resigned on account of his health. He pub. a highly important work on *The Pronunciation, Vocabulary, and Accentuation of the Lat. Lang.*, and wrote on Lat. forms and the dialects of anc. It. D. 1875.

Cortes [the plu. of the Sp. *corte*, a "court"], the national assembly or legislature of Sp., also that of Port. The C. of Leon, Castile, and Aragon originated about the 13th century, and were composed of the nobility, dignified clergy, and the reps. of the towns. The power of the C. attained its height in the 14th century, after which it was gradually reduced, until, after the beginning of the 16th century, it was convoked only upon the accession of a king, its sitting being a mere form. In 1869 a rep. C. was chosen by universal suffrage. By the const. of June 30, 1876, it was ordained that the C. should consist of a senate and cong. The deputies are elected by the votes of all free inhabs. who pay taxes to the amount of \$25 a yr. There are 100 senators appointed for life upon the nomination of the Crown, and 130 who are elected for a specified term by the corporations and large tax-payers. There are also *ex-officio* senators, including certain civil, ecclesiastical, and military dignitaries, and all grantees who have an annual *renta* of \$12,000.

Cortez (HERNANDO), the conqueror of Mex., b. at Medellin, in Estremadura, Sp., in 1485. He studied law at the Univ. of Salamanca, and sailed to the New World to seek his fortune in 1504. He served with distinction under Velasquez in the conquest of Cuba in 1511, after which he became the owner of an estate in Cuba. In 1518 he was appointed by Velasquez to conduct an expedition against Mex., which had recently been discovered. He sailed from Cuba with 11 vessels and about 700 men in Feb. 1519, his professed object being the conversion of infidels. He defeated an army of the natives at Tabasco, and landed on the site of Vera Cruz, where he destroyed his ships, to induce his men to fight with more desperate courage when they knew that it was impossible to save themselves by retreat. He had entered Anahuac, the extensive empire of Montezuma. In Aug. he left the sea-coast and marched against Mex. or Tenochtitlan, the cap. Having defeated the Tlascalans in several battles, he entered Mex. without resistance in Nov., and was received with friendly demonstrations by Montezuma, but seized him in his own palace, and extorted from him a large quantity of gold. Velasquez, who was jealous

of C., sent Narvaez with about 1000 men to supersede him, or operate against him in case he should not submit. C. defeated Narvaez at Zempoalla in 1520, and, reinforced by the soldiers of the latter, returned to Mex., the people of which, during his absence, had revolted against the Spaniards. In the fight, which continued several days, Montezuma was killed by his own subjects, and the Spaniards were driven out of the city, but retook it in 1521, when the vanquished were treated with great cruelty. In 1522 the king of Sp. made him gov. and capt.-gen. of the conquered country, called New Spain. In 1540 he took his final leave of Mex., returning to Sp. D. Dec. 2, 1547. (See PRESIDENT. *Hist. of the Conquest of Mex.*)

Corthell (E. L.). See APPENDIX.

Cortland, a R. R. centre, cap. of Cortland co., N. Y., on the Tioughnioga River, 36 m. S. of Syracuse. It has a State normal school. Pop. 1870, 3066; 1880, 4050.

Cortona (anc. *Corythum* or *Corythus*, afterward *Cortona*), a town of It., on a high hill near Lake Trasymene, 50 m. S. E. of Florence. It has an old cathedral, a museum of Etruscan curiosities, and an acad. of sciences. Here was one of the 12 chief cities of anc. Etruria, portions of whose walls, supposed to have been erected 3000 yrs. ago, remain.

Corundum, **Sapphire**, **Ruby**, **Oriental Amethyst**, **Oriental Topaz**, **Adamantine Spar**, **Salamstone**, or **Emery**, a mineral consisting, when pure, of native oxide of aluminum, which is, however, almost invariably mixed with magnetic oxide of iron. Mineralogically, C. is divided into 3 varieties: (1) Sapphire, which includes the purer kinds, as sapphire, ruby, oriental topaz, etc.; (2) C. proper, the duller kinds crystallized or semi-crystalline, including adamantine spar; and (3) emery, the darker and coarser kinds. The specific gravity of C. is about 4, while in hardness it is next to the diamond. The ruby or red sapphire is valued next to the diamond, and beyond a certain size is equal to it in value; the crystals are seldom above ¼ inch in length. The blue sapphire occurs much larger, crystals 3 inches in length being sometimes found. The Brazil sapphire is a blue tourmaline. Adamantine spar occurs in brownish crystals, was used by the anc. as a polishing material, and continues to be used for fine work. Emery, or "Armenian stone," is mined in Naxos at Cape Emery, in the vicinity of Smyrna, Asia Minor, in Sax., the Ural Mts., Gr., Sp., etc., and in the U. S. at Chester, Mass., and in N. C. It is used as a polishing material, the rock being broken up and then reduced to powder. Emery stones and wheels are made by pressing the powder, made into a paste with water, into moulds, and then exposing them to a high heat. Emery vulcanite for polishing wheels is made by mixing emery with rubber and sulphur, and vulcanizing in moulds. C. F. CHANDLER.

Coruña [anc. *Adrobecum*; Sp. *Coruña*], a seaport of Sp., on the Atlantic, 320 m. N. W. of Madrid. It has a safe harbor defended by 2 fts. and a light-house 92 ft. high. On Jan. 16, 1809, a battle occurred here between the Fr. and Brit., in which Sir John Moore was killed. Pop. 33,735.

Corunna, city, cap. of Shiawassee co., Mich., on R. R., 75 m. N. W. of Detroit. Pop. 1880, 1501; 1884, 1451.

Corvallis, city, cap. of Benton co., Or., on R. R. and Willamette River, 100 m. S. of Portland, contains the State Agricultural Coll. and an acad. Steamboats visit the town during two thirds of the yr. The prin. export is wheat. Pop. 1880, 1128.

Corv'us (MATTHIAS) I., king of Hungary, a son of John Huniades, b. at Klausenburg in 1443. He was elected king in 1458. In 1485 he captured Vienna. D. Apr. 7, 1490.

Corvus (M. VALERIUS), a Rom. gen., b. about 370 B. C., was elected consul in 348. He defeated the Samnites in 343, and in the yr. 299 was elected consul for the sixth time. D. about 270.

Corwin (THOMAS), a lawyer and orator, b. in Bourbon co., Ky., July 29, 1794, removed to O. in early youth; was elected an M. C. in 1830; in 1840 gov. of O., elected to the Senate of the U. S. in 1845, and appointed sec. of the treas. by Pres. Fillmore in July 1850. He was sent as minister to Mex. in 1861, returned home in 1864, and d. Dec. 18, 1865.

Corybantēs [Gr. *Kopivantes*, the plural of *Kopivās*; etymology doubtful], the name of the frantic priests of Cybele or Rhea. They celebrated the festivals of Cybele with orgiastic dances and loud cries.

Coshocton, R. R. Junc., cap. of Coshocton co., O., on the Muskingum River, just below the junction of the Tuscarawas and Walhonding, and on the O. Canal, 69 m. E. N. E. of Columbus. A bridge across the river connects it with Roscoe. Pop. 1870, 1754; 1880, 3044.

Cosmogony. See APPENDIX.

Cos'sack [a term of Tur. origin, said to signify "robber"], a Slavic race intermixed with Kalmucks and Tartars. They are divided into 2 classes—the C. of the Don and the C. of Little Rus. The latter were not known by the name of C. until 1516. They placed themselves under the protection of Rus. in 1654, and revolted in 1708. The C. of the Don entered the service of Rus. in the 16th century. The heir-apparent of the empire is the prin. hetman of the C. All the males are enrolled in the Rus. service. They are extensively colonized in Siberia.

Costa Rica, kos'tah ree'kah (i. e. "rich coast"), the most S. state of Central Amer., bounded N. by Nicaragua, E. by the Caribbean Sea, S. E. by Panamá, S. W. by the Pacific. It lies between lat. 8° and 11° 30' N. and lon. 83° and 85° 40' W. The state is traversed by a continuation of the Andes or Cordilleras. Among the peaks are several active and extinct volcanoes. Mt. Cartago (or Irazu) rises about 11,480 ft. above the sea. This region is subject to frequent earthquakes. The form of govt. is republican, the present const. having been adopted Dec. 1871. Cap. San José. The cong. consists of a single house, the deputies being returned by electors, who are chosen by universal suffrage. Area, 19,979 sq. m. Pop. 185,000.

Coster, or **Koster**—LORENZ JANSSEN, a tradesman of Haarlem, Hol., b. about 1370, mentioned by Adrian Junius in

Bataria, an historical work written 1565-69, was reputed to be the inventor of the art of printing from movable types. D. about 1440. In 1870 Antonius van der Linde demolished his claim to the invention of the art of printing.

Costiveness. See CONSTIPATION.

Co-tidal Lines, a system of lines devised by Dr. Whewell, and drawn upon a map, terrestrial globe, or chart, to illustrate the course of the tidal wave. Each of these lines passes through the places which have high water at the same hour, thus tracing the crest of the wave, and enabling the eye to follow its course with all the modifications that it experiences in each ocean. (See *TIDES*.)

Cotopaxi, a volcano of Ecuador, S. Amer., in the E. Cordillera of the Andes, 34 m. S. S. E. of Quito; lat. 0° 40' S. It is conical in form, rises 19,498 ft. above the sea and 9800 ft. above the adjacent valley, being the highest volcano in Amer. active in modern times. The first recorded eruption was in 1532. In 1698 there was an eruption which destroyed the city of Taunga. There were great eruptions in 1738, 1768, and 1803. During this last eruption, Humboldt, who was at Guayaquil, 135 m. distant, heard the noise of the explosions. C. was first ascended in 1872 by Dr. Reiss.

Cottage City, a noted camp-meeting ground and watering-place, on N. E. shore of Martha's Vineyard, Mass., 30 m. S. E. of New Bedford. Pop. 1880, 672.

Cottage Hill College, for young ladies, at York, Pa., 27 m. from Harrisburg, was founded in 1850 by Rev. J. F. Hey, who for a number of yrs. conducted it as a female coll. with great success. On the 21st of Feb. 1868 the inst. was chartered by the legislature of the State, with full collegiate powers to confer all literary degrees and academic honors which are usually granted and conferred by other colls. for the education of young women.

Cot'tide, a family of acanthopterygian fishes, characterized by the bony cheeks, short first dorsal, and more or less spiny head. It contains the "miller's thumb," sea-bullhead, sculpin, and other fishes, most of which are of rather repulsive appearance.

Cot'ting (JOHN RUGGLES), M. D., LL.D., b. in Acton, Mass., in 1787, ed. at Amherst, Dartmouth, and Cambridge. After spending 50 yrs. of his life in N. Eng., he removed to the valley of the Oconee, near Milledgeville, Ga. Having acquired reputation by his publications in chem. and geol., he was induced by cotton-planters of Ga. to make an agricultural survey of 2 or 3 cos. of that State, the maps and drawings of which were magnificently executed, and were deposited in the museum of the med. coll. in Augusta; their fame reached even Rus., whose emp. solicited a copy for the Royal Library of St. Petersburg. He was a Congl. minister, and had held professorships in Amherst Coll. and at Pittsfield Med. School. D. Oct. 13, 1867.

Cotton, kot'tn [Fr. *coton*; Ar. *alqoton*], the fleecy coating covering the seeds of *Gossypium album*, *nigrum*, and *arborescens*, plants of the natural order Malvaceae, whose original habitat is said to be in the E. I. Herodotus mentions the C. tree as growing in India, about 450 B. C. It was cultivated and utilized in India, and probably in Chi., perhaps at a period earlier than this. Being essentially a tropical plant, though

Savannah, Ga., in 1739, and cultivation extended in S. C. In 1784 an Amer. ship, having 8 bags of C. on board, was seized at Liverpool on the charge that so much C. could not have been produced in the U. S. Culture of short-staple C. commenced in U. S. in 1785; 1,000,000 lbs. exported in 1795 from Charleston, S. C.; the cultivation of C. immensely extended by the invention of the cotton-gin by Whitney, in 1793. In 1791 only 2,000,000 lbs. of C. raised in the U. S. and 189,500 lbs. exported; in 1800, 41,000,000 lbs. were raised and 18,000,000 exported; 10 yrs. later, 97,000,000 lbs. produced, 94,000,000 exported; in 1820, 135,000,000 lbs. produced, 128,000,000 exported; in 1830, 300,000,000 lbs. produced, 271,000,000 exported; in 1840, 450,000,000 lbs. produced, 400,000,000 exported; in 1850, 600,000,000 lbs. produced, 420,000,000 exported; in 1860, 2,275,372,309 lbs. produced, 1,767,830,609 exported; in 1870, 1,451,401,357 lbs. produced, 958,785,304 exported; in 1880, 2,771,797,156 lbs. produced, 1,822,295,843 exported.

The black-seed, sea-island, or long-staple C. (*G. nigrum*) is much more valuable than the other species, and is more easily cleaned from the seed, but it grows only on limited areas of coast or island. The green-seed or short-staple (*G. album*) and its variety, the Peeler cotton-seed, are the kinds generally cultivated. C. is grown in the U. S. between 28° and 40° N. lat., but the States of largest production are N. C., S. C., Ga., Ala., Miss., N. Fla., Tenn., Ark., La., Tex. An International Textile Exhibition was held in Atlanta, Ga., in the autumn of 1881, to consider the best means of improving the culture, quality, and productiveness of C. and other textiles; it will doubtless produce beneficial results. C. is produced largely in India, but of inferior quality; in Chi., Egypt, Mex., Brazil, and other countries, but the U. S. crop is the largest and best. The C. plant has many insect enemies, and losses from them are heavy. The oil expressed from cotton seed is valuable and in large demand, as is also the residual oil-cake. The seed-covings and the stalk and leaves, as well as the waste or refuse cotton, are used for paper-stock.

L. P. BROCKETT.

Cotton (SIR ARTHUR T.), b. 1803, entered the Brit. service as second lieu. of royal engineers (late Madras) in 1820; served throughout the Burmese war of 1824-26; became col. and col.-commandant (late Madras) engineers in 1854. In recognition of his services in promoting the growth of cotton in India he was knighted in 1861, and in 1866 was nominated Knight Commander of Star of India; appointed maj.-gen. in 1862, lieu.-gen. in 1867.

Cotton (JOHN), a learned Eng. Puritan minister, b. at Derby Dec. 4, 1585, preached at Boston in Eng., emigrated to Mass. in 1633, was afterward pastor of the First Ch. in Boston (organized in 1630), and acquired such influence that he was called the patriarch of N. Eng. D. Dec. 23, 1652.

Cotton-Gin, a machine for freeing the fibres of cotton from the seeds. The original "roller-gin" consisted of 2 rollers revolving in opposite directions, between which the cotton was passed. In 1793 Eli Whitney invented the "saw-gin," consisting of a hopper, one side of which is composed of parallel wires, between which revolve circular saws, the teeth of which drag the fibre through the wires, leaving the seeds behind. This invention, which brought Eli Whitney small profit and much litigation, has immensely increased the cotton industry of the world.

Cotton, Gun. See GUN-COTTON, by GEN. H. L. ABBOT.

Cotton Manufacture. The manufacture of cotton fibres into coarse cloth, and even into that of fine texture by primitive processes, has been practised in India and Chi. for at least 2350 yrs., but the great industry which bears the name of C. M. now is hardly 125 yrs. old. Prior to 1750 the carding, spinning, and weaving were all done by hand, one thread only being spun at a time, and that so weak that it could only be used as woof or filling in connection with a woollen or linen warp. Lewis Paul made the first improvement in carding in 1748; J. Hargreaves's carding-machine invented in 1760; his spinning-jenny in 1767-70, producing 8 threads at once; R. Arkwright's "water-frame or throstle," for spinning by rollers, in 1769; S. Crompton's mule-jenny in 1779; Dr. E. Cartwright's power-loom in 1785; E. Whitney's cotton-gin (see COTTON-GIN) in 1793, and J. Watt's steam-engine for driving machinery the same year—these formed a cycle of inventions connected with the C. M. which laid the foundations for its subsequent stupendous development. In the U. S. the first cotton-mill was built at Beverly in 1787, but was a failure; the second, at Pawtucket in 1789, by S. Slater, was a success. In 1810 there were 168 factories in the U. S. and 90,000 spindles, 52,000 of them in Mass., R. I., and Conn. In 1813 the first complete cotton-mill in the world was built at Waltham, Mass. The C. M. at Lowell, Mass., was begun in 1821. In 1831 there were in the U. S. 795 mills; cap. invested, \$40,614,984; hands employed, 57,466—18,539 males, 38,927 females; number of spindles, 1,246,503; 77,757,316 lbs. of cotton used; 230,561,990 yards of cloth made. In 1880, 230,233 looms used; number of spindles, 10,921,147; number of persons employed, 181,628; cotton used, 793,240,500 lbs., indicating a production equal to at least 2,400,000,000 yards of cloth—an increase all along the line of tenfold in 50 yrs., and a doubling of the production of 1870. In these 50 yrs. the manufacture of printed cotton goods had had its origin and development, and the C. M. of these as well as other classes of goods had driven the imported goods out of the Amer. markets. In 1856 the imports of cotton goods were \$25,917,999, the exports nothing. In 1881, with double the pop., the imports were \$31,219,329 and the exports \$13,571,387. We have but few particulars of the C. M. in G. Brit. The importation of raw C. in 1880 was 1,629,295,696 lbs., of which 1,440,361,429 was retained for home consumption, about 50 per cent. more than was used in the U. S. Cotton manufacture is rapidly increasing in the Southern States, which had, in 1884, 314 mills, with 1,276,422 spindles and 24,873 looms, while in 1880, by census, they had only 180 mills, with 713,989 spindles. Very many improvements have been made in cotton machinery since 1860, which increase the quantity and enhance the



Cotton Plant.

now cultivated as far N. as 40° in the U. S. and 43° or 44° in E. Asia, it was late in its introduction into Europe, where it has never been cultivated to any extent. It had been introduced into the W. I. and S. Amer. before their discovery by Columbus. In 1536 explorers found the C. plant in the lower Miss. region and Tex., but it was not cultivated till 1621. Grown as an ornamental plant on E. shore of Md., Del., and Pa., from 1736 to the Revolution; 1 bag exported from

quality of the goods. One, which takes the seed-cotton and separates the seed, by an attachment to the spinning machine, gives a better fibre and renders the manufacture at the S. more easy and profitable.

L. P. BROCKETT.

Cotton-Seed Oil. See APPENDIX.

Cottonwood Tree, a common name of the *Populus monilifera*, which grows on the margins of streams of the W. U. S. to the height of 80 ft. or more. The timber is soft.

Couch (Darius Nash), b. in Putnam co., N. Y., July 23, 1822, grad. at W. Pt. in 1846, was engaged during the war with Mex. and elsewhere until 1855, when he resigned and embarked in mercantile pursuits. At the beginning of the c. war he became col. of a Mass. regiment of volunteers; was made, in July 1862, maj.-gen. of U. S. volunteers. He took part in operations in Va. down to Battle of Chancellorsville; was in command of dept. of the Susquehanna 1863-64, and was afterward engaged in Tenn. and N. C.; resigned 1865, and became unsuccessful Dem. candidate for gov. of Mass.; collector for port of Boston 1866-67, and subsequently pres. of Va. Mining and Manufacturing Co.

Coudersport, Pa. See APPENDIX.

Coues (ELLIOTT). See APPENDIX.

Coughar. See PUMA.

Cough, [Lat. *tussis*], a physiological act or operation, which consists in the sudden expulsion of air from the lungs, at the beginning of which act the glottis is closed. Coughing is designed for the expulsion of foreign or secreted matters from the air-passages. It is largely a reflex action, generally arising from local irritation. It is partly voluntary and partly involuntary. A C. may sometimes be relieved by expectorant remedies, by mucilaginous diluent draughts, by warm foot-baths, by stimulants, and very often by small doses of opium or of other sedatives.

Coughlan (LAWRENCE), an Eng. Wesleyan preacher, b. about 1760, was one of the prin. founders of Methodism in N. S. and the neighboring provs. D. 1834.

Council Bluffs, city, cap. of Pottawattamie co., is an important R. R. centre and the metropolis of W. Ia., 135 m. W. of Des Moines and 4 m. E. of Omaha. The city is built principally upon a plain at the base of the high bluffs from which it derives its name. Among the public buildings are the inst. for the deaf and dumb, a large c.-h., and a high-school building. Pop. 1870, 10,020; 1880, 18,063.

Council Grove, a city, cap. of Morris co., Kan., on R. R. and the Neosho River, 25 m. from Emporia. Pop. 1870, 712; 1880, 1942.

Council, Ecumenical [from the Gr. οἰκουμένη ἑκλή, i. e. the "habitable" world]; because the whole Chr. world is, in theory, assembled; otherwise called **General** or **Universal Council**, a title given to certain great ecclesiastical assemblies, so called in distinction from diocesan, provincial, and national C. The Gr. and Lat. chs. agree in recognizing 7 such C.—viz.: (1) The first of Nice, 325; (2) the first of Constantinople, 381; (3) the first of Ephesus, 431; (4) that of Chalcedon, 451; (5) the second of Constantinople, 553; (6) the third of Constantinople, 681; (7) the second of Nice, 787. To these the R. Cath. Ch. adds 13 more, closing with that of the Vatican, 1869-70.

Counselor at Law. See ATTORNEY, BARRISTER.

Counterfeit, *Fr. contre fait*; literally, "made against"; a term applied chiefly to spurious coin or bank-notes or other fictitious currency. The uttering of such coin or notes is a crime punishable by imprisonment, or even by death in some countries. To guard against counterfeiting, bank-notes are engraved with designs which cannot be reproduced except at great expense. There are also secret marks and combinations of letters and figures known only to the proper authorities. Peculiar ink and paper are often used. Pamphlets called "detectors" are sometimes printed with lists and descriptions of C. notes and coins.

Coupon, koo-pōng' [from the Fr. *couper*, to "cut"], a check or slip of paper cut off from a bond. The term is applied mostly to a dividend or interest certificate, which is attached to bottom of a bond or debenture, and is cut off when interest is due, and is then presented for payment.

Courbet, koor-bā' (GUSTAVE), a Fr. painter of landscape, animals, and figures, b. at Ornans (Doubs) June 10, 1819. His parents were people of moderate estate, who gave him the best education in their power. In 1839 he went to Paris to study law, but finally decided to be a painter. Although he studied at different times in the painting-rooms of 3 artists, he says truly that he never had a master. He exhibited for the first time in the Salon of 1844. In the Salon of 1850-51, C. exhibited, among others, 3 pictures, *An Interior at Ornans*, *Peasants of Flagey returning from the Fair*, and *The Stone-Breaker*, which divided the artistic and cultivated world of Paris into two fiercely hostile parties. C. made himself notorious all his life by his extreme opinions in politics and religion, and at the last by the part he played in the Commune. It was by his influence that the column of the Place Vendôme was destroyed. For this act of vandalism C. was tried, but, after a long imprisonment, was released. One of the first acts of the reactionary govt. that succeeded the rule of M. Thiers was to confiscate all C.'s property, to help to pay for the new column which it was voted to set up on the Place Vendôme. D. 1878.

CLARENCE COOK.

Court de Gébélín (ANTOINE), a Fr. scholar and author, b. at Nîmes in 1725, was the son of Antoine Court, celebrated as the reviver of Fr. Protestantism. He assisted Benjamin Franklin in editing a periodical entitled *The Affairs of Eng. and Amer.* D. May 10, 1784.

Courtenay, kurt'ne (EDWARD H.), LL.D., an officer and educator, b. in 1803 in Md., grad. at W. Pt. in 1821. He served, while lieut. of engineers, as assistant prof. at the Military Acad. 1821-24, in construction of Ft. Adams, R. I., 1824-26, as assistant to chief engineer 1826-28, and as acting prof. of natural and experimental philos. at the Military Acad. 1828-29; appointed full prof. Feb. 16, 1829; Dec. 31, 1834, accepted the professorship of math. in the Univ. of

Pa., continuing in it till 1836; civil engineer New York and Erie R. R. 1836-37, at Ft. Independence, Mass., 1837-41, and construction of dry-dock, Brooklyn navy-yard, 1841-42. He resumed his former vocation as prof. of math. in the Univ. of Va. 1842-53; translator and ed. of Bouchariat's *Mechanics*, and author of a *Treatise on Differential and Integral Calculus*, and *Calculus of Variations*. D. Dec. 21, 1853.

Court-Martial, in the army and navy, a tribunal for the trial of offenders against martial law or against good order and military or naval discipline. The subjects of C.-M. are usually officers or men in actual service, but when martial law prevails C.-M. sometimes punish offences committed by persons not in the service.

Courts (in law), public tribunals established for the administration of justice and the interpretation and enforcement of the law. The protection of private rights, the punishment of criminal offences, the regulation of conflicting interests of individuals and states, the exposition and application of legislative enactments, and, in some nations, even of constitutional provisions, are the various important functions which are generally deputed to such judicial organizations. They are generally composed of distinct bodies of officials holding their positions during stated terms, and are under no supervisory control for decisions rendered or other legal acts performed but that of superior or appellate organizations of a similar nature. In the exercise of their powers C. do not attempt to ferret out and redress every evil and form of injustice that may exist within society, and determine the law of their own motion by the direct establishment of legal principles, but are confined to the decision of controverted questions presented to them by injured parties, and thus evolve the law indirectly and mediately. Criminal cases are presented by the govt., while those of a civil nature are brought either by states or individuals affected therein, at their own option.

The C. upon the continent of Europe and in Scot. administer a system of jurisprudence derived from the civil or Roman law, while in Eng. and the U. S. they apply a system which they themselves have originated, called, by way of distinction, the "common law." In the latter the rule of precedent holds sway, in accordance with which principles determined in previous decisions are, in gen., to be deemed authoritative in subsequent causes involving similar circumstances. In this system, moreover, the mode of trial by jury was developed as a safeguard against oppressive action by the C. The judge does not examine witnesses nor decide any questions but points of law, so that every inducement may be removed which would awaken his personal interest in the cause. A broad distinction is also drawn between actions which are termed legal and suits which are called equitable, and C. are called C. of law or of equity according as they entertain one class of actions or the other. C. of equity are likewise governed by the rule of precedent, but their modes of procedure are less technical than those used in C. of law: their forms of remedy are more diverse, and they employ no juries, though a practice exists of referring special questions to C. of law to be tried by a jury, whose verdict is reported to the equity judge to aid his future action. Sometimes legal and equitable jurisdiction is vested in the same C.

An account will be given in this article of the most important C. of Eng. and of the U. S.

I. The C. of Eng.—By the Eng. and Amer. common-law system C. are distinguished as those of *record* and those *not of record*. A C. of the former class is provided with a clerk and a seal, and receives its name from the fact that its proceedings are required to be preserved in accurate records; C. of the latter class are inferior tribunals without clerk or seal, and their acts are not formally enrolled. C. are said to have *original* jurisdiction before which causes are brought in the first instance; *appellate* jurisdiction when decisions rendered in inferior tribunals are transferred to them for review. Civil causes heard before a single judge, with a jury, are said to be heard at *nisi prius* or at circuit; when several judges sit to review causes on appeal they are said to sit *in banc*. C. are also distinguished as civil or criminal, superior or inferior, as C. of law, of equity, of admiralty, etc.—distinctions which require no explanation. In the following synopsis of the Eng. C. an account will be given of their organization previously to 1875, and then of the important change effected in that yr. by act of Parl.

A. The Eng. C. Prior to 1875.—(1) *The Superior Common Law C. of Record*.—These were the C. of Common Pleas, the King's or Queen's Bench, and the C. of Exchequer. These several tribunals possessed co-ordinate jurisdiction in nearly all civil causes, though originally their jurisdiction had been diverse. The C. of Queen's Bench, however, had exclusive cognizance of criminal matters and the sole superintendence over inferior C. and civil corporations; the C. of Common Pleas had alone the right to entertain real actions—i. e. actions for the specific recovery of real property (actions rarely brought in modern times); while the C. of Exchequer possessed entire control over strict questions of revenue. In other cases the parties to the action might select any one of the C. they preferred. As to the organization of these common-law C., the Queen's Bench and Common Pleas consisted each of a chief-justice and five puisne justices; the Exchequer, of a chief baron and five puisne barons. An appeal lay from any of these C. to the Exchequer Chamber, which, when hearing a cause sent from one of them, was composed of the judges of the other two. A second appeal might also be taken to the House of Lords.

To remedy the inconvenience to suitors arising from the fixed establishment of these C. at Westminster, provision was made at an early period for the hearing of jury trials in every co. one or more times during each yr. The tribunals for this purpose were called C. of *assize* and *nisi prius*, were composed of two or more coms., of whom a superior C. judge, a sergeant-at-law, or a barrister must be one, and in most cos. they sat twice each yr.

(2) *The Superior C. of Equity.*—The equity judges consisted in 1875 of 3 vice-chancellors, a master of the rolls, 2 lords justices, and the lord chancellor. The vice-chancellors and the master of the rolls held each separate C. at which causes were heard in the first instance. Appeals might be taken from either of them to the C. of Appeal in Chancery or to the lord chancellor.

The C. of Appeal in Chancery was composed nominally of the 2 lords justices and the lord chancellor, but almost invariably it was held by the lords justices alone. Any 2 of these 3 judges, however, were sufficient for holding the C., or even the lord chancellor alone. Moreover, each of the justices might, under certain restrictions, sit alone. The chancellor might, in addition, exercise an independent jurisdiction, without acting as a member of the C. of appeals. An appeal might be taken to the House of Lords.

(3) *The C. of Probate, Divorce, and Admiralty.*—The C. of Probate and that of Divorce were established in 1857 to supersede the former ecclesiastical C., and received more extended powers. Their names sufficiently define the nature of their jurisdiction. The judges of either of these tribunals might try questions of fact with a jury, or could order an issue to be tried by a C. of law. Appeals could be taken to the House of Lords. The C. of Probate had only a single judge, who might, however, associate with himself a common-law judge or judges. The C. of Divorce consisted of the judge of probate, the lord chancellor, and the judges of the superior common-law C. The probate judge was made judge ordinary, and might act alone or with the other judges. The power to grant divorce, conferred upon this C., was exercised till 1857 only by Parl. The High C. of Admiralty had cognizance of causes of action arising from the navigation of the seas, as, *e. g.*, claims for repairs of foreign vessels and for supplies furnished them, actions for pilotage fees, for seamen's wages, for personal injuries inflicted at sea, or injuries by collision, seizure, and the like; also to determine matters of prize in war, and decree forfeiture of vessels of the enemy or of neutrals in proper cases. This C. was held by a single judge, appointed by the Crown. He might be the same person as the judge of probate.

(4) *The Criminal C.*—These were divided into the inferior and the superior, the former including the gen. and quarter sessions of the peace, while the latter embraced the assizes, the admiralty sessions, the C. of King's Bench, and the Central Criminal C. The assizes were held before coms. twice a yr. in nearly all the cos. The King's or Queen's Bench was the highest C. of criminal jurisdiction.

(5) *Appellate C.*—(a) The Exchequer Chamber, to which appeals were first taken from the King's Bench, the Common Pleas, and the Exchequer, was composed, as already explained, of the judges of the 2 C. in which the action was not heard originally.

(b) The Judicial Committee of the Privy Council had exclusive jurisdiction of appeals in admiralty and ecclesiastical cases, and in those coming from the colonies. It was a court of record, and was composed of a lord pres., all the equity judges, the 3 chief judges of the common-law C., and certain other officials to the number of 20 or more. Only 4, however, were required to constitute a quorum. There was no appeal to the House of Lords, and there was, consequently, danger of a conflict of authority between these tribunals of last resort.

(c) The House of Lords. Though, in theory, this entire body constituted the appellate tribunal, and any of the lords might, if so disposed, assume to act as judges, yet the judicial functions were, in reality, entirely delegated to a few members of the legal profession, known as the "law lords." The services of the others are only available when they are needed to make up a quorum, for which 3 members were required. The decisions of this C. have always enjoyed a great reputation from the eminence of those usually acting as judges.

B. *The Eng. C. since 1875.*—The inconveniences arising from this complexity of C. organization in Eng. were so manifold that a reform was felt necessary. Accordingly, an act of Parl. was passed in 1873, entitled "The Supreme C. of Judicature Act," which went into effect in Nov. 1875, by which a reorganization was effected. This act has since been amended, so that the present organization of the Eng. C. (1881) is as follows: The chief tribunals existing before 1875 now constitute in combination a single C., called the "Supreme C. of Judicature." This is, however, separated into 2 divisions—one known as "Her Majesty's High C. of Justice," exercising mainly original jurisdiction, while the other is named "Her Majesty's C. of Appeal," with exclusive appellate powers except in some few classes of instances. Each has a considerable body of judges, composed of judges of the former C. who were in office in 1875, or their successors. The appellate jurisdiction of the House of Lords and of the Privy Council is still retained.

For the more convenient despatch of business, it was originally provided that the High C. of Justice should be divided into 5 divisions, corresponding to the former tribunals, whose jurisdiction it received. Thus it was provided that one division should consist of the equity judges, who became members of the High C., and should be known as the Chancery Division. In like manner, other divisions were named the Queen's Bench Division, the Common Pleas Division, the Exchequer Division, and the Probate, Divorce, and Admiralty Division: the first 3 of which were to consist of the judges of the former C. from which they derive their names or their successors, while the last was to be composed of the 2 judges of the C. of Probate and Divorce and the C. of Admiralty. Each of these divisions became vested with very much the same jurisdiction as the former C. of the same name, and constituted in fact the same tribunal, though with some important differences of authority. For instance, the C. which formerly proceeded entirely upon common-law principles have been enabled by the Judicature Act to apply the doctrines of equity jurisprudence, for

it is provided that in every civil cause or matter entertained in the Supreme C. of Judicature law and equity shall be concurrently administered, and that equitable rules shall supersede those of the law when any conflict arises. It is still true, however, that causes of action which in themselves have been hitherto considered distinctively equitable are brought before the Chancery Division, which takes the place of the 4 former chancery C. of original jurisdiction. This system of 5 divisions of the High C. continued until 1881, when the Queen's Bench, Common Pleas, and Exchequer Divisions were consolidated into one, under the name of the Queen's Bench Division.

So far as is practicable, every action and proceeding in the High C. is heard before a single judge. But other matters are referred to divisional courts of the High C., which are generally constituted of 2 judges. These divisional C. are not the same as the divisions already mentioned. Any number of them may sit at the same time, and they may consist of any of the judges of the High C. The divisional C. hear appeals from the decisions of single judges of the High C. and from inferior C., decide various motions, etc. Appeals from inferior C., such as the petty and quarter sessions, co. C., etc., here receive final determination. Other appeals may go on to the C. of Appeal. Every appeal to the C. of Appeal is heard either by the whole C. or by a divisional C. consisting of any number, not less than 3, of the judges thereof. Provision is also made for the appointment of coms. to hold circuit C. throughout the kingdom, as formerly. Referees may also be appointed for the hearing of causes or the determination of much of the incidental business arising in the C. The rules of practice and pleading have also been considerably altered and simplified. This synopsis of the gen. organization of the C. shows how fundamental a revolution has been effected in the judicial system of Eng.

II. *THE COURTS OF THE U. S.*—In accordance with the provision of the const. establishing a Supreme C. and conferring upon Cong. the power to create inferior tribunals, a regular system of C. has been formed throughout the U. The most important are the District C., the Circuit C., and the C. of Claims. Final appeals are taken to the Supreme C. at Wash. All these tribunals exercise both law and equity jurisdiction, and the judicial authority given by the const. is variously apportioned among them.

The District C. are at present (1881) about 60 in number. Each State generally constitutes a single dist., though some of the larger ones, as N. Y., Pa., and a few others, are divided into 2 or 3. Each C. consists of a single judge, who must reside in the dist. for which he is appointed. Original jurisdiction is exercised in civil, criminal, and admiralty causes. They entertain exclusively civil causes of admiralty or maritime jurisdiction in the first instance, including actions for injuries committed upon the high seas, suits to recover upon maritime contracts, actions for salvage, for injuries by collision, and matters of prize. They also have original cognizance of questions arising from seizures upon land, and of all suits for penalties and forfeitures under the U. S. laws, and also of actions against consuls or vice-consuls. They exercise concurrent jurisdiction with the Circuit C. of all crimes and offences against the U. S. the punishment of which is not capital, of patent and copyright cases, and of all causes, civil or criminal, affecting persons who are denied in the State C. their rights of citizenship under the U. S. laws. They also have concurrent jurisdiction with the Circuit C. or with the State C. of all suits at common law where the U. S. or any officer thereof sue. The trial of issues of fact in the District C., except in civil causes of a maritime character, is by jury. No person can be arrested in one dist. for trial in another. Appeals are generally taken to the Circuit C., though sometimes to the Supreme C.

The Circuit C. are 9 in number, and each circuit in which one of these C. is established consists of several States. The 9 justices of the Supreme C. are allotted, by their own selection, each to a particular circuit, and each is required to attend at least one term of such C. to which he is appointed in each dist. of his circuit during every period of 2 yrs. There is also appointed a special circuit judge in each circuit, within whose limits he must reside. A circuit C. is held by the Supreme C. justice thereto allotted, or by the regular circuit judge, or by the dist. judge of the dist. sitting alone, or by the Supreme C. justice and circuit judge sitting together and the former presiding, or, in the absence of either of these, by the other (who then presides) and the dist. judge. Such C. may be held at the same time in the different dists. of the same circuit. Two sessions of each C. are held annually within each dist. of the circuit. The circuit C. have both original and appellate jurisdiction. Their original jurisdiction extends, concurrently with that of the State C., to civil suits in law or equity for more than \$500 when the U. S. are plaintiffs, or an alien is a party, or the suit is between a citizen of the State where the suit is brought and a citizen of another State. Their important concurrent jurisdiction with the District C. has already been mentioned. Provision is made, moreover, for the removal of certain causes—such as, *e. g.*, actions against revenue officers, suits on titles to land derived from other States, etc.—from the State C. to the Circuit C. on proper petition by the defendant and the entering of security. The appellate jurisdiction of Circuit C. extends to admiralty and maritime causes, and to civil actions referred from the District C., where the matter in dispute exceeds the value of \$50; also to patent and some other questions. Appeals from the Circuit C. are taken to the Supreme C.

The C. of Claims is a tribunal established at Wash., consisting of 5 judges, of whom one is appointed chief-justice. It has jurisdiction to determine all claims founded upon any law of Cong., or upon any regulation of an executive dept., or upon any contract with the govt. of the U. S., which are presented to it by petition. Demands which are adjudged valid are payable from the national treas. The C. of Claims has one annual session. Appeals are taken to Supreme C.

The Supreme C. is the highest tribunal of the U. S. It consists of a chief-justice and Associate Justices, and holds one term annually at Wash. : 6 Justices are required to constitute a quorum. The jurisdiction exercised is both original and appellate, but chiefly, in practice, the latter. The original jurisdiction extends to all cases affecting ambassadors, other public ministers, and consuls, and those in which a State is a party, except that in the latter case no suit can be prosecuted against any State by the citizens of another State, in actions against ambassadors or other public ministers, and in many controversies where a State is a party, its jurisdiction is not only original, but exclusive. In the exercise of its appellate powers the Supreme C. reviews the judgments or decrees of the Circuit C. of certain Dist. C. with Circuit C. powers, of the C. of Claims, and of some tribunals established in the Terrs. Moreover, the decisions of the highest State tribunals which are repugnant to the const., treaties, or laws of the U. S. may be re-examined by the Supreme C., and reversed or modified as may be necessary. It has power to review both the law and the fact in any cause of which it takes cognizance on appeal.

III. The judicial systems of the various States of the U. are so diverse that to give any account of them would be impracticable. They all agree in having a number of tribunals, some of original and others of appellate jurisdiction, and the determination of the law by the C. of each State, subject to the review of the Supreme C. of the U. S. in constitutional matters, is conclusive within its own boundaries. Reference must be made to the const. and statutes of the States severally for further details.

GEORGE CHASE.

Couscous, kooos-koos', called also **Sham-sham**, is the **Spotted Phalanx** (*Phalangista maculata*), and has black and brown spots on a light ground. It is about the size of a cat. It is found in the Spice Islands, and is caught for its fur as well as its flesh, which is eaten. The animal has a disagreeable odor from a secretion of its anal glands.

Cousin, koo-zan' (VICTOR), a Fr. philos., b. Nov. 28, 1792, was the son of a watchmaker of Paris. After brilliant academic studies, though he had a strong inclination to music, his mind was directed toward philos. under Laromiguière, Royer-Collard, and Maine de Biran. In 1815 he became prof. at the Sorbonne, but in 1820 was suspended on political grounds. In 1827 he was replaced, and shared with Guizot and Villemain a popularity and power in the community unexampled in university annals. Wrote *Course of Modern Philos.* D. Jan. 15, 1867.

Covenant, kuv'en-ant [Fr. *convenir* from *convenir*, to "agree"; literally, an "agreeing" or "agreement." Gr. *diabhiçh*; Lat. *fœdus*; Ger. *Bund*], in theol., the promises recorded in the Scriptures, made by God on certain conditions of obedience, faith, etc. on the part of man. The old dispensation (or O. T.) is called in Gr. *ἡ παλαιὰ διαθήκη*, i. e., "the old covenant;" and the new dispensation (or Testament), *ἡ καινὴ διαθήκη*, "the new covenant."

The so called "Theol. of the C." or "Federal System" began with Cocceius (1603-69), who taught: (1) the C. of works before the fall; (2) the C. of grace after the fall. And under this second C. 3 economies: (1) prior to the law; (2) under the law; (3) under the gospel.

Covenant [remotely from the Lat. *convenio*, to "come together"], in law, is a promise under seal. There are several words appropriated to sealed instruments or promises contained in them, such as bond, covenant, deed, and obligation. The first, third, and fourth words are used to express the entire instrument, while "covenant" is commonly employed to designate a particular clause in a sealed instrument. Thus, there may be many C. in a deed. The subject is fruitful in distinctions, C. being treated in the law-books as to their form, their nature, their relation to other C., their assignability, and the like. One of the most important of these is that which classifies C. into those which "run with the land" and those which do not. C. are sometimes enforced by an action for damages, and in other instances through the medium of an injunction or other appropriate equitable remedy.

T. W. DWIGHT.

Covenant (National, of Scotland), an agreement to protect the Reformed religion in the Ch. of Scot. from the attempt of the Eng. gov't. to enforce the epis. form of worship, was drawn up and pub. in Edinburgh Mar. 1, 1638. A Gen. Assembly was elected which, in Nov. 1638, abolished episcopacy, and ordered that every person should sign the C. on pain of excommunication. In Sept. 1643 a "Solemn League and C.," differing in important points from that of 1638, was drawn up and signed by many persons of rank and influence. In June 1650 Charles II. agreed to this, hoping thereby to recover the Eng. crown. In May 1661, soon after the restoration, the Eng. House of Commons ordered the C. to be burned by the common hangman, and in the same yr. the Scot. Parl. renounced it, and declared the king to be supreme. The "Covenanters," as those were called who still adhered to the C., suffered severe persecutions during the reign of Charles II.

Covenanters, a name given to the signers of the Covenant in Scot. They were also called Cameronians, from Richard Cameron, the founder of the sect. The Reformed Presbs. regard themselves as the reps. of the C.

Coventry, kuv'en-tre [Lat. *Coventria*], a city of Eng., on the Sherbourne, 10 m. N. N. E. of Warwick, on the Lond. and N. W. R. R. Among the noteworthy buildings are St. Michael's ch., a masterpiece of Gothic arch., with a spire 303 ft. high, founded in 1313, and said to be the largest parish ch. in Eng.; Trinity ch., Christ ch. with a fine anc. spire, and St. Mary's Hall, an admirable specimen of ornamental arch., built about 1450. In 1044 Earl Leofric and his wife, Lady Godiva, founded here a magnificent Benedictine abbey. Pop. 1881, 46,563.

Coverdale (MILES), an Eng. reformer, b. 1488, was an Augustine monk, and one of the first in Eng. to embrace the doctrines of the Ref. In 1535 he put forth the first Eng. translation of the entire Bible, which was reissued in 1537,

with the sanction of Henry VIII. He edited (1540) the "Great Bible," known as Cramer's Bible. In 1551 was made bp. of Exeter, but on the accession of Mary, 1553, was deprived of his office and imprisoned 2 yrs. D. Feb. 1569.

Covington, R. R. junc., cap. of Fountain co., Ind., on the Wabash River and the Wabash and Erie Canal, 71 m. W. N. W. of Indianapolis. Pop. 1870, 1888; 1880, 1920.

Covington, a city and R. R. centre, cap. of Kenton co., Ky., on O. River opposite Cin., and just below the mouth of Licking River, which separates it from Newport. A suspension bridge across the Ohio connects it with Cin. It has also a suspension bridge connecting it with Newport. Pop. 1870, 24,505; 1880, 29,720.

Covington, O. See APPENDIX.

Cow. See CATTLE.

Cow-bird, or **Cow-bunting** (*Molothrus pecoris*), a bird of the U. S., belonging to the family Icteridæ. It lays its eggs in nests of other birds, never hatching its own young.

Cow-hage, **Cowitch**, or **Mucuna**, a drug which consists of short, slender, brittle hairs, which grow on the pods of twining plants of the genus *Mucuna* or *Stizolobium*, natives of the tropical parts of Amer. and Asia. The hairs stick in the skin and cause intolerable itching. It is used in med., acting mechanically in killing and expelling worms.

Cowley (ABRAHAM), M. D., an Eng. poet, b. in Lond. 1618; entered Trinity Coll., Cambridge, 1636, but was expelled as a royalist in 1643. In 1646 he went to Paris with Queen Henrietta Maria, where he remained 10 yrs. Returning to Eng. he was imprisoned as a royalist, but was released and obtained the usufruct of an estate of the queen, valued at £300 a year. He wrote *Liber Plantarum*, a book on nat. hist., essays, and many poems, among which is the *Davideis*, an epic which was never completed. He was the most admired Eng. poet of his day. D. July 28, 1667.

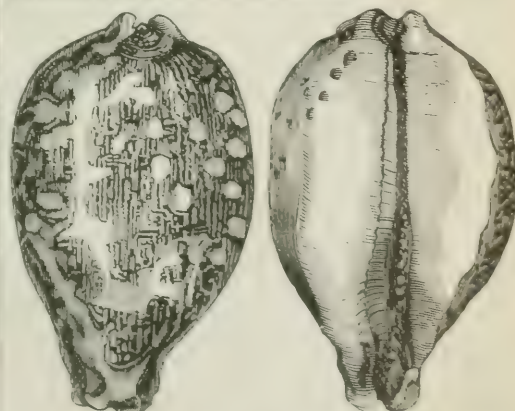
Cow-Parsnip, the popular name of certain plants of the genus *Heracleum*, of the order Umbelliferae, having petals bent in at the middle, and flat fruit. The *Heracleum lanatum* grows in the U. S., from N. C. northward and westward. It is a coarse weed, from 3 to 8 ft. high, strong scented, and is said to be poisonous. One species is a native of Europe (*Heracleum sphorodolium*), the common C.-P., a rank weed, with coarse, hairy leaves, and stem about 3 to 5 ft. high. It is gathered in some parts of Eng. for fattening pigs, and is said to afford wholesome food for cattle. Some Siberian species are much larger, and are valued for the abundant herbage which they yield very early in the season, particularly *Heracleum Panacea*, which sometimes attains a height of 10 ft., and the root-leaves are 3 to 5 ft. long. The species are mostly Asiatic.

Cowpens, a v. of S. C., about 100 m. N. N. W. of Columbia. Here the Amer. gen. Morgan defeated Col. Tarleton Jan. 17, 1781. The Brit. lost about 300 killed and wounded and 500 prisoners.

Cowper (WILLIAM), EARL, an Eng. judge and orator, b. in 1664. He was called to the bar in 1688, and elected to Parl. in 1695. In 1705 he was appointed lord chancellor. D. Oct. 10, 1723.

Cowper (WILLIAM), an Eng. poet, b. Nov. 26, 1731, was a nephew of Earl Cowper, his father being chaplain to George II. In 1752 he was articulated to an attorney, and admitted to the bar in 1754, but never practised. He was appointed clerk of the journals in the House of Lords, but his extreme nervousness prevented him from fulfilling the duties of the office. He fell into extreme despondency, amounting for yrs. almost to insanity, from which he partially recovered for a time, through the tender care of Mrs. Unwin and Lady Austen. He translated Homer into Eng. verse; wrote many poems, among which are *John Gilpin*, lines upon his *Mother's Picture*, and several admirable hymns. His prin. poem is *The Task*, so called because Lady Austen set upon him the task of writing a poem about a sofa. His *Letters* are among the best in our lang., and SOUTHEY'S *Life of Cowper* ranks high among biographies. D. Apr. 25, 1800.

Cow-Pox Inoculation. This species of inoculation, as a security against the smallpox, was introduced by Dr. Jenner, and it became gen. in 1799. The genuine C.-P. appears in the form of vesicles on the teats of the cow. It was first brought into use by Jenner, who first vaccinated from arm to arm in 1796. He had been studying and experimenting about it for a number of yrs. before.



Cowry.

Cow'ry [Hindustani], the popular name of the typical Cypræidæ. The shells are spirally convoluted with the spire

visible in the young, but almost entirely concealed in the adult. The aperture extends linearly the whole length of the shell, and both lips are crenulated. They are mostly beautifully enamelled. They are most abundant and largest in warm seas. The name *C.* is chiefly applied to the shells of *Cyprea moneta*, which have commercial value from their use as a substitute for coin in many parts of Asia and Afr.

Cowslip (*Primula veris*), an herbaceous plant of the order Primulaceae, is a native of Eng. and other parts of Europe. It bears a beautiful and fragrant flower, which is a gen. favorite. The flowers, which are small and grow in an umbel at the top of a scape, have sedative properties, and are sometimes used as an anodyne and antispasmodic. Amer. *C.* is a common name of the *Dodecatheon Meadia*, a plant of the same natural order, and a native of the U. S. It is cultivated in gardens for the beauty of its flowers.

Cow Tree, a name given to several trees of different natural orders, the bland juice (*latic*) of which is used instead of milk. They are natives of tropical climates. Some of them belong to the order Moraceae, and are allied to the fig; others to the closely-related order Artocarpaceae, one of which is the famous *palo de vaca*, or *C. T.* of the Cordilleras (*Brosimum utile*). It grows in rocky situations, at an elevation in equatorial regions of about 3000 ft. It is a lofty tree, with leaves 10 to 16 inches long, and very small flowers. For several months in the yr. its branches appear dead, but as soon as the trunk is pierced there flows a full stream of sweet and nourishing milk. This juice flows most freely at sunrise. The natives then hasten from all directions with bowls to receive it. The milk has a pleasant odor, and a viscosity which does not belong to the milk of animals. It becomes yellow in a short time, and a cream rises to the surface, which gradually thickens into a cheesy consistency. This milk is much used by the negroes and Indians, but differs very much from the milk of animals, more than one half being wax and a nitrogenous compound, a little sugar, a salt of magnesia, and water chiefly making up the rest. The hyahya (*Tabernaemontana utilis*, of the order Apocynaceae) also yields an abundant thick juice, which is used in Guiana and elsewhere as a substitute for milk, and is harmless, agreeable, and nutritious. The *Gymnema lactiferum*, an asclepiadaceous plant of Ceylon, yields a milk which is used as food.

Cox (JACOB D.), a general and lawyer, b. at Montreal Oct. 27, 1828. He became a maj.-gen. of U. volunteers in the autumn of 1862. In Dec. 1861 he commanded a division at the battle of Nashville; was elected gov. of O. by the Reps. in Oct. 1865, and appointed sec. of the interior in Mar. 1869.

Cox (SAMUEL HANSON), D.D., LL.D., a clergyman, b. of Quaker parentage, at Leesville, N. J., Aug. 25, 1793; became a Presb., and was ordained to the ministry 1817; was pastor of the Spring st. ch., New York, 1820-33, prof. of sacred rhetoric in Auburn Theological Sem. 1834-37, pastor of the First Presb. ch., Brooklyn, and prof. of sacred hist. in Union Theological Sem., New York, 1837-54. He wrote *Quakerism not Christianity and Inferiors Memorable and Useful*. D. Oct. 2, 1880.

Coxalgia, or **Coxitis** (*morbus coxarius*, "hip-joint disease"), a chronic inflammation of the hip-joint, which may begin either in the head of the thigh-bone or the socket of the hip-bone, or else in the membrane (*synovial*) that lines its cavity, but which finally extends to all its tissues, cartilages, ligaments, and surrounding soft parts. Inflammation of the bones (*osteitis*), by far the most common origin of the disease in children, is chronic and insidious in its development, and is favored by the incomplete ossification and active nutrition of the bones in childhood. Inflammation of the lining membrane (*synovitis*) is the most frequent form of hip disease in adolescence, and then is often of rheumatic origin. Chronic infantile *C.* principally affects children between 1 and 5 yrs. of age, and is often awakened by a fall or blow, especially when such accident occurs to children of a lymphatic or scrofulous constitution. The symptoms are lameness and pain, first felt in the knee, afterward excited in the joint itself by direct pressure, by motion of the limb, or by the weight of the body resting upon it. To lessen this weight the patient rests on the ball of his toes, and drags the leg in walking, stiffly extending it. It soon becomes impossible to glide the head of the thigh-bone in its socket; the whole hip moves with every motion communicated to the leg.

In the second stage the thigh is more strongly bent on the body, and drawn inward, so that the foot crosses the opposite leg. The affected limb is therefore apparently shortened. A swelling appears in the groin and at the outer aspect of the thigh; the pain becomes intolerably severe; standing and walking are impossible.

In the third stage the ligaments of the joint are relaxed, abscesses form in the neighborhood, and all the soft parts are swollen by inflammatory exudations. The patient's strength is severely undermined, hectic fever sets in, the emaciation is extreme, and death may occur gradually from exhaustion, or more rapidly from acute absorption of pus.

Appropriate treatment of the first and second stages offers about 50 per cent. of recoveries; operative treatment of the third stage has so far cured about one third of the cases submitted to it. Constitutional treatment is to be adopted—cod-liver oil, iron, cinchona, nourishing food, fresh air, and salt-water bathing. As soon as the movements of the joint are compromised, local treatment becomes of primary importance. Many apparatuses are devised. The simplest form is made by swathing the limb in bandages stiffened by plaster of Paris or dextrine. These are only adapted to the earliest stage, or when cure is already progressing. It enables the patient to walk about. This facility is also afforded by steel apparatus that supports the limb at the waist and foot, and gradually extends it by continued traction at the knee. In other cases the patient is kept in bed, and extension made by pulley and weight. Ice may be applied to the

joint to subdue acute inflammation. When suppuration has occurred within the joint, and especially when pus has discharged externally by one or more fistulae, it is necessary to amputate (resect) the head of the thigh-bone. When successful, the patient is rescued from an otherwise certain death, and the joint recovers its integrity, ankylosis being much less frequent than after treatment by immobilizing apparatus. [From orig. art. in *J.'s Univ. Cyc.*, by MARY C. PUTNAM JACOBI, M. D.]

Coxe (ARTHUR CLEVELAND), D. D., a son of Dr. S. H. Cox, noticed above, an Amer. Episcopalian bp., b. at Mendham, N. J., May 10, 1818, grad. at the Univ. of New York in 1838, and took holy orders in 1841. He wrote, beside other works, *Christian Ballads and Impressions of Eng.* He became rector of Calvary ch. in New York in 1859, and bp. of W. N. Y. in 1865.

Coxsackie, Greene co., N. Y., on R. R., near the Hudson River, 22 m. S. of Albany. Pop. 1880, 1661.

Coyote, *koi-ot'* [a Sp. Amer. name, probably derived from the Mex. *cayotl*, "wolf"], a popular name for the small barking or prairie wolf, of which several varieties occur in the U. S. and Mex.

Coypu, the *Myopotamus Coypus*, a S. Amer. rodent of the family Octodontidae, occurring on both sides of the Andes, burrowing in river-banks. It is nearly as large as the beaver, has small ears, long hair mixed with dense, soft, short hair, the upper parts beautifully pencilled with shades of yellow, the sides and under parts lighter and more uniform in color. The fur



Coypu.

has become an important article of commerce under the names of ragondin and nutria, the latter name (signifying in Sp. an "otter") being that chiefly in use in the U. S.

Crab [Lat. *cancer*], a name variously applied: (1) It properly belongs to the brachyurous, decapodous crustaceans—i. e. the wide, short *C.* so designated in the markets. (2) It is also vaguely used as a designation of all crustaceans. (3) It is still further used, by a false extension of analogy, for other forms—e. g. certain lice (*Phthirus pubis*), the limuloids, called horseshoe *C.*, etc.

Hermit C., a name given to numerous anomalous crustaceans of the family Paguridae, which seek shelter in foreign bodies (shells, etc.), whose abdomen is more or less soft. They mostly select the empty shell of some mollusk, coil in it, and secure their position by the extremity of the tail and by several feet on the abdominal sac. They adhere so firmly that they will be destroyed rather than loosen their hold. By protruding the body with the anterior 3 pairs of legs, they are able to walk in search of prey, but if danger approaches they hasten into the shell and close the orifice by a claw. They change residence as often as a larger one is needed. The species are numerous.



Hermit Crab (with shell).

on the beach. It is lethargic in movements and incapable of nipping hard.



Hermit Crab (without shell).

The *Purse C.*, or *Roller C.* (*Birgus latro*), is a species of Paguridae, inhabiting Ambryna and some other islands. It lives in the fissures of rocks, and seeks its food along the beach at night. When observed, it snaps its claws fiercely and retreats. It is said to climb the cocoa-nut tree for the fruit, but this is probably untrue.

The *Spider C.* is a species of Malidae common along the Atlantic coast of the U. S., and often thrown up on the beach. It is lethargic in movements and incapable of nipping hard.

Portunidae, a family of canceroid brachyurans, distinguished by the oar-like hindmost legs and their adaptation for swimming. To this family belongs the common edible *C.* of the U. S. (*Callinectes hastatus*), found along the whole coast. These, like other *C.*, moult once a yr., and are several days casting the shell, but a new one is soon formed. While the new shell is tender, or before it is formed, they are called soft-shell *C.*, and are much esteemed as food. Some *C.* of genus *Lupea* live in the ocean, floating on the sea-weed or on the surface of the water. THEO. GILL.

Crab-Apple (*Pyrus Coronaria*), a small tree growing wild in the U. S., bears rose-colored fragrant blossoms and fragrant greenish fruit, which is prized for preserves. Another wild *C.-A.*, the *Pyrus angustifolia*, also grows in the S. States. The cultivated *C.-A.* is the *Pyrus baccata*, a native of Siberia.

Crabbe (GEORGE), an Eng. poet, b. Dec. 24, 1754; was at first a surgeon; went to Lond. in 1780; lived for some time in great poverty, from which he was rescued by Edmund Burke, who received him into his own house. In 1782 he took orders, and was made chaplain to the Duke of Rutland; became curate of Strathern in 1785, and in 1813 received the living of Trowbridge. Wrote *The Library*, *The Village*, and *Tales of the Hall*. D. Feb. 8, 1832.

Crabron'idæ (Lat. *crabroni*, i. e. "homest"), a family of hymenopterous insects, of which the *Crabron vulgaris* is the type. Some insects of this family excavate their nests or retreats in wood. In the U. S. they build in fences, trees, etc., and are known as sand-wasps and wood-wasps.

Cra'cow, or **Kra'kow**, a city in Aus. Poland, on the Vistula, 158 in. S. S. W. of Warsaw, and connected by R. R. with Vienna, Berlin, and Warsaw. It has a castle, founded about 700 A. D., a magnificent cathedral, a univ. (begun 1343, finished 1401, reorganized 1817), a botanic garden, and many monasteries. C. was founded about 700 A. D., was the cap. of Poland from 1320 to 1609. In the 16th century it contained three times its present pop. On the 3d partition of Poland, in 1795, it was annexed to Aus.; formed a part of the duchy of Warsaw 1809-15; in 1815, with a small terr., was organized into a republic, under the protectorate of Rus., Aus., and Prus.; was reannexed to Aus. 1846. Pop. 1880, 66,095.

Crafts (SAMUEL CHANDLER), b. at Woodstock, Conn., Oct. 6, 1768, grad. at Harvard in 1790, settled in Craftsbury, Vt., in 1790; was long one of the judges of the State courts; was M. C. 1817-23, gov. of the State 1829-32, and U. S. Senator in 1842. D. Nov. 19, 1853.

Cra'gin (ABRAHAM B.), b. in Weston, Vt., Feb. 3, 1821, was M. C. from N. H. 1857-61, U. S. Senator 1865-71, and was re-elected in 1870 for 6 yrs.

Craig (JOHN), a Scot. reformer, b. 1512. He entered the Dominican order, and had charge of the novices at Bologna. Converted to the doctrines of Calvin, he was tried and condemned to be burned by the Inquisition, but was saved by a mob, who, on the death of the pope, broke open the prison. He returned to Scot., was appointed chaplain to James VI. in 1579, and wrote the National Covenant in 1580. D. Dec. 1600.

Craik (DINAH MARIA), better known as **Miss Muloch**, an Eng. novelist, b. at Stoke-upon-Trent in 1836. Wrote *John Halifax, Gentleman*. In 1865 she married G. L. Craik, a nephew of the literary historian.

Craik (GEORGE LILLIE), one of the most useful writers of his time in the field of literary hist. and biography, was b. in Fifehire, Scot., in 1799. In 1830 he pub. a compilation of biographical anecdote, *The Pursuit of Knowledge under Difficulties*. In 1844-45 appeared *Sketches of the Hist. of Lit. and Learning in Eng.* In 1849 C. was made prof. of hist. and of Eng. lit. in Queen's Coll., Belfast. Wrote *The Eng. of Shakespeare*, illustrated by a Philological Commentary on his 'Julius Cæsar.' D. June 25, 1866.

Craik (JAMES), M. D., derives interest from his long and intimate association with Washington. B. in Scot. in 1731, was surgeon to the expedition against the Indians in 1754, was at Braddock's defeat (9th July, 1755), and served throughout the Amer. Revolution. Washington said of him, "He was my compatriot in arms, my old and intimate friend." After the Revolution he practised at Mt. Vernon, and was the family phys. of Washington. D. Feb. 6, 1814.

Cramp (JOHN MCKETT), D. D., b. July 25, 1796, at St. Peter's, Isle of Thanet, Kent, Eng., ed. at Stepney Coll., was ordained May 7, 1818, and became pastor of the Bap. ch. in Dean st., Southwark, Lond. In 1837 he returned to his native place, and was associated in the ministry there with his father. In 1842 he became pastor of the Bap. ch. at Hastings, Sussex; in 1844 became pres. of the Bap. coll., Montreal, Canada, and pres. of Acadia Coll., N. S., in 1851; prin. of the theological dept. 1853-60; was reappointed pres. in 1860, and retired in 1869. Wrote *A Text-Book of Pophy and The Reformation in Europe*.

Cranach, **kran'ak**, or **Kranach** (LUCAS), called THE ELDER, an eminent Ger. painter and engraver, b. at Cranach, a town near Bamberg, in 1472. His family name was Sunder. He became court-painter to Frederick, elector of Sax., in 1504, and worked for many yrs. at Wittenberg, where he was much respected and was made burgomaster. He continued to hold the office of court-painter under the 2 successors of Frederick, John the Constant and John Frederick the Magnanimous, and when, after the battle of Muhlberg in 1547, John Frederick was taken prisoner, C. shared his 5 yrs. captivity. They were both released in 1552. He was also an intimate friend of Luther and Melancthon, whose portraits he both painted and engraved. His works consist of oil paintings, engravings on copper, and woodcuts. His most important picture, an altar-piece, is at Weimar. He d. Oct. 16, 1553. (See SCHUCHARDT, *Lucas Cranach des Älteren Leben und Werke*.) CLARENCE COOK.

Cran'berry (i. e. "crane-berry," so called because its slender stalks were fancied to resemble the legs of a crane), the fruit of several species of a sub-genus, *Oryccoccus*, of small, mostly prostrate evergreen shrubs of the natural order Ericaceæ, belonging to the genus *Vaccinium*, but differing from the rest of the genus in having a wheel-shaped corolla, with its 4 petals decidedly revolute. The species are few, natives of the colder regions of the N. hemisphere. The fruit is acid, and is in great request for making sauces, jellies, etc. The Amer. C. (*Vaccinium Macrocarpon*) is a larger and more erect plant, with larger leaves, less revolute at the edges. The berries are larger and of a brighter red. It is a native of Canada, but is found as far S. as Va., growing in sandy bogs and also elevated situations. The berries are largely cultivated near the sea-coast in the N. States, and large quantities of them exported to Europe.

Cranch (CHRISTOPHER PEARSE), a son of the following, an artist and poet, b. at Alexandria, Va., Mar. 8, 1813, grad. at Columbian Coll., Wash., in 1831; studied divinity, but became a landscape-painter and author. Wrote a vol. of poems and 2 stories for children, *The Last of the Huggenmuggers* and *Kobolotoz*.

Cranch (WILLIAM), LL.D., a jurist, b. at Weymouth, Mass., July 17, 1769, grad. at Harvard in 1787. He was appointed chief-justice of the U. S. circuit court for D. C. in 1805. He held this position for 50 yrs., during which, it is said, only two of his decisions were overruled by the supreme court of the U. S. As reporter of the decisions of

the supreme court he prepared 9 vols. of reports (1801-15). D. Sept. 1, 1855.

Crane [from the A.-S. *cran*; Ger. *Kranich*; Gr. *γέρωνος*; Lat. *grus* (gen. *grutis*); Fr. *grue*], a popular name of various birds belonging to the family Gruidæ, of which the genus *Grus* alone occurs in the U. S. The European C. (*Grus cinerea*) is ashen gray, with face and neck nearly black. The whooping C. (*Grus Americana*) is larger, and pure white, the wings tipped with black. It frequents the S. parts of the U. S. The U. S. have also the sand-hill C. (*Grus canadensis*) and the *Grus fraterculus*, the little C. The blue heron (*Ardea Herodias*) is sometimes called the blue C.

Crane (WILLIAM CAREY), D. D., b. in Richmond, Va., Mar. 17, 1816, grad. at Columbian Coll. and Hamilton Theological Sem.; pastor of Bap. ch., Montgomery, Ala., 1839-42; pres. of Baylor Univ. (Independence, Tex.) 1863.

Craniology. See PHRENOLOGY, by F. G. FAIRFIELD.

Cran'mor (THOMAS), an Eng. prelate and reformer, b. July 2, 1489; studied at Jesus Coll., Cambridge, of which he became fellow in 1510 and lecturer upon theol. in 1523. In 1529 he gained the favor of Henry VIII. by suggesting that the question of the king's divorce should be submitted to the univs. of Europe. He was made chaplain to the king, and sent on a special mission to Rome. In 1533 he was made abp. of Canterbury, and became the prin. adviser of Henry in ecclesiastical matters. He favored the king's marriage with Anne Boleyn, and afterward pronounced the decree for its annulment. Upon the death of Henry he was placed, by the king's last will, at the head of the council for governing the kingdom during the minority of Edward VI. Through the reign of Edward C. took an active part in the measures of the Ref., and was one of the commission which compiled the Liturgy of the Anglican Ch. He favored the attempt to place the crown upon the head of Lady Jane Grey, to the exclusion of Mary and Elizabeth. Soon after the accession of Mary, in 1553, C. was sent to the Tower upon a charge of high treason, and was subsequently arraigned for heresy. Six several times he recanted his heretical teachings, notwithstanding which it was determined that he should be sent to the stake. Just before being burned he made a public retraction of his recantations, and at the stake thrust his right hand into the fire, declaring that it should be the first to burn, as the instrument by which his recantations had been performed. There are few persons upon whose character historians have formed such diverse judgments. (See FROUDE and MACAULAY.) D. Mar. 21, 1556.

Cran'tor (Κράτωρ), a Gr. Academic philos., b. at Soli, in Cilicia, lived about 300 B. C. He was a pupil of Xenocrates at Athens, and wrote a *Treatise on Affection*.

Crape [Fr. *crêpe*, from the Lat. *crispus*, "crisped" or "curled"], a light, transparent fabric, made of raw silk deprived of its gloss. C. are crisped or smooth, according to the degree of twist in weaving; manufactured in It., Eng., and Fr., and extensively used for mourning-dresses.

Cra'po (HENRY H.), b. in Dartmouth, Mass., was police-justice and tax-collector of New Bedford; removed to Mich. in 1837, engaged in the manufacture of lumber, and also in farming; was mayor of Flint, State senator, and gov. near the close of the c. war. D. July 23, 1869.

Cras'sus (MARCUS LICINIUS), a Rom. triumvir, b. about 108 B. C. He was elected prætor in 71 B. C., and defeated Spartacus, the leader of a servile revolt. In the yr. 70 he was chosen consul as the colleague of Pompey. He amassed an immense fortune. About 60 he united with Cæsar and Pompey in a coalition called the first triumvirate. In 53 B. C. he was defeated with great loss by the Parthian gen. Surena, near Carrhæ (the Haran of the Bible), and was treacherously killed at a conference with Surena soon after that battle. (See PLUTARCH, *Life of Crassus*.)

Cra'ter (the "Cup"), one of Ptolemy's N. constellations, situated near Cærvus, the "Deer."

Cra'tes (Κράτης) of Athens, a Gr. comic poet and actor, who flourished about 450 B. C. Only small fragments of his works are extant.

Crates of Thebes, a famous Cynic philos., lived about 320 B. C., and was a disciple of Diogenes at Athens. He wrote poems and other works, which are all lost.

Crati'nus (Κρατινός), an eminent Athenian comic poet of the old comedy, was b. in 519 B. C. He gained a prize for his *Wine Flask* in 423 B. C., when Aristophanes was his competitor. D. in 422 B. C.

Crati'pus [Gr. Κράτιππος], a Gr. Peripatetic philos., a native of Mitylene; the most eminent philos. of that age. In the estimation of Cicero, who was his pupil and friend, C. wrote *On Divination by Dreams*.

Cra'ven (ALFRED W.). See APPENDIX.

Craven (THOMAS T.), b. Dec. 30, 1808, in Portsmouth, N. H., entered the navy as a midn. May 1, 1822, became a rear-admiral in 1866. During the summer of 1861 he commanded the Potomac flotilla, and in 1862, while in command of steam-sloop Brooklyn, took part in engagement with Fts. St. Philip and Jackson and capture of New Orleans.

Craw'fish, or **Cray'fish**, a name given to fresh-water crustaceans of the family Astacidae or Potamobiidae. Most species dig long burrows in the earth. C. do immense damage by opening passages for water through the levees of the Miss., which in some cases have caused extensive cravasses. Certain salt-water crustaceans are also popularly called C., especially the species *Palinurus*.

Craw'ford (GEORGE W.), a lawyer, b. in Columbia co., Ga., Dec. 22, 1798, grad. at Princeton in 1820; rep. in Cong. in 1843, gov. of Ga. 1843-47, and sec. of war under Pres. Taylor 1849-50.

Crawford (MARTIN J.), a citizen of Ga., b. Mar. 17, 1820, ed. at Mercer Univ.; rose to distinction at the bar, rep. in Cong. 1857-61, but withdrew on the secession of Ga., and became M. C. of the S. States, and was one of the 3 com. appointed by that body to treat with the authorities at Wash. for a peaceful separation of the States. D. July 22, 1883.

Crawford (NATHANIEL MAGON), D. D., a Bap. minister

and pulpit-orator, a son of William H. Crawford, b. near Lexington, Ga., Mar. 22, 1811; became in 1854 pres. of Mercer Univ. in Ga. D. Oct. 27, 1871.

Crawford (THOMAS), a sculptor, b. in New York Mar. 22, 1814, was a pupil of Thorwaldsen at Rome; executed the colossal equestrian statue of Washington, now at Richmond, and a colossal statue of the Genius of Amer., which is on the dome of the capitol at Wash. D. Oct. 10, 1857.

Crawford (WILLIAM HARRIS), b. in Amherst co., Va., Feb. 24, 1772, removed to Ga. in his early youth; was admitted to the bar in 1798, and settled at Lexington, Ga. He was elected U. S. Senator in 1807 by the Dems., and was sent as minister to Fr. in 1813. He became sec. of war in 1815, and was sec. of the treas. from 1816 to Mar. 1825. In 1824 he was nominated for presidency of U. S. by a Congressional caucus. In the election of that yr. he had 3 competitors—Gen. Jackson, John Quincy Adams, and Henry Clay. C. received 41 electoral votes. D. Sept. 15, 1834.

Crawfordsville, city and R. R. centre, cap. of Montgomery co., Ind., 44 m. W. N. W. of Indianapolis. It is the seat of Wabash Coll. Pop. 1870, 3701; 1880, 5251.

Crayfish. See CRAWFISH.

Crayon [from Fr. *crayon*, "chalk"], a word signifying something to mark with, hence a pencil; a cylinder of charcoal, pipe-clay, or chalk colored, and used for drawing on paper. Cohesiveness is given to the paste of which the cylinder is formed by gum, wax, or soap. C. containing plumbago are styled lead pencils.

Cream [Lat. *cremor*; Fr. *crème*; Ger. *Rham*], the oily or butyrateous part of milk, which being lighter rises to the surface. The term cream is applied to various preparations, indicative of superior quality or of cream-like consistence, as cold C., shaving C., etc. The Fr. expression "La crème de la crème" ("The cream of the cream") signifies the most fashionable or aristocratic class of society.

Cream of Tartar, Acid Tartrate of Potassa, Bitartrate of Potassa, Supertartrate of Potassa, or Potasse Bitartras [pharm.], a compound existing already formed in the juice of the grape and in other vegetable juices. In the juice of the grape it is held in solution, but as it is less soluble in solutions containing alcohol, as the sugar is transformed into alcohol in the process of fermentation, it is deposited in the casks, forming the crude tartar or argol of commerce. Argol is an article of export from wine-producing countries, the best qualities coming from It. and the S. of Fr. It is used as the source of tartaric acid and the various tartrates employed in med. and the arts. C. of T. has a pleasant acid taste, and is soluble in about 15 parts of boiling and 240 parts of cold water. It is frequently adulterated with sawdust, clay, gypsum, flour, chalk, alum, and sulphate of potash. C. of T. is extensively used, in connection with bicarbonate of soda, as a substitute for yeast and leaven for raising bread. C. of T. is used as a mordant in dyeing wool. In med. it is used for its cathartic, diuretic, and refrigerant properties. Salt of tartar is carbonate of potassa, prepared by incineration of C. of T.

Creatine, kre'a-tin [from the Gr. *κρέας*, "flesh"], a neutral principle discovered in 1835 by Chevreul in raw muscular flesh. C. is found in the flesh of many if not all vertebrate animals, but is now generally considered to be one of the products of the normal destruction of the tissues. It occurs in the urine.

Creatinine, a powerful organic base or alkaloid which exists in small quantities in the juice of animal flesh and in urine, as one of the products of the physiological destruction of tissues. When creatine is subjected to the action of strong acids, it is changed to C., which is crystallized in colorless rhombic prisms.

Creatinism, as distinguished from Traducianism and the doctrine of pre-existence, is the belief that the human soul is directly created by God, and that it joins the embryo soon after conception. Many passages of Scripture, of the Fathers, and of Aristotle were quoted to sustain this view.

Crécy, kres'see, a small town of Fr., about 12 m. N. of Abbeville. It was the scene of a victory gained, Aug. 26, 1346, by Edward III. with 40,000 Eng. over a Fr. army of 100,000. It is stated that nearly 30,000 of the Fr. were killed.

Credit, in political economy, is trust in the promise of an equivalent to be rendered at a future time, for values immediately transferred. The chief forms of C. are book-accounts, loans, mercantile notes, bank-deposits with checks, drafts, and bills of exchange based on them, stocks, bonds of corporations and govts., notes of banks and govts. used as paper-money. Statistics show that 98 per cent. of the every-day exchanges of the city of Lond. are effected by C. in one or other of these forms. C. brings cap. and labor together for production, and is essential to draw out the cap. and the industrial talent of a people. But C. abused works terrible mischief, and becomes the chief cause of commercial panics and financial crises. The true basis of C. is real wealth, existing or prospective, and C. can be stable and sound only as real money is made the lifeblood of all its operations. A. L. CHAPIN.

Credit Foncier, krā-dē fōn-se-ā [i. e. "landed credit," from *fond*, "bottom" or "ground"], in Fr., a plan of borrowing money by mortgaging land, and repaying the borrowed money and int. in small instalments.

Credit, Letters of. See LETTERS OF CREDIT.

Credit Mobilier, krā-dē mō-bē-le-ā (i. e. "credit on movable or personal property"), a name given to a gigantic scheme or joint-stock co. which originated in Fr. in 1852, and was sanctioned by the govt., with a cap. of 60,000,000 francs. The objects of it are—1. To initiate trading enterprises of all kinds on the principle of limited liability; 2. To supersede or buy up trading cos., e. g. railway cos., and to substitute scrip and shares of its own for the shares and bonds of the co.; and 3. To carry on the business of a bank or bankers on the principle of limited liability. (See AYCARD, *Histoire de C. M.*)

"THE C. M. OF AMER." is the title of an organization char-

tered in Pa. in 1859 as a corporation for a gen. loan and contract business, and reorganized in 1864 with the intention, it would appear, of enabling the shareholders of the Union Pacific R. R. to construct their road without incurring any pecuniary liability in case of the failure of the enterprise. To this end the C. M. was to contract for the construction of the road at the risk of its own stockholders. The honesty of its management having been impeached, the affairs of the C. M. received (1872-73) an investigation from Cong., certain members of which were charged with having unlawfully profited by the enterprise.

Creed [from the Lat. *credo*, to "believe"; Fr. *croiance*; Ger. *Glaube*], a term originally signifying "belief," but commonly applied to a statement or profession of fundamental points of belief [Lat. *symbolum*; Fr. *symbole* or *profession de foi*; Ger. *Glaubensbekenntnis*], especially applicable to summaries of Chr. doctrine. Among the more important C. are: The Apostles' C., a summary of the Chr. faith which most Chr. chs. accept; the substance of it is no doubt very anc., but in its present form it dates from the 4th century. The Athanasian C., once supposed to be the work of Athanasius, was certainly composed by some other hand; it is still read in the Ch. of Eng. The Niceno-Constantinopolitan (or Nicene) C. was first adopted at the Council of Nice, 325 A. D.; it sets forth the faith of the Ch. in respect to Arianism. It is admitted by many Protts., and is held as authority in the Rom. and Gr. chs. The above are known as the 3 catholic or gen. C. In addition to these, nearly every denomination has its own special C.

Creedmoor, on R. R., L. I., 11 m. East of New York city, in Queens co., N. Y., has the largest and most complete rifle-range in the U. S., and is much frequented for target-practice. The range is under the control of an incorporated association, and was established in 1871, chiefly at the expense of the State and the cities of New York and Brooklyn.

Creeper [named from the movements of the bird], a popular name for birds of the family *Certhiidae*. The only N. Amer. species is the brown C. (*Certhia Americana*).

Creeping Palsy. See PROGRESSIVE MUSCULAR ATROPHY.

Crefeld, krä'felt, a town of Prus., 13 m. N. W. of Düsseldorf, on R. R. to Cologne. It has more extensive manufactures of silk than any other town in Prus.; has also cotton, linen, and woollen manufactures. Pop. 1880, 73,872.

Cremation. See FUNERAL RITES.

Cremo'na, a city of It., on the Po, 47 m. S. E. of Milan. It is surrounded by walls, has a cathedral, connected with which is one of the finest bell-towers in It., 372 ft. high, completed in 1284. It was formerly celebrated for the violins made here. Pop. 31,930.

Cre'ole [Sp. *criollo*, from *criar*, to "create," to "beget"; also to "nurture"; originally, a "child" or "nursling," a "descendant"], a native of the W. I. or S. Amer. descended from Europeans. The term is sometimes applied to those having some negro or Indian blood.

Cre'osote [Lat. *creosotum*, from the Gr. *κρέας*, "flesh," and *σῶω*, to "save," referring to its antiseptic qualities], a colorless, syrupy liquid obtained for commercial purposes chiefly from the tar of beech wood. Its taste is peculiar and almost insupportable when placed even in a minute quantity upon the tongue. It has an odor resembling that of smoked meats, which doubtless owe their preservation to its presence in the smoke they absorb. It is generally adulterated in commerce with a large percentage of phenol, which can with difficulty be detected. It is employed in toothache, in obstinate vomiting, and as an outward application in cancer. In an overdose it is an irritant poison, for which no antidote is known.

Cres'cent [from the Lat. *creresco*, to "increase"], the figure of the new moon; the "emblem" of the Ottoman empire, but used as the symbol of the Byzantines long before it was adopted by the Turks.

Cres'co, cap. of Howard co., Ia., on R. R., 19 m. N. W. of Calmar. Pop. 1870, 912; 1880, 1875.

Cre'sol [a term which appears to be derived from the first syllable of "creosote" and the first syllable of the Lat. *oleum*, "oil"], called also **Cresyl'ic Acid** and **Cres'yl**

Alcohol, a compound derived from coal-tar or from wood-tar by fractional distillation. Most of the carbolic acid of commerce contains a large percentage of C. It is sold in large quantities as "carbolic acid," and used as a disinfectant.

Cress, a name popularly applied to many cruciferous plants having a pungent taste and used in salads. The garden cress (*Lepidium sativum*) is an annual, a native of Asia. It is easily raised by a little artificial heat in winter. It is antiscorbutic. The bitter C. or cuckoo flower (*Cardamine pratensis*) is common in moist meadows in G. Brit. The flowers are white or light purple, and have stimulant and diaphoretic properties. They had once a reputation for the cure of epilepsy, particularly in children. This plant is also a native of Amer. The young leaves of this species, as well as of *Cardamine amara* and *Cardamine hirsuta*, both Brit. and the latter Amer., are used as salads in Europe.

Cressy, in France. See CRÉCY.

Crested Butte, Col. See APPENDIX.

Crest'line, R. R. junc., Crawford co., O., 63 m. N. by E. from Columbus. Pop. 1870, 2279; 1880, 2848.

Cres'ton, Union co., Ia., on R. R., 190 m. W. of Burlington. Pop. 1870, 411; 1880, 5081.

Cres'well (JOHN A. J.), a lawyer, b. at Port Deposit, Md. Nov. 18, 1828; was a Senator of the U. S. for a short term in 1865; in Mar. 1869 became P. M.-gen. of U. S.

Cresylic Alcohol, or **Cresylic Acid**. See CRESOL.

Cre'ta [the Lat. for "chalk," originally signifying "Cretan earth"], a pharmaceutical name for chalk (native carbonate of lime) and for the precipitated carbonate of lime. The former is more generally used. The chalk is powdered, washed, and dried, and known as *C. preparata* ("prepared chalk"), an excellent antacid remedy. *C. precipitata* (chemically prepared chalk) is more finely divided.

Cretaceous (kre-tā'shūs) [from the Lat. *creta*, "chalk"], **System**, in geol., the last formed or uppermost rocks of the secondary or mesozoic period. It takes its name from the chalk, which in Europe is one of the characteristic rocks of the lower strata of this system. C. beds abound in the U. S., and contain great beds of lignitic coal, which is by some referred to the tertiary, or to a transition group between the C. and the eocene.

Crete, or Can'dia (Gr. Κρήνη; Tur. *Kiridi*), a large island of the Mediterranean, between lat. 34° 57' and 35° 41' N. and lon. 23° 29' and 26° 30' E. It is 150 m. long and from 6 to 35 m. wide. Mt. Ida rises to the height of 7674 ft. Minos is traditionally said to have reigned here before the historical period. In the time of Homer C. was densely peopled by a Hellenic race. It is supposed at one time to have contained 1,200,000 inhabs., and 500,000 in 1204, when it was acquired by the Venetians. It was conquered by the Turks in 1699. In 1866 the Chrs. revolted and demanded annexation to Gr., but were put down in 1869. Pop. about 210,000.

Crete, a city and R. R. junc., Saline co., Neb., 20 m. from Lincoln; is the seat of Doane Coll. Pop. 1880, 1870.

Crétineau-Joly, krā-te-nō'zho-le' (JACQUES), a Fr. author, b. Sept. 23, 1803, at Fontenay, studied theol. in Paris, and wrote a number of works in defence of the interests of royalty and the Catholic Ch. He is best known by his *Hist. of the Jesuits*, an elaborate work in defence of that order. D. Jan. 3, 1875.

Cretinism [Fr. *crétinisme*; etymology uncertain], a name applied to epidemic idiocy or defective mentality, usually associated with phys. deformity and moral debasement. It is frequently hereditary, and is almost always found in connection with goitre. It prevails especially in deep alpine valleys, not only in Switz. and It., but in the Pyrenees and Himalayas. It is also found in Chi., and in Bengal is frequent on calcareous plains. In Europe it is seldom found at a higher elevation than 3000 ft. Cretins are often very repulsive, dirty, and shameless, their appetite voracious, the mouth large and open, the eyes small and usually crossed, the nose flat and broad, the skull wide at the top, with a narrow base, and the forehead retreating. The complexion is cadaverous, the limbs rachitic, the whole body dwarfish except the hands and feet, which are large. C. is a phys. degeneration, caused by defective nutrition, bad ventilation, lack of sunlight, and especially by calcareous matter taken into the system in drinking-water. Like goitre, it is said to prevail especially where magnesian limestone abounds.

Creuzer, kroitz'er (GEORGE FRIEDRICH), a Ger. philologist and antiquary, b. at Marburg Mar. 10, 1771, prof. of philology and anc. hist. at Heidelberg in 1804. His prin. works is his *Symbolism and Mythology of Anc. Peoples*, especially the Grs. He edited the *Ox. Ptolemy*. D. Feb. 16, 1858.

Crichton, kri'ton (JAMES), called the ADMIRABLE CRICHTON, b. in Perthshire in 1551 or 1560, was a son of Robert Crichton, lord advocate of Scot. Ed. at St. Andrew's, before he was 20 he had run through the entire circle of the sciences. He could speak in 10 langs., and was adroit in all manly accomplishments. He journeyed through Europe about 1580, challenging all scholars to a learned disputation in any of 12 tongues. He vanquished all the doctors of all the univs.; moreover he disarmed the most famous swordsman of the time in fencing. He found his death in 1583, at the hands of his pupil Vincentio, son of Gonzago, the duke of Mantua, a dissolute youth whom he had roughly jostled in a carnival encounter. Unmasking on discovering his young opponent, he presented his sword and bared his breast, and the brutal stripling stabbed him. The stories of his accomplishments are no doubt exaggerated. (See P. F. TYTLER, *Admirable Crichton*.)

Crick-et, the popular name of certain orthopterous insects, of the family Achetidae. By friction of the wings the males produce that stridulous sound for which these insects are so well known. The U. S. have several species, *Acheta abbreviata*, etc.

Crillon, kre-yōn', de (LOUIS DES BALBES DE BERTON), a Fr. warrior, b. in Provence in 1541. He fought against the Huguenots in the c. wars. During the reign of Henry III. he fought for that king against the Catholic League. In 1589 he entered the service of Henry IV., who styled him "the bravest of the brave." D. 1615.

Crimea, krim-ee'a, **The** [Rus. *Krim*; anc. *Taurica Chersonesus*], a peninsula of S. Rus., nearly surrounded by the Black Sea and the Sea of Azof, and connected with the mainland by the Isthmus of Perikop, 5 m. broad. Its length is nearly 200 m. from E. to W. The N. W. part is a treeless plain, fit only for pasturage. The S. E. part has wooded mts. and fertile but ill cultivated valleys. The C. was conquered in the 13th century by the Tartars, who made it the khanate of Krim Tartary; it was annexed to Rus. in 1783. Area, 7634 sq. m. Pop. about 200,000.

Crimean War was chiefly waged in the Crimea, by Fr., G. Brit., Tur., and Sard., allied against Rus. The immediate occasion of the war was the claim of Rus. to be the protector of the Gr. Ch. in Tur. The Rus. army entered Wallachia and Moldavia in July 1853, and war was declared by the Porte in Oct. An alliance having been formed between Fr., G. Brit., and Tur., in Mar. 1854, war was declared by them against Rus. Their armies landed, May 29, at Varna, where they suffered severely from cholera. They sailed for the Crimea, and defeated the Rus. at the battle of the Alma Sept. 20. Operations were then transferred to the vicinity of Sevastopol, the bombardment of which was opened Oct. 17. The battle of Balaklava was fought Oct. 25, that of Inkerman Nov. 5. Sard. joined the alliance Jan. 1855. During the winter of 1854-55 the Brit. army suffered severely from the weather and insufficient supplies. The allies were repulsed June 18, 1855, in an attack upon the fts. of Malakoff and the Redan. The Fr. stormed the Malakoff Sept. 8, and Sevastopol was abandoned by the Rus. An

armistice was agreed upon Feb. 26, 1856, and the war was brought to a close by the treaty of Paris, Mar. 30, 1856. (See KINGLAKE'S *Hist. of the Crimean War*.)

Crinoid'ea, or Crinoideæ [from the Gr. κρίνον, a "lily," and εἶδος, "appearance"], a class or sub-class of echinoderms, with a body composed of polygonal plates, ambulacral tubes, tentaculiform and in ambulacral grooves, and generally with an articulated calcareous stem, and with radiating articulated arms furnished with pinnules.



Apicrinites trigintidacluyus (a fossil crinoid).

The fossil forms are sometimes called stone-lilies. The recent species of crinoids are few, but the extinct species are so numerous that their fossils constitute the greater part of extensive strata of limestone. The Burlington limestone contains a great variety of beautiful crinoids. Three orders or sub-orders are generally recognized—(1) Brachiata or typical crinoids, (2) Blastoida, and (3) Cystidea.

Crī'osphinx [from the Gr. κρύς, a "ram"], a term applied to images, found in Egypt, of sphinxes having a ram's head instead of a human head. The latter are termed *androsphinxes*.

Cris'pi (FRANCESCO), an It. statesman, b. Oct. 4, 1819, at Ribera, was a lawyer in Naples, and in 1848 one of the heads of the insurrection in Palermo. In 1860 he aided Garibaldi in expelling the Bourbons, which caused the annexation of Naples and Sic. to the kingdom of It.

Cris'pin, SAINT, a native of Rome, is supposed to have worked at the trade of a shoemaker in Gaul. In 257 A. D. he and his brother Crispinian suffered martyrdom. He is the patron saint of shoemakers. St. Crispin's day is Oct. 25.

Crispin, Knights of Saint, a secret society among shoemakers, founded in 1866 in Milwaukee, Wis. They have an organization like that of the Free Masons and other secret orders. All the lodges of one State are under the jurisdiction of a State grand lodge, while the latter is subordinate to the U. S. grand lodge. The object of the order is to protect the interests of the workmen against employers, to regulate the wages, and to establish special funds in support of the members of the order and their families in case of sickness and death. There is also an order of the "Daughters of St. C.," embracing women employed in the manufacture of shoes and boots.

Crit'ias [Κριτίας], an Athenian orator and poet, was a pupil of Socrates. In 404 he became one of the ruling body called Thirty Tyrants. He was killed in a battle by the army of Thrasybulus in 404 B. C. Some fragments of his elegies remain.

Critola'us [Κριτόλαος], a Gr. philos., b. at Phaselis, in Lycia; eminent as an orator as well as a philos. He was sent to Rome on an important embassy with Carneades about 155 B. C.

Crit'tenden (GEORGE B.), GENERAL, b. in Russellville, Ky., Mar. 20, 1811, a son of the following; grad. at W. Pt. 1832; began to practice law in Ky. in 1835; served in Mex. war; lieut.-col. in U. S. A.; resigned in 1861, and joined the S. Confederacy; became a maj.-gen., was defeated at Mill Spring, Ky., Jan. 19, 1862; kept in arrest by the Confeds. till Nov. 1863, and soon after resigned. D. Nov. 27, 1880.

Crittenden (JOHN JORDON), b. in Woodford co., Ky., Sept. 10, 1786. He studied law, which he practised with distinction; was elected U. S. Senator for a short term in 1817, and again in 1835 for 6 yrs. In Mar. 1841 he was appointed atty.-gen. of the U. S., but resigned in Sept. of that yr. He was again elected U. S. Senator in 1843, and was chosen gov. of Ky. in 1848. He was atty.-gen. in the cabinet of Pres. Fillmore from July 1850 to Mar. 1853. In 1855 he again became a U. S. Senator. He opposed the secession movement in 1860-61, and, performing the part of a mediator, offered in the Senate a series of resolutions called the "Crittenden Compromise," which were not adopted. D. July 26, 1863.

Crittenden (THOMAS LEONIDAS), a gen., a son of the preceding, was b. at Russellville, Ky., in 1819. He served with honor in the Mex. war. He commanded a division of the U. army at Shiloh, Apr. 1862, and obtained the rank of maj.-gen. of volunteers in the summer of that yr. He commanded a corps at the battle of Stone River, which ended Jan. 2, 1863.

Croatia, kro-á'she-a, a prov. of the Austro-Hungarian monarchy, bounded N. W. by Carniola and Styria, W. by the Adriatic, N. E. by Hungary, S. by Tur. and Slavonia. This region was anciently inhabited by the Pannonians, who were conquered by the Roms. in the reign of Augustus. In 940 A. D. the Croats or Horvats migrated hither from the Carpathian Mts., and gave the country the name of C., which was independent until 1097, when it was conquered by the king of Hungary. C. with Slavonia forms a division of Hungary. Area of both, 16,773 sq. m. Pop. 1,732,261.

Crook'ett, Tex. See APPENDIX.

Crockett (DAVID), a famous hunter and humorist, b. in Tenn. Aug. 17, 1786; was elected M. C. in 1827, 1829, and 1831. His habits were eccentric. He enlisted in the Tex. army in revolt against Mex., was taken prisoner at Ft. Alamo, and massacred Mar. 6, 1836.

Crocodile [Gr. κροκοδείλος; Lat. *crocodilus*], a common name for the Crocodylinae or Crocodylidae, with a comparatively narrow upper jaw and with the 2 anterior mandibular teeth received into pits of the intermaxillary, and the canines in grooves at the junction of the intermaxillary



Nilotic Crocodile.

and maxillary. The C. of the Nile (*Crocodylus vulgaris*), now seldom seen below the first cataract, is a most formidable animal. Living exclusively on animal food, and preferring tainted meat, it is useful in purifying the waters. It also feeds on fish, and is a dangerous foe to cattle and other animals. An Amer. C. (*Crocodylus acutus*) occurs in the S. part of Fla.

Croc'cus [Gr. κρόκος, "saffron"], a large genus of Iridaceous plants (herbs) native of Asia and Europe. The *C. vernus* and other species are well known as affording many varieties of very early spring flowers which are common in cultivation. *C. sativus* and other species blossom in autumn. Their orange-red stigmas, when dried, constitute the drug known as "true" saffron.

Crocus of Mars, a name given to the finely divided red oxide of iron, used in med. and in the arts. The "crocus of antimony" of the old chemists was a mixture of the tersulphide and teroxide of antimony. The "crocuses" received their name from their saffron color.

Croes (JOHN), S. T. D. See APPENDIX.

Croesus, kree'sus [Gr. Κροισός], a king of Lydia proverbial for his riches, b. about 590 B. C. Sardis was the cap. of his kingdom. He is said to have enriched himself by the golden sand of Pactolus. In 546 B. C. he was defeated and taken prisoner by Cyrus of Per., who treated him generously.

Croghan, kro'gan (GEORGE), an inspector-gen. of the U. S. A., b. in Ky. Nov. 15, 1791. He served as volunteer aide in the battle of Tippecanoe 1811; was appointed capt. in the 19th Inf. He distinguished himself at the defence of Ft. Meigs and sortie May 15, 1813, and for his gallant conduct in the defence of Ft. Stephenson, against a greatly superior force of Brit. and Indians, he was presented by Cong. with a gold medal. D. Jan. 8, 1849.

Cro'ty (DAVID G.), b. in New York Nov. 3, 1829, learned the trade of silversmith; was for a time a student in New York Univ.; taught phonography; was employed on the *Evening Post* and New York *Herald* 1854-58; was ed. and proprietor of *Rockford Daily News*; city ed. upon New York *World*, subsequently managing ed.; resigned in 1871, and became managing ed. of the *Graphic*. Wrote a *Life of Horatio Seymour* and *The Postivist's Primer*.

Croly (GEORGE), LL.D., b. in Dublin, Ire., Aug. 1780; took orders in Anglican Ch., and became in 1835 rector of St. Stephen's, Wallbrook, Lond. Wrote *Hist. of George IV.* *Poetical Works*, *Cadline*, a *Tragedy*, *Life of Edmund Burke*, etc. D. Nov. 24, 1860.

Croly (JENNIE CUNNINGHAM), "Jennie June," b. in Leicestershire, Eng., came early to the U. S. with her parents, and married in 1856 D. G. Croly of New York. Shortly afterward she began her literary activity as a contributor to the *Sunday Dispatch*, and has ever since written for the press: inaugurated system of duplicate fashion correspondence; has edited *Madame Demorest's Magazine*. She called the first women's cong. in New York 1856, and the second 1869, and in 1868 inaugurated the Sorosis.

Cromarty Frith, an inlet of the N. Sea, in Scot. It communicates with Moray Frith, is 18 m. long, varies in width from 3 to 5 m., and forms a harbor, in which the largest fleet could ride safely.

Cromlech, krom'lek [a Welsh term signifying a "bent or concave stone"], or **Dolmen**, a rude structure of 2 or more unhewn stones fixed vertically in the ground, and supporting a large flat stone placed in a horizontal position. C. are found in Eng., Wales, Ire., Fr., Ger., Den., Hindostan,

and other countries. In many instances C. have been discovered in the interior of earthen mounds or barrows.

Crompton (SAMUEL), inventor of the spinning-mule, b. near Bolton, in Lancashire, Eng., Dec. 3, 1753. Farming and weaving were the employments of his boyhood. For his invention, which was perfected in 1779, he received, in subscriptions from the manufacturers, only £67 6s. 6d. Parl. in 1812 voted him £5000. D. June 26, 1827. (See FRENCH, *Life of Crompton*.)

Cromwell (HENRY), a younger son of Oliver, b. at Huntingdon Jan. 1628. He served as col. under his father in Ire. in 1649, became M. P. in 1653, and lord deputy of Ire. in 1657. After 1659 he lived as a private citizen. D. 1674.

Cromwell (OLIVER), lord protector of Eng., b. at Huntingdon Apr. 25, 1599. He was a son of Robert Cromwell and a grandson of Sir Henry Cromwell. In 1616 he entered Sidney Sussex Coll., Cambridge, which he quitted on the death of his father in June 1617. In 1620 he married and settled on his estate at Huntingdon. In the Short Parl. of 1628 he made but one speech, and during the 11 yrs. prorogation he devoted his time to the cultivation of his farms. He represented Cambridge in the Short Parl., which met in Apr. 1640, and in the Long Parl., which met the same yr. He was then a zealous member of the Country party, and took an active part in the business of the House, but was not a fluent speaker. Having raised 2 companies of volunteers he entered the army of the Parl. in 1642 as a capt. of cav., and distinguished himself by his strict discipline. He soon became a col., and formed a body of fanatical soldiers, the redoubtable "Ironsides." On July 2, 1644, he commanded the victorious left wing at Marston Moor. C. was the master spirit of the Independents, who were one of the two parties into which the Parliamentarians were divided, the Presbs. being the other. When the army was reorganized, and Fairfax appointed gen.-in-chief, C. was promoted to the rank of lieutenant-gen. In command of the right wing at Naseby, June 1645, he greatly contributed to that decisive victory. In May 1646 the king surrendered himself to the Scot. army, which transferred him to the custody of the Eng. Parl., in which the Presbs. had a majority. In June 1647 the king was seized by one of C.'s officers, and removed from the custody of Parl. into that of the army, which the Independents controlled. In Aug. 1648 C. defeated the Duke of Hamilton, who commanded an army of Scot. royalists, at the battle of Preston. He was a member of the court which tried the king and condemned him to death in Jan. 1649. In 1649 he went to Ire. as lord lieutenant with an army, and subdued the rebellious Irish royalists with extreme severity. The Scotch now proclaimed Charles II. as their king, and raised an army for the invasion of Eng. C., who had returned to Eng. in May 1650, was then appointed commander-in-chief. He signally defeated the Scot. army at Dunbar on the 3d of Sept. 1650, and took about 10,000 prisoners. Charles II., having been reinforced, then marched into Eng. C. pursued him, and gained a decisive victory at Worcester, Sept. 3, 1651. In this great crisis he displayed eminent vigor and sagacity. Clarendon observes that "his parts seemed to be raised, as if he had concealed his faculties until he had occasion to use them." In Apr. 1653 he dissolved the remnant of the Long Parl., which was called the Rump, summoning soon a new Parl. The same yr. he assumed the title of Lord Protector of the Commonwealth. The title of king was offered to him by Parl., but he declined it. He was stigmatized as usurper by the royalists, and also by the republicans. D. Sept. 3, 1658, and was succeeded by his son Richard. (See CARLYLE, *Letters and Speeches of Cromwell*.)

Cromwell (RICHARD), a son of the preceding, b. at Huntingdon Oct. 4, 1626. He entered Lincoln's Inn as a student of law in 1647. He was a man of moderate capacity, virtuous, and unambitious. After Oliver became Protector, Richard was elected to Parl., and was a member of the privy council. He succeeded his father as Protector in Sept. 1658, but the army was disaffected, and he was not earnestly supported by the people. He resigned his power in Apr. 1659, and passed the rest of his life in obscurity and peace. D. July 12, 1712.

Cromwell (THOMAS), earl of Essex, an Eng. courtier and minister of state, b. at Putney about 1490. Soon after the fall of Wolsey he entered the civil service of Henry VIII. He promoted the Ref. by his strenuous efforts to destroy the supremacy of the pope. In 1534 he was appointed prin. sec. of state, and about a yr. later vicar-gen. with power to suppress monasteries. He was for several yrs. the most powerful subject in Eng., and was created earl of Essex in 1539. He promoted the marriage of Henry VIII. with Anne of Cleves, because she favored the Lutheran doctrines. His agency in this affair was conducive to his own ruin, for the capricious king regarded her with disgust. C. was tried for treason, and was beheaded July 28, 1540. (See FROUDE, *Hist. of Eng.*, chaps. vi.-xvii.)

Cro'nos [Κρόνος], a god of the Gr. mythology, was said to be a son of Uranus and the father of Jupiter, Neptune, Juno, and Ceres. He is commonly identified with the Rom. Saturn.

Cronstadt, krön'stadt [Ger. "crown city"], a fortified seaport of Rus., on the island of Kotlin, in the Gulf of Finland, about 20 m. W. of St. Petersburg, and opposite the mouth of the river Neva. It is the greatest naval station of Rus. The harbor is blocked up by ice for nearly 5 months in the yr. Pop. 48,276.

Crook (GEORGE), b. Sept. 8, 1828, near Dayton, O.; grad. at W. P. t. in 1852, and July 28, 1866, became lieutenant-col. 23d Inf. He served on frontier duty 1852-61; in the C. war he became col. 36th O. Volunteers, and was promoted, Oct. 21, 1864, to be maj.-gen. U. S. volunteers, serving in W. Va. operations 1861-62; was engaged in campaigns in W. Va., N. Va., Md., and at S. Mountain and Antietam; in Tullahoma, Hoover's Gap, Chickamauga, Berryville, Fisher's Hill, Strasburg, Opequan, and Cedar Creek; in command of cav. of Army of the Potomac 1865, engaged at Dinwiddie

C.-H., Jetersville, Sailor's Creek, Farmville, and Appomattox C.-H., and in command of the dist. of Wilmington, N. C., 1855-66. Has since commanded the dist. of Id. also the dist. of Ari., having quelled all Indian disturbances. Promoted to be brig.-gen. U. S. A. Oct. 29, 1873.

Crooked Lake, in W. N. Y., now generally called Keuka Lake, about 18 m. long, greatest breadth $1\frac{1}{2}$ m.; lies 718 ft. above the ocean.

Crooks (GEORGE R.), D. D., LL.D., a Meth. divine and journalist, b. in Phila. Feb. 3, 1822, grad. in 1840 at Dickinson Coll.; joined the Meth. ministry in 1841, travelled and preached in Ill.; was an adjunct prof. of anc. langs. in 1846; in 1848 resumed the ministry, occupying pulpits in Phila., Wilmington, New York, and Brooklyn; in conjunction with Prof. McClintock, prepared *A First Book in Lat. and A First Book in Gr.*; also edited Butler's *Analogy*, and in 1860 was elected first ed. of the *Methodist*, New York.

Crookston, Minn. See APPENDIX.

Cropsey (JASPER FRANK), a landscape-painter, b. at Westfield, Richmond co., N. Y., Feb. 18, 1823. He became a resident of Eng. in 1856.

Crosby (REV. HOWARD), D. D., LL.D., was b. in New York Feb. 27, 1826, grad. at the New York Univ. in 1844; became prof. of Gr. in Rutgers Coll., N. J., in 1859, pastor of First Presb. ch. in New Brunswick in 1861, and of the 4th avenue Presb. ch. in New York in 1863; chancellor of Univ. of New York 1870-81. Wrote *Leads of the Modern*, (*Edipus Tyrannus*, *Notes on the N. T.*, and *Life of Jesus*).

Cross (JOHN SCHUYLER). See APPENDIX.

Cross (Gr. *στροσος*; Lat. *crux* (gen. *crucis*); Fr. *croix*; Sp. *cruc*; Ger. *Kreuz*; It. *croce*), an instrument anciently used for inflicting the punishment of death. It was often a simple stake, upon which the victim was either impaled or tied. There were also other forms, as the *crux decussata*, or St. Andrew's C. (X); the *crux commissa*, or St. Anthony's C. (T); and the *crux innimisa* (†), upon which, according to uniform tradition, our Lord suffered.

Cross-Bill, the name of birds of the genus *Loxia*. The mandibles of the bill cross each other, and are crescent-shaped. The Amer. C.-B. (*L. Americana*) is distinct from the European (*L. curvirostra*), but much resembles it. The male is red, the female greenish-olive above, grayish below. The parrot C.-B. (*L. polyopsittacus*) is another European species. The Amer. white-winged C.-B. (*L. leucoptera*) is of a carmine color, with black wings and tail; the wings have 2 white bands. It inhabits N. parts of N. Amer.

Crosse (ANDREW), an Eng. gentleman who gained distinction by his experiments in electricity, b. in Somersetshire June 17, 1784, ed. at Ox. He commenced in 1807 experiments with a view to form artificial crystals by a voltaic battery, in which he was successful. Some excitement was produced in the same yr. by the apparent generation of insects of the genus *Acarus* during his experiments with a voltaic battery. D. July 6, 1855.

Cross-Examination, in the law of evidence, is the examination of a witness by a party against whom he is called to testify, and is thus distinguished from a direct examination, which is had by the party calling the witness. The range of a C.-E. is much wider than that of a direct examination, the party examining being allowed to impeach the credit of the witness, and to show the inconsistency of his statements, his bias, his want of memory, and other matters tending to reduce the value of his testimony.

Cross Keys, a village of Rockingham co., Va., near which a sharp but indecisive action was fought, June 8, 1862, between the U. force under Fremont and the Confeds. under Jackson.

Cross, **The Southern**, the most conspicuous constellation of the S. hemisphere, is not visible in the N. hemisphere, except in regions near the equator. It consists of 4 bright stars arranged in the form of a cross. The 2 stars which mark the summit and foot of the C. have nearly the same right ascension, and serve as pointers to the S. pole.

Crotalus. See RATTLESNAKE.

Croton (Gr. *κρότων*), a genus of trees, shrubs, and herbs of the order Euphorbiaceæ; the species are numerous and mostly tropical. Some of them possess the acrid properties of their order in excess. One of the most important is the *C. Tiglium*, which yields croton oil. It is a native of the tropical parts of Asia. The seeds were formerly used as a purgative, but their use is disapproved on account of their uncertain and violent action; they are now chiefly valuable for the oil which they yield. Some species of C. are fragrant and aromatic, and are employed in med. One of these is *cascarilla*. Eight species are native to the S. States.

Croton Aqueduct. See AQUEDUCT.

Croton Oil (*Oleum Tiglid*) is the expressed oil of the seeds of *C. Tiglium*, a small tree which grows in various parts of India. In taste it is hot and acrid, varies from a pale yellow to a reddish-brown color, has a faint, peculiar smell, and is miscible with alcohol, ether, and oil of turpentine. It is a powerful purgative.

Croton River rises in Dutchess co., N. Y., flows S. and S. W., and enters the Hudson River about 35 m. above New York city, which derives from this river much of its supply of water.

Croup. All the forms of C. have one thing in common—viz. an obstruction (catarrhal or inflammatory) in the interior of the larynx, particularly on the vocal chords. The milder form is called "false C." or "pseudo C." The passage of air through the larynx is impeded by mucus and spasmodic action of its muscular apparatus. It is frequently found in children who have before suffered from "colds," especially from catarrh of the throat and enlarged tonsils, and who have been too carefully kept from the contact with cold air and cold water. The attack of "pseudo C." is sudden or preceded by nasal or bronchial catarrh. It takes place after the child has been asleep for some hours. It wakes up about midnight with a barking cough, loud and laborious respiration, small and frequent pulse, and more

or less fever. In bad cases the veins of the neck and face swell, the face is bloated and bluish, and suffocation appears imminent. This attack may last from half an hour to 6 hours. It terminates in perspiration, the cough becoming moister, the voice being hoarse, but may return in the next night. Some children are apt to have many attacks in the course of many yrs. A very severe attack requires an emetic (powdered ipecac, sulphate of zinc, sulphate of copper, turpeth mineral); milder attacks require very little or no treatment. Let the child drink a little hot milk at short intervals. It must not sleep longer than an hour at a time, and should take a drink on waking up. Put a mustard plaster round the neck, or apply cold water at short intervals; where inhalation is very spasmodic, half a teaspoonful of paregoric (one dose) or one grain of Dover's powder. The other form, or "true C.," "membranous C.," is very dangerous. Under ordinary circumstances, and with a treatment exclusively medicinal, 90 out of 100 die. It consists in the obstruction of the larynx by a deposit of a whitish or grayish "croupous" membrane. There is hoarseness or even aphonia. When membrane covers the whole interior of the larynx, both inspiration and expiration are impeded, and aphonia is complete. When they result in serous (watery) swelling of the larynx (especially the posterior insertion of the vocal chords) only, expiration is easier and the voice not entirely suppressed. The first stage is a simple catarrh only, which is attended with but little fever, and therefore little thought of. It may last a few days. In the second stage (12 hours to 14 days) the symptoms of obstruction show themselves; the voice is hoarse, and at last absent; respiration is slow, labored, and loud; the muscles of the neck and chest exerted to their utmost; the insertion of the diaphragm drawn in with every inspiration, deep grooves forming with every inspiration above and below the clavicle, the child tossing about, supporting itself on its knees, and throwing the head backward. The lips begin to exhibit a bluish hue. This symptom (cyanosis) increases in the third stage, where the influence of the insufficient oxygenization of the blood is more visible in gen. paleness, bluishness, in sleepiness, in the frequent and irregular pulse, in the cool surface, convulsive twitchings, and loss of consciousness. Unfortunately, the latter symptom is not constant, many children dying with undisturbed intellect. Death is the result of direct suffocation, or the result of a complication of the disease with bronchitis or pneumonia. Medicinal treatment is very unsatisfactory. We seldom succeed in dissolving and removing the membranes. Nitrate-of-silver applications to the larynx have justly been discarded. Inhalation of diluted lime-water through an atomizer or of lactic acid in glycerine and water (1:8-10) has proved successful in a few instances. Emetics are of use in such cases only where the membranes are known to be partially loosened (peculiar flapping sound in respiration), or when the presence of mucus, in addition to a membrane, proves dangerous. Ice-pills frequently, ice applications to the throat, moist air, 1-2 grains of chlorate of potassa in a teaspoonful of water every $\frac{1}{2}$ hour; inhalations of carbolic acid, either through an atomizer or sprinkled through the room; muriate of ammonia, evaporated on a stove or hot coal—all such means may be tried, but not to such an extent as to interfere with a copious supply of pure air, the effect of which may still be improved by inhalation of oxygen gas. Where the disease runs its course with fever, quinia, seldom aconite or veratrum. Most cases will resist treatment. Twenty or 25 per cent. will be saved by tracheotomy, an operation consisting in the artificial opening of the windpipe below the obstructed larynx. This opening in the trachea is kept patent by means of a silver or hard-rubber tube inserted in it until the disease has disappeared from the larynx. The relief given by this operation is surprising, and although the mortality after its performance is still very great, death is almost always easier, resulting more from exhaustion than from suffocation. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. ABRAHAM JACOB, M. D.]

Crow [*A. S. crawe*, so called from the sound produced by the bird], a name popularly applied to several birds of the family *Corvidæ*. The common Amer. C. (*Corvus Americanus*) is black with purplish-violet gloss, and inhabits the U. S. The fish C. of the Atlantic coast of the U. S. (*Corvus œsifragus*) is smaller, and has the gloss on the belly green instead of violet. The hooded C. of Europe (*Corvus cornix*) is shiny black, but its neck, back, and under parts are smoky gray.

Crown [Lat. *corona*; Fr. *couronne*; Ger. *Krone*], originally a fillet of leaves, used by the anc. in the observance of religious rites and festive occasions. In Gr. such C. were bestowed upon victors in the games, and upon citizens who had rendered great services to the state. In Rome C. of laurel, or oak leaves and acorns, were rewards for courage, and were of several sorts, the one most esteemed being that bestowed upon a gen. who had first come to the relief of a beleaguered army or town. The C. as a symbol of royalty was first used by Constantine the Great, about 306 A. D. It was assumed by the kings of Sp. about 580, by those of Fr. in 768. The papal tiara was at first a simple pointed cap, to which the triple C. were added one by one at different periods between 523 and 1334.

Crown and Half Crown were originally Eng. gold coins issued by Henry VIII. in 1527. The first commission for coining them of silver was signed by Edward VI. Oct. 1, 1551. The C. at present is a silver coin worth 5s. sterling—about \$1.25 U. S. in silver.

Crown Glass, the glass usually employed for windows. It is made of a mixture of 100 parts of sand, 35 of soda-ash or potash, and 35 of chalk. It is essentially a silicate of soda (or potash) and lime.

Crown Imperial. See FRITILLARY.

Crown Point, cap. of Lake co., Ind., on R. R., 41 m. S. S. E. of Chicago. Pop. 1880, 1708.

Crown Point, Essex co., N. Y., settled by the Fr., who in 1731 built a ft. here upon a cape projecting into Lake

(Champlain. This was taken by the Brit. in 1759, and in 1775 was captured by the Amer. Pop. pt. 1870, 2449; 1880, 4287.

Crown Prince (Ger. *Kron Prinz*); in Prus., Swc., and some other European countries, is the title of the heir-apparent to the throne.

Crown, Treaty of the, a treaty made at Vienna Nov. 16, 1700, in which the emp. Leopold recognized the elector Frederick III. as king of Prus. Frederick engaged to furnish 10,000 men to support Aus. in the Diet, and to vote as elector for the descendants of the emp.'s son, Joseph, king of the Romans.

Crozer Theological Seminary (Bap.) is located at Upland, Pa., 14 m. from Phila., on the Phila., Wilmington and Baltimore R. R. It was founded and endowed through the liberality of the members of the Crozer family, residents of Upland and Phila. in 1868.

Crucifixion [Lat. *crucifixio*, from *crucifigō*, *crucifigam*, to "crucify," from *cruce*, *crucis*, a "cross," and *figo*, *figam*, to "fix" or "fasten"], literally, "fastening on the cross," a form of cap. punishment common among almost all anc. nations. It consisted in nailing or binding the criminal to a cross. The legs were often broken to hasten death. C. was abolished by Constantine the Great, probably in 315.

Cru'den (ALEXANDER), b. at Aberdeen in Scot., May 31, 1700; ed. for the ministry of the Kirk, but never preached, having had his reason unsettled by disappointment in love. He first taught the classics, afterward opened a bookstore in Lond., then became librarian to Queen Caroline, wife of George II. In 1737 he pub. his *Complete Concordance of the O. and N. T.* He was several times an inmate of lunatic asylums. D. Nov. 1, 1770.

Cruikshank, krook'shank (GEORGE), an Eng. caricaturist, son of an engraver, originally from Scot., b. in Lond. Sept. 28, 1792. He illustrated William Hone's satirical works. Produced *The Bottle*, 8 plates depicting the drunkard's career. He subsequently devoted himself to oil-painting. D. Feb. 1878.

Crusade' [from the Sp. *crusada* (from *cruz*, a "cross"); Catalan *crusada*; Fr. *croisiade*; It. *crociata*; Ger. *Kreuzzug*], a war waged for the defence or advancement of the cross, but applied especially to the religious wars carried on for the recovery of Pal. from the Mohammedans. From a very early period Chrs. were in the habit of making pilgrimages to Jerusalem and other parts of Pal. In 637 Jerusalem fell into the hands of the Mohammedans, but pilgrimages continued with little opposition till the year 1076, when Pal., then governed by the Egyptian caliph, was overrun and conquered by hordes of Seljuik Turks. Accounts of the indignities perpetrated by these barbarians produced a deep and powerful impression in all parts of Christendom. At length Peter the Hermit, a native of Amiens in Fr., having visited Pal. and witnessed the cruelty of the Turks, reported what he had seen to Urban II., by whom encouraged, he travelled through It. and Fr., and by his zeal and eloquence excited an extraordinary religious enthusiasm among all classes. In 1095, at a council held at Clermont, a C. was resolved on. There were 8 C., as follows: (1) 1096-1099 A. D.; (2) 1147-1149; (3) 1189-1192; (4) 1202-1204; (5) 1216-1229; (6) 1238-1240; (7) 1248-1254; (8) 1270-1272. Of these, the 1st, 2d, 3d, and 6th had Pal. for their theatre; the 4th Constantinople; the 5th and 7th Egypt; the 8th Tunis and Pal.

Beside these, the Children's C. in 1212 is one of the strangest episodes in hist. An army of unarmed Fr. children, 30,000 strong, headed by a boy named Stephen, set out for the Holy Land by way of Marseilles. A similar army of Ger. children, 20,000 strong, led by a boy named Nicholas, crossed the Alps at Mt. Cenis. A second army of Ger. children, numbering nearly 20,000, the name of whose leader is not known, crossed the Alps by a more easterly route, touching the sea at Brindisi. Their idea was that the Mediterranean would open a path for them to Pal., and that the Holy Land would be recovered and the Moslems converted by miracles. Some of the children got discouraged and returned home; many stopped by the way, but most of them perished on the march, were lost at sea, or were sold into slavery.

The chief result of the C. was a better acquaintance of the people of W. Europe with 2 civilizations more advanced than their own—the Gr. and the Saracenic. Thus a powerful impulse was given both to the lit. and the commerce of Europe. (See MILMAN, *Hist. of Lat. Christianity*, and MICHAUD, *Hist. of the Crusades*.) R. D. HITCHCOCK.

Crushing Machinery. See GRINDING AND CRUSHING MACHINERY, by PROF. R. H. THURSTON, C. E.

Cruveilhier's Disease. See PROGRESSIVE MUSCULAR ATROPHY.

Cryolite [from the Gr. *κρύος*, "ice," and *λίθος*, a "stone"] is so named because it melts in the flame of a candle. It is a double fluoride of aluminium and sodium, and is important as a source of the metal aluminium. When fused it may be made into table-ware much resembling porcelain, and known as "hot-cast porcelain."

Crypto-Calvinists, a name applied in the last half of the 16th century to followers of Melancthon (called also Philippists), who earnestly desired the union of Lutherans and Calvinists, and were charged with leaning too strongly toward the Calvinistic doctrine of the Lord's Supper.

Cryptography [from the Gr. *κρυπτός*, "hidden," and *γράφω*, to "write"], the art of writing or telegraphing in cipher, or in such a way that the matter written cannot be read by any one not in possession of the necessary key. Military and naval signals resemble cryptographic writing in this respect.

Crystal. See CRYSTALLOGRAPHY.

Crystalline Rocks, a term applied in geol. to such rocks as granite, quartz, and marble, which show by their C. structure that they have been brought into their present state by the action of chemical forces. The greater number of intruded igneous rocks (such as basalt) possess the C. structure.

Crystallography is the science of crystals. It is de-

rived from the Gr. *κρύσταλλος*, a "crystal," and *γράφω*, to "describe." A crystal is a natural inorganic solid, bounded by plane surfaces, which are symmetrically arranged around certain imaginary lines called *axes*. *Κρύσταλλος* originally meant "ice;" it was afterward applied to the transparent variety of quartz, because it was thought that rock-crystal was water turned into stone; it was subsequently applied indifferently to any solid which assumed a geometrical shape by natural laws.

All crystals may be referred to 7 systems, 6 of which are referred to 3 axes, and one of them to 4. These systems are divided into 2 classes, according as the axes are or not at right angles. Those which are at right angles are called the *orthometric*, and those which are not are called *clinometric* systems. In each one of them there are 3 varieties. When all the axes are equal and at right angles, the system is called *isometric*. When only 2 are equal, but all at right angles, it is called the *tetragonal*. When none of the axes are equal, but all are at right angles, it is called the *orthorhombic*. The *clinometric* systems are called, respectively, the *monoclinic*, the *dichlinic*, and the *trichlinic*, according as the axes have different inclinations. The single system of 4 axes is called the *hexagonal*.

In all of these systems one axis is placed upright, and is called the vertical axis. In the isometric, tetragonal, and hexagonal systems the other axes are simply called the basal axes, while in each of the other systems each axis has its own name. The axes always terminate in homologous parts, whether these parts are edges or angles. The axes form a system of co-ordinates by which the position of any face may be determined. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. THOMAS EGGLESTON, LL.D.]

Crystal Palace, a building erected in Lond. in 1851, in which the great World's Fair of that yr. was held. It was designed by Sir Joseph Paxton, and was composed of glass and iron, excepting the floors, which were of wood. It was 1851 ft. in length, and covered an area of 21 acres. During the exhibition it was visited by over 6,000,000 persons. The whole structure was removed soon afterward. A permanent C.-P. was erected in 1854 at Sydenham, 8 m. from Lond. It cost £1,450,000, and contains an extensive museum, in which almost every dept. of art and science is represented. In 1853 a C.-P. for another universal exhibition was erected in New York. It was burned in 1858. Others have since been erected for similar purposes.

Ctesias, tee'she-as [Κτησίας], a Gr. historian, a native of Cnidos, in Caria, lived about 400 B. C. He passed many yrs. in Per. as phys. to King Artaxerxes Mnemon. He wrote a *Hist. of Per.* (Περσικά) and a *Description of India*.

Ctesibius, tes-sib'e-us [Κτησιβίους], a famous Gr. mechanician who flourished at Alexandria about 130 B. C. He invented the clepsydra, a pump, and other machines.

Ctesiphon, tes'e-fon [Κτησιφών], an Athenian prosecuted by Æschines for his proposition to give a crown of gold to Demosthenes for his "Philippics," but successfully defended by D. in his great oration *De Corona*, B. C. 330.

Cu'ba, the largest and westernmost island of the Antilles, and the chief colony of Sp., lying between the Caribbean Sea on the S. and the Gulf of Mex. and Bahama Channel on the N., 130 m. S. of Fla. and about equidistant from Yucatan on the W. and Hayti and Jamaica on the E. and S. E. Lat. 19° 50' to 23° 9' N., lon. 74° 8' to 84° 58' W. It is 780 m. long from E. to W., and from 25 to 130 m. wide. Its area is 43,220 sq. m.

Topography and Surface.—C. probably had its origin in volcanic action, as demonstrated by the mt.-chain (the Copper Mts.) which traverses its whole length. Pico Turquinos, its highest summit, being about 7750 ft. From the bases of this chain N. and S. the country expands into broad meadows, with frequent lagoons and swamps. The rivers are all small, and none of them navigable. There are good harbors with deep water at Havana, Matanzas, Puerto Principe, Santiago de Cuba, etc. Elsewhere the coasts are shallow and rocky.

Climate.—In the hills, healthy and agreeable; in the lowlands, sickly and generally hot; maximum temperature does not often exceed 88° F., but the heat is protracted, the mean of the yr. in the lowlands being 78°. It is a moist climate, the annual rainfall in the Havana being 90.66 inches, yet some places in the interior require irrigation. There are some hurricanes and occasional earthquakes.

Minerals.—Copper, with some gold, silver, iron, coal, marble, etc. There are productive copper-mines in the mts.

Soil and Vegetation.—The mts. are covered with forests of mahogany, ebony, granadilla, rosewood, cedar, live oak, fustic, palms, and plantains. The cultivated dists. yield large crops of maize, rice, yams, bananas, sugar, coffee, tobacco, cotton, and all tropical fruits, sugar and tobacco being the leading products, while immense herds of cattle are reared on the grazing lands.

Exports mainly sugar, tobacco, and cigars; the greater part of these goes to the U. S. In 1880, 405,000 out of 460,000 tons of sugar (the total export) went to U. S.; valued at \$57,170,241. Of tobacco and cigars the U. S. received \$7,096,930, and of all other articles, \$1,155,847; total, \$65,423,018. The imports from the U. S. were valued at \$10,924,633, about 1/8 of the exports. They were provisions, wood, manufactured iron and steel, breadstuffs, live stock, and oils.

Industries.—Manufacture of sugar, molasses, rum, and cigars, preparation of coffee for market, preserving fruit, bleaching wax, and minor industries. The local consumption of sugar was 70,000 tons.

Commerce.—1426 vessels, having a tonnage of 1,018,140, entered the port of Havana in 1880; of these, 663 were Amer.

Railways.—Over 900 m. of R. R. are now operated in C.

Finances.—The debt of C. in 1880 was \$85,000,000. Its imports and exports amount to about \$125,000,000 annually, of which the exports exceed \$88,000,000. The taxes are heavy, and the income drawn from C. by Sp. large.

Church and Education.—R. Cath. only established re-

Highly; common-school education at a low ebb; there are schools of secondary education in the towns, and a univ. at Havana.

History.—Island discovered Oct. 1492 by Columbus; colonized by Spaniards 1511; Indians cruelly treated by Hernando, Sp. gov., and in 1533 entire Indian pop. became extinct. In 1594 and in 1554 Havana destroyed by Fr., but speedily rebuilt and strongly fortified in 1584; in 1624 taken by Dut., but restored to Sp. speedily; from 1650 to 1700 often ravaged by filibusters. Puerto Principe plundered and destroyed by them in 1688. After 1700 C. prospered greatly. Tobacco monopoly established 1717, and not abolished till 1816. In 1762 Havana taken by Eng., but exchanged in 1763; its commercial importance rapidly increased, but it became the centre of slave-trade for Sp. Amer. During the prevalence of the slave-trade, 1789-1845, it is said that over 550,000 slaves were brought into C. There were negro insurrections in 1844 and 1848; more than 10,000 negroes perished in the latter. For 40 yrs. past there has been a strong pressure upon the U. S. gov't, mainly from the S., to obtain possession of C.; J. Pres. Polk offered \$100,000,000 for it in 1848; in 1854 the Ostend Manifesto, signed by Buchanan, Soule, and Mason, claimed the right to take and annex it if Sp. should refuse to sell. Meantime, in 1849-51, there were insurrections, led by Amer. adventurers. The Sp. revolution of 1868 led to an effort for Cuban independence, which continued with varying fortunes for 12 yrs.; the war was a severe one on both sides; Cespedes was the insurgent pres. In 1880 it was substantially put down, but the island was left in disorder, and with a debt of \$85,000,000.

Population and Political Divisions.—In Jan. 1878, 1,394,576 inhabs., composed of whites, Spaniards, and Sp. Creoles, 764,164; free people of color, 344,405; slaves, 227,902; Chi., 58,400. The pop. had decreased 20,500 since 1870, and the number of slaves 136,000. C. is divided into 3 provs.—W., Central, and S. E. The last 2 have 22 cities and towns and 204 v. and hamlets. The largest cities are Havana (cap.), pop. 250,000; Santiago de Cuba, about 60,000; Matanzas, 36,000; Puerto Principe, 30,000. L. P. BROCKETT.

Cuba, Allegany co., N. Y., on R. R. and Genesee Valley Canal, 12 m. N. E. of Olean. Pop. 1880, 1251.

Cube [Gr. κύβος, a "die"], in geom., a vol. bounded by 6 equal squares; in analysis, the product of 3 equal factors.

Cubeb [Lat. *cubeba*; Fr. *cubèbe*; Ger. *Kubebe*; Ar. *kabībīhī*], the dried, unripe fruit of the *Cubeba officinalis* (and probably of other species), climbing woody plants belonging to the order Piperaceae. The C. vine resembles that which produces the ordinary black pepper. C. are brought chiefly from Java, Penang, etc., and are used as an aromatic and stimulant diuretic. Their active properties depend on the volatile oil which they contain. They also have a crystallizable principle called "cubebine," and a balsamic resin. The oil, tincture, and extract are used in med.

Cube Root. See RADICAL and ROOT.

Cubic Nitre, a commercial name applied to the nitrate of soda, which is largely obtained from the desert of Atacama in Peru. It is used in the arts and as a manure.

Cubit [Lat. *cubitus*, i. e. the "elbow"; Gr. πῦγξ, the "fore arm"], a linear measure of the anc. equal to the length of a man's arm from the elbow to the tip of the middle finger. It is generally stated to be 18 Eng. inches. The anc. Egyptian C., or "C. of Memphis," was about 20.7 Brit. inches. The mean of Sir Isaac Newton's determinations, from the careful measurements of the great pyramid by Prof. John Greaves (pub. in 1737), made it 20.672. The mean of still more careful measurement by Prof. C. Piazz Smith in 1865 made it 20.73. According to Newton, the C. of Babylon was very nearly 24 Brit. inches; the royal C. of Per., 21.195 inches; the C. of the Romans, 17.406 inches; the C. of the Grs., 18.1306 inches; the Egyptian C. in use in 1737, 21.888 inches; the sacred C. of Moses he calculates not to have been greater than 24.9389 inches, nor less than 24.7262, and its probable value to have been 24.7552 inches. Prof. Piazz Smith thinks that he has proved that the unit of measure employed by the builders of the Great Pyramid in laying out the ground-plan of their work was identical with the sacred C. of Moses, and that its value was 25.025 Brit. inches; which is, according to the most recent determinations, almost exactly the 10,000,000th part of the earth's polar radius. He supposes, therefore, that this unit of measure, which was divinely given, was made by divine intention to be in this exact decimal relation to the invariable line around which the earth revolves. If the Brit. inch be increased by one-1000th part, it becomes what Prof. Smyth calls a "pyramid-inch"; and a pyramid-C., or sacred C., is 25 pyramid inches, or one-10,000,000th part of the earth's polar radius. Prof. Smyth maintains his hypothesis with much ingenuity, but it has not been generally received with favor.

The value of the biblical "C. of a man" is extremely uncertain. Dr. William Smith, in his *Diet. of the Bible*, has discussed the question pretty fully, and inclines to regard it as having had a value, deduced by Thenius (*Theologische Studien und Kritiken* for 1846) from the Egyptian C. measure preserved in the Turin Museum, of 23 digits, each digit being 0.7998 Brit. inch = 18.257 Brit. inches. F. A. P. BARNARD.

Cuck'oo [Lat. *cuculus*; Fr. *cucou*; It. *cucco*, so named from its peculiar note], a name given to birds of the family *Cuculidae*, the best known of which is the common European *Cuculus canorus*. Like the great spotted C. (*Coccyzus glandarius*) of N. Afr., and some other species, it builds no nest, but deposits its eggs in the nest of another bird, and the proprietor hatches it with her own. The Amer. species rear their own young. The common Amer. C. (*Coccyzus americanus*), sometimes called the yellow-billed C., is of a greenish olive color above, white beneath.

Cucumber Tree, the *Magnolia acuminata*, a noble forest tree of the U. S., found from Niagara Falls southward to Ga., chiefly along the Alleghanies. It is a tall tree, with duller green foliage than in other magnolias, and with in-

conspicuous yellowish-green flowers. Its wood is light, and is prized for making pumps and canoes. Its cucumber-like fruit is soaked in spirits, and makes a very bitter drink, popularly used as a tonic and anti-rheumatic.

Cud'bear [supposed to be a corruption of *Cuthbert*, from Dr. Cuthbert Gordon, who introduced the manufacture at Leith], a powder obtained from certain lichens by the action of ammoniacal liquids, and used for dyeing various colors. It does not afford a very permanent color.

Cud'weed, the name given to many species of the *Gnaphalium*, *Antennaria*, and *Filago*, belonging to the order Composite and sub-order Tubuliflorae. The flowers, which are commonly called "life-everlasting," consist mostly of dry involucre scales, and the stems and leaves are more or less covered with white down. The C. are common in Europe and N. Amer., and some of them are used as diaphoretics in domestic med.

Cue'ro, a city, De Witt co., Tex., on R. R. and Guadalupe River, 66 m. N. W. of Indianola. Pop. 1880, 1333.

Cu'ic Writing [so named from the town of Cufa or Koofa, where the transcribing of anc. MSS. was extensively carried on] was one of the most anc. forms of Arabic writing, supposed to have been introduced into Ar. just before the period of Mohammed. It was in common use till the 10th century, and then confined to coins and inscriptions.

Cuirass, kwé-ras' [Fr. *cuirasse*, from *cuir*, "leather"], originally a garment of leather, so thick as to be proof against a pistol ball. The term was afterward applied to a portion of armor made of metal, consisting of a backplate and breastplate hooked or buckled together. The C. is still worn by bodies of heavy cav., called *cuirassiers*.

Culdees, or Kildees, from the Celtic; according to one etymology, meaning "servants of God," according to another, "men of the recess." The name was first used in the 8th century, as some say, of Celtic Christians generally in Great Britain and Ireland; or, as others say, of Celtic missionaries of the 6th and subsequent centuries, who carried the Gospel to Scotland and other countries.

R. D. HITCHCOCK.

Culil'awan Bark, called also **Clove Bark**, a valuable aromatic bark, the product of the *Cinnamomum Culil'awan*, a tree which grows in the Molucca Islands. It has a pungent taste and an odor like nutmeg and cloves.

Cul'len (PAUL), D. D., CARDINAL, b. in Dublin Apr. 27, 1803, ed. at Rome, became cardinal-priest in 1866. He was the main supporter of the Catholic Univ. of Dublin. D. Oct. 24, 1878.

Cullo'den, also called **Drummoissie Moor**, a battlefield of Scot., 6 m. E. N. E. of Inverness. Here the royal army, commanded by the duke of Cumberland, totally defeated the Young Pretender, Apr. 16, 1746.

Cul'iom (SHELBY M.), b. in Ky. in 1829, studied law, was admitted to the bar, and began to practise at Springfield, Ill., in 1848; elected to State legislature in 1856, re-elected in 1860; member of the war commission which sat in Cairo in 1862, and of the 39th and 40th Congs.; again elected to the State legislature in 1872, re-elected in 1874; was gov. of Ill. 1877-83. Elected U. S. Senator Jan. 17, 1883.

Cul'ium (GEORGE W.), b. Feb. 25, 1809, in New York, grad. at W. Pt. in 1833; col. of engineers May 7, 1867, and brig.-gen. of volunteers Nov. 1, 1861. He served in the construction of Ft. Adams, R. I., 1833-34, and thenceforward chiefly as an engineer of defences and fortifications till 1864; supt. of U. S. Military Acad. 1864-66; then member of the board of engineers for fortifications. Author of *Systems of Military Bridges* and of a *Biographical Register of the Officers and Graduates of the U. S. Military Acad.* Retired from active service Jan. 13, 1874.

Cul'peper (THOMAS), SECOND LORD, was one of the persons to whom Charles II. granted the terr. of Va. in 1673; gov. of Va. from 1680 to 1683. This name in the baronage of Eng. is written Colepeper. D. 1719.

Culpeper See FAIRFAX.

Cul'verin [Fr. *culevrine*], a long cannon used from the 14th to the 16th century, generally carried a shot of 18 lbs. A demi-C. was a 9-pounder.

Cu'mæ, an anc. city of It., on the Mediterranean, 11 m. W. of Naples, founded by Gr. colonists, and famous as the residence of the Sibyl. From 700 to 500 b. c. it was the chief city of S. It.; was captured by the Samnites 420 b. c., and became a Rom. *municipium* 338 b. c. In the second Punic war Hannibal vainly attempted its capture. It was taken from the Goths by the Byzantines 532 A. D. Few remains of it now exist.

Cum'berland, cap. and R. R. centre of Allegany co., Md., on the Potomac. In pop. and commerce it is the second city in the State. It is the head of navigation of the Chesapeake and O. Canal (leading to Georgetown, D. C.) and the shipping-point for the semi-bituminous coal of the vicinity. It is 178 m. W. by N. from Baltimore. The steadily developing coal-trade and its growing iron industries are its chief sources of prosperity. Pop., 1870, 6056; 1880, 10,693.

Cumberland, Wis. See APPENDIX.

Cumberland (WILLIAM AUGUSTUS), DUKE OF, the 3d son of George II., king of Eng., b. Apr. 26, 1721. He commanded the allied army which was defeated by the Fr. at Fontenoy in 1745. He defeated the army of the Pretender at Culloden in Apr. 1746. During the Seven Years war he commanded an Eng. army, which was defeated at Hastenbeck in 1757. D. Oct. 31, 1765.

Cumberland and Teviotdale, DUKE OF (G. Brit. 1799), and earl of Armagh (Ire. 1799), are titles borne by the ex-king of Hanover, FIRST COUSIN to Queen Victoria. His full name is GEORGE FREDERICK ALEXANDER CHARLES ERNEST AUGUSTUS, B. at Berlin May 27, 1819. He succeeded to the throne of Hanover Nov. 18, 1851, as George V., on the death of his father, Ernest Augustus. In consequence of supporting Aus. against Prus. in 1866 he was deprived of his kingdom, which was annexed to Prus. by decree Sept. 30, 1866. D. June 12, 1878.

Cumberland Gap, a narrow pass through the Cumberland Mts., on the line between Ky. and Tenn. and at the W. extremity of Va. It was an important strategic point in the c. war, was strongly fortified by the Confeds., and was several times taken and retaken.

Cumberland Mountains, a range of the Appalachian system, forming part of the boundary between Va. and Ky., extending in a generally S. W. direction across Tenn., where it forms an elevated plateau at some points nearly 50 m. across, and seldom more than 2000 ft. high. N. E. Ala. and N. W. Ga. are broken by the S. extremity of the range. The plateau on both sides breaks off into steep sandstone cliffs, from 800 to 1000 ft. high. In Tenn. the range is rich in coal and iron.

Cumberland Presbyterian Church, The. In 1797 a notable revival of religion sprang up in S. W. Ky. The prin. minister connected with its early development was the Rev. James McGready, a Presb., ed. at what afterward became Jefferson Coll., W. Pa. He commenced his ministry in N. C., but in 1796 removed to Ky., where he was settled over 3 congregations, one of which was in Tenn., near the dividing line between the 2 States. He proposed to his people a written covenant, which they were to subscribe. This document, after reciting the scriptural promises of an answer to prayer for a revival of religion, concludes: "Therefore, we bind ourselves to observe the third Saturday in each month for one year as a day of fasting and prayer for the conversion of sinners in Logan co. and throughout the world. We also engage to spend one half hour every Saturday evening, beginning at the setting of the sun, and one half hour every Sabbath morning, beginning at the rising of the sun, in pleading with God to revive his work."

In May 1797 occurred the first developments of the desired work, which advanced slowly until 1799, when at the sacramental meeting in July many were converted. In the following month the work went forward in still greater power. In July 1800 occurred the first camp-meeting that ever was held in Christendom. Great numbers professed religion at the camp-meetings and upon other occasions, and the work spread rapidly over S. W. Ky. and what was called the "Cumberland Country," now Middle Tenn. A large element of the pop. was either Scotch-Irish or of Scotch-Irish descent, and they are generally Presb. in their religious proclivities. When the Ch. came to be fully organized, nine tenths of its ministry and at least four fifths of its membership were of Scotch-Irish descent.

The rapid progress of the revival produced the necessity of organizing new congregations, and this required more ministerial laborers. The Presb. Ch. could not supply them in the ordinary way. There were no schools, and if schools had been abundant the congregations could not wait until young men could go through a course of literary and theological training. From this cause arose many controversies, turning mainly upon the validity of the ordination of several ministers. These finally culminated in Feb. 1810, when Finis Ewing and Samuel King, who had been proscribed by the presbytery, and Samuel McAdam, who had been placed under interdict, met in Tenn. and reorganized the Cumberland Presbytery, which had in 1806 been dissolved by the Synod of Ky. It was organized as an independent presbytery, taking its name from its locality. The ch. which grew up from these beginnings is called the "Cumberland Presbyterian Church." It now extends from Pa. to the Pacific. In 1813 the presbytery divided itself into 3, and constituted the Cumberland Synod, which in 1816 adopted a Confession of Faith, a modification of that of the Presb. Ch., with the exception of the doctrine of predestination. The form of govt. is Presb. [From orig. art. in *J.'s Univ. Cyc.*, by RICHARD BEARD, Prof. of Theol. in *Cumberland Univ.*]

Cumberland River, an affluent of the O., rises in S. E. Ky., flows nearly W., enters Tenn., makes a wide circuit, and returns into Ky.; then flows N. W. and enters the O. Steamers can ascend to Nashville, about 200 m. from its mouth, and it is navigable at certain seasons 400 m. Length estimated at 650 m.

Cumberland University, at Lebanon, Tenn., belonging to the Cumberland Presb., was founded in 1842. Its departments are—arts, theol., med., natural science, commercial and polytechnic, preparatory.

Cum/bre, La (the summit), a pass across the Andes, between Santiago in Chili and Mendoza in the Argentine Republic. Elevation, 12,454 ft. above the sea.

Cum/bria [named from the Cymry, its anc. inhabs.], a former Brit. principality, comprising Cumberland in Eng. and a part of Scot. It was ruled by its own kings until about 950 A. D. Scottish C. then became the kingdom of Strathclyde.

Cum/brian Mountains, a range in the N. of Eng. This region, called the "Eng. Lake Dist.," is remarkable for its picturesque scenery. Sea Fell Pike, the highest point, rises 3166 ft. above the sea.

Cum/min- (or **Cumin-**) **Seed** [Lat. *cuminum*], the fruit of the *Cuminum cuminum*, a plant belonging to the order Umbelliferae. It is the only known species, and is found in Egypt and the adjacent countries. It is an annual with branched stem, thread-like leaves, with umbels of small white or pink flowers. It has been cultivated from remote times for the sake of its seeds, which have an aromatic taste somewhat resembling caraway. In Ger. and Hol. it is used in cookery. As a med. it is mostly limited to veterinary practice. It is cultivated in N. Afr., India, and S. Europe, but the seed are mostly imported from Sic. and Malta. Oil of cummin is abundantly obtained from the seed. The oil of cummin consists of a mixture of 2 distinct oils, one called cymene, the other regarded as a hydride of cumyl. This oil is of a strong bitter, disagreeable taste, with the gen. properties of other essential oils.

Cum/ning (JOHN), D. D., Fellow of the Royal Society of

Edinburgh, a Scotch preacher, b. in Aberdeenshire Nov. 10, 1810. He became in 1833 minister to the Scot. ch. in Crown court, Covent Garden, Lond. Wrote interpretations of apocalyptic prophecies, *The Great Tribulation*, and *The Destiny of Nations*. Was a zealous opponent of the R. Cath. Ch. and a defender of the National Ch. of Scot. D. July 5, 1881.

Cum/mings (JOSEPH), D. D., LL.D., a Meth. Epis. theol., b. at Falmouth, Me., Mar. 3, 1817, grad. at Wesleyan Univ. in 1840; entered the ministry in 1841, was pres. of Geneva Coll. 1854-57, and in the latter yr. became pres. of Wesleyan Univ., Middletown, Conn. He was elected pres. of North-Western Univ., Evanston, Ill., in 1881.

Cum/minis (GEORGE DAVID), D. D., a clergyman, b. near Smyrna, Del., Dec. 11, 1822, grad. from Dickinson Coll. in 1841, and was a licentiate in the M. E. Ch. for 2 yrs. In 1845 he studied for orders in the P. E. Ch., and in Oct. of the same yr. was ordained a deacon. In 1866 he was elected assistant bp. of Ky. In Nov. 1873 he resigned his position, withdrew from the P. E. Ch., and founded the Reformed Epis. Ch., of which he was made presiding bp. Dec. 2, 1873. D. June 26, 1876.

Cumulative Voting. See PROPORTIONAL REPRESENTATION.

Cundinamar/ca, one of the U. S. of Colombia, separated by the Central Cordillera from Antioquia and Cauca on the W., by the Orinoco from Cauca and Venezuela on the E., and bordering S. on Cauca and N. on Boyaca and Antioquia. Area, 79,810 sq. m. Pop. 409,602.

Cundurango, or **Condurango**, a twining plant of the order Asclepiadaceae, apparently belonging to the genus *Nantonia*. It grows in Ecuador, and has been sold in the U. S. and Europe as a cure for cancer. It has, however, no favorable effect upon that disease. Its name signifies "condor root," and it is believed by the Indians that the condor uses it as a med.

Cuneiform (or **Arrow-headed Inscriptions**). The C. characters used in the Euphrates valley had their origin in a hieroglyphic or picture system of writing. The ordinary characters are made up entirely of wedges, differently arranged, and ranging from a single one to a combination of 20. Each character is either a syllable or a word. The choice of the wedge as the basis of all the characters results from the employment of soft clay (instead of parchment), which was inscribed with a pointed stylus.

The earliest civilization of the Euphrates was Turanian. This Turanian people, called *Accad*, invented the form of writing which, with the modifications produced by ages of use, was adopted by all the other langs. about them. Not being originally an alphabet of simple sounds, but characters representing words, it naturally became encumbered in the transfer with a multiplicity of sounds. Thus, for example, in Turanian the word *par* means "the sun," and had its appropriate hieroglyphic. The meanings "light" and "day" were naturally enough attached to the same character. Any other word signifying "sun," "light," or "day," was attached to this hieroglyphic as its variant significations and pronunciations. When the character was transferred into the Assyrian lang. it kept its significations, but utterly altered its pronunciations. In its sense of "the sun," from *par* it became *samas*; in its sense of "day," it became *inna*; and so with other significations. It was a very simple step to abbreviate the sound allowed to a character. Thus, in *Accad* the word *Annap* means God, and is represented by 2 successive short horizontal wedges followed by a longer upright one. This character was not only employed to represent the idea of God (pron. *Annap* in an *Accad* and *Ilu* in an Assyrian inscription), but also to represent the first syllable *an* of *Annap*. In a similar way the character pronounced *ph*, "ear," in *Accad*, came to represent the simpler syllable *ph*. There were thus as many simple syllables formed as could be made by the combination of 20 consonants with 3 vowels. These different stages of writing will be more or less combined in any Assyrian inscription, so that we may have in the same line simple syllables, like those in *ha-ab-ba*, "sea," complex syllables, like those in *gul-bul-tu*, "curse," and ideographic signs, like that for *rabu*, "great." And a single sign may have several different values; and cases occur in which the same character is used in 2 successive syllables of the same word with different values; and there are cases where a single character has 5 or 6 distinct values.

The complexity of the Assyrian system of writing is so great that there was for a long time much scepticism about the trustworthiness of the decipherment. But the proofs of its correctness are beyond cavil. The proof of the correctness of these readings was first given, so as to make it beyond reasonable question, in 1857, when Sir Henry Rawlinson, William H. Fox Talbot, Esq., Rev. E. Hincks, D. D., and Dr. Jules Oppert prepared independent translations from copies of a long inscription of Tiglath-Pileser, which were so nearly identical that it was preposterous to suppose that the true foundation had not been laid for the decipherment. These inscriptions relate to an immense variety of subjects, and contain almost everything that a people greatly given to writing would care to record. The discovery of libraries or record-chambers of Sennacherib and Assurbanipal has been of incalculable service.

The anc. Babylonians were familiar with the story of the Deluge, as is proved by tablets deciphered by Mr. George Smith, and probably reaching back to over 2000 B. C. In this story Sisyphus takes the place of Noah, and is warned by Hea to build a ship, that he and his family and individuals of all the animals may escape a flood sent to punish the wickedness of men. This ship, unlike the ark, has a pilot. The rain lasts but 7 days, and the birds sent out are a dove, a swallow, and a raven. The ark rests on the mts. E. of Babylon, when the god lets Sisyphus and the animals out, and he offers a sacrifice. As a reward for his services he receives the gift of immortality.

The most important result of the decipherment of the

C. I is the addition of an almost entirely new chap. to the hist. of the anc. world. The fragmentary and contradictory accounts of Berosus, Ctesias, etc. have been supplemented by an immense mass of contemporary records, quite complete in some reigns, from which we can gain a very clear view of the rise and fall of the Assyrian and Babylonian powers. The inscriptions have greatly increased our respect for the historical authority of Herodotus, and especially of Berosus, whose accounts are always confirmed. The same may be said of the biblical records, which receive great light from these historical monuments in confirmation of their gen. historical accuracy, although such facts as the overthrow of Sennacherib's army and the insanity of Nebuchadnezzar are omitted. See J. H. SAYCE, *Assyrian Grammar*, and LAYARD'S *Monuments of Nineveh*. [From orig. art. in *J. S. Encyc. Cyc.*, by RYS. W. H. WARD, D. D.]

Cup'el [Fr. *coupele*, a "little cup"], a shallow and porous vessel, somewhat cup-shaped, generally made of bone-ear. It is used in the process of assaying gold and silver, which are fused with lead upon a C. The lead is oxidized in the process and sinks into the substance of the C., leaving the metal pure.

Cupellation [for etymology see preceding article] is the process of refining precious metals on a cupel.

Cup'id [Lat. *Cupido*], the Rom. name of the god of love, corresponding to the Eros [Ἔρως] of the Gr. mythology. He was usually represented as the son of Venus, and as a beautiful winged boy bearing a bow and arrows.

Curacao, or **Curacoo**, ku-ra-sō', one of the W. I. Islands, of a like-named group, belonging to the Dut., off the N. coast of Venezuela. Area, 164 sq. m. Pop. 23,988.

Curacao, a liqueur which is made of C. oranges or orange peel, by digesting in sweetened spirits along with a little cinnamon, and often a little mace or cloves.

Curari, **Woorai**, or **Woorara**, a celebrated arrow-poison used by the S. Amer. Indians. Its nature and origin are still unknown, but the prin. ingredient is believed by some to be the juice of the *Strychnos toxifera*, a woody vine covered with long reddish hairs, having ovate leaves, rough and pointed, and large round fruit. This is not its probable origin. It is, however, a vegetable extract, and not a snake-poison, as many have conjectured. There is more than one variety of the drug. The poison, when it enters the blood through a wound, causes paralysis, with convulsive motions, followed by death. It may be swallowed in considerable doses with impunity. It is regarded as the most powerful of all sedatives, and the employment of it in cases of tetanus and hydrophobia has been suggested. The best means of preventing its deadly effect is found in artificial respiration.

Curas'sow, the name of several large birds belonging to the Gallinæ, having the hallux on a level with the other toes; on the head a crest of feathers which can be raised. They are found in tropical Amer. The best known species is the crested C. (*Craz globiceira*).

Curculion'idæ [curculio, i. e. Lat. for "weevil"], a family of coleopterous insects, including the weevils, and distinguishable by the elongation of the head into a snout, near the middle of which the antennæ arise. One of the best known species is the *Conotrachelus nenuphar*, a small dark-brown insect, speckled with yellowish-white and black. In spring and early summer it attacks the young fruit, such as apples, pears, apricots, plums, etc. The female makes a crescent-shaped puncture in which she deposits her egg; the maggot feeds upon the young fruit, which generally falls to the ground in a short time, and the larva burrows in the earth, becoming a perfect insect in about 3 weeks. Another destructive curculionid is the plum-gouger (*Anthonomus prunivora*), which occurs very abundantly in the W. States. The grape curculio (*Calodes inaequalis*) and other species are very destructive to grapes. The palm weevil is a S. Amer. species.

Curfew Bell, or simply **Curfew** [Fr. *courre-feu*, i. e. "cover the fire"], was a bell rung at 8 in the evening as a signal for extinguishing lights and fires—a practice said to have been introduced into Eng. by William I. 1068; it is, however, probable that it was not originated by him, but only more strictly enforced. The stringency of this law was relaxed by Henry I. in 1103.

Cur'ia (plu. *Curiae*), the name of the building in which the senate held its sessions in the cities of anc. It. Also a subdivision of the Rom. patrician tribes, each of which was divided into 10 *curiæ*. These tribes were 3 in number, so that there were 30 C. In early times the C. were of the greatest importance, which was subsequently lost. The C. voting together constituted the *comitia curiata*. In it each of the C. had one vote, and in each C. each member had one vote. In the lang. of modern Europe, *curia* is the Lat. word for court or place of justice.

Cur'lew (*Numenius*), a name of a circumpolar genus of birds of the Limicolæ, with long and curved bills, long legs, and short tails. The long-billed C. (*N. longirostris*) inhabits all the temperate parts of N. Amer. It is of a pale-reddish color, with ashy tints and brown-black marks, and longitudinal lines of black. The short-billed C. (*N. hudsonicus*) is $\frac{3}{4}$ the size of the foregoing. The Esquimaux C. (*N. borealis*) is still smaller.

Cur'ran (JOHN PHILPOT), an Irish orator, b. at Newmarket, near Cork, July 24, 1750, ed. at Trinity Coll., Dublin, was called to the Irish bar in 1775. As a barrister he was very successful, and was distinguished for his humor and sarcastic speech. He became in 1783 an M. P. In 1806 was appointed master of the rolls in Ire. D. Oct. 14, 1817. (See CHARLES PHILLIPS, *Curran and his Contemporaries*.)

Cur'rant [from *Corinth*, in Gr., from which port this fruit was formerly exported], a common name of a kind of small raisin (*Vua passula minor*), the dried berry of a seedless variety of grape which is cultivated in the Levant.

Currant [so called from its resemblance to the above fruit], the popular name of the berries of certain species of

Ribes, low shrubs of the order Grossulaceæ, distinguished from the gooseberries by the flowers, which grow in racemes, and by the fact that the C. bush is never thorny. The red C. (*Ribes rubrum*) is a native of Europe, Asia, and N. Amer., is cultivated in gardens for its pleasant acid fruit, and is much used for the table and for jellies, conserves, etc. "C. wine" is a domestic drink, made of C. juice, sugar, and water, which is allowed to undergo alcoholic fermentation. The black C. (*Ribes nigrum*) is also cultivated, and in Fr. large quantities of *liqueur de cassis*, a very agreeable and popular variety of C. wine, are prepared from it. Over 60 species of C. are described, about $\frac{2}{3}$ of which are Amer.

Currency [from the Lat. *currō*; It. *corrente*, to "run"] is the circulating money of a country. Some writers include bank deposits, bills of exchange, and generally whatever serves as a substitute for money or whatever has "purchasing power." But the great weight of authority and practice confines the meaning of C. to money. The first care of every society has been to establish a current money. It is difficult to conceive how the transactions of modern trade could be carried on without such a medium. Before the precious metals were produced in sufficient quantity to answer the purpose some special commodity was selected, as salt, leather, etc. The ruder metals were next adopted. Iron was commonly used by the old Spartans, and copper by the Romans.

The C. of modern times in all industrial countries has consisted of gold and silver, and paper money redeemable in coin of those metals. Gold is the common international standard.

The constitution of gold as the medium of international payment has made it indispensable for each nation to adopt a supplemental home medium as a defence against the possibility of being left without any C. for the transaction of its business. It is a normal condition of commerce that the balance of accounts between nations shall alternate from one to another. The debtor market, if not provided with a local medium, is at once prostrated and disabled from the prosecution of those productive labors by which alone it can restore itself to rotation as a creditor. The necessity of a supplemental C. as a protection against such ill consequences must have promptly commended the bank-note to the favorable consideration of economists and statesmen. Every argument in its favor has been strengthened by its beneficent influence over industrial employments.

The paper part of a C. is usually local to the country where it is issued. A solitary exception is that of the notes of the Bank of Eng., which carry a premium above specie in most commercial countries. That part of the C. of every country which is composed of gold, being also the international medium of payment, is liable to be drawn off by the creditor markets. For this reason an extraordinary export of specie creates alarm among the banks of the exporting country, and obliges them to turn upon their customers to pay up their borrowings. The advocates of an exclusively metallic C. build their most plausible argument on this ground.

The principles of C. are derived mostly from circumstances exterior to itself. In a country like Eng., of narrow boundaries, the bank-note repeats its service rapidly, and hence the amount required to effect the exchanges in a given time is much smaller, other things being equal, than in a country like the U. S. The average time of the circuit of C. is the governing term of *quantity*. If, for example, bank-bills to the amount of \$1,000,000,000 be required to make the whole of the payments of Eng. for one day, and if it were ascertained that the bills complete an average of 5 circuits per day, the amount of bills to be kept in issue would be \$200,000,000. But in the U. S. the vol. of paper money does not repeat its service more than once a day, in consequence of the greater distances to be overcome, in which case the amount to be maintained in issue would be \$500,000,000. Therefore, not only does the average time of the circulation govern the amount to be kept in issue, but it necessarily governs also the amount of reserve, or "dead weight," as it is sometimes called, to be kept against demands of redemption. The fundamental principle of all C. being stability, permanence, invariability, the paper part of it can be invested with that quality only by convertibility with the standard, gold. [From orig. art. in *J. S. Encyc. Cyc.*, by J. S. GIBBONS.]

Currents, Electric, etc. See ELECTRICITY, by PRES. HENRY MORTON, PH. D., and MAGNETISM, by PROF. A. M. MAYER, PH. D.

Currents, Marine, are the great rivers of the sea. They move on steadily through waters comparatively tranquil, often distinguished by a different color and temperature. Unlike the inland streams, which are but threads on the surface of the continents, they are scores, nay hundreds, of m. broad, and their course, as in the Amer. Gulf Stream, extends over a large portion of the globe. They are not only found at the surface, but also in deep waters, where they are often moving in different directions.

The main cause of these vast movements of the ocean is found in the difference of temperature between the polar and tropical regions, which acts directly on the waters, and indirectly on them by the winds. The cold and heavier waters of the polar regions tend incessantly to flow into and displace the warm and lighter waters of the tropical zone; when both meet, the cold waters sink and disappear below the warm waters, which return as surface-currents toward the polar regions. Hence two series of C., the cold from the polar, the warm from the tropical, regions. Both, however, are deflected from their straight course by the steady action of the earth's rotation—the polar C. more and more to the W., the tropical C. more and more to the E. The polar C. unite in the tropical zone, and, aided by the powerful influence of the trade-winds, form the so called *Great Equatorial C.*, which flows westward around the whole globe. These gen. C. are further modified by the form of the basins of the 3 great oceans in which they move.

C. in the Pacific Ocean.—The Great Equatorial C. embraces

the whole width of the tropical zone, and flows at the rate of 2 or 3 m. an hour, separated into 2 branches by a central counter-C. running eastward. Arrested by the coasts of Asia and Australia, it divides. The S. branch sends southward the *Australian C.* The N. branch bends to the N. and N. E. becomes the *Japanese C.* (or *Kuro-Sivo*), the Asiatic Gulf Stream, whose deep blue and warm waters flow swiftly along the E. coasts of Japan, and crossing the N. Pacific reach the peninsula of Alaska; thence turning southward along the coast of Or. and Cal. as a cool C., they leave the continent of Amer. to re-enter the Great Equatorial C.

The polar C. are almost absent in the N. Pacific Ocean, because of the shallowness and narrowness of Bering's Strait, the only passage open to them; but they are all the more mighty in the S. Pacific. Here the broad *Antarctic Drift C.* carries the cold polar waters to the W. coast of S. Amer. Striking the continent in the S. part of Chili, it divides. The main branch, called the *Peruvian* or *Humboldt C.*, flows to the N. along the coast of Peru, and leaving it at its extreme W. projection becomes the main feeder of the S. Equatorial C. The smaller branch bends around Cape Horn and enters the Atlantic Ocean.

C. in the Atlantic Ocean.—Owing to the narrowness and irregularity of the basin of the Atlantic Ocean, the equatorial C. in it has neither the size nor the symmetry it shows in the Pacific Ocean. The N. branch is less marked, but the course of the S. branch is very apparent. Proceeding westward from the coast of Afr., it crosses the basin of the Atlantic to S. Amer., where, at Cape St. Roque, it divides, one branch flowing southward, forming the *Brazil C.*; another to the N. W. the *Guiana C.*, which runs along the coast of Guiana and unites with the waters of the N. Equatorial in the Caribbean Sea and around the W. I. Islands.

The *Gulf Stream* is the outlet of the accumulated waters of both equatorial C. in the Gulf of Mex. It becomes fully apparent at the N. W. of the island of Cuba. Its course is there changed, by striking against the Bahama Banks, to the N.; and it flows with great rapidity along the coast of the U. S., gradually expanding in vol. and diminishing in velocity as it proceeds northward. Reaching the lat. of New York, it gradually turns to the E. and crosses the Atlantic basin to the islands of the Azores. Here it divides; the main branch, tending southward, enters the tropical regions on the coast of Afr., and is swept back westward by the N. Equatorial C. Thus a great whirlpool is formed, in the midst of which is accumulated that vast amount of seaweed which bears the name of *Mar de Sargasso*. The N. branch continues its course to the Brit. Isles and Nor., and often carries to their shores, with the heat of the tropics, the seeds and driftwood coming from the W. I. (See *GULF STREAM*.)

The Atlantic Ocean is almost the only outlet of the N. polar waters toward the equatorial regions, as the Pacific is that of the Antarctic waters. Under the influence of the earth's rotation the polar C. all crowd to the W. on the Amer. coast. Two main C., on each side of Greenland, carry the waters and masses of ice from the Frozen Ocean toward the warmer lats.; the *Greenland C.* along the E. coast and the *Labrador C.* on the W. form Baffin's Bay. Joining their waters and their icebergs, they flow to Newfoundland, and further along the coast, but soon sink beneath the warm Gulf Stream.

C. in the Indian Ocean.—In this ocean, surrounded on 3 sides by continents, the N. Equatorial C. is destroyed by the influence of the season winds, called monsoons, which blow alternately from the S. W. and N. W., and the waters mostly obey the direction of the winds. But the S. Equatorial is quite regular, and extends from Australia to Madagascar, where it divides, one branch passing N. of the island, the other along its E. coast. The N. branch, uniting with the waters from the N., forms the strong C. of Mozambique, which runs along the coast of Natal to the Cape of Good Hope, whence turning eastward it mingles with the Antarctic waters.

A. GUYOT.

Currier Bell. See BRONTÉ (CHARLOTTE).

Curry (DANIEL, D. D., LL.D., a Meth. divine and journalist, b. near Peekskill, N. Y., Nov. 26, 1809, grad. at the Wesleyan Univ., Conn., in 1827; entered the ministry in Ga. in 1841; had pastoral charge of chs. in New York and other cities, was 3 yrs. pres. of the Ind. Wesleyan Univ., and in 1864 was appointed ed. of *The Christian Advocate*, New York, which office he held till 1876. Wrote the *Life of Wycliff* and *Metropolitan City of Amer.*

Curry (JABEZ LAMAR MONROE, D. D., LL.D., b. in Lincoln co., Ga., June 5, 1825, grad. at the Univ. of Ga. in 1843 and at Dane Law School (Harvard Coll.) 1845. He served in 1846 as a Tex. ranger during the Mex. war; M. C. from 1857 to 1861; in 1861 elected to the Cong. of the Confed. States; in 1864 entered the Confed. army, and at the close of the war was in command of a regiment of cav.; in 1865 was elected pres. of Howard Coll., Ala.; in 1866 ordained to the Bap. ministry; in 1868 prof. of the Eng. lang. and lit. in Richmond Coll., Va.

Cursores [Lat. the "runners"], an order of the older ornithological systems, and which embraced about the same genera which now constitute the order *Ratitæ*.

Curtesy, Estate by the. This is an estate which a husband takes in the lands of inheritance belonging to his wife in case she dies before him and there was a child b. alive during the marriage. It is an estate for his own life, and after his death the land reverts to the wife's lawful heirs. When the child is b. the husband is said to have a tenancy by the C. *institute*; upon the death of the wife, a tenancy by the C. *consummate*. It is not necessary that the child should live if it be once b. alive. This estate is similar in many of its incidents to dower, but it differs in this respect, that it pertains to the whole of the wife's lands in which she had an estate of inheritance during coverture, and not merely to a third thereof, as in dower. No assignment of the lands to the husband is therefore necessary, and he becomes tenant at once upon the wife's death.

Curtin (ANDREW GREGG), b. Apr. 22, 1817, was the son of Rowland Curtin, one of the earliest iron-manufacturers in Centre co., who came to this country from Ire. in 1793. He studied law in Dickinson Coll., was sec. of the commonwealth in 1854, elected gov. in 1860, re-elected in 1863, and in 1869 was minister to St. Petersburg.

Curtis (BENJAMIN ROBBINS), LL.D., b. in Watertown, Mass., Nov. 4, 1809, grad. at Harvard in 1829, admitted to the bar in 1832, and practised in Boston. He was appointed a judge of the supreme court of the U. S. in 1851, but resigned that office in 1857. He was one of the counsel who defended Pres. Johnson in his trial before the Senate in Apr. 1868. Prepared several vols. of legal reports. D. Sept. 15, 1874.

Curtis (EDWARD), A. B., M. D., b. at Providence, R. I., June 4, 1838, grad. in 1859 at Harvard; took his degree in med. in 1861 at the Univ. of Pa.; became prof. of materia medica and therapeutics at Columbia Coll., New York, in 1872; has made a study of photographing microscopic objects by means of the microscope.

Curtis (GEORGE TICKNOR), a brother of B. R. Curtis, b. in Watertown, Mass., Nov. 28, 1812, grad. at Harvard in 1832, admitted to bar in 1836; practised in Boston. Wrote *Treatise on the Rights and Duties of Merchant Seamen and Hist. of the Origin, Formation, and Adoption of the Const. of the U. S.*

Curtis (GEORGE WILLIAM), LL.D., b. at Providence, R. I., Feb. 24, 1824; studied in the Univ. of Berlin, and made an extensive tour in the Levant, from which he returned home in 1850. Wrote *Nile Notes of a Howadji* and *The Potiphar Papers*. Became ed. of *Harper's Weekly* and of the "Easy Chair" in *Harper's Magazine*. Delivered eulogy on Wendell Phillips in 1884, for which he received a gold medal from the city of Boston.

Curtis (JOSEPH BRIDGHAM), second son of George and Julia Bridgham Curtis, was b. in Providence, R. I., Oct. 25, 1836. On the breaking out of the c. war he was appointed engineer, with the rank of capt., in the 9th regiment N. Y. S. M., Apr. 1861. On Sept. 16, 1861, he became second lieut. of the 4th regiment R. I. Volunteers, and was made first lieut. of the regiment Oct. 2 of the same yr. He served with Burnside in N. C., and was made assistant adjutant-gen. with Gen. Rodman June 9, 1862. In Aug. 1862 he became lieut.-col. of the 4th regiment R. I. Volunteers. He fought at S. Mountain and Antietam, and was killed at Fredericksburg Dec. 13, 1862.

CLARENCE COOK.

Curtis (SAMUEL RYAN), b. Feb. 3, 1805, near Champlain, N. Y., grad. at W. Pt. in 1831, serving at Ft. Gibson in 7th Inf. till he resigned June 30, 1832; C. E. 1836-41, counsellor-at-law 1841-46, adjutant-gen. of O. 1846, and col. 2d O. Volunteers in the war with Mex. 1846-48, serving as gov. of Camargo, and by his operations against Gen. Urrea opening Gen. Taylor's communications. Chief-engineer of several important works 1847-55, counsellor-at-law at Keokuk, Ia., 1855-61, and M. C. 1857-61. In the c. war he was elected col. 2d Ia. Volunteers, and obtained the rank, Mar. 21, 1862, of maj.-gen. U. S. volunteers; engaged in driving the enemy from Mo., battle of Pea Ridge, and numerous actions on his difficult march of over 1000 m. to Helena, Ark., and in command of depts. of Mo. and of Kan.; was active in promoting the construction of the Union Pacific R. R. from its initiation. D. Dec. 26, 1866.

Curtius (ERNST), a Ger. Hellenist, b. at Lübeck Sept. 2, 1814. He became, in 1856, prof. in Göttingen, and in 1865 in Berlin. He pub. *The Acropolis of Athens*, *The Peloponnesus*, a *Hist. of Gr.*, etc.

Curtius (GEORGE), a Ger. classical scholar, a brother of the preceding, was b. at Lübeck Apr. 16, 1830. He became prof. of classical philology at Leipzig in 1862. Wrote *Grundzüge der Griech. Etymologie*, *Das Verbum der Griech. Sprache*.

Curtius (MARCUS), a patriotic Rom. youth. According to tradition, a chasm opened in the forum of Rome, about 362 B. C., which the soothsayers declared could not be filled except by the sacrifice of the chief wealth or strength of the Rom. people. C., completely armed, plunged on horseback into the chasm, which immediately closed up.

Curtius (QUINTUS). See QUINTUS CURTIUS.

Curule Chair [Lat. *sella curulis*], among the anc. Roms., a throne or chair of state, one of the emblems of anc. kingly power, which was retained by the prin. magistrates of the republic when engaged in their public duties.

Curve [Lat. *curvus*, "bent"], a line which may be generated by a point moving according to a fixed law. If all its points lie in one plane it is a plane C., otherwise it is a C. of double curvature.

Curwensville, Pa. See APPENDIX.

Cushing (CALEB), LL.D., a jurist and scholar, b. at Salisbury, Mass., Jan. 17, 1800; grad. at Harvard, and visited Europe in 1829; became Whig M. C. 1835-43. As a political friend of Pres. Tyler he separated from the majority of the Whigs in 1841 and joined the Dem. party. In 1843 he was appointed com. to Chi., and negotiated the first treaty between the U. S. and that empire; served as col. in the Mex. war; was appointed a justice of the supreme court of Mass. in 1852, and was atty.-gen. of the U. S. 1853-57; was one of the 3 lawyers appointed by Pres. Grant to advocate the interests and rights of the Amers. before the tribunal of arbitrators who met in Geneva in 1871 for the settlement of the "Alabama claims"; minister to Sp. 1873-77. D. Jan. 2, 1879.

Cushing (LUTHER STEARNS), a jurist, b. in Lunenburg, Mass., June 22, 1803. He was reporter to the supreme court of that State. Wrote *The Law and Practice of Legislative Assemblies in the U. S.* D. June 22, 1856.

Cushing (THOMAS), LL.D., b. at Boston, Mass., Mar. 24, 1725, grad. at Harvard in 1744; was speaker of the Mass. house of reps. 1762-74, and a member in 1774 of the provincial and the Phila. congs. He was regarded in G. Brit. as the prin. leader of sedition; became a judge and lieut.-gov. of Mass. D. Feb. 28, 1788.

Cushing (WILLIAM), LL.D., a jurist, b. at Scituate, Mass., Mar. 1, 1733; became chief-justice of the superior court of Mass. in 1777, and associate justice of the supreme court of the U. S. in 1789. D. Sept. 13, 1810.

Cushing (WILLIAM B. U. S. N., b. Nov. 4, 1843, in Wis., was appointed to Naval Acad. in 1857, and, being found "deficient in his studies," resigned in 1858. He entered the service as a volunteer officer in 1861, and received a commission as lieutenant in the navy July 16, 1862; became a lieutenant-commander in 1864 and a commander in 1872. In 1861 distinguished himself on the Blackwater, in the Sounds of N. C., and at New River Inlet, and in 1863 by his expedition up the Cape Fear and Little rivers and his operations on the Nausemond; and in 1864 he performed the great feat of blowing up the ram Albemarle at Plymouth, N. C. Commander C. may be regarded as the most adventurous of our naval heroes since Decatur d. Dec. 1874.

Cushman (CHARLOTTE SAUNDERS), an actress, b. in Boston July 23, 1816. She made her *début* in 1835, and performed in tragedy and comedy; visited Eng. in 1845, and performed there for several yrs.; gave public readings from Shakspeare and other writers, in the large cities of the U. S. in 1872. D. Feb. 18, 1876.

Cushman (HENRY WYLES), b. at Bernardston, Mass., Aug. 9, 1805, ed. at Norwich Univ., Vt.; became lieutenant-gov. of Mass. 1851, and a member of the constitutional convention 1853. D. Nov. 21, 1863.

Cushman (ROBERT), one of the founders of the Plymouth Colony, b. in Eng. about 1580. He emigrated to Plymouth in 1621, and preached, Dec. 9 of that yr., the first sermon that was ever printed in Amer. D. early in 1625.

Cusk, Tusk, or Torsk, popular names of a marine fish of the cod family—the *Brosmeus brosme*—occurring along the European and Amer. coasts. It is distinguished by a long undivided dorsal fin.

Cusp [Lat. *cusps*]. A "point", a C. point is a point where 2 branches of a curve terminate in a common tangent. If the 2 branches lie on the same side of this tangent they form a C. called a *ramphoid*; if they lie on opposite sides the C. is called a *ceratoid*.

Cusp, in arch., is the point formed by the meeting of 2 small arches or foils, one of the projecting points of the featherings or foliations in Gothic panels, arches, or tracery. C., in astron., is a point or horn of the moon or of one of the inferior planets.

Custer (GEORGE A.), b. in 1840 in O., grad. at W. Pt. in 1861; lieutenant-col. 7th Cav. July 28, 1866. He served in the c. war, and was engaged at Bull Run, in the Peninsular campaign, the Md., Rappahannock, Pa., and Richmond campaigns, taking part in numerous battles and skirmishes; was in command of the cav. division in the military division of the S. W. and Gulf 1865, and chief of cav. in the dept. of Tex. 1865-66; made maj.-gen. U. S. volunteers after Gen. Lee's surrender. He was killed June 25, 1876, in a battle with the Sioux Indians, on the Little Big Horn, in Mont. Terr.

Custine, kus-teen', de (ADAM PHILIPPE), COUNT, a Fr. gen., b. at Metz Feb. 4, 1740. He served as col. at Yorktown, Va., in 1781, and commanded an army on the Rhine in 1792. His popularity and talents excited the jealousy of the Jacobins, and he was guillotined Aug. 28, 1793. (See his memoirs by D'HILLIERS.)

Custine, de (ASTOLPH), MARQUIS, a grandson of the preceding, b. in 1793, travelled through Eng., Scot., Switz., It., Sp. (1835), and Rus., and d. in 1857. His work *La Russie en 1839* created at the time of its publication a profound sensation, and the Rus. govt. deemed it necessary to have an answer to it published.

Cus'tis (GEORGE WASHINGTON PARKE), an adopted son of Gen. Washington, b. in Md. Apr. 30, 1781. He was a grandson of Mrs. Martha Washington. Wrote a vol. of *Recollections of Washington*. D. Oct. 10, 1857.

Cutch, or Kutch, a portion of W. Hindostan, under Brit. protection, on the Indian Ocean, between Sindh and Guzerat, and separated from the desert by the Runn of Cutch, 7000 sq. m. of land encrusted with salt. The political system is like feudalism, with a sovereign called a *rao* over about 200 chieftains.

Cutch, a variety of catechu, used in tanning and dyeing. **Cuth'ans**, a name given by Jews to Samaritans.

Cuth'bert, R. E. jung., cap. of Randolph co., Ga., 118 m. S. W. of Macon. It has 2 female colleges, and a high school. Pop. 1870, 2210; 1880, 2129.

Cutler (LYSANDER), a native of Me., became col. of the 6th Wis. Volunteers in 1861, served in the Army of the Potomac, where he became a maj.-gen. D. July 30, 1866.

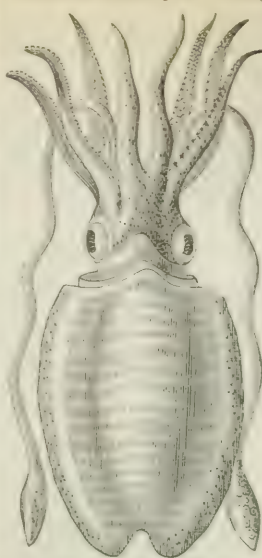
Cutler (MANASSEH), LL.D., a botanist and Congl. minister, b. at Killingly, Conn., May 3, 1742, grad. at Yale in 1765. He described 350 species of plants indigenous in N. Eng. He was a leader of a party that settled at Marietta, O., in 1788. He was also a lawyer and phys., and was M. C. 1800-04. D. July 28, 1823.

Cutler (TIMOTHY), D. D. Oxon., a clergyman, b. in Mass. in 1685. He became pres. of Yale Coll. in 1719, a member of the Epis. Ch. in 1722, and rector of a ch. in Boston in 1723. D. Aug. 17, 1755.

Cutlery [from the Lat. *cultellus*, diminutive of *cultus*, a "knife"], a term used to designate cutting instruments made of iron or steel. The most primitive cutting instruments were flints, shells, etc., which were succeeded by bronze implements and weapons. These were probably used to some extent by the Romans, until about the commencement of the Chr. era. Good table-knives are made of iron and steel welded together, the blades only being of steel. In many articles only the cutting edge is of steel. The blades of knives, razors, etc., are usually forged into shape in the bar. A pocket-knife is the work of many hands—one person making the blade, another the spring, another the handle, and so on—all the pieces being finally put together by the finisher.

Cuttings, portions of branches of trees or shrubs employed to produce new plants by the insertion of the lower end into the earth. The willow, currant, and gooseberry are easily propagated in this mode. Young branches, but not less than 1 yr. old, are most adapted for this purpose.

Cuttle-Fish [Ger. *Kuttelfisch*], a name applied to the



Cuttle Fish: *Sepia officinalis*.

where offenders against chastity were obliged to sit for 3 Sundays and receive a reprimand from the minister.

Cut-Worm, a name given to many larvæ, mostly of the family Noctuelle, and especially species of *Agrotis*. They cut off corn, cabbage, and other plants just below the surface of the ground, and one species at least (*Agrotis Cochranii*) climbs apple and pear trees and destroys the young buds. No effective remedy for their ravages has been discovered.

Cuvier, ku-ve-ä' (GEORGE CHRÉTIEN LÉOPOLD FRÉDÉRIC DAGOBERT), BARON, a Fr. naturalist, b. Aug. 23, 1769, at Montbéliard, then in Wurtemberg, whither the family had removed from Jura in the 16th century upon embracing Protestantism. His father was an officer in a Fr. regiment of Swiss mercenaries. He was an enthusiastic student from boyhood, and his passion for nat. hist. showed itself in his 13th yr. He became in 1788 tutor to the son of Count d'Héricy, who lived in Normandy, and remained in this situation nearly 6 yrs., at the same time pursuing his studies. Early in 1795 he removed to Paris, where he associated with Jussieu and Geoffroy St. Hilaire. He became, in July 1795, prof. of comparative anat. in the Museum of Nat. Hist., and began to form his great cabinet of comparative anat.; was prof. of nat. hist. in the Coll. of Fr. in 1800. In 1808 he was appointed councillor to the Imperial Univ. He displayed a rare faculty of expressing scientific truths in popular and elegant lang. in his *Discourse on the Revolutions of the Surface of the Globe*, in which he propounds the theory of the correlation of forms in organized beings. In his *Animal Kingdom* he proposed the arrangement of animals in 4 divisions—the Vertebrata, Mollusca, Articulata, and Radiata. Soon after the restoration of the Bourbons he was appointed chancellor of the Univ. of Paris by Louis XVIII. He was elected a member of the Fr. Acad. in 1818, and received the title of baron in 1820. He first applied to zoology the natural method, and founded a system on the basis of the invariable characters of anatomical structure. He is regarded as the founder of the science of comparative anat., and his knowledge of that science was such that a bone or small fragment of a fossil animal enabled him to determine the order, and even genus, to which it belonged. He was created a peer of Fr. in 1831. D. May 13, 1832. (See FLORENS, *Cuvier, Histoire de ses Travaux*.)—The brother of the naturalist, FRÉDÉRIC CUVIER, b. June 28, 1773, pub. with Geoffroy St. Hilaire, *Histoire naturelle des mammifères*.

Cuxhaven, a town of Ger., on the left bank of the Elbe, at its entrance into the Ger. Ocean, about 60 m. W. N. W. of Hamburg, to which it belongs. It has a good harbor, and is important as the port whence the Hamburg steamers depart when the Elbe is frozen. Pop. 2200.

Cuyahoga (ki-a-hō'ga) Falls, Summit co., O., on R. R. and Cuyahoga River, 34 m. S. S. E. of Cleveland. The river is here inclosed between rocky walls nearly 200 ft. high, and affords abundant water-power. Pop. 1870, 1861; 1880, 2294.

Cuyler, k'ler (THEODORE LEDYARD), D. D., b. at Aurora, Cayuga co., N. Y., Jan. 10, 1822, grad. at Princeton Coll. in 1841, at Princeton Sem. in 1846; preached three years at Burlington, N. J., was pastor of 3d Presb. ch., Trenton, N. J., also of Market st. Reformed ch. in New York, and became in 1860 pastor of Lafayette avenue Presb. ch., Brooklyn, N. Y., where the 25th anniversary of his pastorate was celebrated Apr. 5, 1885. Wrote *Empty Crib. Thought Hives*, and many articles for newspapers and periodicals.

Cuyyp, koip (ALBERT), a Dut. landscape-painter, pupil of his father, Jacob Gerrits Cuyyp (1755-1850), b. at Dort in 1806. His works, remarked for atmospheric effects, are many of them in Eng. D. after 1863.

Cuzco, koos'ko, a city of Peru, formerly the cap. of the Incas, in a valley 11,340 ft. above the sea, surrounded by lofty mts. 200 m. N. of Arequipa. Here and near by are stupendous remains of anc. Inca arch. and fortification. It has a fine cathedral, a univ., and a mint. Pop. 18,370.

Cyanæida, a family of phanerocarpous aculephs, with a thick and lobate disk and filaments united in groups on the inferior aspect. The *Cyanæa capillata* is one of the best known species, and notable for its severe sting.

Cyane [Gr. *Κυανή*], the name of a water nymph of classic mythology, who tried to rescue her playmate Proserpine, and was changed by Pluto into a fountain in Sic. The fountain C., near Syracuse, still flows.

Cyanide, or **Cyanuret**, a compound of cyanogen with a positive radical. Prus. blue is a C. (or rather a ferro-cyanide) of iron. The C. of potassium is very useful in chem. and the arts, and is also employed in med. as a sedative. It is a very active poison.

Cyanite, or **Kyanite** [from the Gr. *κυανός*, "blue," and *λίθος*, a "stone"], a beautiful mineral, sometimes called **Disthene**, is a silicate of alumina. It often occurs crystallized, and generally in broad prisms. It is transparent or translucent, sometimes opalescent, and exhibits various shades of blue.

Cyanogen [from the Gr. *κυανός*, "blue," and *γεννάω*, to "produce," referring to "prussian blue," one of its compounds], a compound negative radical composed of carbon and nitrogen. It has the odor of peach kernels. Combined with hydrogen it produces prussic or hydrocyanic acid, remarkable for its deadly action upon the animal economy. C. combines with metals and other positive radicals, and produces a class of compounds known as cyanides, which are analogous in character to the chlorides, iodides, etc. Some of these are of great importance in the arts, as in gilding, electro-plating, photographing, and as tests in the chemical laboratory. Some are used in med. as sedatives, but they are in gen. extremely poisonous. Prus. blue is one of the most important of the cyanides.

Cyanometer [from the Gr. *κυανός*, "blue," and *μέτρον*, a "measure"], an instrument for measuring the blueness of the sky. It consists, essentially, of a disk divided into sectors, the several sectors being colored with tints of blue gradually increasing in intensity. Held between the eye and the sky, some sectors will appear deeper, and some lighter in tint than the heavens. That one where the difference is insensible is the measure of the blueness for the time being.

Cyaxares, *si-aks'-a-réz* [Gr. *Κυαξάρης*; Old Per. *Uvaxshatara*, i. e. "beautiful eyed"] I., a king of the Medes, began to reign in 633 B. C. C. and the king of Babylon took Nineveh in 625. D. 593, and was succeeded by his son Astyages, who reigned from 593 to 559 B. C.

Cyaxares II., a son of Astyages, grandson of Cyaxares I., and uncle of Cyrus the Great, began to reign 559 B. C. He is probably the same as "Darius the Median" spoken of by the prophet Daniel (v. 31).

Cybele [Gr. *Κυβέλη* or *Κυβήλη*], called also **Cybebe** [Gr. *Κυβήθη*] and **Rhea** [Gr. *Ρεία*, "Pea or 'Peia"], a goddess of classic mythology, received the appellation of "Mother of the Gods" or "Great Mother." She was supposed to be a daughter of Uranus and Terra, the wife of Saturn (Cronos), and the mother of Jupiter.

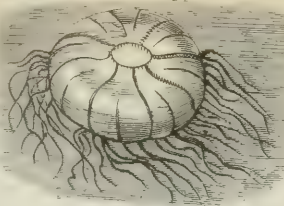
Cyclades, *sik'-la-déz* [from the Gr. *κύκλος*, a "circle," a group of 12 islands in the Ægean. These with 8 others form a name of the kingdom of Gr. Area, 926 sq. m. Pop. 132,020.

Cyclamen [Gr. *κυκλάμινος*, from *κύκλος*, "circle," because it was used for garlands], the name of a genus of plants of the natural order Primulaceæ, having a wheel-shaped corolla, with a long reflexed limb, and flower-stalks twisted spirally after flowering. The species are herbaceous perennials, mostly natives of the S. of Europe. Some of them are cultivated in gardens for the sake of the flowers, which are beautiful and fragrant. The root or subterranean stem is acrid and drastic. These properties depend on a peculiar principle called cyclamin.

Cycle [Gr. *κύκλος*, a "circle"], a period of time which finishes and recommences perpetually. The term has been employed for marking the intervals in which 2 or more periods of unequal length are each completed in a certain number of times, so that both begin again exactly in the same relations as at first. The C. used in chronology are 3: the C. of the sun, the C. of the moon (or Metonic C.), and the C. of indiction. The C. of the sun, or solar C., is a period of time after which the same days of the week recur on the same days of the yr. In the Julian calendar this C. contains 28 yrs. The C. of the moon is a period of 19 solar yrs., after which the new and full moons fall on the same days of the yr. as they did 19 yrs. before. This C. was invented by Meton, an Athenian astron., and is known as the "Metonic C." The C. of indictions, or Rom. indiction, is a period of 15 yrs., not astronomical, but entirely arbitrary. Its origin and purpose are alike uncertain, but it is conjectured that it was introduced by Constantine the Great about 312 of the common era, and had reference to certain judicial acts that took place at stated intervals of 15 yrs. F. A. P. BARNARD.

Cyclic Poets [Gr. *οἱ ποιηταὶ κυκλικοί*, the "poets of the cycle" of mythology], a name originally given to Homer and certain epic poets whose works treated of the mythological and heroic ages of Gr. The Homeric poems, though originally comprised in this cycle, are always treated as distinct from it, and the name "cyclic poet" became rather one of reproach. The prin. C. P. were Arctinus, Lesches, Agias, Eumelus, Stasinus, and Eugamon. Their extant writings are mere fragments.

Cycloid [Gr. *κύκλος*, a "circle," and *εἶδος*, "form"], a curve that may be generated by a point in the plane of a circle when the circle is rolled on a straight line. If the gen-



Cyanæa.

erating point is on the circumference of the rolling circle, the curve is the *common C.*; if it is without the circumference the curve is a *curtate C.*; if it is within the circumference the curve is a *prolate C.* The common C. is the curve of quickest descent—i. e. if a body is to roll from one point to another in the same plane, but not in the same vertical, it will do so along the arc of an inverted C. quicker than along any other curve. If a pendulum is made to vibrate in the arc of an inverted C. its beats will be *isochronous*, no matter what may be the amplitude of vibration. W. G. PECK.

Cyclone [from Gr. *κύκλος*, a "circle"; -*ónē* is an augmentative suffix], a rotatory storm or whirlwind occurring in the tropical seas, but never on the equator. The diameter is generally about 200 and 300 m., and sometimes exceeds 500. The centre of the vortex (which is always calm) travels at a rate varying from 11 to 30 m. an hour. According to Humboldt the velocity of the wind is sometimes from 200 to 300 m. an hour.

Cyclopean Walls, a term applied to certain huge structures or walls of uncemented stones, unhewn or hewn, the remains of which are found in Gr., It., and Asia Minor; so called because they were supposed to have been built by the Cyclopes of mythology. Some believe they were erected by the Pelagii, over 1000 yrs. before the Chr. era.

Cyclops [Gr. *Κύκλωψ*, (i. e. "round-eyed"), from *κύκλος*, a "circle," and *ὤψ*, an "eye"], plu. **Cyclopes**, in classic mythology, a race of giants or monsters having each one eye in the middle of the forehead. Homer represents them as gigantic and lawless shepherds and cannibals living in Sic.

Cyclopidae a family of minute entomostracans, so named from the supposition that the animal had but one eye. It has since been discovered to have two eyes, forming a single spot in the centre of the forehead. The prin. genus is *Cyclops*, of which the species are numerous, and inhabit fresh waters.



Cyclops.

Cyclo'sis [Gr. *κύκλωσις*, a "going around," from *κύκλος*, a "circle"], a movement of elaborated sap, *latex*, or granulated protoplasm within the cells or vessels of plants. It was first observed and described by C. H. Schultz. In the milky or colored latex of some species of the genera *Ficus* and *Euphorbia*, and in the celandine (*Chelidonium majus*), it is easily seen under the microscope, but is nowhere more beautiful than in the elongated cells of *Chara* and some other aquatic plants, especially with a magnifying power of about 1200 diameters. It has been observed in the needle-like hairs of the common nettle. There is usually a regular rotation (whence the name) of the granules in each cell, up one side and down the other, with also smaller partial currents in different directions. Huxley considers the cause of the currents to exist in contractions of the protoplasm, too minute to be discerned except through their effects. (See SCHULTZ, *Die Cyklose, etc. in den Pflanzen*, Breslau.)

Cydnus [Gr. *Κύδνος*], a river of Cilicia, flowing through the city of Tarsus into the Mediterranean. It was anciently navigable up to Tarsus (12 m.), but its mouth is now obstructed by bars.

Cygnus (the "Swan"), a constellation of the N. hemisphere between Lyra and Cassiopeia, comprises several bright stars. The parallax of the binary star 61 Cygni was measured by Bessel, who pub. in 1839 *Messure of the Distance of the Star 61 in the Constellation of Cygnus*. By 2 distinct methods of observation the distance of this star has been shown to exceed 50,000,000,000 m.

Cylinder [Gr. *κύλινδρος*, from *κύλινδω*, to "roll"], in geom., a vol. that may be generated by a rectangle when revolved about one of its sides. The opposite side generates the *lateral surface*, and the other 2 sides generate the *bases*.

Cyllene [Κυλλάρις], a mt. of Gr., now called Zyria, was supposed to be the birthplace of Mercury (Hermes), who had a temple on its summit. Height above the sea, 7788 ft.

Cymry, the name given by the Welsh to their nation, frequently extended to the entire branch of the Celtic race to which the Welsh belong. Probably a great part of the anc. Brit. race was Cymric, and many Cymric roots appear to have been found in Gaulish and Belgic names.

Cynanchum [Gr. *κύνων*, a "dog," and *ἀγχω*, to "choke," i. e. "dog-bane"], a genus of plants of the order Asclepiadaceæ. *C. Monspeliacum*, found on the shores of the Mediterranean, produces the Montpellier scammony. Caoutchouc is obtained to some extent from the *C. ovalifolium*, a native of Penang. Other species have been used in med.

Cynics [Gr. *κυνικοί*, "dog-like," from *κύνων*, "dog"], a sect of philos. among the Grs., so called from their dog-like temper and their disregard of the conventional usages of society. The sect was founded in the 5th century B. C. by Antisthenes, a disciple of Socrates. Its most noted member was Diogenes. Its professed aim was to inculcate a love of austere virtue and a contempt of pleasure.

Cynocephalus, *sin-o-sef'-alus* [from the Gr. *κύνων*, a "dog," and *κεφαλή*, "head"], in Egyptian mythology, a dog-faced baboon. The Egyptians held these animals in great veneration, and professed to discover by their aid the periods of the sun and moon. The name is now applied to a genus of Afr. monkeys.

Cynosura [Gr. *κυνόσουρα*, from *κύνων*, *κυνός*, "dog," and *ούρα*, "tail," probably because 4 stars of the constellation Ursa Minor, including the N. Star, were fancied to resemble a dog's tail; Fr. and Eng. *cynosure*], a nymph of Ida, said to have been one of the nurses of Jupiter, who translated her into the constellation. In the lang. of poetry it signifies a "point of attraction."

Cynthiana, a city, cap. of Harrison co., Ky., on R. R. and the S. Fork of the Licking River, 66 m. S. of Cin. It was

first settled in 1780, and was named from Cynthia and Anna Harrison, daughters of one of the early settlers. It is noted for the manufacture of "Bourbon" whiskey. It has a female coll. There were conflicts here between the U. and Confed. forces, on July 17, 1862, and June 11 and 14, 1864. Pop. 1870, 1771; 1880, 2101.

Cyperus [Gr. *κυρπεος*, the name of a water-plant], a genus of plants of the order Cyperaceæ, distinguished by hermaphrodite flowers and compound spikes of numerous 2-rowed glumes, without bristles. It contains numerous species, many of which are natives of the tropics, and others of the U. S. Some of them have tubers or corms which are mucilaginous and nutritious. The *C. esculentus* (rush-nut), a native of S. Europe, is cultivated in It., Sp., and Fr., and bears farinaceous tubers which are as large as a hazel-nut, and are called *amande de terre* ("ground almond") by the Fr. They are eaten as dessert, and are used in making orgeat. The papyrus plant is often referred to this genus, though separated from it by some botanists.

Cypreïde [from *Cypria* (Cyprus, a name of Venus)], a family of gastropod mollusks, distinguished by the beauty of the shells of most of the species. These are much sought after by shell-collectors, and popularly known under the name of cowries. The animal has a broad, flattened foot, more or less truncated in front and pointed behind; the mantle is expanded on each side, and forms lobes which meet over the back of the shell near its median line; the rostrum rather long and with an invertible tip; the teeth are in 7 rows, 1 rhachidian, and 3 uncinal on each side; the shell in youth is cylindrical or olive-form, and with a conspicuous spire, but toward maturity the outer lip encroaches upon the spire and becomes thickened, while an extensive deposit of callous material is secreted upon the columella, and the shell consequently becomes involute and ovoid in form, and assumes the aspect represented in cowry; the aperture is then narrow and longitudinal, and occupies the whole length of the shell, and each of the lips is plicated by numerous transverse teeth. Two groups have been differentiated by Troschel as distinct families—(1) the true cowries, retaining the Cypræaceæ, and (2) the Trivia, or small ribbed forms, as well as *Erato*, or margined-like forms, being contradistinguished under the name Triviaceæ. The species of the 2 families are numerous, between 150 and 200 having been described.

THEODORE GILL.

Cypress [Gr. *κυπαρισσος*, perhaps the Heb. *gopher*], (*Cupressus*), a genus of evergreen trees and shrubs of the natural order Coniferae, having globular cones, and very small and scale-like or awl-shaped leaves, which are appressed and imbricated. The wood is valuable and exceedingly durable. The common *C. (Cupressus sempervirens)*, a native of the Levant and N. Afr., is a tree of a conical form, sometimes growing to the height of 100 ft. or more. On account of its dark green leaves and sombre aspect it has from very early times been adopted as an emblem of mourning. The anc. Grs. and Roms. planted it in burial grounds, and the same custom now prevails in Tur. The wood has a pleasant smell, is not liable to be injured by insects, and is therefore valuable to cabinet-makers. It is compact and durable. Specimens of this wood preserved in museums are said to be several thousand yrs. old. Some critics believe that the kinds of timber called cedar and gopher-wood in Script. were the wood of the *Cupressus*. Among the other species of this genus are the *Cupressus thurifera* of Mex., the resin of which is burned for incense, and the *Cupressus thuyoides*, which is a native of the U. S., and is commonly called white cedar. The popular name Amer. C. is given to the *Taxodium distichum*, a large and valuable deciduous tree which grows in swamps in the S. U. S.

Cyprian, SAINT [Lat. *Cyprianus*], or, more fully, **Thascius Cæcilianus Cyprianus**, a bp. of Carthage and Lat. Father of the Ch., b. in 200 A. D. at Carthage. He was a teacher of rhetoric before his conversion, which occurred about the yr. 246, and he was chosen bp. of Carthage in 248 A. D. He emphasized the idea of the Ch., insisted upon the 3 orders of the ministry, and stoutly maintained the parity of bps. against the assumptions of the bp. of Rome. Suffered martyrdom under Valerian in 258 A. D. Wrote *De Unitate Ecclesie*. (See POOLE, *Life and Times of St. Cyprian*.)

Cypriidæ, a family of minute entomostracous Branchiopoda, with the body inclosed in a bivalve shell. The antennæ and feet are furnished with fringed bristles, by means of which they swim with ease.

Cypriinidæ, a family of malacostracous fishes, characterized by the development of sickle-shaped liver, pharyngeal bones, with a short row of (3-8) teeth, upper jaw bordered laterally by the intermaxillaries; both jaws toothless, and 3 branchiostegal rays. The species are very numerous (probably 700-800), and found in the fresh waters of all parts of the world except S. Amer. and Australasia. They are known as carps, dace, shiners, etc.

Cypriodonidæ [from *cyprius*, "carp," and *ὄδων*, *odontos*, a "tooth"], a family of haplochromis fishes characterized by a flattened scaly head, upper jaw constituted laterally by the intermaxillaries only, and cardiform teeth of the jaws and pharyngeals. Most of the species are viviparous, and in some the sexes are excessively differentiated. They inhabit the fresh and brackish waters of most parts of the world. In the U. S. they are chiefly called minnows, nummichog, and killifish.

Cyprus [Tur. *Kibris*; Gr. *Κυπρος*], an island of Asia, in the N. E. corner of the Mediterranean, 44 m. S. of Cape Anamoor in Anatolia, and about the same distance W. of the coast of Syria. It is about 140 m. long, and 50 m. broad at the widest part. Area, 3678 sq. m. Pop. 1881, about 185,000. The interior is occupied by a range of mts., the highest points of which rise nearly 7000 ft. above the sea. These mts. are of limestone formation, and are covered with vast forests of walnut, oak, and other good timber. The soil is generally very fertile, but the island is not liberally supplied with water. The staple products are cotton,

wheat, tobacco, madder, silk; also grapes and other fruits. Wine of good quality is also made. A large portion of the pop. are Grs. Cap. Nicosia. In anc. times C. was devoted to the worship of Aphrodite or Venus, who was fabled to have here risen from the sea. In 44 A. D. it was visited by Paul in his first missionary tour. The Saracens (from 649 A. D.) took and retook it several times. Wrested from the Saracens by Richard Cœur de Lion in 1191, it was governed by kings of its own from 1192 to 1489, and belonged to Venice from that time till 1573, when it was conquered by the Turks, who ceded it to Eng. in 1878. Perhaps no country on the globe has changed masters so many times, or holds within its bosom the relics of so many civilizations. Discoveries of the greatest interest and importance have recently been made by Gen. di Cesnola, Amer. consul in C. For many yrs. C. has been a hunting-ground for archaeologists. The Codex Cyprius, containing the unutilized Gospels, was found here in the 9th century, and was carried to Paris in 1673. Pococke saw ruins and tombs; the abbé Martini, who visited the island in the latter part of the last century, describes marbles, coins, medals, and lamps, but the Turks would not permit diggings. Later, a number of silver bowls were found, one of which, now in the collection of the Duc de Luyne, closely resembles those found by Layard at Nimroud. In 1845 a bas-relief in black basalt was found at Larnica, upon which is sculptured the figure of Sargon, king of Assyria, father of Sennacherib. This bore the inscription in cuneiform letters, "From the great king Sargon to his vassal friend, the king of Citium." There had, however, been no systematic researches undertaken in the island until Di Cesnola began his, the larger portion of the fruits of which is now deposited in the Metropolitan Museum of Art in New York.

Among the coins are some of the best Gr. period, good examples of the Rom. imperial times, with others belonging to the Alexanders, the Seleucidae, and the kings of C. In bronze the articles are very curious and valuable, though they have all suffered greatly from decomposition. There are several statuettes of Osiris, of Minerva, of Pomona, and one of a mounted warrior, with Gr. initials on the pedestal. Beside these artistic objects there are a multitude of implements—bracelets, anklets, rings, amulets, hair-pins, mirrors and mirror-cases, brooches and buckles, strigils, tweezers, pincers, lamps, modelling tools, vases, cups, tripods, shields, spears, battle-axes, javelins, arrow-heads, hooks and nails, and the small toothed sickles, such as are in use to-day in the island. There are many articles in gold and silver, and gems and stones engraved in intaglio and in relief—carnelian, carbuncle, jasper, garnet, onyx and agate, sapphire and amethyst, with some cameos of paste, one a head of Cæsar, white on a dark-blue ground. The Di Cesnola jewelry consists of rings, earrings, necklaces, amulets, bracelets, beads, buttons, spoons, and 2 or 3 collars of uncommon size and importance. Many of these ornaments are of gold alone, wrought with the pincers and the hammer, twisted, granulated, and embossed, showing great skill in execution and resource and freedom in design. The objects in marble, alabaster, and stone are very numerous. The most interesting and important are the statues, but beside these are heads of animals, plates, tripods, ointment-boxes, tear-bottles, vases, seals, lamps, small altars, and pedestals. But the objects in glass and terra-cotta are the most numerous of all. There are 1700 pieces of glass, the greater part of it probably of Phœnician make, though found in Gr. tombs at Idaliom (the modern Dali), and supposed to range from 400 B. C. to 100 B. C. It would be impossible within any reasonable limits to give any satisfactory account of this collection. The objects consist of plates, cups, bottles—these last of all sizes and shapes—vases, buttons, necklaces, and seals, and one spoon—a unique specimen. Much of this glass has been oxidized by the action of time and burial in the earth, and the result is a splendid iridescence, differing greatly in amount in different specimens, and differing too in the chord of color. In gen., the surface of these glass objects is little ornamented, but there are notable exceptions, a few being either fluted, ribbed, or decorated with pressed ornaments or crinkled handles, or with twisted patterns in the glass itself, as in some specimens of Venetian glass. Nor are the objects in terra-cotta less numerous or less interesting. They are of all periods and races, and the visitor will find his interest divided between the Phœnician pottery and the Gr. statuettes, lamps, and vases. The series of lamps begins with the Phœnician, mere clay scoops, modelled from bivalve shells perhaps, as their oldest vases and bowls are from gourds; then come the Egyptian and then the Gr. The statuettes in terra-cotta are of the highest interest. They are in great variety, and many of them are so odd that it is difficult not to believe them caricatures. In one of the cases there are ranged in chronological order statuettes of Venus from the earliest time, some of them most amusing in their deformity, but the series culminates in several little figures of the purest Gr. type and of the finest execution. (See *Die Sammlung Cesnola, beschreibend von Dr. Hermann Düll*, pub. in the *Memoirs of the St. Petersburg Imperial Acad. of Sciences*; also *The Antiquities of Cyprus*, photographed by Stephen Thompson, from a selection made by C. T. Newton, M. A., Keeper of Gr. and Rom. Antiquities at the Brit. Museum.)

Cyrenaica [Gr. *Κυρηναία*], the anc. name of a region of N. Afr., now known as Barca. It is also called Pentapolis, from its 5 cities, Cyrene, Apollonia, Teuchira, Hesperides, Barca; afterward Cyrene, Apollonia, Ptolemais, Arsinoë, Berenice. The prin. city was Cyrene, from which the name was derived. C. was bounded on the W. by Afr. Propria, on the E. by Marmarica, and extended S. as far as Libya Inferior. The original inhabs. now represented by the Berbers, were probably descendants of Phut, the third son of Ham (Gen. x. 6). The Grs. began to colonize this part of Afr. about 631 B. C. Till 430 B. C. C. was governed by a dynasty of 8 kings, 4 of whom bore the name of Battus, and

4 the name of Arcesilaus. A democratic republic was then established. In 332 B. C. the people submitted to Alexander. Under the Ptolemies many Jews settled there. In 75 B. C. C. became a Rom. prov., and afterward a part of the Byzantine empire. In A. D. 616 it was conquered by the Pers. Chosroes (Khosroo), in 647 was overrun by the Arabs, and now is under the rule of the Turks, whose authority, however, is hardly more than nominal. Its climate is delightful, and much of its soil very fertile.

Cyrene [Gr. Κυρήνη], the cap. of Cyrenaica, was situated about 10 m. from the Mediterranean, and 1800 ft. above the level of the sea. It was founded about 631 B. C. by a colony of Grs. C. carried on an extensive commerce with Egypt and Gr. through its port called Apollonia. It was the native place of Aristippus, Eratosthenes, the poet Callimachus, and Carneades. Remains of its former magnificence are still visible. The site is now occupied by a poor town called *Grenne* or *Kooreen*.

Cyrenius, or **Quirinius** (PUBLIUS SULPICIUS), a Rom. gov. (proconsul) of Syria. Recent investigations have rendered it highly probable that he held that office twice—first, from 4 to 1 B. C., when Chr. was born (Luke II. 2), and again from 6 to 11 A. D. (See ZCUMPT, *De Syria Romanorum Provincia*.)

Cyrl, or **Cyrlus** [Gr. Κύριλλος], SAINT, b. probably in Jerusalem, 315 A. D. Ordained a deacon in 334 or 335, and became bp. of Jerusalem in 350 or 351. His writings have no great doctrinal weight, but are of great archaeological and liturgical value. D. Mar. 18, 386.

Cyrl, or **Cyrrillus**, SAINT, an intolerant and arrogant prelate, b. at Alexandria in Egypt. He became bp. of Alexandria in 412 A. D. He had a long controversy with Nestorius on the subject of the Incarnation, and presided over the Council of Ephesus in 431. D. June 9 or 27, 444.

Cyrl, whose name originally was **Constantine**, son of Leon of Thessalonica, and elder brother of Methodius, b. between 810 and 830 A. D. In 863 the 2 brothers went together to Moravia. They were the apostles of the Slavic race. C. invented the alphabet, and translated into the Slavic lang. the Psalter and all of the N. T. except the Apocalypse. D. Feb. 14, 869.

Cyrrillic Alphabet, invented about 863 A. D. by St. Cyrl, the apostle of the S. Slavi. It was based upon an older alphabet. The C., with a number of modifications, is the alphabet used in Rus. and some other Slavic countries.

Cyrus [Gr. Κύρος (or Κύριος ο βασιλεὺς, i. e. "Cyrus the Elder")], Per. *Kai-Khosroo*; old (cuneiform) Per. *Kooroshi*], surnamed THE GREAT, the founder of the Per. empire, was the son of Cambyzes, a Per. nobleman. His mother was Mandane, a daughter of Astyages, king of Media. Heading a revolt, C. defeated Astyages in battle, and ascended the throne in 558 B. C. He conquered Crœsus, king of Lydia, in 554, and overthrew the Babylonian empire in 538. In 536 he issued an edict permitting the return of the Jews to Pal. Herodotus states that he afterward invaded the country of the Scythian Massagetae, who were ruled by Queen Tomyris, and that he gained several victories over her, but was drawn into an ambush and killed in 529 B. C. According to Xenophon, C. d. a natural death at Pasargadae. He was succeeded by his son Cambyzes. R. D. HITCHCOCK.

Cyrus the Younger was the second son of Darius Nothus, king of Per., by whom he was appointed satrap of Lydia and Phrygia in 407 B. C. Having formed a design to dethrone his brother Artaxerxes Mnemon, he hired a large army of Gr. mercenaries, of whom Clearchus, a Spartan, was the leader. In the yr. 401 B. C. he moved his army from Sardis. Xenophon the historian took part in the expedition. C. met the army of Artaxerxes at Cunaxa, where he was killed about Sept. 401 B. C.

Cysticeræus [Gr. κύστις, a "cyst," and κύρεος, a "tail"], a name applied to the larvæ of certain cestoid worms, and found in the flesh of animals, where they cause the tumors known as hydatids.

Cystic Worms. See CESTOID WORMS.

Cystitis [Gr. κύστις, the bladder], inflammation of the bladder. It may be acute or chronic. It is more frequent in men than in women. It may be the result of blows, kicks, bruises, punctured or incised wounds. It also occurs from holding the urine too long, from urine which is irritating—either highly acid or very alkaline—or from the irritation of calculus and gravel in the bladder. In old men it results from enlarged prostate (neck of the bladder), and in women from inflammations and diseases of the uterus and pelvic cellular tissue. The symptoms are chilliness, fever, nausea and vomiting, prostration of strength, pain and sense of heat over the bladder, constant desire to urinate, often with inability to do so, and the voiding of urine thick and creamy like pea-soup. The treatment consists in applying in some cases ice-packs over the bladder, in others hot poultices and fomentations sprinkled with laudanum, opiates and chloral by the mouth to allay pain, the free use of alkaline and demulcent drinks, and in withdrawing the urine by the catheter twice daily if practicable, washing out the bladder with tepid or cool water, medicated or carbolic. In chronic C. in men the urine must be regularly drawn and the bladder washed out. E. D. HICCOCK.

Czar, zar [from the Rus. *tsar*, a "king"], the title of the emps. of Rus. It was applied as early as the 12th century to the grand dukes of Moscow. In 1505 Basil assumed the title of *samodershek* (autocrat). His son, Ivan the Terrible, caused himself to be crowned as C. in 1547. In 1721 Peter the Great assumed the additional title of *imperator*. The C. is popularly termed *hossoodar*. His wife was styled *czarina*, now *imperialina*.

Czartoryski (ADAM GEORGE), PRINCE, a Polish patriot, a son of Prince Adam Casimir, pres. of the Polish Diet, b. at Warsaw Jan. 14, 1770. He fought against Rus. in 1792, was taken to St. Petersburg as a hostage, and gained the favor of the grand duke Alexander, who appointed him assistant minister of foreign affairs in 1802, which position he

resigned in 1808. In the revolution of 1830 he supported the Poles against Rus., and was elected pres. of the new govt. Jan. 1831, but after the defeat of the Poles in Aug. of that yr. went into exile. D. July 16, 1861.

Czerny, cher'nee (GEORGE), or **Kara George** (Black George), a Servian chief, b. Dec. 21, 1766, was originally a peasant. In 1806 he led the revolt of the Servians against Tur., defeated the Turks, captured Belgrade in Dec., and liberated Servia, secretly aided by Rus. When Rus., invaded by Nap., could no longer support him, C. was driven out by the Turks in 1813. Having returned, he was murdered in July 1817, at the instance of Milosch Obrenovitch.—His second son, ALEXANDER KARAGEORGEVITCH, was prince of Servia from 1842 to 1858.

D.

D, the 4th letter of the Phœnician and Heb., as well as of the Gr. and Rom. alphabets. The name in Heb. (*dâleth*) signifies "door," and the picture of a door was probably its original form. The sound of the Eng. *d* is formed by placing the tongue against the gums at the roots of the teeth. But in pronouncing the letter in several other langs. (as the Sp., Ar., and Per.) the tongue is placed against the teeth themselves, and from this circumstance it is termed a *dental*. In the Sans. there are 2 letters which are represented, though not quite accurately, by the Eng. *d*. The one is truly a dental, being similar to the Sp. *d*; the other is formed by turning the tip of the tongue back against the roof of the mouth, whence it is termed a *palatal*, and sometimes a *cerebral*, letter. *D* is often interchanged with other letters (as *t* and *th* (9)) of the same class. The sound of dental *d* often approaches, or is actually changed into, that of *th* in *this*. Thus, in Sp., *d* when between 2 vowels or at the end of a word has almost, if not exactly, the sound of *th* in the Eng. word *smother*; the same is substantially true of the Dan.; hence the Dan. words for "brother" (*broder*) and "mother" (*moder*) have nearly the same sound as their Eng. equivalents. The delta (δ) of the modern Grs. has exactly the same sound as our *th* in *this*. Among the anc. Roms., *D* (cap.) stood for 500, or as an abbreviation it stood for *divus* (a title signifying the "godlike"), and *Decimus*, a name. Among the anc. Grs. *della* with a mark on it (δ̄) stood for the number 4.

Dab, a name applied to various Pleuronectidæ, but especially to *Limanda vulgaris*, a species commonly about 8 or 9 inches and rarely 1 ft. long. It is common on the sandy coasts of N. Europe, is found in deeper water than the flounder, and does not enter the mouths of streams. The *Limanda ferruginea* is a closely related N. Amer. species.

Dabol (NATHAN), b. about 1750, was the author of *Dabol's Arith.* He was a teacher of Conn. D. Mar. 9, 1818.—C. L. DABOL, his son, was the inventor of the fog-trumpet. D. Oct. 13, 1866.

Dacæa, a city of Bengal, on the Burha Gunja, 127 m. N. E. of Calcutta, formerly celebrated for its gauze-like muslins. It was once a very large city, and there are magnificent ruins. It has a govt. coll. Pop. 1880, 69,212.

Dace, a name applied to numerous fishes of the family Cyprinidæ, but properly restricted to those of the genus *Leuciscus* or *Squalius*, whose pharyngeal teeth are biseriate, lateral line complete, etc. The best known species is *L. vulgaris*. *D.* are gregarious, and swim in shoals. They prefer clear, quiet streams, and are found in Europe, etc.

Dacelo. See LAUGHING JACKASS.

Dac'i also called **Getæ**, an anc. barbarous people who inhabited Dacia. They are supposed to have emigrated from Thrace to Dacia before the time of Alexander the Great. Their name, "Getæ," is thought to be identical with "Gothi" or Goths.

Dacia, da'she-a, a former country of Europe, occupied by the Daci, bounded N. by the Carpathian Mts., S. by the Danube. The Dacians waged a long war, beginning 10 B. C., with the Roms., whom they defeated in 87 A. D., compelling them to pay tribute. *D.* was reduced to a Rom. prov. by Trajan 106 A. D.; remained under Rom. rule until Aurelian abandoned it (270-275), and made the Danube the boundary of his empire. The Rom. prov. comprised the E. part of Hungary, Transylvania, and Roumania.

Dacier, dah-se-ä' (ANNE LEFÈVRE), a learned Fr. lady, the wife of André Dacier, was b. at Saumur in Mar. 1654. She was instructed in Gr. and Lat. by her father, and was employed to edit several Lat. authors for the use of the dauphin. She was married in 1683 to André Dacier (1651-1722), librarian of the king, who also was distinguished as a translator and ed. of classical authors. She produced Fr. translations of Anacreon, of Terence, of Homer's *Iliad*, and of the *Odyssey*. D. Aug. 17, 1720.

Da Costa (J. M.), M. D., a phys., b. in the island of St. Thomas, in the W. I., Feb. 7, 1833, and received his med. education at Phila. and in Europe. He became prof. of the practice of med. at the Jefferson Coll. in Phila. in 1872. He has pub., beside other works, *Med. Diagnosis*.

Dacota. See DAKOTA.

Dactylopteris. See FLYING ROBIN.

Dactylos [Gr. δάκτυλος, a "finger"], a finger's breadth, an anc. Gr. measure, equal to 0.7586 inches.

Dactyl [from the Gr. δάκτυλος, a "finger," because, like the *D.*, a finger has 1 longer and 2 shorter parts], the name of a metrical foot in Gr. and Lat. poetry, consisting of 1 long and 2 short syllables, as *carmīnū*. The term is also applied in the Eng. and other langs. to a foot or measure consisting of 1 accented and 2 unaccented syllables, as *destiny*. In Lat. hexameters the next to the last foot is almost always a dactyl.

Dado, an It. word signifying a "die," is applied in arch. to the cubic block which forms the body of a pedestal, and is between the base and the cornice. The term is also applied to the wainscoting of a room.

Dædalus (Gr. Δαίδαλος), a personage of Gr. mythology, was celebrated as an inventor and mechanical genius. According to tradition, he built the Labyrinth of Crete, and made wings with which he flew from Crete to Sic. (See *Leviathan*.)

Dædalus (dæ'd-a-lus) of **Sicyon**, son and pupil of Pærocles, himself a distinguished artist, flourished about 400 b. c. He made for the Eleans, after their victory over the Lacedæmonians, the trophy which they erected in the grove Altis. Beside this he fashioned statues of several athletes, a Victory, and others enumerated by Pausanias.

Daffodil (Gr. ἀσφόδελος; Lat. *asphodelus*), the Eng. name of those species of *Narcissus* which have a large bell-shaped corona. The common D. (*Narcissus Pseudo-narcissus*) is a native of Eng., having showy yellow flowers. Another species, called *Narcissus minor*, is cultivated in gardens for the sake of the flowers, which open early in spring.

Dagg (JOHN LEADLEY, D. D., LL.D., b. in Middleburg, Va., Feb. 13, 1794; Bap. pastor; pres. of Mercer Univ. 1844-54; author of *A Manual of Theol.*, *Moral Science*, *Church Order*, and *Evidences of Christianity*).

Daggett (DAVID), LL.D., a lawyer and jurist, b. at Attleborough, Mass., Dec. 31, 1764; was a U. S. Senator 1813-19. He became chief-justice of Conn. in 1832. D. Apr. 12, 1851.

Daggett (OLIVER ELLSWORTH), D. D., a scholar and divine, son of David, noticed above, b. Jan. 14, 1810, at New Haven, Conn., grad. at Yale Coll. 1828; ordained pastor of the South ch., Hartford, Conn., 1837, pastor of the First Congl. ch., Canandaigua, N. Y., nearly 23 yrs., afterward prof. of divinity in Yale Coll. about 3 yrs., and subsequently pastor of the Second Congl. ch., New London, Conn.; author of many articles in the *New Englander*, and also one of the compilers of the *Conn. Hymn-Book*. D. Aug. 31 or Sept. 1, 1880.

Daghestan [from the Per. dagh, "mountain," and stan, "country"], a govt. of Rus., extends along the W. coast of the Caspian Sea, from lat. 41° to 43° N., and is mostly between lon. 46° and 50° E. It is bounded on the S. W. by the Caucasus Mts., and the surface is generally mountainous. Area, 11,099 sq. m. Belonged to Per. until 1812, when it was ceded to Rus., but the Rus. rule was not fully established until the submission of Schamyl in 1859. Pop. 481,624.

Dag'obert [Lat. *Dagobertus*] I., king of the Franks, b. about 602 A. D., succeeded his father, Clotaire II., in 628. D. 638, leaving 2 sons, Sigebert, king of Austrasia, and Clovis II. of Neustria.

Da'gon [a diminutive of endearment, apparently masculine, from the Heb. dag, "a fish"], a Philistine god, human down to the waist, with the tail of a fish. The Phœnicians also had a fish-god, Dagon.

Daguerre, dah-gair' (LOUIS JACQUES MANDÉ), b. at Cormeilles in 1789; became a skillful scene-painter, and was one of the inventors of the diorama; invented the daguerrotype. D. July 12, 1851.

Daguerrotype, da-ger'o-tip [named from Daguerre, its inventor], the first successful (now obsolete) form of the photograph.

Dahlgren, dal'gren (JOHN A.), b. Nov. 13, 1809, in Phila., entered the navy as a midpn. Feb. 1, 1826, became rear-admiral in 1863. On Apr. 22, 1861, through the abandonment of his trust by Capt. Franklin Buchanan, D., then on ordnance duty, became commandant of the U. S. navy-yard, Wash., and to his firmness and sound judgment at that crisis the govt. was indebted for the preservation of the yard from falling into the hands of the Confeds. In the fall of 1862 D. was detached from the navy-yard and appointed chief of the bureau of ordnance, and in June 1863 became commander-in-chief of the S. Atlantic blockading squadron. He at once commenced active operations in conjunction with Gen. Gilmore, U. S. A., which speedily resulted in the possession of the greater part of Morris Island and the silencing of Ft. Sumter, and secured a safe anchorage for the monitors inside the bar of Charleston, thus effectually putting a stop to the blockade-running. In 1866 was appointed commander-in-chief of the S. Pacific squadron, remaining 2 yrs.; in 1870 was ordered to the command of the navy-yard at Wash., where he d. July 12, 1870. Wrote *Exercise and Manœuvres for the Boat Howitzer*, U. S. N., *Ordnance Memoranda*, and *Shells and Shell-Guns*.

Dahl'gren Gun [named from Admiral Dahlgren, its inventor], an improved form of ordnance used for howitzers, heavy artil., and especially in naval gunnery. Its essential feature is the increase of the relative size of the breech.

Dahlia, dah'le-a [named in honor of Andrew Dahl, a Swe. botanist], a genus of plants of the order Composite and sub-order Tubulifloræ. They are natives of Mex., and the numerous varieties cultivated are chiefly derived from 2 species—*D. coccinea* and *D. variabilis*. New varieties are easily obtained by the artificial fecundation of one with the pollen of another. D. have recently become very popular, being conspicuous for their varied and exquisite colors and regularity of form. The tuberous roots of these plants, although not agreeable in taste, are used as food in Mex.

Dahlone'ga, cap. of Lumpkin co., Ga., about 66 m. N. N. E. of Atlanta. Gold-mines have been opened in the vicinity. Here was before the war a branch mint of the U. S.; the building has been converted into the N. Ga. Agricultural Coll. When gold was first discovered here the Cherokees inhabited this part of Ga. *Nega* was the Indian word for yellow, and they called gold *dalla-nega*, yellow dollar, putting the adjective after the substantive. Hence the modified name, Dahlonega, a compound of Eng. and Indian. Pop. 1870, 471; 1880, 602.

Dahomey, a kingdom of W. Afr., bounded S. by Gulf of Guinea, and partly W. by river Volta, which separates it from Ashantee. The govt. is an absolute despotism, the religion fetishism, the prin. fetish being the tiger. All the women are held to be the property of the king, who has a standing army of 6000 female soldiers and a multitude of wives. Cap. Abomey. Area, about 4000 sq. m. Pop. about 180,000.

Dako'ta, a Terr. of the U. S. between 42° 30' and 49° N. lat., and 96° 20' and 104° W. lon.; bounded N. by Manitoba and the N. W. provs. of Brit. Amer., E. by Minn., S. by Neb., W. by Wyo. and Mont.; area (census of 1880), 149,100 sq. m. It is 450 m. from N. to S. and 350 from E. to W., about 3 times as large as N. Y.

Topography, Rivers, Etc.—The Black Hills region has a few summits between 5000 and 6000 ft. high, possibly one or two within the limits of D. rising to 7000 ft. Aside from these there are occasional isolated *buttes* from 3,500 to 4000 ft., but no chain of mts. or even high hills. Most of the Terr. belongs to the Great Plains E. of the Rocky Mts., but less elevated than the same plains farther S. The watershed is about the 46th parallel, and is 1500 or 1600 ft. above the sea, sloping downward both N. and S. D. is well watered; Mo. River traverses it diagonally from N. W. to S. E., with 12 or 15 large affluents on the W. bank, the prin. of which are Niobrara, Keyapaha, White, Bad, Cheyenne, Moreau, Grand Cannon Ball, Big Heart, and Little Mo., and about 30 on the E. bank, of which only the Big Sioux, Vermillion, and James or Dakota are very large. The Red River of the N. forms its E. boundary for 250 m., and its affluents, the Sheyenne, Wild Rice, Big Salt, and Pembina, drain the N. E. part of D. The Souris or Mouse, called also Riviere des Lacs, a tributary of the Assiniboine, traverses the N. cos. There are hundreds of beautiful lakes, Miniwakan, Big Stone, Traverse, Albert, Poinsett, McIntosh, Wood, Long, and Thompson being the largest.

Soil and Vegetation.—D. has a large area of good and arable land, and the river valleys are very fertile and fine wheat lands. The prairie or plateau lands, though not quite as rich, yield large crops. In S. D. all grains and root crops are abundant, even with imperfect cultivation. The Black Hills region was thought to be sterile, but its hillsides are found to be productive. The Bad Lands, of which there are 2 or 3 small tracts, are not cultivable, but are wonderful for their fossils and their statues, cathedrals, and fortresses, carved by the waters out of the soft rocks and plastic clays of that region. The hilly portions are excellent grazing lands. There is not any great extent of forest in D., though the banks of the larger streams are well wooded, and the mt.-sides in the Black Hills and the buttes of the N. W. are crowned with forest trees.

Minerals.—There is gold in large quantity in the Black Hills, as well as silver, lead, and probably copper; iron, in various ores, in all parts; lignite and excellent bituminous coal on the Little Mo., hydraulic lime, limestone, salt in the Red River region, etc.

Zoology.—Bears, panthers, wild cats, lynxes, wolves, badgers, wolverenes, the pine and stone marten, minks, skunks, coyotes, and several varieties of foxes; buffaloes, moose, elk, 2 species of deer, and rarely the musk-ox; gophers, several species of rabbits and squirrels, and a great variety of the smaller rodents; all the birds of the Miss. and Mo. valleys, and the rivers and lakes swarm with fish.

Climate.—The range of temperature is about the same in all parts of the Terr., from a maximum of summer heat ranging from 90° to 100° F. to a winter minimum from -25° to -44°, but the mean temperature of the yr. varies largely; 35° at Pembina, lat. 49°; 41.3° at Bismarck, lat. 46° 50'; at Deadwood, lat. 44° 30', it is 43.19°, and at Yankton, lat. 42° 50', it is 47.1°. The rainfall is least at Bismarck—19.66 inches; 20.02 inches at Yankton, 23.58 at Deadwood, and 25.36 at Pembina. The winters are very cold, but generally dry and without very high winds; the summers are hot, but with cool nights; the climate is healthy and bracing. Only the N. grapes can live there, and corn does not always ripen except in S. D.

Agricultural Products.—Wheat and the other cereals, except corn, yield immense crops; in N. D. root crops also do well. There are wheat farms of from 50,000 to 75,000 acres in N. D., yielding an average of 22 bushels to the acre, and smaller farmers report, with more careful cultivation, a much larger yield. S. D. is an excellent grain region, with a rich, fertile soil; Central D. is better adapted to grazing, but has much good grain land. By census of 1880 the wheat crop was 2,390,289 bushels; value of live stock, \$6,463,274.

Manufactures.—The prin. are flour, lumber, wagons, leather, bricks, wool and woollen goods. In 1880 the value of flouring and grist mill products was \$1,040,958; of lumber products, \$435,792; of all manufactures, \$2,373,970. It had 251 manufacturing establishments in 1880.

Mining.—Aside from the coal-mines of the N. W., near the mouth of the Little Mo., mining in D. is confined to the Black Hills. Mining commenced there in 1875, but there was not much done before 1877; the early mines on the Deadwood belt are of gold, low grade ores, but of free milling gold and easily reduced, so that gold-mining on a large scale there is profitable. Some silver-mines have been opened, but gold is much the larger product. The gold and silver product for year ending May 31, 1880, was \$3,325,547.

Railways.—To Dec. 1881 there were more than 1800 m. of railways in operation in D. These included 3 parallel lines crossing the Terr.—viz. N. Pacific, Chicago and N. W., and Chicago, Milwaukee and St. Paul, and several local roads. The cos. on the E. border have each access to Chicago and Milwaukee by branches of the Chicago and N. W. and Chicago, Milwaukee and St. Paul, while the whole Red River Valley is within easy reach of the St. Paul, Minn. and Manitoba R. R. Many m. of R. R. have been built in D. since Dec. 1881.

Banks.—D. had, in Nov. 1881, 12 national banks, with \$750,000 cap., \$545,000 U. S. bonds on deposit, and \$326,750 circulation. It had also in 1881, 37 private banking houses, with \$216,263 cap. and \$484,335 deposits. No insurance cos. reported.

Finance, Etc.—The Territorial debt, Nov. 1884, was \$302,000, principally for public buildings. Valuation of property, 1884, real and personal, \$84,597,498. The Terr. has no sea, river, or lake ports, and has only internal commerce.

Education, Libraries, Etc.—The common-school statistics are meagre and imperfect. In 1880 D. had 508 public schools, with 13,718 pupils; the total expenditure for the year was \$183,257. The pop. of school age (5-21 yrs.) in 1883 was 56,476; number enrolled, 33,988. D. has a good school system, and will have a sufficient revenue from school lands and taxation to support it; the city schools have been promptly organized and are of high character; higher education as well as normal training is in progress. Only 4 public libraries are reported, 2 of them in Yankton.

Churches.—There are nearly 200 of all denominations in the Terr.: the Congregationalists lead, followed by Meths., Presbs., Baps., Mennonites, Episcopalians, Lutherans, Disciples, R. Caths., etc.

Population, 1870, 14,181; 1880, 135,177 (white 133,147, colored 2030, including 238 Chl. and 1391 civilized Indians), besides 27,168 tribal Indians. Estimated pop. 1884, between 400,000 and 500,000.

Principal Towns, 1880.—Yankton, 3431; Deadwood, 3777; Fargo, 2693; Sioux Falls, 2164; Bismarck, 1758; Grand Forks, 1705; Lead City, 1437; Central City, 1008.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Allred	2-B	..	No pop.		
Aurora	7-E	89	..	Plankinton	..
Barnes	3-F	..	1,585	Valley City	362
Beadle	6-F	..	1,299	Huron	164
Benson	2-E	..	No pop.	Minnewaukan	..
Billings	3-B	..	1,223		
Bon Homme	8-F	..	5,463	Bon Homme	..
Boraman	4-C	..	534	Bottineau	..
Bottineau	1-D	..	No pop.		
Bowman	4-B	..	..	Brookings	..
Brookings	6-F	163	4,965	Brookings	..
Brown	5-F	..	552	Columbia	141
Brule	7-E	..	278	Chamberlain	..
Buffalo	7-E	246	81		
Buford	1-B	..	No pop.		
Burdick	3-B	..	..
Burlingame	3-D	..	3,246	Bienville	1,738
Butte	6-B	..	No pop.	Minnekahta	..
Campbell	5-D	..	50	La Grace	..
Cass	3-F	..	8,993	Fargo	2,686
Cavalier	1-E	..	No pop.		
Charles Mix	8-E	152	407	Wheeler	..
Chouteau	5-B	..	No pop.		
Clark	6-F	..	114	Clark	25
Clay	8-G	2,821	5,001	Vermillion	714
Codington	6-F	..	2,156	Watertown	746
Custer	7-B	..	995	Custer	371
Dakota	7-F	..	1,256	Mitchell	320
Day	5-F	..	97	Webster	..
De la Platte	6-B	..	No pop.		
De Smet	2-D	..	..
Deuel	6-G	57	2,302	Gary	..
Dewey	5-C	..	No pop.		
Dickey	4-E	..	..	Ellendale	..
Douglas	7-F	..	6	Grand View	..
Dunn	3-B	..	No pop.		
Edmunds	3-E	..	..	Ipswich	..
Emmons	4-D	..	38	Williamsport	..
Ewing	4-D	..	No pop.		
Fall River	8-B	..	..	Hot Springs	..
Faulk	5-E	..	4	La Foon	..
Flannery	1-B	..	No pop.		
Foster	2-E	33	..	Carleton	..
Grand Forks	2-F	..	6,213	Grand Forks	1,506
Grant	5-G	..	3,010	Millbank	..
Gregory	8-E	..	No pop.		
Griggs	2-F	..	..	Cooperstown	..
Hauka	6-F	..	693	Estelle	..
Henderson	6-E	..	153	Miller	..
Hanson	7-F	..	1,301	Alexandria	..
Hawling	5-A	..	No pop.		
Hettinger	4-B	..	..	Pierre	268
Hughes	6-D	..	268	Oliver	5,573
Hutchinson	7-F	27	..	Highmore	..
Hyde	6-D	..	No pop.		
Jackson	7-C	..	..	Wessington Sp.	..
Jerauld	7-F	..	..	Steele	..
Kidder	3-E	..	819	De Smet	..
Kingsbury	6-F	..	1,102	Madison	116
Lake	7-F	..	2,657	Madison	96
La Moure	4-E	..	20	Grand Rapids	..
Lawrence	6-B	..	13,248	Deadwood	3,777
Lincoln	8-G	712	5,896	Canton	675
Lyon	7-E	..	No pop.		
Lugenbeel	8-C	..	..
Lyon	7-E	..	124	Salem	..
McCook	7-F	..	1,283		
McHenry	2-D	..	No pop.		
McIntosh	4-E	..	..
McKenzie	2-B	..	..
McLean	2-D	..	..	Washburn	..
McPherson	4-E	..	..	Leola	..
Mandan	6-B	..	..
Martin	5-B	..	..
Mercer	3-C	..	..
Meyer	8-E	..	115	Howard	..
Miner	7-F	..	263	Sioux Falls	2,164
Minnehaha	7-G	305	8,251	Flandreau	471
Moody	7-G	..	3,915	Mandan	239
Morton	4-C	..	206		
Mountrail	1-C	..	13	Mapes	..
Nebraska	2-F	..	No pop.		
Nowlin	7-C	..	..
Pembina	1-D	1,213	4,862	Pembina	287
Pennington	7-B	..	2,244	Rapid City	292
Potter	5-B	..	No pop.	Forest City	..
Pratt	7-D	..	..
Presho	7-D	..	..
Pyatt	6-C	..	..
Ransom	2-E	..	..
Ransom	4-F	..	567	Lisbon	..
Renville	1-C	..	No pop.		
Richland	4-F	..	3,597	Wahpeton	400
Richards	5-B	..	No pop.		
Roberts	5-G	..	..
Rodette	1-E	..	..	Traverse	..
Sanborn	7-F	..	..	Letcher	..
Sargent	4-F	..	..	Minor	..
Schnase	5-C	..	..
Shannon	6-B	..	..
Shannon	6-B	..	113		
Sheridan	2-D	..	No pop.		
Spink	6-F	..	477	Reidfield	..
Stanley	6-D	..	793		
Stark	3-C	..	No pop.	Dickinson	..
Steele	2-F	..	..	Hope	..

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Sterling	6-C	..	No pop.		
Stevens	2-C	..	347		
Stutsman	3-E	..	1,007	Jamestown	293
Sully	6-D	..	296	Clifton	..
Towner	1-E	..	No pop.		
Trail	2-F	..	1,193	Caledonia	..
Tripp	8-D	..	No pop.		
Turner	8-F	..	5,320	Swan Lake	49
Union	8-G	3,507	6,813	Elk Point	719
Villard	4-B	..	No pop.		
Wagner	5-C	..	..
Wallace	2-B	..	..
Walsh	1-F	..	..	Grafton	..
Walworth	5-D	..	46	Le Beau	..
Washburn	7-C	..	No pop.		
Washington	7-B	..	..
Wells	2-E	..	..	St. Joseph	..
Williams	3-C	..	14		
Wynn	1-D	..	No pop.		
Yankton	8-F	2,097	8,390	Yankton	3,431
Ziebach	7-B	..	No pop.		
Unorganized terr.		2,091	..		
Total		14,181	135,177		

* Reference for location of counties. See map of Dakota.

Notes.—The cos. left blank in 1870 column had either no pop., were not separately returned, being included in "unorganized territory," were formed since 1880. The totals of 1870 and 1880 population contain that of former counties now abolished, also whites on military and Indian reservations.

History.—Portion of the old La. Terr. ceded to U. S. in 1803; organized as a Terr. in 1861, extending from 42° 30'-43° to 49° N. lat., and from Minn. to Rocky Mts.; id. (including Mont.) set off in 1863, and Wyo. in 1868; a tract W. of Wyo., 5740 sq. m. in extent, remained to D., but is now recorded by the Census Office as unorganized territory; an Indian war with Little Crow's band in 1862; Indians defeated in D. and 38 hung; in 1863 another Indian war, in which the Indians were completely overthrown by Gens. Sibley and Sully; Gen. Custer visited the Black Hills in 1874, and in 1876 he and his force were destroyed by the Indians under Sitting Bull; since the terrible chastisement they received for this massacre there has been peace with the Indians, though numerous in the Terr. The cap. of the Terr. was removed from Yankton to Bismarck in 1883. A bill for the admission of Dakota as a State provides for a division of the Terr. on the 46th parallel of N. lat., the part N. of that line to remain a Terr. under the name of Lincoln; it was passed by the U. S. Senate Dec. 1884.

Territorial Governors.

William Jayne..... 1861-63 William A. Howard..... 1878-80
Newton Edmonds..... 1863-66 Nehemiah G. Ordway..... 1880-84
Andrew J. Faulk..... 1866-69 Gilbert A. Pierce..... 1884-88
John A. Burbank..... 1869-73
John L. Pennington..... 1873-78

L. P. BROCKETT.

Dakota River, Riviere a Jacques, or James River, rises in the N. E. part of Dak. It flows nearly southward, and enters the M. River about 8 m. below Yankton. Its whole length is estimated at 600 m.

Dale (RICHARD), b. near Norfolk, Va., Nov. 6, 1756, entered the merchant service when only 12 yrs. of age, and the U. S. N. in 1776 as mdpn.; was captured in 1777, but escaping to Fr. on ship, and in the action with the Serapis he greatly distinguished himself. In 1801 he was made a com., and commanded a squadron during the Tripolitan war; on his return to the U. S. resigned in 1802. D. Feb. 24, 1826.

Dall (WILLIAM HEALEY), b. at Boston Aug. 21, 1845, became a special pupil of Prof. Louis Agassiz and held several positions on geological surveys. In 1866 went to E. Siberia in charge of work of Western Union Telegraph expedition, for an international line to Europe via Behring Straits, and after that time he has made several exploring expeditions to Alaska. In 1884 he was made paleontologist to the U. S. Geological Survey. He is the author of *Alaska and its Resources* (1870); *Meteorology of Alaska* (U. S. Coast Survey, 1879); *Pilot of Alaska* (U. S. Coast Survey, 1884); besides a number of papers on brachiopoda, mollusks, etc.

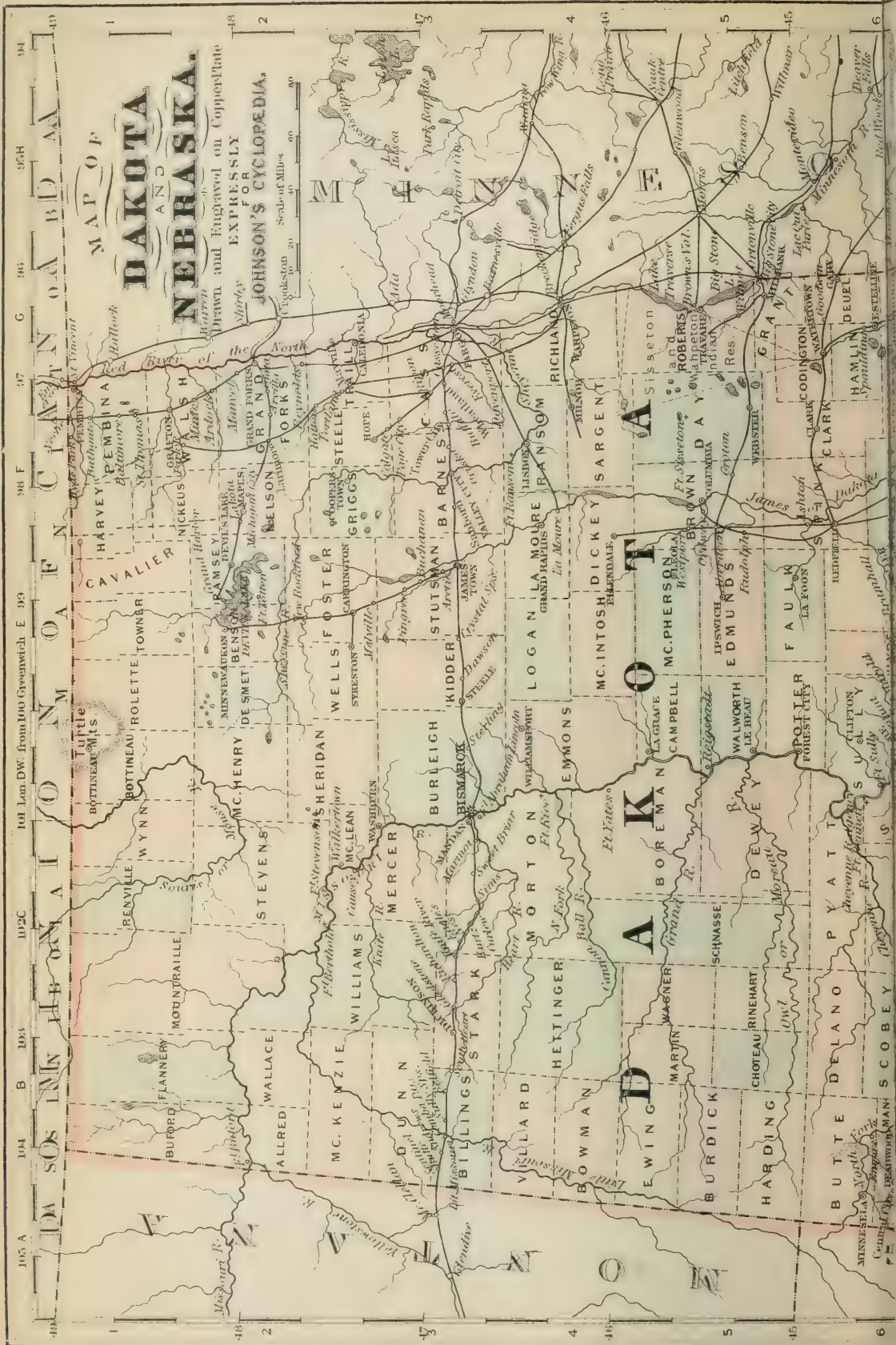
Dallas, a city and R. R. centre, cap. of Dallas co., Tex., on the Trinity River, 186 m. W. of Shreveport, La. It has a Merchants' Exchange and an opera-house, public parks and the electric light; U. S. c. h. and P. O. will soon be erected. Pop. 1880, 10,358; 1883, about 22,500. Ed. "HERALD."

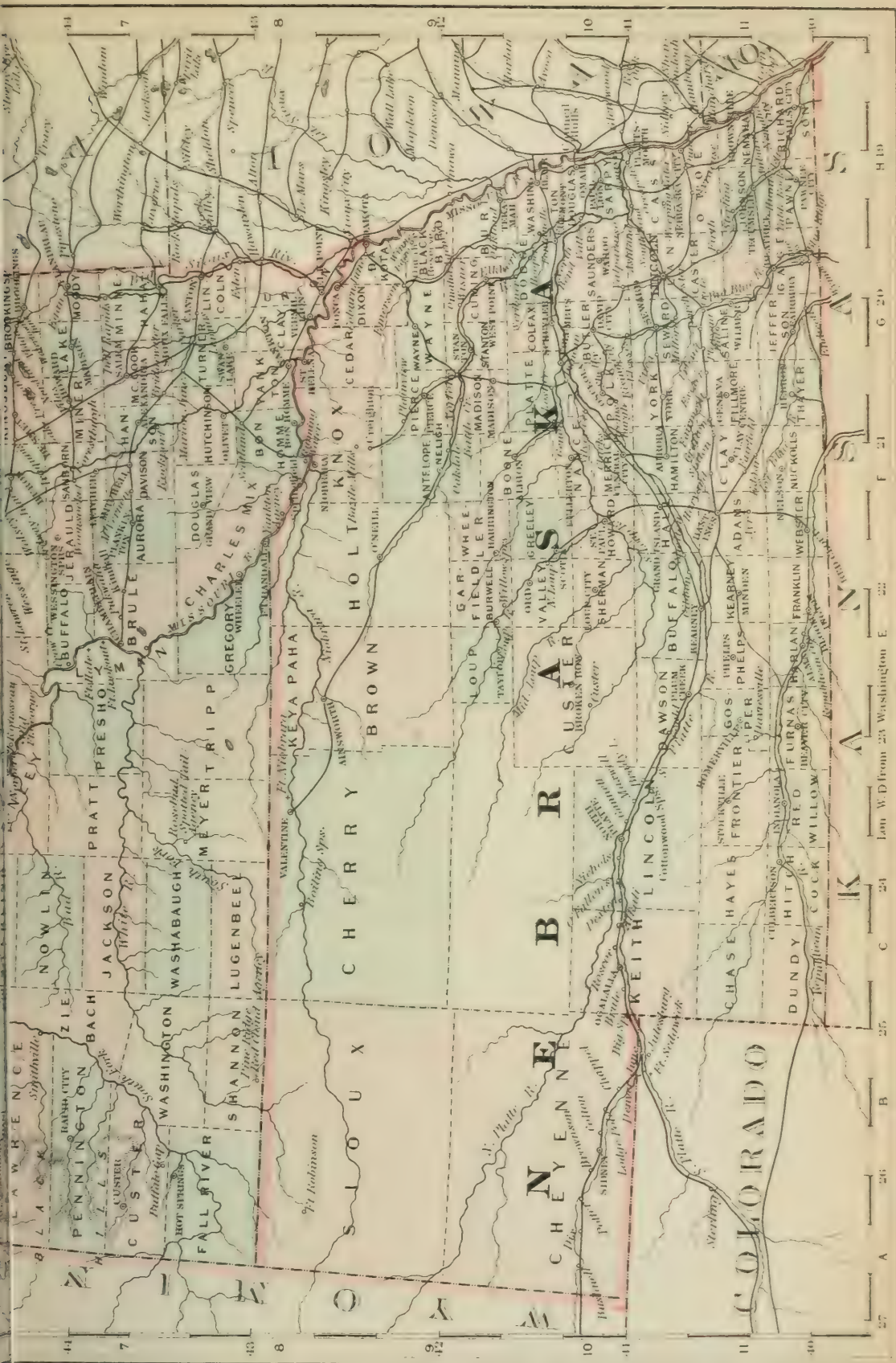
Dallas (GEORGE MIFFLIN), LL.D., a son of the preceding, b. in Phila. June 10, 1792, was admitted to the bar in 1813; in 1831 was elected to the Senate of U. S. for a short term; was sent as minister to St. Petersburg in 1837, returned in 1839, and was elected V.-P. in 1844, when M. Polk was chosen Pres. In 1846 he gave his casting vote in the Senate for a revenue tariff bill, which was opposed by the protectionist party; minister to Eng. 1856-61. D. Dec. 31, 1864.

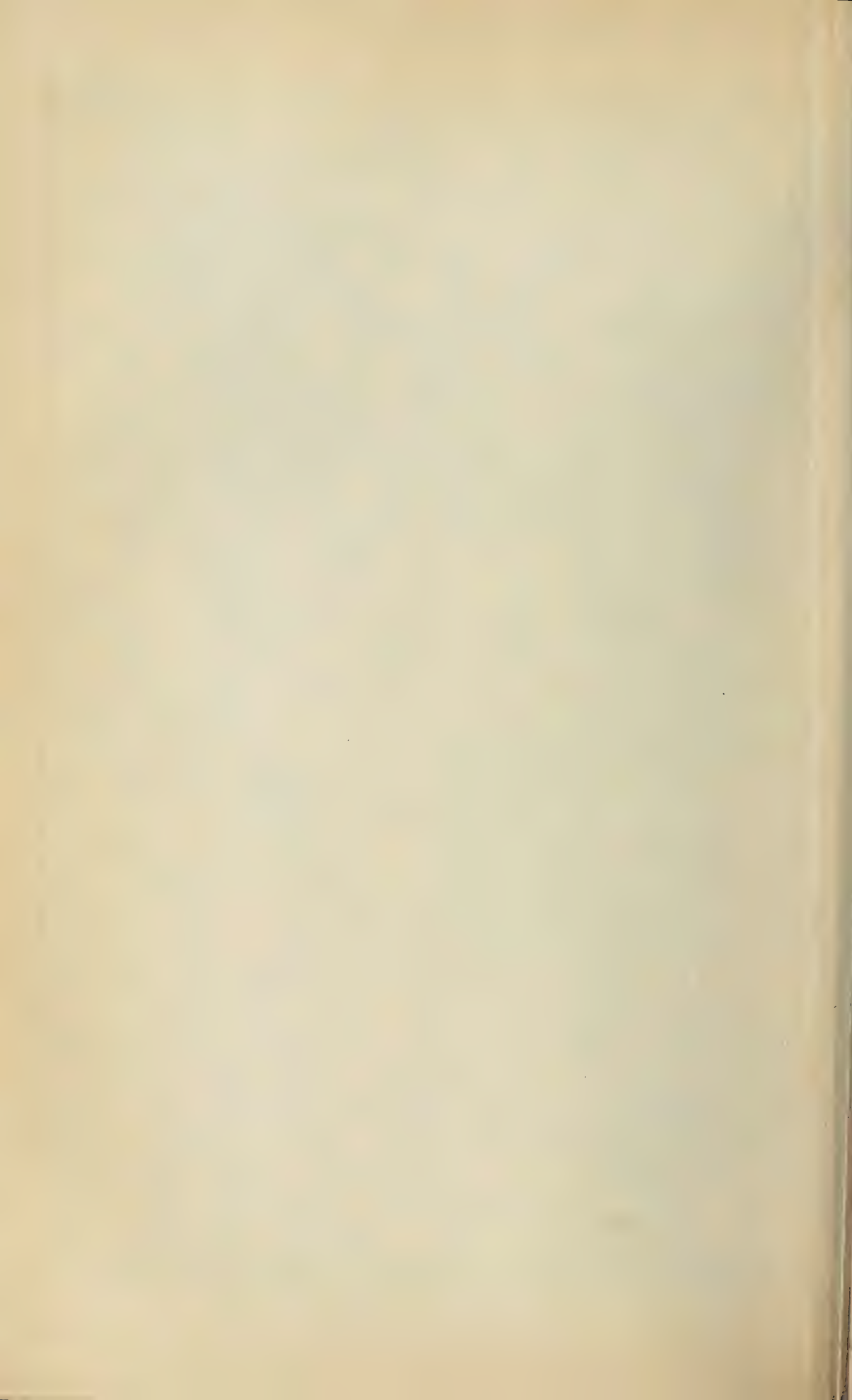
Dalles City, or The Dalles, on R. E., cap. of Wasco co., Or., on the S. bank of the Columbia River, about 120 m. by water E. of Portland. The navigation is here obstructed by rapids. Pop. 1870, 943; 1880, 2292.

Dalles of the Columbia, a narrow portion of the Columbia River, 45 m. above the Cascades. The river here rushes violently through a chasm only 58 yards wide, inclosed between steep walls of basaltic rock. *Dalle* is a Fr. word signifying "flag-stone," and also a "spout" for water.

Dalmatia, dal-ma'she-a (Ger. *Dalmatien*), a prov. of the empire of Aus.-Hungary, bounded N. by Croatia, N. E. by Herzegovina, S. W. by the Adriatic. It is a narrow strip of coast-land, including several islands. The shores are deeply indented by bays, which form good harbors. It was conquered by the Roms. during the reign of Augustus; was taken in the 7th century by the Slavonians, who founded a kingdom which lasted till 1050. It belonged successively to Hungary and Venice, and in 1797 was ceded to Aus. In 1805 Nap. annexed it to the kingdom of Il., and in 1810 to that of Illyria, but in 1814 it reverted to Aus. Pop. 476,101.







Dal'ton, R. R. junr., cap. of Whitfield co., Ga., 90 m. N. N. W. of Atlanta. It was an important strategical position during the last yr. of the c. war, being the head-quarters of the Confed. army under Gen. J. E. Johnston in the spring of 1864. Abandoned May 7, at the beginning of Sherman's Atlanta campaign. Pop. 1870, 1809; 1880, 3516.

Dalton, Mass. See APPENDIX.

Dalton (JOHN), F. R. S., an Eng. chemist, author of the atomic theory, b. at Eaglesfield, in Cumberland, Sept. 5, 1766. In 1802 he announced his important theory of the const. of mixed gases. The development of the laws of combining proportions and the atomic theory he explained in his *New System of Chemical Philos.* D. July 27, 1844.

Dalton (JOHN C.), M. D., b. at Chelmsford, Mass., Feb. 2, 1825, grad. at Harvard in 1844. Wrote a *Treatise on Physiology and Hygiene for Schools, Families, and Colls.*; became prof. of physiology and hygiene in the New York Coll. of Phys. and Surgeons. Wrote *EMERGENCY in J.'s Univ. Cyc.*

Dal'ty (CHARLES P.), LL.D., b. of Irish parentage in New York Oct. 31, 1816, was admitted to the bar in 1839; became judge of common pleas in that city in 1845, and chief judge in 1857; has been pres. of the Amer. Geographical and Statistical Society since its foundation, and is a prominent member of the Ethnological Society.

Dama'u (an animal). See HYACIDEÆ.

Damascenus (NICOLAUS), a Gr. philos., b. in Damascus in 74 B. C., was a friend of Herod, king of Judæa. Wrote *Universal Hist.*

Damascus [Ar. *Sham el Kebe'r* or *es Sherief* ("the great" or "the holy"), a city of Syria, in a beautiful plain at the E. base of the Anti-Libanus, 58 m. E. S. E. of Beyroot. It is surrounded by a wall; contains 248 mosques, the prin. of which, formerly a Chr. ch., is cruciform, 650 ft. long, 150 ft. broad. Seen from a distance it has an imposing aspect. The houses generally present only a dead wall to the street, but the interiors of many are magnificent, and the bazaars are considered finer than those of Cairo or Constantinople. It is the centre of an immense trade, and is a starting point of one of the great annual caravans for Mecca. It is probably the most anc. considerable city in the world now inhabited, having been founded before the time of Abraham. During the period of the Heb. monarchy it was the cap. of Syria. It afterward passed successively into the hands of the Assyrians, Babylonians, Pers., Macedonians, Romans, and Saracens, and was finally taken by the Turks in 1516. It is one of the sacred cities of the Mohammedans, and has long been noted for the fanaticism of the inhabs. In 1860 the Druses entered D. and massacred many Chrs. Pop. 150,000.

Damascus Blades, sword-blades of the highest excellence, formerly made at Damascus. It is said that they can be bent into a hoop, and will fly back to their original shape without injury.

Dam'ask, rich stuffs of silk and linen, first manufactured at Damascus, whence the trade was carried to Venice, Lyons, and Genoa. The cloth in modern times is often made of worsted or worsted and cotton mixed.

Damasc'es, son of Dioxiopus, a Gr. historian, was a native of Sigeum. He is called by Suidas a pupil of Helanicius, and flourished about 440 B. C. Several works are ascribed to him, of which only a few fragments remain.

Dam'asus I. [Fr. *Damasc*], SAINT, b., some say, in Rome, others in Sp., in 306 A. D., was elected bp. of Rome in 366. We are indebted to him for Jerome's new version of the Lat. Bible. He introduced the Psalter, and is said to have been the first to employ rhyme. D. Dec. 10, 384.—**DAMASUS II.**, a Ger., and probably a Bavarian, was consecrated pope July 17, 1048; d. Aug. 9 of the same yr. (See JAFFÉ, *Regesta Pontificum Romanorum*.)

Dam'ianists (sometimes called *Angelists*), a sect originating in the 6th century, who held a theory in respect to the Divine nature similar to that of the Sabellians.

Damia'nus, a distinguished Sophist and rhetorician of Ephesus, of whom an account is given by his friend Philostratus in his lives of the Sophists. He appears to have left no writings.

Damiet'ta, a river-port of Lower Egypt, on the E. mouth of the Nile, about 8 m. from the Mediterranean and 110 m. N. by E. from Cairo. A bar at the mouth of the river prevents the entrance of large vessels. Pop. 32,730.

Damm (CHRISTIAN TOBIAS), a learned Gr. scholar and theol., b. in 1699 near Leipsic. He was appointed pro-rector in 1742, and afterward rector of the Königsches Real-Gymnasium in Berlin. He d. in 1778. His prin. work was his *Hæmericæ and Pindaric Lexicon*.

Dam'mar, or **Dámar** [from the Hindostanee and Malay *dámar*, "resin"], the name of a valuable varnish produced by the D. pine (*Dammara orientalis*), of the natural order Conifereæ. This tree is a native of the Molucca Islands, and is distinguished from most of the other trees of its order by the broad, lanceolate, leathery leaves. It grows to an immense height, and on its trunk, which is often 9 ft. in diameter, are many huge knots. The tree is not valuable as timber. The resin is used in varnishes, but not being permanent it cannot take the place of copal and amber. It is sometimes used in photography. The kauri pine (*Dammara australis*) produces kauri resin or kauri gum. It is a native of New Zealand. Black D. is obtained from the Molucca Islands; it has a strong resinous odor, and is black when dried; it is used as pitch, and by distillation a kind of turpentine is obtained from it. It is the product of a tree of the natural order Amyridaceæ. *Canarium microcarpum* is of the same order, and is also a native of the E. It yields a substance called dammar, which is used as oakum in ship-building. When mixed with chalk and the bark of reeds it becomes hard as stone. Other trees yield resins called D.

Dam'o, daughter of Pythagoras, to whom he left his memoirs (*ὑπομνήματα*), with strict injunctions not to allow them to pass out of his family.

Dam'ocles [Gr. *Δαμοκλῆς*], a Syracusan courtier who lived at the court of Dionysius the Elder. As an antidote to

his fond admiration of regal luxury and happiness, the tyrant invited him to a sumptuous banquet at which a sword was suspended over his head by a single hair.

Dam'on, a distinguished musician of Athens, celebrated also as a Sophist. Plutarch ascribes to him the invention of one form of the Lydian melody. He taught Pericles music, and was his adviser also in many of his political measures.

Dam'on and **Pyth'ias** (or **Phin'tias**), 2 Syracusans and disciples of Pythagoras, celebrated for the fidelity of their friendship. P. was condemned to death by Dionysius, who kept D. as a hostage while the former went home to settle his affairs. P. returned punctually, to the surprise of the tyrant, who pardoned him, and desired to be a partner in their friendship.

Damophil'us of Bithynia, called by Suidas a philos. and Sophist. He wrote *Philobiblus*, concerning Books worth Possessing, and *Concerning the Life of the Ancs.*

Dam'ophon, or **Demophon**, a statue of Messene, flourished about 370 B. C. Pausanias mentions among his most important works a statue of Lucina, one of Esculapius, of the Mother of the Gods, of Mercury, and of Venus.

Damophil'yle, one of the large group of Gr. lyric female poets who were pupils, companions, and followers of Sappho. She flourished about 610 B. C., wrote love-poems, and composed those hymns to Artemis which were sung at Perga. None of her works are now extant.

Damrosch (LEOPOLD). See APPENDIX.

Dam'son [a contraction of *Damascene*, from Damascus], a small oval plum, made use of in preserving.

Dam, Tinker's, is the wall of dough or chewed bread which a tinker puts around the hole which he is stopping, so as to confine the melted solder to that point. When once used it loses its value, so that its name is often employed in popular slang as a symbol of utter worthlessness.

Dan, a son of the Heb. patriarch Jacob. Also a part of Pal. occupied by the tribe of Dan, and bounded W. by the Mediterranean. D. (or Laish) was an anc. city in the extreme N. part of Canaan.

Dan, a river of Va. and N. C., rises in the S. part of Va., flows in a generally E. direction, and crosses the boundary between those States 5 or 6 times. After a course of about 200 m. it unites with Staunton River.

Dana (CHARLES ANDERSON), a journalist, b. at Hinsdale, N. H. Aug., 8, 1819; studied 2 yrs. at Harvard Univ., did not graduate owing to a disease of the eyes, but received the degree of A. M.; was connected with the New York *Tribune* 1847-58, is now editor of the *Sun*; in connection with George Ripley edited *The New Amer. Cyc.*; he was assistant sec. of war 1863-64.

Dana (FRANCIS), LL.D., a statesman and jurist, b. at Charlestown, Mass., June 13, 1743, was a son of Judge Richard Dana; was admitted to the bar in 1767; joined the "Sons of Liberty;" served in Cong. In Dec. 1780 was appointed minister to Rus., and in 1785 a judge of the supreme court of Mass.; was chosen in 1787 a delegate to the convention which formed the const. of the U. S., but his judicial duties and ill-health prevented his attendance. He was chief-justice of Mass. from 1791 to 1806. D. Apr. 25, 1811.

Dana (JAMES DWIGHT), LL.D., a naturalist and geologist, b. at Utica, N. Y., Feb. 12, 1813, grad. at Yale in 1833. He sailed with Capt. Wilkes as geologist of the exploring expedition sent out by the govt. in 1838. Some results of this exploration appeared in his *Report on Zoophytes, a Report on the Geol. of the Pacific, a Report on the Crustacea*, etc.; became one of the eds. of the *Amer. Journal of Science*. In 1855 was elected prof. of nat. hist. and geol. at Yale Coll. Wrote *Coralis and Coral Islands*.

Dana (RICHARD HENRY), a poet, b. at Cambridge, Mass., Nov. 15, 1787, a son of Chief-Justice Francis Dana, was ed. at Harvard Coll., studied law, and was admitted to the bar of Boston in 1811. He was one of the eds. of the *N. Amer. Review* in 1818-19. Wrote *The Dying Raven* and *The Buccaneer*. D. Feb. 2, 1879.

Dana (RICHARD HENRY, JR.), LL.D., a lawyer and author, a son of the preceding, b. at Cambridge, Mass., Aug. 1, 1815. He entered Harvard Coll. in 1832, but suspended his studies on account of the weakness of his eyes in 1834. He then performed as a common sailor a voyage to Cal., of which he wrote a narrative entitled *Two Years Before the Mast*. Grad. at Harvard in 1837, studied law under Judge Story, and was admitted to the bar in 1840; pub. *The Seaman's Friend, containing a Treatise on Practical Seamanship*, and *WHEATON'S International Law*. He was one of the founders of the Free-Soil party in 1848. In 1861 he was appointed U. S. atty. for Mass. by Pres. Lincoln; in 1866-67 was lecturer on international law in Harvard Univ. Law School. D. Jan. 7, 1882.

Dana (SAMUEL WHITTELEY), b. at New Haven, Conn., July 1737, grad. at Yale in 1773; was M. C. 1796-1810, and U. S. Senator 1810-21; was a leading Federalist. D. July 21, 1880.

Dan'æ [Gr. *Δανάη*], in classical mythology, a daughter of Acrisius, king of Argos, who imprisoned her because an oracle had predicted that her son would kill her father. She became the mother of Perseus, whose father, Jupiter, is said to have obtained access to her in the form of a golden shower.

Dan'aid [for etymology see below], an ingenious hydraulic machine, consisting essentially of 2 hollow cylinders, placed one within the other, with a (comparatively) narrow space between; the inner cylinder closed at bottom, the outer having an aperture at the bottom in the centre. Between the 2 bottoms are partitions radiating from the centre to the circumference, but the annular cylindrical space is without partitions. The whole is sustained by a vertical axis, about which it turns easily. A jet or stream of water being now admitted into the annular space, as nearly tangential horizontally to the cylindrical surface as possible, sets the machine in motion, at first by mere friction, but presently the living force imparted to the water by revolution, acting on the radial partitions of the base, accelerates the velocity and increases the force. Experiments show that

this machine utilizes from 70 to 75 per cent. of the power due to the hydraulic head. The name seems to have been suggested by the fable of the Danaides pouring water forever into a vessel, from which it continually escapes.

Danaïdes (Gr. *Danaides*), the 50 daughters of Danaus, a mythical king of Egypt, married to 50 sons of their uncle. By order of their father, each of them, except one, killed her bridegroom on the wedding-night. They were doomed in Tartarus to pour water forever into a vessel with holes.

Danbury, R. R. centre, semi-cap. of Fairfield co., Conn., 69 m. N. N. E. of New York. It was settled in 1684, and burned by the Brit. in Apr. 1777. Pop. 1870, 6542, tp. 8753; 1880, 11, 1,666.

Dan'cing, a succession of rhythmical movements of the body, often accompanied by music. The anc. constituted it a part of their religious observances, and danced before the altars and images of their gods. Aristotle ranks D. with poetry. In anc. times, D. in private entertainments was performed by professionals. The Roms. counted it disgraceful for a free citizen to dance except as a religious rite. Among savages D. is still used as a religious rite or as a sort of state ceremony on important occasions.

Dancing Mania, an epidemic disorder of the 14th, 15th, and 16th centuries, similar to chorea. It is supposed that much imposture prevailed in many forms of this epidemic, but there were also many cases in which the subject entirely lost control of the will. This disorder is even now known in Abyssinia. Something similar to it in it was ascribed to the bite of a spider called the tarantula, but its greatest prevalence was in the cities of Ger. during the Middle Ages. At Aix-la-Chapelle, in 1374, there appeared on the streets crowds of dancing men and women, apparently excited thereto by the frantic demonstrations at the festival of St. John. The dancers were said to be unobscured by outward things, but sensible of visions. They appeared to lose all self-control, and would dance till they fell as if dead, and would sometimes beat out their brains upon the ground. The mania extended to the Low Countries, as well as Cologne, Metz, and Strasburg, and caused much demoralization. Exorcism was at first found remedial, and cold water, as applied by Paracelsus in the 16th century, was very efficacious. At the beginning of the 17th century the St. Vitus's Dance, as the disorder was then called, was abating, and is now almost unknown. The "St. Vitus's Dance" of our day is chorea.

Dandelion [from the Fr. *dent de lion*, "lion's tooth," probably from the shape of its leaves; Ger. *Loewenzahn*], the *Taraxacum dens-leonis*, an herbaceous plant of the natural order Compositae, with a perennial fusiform root. The leaves spring immediately from the root, are long, feather-shaped, with the divisions toothed, smooth, and of a fine green color. The plant grows spontaneously in most parts of the globe. The leaves when very young are tender, and are often used as a potherb, and it is cultivated and brought to market in considerable quantities for this use. It is a popular remedy with many med. practitioners in this country and Europe, having gentle tonic powers. The root is sometimes prepared and ground with coffee, the taste of which covers that of the D.

Dandolo (ENRICO), a Venetian statesman and gen., b. in 1108, was eminent for learning and eloquence. In 1192 he was elected doge of Venice. Having formed an alliance with the leaders of the 4th crusade, he furnished vessels to transport their army to the Levant in 1201, and took command of the combined forces. They captured Constantinople by storm in 1204. The throne was offered to D. but he declined it. He was blind in old age. D. June 1, 1205.

Dane (NATHAN), LL.D., a jurist, b. in Ipswich, Mass., Dec. 27, 1756, grad. at Harvard in 1778; was a member of the Continental Cong. 1785-88. In 1787 he framed the ordinance for the govt. and organization of the N. W. Terr. in which he inserted a clause prohibiting slavery. Author of *An Abridgment and Digest of Amer. Law*. D. Feb. 15, 1835.

Daniel, dan'yel ("God is Judge," or "God will judge"), one of the 4 greater Heb. prophets, was carried with other Jewish captives to Babylon, 605 B. C.; was ed. at the court of Nebuchadnezzar, who made him gov. of the prov. of Babylon and chief of the Magi. He interpreted the dream of Nebuchadnezzar and explained the handwriting on the wall at Belshazzar's feast about 538 B. C. After the capture of Babylon he gained the favor of Darius the Mede, and prospered during the reign of Cyrus.

Daniel, Book of, a canonical book of the O. T., written partly in Heb. and partly in the older Chaldee. The close correspondence of its prophecies with the facts of hist. has led some writers to the belief that the book was written much later than the time of Daniel, but its genuineness is accepted by the great body of the Chr. chs.

Daniel (JOHN WILLIAM). See APPENDIX.

Daniel (PETER VIVIAN), a lawyer, b. in Stafford co., Va., in 1785, grad. at Princeton in 1805; became associate justice of supreme court of U. S. in 1841. D. May 31, 1860.

Daniel (JOHN FREDERICK), F. R. S., D. C. L., an Eng. natural phil., b. in Lond. Mar. 12, 1790. He was the inventor of the first form of galvanic battery by which it was made possible to maintain a current sensibly constant for a long period of time. Wrote an *Introduction to Chemical Philos.* D. Mar. 15, 1845.

Dan'eltonville, Windham co., Conn., on R. R. and the Quinebaug River, 26 m. N. N. E. of Norwich. Pop. 1880, 3118.

Danish Language and Literature. The Dan. lang. is the development of the old tongue, which as late as 800 yrs. after Chr. was spoken with very slight modifications throughout the whole of Scandinavia, and which still exists as a living lang. in Iceland. It has a great part of its vocabulary in common with the Ger. lang., but its grammar and phrases are singularly like those of the Eng. lang. Its style is more precise but less pathetic than that of the Ger. lang., more truthful but less brilliant than that of the Fr., more

fanciful but less sympathetic than that of the Eng. It is not the Danish lang., but it is a highly developed one.

The Dan. lit. began immediately after the Ref. The Bible was translated; the hist. of the country was written; the old popular songs, which had been composed 2 or 3 centuries earlier, and handed down by tradition, and which at this very day constitute an important element of Dan. civilization, were collected and printed in a remarkably clever ed. Great scientists appeared; Tycho Brahe made his observations; Niels Hemmingsen was a sharp and subtle theol. of a singularly pure and powerful mind. Comedies and tragedies were written both in Lat. and Dan. In every field of lit. and art there were activity and energy. But this splendid beginning came to a sudden stop. For 2 centuries there was no lit. in Den., except the king's orders for new taxes and the queen's bill of fare for sumptuous court-dinners, and both were written in Ger. Now and then a great scientist appeared, as Thomas Bartholinus, the celebrated anatomist, and Ole Rømer, who figured out the velocity of light. Now and then a little song flew out, or an awkward endeavor was made of imitating some classical pattern. But these feeble tokens of life make only the gen. misery more conspicuous. It was 2 centuries before lit. in Den. took a new start with Ludvig Holberg (1684-1754). He was a Nor. by birth; his ideas were Eng. and his patterns Fr., but the materials he used were exclusively Dan., and he handled them with such a penetrating power of understanding, with such a happy talent for interpretation, and with such a superiority of judgment, that it has been said of him, with truth, that if the whole of Den. were swallowed by the ocean, and nothing left but Holberg's comedies, the world would have a perfectly clear and exhaustive idea of Dan. society at that time. In other respects, too, he became the founder of Dan. lit. He created a public in Den. He aroused the attention of the people for literary affairs. He taught them how to use a book as a means of education and enjoyment. He wrote exactly what they needed and liked, and whenever the interest slackened a little he whipped them with his satire until their attention was fully awake. There were 10 readers in Den. when he began; there were 10,000 when he finished. Next he made authorship in Den. possible. Before his time an author in Den. was a beggar who tried to win a patron for his book by a high-flown dedication, and who was paid for his work by a miserable alms from the patron. Holberg brought his books to the market through a bookseller, without any patron or dedication, and the immense success with which his courage was rewarded made authorship a profession and bookselling a trade in Den.

The period following immediately after Holberg's death was very curious—talents which ran wild and passions which fought against their own ideas; great exertions ending with bagatelles, and great energies producing nothing but noise; passionate debates about trifles, and sentimental wallings about nonsense; and all this done in the greatest good earnest, and with the fullest confidence that it was great. But with the new century that man appeared who truly is the representative of the genius of the Dan. people, Adam Oehlenschläger (1779-1850). Every one of Oehlenschläger's earlier works became a new influence in the Dan. civilization. In his great epos, *The Gods of the North*, and in several tragedies, *Juulens Juhl*, *Palmstokke*, *Hagbart and Signe*, etc., he gave a sublime representation of the old pagan Scandinavian civilization, and by these works the study of Scandinavian antiquities became a popular interest. In his comedy, *The Play of St. Hans' Night*, he gave a most lovely and charming picture of life as it is led by the Dan. middle class, and Heiberg, Hertz, Oerskov, and Høstrup followed the track with such a power and variety of talent that the theatre of Copenhagen during a whole generation exercised an influence on Dan. culture hardly surpassed by that of the univ. Most deeply, however, Oehlenschläger influenced the Dan. people by his *Aladdin*; by this work he touched the moral character of the people. *Aladdin* is a kind of drama which in a series of most brilliant pictures shows the contrast between the born genius who enters the world as he would his own house, and the ambitious, restless energy which toils and conquers only to fail at last. This book and its continuation in H. C. Andersen contributed much to give Dan. character a freer scope and a more natural turn. Contemporary with Oehlenschläger lived Thorwaldsen, the greatest modern sculptor; Ørsted, the discoverer of electromagnetism; Rask, the founder of comparative philology; Martensen, the leader of the speculative school of theol.; Gade, one of the finest and mightiest composers of our time; and each of these men had a number of pupils, and each of these pupils an audience. Furthermore, Søren Kierkegaard (1813-54) gave a sublime but austere exposition of the fundamental ideas of Christianity, and Bp. Grundtvig (1784-1871) labored in an equally grave direction as a poet, scholar, and preacher. CLEMENS PETERSEN.

Dan'ites, among the Mormons of Ut., a secret organization of men who are believed to have taken an oath to support the authority and execute the commands of the leaders of their sect at all hazards. Many massacres, robberies, and murders, committed during the earlier hist. of Ut., are ascribed to the D.

Dan'nebrog [etymology uncertain], the anc. battle-standard of Den., bearing the figures of a cross and crown. It was fabled to have fallen from heaven at the battle of Volmar in Esthonia (1219). It was twice taken in battle and twice recaptured. The ORDER of the DANNEBROG is the second of the Dan. orders of knighthood.

Dan'nevr'ke (the "Danish Work"), a boundary-wall built by the Danes against the Franks about 808, from the Baltic to the N. Sea. The line of the D. was restored in 1848 by a system of fortifications known as the "Great" and the "Little D." They were evacuated by the Danes Feb. 5, 1864, and destroyed by the allies.

Dansville, R. R. centre, largest town in Livingston co.,

N. Y., at the head of the Genesee Valley. It contains a hygienic food and a stim. Pop. 1870, 3387; 1880, 3025.

Dante Alighieri, the greatest It. poet, b. in Florence May 14, 1265. Of the events of his life little is known with certainty. He was the son of a lawyer, left an orphan at an early age, but was carefully ed. in letters and the arts. When 9 yrs. old he is said to have fallen deeply in love with Beatrice Portinari, who was a yr. younger than himself, and whom he has celebrated as the guardian genius of his life. She married another, and d. at the age of 24; some yrs. after which D. married a noble Florentine lady. He entered into the Florentine political disputes, embracing the side of the Guelphs, and in 1300 was chosen chief of the Priori—magistrates who held office for only 2 months. The Guelphs split into 2 parties—the "Whites" and the "Blacks"—D. favoring the former, but in the end he fell into disfavor with the leaders of both factions and was banished from Florence. He wandered far and wide, finding at last a refuge at Ravenna with Guido Novello da Polenta. He wrote several works in prose and verse, of which the *Vita Nuova* is of note. But his great production is the *Divina Commedia*, or the descent into the Inferno, and the ascent through the Purgatorio into the Paradiso. The epithet "Divine," however, was applied by some ed., the title given by the author being *The Comedy of Dante Alighieri, a Florentine by Birth but not by Manners*. See J. A. CARLYLE'S translation of the *Purgatorio*, and LONGFELLOW'S translation of the entire *Divina Commedia*.) D. at Ravenna Sept. 14, 1321. CLARENCE COOK.

Danton, (GEORGES JACQUES), a Fr. demagogue, b. at Arcis-sur-Aube Oct. 28, 1759. He practised law in Paris before the Revolution. Having a tall stature, a muscular frame, an ardent temperament, and the voice of a Stentor, he was well qualified for a revolutionist and agitator. D. and Marat founded the club of Cordeliers, which equalled or surpassed that of the Jacobins in violence and in hostility to the royalists. As a favorite orator of the populace he instigated the bloody insurrection of Aug. 10, 1792, which initiated the Reign of Terror. D. then became minister of justice, and shared the supreme power with Robespierre and Marat. Having been elected to the Convention, he resigned the office of minister and became the leader of the Mountain. He voted for the death of the king, and established, in Mar. 1793, the revolutionary tribunal. He co-operated with Robespierre in the destruction of the Girondists, and was a member of the Committee of Public Safety. Robespierre regarded him with jealousy, and resolved to sacrifice him. In Mar. 1794 he was arrested and taken before the revolutionary tribunal. Guillotined Apr. 5, 1794. "Nothing," says Lamartine, "was wanting to make D. a great man except virtue." (See DES JARDINS, *Vie de Danton*.)

Dantzic [Ger. *Danzig*], a fortified seaport of W. Prus., on the left bank of the Vistula, $3\frac{1}{2}$ m. from its entrance into the Baltic Sea. It is traversed by the rivers Motlau and Radanne, which here enter the Vistula, and is the terminus of a railway from Berlin. D. is surrounded by walls. It contains a fine cathedral (built 1343-1503), numerous chs., an exchange, a town-hall, a gymnasium, schools of navigation and commerce, a school of arts and trade, an observatory, a public library, a museum, and an arsenal. Excellent timber is exported from this place, and great quantities of wheat out of Poland. The granaries on the Speicher Island are capable of storing 3,000,000 bushels. D. was founded in the 10th century or earlier; was occupied by the Teutonic Knights from 1310 till 1454; became a free state under the protection of Poland; was for a long time one of the cities of the Hanseatic League. On the partition of Poland in 1793 it was annexed to Prus. It has been twice besieged. The first and most famous siege was made by the Fr. in the winter and spring of 1807, the second by the allies (Prus. and Rus.) in the winter and spring of 1813. Pop. 1880, 108,549.

Danube [anc. *Ister* and *Danubius*; Ger. *Donau*; Hun. *Duna*], a river of Europe formed by the junction of 2 streams rising in the Black Forest, and receiving in its course more than 50 navigable rivers. It flows first N. E., through Würtemberg and Bavaria, then S. E., entering Aus. Near Vienna it was divided into several shallow channels, but in 1869 works were begun for confining the stream in one deep channel. At Pesth it bends S., and enters the Hungarian plain. At Orsova it passes through the "Iron Gate," a rocky defile 1400 yards wide, which could not formerly be ascended by vessels drawing more than $2\frac{1}{2}$ ft.; but improvements have been made so that at certain seasons vessels drawing 8 or 9 ft. can pass. Lower down it flows E., forming the boundary between Bulgaria and Roumania, and after a course of between 1750 and 1850 m. enters the Black Sea by several mouths.

Danvers, R. R. centre, Essex co., Mass., 18 m. N. by E. from Boston. It has a State insane asylum. Pop. 1870, 5600; 1880, 6508.

Danville, a city, R. R. centre, and cap. of Vermillion co., Ill., on the Vermillion River. Pop. 1870, 4751; 1880, 7733.

Danville, cap. of Hendricks co., Ind., on R. R., 19 m. W. of Indianapolis. Pop. 1870, 1040; 1880, 1508.

Danville, R. R. junc., cap. of Boyle co., Ky., 96 m. S. E. of Louisville. It is the seat of Centre Coll., Danville Theological Sem. (Presb.), the S. Collegiate Inst., the Caldwell Female Inst., and a State asylum for the deaf and dumb. Pop. 1870, 2543; 1880, 3074.

Danville, R. R. centre, cap. of Montour co., Pa., on the N. Branch of the Susquehanna, 67 m. N. by E. from Harrisburg. Good iron ore, limestone, and anthracite coal are found in the vicinity. Pop. 1870, 8436; 1880, 9346.

Danville, R. R. centre, Pittsylvania co., Va., on the falls of Dan River, 141 m. W. S. W. of Richmond. Leaf tobacco is largely exported. It is the seat of Roanoke Female Coll. and another female inst. Pop. 1870, 3463; 1880, 7526.

Daphne, a genus of trees and shrubs of the order Thymelacæ. The leaves are sometimes deciduous and some-

times evergreen, and are more or less acrid. The berries are poisonous, but the flowers of some species are beautiful and of exquisite fragrance. The garou bush (*D. Gnidium*) of S. Europe, and the mezereon, both used in med., belong to this genus. The spurge laurel (*D. Laureola*) is a native of G. Brit. Paper is made in India from the bark of the *D. cannabina*; it is called Nepaul paper, and is distinguished for smoothness and durability.

Daphne, a celebrated grove and sanctuary of Apollo. 5 m. S. W. of Antioch in Syria, where was a temple of Apollo. It was noted as a voluntary resort.

Daphne [Gr. *Δάφνη*], in Gr. mythology, a nymph beloved by Apollo. To escape from him she besought the aid of the earth, which opened to receive her, and she was transformed into a laurel tree.

Daphnis [*Δάφνις*], in Gr. mythology, a beautiful youth of Sic., was the son of Mercury. He was reared amid beautiful groves of laurel (*δάφνη*), whence his name, and was taught by Pan to play on the pipe. The invention of bucolic poetry was ascribed to him, and the name frequently occurs as a character in descriptions of pastoral life.

D'Arblay, (MRS. MADAME) (NÉE FRANCES BURNLEY), an Eng. novelist, b. at Lynn-Regis June 13, 1752, a daughter of Charles Burney, the musician. Burke, Dr. Johnson, Garrick, and other literati frequented her father's house and listened to his musical concerts, and in these assemblies she was a silent and diffident spectator. Her first novel, *Evelina*, pub. anonymously in 1778, had a great success. In 1793 she was married to Count d'Arblay, a Fr. exile. D. Jan. 6, 1840.

Darboy (GEORGES), a Fr. ecclesiastic, b. Jan. 16, 1813, became in 1863 abp. of Paris. On Apr. 5, 1871, he was arrested by the Communists, and when the govt. troops took the city he was with 5 others shot at the prison of La Roquette, May 24. Wrote *Levée de St. Thomas à Becket*.

Darbyites. See PLYMOUTH BRETHREN.

Darcet, (JEAN PIERRE JOSEPH), a Fr. chemist, b. Aug. 31, 1777, was the son of Jean Darcet, director of the porcelain manufactory at Sèvres, who established the combustibility of the diamond. He added important improvements in the manufacture of powder and in the composition of bronze and steel, the production of soda from common salt, etc. D. Aug. 2, 1844.

Dardanelle, Ark. See APPENDIX.

Dardanelles (anc. *Hellespontus*), called also the **Strait of Gallipoli**, a narrow channel connecting the Sea of Marmora with the Ægean Sea, and forming part of boundary between Europe and Asia. Its length is about 40 m., width from 1 to 4 m., both shores strongly fortified.

Dare (VIRGINIA), the first child born among the Eng. colonists in Amer., b. at Roanoke (now in N. C.) in Aug. 1587.

Dares, dā-réz, a Trojan, companion of Æneas, distinguished for his skill in boxing. At the games in honor of Anchises in Sic. D. challenged all competitors, but was defeated and nearly slain by the aged Entellus.

Dares, a priest of Vulcan in Troy, to whom was ascribed an *Iliad*, written before that of Homer, on palm leaves. There is still extant, under the name of Dares Phrygius, a narrative in prose of the destruction of Troy (*De Evictio Troje Historia*) in 44 chaps. A letter prefixed, addressed to the historian Sallust, states that this narrative was translated from the Gr. by Cornelius Nepos, who met with the original in Athens.

Darfour, a country of Central Afr., mostly included between lat. 10° and 16° N. and lon. 26° and 29° E. The N. part is level, sandy, and nearly waterless. A mt.-ridge extends through the central part. It sends ivory, ostrich feathers, and slaves to Egypt. Area, about 106,000 sq. m. Pop. about 4,000,000.

Dar'gan (EDWARD S.), a lawyer and jurist in Ala., a native of N. C. first taught school, then studied law, and upon being admitted to the bar settled in Mobile. In 1844 was elected mayor of the city; from 1845 to 1847 was rep. in Cong. On his return from Cong. he was elected judge of supreme court of Ala. D. Nov. 1879.

Darien, a pt. of entry and cap. of McIntosh co., Ga., on Altamaha River, 12 m. from the sea, 60 m. S. S. W. of Savannah. Pine lumber is exported. Pop. 1870, 547; 1880, 1543.

Darien, Gulf of, a portion of the Caribbean Sea, in the U. S. of Colombia, is bounded on the W. by the Isthmus of Darien (or Panamá). It receives the river Atrato.

Darien, Isthmus of. See PANAMA.

Darius [Gr. *Δαρείος*; old Egyptian, *Nirāmansh*; modern Per. *Dara* or *Darab*; Heb. *Dariyareh*; old Per. (cuneiform) *Daryuhesh*] I., or **Darius Hystaspis**, king of Per., was the son of Hystaspes, a member of the noble family of Achæmenidæ. Was called Gushtāsp in the legends of Per. Was one of 7 noble Pers. who conspired against and killed the usurper Smerdis, whom he succeeded in 522 b. c. His army was routed at the great battle of Marathon, 490. D. 486 b. c., in 63d yr. of his age, and was succeeded by his son Xerxes. (See GROTE, *Hist. of Gr.*) There is little doubt that at first the name Darius was a title rather than a proper name.

Darius III., surnamed Codomānus, the last king of the anc. Per. monarchy, ascended the throne in 336 b. c., on the death of Arsēs. In 334 Alexander the Great of Macedon defeated his troops at the river Granicus. D., commanding in person, was defeated at Issus in 333, and again at Gaugamela, near Arbela, in 331. He was murdered by Bessus, one of his satraps, in the yr. 330 b. c. Alexander married his daughter Statira.

Darius the Median. See CTAXARES II.

Dark Ages, a term applied to the period between the fall of the Rom. empire and the revival of letters, about the 13th century. As this revival occurred earlier in It. than in N. Europe, the D. A. may justly be said to have been of longer duration in the N. than in the S.

Dark Day. In N. Eng. and in the neighboring States of N. Y. and N. J. the term "Dark Day" is understood to refer to the dark day, May 19, 1780, noticed in Noah Webster's

Hist. of Pestilential Diseases, in the *Collections of the Mass. Historical Society* (1st series, vol. I.), and elsewhere. Except the last, these notices are brief, and none of them, with the same exception, give any description of the meteorological phenomena accompanying the approach of the darkness, or prevailing during its continuance. Meagre as they are, they are fuller than those we have of any of the not very rare similar occurrences of earlier or later date.

The hypotheses which have been suggested in explanation of this and other D. D. are: (1) The smoke of vast burning forests, shutting out the light of the sun. (2) Dense exhalations of smoke and ashes from volcanoes. (3) Vapors generated by the internal heat of the earth. (4) Smoke produced by the combustion of large meteors traversing the atmosphere. (5) Cosmical dust, drifting from outer space. (6) Terrestrial dust raised in clouds from deserts. (7) Clouds of extraordinary density, reinforced in the neighborhood of large towns by the smoke of countless fires.

The first of these hypotheses is disposed of by Dr. Webster by presenting 2 conclusive considerations: (1) that there has been no evidence of the occurrence of great forest conflagrations immediately before these days of darkness or simultaneously with them; and (2) that if such conflagrations had existed the cause is not adequate to the observed effect.

The second hypothesis is equally untenable. It is not to be questioned that the exhalations of volcanoes are often voluminous enough to shut out the light of the sun from the regions which they overhang. But this dark day occurred in a locality far distant from any volcanic crater, and it is not conceivable that the fumes of volcanic eruptions should have been borne so far and maintained in density sufficient to produce the observed effect without obscuring the intermediate region. But though it appears that volcanic fumes, or exhalations from fissures in the earth, or the smoke of burning meteors, or accessions of impalpable dust from the regions of space may be presumed sometimes to affect the gen. transparency of the atmosphere, no one of these causes suggests an explanation applicable to a case of darkness like that of May 19, 1780.

We must equally reject the hypothesis which finds an explanation of these phenomena in the smoke of meteoric bodies consumed in the atmosphere. A fire-ball large enough to leave behind it so voluminous and permanent traces of its passage must have been too bright to escape observation.

Nor is it possible to speak more favorably of that hypothesis which ascribes the darkness to a cloud of dust falling into the atmosphere from the regions of space. Such a cloud could disappear only by subsidence, or by dissipation through the agency of atmospheric currents, or by the joint effect of these causes combined, and could not be dispersed without exhibiting a succession of phases of gradually diminishing darkness extending probably through many days; none of which phenomena are recorded.

The hypothesis which ascribes the darkness to clouds of terrestrial dust or sand transported by atmospheric currents must also be dismissed. There is no source in N. Eng. or adjacent States from which a dust-cloud could have been raised adequate to produce the darkness of May 19, 1780.

In the absence of any other supposable cause, we are compelled to attribute this example of extraordinary darkness to the presence of ordinary clouds of very unusual volume and density. Nor will this explanation appear insufficient when we consider that occasions are not of very rare occurrence when, for intervals of a few minutes, the darkness produced by heavy rain-clouds is so great as to make it impossible to read or write without artificial light. In such cases it would be only necessary that the cloud should be a little more dense, more gen., and more persistent to reproduce the D. D. of 1780.

F. A. P. BARNARD.

Darling, a river of Australia, in New S. Wales, formed by numerous branches which rise on the W. declivity of the Australian Alps. It flows S. W. through arid plains, and enters the Murray near lat. 34° S. The main stream is about 600 m. long.

Darlington, city, cap. of La Fayette co., Wis., on R. R. and Pecatonica River, 50 m. S. W. of Madison; has good water-power. Pop. 1870, 2773; 1880, 2599, including D. 1872.

Darlington (WILLIAM), M. D., LL.D., a botanist, b. in Chester co., Pa., April 28, 1782; practised med. at West Chester. He was a Dem. M. C. 1815-17 and 1819-23. Wrote *Agricultural Botany and Memorials of John Bartram and Humphrey Marshall*. The *Darlingtonia Californica*, a curious saracenaceous plant of the Pacific States, was named in his honor. D. Apr. 23, 1863.

Darlingtonia [named by the late Dr. John Torrey in honor of Dr. William Darlington, noticed above], a genus of herbs of the natural order Sarracenaceae, comprising but one known species, the *D. Californica*, a perennial plant of Cal. Its leaves are all radical, and resemble somewhat closely those of the Sarracennias of the Atlantic States, but the size of the leaves of the *D.* is much the larger, the length in some instances exceeding 2 ft. The leaves are hollow and twisted, the upper part being turned over into a hood-like dome or vault, beneath which is the orifice which opens into the cavity or pitcher of the leaf. On either side of the opening 2 lobes depend, which may be taken to represent the true leaf, in which case the ascidium or pitcher must be considered as representing the petiole or leaf-stalk. Inside the pitcher the remains of insects are often found, their exit being impeded by long slender hairs within the leaf. The flower-stalk is sometimes 4 ft. high, single, and furnished with bracts; the flower regular, nodding, and single, and about 2 inches across; the calyx straw-colored, of 5 sepals, all pointed; the 5 petals are pale purple, the stamens, 12 to 15, nearly hidden by the top-shaped ovary, upon which there is a style with a 5-parted stigma. The capsule is 5-celled, many-seeded, and 1 inch long. This plant is the representative of the Sarracennias of the Atlantic States, and with them and the *Heliamphora* of S. Amer. constitutes the whole natural order as far as it is known at present.

Darmstadt, a town of Ger., cap. of the grand duchy of Hesse-Darmstadt, on the river Darm and the Frankfort and Mannheim R. R., 15 m. S. of Frankfort-on-the-Main. It consists of an old and a new town, both surrounded by walls. It has 5 public squares, and 2 ducal palaces, one of which contains a library of 200,000 vols. and a valuable collection of 700 paintings. Pop. 48,863.

Darnel (*Lilium temetivum*), a grass well known in Europe, and naturalized in the U. S. The glumes are as long as the spikelets, or longer, and the spikelets have 5 to 7 florets which are awned. The seeds of *D.* are reputed poisonous, but recent researches are said to have established their harmlessness. It is often infested by ergot, and this may account for its poisonous qualities.

Darnley (HENRY STUART), LORD, b. in Eng. in 1541, was a son of the Scot. earl of Lennox. His mother was a niece of Henry VIII. of Eng. He had a handsome person, but was profligate and deficient in intellect. In 1565 he married Mary queen of Scots, whom he soon offended by his insolence and other faults. He also procured the assassination of Rizzio, which aroused her deepest indignation. The isolated house in which he lodged was blown up with gunpowder at the instance, it was suspected, of his wife, and he was killed Feb. 9, 1567.

Darter [so called from their manner of seizing their prey], a name of birds (*Plotus*), which are also sometimes called snake-birds from the length of the neck. The common *D.* (*Plotus Anhinga*) is found in the S. States.

Dartmoor, an elevated moor or table-land and royal forest in Eng., noted for its rugged scenery and its cyclopean relics of pre-historic races. The royal forest and its adjuncts extend about 20 m. from E. to W. and 22 from N. to S., being 1/5 of the whole area of Devonshire, and measuring more than 130,000 acres. *D.* is famous as the seat of a prison, in which, during the war of 1812-15, a large number of Amer. sailors were confined.

Dartmouth College, the 4th of the N. Eng. colls. in chronological order—preceded only by Harvard, Yale, and Brown—was an offshoot of Moore's charity school, an inst. for the education of Indian youth, established in Lebanon, Conn., in the yr. 1754, by the Rev. Eleazar Wheelock, D. D. The school was subsequently removed to Hanover, N. H., a charter for a coll. to be connected with it, and yet a distinct inst., having been obtained. This charter was issued Dec. 13, 1769, by John Wentworth, the last of the royal govs. of N. H. Dr. Wheelock was its first pres., and in view of the interest taken in the school by Lord Dartmouth, an Eng. nobleman, and of his benefactions to it, his name was given to the coll. One of the most signal events in the hist. of the inst. is the controversy out of which arose the famous D. C. case. The legislature of N. H. passed an act in 1816, changing the name of the inst. to "Dartmouth University," and embracing other important and undesirable modifications. To this act the trustees were opposed, and with the design of testing its constitutionality they brought an action before the supreme court of the State. By this tribunal the legislature was sustained, and appeal was taken to the supreme court of the U. S. The cause of the coll. was there argued by Daniel Webster and other able counsel, and fully sustained by the court. The univ. organization was dissolved, and the old coll. board of trustees sustained. This great battle was fought by them not for themselves only; the principles concerned were vital to many other insts. *D.* in comparative poverty, was thus instrumental in vindicating and establishing the sacredness of private trusts.

While the inst. has aimed from the beginning at a high religious tone, it is not sectarian. Most of the trustees and teachers are of the orthodox Congl. connection. As to methods of teaching, it holds to a carefully devised curriculum, but has divers options both as to courses and particular studies. It retains and honors the anc. classics, but it favors science also. The various depts. are as follows: 1, the old academic dept. with its 4 yrs. curriculum; 2, the Chandler scientific dept., with a regular course, chronologically parallel to that of the academic; 3, the agricultural dept., so called, or "the N. H. Coll. of Agriculture and the Mechanic Arts," based on the Congressional land-grant, and having a regular 3 yrs. course; 4, the engineering dept., or the "Thayer School of Civil Engineering;" 5, the med. dept., or the old N. H. Med. Coll.

Daru (PIERRE ANTOINE NOËL BRUNO), COUNT, a Fr. statesman and author, b. at Montpellier Jan. 12, 1767. He became a member of the Tribunal in 1802, a councillor of state in 1805, and intendant-gen. of the imperial household. In the campaigns against Prus. and Aus. (1806-09) he accompanied Nap., whom he served with ability as a diplomatist and financier. In 1815 he was elected pres. of the Fr. Acad. Among his works is a *Hist. of Venice*. D. Sept. 5, 1829.

Darwin (CHARLES ROBERT), F. R. S., a naturalist, a son of Dr. R. W. Darwin, F. R. S., and grandson of Dr. Erasmus Darwin, b. at Shrewsbury, Eng., Feb. 12, 1809. He took his degree of M. A. in 1831 at Christ's Coll., Cambridge. After his return, in 1836, from a voyage round the globe, Mr. D. pub. a *Journal of Researches into Geol. and Nat. Hist.* Wrote *Origin of Species by Means of Natural Selection*, a work which has given rise to warm controversy in all civilized countries. Of this work his *Descent of Man* may be considered a continuation. D. Apr. 19, 1882. (See EVOLUTION.)

Darwinism, a term applied to a particular theory of development originated by C. R. Darwin. *D.*, while based on the doctrine of evolution, is not identical with it. *D.* is an attempt to explain the law or manner of evolution. It is well known that man can, by pursuing a certain method of breeding or cultivation, improve and in various ways modify the character of the different domestic animals and plants. By always selecting the best specimen from which to propagate the race, those features which it is desired to perpetuate become more and more strongly developed, so that what are admitted to be mere varieties sometimes acquire, in the course of successive generations, a character as

strikingly distinct, to all appearance, from those of other varieties, as one species is from another species of the same genus. Hence it is inferred that what we call species were originally only varieties. Mr. Darwin maintains that a system of influences, not wholly unlike to those which man brings to bear in the breeding of animals, is found in the circumstances with which they are often surrounded in a state of nature. (See EVOLUTION.)

Dash-tell (ROBERT LAWRENSON), D. D., b. in Salisbury, Md., 1820, grad. at Dickinson Coll., Pa., 1846; became a Meth. pastor, and in 1868 was elected pres. of Dickinson Coll., Pa.; was appointed corresponding sec. of the Missionary Society of the M. E. Ch. in 1872. D. Mar. 8, 1880.

Dash-kof (EKATERINA ROMANOVNA), PRINCESS, a Rus. lady eminent for her talents and learning, b. of a noble family Mar. 28, 1743; became the wife of Prince Dashkof and a friend of the empress Catharine II. She was one of the chiefs of the conspiracy which dethroned Peter II. In 1782 she was appointed pres. of the Acad. of Sciences at St. Petersburg. She was the first pres. of the Rus. Acad. founded in 1784, and she superintended the compilation of a great dict. of the Rus. lang. D. Jan. 16, 1840.

Dasyure, das'-i-ure (Gr. *dasyr*, "hairy," and *oura*, a quasi-popular form for "tail") (*Dasyurus*), a genus of carnivorous marsupials of the family Thylacynidae, with 8 incisors in the upper and 6 in the lower jaw, and 12 molars in each jaw. They are all Australasian. The spotted D. (*Dasyurus macrurus*) is the size of a cat, has a tail as long as the body, and is of deep brown color spotted with white. A smaller species (*Dasyurus Mungai*) is called the wild-cat. Both are natives of Van Diemen's Land, and are destructive to poultry.

Datames, dat'-améz, 4th century B. C., a Per. gen. and satrap, b. of a Carian father and Scythian mother; his prin. fields of action were Asia Minor and Syria. Finding himself mistrusted by the Per. monarch, Artaxerxes, he set up for himself, and was victorious over the powerful forces sent against him. Too great to be conquered, he was betrayed by a friend, and in a conference murdered about 362 B. C.

Date [Fr. *datte*; from the Gr. *δάκτυλος* (*daktylos*), "finger," and also a "date," so called from its shape]; Lat. *datylus*; Sp. *datil*], the fruit of the date-palm (*Phoenix dactylifera*), a native of the N. of Afr. and the S. W. of Asia. It also grows in S. Europe, and to some extent in the S. U. S. The stem grows to the height of 30 to 60 ft., and is straight. This tree furnishes food to millions of the human race. On the N. coast of Afr., in Per., and in Ar., D. form a chief article of food. Both wine and vinegar are made from them by fermentation, and in Per. an ardent spirit is distilled from them. At the top of the stem is a soft pith, with the young leaves surrounding it is called "palm-cabbage," and is much esteemed as food. The undeveloped panicles of flowers are also eaten, and "palm wine" is made by fermentation of the sap. The roasted seeds are used in N. Afr. as coffee. These seeds are also ground and an oil expressed from them, the paste which remains being used as food for cattle. Baskets are made from the leaf-stalks, and mats and bags from the leaves. The fibrous parts at the base of the stalks are made into cordage, and the wood is used in the construction of buildings.

Date Plum. See DIOSPYROS.

Daubenton, dô-bon-tôn' (LOUIS JEAN MARIE), M. D., a Fr. naturalist, b. at Montbar May 29, 1716. He studied med. in Paris, and began in 1742 to assist Buffon in the preparation of his great work on nat. hist.; in 1745 was appointed curator and demonstrator of the cabinet of nat. hist. in Paris. D. Jan. 1, 1800. (See CUVIER, *Notice sur la Vie de Daubenton*.)

Dauber, or **Mud-Wasp**, names applied to various hymenoptera of the family Sphecidae, natives of Amer., and some of which are quite common in the U. S. The mother-insect constructs a tubular nest of lumps of mud, which she partitions into cells, in which she lays her eggs, one in each cell, storing each with spiders paralyzed by her sting. The eggs hatch, the grub feeds on the spiders, goes into the pupa state, and, having burst its cocoon, gnaws through the wall of earth and escapes a perfect insect.

D'Aubigné, dô-bên-yâ' (JEAN HENRI MERLE), D. D., a Prot. Swiss divine and historian, b. at Geneva Aug. 16, 1594. His father's name was Louis Merle. He preached about 5 yrs. at Hamburg, and removed to Brussels in 1823; in 1831 became prof. of ch. hist. at Geneva. His prin. work is *Hist. of the Ref. in the Sixteenth Century*. D. Oct. 21, 1852.

D'Aubigné (THÉODORE AGRIPIA). See AUBIGNÉ, D.

Dau, down, von (LEOPOLD JOSEPH MARIA), COUNT, an Aus. gen., b. at Vienna Sept. 25, 1705. He was commander-in-chief of the imperial army in the Seven Years' war. On June 18, 1757, he defeated Frederick the Great at Kollin, and again on Oct. 14, 1758, at Hochkirchen. On Aug. 15, 1760, he was defeated at Liegnitz, and on Nov. 3, 1761, at Torgau. D. Feb. 5, 1766.

Dannou, dô-noo' (PIERRE CLAUDE FRANÇOIS), a Fr. author, b. at Boulogne Aug. 18, 1761; was a member of the National Convention, in which he opposed the proscription of the Girondists. He was the first pres. of the Council of Five Hundred, and a member of the committee which formed the const. of the yr. VIII. (1800). Wrote a *Course of Historical Studies*. D. June 20, 1840. (See WALCKENAER, *Notice sur la Vie de Dannou*.)

Dau'phin [Lat. *dolphinus*], the former title of the eldest son and heir-apparent to the king of Fr. It was originally the title of the sovereign lords of the prov. of Dauphiné. This title was abolished at the revolution of 1830.

Dauphiné, dô-fee-na', a former prov. in the S. E. of Fr., bounded W. by the Rhone, and now forming 3 depts. After it had been long governed by counts called *dauphins*, it was ceded to the crown of Fr. 1349.

Dauw, or **Bur'chell's Zebra** (*Asinus Burchelli*), a wild ass of S. Afr., resembling the true zebra, but with stripes less brilliant, and not distributed over the whole

body. It feeds in troops on the plains, while the zebra lives in the mts. It has been domesticated.

Davenport, a city, river-port and important R. R. centre of Ia., cap. of Scott co., on the Miss. at the foot of the Upper Rapids, 330 m. above St. Louis and 184 m. W. by S. from Chicago. The city of Rock Island is on the opposite side of the Miss. A R. R. here crosses the river on an iron bridge. It contains Griswold Coll., a business coll., the R. Cath. Coll. of the Immaculate Conception, an opera-house, water-works, and has electric light. Coal abounds in the vicinity. Pop. 1870, 20,088; 1880, 21,831; 1883, about 23,000.

Davenport (JOHN), D. D., a Puritan divine and colonist, b. at Coventry, Eng., in 1597, ed. at Ox. In 1637 he came to Boston, Mass. Bay, and in 1638 became one of the founders of the New Haven colony. He protected Goffe and Whalley, the regicides, and in 1668 became minister of the First ch. Boston. D. Mar. 15, 1670.

Da'vid [Heb. דָּוִד, "beloved"; Gr. *Δαβὶδ* or *Δαυὶδ*; Ar. *Daood*], one of the most remarkable characters in hist., b. at Bethlehem in Judæa about 1085 B. C. When about 22 yrs. of age he was received into the household of Saul, king of Israel. Not long afterward he slew in single combat a Philistine giant named Goliath, and received Michal, Saul's daughter, in marriage. In 1055 B. C. Saul was slain in a battle with the Philistines, after which D. was made king of the tribe of Judah, reigning at Hebron for 7 yrs., while Ishbosheth, Saul's son, was in power on the E. side of the Jordan. After the murder of Ishbosheth, in 1048 B. C., D. became king of the whole nation. He d. in 1015, and Solomon, his son, succeeded to the throne. He wrote 73 of the 150 lyrics which compose the book of Psalms. (See REV. SAMUEL CHALCER'S *Critical Hist. of the Life of David*; EWALD, *Hist. of Israel*, iii. 54-203.) R. D. HITCHCOCK.

David I., king of Scot., the sixth son of Malcolm III., b. about 1080. He succeeded his brother Alexander I., in 1124, and swore to maintain the right of his niece Matilda to the throne of Eng. in case her father, Henry I., left no male issue, and afterward waged war against Stephen, who disputed her claim to the throne. He was defeated at Northallerton in 1138. He promoted manufactures, education, and civilization. D. 1153, and left the throne to his grandson, Malcolm IV.

David II., or **David Bruce**, king of Scot., b. in 1323, was a son of Robert Bruce, whom he succeeded in 1329. Having invaded Eng. in 1346, he was defeated, captured, and detained until 1357. D. 1370.

David (JACQUES LOUIS), a celebrated Fr. historical painter, founder of the Fr. classical school of painting, b. in Paris Aug. 31, 1748. He was a pupil of Vien, with whom he visited Rome in 1775. Having passed several yrs. in Rome and painted the *Triumph of Paulus Æmilius* and other works, he returned to Paris in 1780. He was admitted into the Royal Acad. in 1783, revisited Rome in 1784, and painted a picture of the *Horatii*, which was greatly admired. He produced the *Death of Socrates* in 1787, and *Brutus Condemning his Sons* in 1789. In the Revolution he was a violent Jacobin. Having been elected to the Convention in 1792, he voted for the death of the king, and was an accomplice or partisan of Robespierre. He was the manager of the national festivals and spectacles during the republic. He painted at this time several pictures relating to the events of the Terror—*The Death of Marat*, *The Murder of Pelletier*, *The Jeu des Paumes*. He was appointed first painter to Nap. about 1804, and was banished as a regicide in 1815. He afterward resided at Brussels, where he d. Dec. 29, 1825. His body was refused burial in Fr. *The Rape of the Sabinæ* is regarded as his masterpiece. CLARENCE COOK.

David (PIERRE JEAN), a Fr. sculptor known as **David d'Angers**, b. at Angers Mar. 12, 1789. He gained at Paris the first prize (with a pension) in 1811, and then went to Rome to pursue his studies. He formed a friendship with Canova, returned to Fr. in 1816, and produced a statue of the great prince of Condé, by which he acquired a high reputation. In 1826 he became a member of the Inst. Soon after the revolution of 1830 he was employed by the govt. to adorn the Pantheon with sculptures. Among his works are busts of Washington, La Fayette, and Goethe, and statues of Cuvier, Racine, and Jefferson. He was a republican member of the National Assembly in 1848. D. Jan. 5, 1856.

David City, Neb. See APPENDIX.

Da'vidists, **Da'vid-Georgians**, or **Jo'rists**, a sect founded by David George or Joris, otherwise called John of Bruges, an Anabaptist leader, b. at Delft in Hol., in 1501 or 1502, d. at Bale in 1556; pretended to be the Messiah, denied the resurrection, and held heretical opinions.

Da'vidson (GEORGE), A. M., Ph. D., b. at Nottingham, Eng., May 9, 1825, came to the U. S. in 1832; entered the U. S. Coast Survey; served in the States bordering the Atlantic and Gulf coasts until 1850, when selected to take charge of a party to the Pacific coast; during the c. war served on the Atlantic coast; was chief engineer of an expedition for the survey of a ship-canal route across the Isthmus of Darien; in 1867 made a geographical reconnaissance of the coast of Alaska, in 1868 returned to the Pacific coast, in 1869 took charge of the expedition to Alaska to observe the total solar eclipse of Aug.; in 1873 determined the 120th meridian, in 1874 conducted the U. S. transit-of-Venus party to Japan; visited Chi., India, Egypt, and Europe for scientific study; returned to the Pacific coast, and was placed in charge of the telegraph-longitude work and of the main triangulation and astronomical party carrying the geodetic work across the continent. During the last 27 yrs. he has continued determinations of the magnetic elements from lat. 32° to 60°, and in 1874 carried a series of observations across the Pacific; has written works on transit instruments and observations, irrigation, harbor and river improvements, and many communications in the *Proceedings of the Cal. Acad. of Sciences*, of which he has been pres.

Davidson (ROBERT), D. D., b. at Carlisle, Pa., Feb. 23, 1808. His father was pres. of Dickinson Coll. He studied

theol. at Princeton, and became pres. of Transylvania Univ. Wrote *Hist. of the Presb. Ch. in Ky.* D. Apr. 6, 1876.

Davidson (SAMUEL, D. D., LL.D., b. in 1807 near Ballymena, Ire.; studied at the Royal Coll. of Belfast, where he was appointed prof. of biblical criticism and lit. in 1835; removed in 1842 to Manchester as prof. of biblical lit. and Oriental langs. at the Lancashire Independent Coll., but subsequently resigned this position and settled in Lond. Of his numerous works the most remarkable are *Introduction to the N. T.*, new ed. in 2 vols., and *Introduction to the O. T.*

Davidson (THOMAS), M. A., b. Oct. 25, 1840, near Fettergang, parish of Deer, Aberdeenshire, Scot., grad. at Aberdeen in 1860; was for several yrs. rector of the gram. (Lat.) school of Old Aberdeen, and subsequently master in several Eng. schools; spent considerable time in Fr. and Ger.; came to Canada in 1866, and to the U. S. in 1867, and, after spending 8 yrs. in St. Louis, removed to Cambridge, Mass., in 1875. He was for several yrs. connected with the *Round Table*, and at the same time edited the *Western Educational Monthly*, which afterward, under his conduct, changed its name and became *The Western*.

Davidson (Gen. WILLIAM), b. in Lancaster co., Pa., in 1746. The family was of Irish extraction. In 1750 they removed to Rowan co., N. C. William, the youngest son, was ed. at Queen's Museum, afterward Liberty Hall, in Charlotte, the co.-seat of Mecklenburg. D. was made major in one of the first regiments organized in N. C. for the Revolutionary war. He fought at Monmouth, Brandywine, and Germantown. Returning to Carolina, he was shot through the body in a skirmish at Calson's Mill. Upon his recovery he was made brig.-gen., and his energy and popularity were used in rallying and organizing the militia throughout this region. Lord Cornwallis had resolved to crush Morgan and Greene in succession. So Tarleton was detached and sent forward to take Morgan. He found him at Cowpens, Jan. 17, 1781, and was signally defeated. There was now a trial of speed for the Catawba. The Amers' rear crossed at Sherrill's Ford only 2 hours before the Brit. van came in sight. Greene met Morgan, D., and Col. Washington at Beattie's Ford, and after a conference Gen. D., with 250 militia and Capt. Graham's cav., was despatched to Cowan's Ford, 4 m. below. This being a more private and dangerous crossing, Cornwallis had hoped it might escape the attention of his adversary. So, after making a feint of crossing at Beattie's Ford, the main body of the Brit. army was marched down to Cowan's Ford after midnight. While crossing, the Amers. attacked them, but were driven back. The Brit. lost 31 killed and 35 wounded. We lost 4 killed, among them Gen. D., Feb. 1, 1781.

Davidson College, Mecklenburg co., N. C., was founded in 1837. The name was given in honor of Gen. William Davidson, a Revolutionary officer who fell at Cowan's Ford on the Catawba River, not far from where the coll. is situated. As early as 1770 a charter was obtained from the colonial legislature to incorporate "Queen's Museum" at Charlotte in Mecklenburg co., which was the first coll. ever attempted in the State. This charter was repealed by royal proclamation, but the inst. was not abandoned. In 1777 it was rechartered as "Liberty Hall," and continued its operations until 1780, when it was closed by the progress of the Revolution. Again, in 1820, earnest efforts were made in W. N. C. to establish an inst. of high grade, to be called "Western Coll." This also failed. The next movement began in 1835 in Concord Presbytery. This led to the establishment of D. C. in 1837, for which a charter was obtained in 1838. D. C., while its charter distinctly announces that its object is to "educate youth of all classes, without any regard to the distinction of religious denominations," is under the govt. and control of Presbs. exclusively. At the beginning the inst. received a valuable landed estate from William Lee Davidson, the son of Gen. Davidson. Upon this land the coll. buildings were erected. Subsequently Mr. Maxwell Chambers of Salisbury, N. C., bequeathed it \$258,000. It has 2 organized courses of instruction—the one literary and the other scientific.

Da'vie (WILLIAM RICHARDSON), GENERAL, b. in Eng. June 30, 1756, and emigrated to Amer. in early youth; grad. at Princeton in 1776, served as col. in the Revolutionary war, and was a delegate from N. C. to the convention which formed the Federal const. in 1787. In 1799 he was chosen gov. of N. C. D. Nov. 8, 1820.

Da'vies (CHARLES), LL.D., a math., b. Jan. 22, 1798, in Washington, Conn., grad. at W. Pt. in 1815; became prof. of math. at the Military Acad., resigning, May 31, 1837, for a like position in Trinity Coll., Hartford, Conn.; was paymaster U. S. A. 1841-45, and subsequently prof. in the Univ. of New York 1848-49, and in Columbia Coll., New York, 1857-65. After leaving W. Pt. in 1837 he prepared a complete series of mathematical text-books. D. Sept. 18, 1876.

Davies (SAMUEL), D. D., a Presb. divine and pulpit-orator of Welsh descent, b. near Summit Ridge, Newcastle co., Del., Nov. 3, 1725. He was one of the founders of the Coll. of New Jersey, and succeeded Jonathan Edwards as pres. of it in 1759. D. Feb. 4, 1761.

Da'vis (ANDREW JACKSON), a clairvoyant and prominent spiritualist, was b. Aug. 11, 1826, at Blooming Grove, N. Y. His first work, *The Principles of Nature, her Divine Revelations*, etc., claims to have been dictated by him under spiritual influence, when he had very little education. Wrote also *The Great Harmonia*.

Davis (CHARLES HENRY), LL.D., b. Jan. 16, 1807, in Boston, Mass., entered the navy as mdpn. Aug. 12, 1823; became rear-admiral in 1863. During the c. war served as chief of staff with the expedition against Ft. Royal; on May 9, 1862, relieved Flag-Officer Foote of the command of the W. flotilla off Ft. Pillow; on June 5 Ft. Pillow was abandoned by the Confeds. and on the 8th D. fell in with their iron-clads and rams opposite the city of Memphis; a running fight ensued, resulting in the capture of all the Confed. vessels but one, and the surrender of Memphis; was appointed in 1865

supt. of the Naval Observatory; in 1867 was detailed as commander-in-chief of U. S. squadron on the coast of Brazil, and in 1870 was appointed to the command of the navy-yard at Norfolk, Va. D. Feb. 18, 1877.

Davis (DAVID), LL.D., jurist, b. in Cecil co., Md., Mar. 9, 1815, ed. at Kenyon Coll., O., studied in the Law School at New Haven, Conn. In 1836 he settled in Bloomington, Ill. While serving as an Ill. judge he was appointed by Pres. Lincoln an associate justice of the supreme court of the U. S. Oct. 1862. He resigned as U. S. judge, and was elected U. S. Senator from Ill. for the full term 1877-83; pres. *pro tem.* U. S. Senate Oct. 13, 1881, to Mar. 3, 1883.

Davis (EMERSON), D. D., a Congl. divine and author, b. at Ware, Mass., July 15, 1798, grad. at Williams Coll. in 1821; was for some time tutor in that coll. and preceptor in the acad. at Westfield, Mass. He became in 1836 pastor of the First Congl. ch. in the latter town, where he remained for life, greatly honored and beloved, and exerting a wide and very useful influence, especially in educational affairs. In 1847 he received the degree of D. D. from Harvard Coll. He was v.-p. of Williams Coll. 1861-68. Wrote *The Teacher Taught*, and *The Half Century*. D. June 8, 1866.

Davis (GARRET), b. in Mt. Sterling, Ky., Sept. 10, 1801, was admitted to the bar in 1823; became a Whig M. C. 1839-47, and a Dem. U. S. Senator from Ky. 1861-72. He was very active in preventing the secession of his native State in 1861. D. Sept. 1872.

Davis (HENRY), D. D., a Presb. divine, b. at East Hampton, N. Y., Sept. 15, 1771, grad. at Yale in 1796. He was prof. of Gr. at Union Coll., Schenectady, N. Y., 1806-09; pres. of Middlebury Coll., Vt., 1809-17; pres. of Hamilton Coll., Clinton, N. Y., 1817-37; was one of the founders of Auburn Theological Sem. D. Mar. 8, 1832.

Davis (HENRY WINTER), LL.D., a statesman, b. at Annapolis, Md., Aug. 16, 1817. He was elected M. C. by the voters of Baltimore in 1855 and 1857. He was an eloquent speaker, and acted with the "American" party. In 1859 he was re-elected. Soon after the c. war began he became a radical Rep. Was chairman of the committee of foreign affairs in the 38th Cong. (1863-65). D. Dec. 30, 1865.

Davis (ISAAC), LL.D., b. in Northboro', Worcester co., Mass., June 2, 1799, and graduated at Brown Univ. (of which he became one of the fellows) in 1822. He had an extensive and lucrative legal practice in Worcester, Massachusetts. He was pres. of the Mass. Baptist State Convention 1833-40; pres. of board of trustees of Worcester Acad. 1833-73; Dem. candidate for gov. of Mass. in 1845, 1846, and 1861; mayor of Worcester in 1856, 1858, 1861; member of the State senate in 1843-54; member of gov.'s council 1851; member of the house of reps. (State) and chairman of committee on judiciary in 1852; member of the Mass. constitutional convention in 1853, and member of the Mass. board of education in 1852-60. D. Mar. 31, 1883.

Davis (JEFFERSON), LL.D., b. June 3, 1808, in Christian co., Ky., grad. at W. Pt. 1828; served as lieut. of inf. at W. posts 1828-33, of 1st Dragoons as adjutant 1833-34, and on frontier service 1834. After resigning, June 30, 1835, he became a cotton planter in Warren co., Miss., 1835-46; member U. S. House of Reps. 1845-46; col. 1st Miss. Rifle Volunteers in the war with Mex. 1846-47; engaged at Monterey and Buena Vista (severely wounded); member of the U. S. Senate 1847-51; sec. of war in Pres. Pierce's cabinet 1853-57; member of the U. S. Senate 1857-61; Pres. of the S. Confederacy from Feb. 4, 1861, till captured, May 10, 1865, at Irwinville, Ga.; prisoner of war 1865-67 at Fortress Monroe, Va. Released on bail, and finally set free 1868. Has since been engaged in business, and wrote *Rise and Fall of the S. Confederacy*.

Davis (JOHN), LL.D., b. in Plymouth, Mass., Jan. 25, 1761, grad. at Harvard in 1781, became a lawyer of Plymouth in 1786. After holding other important offices, he became in 1795 comptroller of the U. S. treas., in 1796 Mass. dist. atty., and in 1801 U. S. dist. judge for Mass. He was an eminent antiquary and a learned scientist. D. Jan. 14, 1847.

Davis (JOHN), LL.D., b. in Northborough, Mass., Jan. 13, 1787, grad. at Yale in 1812; was elected M. C. in 1824, and gov. of Mass. 1833-35 and 1840-41. In 1835 was chosen a Senator of the U. S. by the Whigs, re-elected in 1845. He was often called "Honest John Davis." D. April 19, 1854.

Davis (JOHN CHANDLER BANCROFT), a lawyer, b. at Worcester, Mass., Dec. 29, 1822, ed. at Harvard Coll. He was assistant sec. of state 1869-71; agent of the U. S. at Geneva during the meeting of the tribunal of arbitration for the settlement of all points of difference between the U. S. and G. Brit. 1871-73; assistant sec. of state 1873-75; U. S. minister at Berlin 1875; judge of the U. S. court of claims 1877; assistant sec. of state of U. S. Dec. 19, 1881-82.

Davis (NOAH), jurist, b. at Haverhill, N. H., Sept. 10, 1818, removed to Albion, N. Y., in 1825, and was admitted to the bar in 1841. Practised law in Albion for about 14 yrs.; was a justice of the supreme court of New York, and in 1864 resigned in order to take a seat in Cong. He commenced the practice of law in New York city in 1869, and the same yr. again became M. C., resigning in 1870 to become U. S. atty. for the S. dist. of N. Y., and was elected judge of the supreme court of the same dist. in 1873.

Davis's Strait connects Baffin's Bay with the Atlantic, and lies between Greenland and Brit. N. Amer. It is about 160 m. wide at the narrowest part. A constant current runs S. through this strait from the circumpolar regions.

Davout or **Davoust**, dah-voo' (LOUIS NICHOLAS), duke of Auerstadt and prince of Eckmühl, a Fr. marshal, b. near Noyers (Yonne) May 10, 1770. He was a fellow-student of Bonaparte at Brienne, and entered the army in early youth; gen. of brigade in 1793, and in 1798 went with Bonaparte to Egypt; gen. of division in 1800, and commanded the cav. of the army of It. in that yr.; received a marshal's baton in 1804, and led the right wing at Austerlitz in Dec. 1805; defeated the Prus. at the battle of Auerstadt, Oct. 14, 1806. For his services at Eckmühl he was created prince of Eckmühl in 1809. In the Rus. campaign of 1812 he was wounded

at Rodolinda; was afterward gov. of the Hanse Towns, and defended Hamburg for several months against the allies. During the Hundred Days (1815) he was Nap.'s minister of war; was commander-in-chief of the Fr. armies after the battle of Waterloo. D. June 4, 1823. (See CHÉNIER, *Vie du Maréchal Davout*.)

Davy Sir HUMPHRY, BART. F.R.S., an Eng. chemist, b. Dec. 17, 1778, at Penzance, Cornwall. He was associated in 1798 with Dr. Beddoes at Bristol in the Pneumatic Inst. founded by that gentleman. The next year appeared his first contribution to science, under the name of *Essays on Heat and Light, with a New Theory of Respiration*. In 1800 he made known his discovery of the peculiar intoxicating or exhilarating properties of nitrous oxide gas, and the results of interesting and dangerous experiments on the respiration of nitrogen, hydrogen, carburetted hydrogen, carbonic acid, and nitrous gases. In 1802 he was made a prof. of the Royal Inst. He was pre-eminently successful as a lecturer. In 1807 he delivered before the Royal Society his second Bakerian lecture, in which he gave an account of the decomposition by galvanism of the fixed alkalis, his great achievement, by which he proved that these alkalis are merely metallic oxides. He was knighted in 1812 and made a baronet in 1818. One of the most important of his inventions is the safety-lamp (1815-17). He became pres. of the Royal Society in 1820, and was elected to that office for 7 succeeding yrs. D. May 28, 1829. Wrote *Elements of Chemical Philosophy*, and *Elements of Agricultural Chem.* (See *Memoirs of the Life of Sir Humphry Davy*, by his brother, Dr. JOHN DAVY.)

Davy's Safety-Lamp, invented by Sir Humphry Davy (1815-17), consists of a common oil lamp surrounded by wire gauze of 400 meshes to the square inch. It is used in coal-mines where fire-damp abounds. When fire-damp (light carburetted hydrogen gas mixed with air) is touched by a flame it explodes with great violence, but its flame cannot pass through fine wire netting, because the wire conducts away the heat, leaving the gas on the outside too cold to take fire.

Daw, or **Jack-daw** *Colinus monedula*, a bird of the



Daw, or Jack-daw.

crow family, found in Europe; black, with a smoky-gray neck, often nesting in ch. towers and old castles.

Dawes, dauz (HENRY LAURENS), a lawyer, b. at Cummington, Mass., Oct. 30, 1816, grad. at Yale in 1839; was newspaper ed., and studied and practised law. He was dist. atty., and became M. C. in 1857. Is now (1885) U. S. Senator from Mass.

Dawson (SIR WILLIAM), LL.D., F.R.S., a geol., b. at Pictou, N. S., Oct. 1830, ed. at the Univ. of Edinburgh. Under the direction of Sir Charles Lyell he made explorations in the prov. of N. S. in 1841, and gave an account of its geol. in the *Proceedings of the Geological Society of Lond.* He was appointed prin. of McGill Coll. at Montreal 1855. Wrote *Hints to the Farmers of N. S., America, or Studies of the Cosmogony and Nat. Hist. of the Heb. Scriptures*, and the article on *Geology in J.'s Univ. Cyc.*

Dawson (WILLIAM C.), a lawyer, b. Jan. 4, 1798, grad. at the univ. of the State in 1816, studied law at Litchfield, Conn., and settled at Greensboro', Ga., in his native co. Was M. C. 1837 to 1842; afterward judge of the superior courts in his State, and from 1849 to 1855 a U. S. Senator. D. May 5, 1856.

Day (GEORGE EDWARD), D. D., b. at Pittsfield, Mass., Mar. 19, 1815, grad. at Yale (1833) and at the Yale Theological Sem. (1838); was assistant instructor in sacred lit. there from 1838 to 1840; preached 1840-47 in Marlboro', Mass., and 1848-51 in Northampton, Mass.; prof. of biblical lit. in Lane Theological Sem. 1851-66, and has since been prof. of the Heb. lang. and lit. and biblical theol. in the theological dept. of Yale Coll. From 1863 he edited the *Theological Eclectic* till 1871, when it was united with the *Bibliotheca Sacra*. He translated and edited Van Oostersee's *Titus in Lange's Commentary*, and has also translated Van Oostersee's *Biblical Theol. of the N. T.*

Day (REV. HENRY NOBLE), an author and educator, b. at New Preston, Conn., Aug. 4, 1808, grad. at Yale in 1828; was ordained to the Congl. ministry at Waterbury, Conn., in 1836, became prof. of sacred rhetoric at the Western Reserve Coll., O., in 1840. He was pres. of the Ohio Female Coll. 1838-64. Wrote *The Art of Elocution*, *Elements of Logic*, and *The Science of Aesthetics*.

Day (JEREMIAH), D. D., LL.D., a math., b. in New Preston, Conn., Aug. 3, 1773, grad. at Yale Coll. in 1795; became in 1801 prof. of math. and natural philos. in that coll., and was pres. of the same 1822-46. Wrote *Introduction to Algebra and Navigation and Surveying*. D. Aug. 22, 1867.

Day-Lily (*Hemerocallis*), a genus of liliaceous plants having a perianth with bell-shaped limb and sub-cylindrical tube, and globose seeds. Several varieties are cultivated in gardens; among these is the fragrant yellow D.-L. (*Hem-*

erocallis flava). It has been accounted good food for cattle, but another species, the *Hemerocallis fulva*, has more profuse foliage and is equally acceptable to cattle.

Day'ton, a city and important R. centre, cap. of Montgomery co., O., on the left (E.) bank of the Great Miami, at the mouth of the Mad River, 60 m. N. N. E. of Cin.; the Miami Canal, connecting the O. with Lake Erie, passes through it. Has the Cooper Sem. for girls and St. Mary's (Catholic) Inst. for boys; a large water-power and limestone quarries. Here is the National Soldiers' Home. Pop. 1870, 30,473; 1880, 38,678; 1884, about 45,000.

Dayton, on R. N., cap. Columbia co., Wash. Terr. Pop. 1880, 996.

Dayton (JONATHAN), LL.D., b. at Elizabethtown, N. J., Oct. 16, 1760. He served in the Revolutionary war, was a delegate from N. J. to the convention which framed the Federal const. in 1787; in 1791 was elected M. C. He was speaker of the House of Reps. for 2 terms (1793-97), and was chosen U. S. Senator in 1799. D. Oct. 9, 1824.

Dayton (WILLIAM LEWIS), LL.D., nephew of the preceding, b. in Somerset co., N. J., Feb. 17, 1807; was admitted to the bar in 1830, and practised at Trenton; a U. S. Senator 1843-51. In 1856 was nominated as Rep. candidate for V.-P.; was appointed minister to Fr. in 1861. D. Dec. 1, 1864.

Deadly Nightshade. See *BELLADONNA*.

Dead Nettle (*Lamium*), a genus of plants of the order Labiate, with a 5-toothed calyx and 2-lipped corolla, the upper lip arched, the lower trifid. The genera *Galeopsis* and *Galeobdolon*, resembling the *Lamium*, are often called by this name. *Lamium purpureum* and other species are common weeds in G. Brit., and are naturalized in the U. S. There is an old belief that the touch of the D. N. causes an irritation which may end in death; hence the name. It appears, however, to be quite harmless.

Dead Sea, or **Sea of Sodom** [Ar. *Bahr Lût*, "Sea of Lot;" Lat. *Lucus Asphaltites*; O. T. the "Salt Sea"], a lake in the S. part of Pal. It was first described by Diodorus Siculus (xix. 98), 45 B. C., and in recent times has been carefully surveyed. Its length is about 46 m., and its average width about 10 m. Its greatest depth is 1310 ft., and its depression below the Mediterranean 1293 ft. It is fed by the Jordan and other streams, but has no outlet. Its water is extremely salt and bitter. Ducks have been seen swimming on its surface, but no fish are found in it. The lower portion of it is shallow. (See LIETZ, LYNCH, *Narrative of the U. S. Expedition to the River Jordan and the Dead Sea*; LABRET, *Geologie de la Palestine*, 1869.) R. D. HITCHCOCK.

Dead wood, cap. Lawrence co., Dak., in Black Hills geological, in S. W. part of the Terr. Pop. 1880, 377.

Deaf and Dumb, or **Deaf Mutes, Instruction of**. A deaf mute is a person who was b. deaf or became deaf through accident or disease in infancy or early childhood, and is usually mute, not because of any defect in the vocal organs or any inability, nervous or other, to speak, but because he is without the guidance of the sense of hearing, which would enable him to imitate sounds. There are cases of mute persons who can hear perfectly well, but who cannot speak, through some defect or disease of the vocal organs. Persons who become deaf at the age of 7 or 8 yrs. or older, generally retain their speech, though not, unless trained, their power of infection or variation of the voice. These are usually called *semi-mutes*.

D. M. have existed in all countries and in all ages, and probably in numbers not greatly varying in their proportion to the pop., though among savage nations and those living almost wholly in the open air they are somewhat less common, because children who are defective in development are very generally abandoned, and because an out-door life is more favorable to healthy development of the phys. faculties. In Europe the proportion is said to be 1 in 1360; in the U. S. it was reported as 1 in 2373, but the enumeration was undoubtedly incomplete.

The prin. causes of congenital deaf-mutism are consanguineous marriages or marriages of persons of the same temperament, intemperance, venereal diseases, scrofula, or defective nutrition on the part of the mother. The code Justinian declared D. M. incapable of legally managing their own affairs; during the Middle Ages the right of the feudal succession was denied them. The earliest attempt to teach one of them is recorded by Bede, about A. D. 700; some of the most favored of them attained a fair education, as e. g. the painter Quintus Pedius, mentioned by Pliny, and others in the Middle Ages, among them Rodolph Agricola of Groningen (1442-85). Jerome Cardan, in the next century, evolved the theory of D. M. inst. Ponce de Leon (1520-84) and Pasch, a clergyman of Brandenburg, were the first known teachers of D. M.; J. P. Bonet, Dr. J. Bulwer, Dr. W. Holder, Dr. J. Wallis, and J. C. Amman, the best of the early writers on the subject. George Dalgarno, a Scotchman, pub. a manual alphabet in 1680. In 1744 J. R. Pereire, a Spaniard of Heb. descent (1715-80), commenced teaching D. M. at Bordeaux by a new and secret process. He taught articulation with great success, his pupils acquiring proper inflections of the voice, and even the dialectic peculiarities of their teacher. He also used the manual alphabet. In 1760 the Abbé C. M. de l'Épée in Paris, and Thomas Braidwood in Edinburgh, commenced teaching D. M. The Abbé de l'Épée did not attempt to teach articulation, but in addition to a manual alphabet introduced the manual sign lang. and the practice of reading from the lip. De l'Épée d. in 1789, and his successor, the Abbé Sicard, though in a stormy period (the Fr. Revolution), continued and improved his methods. In 1782 Dr. Joseph Watson, a nephew and former assistant of Braidwood at Edinburgh and Hackney, founded the Lond. Asylum for D. M., and continued in charge of it till 1829, when he was succeeded by his son, T. J. Watson, and he, by his son, J. H. Watson, in 1857. The Lond. Asylum and Donaldson's Hospital have always taught articulation, the use of the two-handed manual alphabet, and instruction by visible signs, pictures, etc., with writing, but not the

23, 1751. Was capt. at the battle of Bunker Hill 1775, major in the campaign against Burgoyne in 1777, and in 1778 fought at Monmouth. He was M. C. from Mass. 1793-97, and sec. of war under Jefferson 1801-09. Became maj.-gen., and captured York (now Toronto) in Canada Apr. 27, 1813; was U. S. minister to Port. 1822-24. D. June 6, 1829.

Death (Gr. *θάνατος*; Lat. *mors, mortis*; Fr. *mort*; Ger. *Tod*), the cessation of vital functions in animals and plants. The active phenomena observed after death, such as material decay and loss of heat, are merely continuations of processes which have been going on through life. The corresponding operations of repair having ceased, the destructive processes become manifest. In a short time, however, in ordinary conditions, new and much more rapid destructive changes are induced.

Local or partial D. of an animal is called mortification, gangrene, or sphacelus; if in a bone, it is necrosis. Molecular D. of animal tissue is called ulceration, except in bony tissues, when it has the name of caries. Systemic D. is said by Bichat to be either—1, by "syncope," or fainting, when the heart's action fails from lack of its usual stimulus; 2, by "asphyxia," when suffocation occurs or the lungs cease to act; or 3, by "coma," when D. begins at the brain. Other authorities add to these forms D. by (4) "anæmia," or deficiency of the blood, by (5) "asthenia," or weakness, and (6) by starvation; but these may be regarded as varieties of the first form, or syncope. Still others reckon as distinct forms of D. (7) that by paralysis—which is indeed one of the causes of the second form—that produced by asphyxia, or apnoea. An eighth form, "necræmia," or D. by the blood, when the latter element is poisoned or changed in character by disease, is mentioned by writers. It would be difficult to assign some instances (such as instantaneous D. from an injury) to any one of these categories. It is asserted by many careful observers that D. is usually painless, and that the apparent agony or struggle so often observed is automatic. Cases are on record of burial after apparent D. Such terrible mistakes may be prevented by observing the rule of preserving bodies until unequivocal signs of decay are observed.

WILLARD PARKER.

Death, Brothers of, a name sometimes given to the monks of the order of St. Paul the Hermit, which was suppressed by Pope Urban VIII. about 1630. They always carried with them a death's head to remind them continually of death.

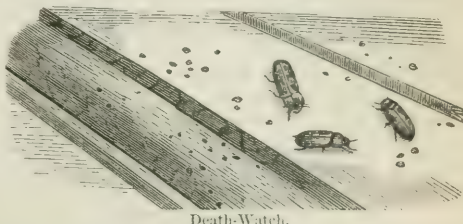
Death's-Head Moth, or Acheron'tia [from *Acheron*, in the Gr. mythology a river of the dead], is a genus of lepidopterous insects belonging to the family Sphingidæ. There is found in Eng. and other European countries a species of this genus (the *A. atropos*), having on the back of the thorax a remarkable representation of a human skull, and it has hence received the name of death's-head moth. This is a very handsome insect, and is from 4½ to 5½ inches in expanse of wing. If disturbed or handled, it makes a peculiar squeaking noise, the only known example, it is said, of a lepidopterous insect having what may be called a voice. It is much dreaded by the ignorant and superstitious, who consider its appearance to be ominous of evil. It does not hesitate to attack bee-hives, devouring the honey and putting the bees to flight. Though possessing no weapons of defence that have yet been discovered, it appears to suffer no harm from its armed enemies. Its larva is a large caterpillar about 5 inches in length, with beautiful markings; the color is a kind of greenish-yellow, and the back is traversed by lines partly blue and partly white, speckled with black spots. The caterpillar feeds mostly on the leaves of the potato plant, and it retires deep into the earth, and changes into a chrysalis in the month of Sept. It emerges the following June or July, transformed into a perfect insect. This moth is seen most frequently in the mornings and evenings of autumn.

Death Valley, Cal., so called because a party of emigrants, on their way to Cal., perished there from thirst and starvation in 1849. About 11 yrs. afterward Dr. I. R. N. Owen, of the U. S. and Cal. boundary survey, followed the marks of their wagon-wheels, and discovered the remains of their fires and the iron of their wagons on the spot where they had camped, these remains being perfectly preserved in this rainless region. This valley is the most N. of a chain of desert basins extending from the head of the Gulf of Cal. northward, embracing the Col. Desert, the Mohave Desert, and the Amargosa Desert, or "D. V." It is situated in the S. E. portion of Inyo co., Cal., about lat. 36° 15' N. and lon. 116° 50' W. The basin or sink is about 39 m. long and 11 m. wide, extending in a direction nearly N. and S. It is surrounded on all sides by very high and precipitous mts., the most conspicuous of which are the Panamint Mts. on the W. and the Amargosa Mts. on the E. It is a dreary and desolate region, nearly destitute of water and vegetation, fearfully hot in summer, and occasionally swept by terrible sand-storms. The Amargosa River flows into the S. end of the valley, and Furnace Creek runs into the E. side of its N. extremity; all the waters sink when they reach the valley. The soil is covered with a white alkaline efflorescence, but in winter it is somewhat marshy near the centre. The formations surrounding it are, to a large extent, volcanic, obsidian being abundant on the W. slope of the Amargosa Mts. One of the most interesting features connected with the topography of this portion of Cal. is the fact that this valley, although far in the interior of the continent—being

on the E. side of the lofty Sierra Nev. range and 200 m. from any sea—is from 150 to 200 ft. below the sea-level. This fact has been established by careful barometric measurements. Until recently this was supposed to be true of no other part of the N. Amer. continent at any considerable distance from the coast; but it is now known, by means of careful levellings, that a large portion of the Col. Desert in San Diego co., about 200 m. farther S., is below the level of the sea, the greatest depression near the N. extremity, Dry Lake, being from 250 to 300 ft. below the sea-level. It may be interesting to add that the remarkable depression of D. V. occurs in comparative proximity to the loftiest peaks of the Sierra Nev. Mts., the crowning peak, Mt. Whitney, being about 75 m. to the W. of it.

JOHN LE CONTE.

Death-Watch, the name of certain small beetles producing a sound like the ticking of a watch. This sound being more readily heard in the stillness attending sickness, it has given rise to the superstitious belief that it prognosticates



Death-Watch.

death; hence the name. The common D.-W. (*Anobium*) is a species of borer. It is about a quarter of an inch in length, and of a dusky-brown color. The *Arctropus pulsatorius*, a very different insect, is called in Eng. by the same popular name, and for the same reason.

Deb'orah, a Heb. prophetess and judge, the wife of Lapidoth, gained celebrity by her successful efforts to liberate the Israelites from Jabin, king of Canaan. She is supposed to have composed the lyric which forms the 5th chap. of Judg.

De Bow (JAMES DUNWOODY BROWNSON), a writer on commerce and statistics, b. at Charleston, S. C., July 10, 1820, was admitted to the bar in 1844. In 1845 he removed to New Orleans and founded *De Bow's Commercial Review*, which he edited for many yrs. He became in 1847 prof. of political economy in the Univ. of La. D. Feb. 27, 1867.

Debreczin, da-bret'sin, a royal free town of Hungary on a sandy plain 116 m. E. of Pesth, with which it is connected by R. R. It has a fine town-hall and a Calvinistic Coll. Most of the inhabs. are Prots. and Magyars. Pop. 51,112.

Debt, det, in law, means a sum of money due which is certain in amount or capable of being reduced to certainty. Such an indebtedness may arise either as the result of a judgment of a court of justice, or on a sealed instrument (specialty), or on an unsealed instrument, or on a mere oral contract. Ds. are thus distinguished into such as are of record, or of special contract or simple contract. They may arise either on an express or implied promise. Action of D. is a common-law action brought to collect a D. It is also used to collect a penalty given by statute.

Debt, National, of the U. S., as it existed at the commencement of the yr. 1873, consisted almost entirely of obligations incurred or accruing since the beginning of 1861, and, as usually stated in official reports, it was, on Jan. 1, 1873, \$2,162,252,338. But this sum embraces all known liabilities of the govt., including the entire amount of currency outstanding issued by the treas. directly, with various items of old debts long unclaimed, and probably obsolete, though still necessarily carried on the books of the treas. The total amount of outstanding interest-bearing debt of the U. S. Jan. 1882 was \$1,534,331,600.

Decal'omanie [Fr. *décadner*, to "counterdraw," and *manie*, "fancy"], the art of transferring pictures and designs upon china, glass, marble, wood, leather, etc. The picture to be applied is coated thinly with prepared cement, then placed in the position required and pressed tightly. A damp sponge is applied to the upper surface till the paper becomes moist, after which it can be easily removed, and the picture will remain upon the object.

Dec'alitre [Fr.], a measure equivalent to 10 litres.

Dec'alogue [Gr. *δεκάλογος*, or *οἱ δέκα λόγοι*, "the ten words"], called also the **Ten Commandments**, is that part of the law of Moses contained in Ex. xx. 3-17 and repeated in a hortatory form in Deut. v. 7-21. The ten commandments, with the exception of the 4th and the 5th, are negative ones. The D. is generally regarded as a moral code. It is, however, admitted that the 4th (or Sabbath) commandment has a positive as well as a moral element in it. Christ reduced the ten commandments to two.

De Camp (JOHN C.), U. S. N., b. Oct. 5, 1812, in N. J., entered the navy as a midpn. Oct. 1, 1827; became a rear-admiral (retired list) in 1870. He commanded the *Iroquois* in every action on Miss. under Farragut. D. June 24, 1875.

De Candolle, deh kon-dol' (AUGUSTIN PYRAME), M. D., a botanist of Fr. extraction, b. at Geneva Feb. 4, 1778. At Paris he became a pupil of the botanist Desfontaines and enjoyed the friendship of Cuvier and Humboldt. In 1804 grad. with an *Essay on the Medicinal Properties of Plants*; became in 1808 prof. of bot. at Montpellier, and pub. in 1813 his *Elementary Theory of Bot.*, a profound work, in which he developed his new system of classification according to the natural method. In 1816 he removed to Geneva. His *Prodromus Systematis Naturalis Regni Vegetabilis*, which he did not live to finish, is a very important book of reference for working botanists. D. Sept. 9, 1841. (See DELARIVE, A. P. *Decandolle, sa Vie et ses Travaux*.)

Decap'olis [from the Gr. *deka*, "ten," and *πολις*, a

"city"), a dist. containing 10 cities of Pal. and Syria, founded principally by veterans from the army of Alexander, but recolonized and endowed with special privileges after the Rom. conquest of Syria (65 B. C.).

Decatur, Ala. See APPENDIX.

Decatur, a city, important R. R. centre, and cap. of Macon co., Ill., about 1 m. N. of Sangamon River, 39 m. E. of Springfield. Pop. 1870, 7161; 1880, 9547.

Decatur, Ind. See APPENDIX.

Decatur, Van Buren co., Mich., on R. R., 116 m. E. by N. of Chicago. Pop. 1870, 1420; 1880, 1267.

Decatur, Tex. See APPENDIX.

Decatur (STEPHEN), a com., b. at Sinnepuxent, Md., Jan. 5, 1779, and entered the navy in 1798. In Feb. 1804 he led a small party which burned in the harbor of Tripoli the Amer. frigate Philadelphia after she had been captured. For this exploit he was raised to the rank of capt. Having taken command of the frigate United States, he captured the Brit. frigate Macedonian Oct. 25, 1812. On June 17, 1815, he captured two Algerine vessels of war, and compelled the dey of Algiers to sue for peace. He was killed in a duel by Com. James Barron Mar. 22, 1820.

Decem'ber [Fr. *Décembre*, from Lat. *decem*, "ten"], the 12th and last month of the yr., is so called because in the anc. Rom. calendar it was the 10th month.

Decem'viri (sing. **Decemvir**), Lat., from *decem*, "ten," and *vir* (plu. *viri*), a "man"; a name applicable especially to ten patrician magistrates elected to draw up a code of laws for the Rom. state, and invested with supreme authority for a yr.; a new commission, consisting partly of plebeians with similar powers, was appointed the next yr., the result of their labors being the Twelve Tables, which became the foundation of Rom. law. The new decemviri proceeded to lawless acts, were driven from office, and the old magistracy was re-established. Beside these, there were D. for various special purposes.

Dec'imal [Lat. *decem*, "ten"], a number written in the scale of *tens*. The term is usually applied to a fraction whose denominator is some power of 10; in this case the denominator is not written, but indicated by a point (·) called a *decimal point*; the numerator is then equal to the number following the point, and the denominator is 1 followed by as many zeros as there are decimal places.

Decius, dē'she-us (CAIUS MESSIUS QUINTUS TRAJANUS), a Rom. emp., b. in Pannonia about 200 A. D. He had command of an army which revolted against the emp. Philip and proclaimed D. In the battle that ensued Philip was defeated and killed in 249. He persecuted the Chrs.; was killed in battle by the Goths in Nov. 251.

Deck'er (THOMAS), an Eng. dramatist, b. before 1600. He wrote several plays in partnership with Ford and Rowley. Wrote *Fortunatus*, or the *Wishing Cup*, etc. D. after 1638.

Declaration [Lat. *declaratio*, from *declaro*, to "make clear"], an affirmation; the act of declaring; a public announcement; a public expression of facts or opinions; a proclamation. Among the most memorable of all political documents is the Amer. DEC. OF IND. The first Colonial Cong. passed an important "D. of Rights" at Phila. on the 14th of Oct. 1774. Though less famous than the Dec. of Ind., it is of scarcely less importance in the hist. of our country. A "D. of the Rights of Man" was adopted by the National Assembly at Paris Aug. 18, 1789. The "D. of Thorn" (Lat. *declaratio Thorunensis*) was a confession of faith drawn up at Thorn, in Poland, in 1645, for the use of the Reformed chs., the design being to settle controverted points.

D., in law, is a specification of a cause of action by a plaintiff against a defendant; the pleading in which a plaintiff sets forth his case against the defendant. It contains certain formal or substantial parts, such as the title, venue, the cause of action, and the conclusion. If the plaintiff fails to declare within a certain time, the defendant may obtain judgment of *non pros*. The term is used in other significations in other branches of the law—e. g. D. of trust, D. of uses, D. in evidence, etc.

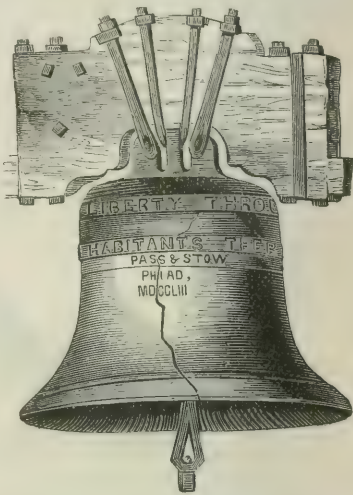
D. OF WAR, the formal announcement by a govt. of its intention to wage war against another, is a proceeding which is observed among all civilized nations, though instances have frequently occurred where *de facto* wars have been carried on without such notification, as between the Eng. and Sp. at sea at various times during the reigns of Elizabeth and James I. of Eng. Powerful nations have also sometimes, without any such D., attacked the weak, designing a breach of international law. In the U. S. the D. of war is a power exercised by Cong. alone. During the age of chivalry, a herald made D. of war at the enemy's court, his tabard on his arm. No offence was taken at his defiance, which was frequently rewarded by gifts of money from the party defied.

Declaration of Independence. The first Cong. of the 13 Brit. colonies which led to their union in resistance to the crown, and ultimately to their independence as States, met in Phila. Sept. 5, 1774. The immediate cause of this assemblage was what was known as the "Boston Port Bill"—i. e. an act of Parl. by which the pt. of Boston was closed and the custom-house removed to Salem, because of the destruction of tea in Boston harbor. When the news of this act of Parl. was known in this country it excited intense interest in all the colonies, and especially in Va. It was then that the cry was raised there that "the cause of Boston is the cause of us all." The result was the call of a gen. Cong. of all the States, to meet by deputies at the time and place stated, for joint consultation and action in the maintenance of principles essential to the preservation of the rights and liberties of all. This Cong., after adopting various measures looking to redress of grievances, and without any idea of resorting to independence, adjourned, Sept. 26, 1774, with a recommendation that another similar Cong. meet May 10, 1775. But, so far from redressing grievances, the course of the Brit. Parl. was to increase the alienation. In Apr. 1775 there were 3000 Brit. troops in Boston, for the purpose of enforcing

measures of oppression at the point of the bayonet. Hostilities ensued; the battles of Concord and Lexington were fought, engagements also took place at Ticonderoga, Crown Point, and Skenesborough, N. Y. It was in this state of things that the second Cong. of the colonies assembled, May 10, 1775. The colonies raised troops to repel force by force, and George Washington was chosen commander-in-chief of all the colonial forces. The battle of Bunker Hill was fought 3 days afterward. Public excitement increased. On May 20, 1775, the people of N. C. proclaimed their celebrated Mecklenburg D. of I. On June 7, 1776, a motion was made and carried, "that these united colonies were, and of right ought to be, free and independent states." A committee to draw up the joint declaration was appointed on the same day, and another to draw up articles of confederation. The committee on the declaration were Thomas Jefferson, John Adams, Benjamin Franklin, Roger Sherman, and Robert R. Livingston. The report was made June 28. This celebrated paper was drawn up by Mr. Jefferson. It came up for final action on July 4, when it received the unanimous vote, not only of all the colonies, but of all their delegates in Cong. It was voted upon by the colonies as separate and distinct political bodies, and as it stands on the journal is in these words: "In Congress, July 4, 1776. The unanimous Declaration of the thirteen United States of America."

ALEXANDER H. STEPHENS.

The "Liberty Bell" was first imported from Eng. in 1753. It was cracked at the first ringing after its arrival, and recast in Phila. in the same yr. Upon the fillets around it were cast (23 yrs. before the Dec. of Ind.) the prophetic words: "Proclaim liberty throughout all the land, unto all the in-



habitants thereof" After the first reading of the Declaration it was rung for more than 2 hours, with the firing of cannon and the beating of drums. It has been broken for many yrs., and stands in the hall of the old State-house, Phila.

Declaration of Rights, a state paper presented to the prince and princess of Orange (afterward William III. and Mary II.) at the time the crown was tendered to them (Feb. 13, 1689). The declaration complained of several grievances which Eng. had endured during the reign of James II., then asserted the rights which had been thus violated, and claimed various privileges for the nation. The substance of this declaration became the "Bill of Rights."

Declina'tion [Lat. *declino*, to "deviate"], in astron., the angular distance of a body from the equinoctial; it is counted both N. and S., and may have any value from 0 to 90°.

Declination of the Magnet'ic Needle is the deviation of the axis of a magnetic needle (i. e. the straight line which joins its poles) from the astronomical meridian. This declination is sometimes toward the W. and sometimes toward the E.

Deco'rah, a city, cap. of Winneshiek co., Ia., on R. R. and the Upper Ia. River. It contains the Nor. Lutheran Coll. Pop. 1870, 2110; 1880, 2951.

Deco'rate [from the Lat. *decoro*, *decoratum*, to "adorn"], to adorn, embellish; to cover with external ornaments. To D. graves is to garnish them with flowers. The anniversary on which flowers are placed on soldiers' graves in the U. S. is called Decoration Day, and is observed on May 30.

Bedham, ded'am, R. R. centre and cap. of Norfolk co., Mass., on Charles River, 10 m. S. W. of the State-house in Boston. The town has a large R. Cath. inst. under the care of the Sisters of Charity, and a home for fallen women, which receives the assistance of the State. The tp. of Norwood has been set off from D. tp. since U. S. census of 1870. Pop. tp. 1870, 7342; 1880, 6233.

Dedica'tion [Lat. *dedicatio*, from *dedico*, *dedicatum*, to "dedicate"], a complimentary address to a particular person, prefixed by an author to his work. Horace, Virgil, Cicero, and Lucretius were among those who practised it. At the period of the revival of letters in Europe, few works were pub. without D. Many of these are remarkable for their elegance and purity of style, and are of more value than the treatises to which they are prefixed. A complete hist. of D. would be of great value, as throwing light upon the hist. and character of many distinguished persons.

Deed [from the A.-S. *dead*, "done"; hence, as a noun, "something done" or "executed"], a writing on paper or

parclement, sealed and delivered. This is its most gen. signification. In a restricted sense it means an instrument for the conveyance of real estate. According to Lord Coke, it should possess the following requisites: writing, parclement or paper, a person able to contract, a sufficient name, a person able to be contracted with, a sufficient name, a thing to be contracted for, apt words required by law, sealing and delivery. D. pursue a regular form—containing the premises, *habendum*, *tenendum*, *reddendum*, conditions, warranty, covenants, and conclusion. The premises express the names of the parties, the consideration to be paid for the conveyance, and a description of the property conveyed. This should be minute and accurate. The "*habendum*" expresses the interest which the grantee is to have, whether it be an estate in fee, for life, or an inferior estate. The "*tenendum*" refers to the tenure upon which the land is to be held, and is at present of no practical importance. The "*condition*," "*warranty*," and "*covenants*" are not found in all D. They may be inserted whenever required to carry out the intention of the parties. When a condition is resorted to, it may be either precedent or subsequent. The covenants vary with the nature of the conveyance. In a conveyance in fee 6 covenants may be inserted, and in such case the instrument is called a D. with full covenants. In some instances the single covenant of warranty is introduced, when it is ordinarily termed a warranty D. In many cases there are no covenants at all, the object of the transaction being only to convey whatever interest the grantor may have. It is a rule of the common law that some words in a conveyance used by a grantor will imply a covenant. This doctrine tends to mislead grantors who are not familiar with the rules of law, and it has been abrogated in some of the States—e. g. N. Y. There is, however, an important rule that a promise may be implied on the part of the grantee from his acceptance of an instrument containing words purporting to create a personal liability. Thus, if there are words to the effect that the grantee assumes the payment of a certain specified mortgage, he becomes liable by his acceptance, though he does not execute the instrument. T. W. DWIGHT.

Deems (CHARLES F.), D. D., LL.D., b. in Baltimore, Md., Dec. 4, 1820, grad. at Dickinson Coll.; served in the Meth. ministry of the S. several yrs., and has been prof. in the Univ. of N. C. and in Randolph-Macon Coll., and pres. of Greensboro' and Centenary Colls.; became pastor of the Ch. of the Strangers, New York. Wrote a *Life of Dr. Clark*, poems entitled *Triumphs of Peace*, and *Life of Christ*.

Deep River [Indian *Sapponah*], a river of N. C., flows S. E. and then nearly E. until it enters the Cape Fear River. Length estimated at 120 m. In the valley of the D. R. are extensive beds of excellent bituminous, semi-bituminous, and anthracite coal.

Deep-Sea Dredging. The use of iron dredges for procuring oysters, etc. in shallow water has long been known to all civilized countries. The instrument used for this purpose is large and heavy, consisting of an iron frame several ft. across, with one scraping edge, which acts like a hoe; the arms to which the drag-rope is fastened are usually rigid, and behind the frame there is a net with large meshes of wire-work. This instrument is efficient for dredging large objects, like oysters, etc., for which it is intended; but for scientific purposes it is of little use. Hence, various modifications have been devised by naturalists, the first of which was used if not invented by Otho Frederick Müller on the coasts of Nor. and Den. before 1780. Naturalists now use a dredge consisting of a narrow rectangular frame, with 2 scraping edges, the ends of the frame being of round iron, and each supporting a forked iron arm, each fork being bent around the end-piece of the frame at the corners, so as to turn freely upon it. The other end of each arm is furnished with a ring or eye, to which the drag-rope is attached. To the back of the rectangular frame a bag-like net of stout twine, with small meshes, is securely attached. For dredging in shallow water or on rocky bottoms it is usual to protect the inner net or bag with an outside bottomless bag of stout canvas, otherwise the rocks will quickly destroy the net. The drag-rope is attached to one of the arms of the dredge, while the other arm is tied to it by a smaller rope, so that in case the dredge becomes wedged between rocks the strain upon it may break away the weaker fastenings, allowing the frame to straighten out and thus free itself. One or more weights are attached to the rope at a short distance in front of the dredge, partly to help sink the dredge, partly to keep the edge of the dredge down upon the bottom in its proper position. In very deep water several hundred lbs. are sometimes used, attached several hundred ft. from the dredge. The dredge must be drawn slowly over the bottom, either by the drifting of the vessel by the force of the tide, or by the wind without sails, or by an occasional turn of the wheels of a steamer.

The Eng. D.-S. D. expeditions introduced the use of "tangles" in connection with the dredge, and these proved to be very valuable adjuncts. The "tangles" consist of pieces of frayed-out hemp-rope, a few ft. long, tied together at one end, so as to form large brushes. They generally fastened these to the iron rod attached across the end of the dredge-bag, so that they dragged over the bottom behind the dredge, and caught up all objects having rough or spiny surfaces; but many of the objects thus caught had been already broken or injured by the dredge.

During the past 25 yrs. dredging has been carried on along all parts of the European and N. Amer. coasts, and in many other parts of the world, in waters of moderate depth. But within the past 5 or 6 yrs. these investigations of the life of the bottom have been carried on successfully at far greater depths, both on the Amer. and European sides of the Atlantic Ocean. On the coast of Nor. and at the Lofoden Islands collections were made at depths between 250 and 450 fathoms by Dr. G. O. Sars. In the yr. 1867 D. S. D. were commenced by Mr. L. F. de Pourtales of the U. S. Coast Survey in the Gulf Stream between Florida and Cuba. In 1868 and

1869 these investigations were continued in that region by Mr. de Pourtales. In these explorations dredgings were made on several lines across the Straits of Florida, from the shores to the deepest waters. In 1868 the Eng. govt. fitted out the steamer *Lightning*, under the scientific direction of Dr. William B. Carpenter and Dr. Wyville Thomson, for the purpose of D.-S. D. In 1869 the Porcupine was fitted out for the same service, and made 3 cruises. In 1870 the same vessel made a new cruise, and in 1870 Mr. Marshall Hall dredged in deep water off the coasts of Sp. and Port. in his yacht *Norma*. In 1871-72 the late Dr. William Stimson dredged in the Gulf of Mex. on board the U. S. Coast Survey steamer *Bache*, and in 1872 Mr. S. I. Smith and O. Harger, on board the same steamer, made the deepest dredgings yet accomplished off the N. coast of the U. S. All these dredgings were carried on with important results. [From orig. art. in *J.'s Univ. Cyclopedia*, by PROF. A. E. VERRILL.]

Deep-Sea Soundings. It is difficult to define precisely what is to be understood by the expression "deep-sea soundings." There are places in the ocean very near to the most frequented shores, like the Gulf Stream off Cape Hatteras, where it has been found difficult, if not impracticable, to determine the depth of the water with certainty, owing to the rapidity of the current, combined with the great depth; or the same stream within a few miles of the N. shore of Cuba, where the depth of less than 1000 fathoms, combined with the strength of the current, for a long time baffled the skill of the best officers of the Amer. navy in their efforts to obtain a section across the straits between Cuba and Key West. And on the other hand there are areas extending hundreds of m. seaward from the coast of continents, like the plateau off the coast of Ire., where the depth hardly exceeds 500 fathoms, and soundings are so easily made that they would be classed in hydrographic work as "off-shore soundings." Other portions of the sea-bed, again, deepen gradually from the shores outward, and it would be difficult to say where off-shore soundings end and D.-S. S. begin.

The precise definition is of little importance, however, at the present time; but it may be said that in the early attempts to determine depths of the ocean out of sight of land a depth of 1000 fathoms (or 6000 ft.) was considered a D.-S. S. It is believed that there is no record of any successful effort having been made to determine depths greater than 1000 fathoms previous to that of Capt. James Ross in the yr. 1840. Up to that time navigators had been engrossed in geographical explorations, and had contented themselves with regarding the ocean as practically unfathomable beyond a very narrow belt along the shores of continents. Capt. James Ross of the Eng. navy was the first explorer who dispelled this idea by a successful effort to sound in what was evidently very deep water. In the yr. 1840, while off the W. coast of Afr., he prepared several m. of sounding-line upon a reel, and having attached a weight of 540 lbs. to the end of the line, this weight was allowed to descend to the bottom of the sea. A sudden cessation of the line was found to indicate that the bottom was reached, and it was found that the length of line run out was 2877 fathoms. In a subsequent attempt during the same voyage 4000 fathoms of line were run out without finding bottom, and the line finally broke. The first sounding was doubtless as nearly correct as most soundings since made at same depth by other explorers.

Another attempt, made in 1843 by officers of the Eng. navy, in the S. ocean, proved a failure, no bottom having been reached with 4000 fathoms of line out. In 1847 another sounding was made by Capt. Stanley, midway between the coasts of Afr. and S. Amer. bottom having been reported at 2600 fathoms, but the result was doubtful.

These are the only recorded soundings made by the Eng. navy before the problem was taken up by the Amer. navy. In 1843 Lieut.-Commander (now Admiral) Davis, who was then attached to the U. S. Coast Survey, made several successful soundings off Block Island, in water a little less than 2000 fathoms' depth. A cup for bringing up specimens of the bottom was attached to the lead, and for the first time a portion of the deep-sea mud was brought to light from these depths. Deep-sea explorations began from that time invested with a special interest from the discovery of the existence of animal life or the remains of minute animals in every specimen of the bottom brought to the surface.

During a period of 10 yrs. subsequent to the explorations of Commander Davis, D.-S. S. were continued off the Atlantic coast by officers of the U. S. N. under the direction of Prof. Bache, supt. of the U. S. Coast Survey, in a series of sections run perpendicular to the coast, made with a view of tracing the form of the bottom along the course of the Gulf Stream. The temperature of the waters of the Gulf Stream, taken beneath the surface at various depths, indicated, by successive bands of cool and warm water, the probable existence of submarine ranges of mts. having courses coincident with these bands, and the sections determined confirmed this idea wherever the depths could be determined. During the progress of these explorations the U. S. N. dept., through the efforts of Lieut. Maury, undertook an extensive series of D.-S. S. in various parts of the Atlantic, but as the observations were scattered and not confined to systematic lines, and were, moreover, made by a method which had in it great elements of uncertainty, the results, so far as the extension of exact knowledge in regard to the form of the ocean-bed was concerned, were very meagre. The explorations, however, served to prepare for this kind of service officers who subsequently did important work. Among these was Lieut. Berryman, who afterward ran the first line of soundings across the N. Atlantic. The invention of the apparatus for detaching the heavy lead at the bottom, thus enabling a small line to be used for bringing up specimens of the bottom, was also one of the fruits of these explorations. Brooke's lead, or detaching apparatus, became, both in the Amer. and in foreign explorations, the most important feature of sounding-instruments.

The first lines of sounding which were carried across the

Atlantic were run by Lieut. Berryman of the U. S. N., for the purpose of ascertaining the practicability of laying a submarine cable. Upon the favorable report of his soundings it was determined definitely to undertake this work. Lieut. Berryman was followed in this field of exploration by Lieut. Dayman of the R. N., whose results were confirmatory of those of Lieut. Berryman.

The depths obtained by both these officers appeared, however, to have large probable errors, and the small number of observations made for so long a line rendered it impossible to construct a profile of the bottom of positive accuracy. The actual laying of the telegraph cables furnished the only convincing and satisfactory evidence of the existence of the conditions favorable to such an enterprise.

After the laying of the Atlantic cable the Eng. admiralty took up the question of deep-sea explorations in a thorough manner, and the field seems to have been abandoned by the Amer. navy altogether. (See OCEAN.) W. P. TROWBRIDGE.

Deer [etymologically related to the Gr. *θηρ*; Ger. *Thier*, a "beast"], the name given to those species of Cervidae which are provided with antlers, in the male at least. The remainder of both sexes are antlered, but the females of the other species are destitute of them. The prin. species are the Elk or Moose, Fallow-Deer, Red-Deer, Reindeer or Caribou, Roe-buck, and Wapiti. The characteristic North American D. belong to the genus *Cervus*. The most common species is *Cervus Virginianus*. Its food varies with the season; in winter, buds of shrubs; in spring and summer, grass, grain, berries, and the like. The mule-D. (*Cervus macrotis*) is larger than the common D. Its horns are twice forked and its ears long, whence the name. It is confined mostly to the E. slope of the Rocky Mts., from lat. 54° to 30°. The black-tailed D. (*Cervus Richardsonii*), somewhat larger than the common D. but smaller than the mule-D., is found in the Pacific States and Rocky Mt. region. Many species of D. exist in S. Amer., Afr., and especially in Asia and its islands.

Deerfield, Franklin co., Mass., on R. R., 33 m. N. of Springfield. The tp. contains the v. of S. D., and was the scene of several contests with the Indians in colonial times. Among these may be mentioned the "Bloody Brook massacre" (1675), and the burning of the v. by the Fr. and Indians under De Rouville (1703). Old D. has a beautiful soldiers' monument, and there is at S. D. a marble monument commemorative of the Bloody Brook disaster. D. has an acad. Pop. of tp. 1870, 3632; 1880, 3543.

Deer Grass (*Rhexia*), a genus of plants of the order Melastomaceae. Eight species are natives of the U. S.

Deer Lodge City, on Deer Lodge River, cap. of Deer Lodge co., Mont., has a penitentiary. Pop. 1880, 941.

Deer-mouse, or **Jumping Mouse** (*Meriones*), a genus of rodents allied to the mouse and jerboa families, are natives of Amer. One species, the Labrador jumping mouse, is found far N. The Canada jumping mouse (*Meriones Canadensis*) is active and beautiful, having long, slender hind legs and a very long tail. It can leap 4 yards.

Defamation. See SLANDER.

Default [Fr. *défaut*, from *de*, intensive, and *faillir*, to "fail"], in law, is, in a gen. sense, the omission of any act which a party ought to perform in order to entitle himself to a legal remedy. Such is, for example, non-appearance in court on a day assigned. If a plaintiff in an action make D., he is nonsuited; if a defendant, judgment by D. is passed against him. Judgment by D. is not necessarily final.

Defeatance [Norman Fr. *défaillance*, from *de*, negative, and *faire*, to "do or perform"], in law, a collateral deed made at the same time with a deed of conveyance, containing conditions on the performance of which the estate thus created may be defeated; also a D. as to a bond or recognition is a condition contained in or indorsed on the instrument, which when performed defeats it.

Deferent [Lat. *deferro*, to "carry away"]. In anc. astron., the alternate advance and retrogradation of the planets was explained by supposing the planet to revolve in a small circle whose centre was carried around the earth on a second circle coinciding with the planets' mean path; this latter circle was called the *deferent*.

Defiance, R. R. junc., cap. of Defiance co., O., on the Maumee River at the mouth of the Auglaize, 50 m. W. S. W. of Toledo. Pop. 1870, 2750; 1880, 5007.

De Foe (DANIEL), an Eng. writer, b. in Lond. in 1661, was a son of James Foe, a butcher and nonconformist. In 1685 he joined the rebellion of the duke of Monmouth, after whose defeat he became a tradesman. In 1702 he wrote an ironical pamphlet entitled *The Shortest Way with Dissenters*, for which the House of Commons punished him with the pillory, a fine, and imprisonment for 2 yrs. In 1706 the ministers employed him as one of the staff of coms. sent to Scot. to promote the union of the two countries. Wrote *His. of the Union*, *The Adventures of Robinson Crusoe*, and a *Journal of the Plague*. D. Apr. 24, 1731. (See WILLIAM LEE, *Life of Daniel Defoe*.)

Degree [from Lat. *de*, intensive, and *gradus*, a "step"]. In algebra, the D. of an equation is the greatest sum of the exponents of the unknown quantities in any term; the D. of a term is the number of its literal factors. In trigonometry, a D. is an angle equal to the 90th part of a right angle.

D., as a *scholastic distinction*, is the grade or rank to which scholars are admitted, in recognition of their attainments, by a coll. or univ. Collegiate D., *in course*, are given, or should be given, only upon examination. *Honorary D.* are sometimes conferred without examination. The pope and the abp. of Canterbury also confer scholastic D., especially the doctorate.

Degrees of Latitude and Longitude. The distance from the equator to the poles, measured along a meridian, is called *latitude*, or width; the distance from an assumed prime meridian, along a parallel, in the direction of the earth's rotation, is called *longitude*, or length. These expressions have been handed down to us by the anc., who

used them because the world known to them was really more extensive, or long, from E. to W., than wide, from N. to S. The D. of lat. are counted from the equator as zero, both N. and S., making 90 D. each way to the poles. The D. of lon. are reckoned along the parallels from an assumed prime meridian. The Eng. count 180 D. E. and 180 D. W. from the meridian passing through their national observatory at Greenwich, near Lond.; the Fr. from the meridian of Paris; the Gers. often take the meridian of Ferro, the most W. of the Canary Islands, which divides the E. from the W. world. The Amers. often use the meridian of the National Observatory at Wash. Therefore, when the lon. of a place is mentioned, the prime meridian from which it is reckoned must be indicated. The seafaring nations mostly use Greenwich lon.; the nations on the continent of Europe, Paris and Ferro. The relative position of these prime meridians is such that, Paris being zero, Greenwich is 2° 20' 22" W., and Ferro is assumed to be 20° W. from the Paris meridian. Wash. is 79° 23' 28" W. from Paris, and 77° 3' 6" from Greenwich. The lat. and lon. of a point being known, it is evident that its true position on the surface of the globe is fully determined.

As the earth revolves on its axis, each meridian is carried over 360 D. in 24 hours, or 1440 minutes, and over 1 D. in 4 minutes, whatever be the length of the D. The difference in lon. of 2 places can, therefore, be expressed by the difference of the local time of their meridians. That difference of 4 minutes for each D. is uniformly the same in all lat.

ARNOLD GUYOT.

De Ha'ven (EDWIN J.), a naval officer, b. in Phila. in 1819. He conducted an expedition sent from New York in search of Sir John Franklin in 1850. D. May 9, 1865.

Deists [from Lat. *Deus*, "God"], a name assumed in Fr. and It. about the middle of the 16th century by those who acknowledged the existence of a God, but rejected the Bible. The term came to be used in a derogatory sense, practically synonymous with "infidel," a sense not implied in its etymology, which signifies merely "believer in God."

Dejanira, or **Deianeira** [Gr. *Δηϊανειρα*, or *Δηϊανειρα*], in Gr. mythology, a daughter of Æneus, king of Æolia, was wife of Hercules. She preserved some blood of the centaur Nessus as a love-charm, and saturated with it a tunic of Hercules, who was poisoned by it.

De Kalb, city, De Kalb co., Ill., on R. R., 58 m. W. of Chicago. Pop. 1880, 1598.

De Kalb (JOHN), BARON, a Ger. gen., b. in Bavaria June 29, 1721, served first in the Fr. army. He came to the U. S. with La Fayette in 1777, and was appointed a maj.-gen. by Cong. in the same yr. He was mortally wounded at the battle of Camden, S. C., and d. Aug. 19, 1780.

De Koven (JAMES), b. at Middletown, Conn., Sept. 19, 1831, grad. at Columbia Coll. New York, in 1851, and at Gen. Theological Sem. in the same city in 1854; was admitted to the diaconate of the P. E. Ch. the same yr., and to the priesthood the yr. following; was rector of a ch. at Delafield, Wis., for 5 yrs., and became warden of Racine Coll. in the same State in 1859; in Feb. 1875 was elected bp. of Ill., but failed to be confirmed on account of his extreme High Ch. views. D. Mar. 19, 1879.

DeLafield (EDWARD), b. in New York in 1794, grad. at Yale in 1812, and at the Coll. of Phys. and Surgeons in 1815; became a pupil of Sir Astley Cooper and Mr. Abernethy; remained abroad about a yr., and on his return to New York he, in conjunction with Dr. J. Kearny Rodgers, established the New York Eye and Ear Infirmary in 1820; in 1858 was elected pres. of the Coll. of Phys. and Surgeons, and in 1870 became, by virtue of his presidency of the Coll. of Phys. and Surgeons, one of the gov's. of the Roosevelt Hospital. D. Feb. 13, 1875.

DeLafield (RICHARD), b. Sept. 1, 1798, in New York, grad. at W. Pt. in 1818; chief of engineers Apr. 22, 1864, with the rank of brig.-gen. He served on the N. boundary survey of the U. S. under the treaty of Ghent 1818; as supt. of the Military Acad. 1838-45 and 1856-61; as pres. of military commission to the Crimea and theatre of war in Europe 1854-56; on the staff of Gov. Morgan of N. Y. to reorganize and equip State forces for service in the c. war 1861-63, and as agent of Smithsonian Inst. 1865-70. Brevet maj.-gen. U. S. A. Mar. 13, 1865; retired Aug. 8, 1866. D. Nov. 5, 1873.

Delambre, del-lombr' (JEAN BAPTIST JOSEPH), a Fr. astron., b. at Amiens Sept. 29, 1749, studied under Lalande. In the service of the govt., D. and Méchain spent about 7 yrs. (1792-99) in the measurement of the arc of the meridian from Dunkirk to Barcelona; D. pub. the result of this operation in his *Bases du Systeme Métrique Decimal*; became prof. of astron. in the Coll. of Fr. in 1807. Wrote *Theoretical and Practical Astron.* D. Aug. 19, 1822.

De Lan'cey (JAMES), a jurist, b. in New York in 1703, was the son of a Huguenot from Normandy. He was ed. at Cambridge, Eng., returned to New York in 1729, became a justice in the supreme court of the prov., and in 1733 its chief-justice. He was one of the founders of King's (now Columbia) Coll., and was lieut.-gov. D. Aug. 2, 1760.

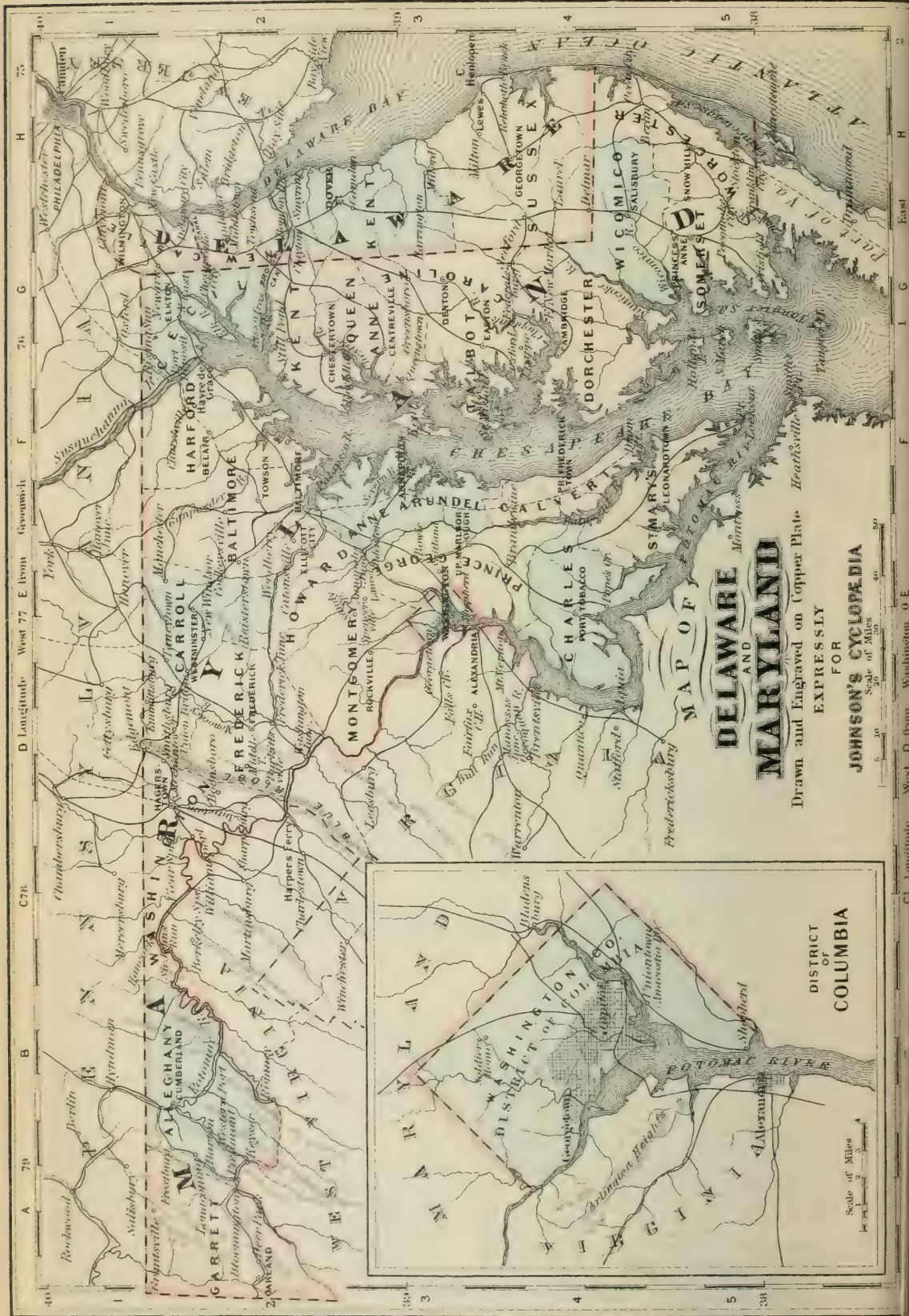
De Lancey (WILLIAM HEATHCOTE), D. D., LL. D., D. C. L., Oxon., a Prot. Episcopalian bp., b. at Mamaroneck, N. Y., Oct. 8, 1797, grad. at Yale at 1817; was ordained deacon in 1819, priest in 1822; was provost of Univ. of Pa. 1825-30, and was consecrated bp. of W. N. Y. 1839. D. Apr. 5, 1865.

De Land, Fla. See APPENDIX.

DeLano (COLUMBUS), a lawyer, b. in Shoreham, Vt., in 1809, removed in his early youth to O. He practised law, and was chosen M. C. in 1844. Having joined the Rep. party, he was again elected to Cong. in 1864. He became com. of internal revenue in 1869, and sec. of the interior in the cabinet of Gen. Grant in 1870.

DeLavan, R. R. junc., Tazewell co., Ill., 157 m. S. W. of Chicago. Pop. 1880, 1340.

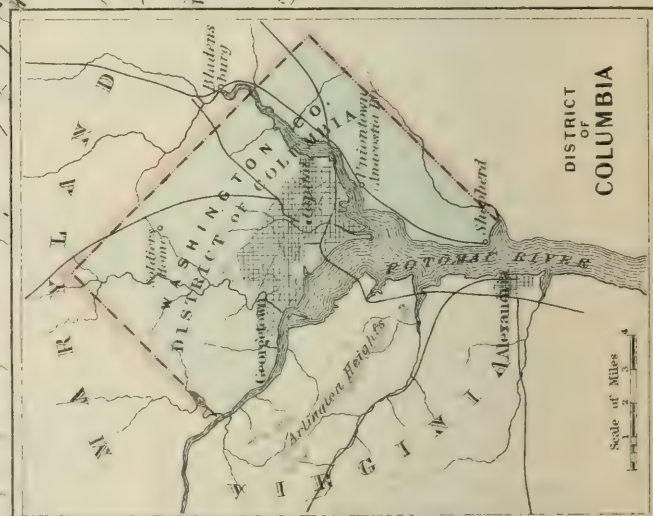
DeLavan, Walworth co., Wis., on R. R. and Turtle Creek, 58 m. S. W. of Milwaukee. It has the State inst. for the deaf and dumb. Pop. 1870, 1688; 1880, 1798.



**DELAWARE
AND
MARYLAND**

Drawn and Engraved on Copper Plate
EXPRESSLY
FOR

JOHNSON'S CYCLOPEDIA



Scale of Miles
1 2 3 4

Delaware, one of the Middle Atlantic States and one of the original 13. It is situated between 38° 28' and 39° 50' N. lat. and 75° and 75° 46' W. lon. It is 96 m. long from N. to S., and from 9 to 37 m. wide. Bounded on the N. and N. W. by Pa., E. by Del. River and Bay and the Atlantic, S. and W. by Md. Area, 2050 sq. m., or 1,312,000 acres.



Delaware Seal.

Topography.—The peninsula bounded by Chesapeake and Del. bays and the Atlantic, of which D. forms the N. E. portion, is generally nearly level, and, except on Del. River and Bay, sandy. There are no mts., but some rolling land with hills and valleys in the N.; but below New Castle a sandy and somewhat marshy ridge only relieves the eye from gazing on a dead level. This ridge is nowhere above 70 ft. in height, runs near the W. boundary of D., and forms the backbone of the peninsula. The affluents of the Del. River in the E., and of the 5 or 6 streams falling into Chesapeake Bay, all have their sources in this low ridge. There are 3 shallow bays or sounds, landlocked by spits of sand, below Cape Henlopen—viz. Rehoboth Bay, Indian River Bay, and the N. portion of St. Martin's Bay. Most of the larger streams and bays are navigable for vessels of light draught, but only the Del. River and Bay and Christiana Creek are navigable for large ships and steamers. Rehoboth Bay admits vessels drawing 6 ft. of water. Del. Bay is a fine body of water, with a deep though tortuous channel, having from 35 to 75 ft. of water; but along the Del. shore it is at most points much silted up, and its banks are marshy and low. The only good harbors in the State are those of Wilmington on Christiana Creek, New Castle, and Lewes, just inside of the Breakwater.

Minerals.—Bog-iron ore, found in all the swamps, shell marl, in the greensand region, and kaolin or porcelain clay are abundant.

Zoology.—There are few wild animals in the State, but no lack of formidable reptiles in the swamps. The shores of Del. Bay are frequented by immense flocks of ducks and teal as well as by wild geese; the other birds of the State are those common to the Middle Atlantic States.

Soil and Vegetation.—In the swamps there are extensive forests of cypress and other evergreen trees and shrubs of a semi-tropical character, as well as bog oak, hackmatack, etc. Elsewhere in the State there are no extensive forests, the land being almost wholly under cultivation. The soil for 8 or 10 m. inward from Del. Bay is for the most part a rich clayey loam, but W. of this it is sandy, and requires constant fertilization to yield heavy crops. The swamp lands, when reclaimed, are very rich.

The climate is mild and favorable for farming; healthy in the N. and centre; some remittent and intermittent fevers in the swampy region in the S.

Agricultural Products.—D. is eminently a fruit-growing State. Peaches, apples, and small fruits raised here are in demand in the New York and Phila. markets, and in connection with N. J. and Md. she supplies certainly $\frac{1}{10}$ of the entire demand for these products. In 1880 she reported 8749 farms, of which 6745, more than $\frac{3}{4}$, were of 50 acres or more; of the whole number 3708 (about $\frac{2}{3}$) were rented, and $\frac{3}{4}$ of these were rented for pay in kind (generally fruit). Farms occupy about $\frac{19}{100}$ of the entire area. By the census of 1880 D. produced 3,894,364 bushels of Indian corn, 1,175,272 bushels of wheat, 378,508 bushels of oats, 5953 bushels of rye, 5857 bushels of buckwheat, 49,632 tons of hay, 283,864 bushels of Irish potatoes, 195,937 bushels of sweet potatoes. Value of orchard products, \$846,692. 1,876,275 lbs. of butter were reported in census of 1880. The live stock of the State, by census of 1880, was 21,933 horses, 3931 mules and asses, 5818 working oxen, 27,284 milch cows, 20,450 other cattle, 21,967 sheep, and 48,186 swine. The peach crop varies in favorable years from 3,300,000 to 4,000,000 baskets or crates. The apples, pears, quinces and small fruits are together worth more than the peaches.

Manufactures.—D. has extensive manufactures, Wilmington being the centre of some important interests; the prin. are iron, mostly rolled; flour and meal, morocco and leather; shipbuilding, iron and wood; machinery, car-wheels etc.; R. R. and horse cars; cotton goods, paper, powder and chemicals, carriages and wagons; canned provisions, vegetables, and fruits; tobacco, cigars, cigarettes, and snuff; woollen goods, boots, shoes, and findings. By the census of 1880 there were 746 manufactories; total product, \$20,514,438.

Railroads.—There were in 1881 about 290 m. of R. Rs. in operation in D. These R. Rs. penetrate each co., and are of great local advantage. Trunk roads to Baltimore, Wash., and the S. pass through N. part of State.

Finances.—State debt, 1880—State proper, \$880,750; co., \$44,000; school dist., \$4222; city and town, \$1,417,613; total, \$2,346,585; assessed valuation in 1880—real estate, \$50,302,739;

personal, \$9,648,904; both, \$59,951,643; true valuation, \$103,759,295; assessed valuation of Wilmington, \$23,300,000. The State annual revenue, as well as that of Wilmington, exceeds the expenditure. Taxation—State, none; local, \$604,257.

Commerce.—Though the foreign commerce of D. is conducted mostly through Phila. and Baltimore, yet the Del. dist., of which Wilmington was the port, had \$270,309 of exports and \$7773 imports in 1880. Wilmington had in 1880 a line of steamers plying regularly to New York, and steam and sailing vessels of lighter draught ran to various ports in the State. D. had 182 vessels of all sorts registered, enrolled, and licensed in 1880, with a tonnage of 16,287.

Banks, Etc.—D. had, in Nov. 1881, 14 national banks in operation, with a cap. of \$1,743,985, and \$1,804,200 U. S. bonds on deposit; the outstanding circulation was \$1,580,500. There were also in 1881 8 State banks, savings banks, and private banking-houses, having an aggregate cap. of \$675,689; deposits, \$2,127,426, of which \$20,000 were invested in U. S. bonds. There were also 4 fire insurance cos. and 1 mutual life insurance co. in the State, none of them large.

Newspapers and Libraries.—There are 26 newspapers in the State—5 daily, 20 weekly; 1 monthly; total circulation per issue, 18,625. There are also 18 public libraries, having an aggregate of 50,000 vols.

Churches and Education.—The number of chs. of all denominations is about 900; the Meths. (Epis. and Prot.) lead, and are followed in their order by Presbs., Episcopalians, Baps., R. Caths., Friends, Lutherans, and 5 or 6 minor denominations. D. has 35,649 children of school age (31,849 white and 3800 colored), of whom 26,672 are enrolled in the schools; number of schools, 460 (404 white, 56 colored); average duration of schools, 7½ months; value of school property, about \$550,000. There are 402 teachers (233 men, 169 women) for the white schools; total receipts for these schools, \$216,540; total expenditure, \$221,731. The city schools of Wilmington are excellent. There is normal instruction, but no distinct normal school; 10 teachers' insts. held. One State coll. at Newark, with scientific and normal dept. and 37 students; a female coll. at Wilmington, with 86 students; no professional schools; 13 acads., sems., or high schools; no insts. for special instruction.

Population.—In 1790, 59,084; in 1830, 75,748; in 1870, 125,015, of whom 102,221 were whites, 22,794 colored; in 1880, 146,608 (white 120,160, colored 26,448, including 1 Chl. and 5 Indians).

Principal Towns and Pop. 1880.—Wilmington, largest city, 42,478; Dover (cap.), 2811; New Castle, 3700, and Smyrna, 2423. North Milford, Seaford, Lewes, Delaware City, S. Milford, Georgetown, and Newark are important towns.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Kent.....	3-H	99,804	328,74	Dover.....	2,811
New Castle.....	2-H	63,513	77,716	Wilmington.....	42,478
Sussex.....	4-H	51,696	26,015	Georgetown.....	995
Total.....		125,015	146,608		

Government.—Gov. elected for 4 yrs., senate (9 members) for 4 yrs., house of reps. for 2 yrs. There are the usual courts; punishment of minor offences, public whipping.

History.—Named from the bay and river; first settlement by Dut. under De Vries, 1630, near Lewes; colony destroyed by Indians. In 1637 Swedes and Finns bought the land from Cape Henlopen to Christiana Creek, and built a ft. at the mouth of the creek, calling the country New Sweden; the Dut. at New Amsterdam built a ft. at New Castle, 5 m. below; after some difficulties the Dut. captured New Sweden in 1655, and expelled those who would not swear allegiance to Hol. In 1664 when the New Netherlands were conquered by the Eng. the duke of York claimed D. as belonging to him; Lord Baltimore also claimed it; William Penn purchased it in 1685, and it was called "the territories," and regarded as a part of Pa. for 20 yrs. In 1703 it had a distinct legislature, but until 1776 was under the Pa. gov., and the Penn family were proprietaries. Became independent in 1776, and in the Revolutionary war, as in previous wars, the "Blue Hen's chickens" (so called from their flag) were as brave and efficient soldiers as any. Const. adopted Sept. 20, 1776, and a second in 1792; ratified the Const. of the U. S. Dec. 7, 1787. The State has been quiet but prosperous; it has lacked in enterprise and in educational development. It held a few slaves till the c. war, and though it sent about 10,000 men into the army in the war, there was a large minority who then and since did not sympathize with the U.; but better counsels now prevail, and a better feeling is manifested.

Governors of the State.—From 1776 to 1787, 2 gov. of Pa., John Dickinson and Thomas McKean, were presidents of D., but in 1789 the first gov. of D. was elected, and the succession has since been:

Joshua Clayton.....	1789-96	Caleb P. Bennett.....	1833-37
Gunning Bedford.....	1796-97	Cornelius P. Comerghs.....	1837-40
Daniel Rogers.....	1797-98	William B. Cooper.....	1840-44
Richard Bassett.....	1798-1801	Thomas Stockton.....	1844-46
James Sykes (acting).....	1801-02	Joseph Maul (acting).....	1846
David Hall.....	1802-05	William Temple.....	1846
Nathaniel Mitchell.....	1805-08	William Thorp.....	1846-51
George Truett.....	1808-11	William H. Ross.....	1851-55
Joseph Haslett.....	1811-14	Peter F. Cansey.....	1855-59
Daniel Rodney.....	1814-17	William Burton.....	1859-63
John Clarke.....	1817-20	William Cannon.....	1863-65
Jacob Stout (acting).....	1820-21	Gove Saulsbury.....	1865-69
John Collins.....	1821-22	James Ponder.....	1869-75
Caleb Rodney (acting).....	1822-23	John P. Cochran.....	1875-79
Joseph Haslett.....	1823-24	John W. Hall.....	1879-83
Samuel Paynter.....	1824-27	Charles C. Stockley.....	1883-87
George Poindexter.....	1827-30		
David Hazzard.....	1830-33		

L. P. BROCKETT.

*Refer to description of counties. See map of Delaware.

Delaware, a city and R. R. centre, cap. of Delaware co., O., on the Olentangy River, 24 m. N. of Columbus. It is the seat of O. Wesleyan Univ. and O. Wesleyan Female Coll. There are valuable medicinal springs in D. and vicinity. Pop. 1870, 5641; 1880, 6894.

Delaware, or, more correctly, **Delawarr** (THOMAS WEST), Lord, the twelfth baron of that title, the second gov. and first capt.-gen. of Va., was a descendant by the female line of an old and noble family, which derived its name, according to some authorities, from an estate called La Warre (or Warwick) in Gloucestershire, Eng. He took his title in 1602. He was named capt.-gen. of Va. (which comprehended nearly all the present E. coast of the U. S.) in a charter dated May 23, 1609. He visited the colony in 1610, and returned in the following yr. to Eng. He expended large sums of money in establishing the colony of Va. D. at sea, "not without suspicion of poison," June 7, 1618, while on his second voyage to Amer.

Delaware Bay, a wide estuary between the mouth of the Del. River and the Atlantic, separating the State of Del. from the S. part of N. J. The entrance between Capes May and Henlopen is 13 m. wide; the greatest breadth of the bay is about 25 m. A safe and capacious harbor has been formed in this bay by the construction of a breakwater.

Delaware River, a river of the E. U. S. (named in honor of Lord Delawarr, second gov. of Va.), rising in N. Y., formed by 3 tributaries—the Coquago, Popacton, and Little Del.—which unite near Hancock, on the line of N. Y. and Pa. It flows S. E. to Port Jervis, at the N. extremity of N. J., receiving several large affluents. Below this point it forms the boundary between Pa. and N. J. and flows S. W. to Del. Water Gap, where it passes through a gorge in the Kittatinny Mt.; thence S. to N. extremity of Bucks co., Pa., thence S. E. to Trenton, where it meets tide-water. From Bordentown its course is S. W. to Del. Bay, 40 m. below Phila. Length, 300 m.; navigable for steamers to Trenton, and for largest ships to Phila., where it is 1 m. wide. Connected with the Hudson River by Morris and Del. and Hudson canals. D. R. abounds in fish; large numbers of shad caught in its lower waters.

Delaware Water Gap, in Pa., on the Del. River, where it passes through the Kittatinny Mt., and on the Del. Lackawanna and W. R. R., 108 m. N. of Phila. and 92 m. W. of New York. The river here flows through a narrow gorge between steep rocky banks, which rise nearly 1200 ft. above the water.

Delescluze, d'la-klüz' (LOUIS CHARLES), a Fr. politician, b. Oct. 2, 1809, took part in 1830 in the republican movement; in 1857 was deported to Cayenne. During the reign of the Commune he was at the head of the war commission with almost unlimited powers. His fall, May 28, 1871, on the barricade in the Rue d'Angoulême, ended the resistance of the Commune to the troops of the gov't.

Delft, a town of the Netherlands on the R. R. from Rotterdam to the Hague, 4 m. S. E. of the latter. It has a richly adorned town-hall, and a Gothic ch. containing a monument to William prince of Orange, who was assassinated here in 1584. D. was formerly noted for glazed earthenware, which was called delft-ware. Pop. 26,028.

Delhi, del'lee [Sans. *Indraprastha*], a city of Hindostan, called by the Mohammedans **Shahjehanabad**, on the Jumna, about 790 m. N. W. of Calcutta, was formerly the cap. of the Mogul empire, and the largest city of Hindostan, having a pop. of 2,000,000. The modern city, founded by Shah Jehan 1631, is 7 m. in circumference, surrounded by a wall 30 ft. high, with 7 colossal arched gates, defended by round bulwarks. The palace, built by Shah Jehan, is the most magnificent in India. There are about 40 mosques, among which is the Jamma mosque, built in the Byzantine style, of white marble and red sandstone. D. Coll., founded in 1792, has a separate dept. for the Ar., Per., Sans., and Eng. langs. D. has been frequently captured. It was taken by the Brit. in 1803, since which it has been held by them. In May 1857 it was occupied by Sepoy mutineers; was besieged by the Brit. in June, and taken in Sept. Pop. 160,553.

Delhi, Ia. See APPENDIX.

Delhi, cap. of Del. co., N. Y., on R. R. and the N. bank of the Del. River (W. branch). It has an acad. Pop. 1870, 1223; 1880, 1384.

Delirium Tremens (i. e. "trembling delirium"), a morbid affection caused by the action of alcoholic drinks. Delirium, trembling and subsultus of the muscles and tendons, wakefulness, and rapid pulse are characteristic symptoms. The patient sometimes suffers extremely from the most frightful apprehensions, and frequently thinks he sees grotesque and horrible objects. Death occurs in about one sixth of the cases. The mortality appears to have been formerly much greater than at present. The treatment is various. Sleep may be induced by the use of chloral or bromide of potassium, and in long continued cases opiates may be cautiously administered with the happiest results. The strength should be kept up by beef-tea, milk, raw eggs, etc. Cinchona bark or quinine should be given as a tonic, and chloral, bromides, and valerian to secure sleep and allay excitement.

Delisle, deh-lêl' (GUILLAUME), a Fr. geog., b. in Paris Feb. 28, 1675. He reformed the system of geog., and pub. in 1700 a map of the world and celestial and terrestrial globes. D. Jan. 25, 1726.—His brother, JOSEPH NICHOLAS DELISLE (b. Apr. 4, 1688), founded a school of astron. at St. Petersburg. In D.'s thermometer, used in Rus., the boiling-point of water is zero and the freezing-point is 150°. D. Sept. 11, 1768.

Delitzsch, dā'ilsh (FRANZ), a Ger. theol., was b. at Leipzig Feb. 23, 1813, of Jewish parents, and was ed. at Leipzig. In 1846 became prof. of theol. at Rostock, in 1850 at Erlangen, and in 1867 at Leipzig; master of biblical exegesis and Jewish lit. Wrote valuable commentaries, etc.

Del Rapids, Dak. See APPENDIX.

Del Norte, city, on R. R., cap. of Rio Grande co., Col., on the right bank of the Rio Grande, 280 m. by R. R. S. W.

of Denver. It is a depot of supplies, being situated on the dividing-line between the San Luis Valley and the San Juan mines. Pop. 1880, 729.

De Long (G. W.). See APPENDIX.

De'los [Gr. *Δῆλος*], also called **Orty'gia**, a small rocky island in the Egean Sea, one of the Cyclades. According to anc. legend it was originally a floating island, but was made fast by Jupiter as a refuge for Latona, the mother of Apollo and Diana, who were b. upon it. D. became one of the holy places of Gr., sacred to Apollo, who had here a famous temple and oracle. In 477 b. c. it was made the place of the common treas. of the Gr. states leagued against Per. In 426 it was "purified" by the Athenians, who removed the tombs and ordained that thenceforth no birth or death should take place on the island. After the destruction of Corinth, 146 b. c., D. became the centre of an extensive commerce, having a large town of the same name, now only a mass of ruins. Area, 32 sq. m., and now uninhabited.

Del'phi [Gr. *Δελφοί*], a town of Phocis, in Gr., in a narrow valley at the S. base of Mt. Parnassus, the site of the oracle of Apollo, the most famous in the anc. world. The original name of the oracle was *Pytho*; the responses were delivered by a female styled the *Pythiess* (Gr. *Πυθία*), who sat upon a tripod over the mouth of a cave from which exhaled an intoxicating vapor which was believed to inspire her with prophetic powers. At the foot of Parnassus was the sacred fountain of Castalia, which supplied water for the temple of Apollo, one of the finest in Gr. In the 8th century b. c. this oracle had become famous not only in Gr. but in other nations. The Pythian games were celebrated here every 4th yr., the earliest being 586 b. c. In 480 b. c. Xerxes sent an army to plunder the temple, but according to legend the Pers. were driven back in terror by a shout from the shrine and by the fall of 2 huge crags from the mt.-side. In 337 b. c. the Phocians seized the temple, and thus gave occasion to the "Sacred War." In 279 b. c. the Gauls attempted to plunder the temple, but are said to have been repelled supernaturally, as the Pers. had been. The Delphic oracle was suppressed by the Rom. emp. Theodosius. The site of D. is occupied by little v. of Castril. Pop. about 600.

Delphi, city and R. R. junc., cap. of Carroll co., Ind., on the Wabash River. It has excellent water-power. The Wabash and Erie Canal passes through it. Pop. 1870, 1614; 1880, 2040.

Dolphin'idae, a family of toothed cetaceans, with the temporal fosse uncovered above the frontals, visible above only along the elongated hook-shaped borders, produced backward around the maxillaries, and the costal cartilages ossified. The species are numerous, and chiefly known as porpoises. They live in communities.

Dolphin'us [the Lat. term for dolphin], the name of one of the constellations of the N. hemisphere.

Del'phos, R. R. junc., Allen and Van Wert cos., O., on the Miami Extension Canal, 45 m. E. of Fort Wayne. It has good water-power. Pop. 1870, 1667; 1880, 3814.

Del'ta [so named from their resemblance in form to the letter Δ of the Gr. alphabet], the triangular expanses of alluvial deposit formed at the mouths of certain rivers, as of the Mississippi, Nile, and Ganges. The D. of the Ganges is the largest; it is estimated that its head commences 220 m. from the sea, and its base-line is about 200 m.

Deluc, deh-look' (JEAN ANDRÉ), F. R. S., a Swiss geologist and natural philos., b. at Geneva Feb. 8, 1727. He invented a portable barometer, and pub. in 1772 *Researches on the Modifications of the Atmosphere*. Soon after that date he removed to Eng., was chosen F. R. S., and became reader to the queen. Wrote *Letters, Phys. and Moral*, on the *Hist. of the Earth and Man*, in which he defended the cosmogony of the Bible, and ascribed the formation of the present continents to a great and violent revolution which occurred about 4500 yrs. ago. He became a prof. in Göttingen in 1798, but subsequently returned to Eng. D. Nov. 8, 1817.

Del'uge [Lat. *diluvium*, from *dis* (for *dis*), "apart," and *luo*, to "wash"], an inundation or overflow of land by water, a term especially applied to the flood in the time of Noah. Traditions of the Flood occur in many countries. Among these is the Chaldean account preserved in a fragment of Berossus, and somewhat resembling that given in the Bible. In 1872 George Smith translated from the cuneiform inscriptions a remarkable account of the Flood, corresponding in many particulars with those of Moses and Berossus.

Dema'des [Gr. *Δημάδης*], an Athenian orator and demagogue, who was a violent opponent of Demosthenes. He fought against Philip of Macedon at Chæronea, 338 b. c., but afterward took a bribe from that king. He was put to death by order of Antipater (or Cassander) in 318 b. c.

Dem'bea, or **Tzana**, a lake of Abyssinia, 40 m. long, with an average width of 25 m. It is 6108 ft. above the sea.

Dembinski, dem-bin'ske (HENRY), a Polish gen., b. in the palatinate of Cracow Jan. 16, 1791. He fought against Rus. in the revolution of 1830, and made a masterly retreat from Lithuania in July 1831. He was appointed commander-in-chief of the Hungarian army by Kossuth in Feb. 1849. Görgei refused to serve under him. D. soon resigned the command and fled to Tur. D. June 13, 1864.

Demeter. See CERES.

Demetri'us, an arch. who is said to have completed, in conjunction with Pæonius the Ephesian, the temple of Diana at Ephesus.

Demetri'us, probably of Alopecie in Attica, a statuary who flourished about b. c. 440. Among his productions are a statue of Lysimache, priestess of Minerva, one of Minerva *Musica*, and an equestrian statue of Simon.

Demetri'us, a silversmith of Ephesus, who made silver shrines for Diana. He excited a tumult against St. Paul among his fellow-craftsmen.

Demetri'us [Rus. *Dmitri*], czar of Rus., usually called the FALSE DEMETRIUS. He pretended to be a son of Ivan IV., who at his death in 1584 left 2 sons, Feodor and Demetrius. The latter probably died in 1591. The subject of

this article raised an army of Poles in 1603, invaded Russ., and defeated Boris in battle. He began to reign in Moscow in 1605, but his partiality to the Poles offended the Russ., who revolted and killed him May 28, 1606. He was succeeded by Basil III., or Shuisky.

Demetrius Phale'reus, an eminent Gr. orator and philos., b. at Phalerum in Attica about 345 B. C. He was a disciple of Theophrastus the philos. He was appointed gov. of Athens by Cassander in 317 B. C., and held that office 10 yrs. He was the author of many historical and philosophical works, of which only fragments are extant. D. about 284 B. C.

Demetrius Poliorcetes [Gr. Δημήτριος Πολιορκητής (i. e. "Demetrius the besieger of cities")], a king of Macedon, b. about 335 B. C., was a son of Antigonos, king of Asia. He was surnamed Poliorcetes on account of his success as a gen. In 306 B. C. he captured Athens from Cassander. He usurped the throne of Macedon in 294, but was driven out by Pyrrhus and Lysimachus. D. about 283 B. C. (See PLUTARCH, *Life of Demetrius*.)

Demetrius of Byzantium, a Peripatetic philos., a work of his is quoted, "περί ποιητῶν," or "περί ποιημάτων." Some fragments from this writer have been found in MSS. discovered at Herculaneum.

Demetrius of Su'nium, a distinguished Cynic philos., enjoyed a high reputation for correctness of life and firmness of principle. He lived at Rome under the emps. from Caligula to Domitian, and was the friend of Thraseas Patus and of Seneca. He left no writings.

Demetrius of Sc'ep'sis, a Gr. grammarian, flourished about 210 B. C. He composed an extensive work in at least 26 books, full of historical and geographical information about the places mentioned in the catalogue of ships in the second book of the *Iliad* ("Τρωϊκὸς δακρυόσπιν").

Demetrius So'ter [Gr. Δημήτριος Σωτήρ (i. e. "Demetrius the Preserver"), so called by the Babylonians because he freed them from their tyrants], b. about 185 B. C., was a son of Seleucus Philopator; became king of Syria in 161. He was defeated and killed in 150 B. C. His son, Demetrius Nicator, eventually became king of Syria.

Demetrius the [SECOND] False, another pretender to the throne of Russ., began to urge his claim in 1607, affirming that he was Demetrius, the son of Ivan IV. He was killed by a Tartar chief in 1610.

Demetrius Triclin'ius, a Gr. scholiast who flourished in the 15th century. He composed scholia on Sophocles, and 2 other works on the same poet, the one on the metres (περί μέτρων), the other on the figures (περί σχημάτων). He compiled scholia also on Hesiod, Pindar, and Aristophanes.

Demetrius Ze'nus, of Zacynthus, about 1530 A. D., translated the *Balrachomomachia* into modern Gr. in the so-called *στύχοι ποταμῶν* (popular verses). He composed a poem in the same measure on Alexander the Great.

Dem'ing (HENRY C.), b. at Middle Haddam, Conn., in 1815, grad. at Yale in 1836 and at Harvard Law School in 1838. He was an able lawyer and Dem. politician of Hartford, Conn. He held many prominent State offices. In 1861 he became col. of the 12th Conn. Volunteers, serving in La., and was mayor of New Orleans 1862-63. He was a Rep. M. C. from Conn. 1864-68. D. Oct. 9, 1872.

Dem'ing, N. Mex. See APPENDIX.

Dem'it'us, or **Dem'it'us** [from the Gr. δημιουργός, "working for the people," from δῆμος, the "people," and ἔργον, "work"], a word originally applied to an artisan or workman, afterward used by Plato, and especially by the Gnostics, to designate the Creator of the world, who was conceived to be a being inferior to the Supreme Deity.

Democrates, de-mok'ra-tēz (Δημοκράτης), a supposed Pythagorean philos., under whose name a collection of moral sayings called the *Golden Maxims* (γνώμαι χρυσαί) has come down to our time. These are written in the Ionic dialect, and are simple and correct.

Democratic Party. See PARTIES, POLITICAL, OF U. S.

Democ'ritus [Gr. Δημόκριτος], a celebrated Gr. philos., b. at Abdera, in Thrace, about 460, or, some say, 469 B. C. He inherited, it is said, from his father, a large fortune, most of which he spent in his travels in pursuit of knowledge in Egypt, Gr., Per., and India. Having returned to Abdera, he declined political honors and employment, preferring to pass his life in study and retirement. He had a high reputation for virtue as well as learning. He appears to have been versed in geom., physics, nat. hist., and ethics, on which subjects he wrote numerous works, but none of them are now extant. According to the later biographers he was called the "laughing philosopher," from his habit of laughing at the follies of mankind. D. 357 B. C.

Demod'ocus (Δημόδοκος), the celebrated bard of the Phaeacians, who is represented in the *Odyssey* as singing at the banquet of Alcinoos the battles and the fate of the Grs. who went to Troy.

Demogor'on [from the Gr. δαίμων], a "divinity," and γοργός, "terrible"), a mysterious being alluded to by some later classical writers, and by Spenser, Milton, Shelley, and others. The anc. dreded the mention of his name.

De'mon, or **Da'mon** [Gr. δαίμων or δαιμόνιον; Lat. *dæmon*], a term of Gr. origin, used in classical writers primarily for the Supreme Divinity, sometimes as a synonym for θεός, a "god," and later more especially as a tutelary or guardian divinity which was supposed to attend upon men. Thus, Socrates is commonly said to have been attended by a beneficent D. The Neo-Platonists divided the D. into good and bad. In time the word came to be almost always used in a bad sense. In the N. T. evil spirits are often called D. (δαίμονια, commonly translated "devils"), and Beelzebub is spoken of as the prince of D.

De'mon (Δῆμος), a Gr. writer, author of an *Atthis*, or *Hist. of Attica*, flourished about 280 B. C. He was also the author, according to Schneidewin, of a work on proverbs. Of both these works some fragments still exist.

Demo'nax (Δημόναξ), a celebrated Cynic philos., who

lived and taught at Athens in the 2d century A. D. Though a native of Cyprus, he passed most of his life in Athens. **Demonstration** [Lat. *de*, "from," *monstro*, to "show"], a course of logical reasoning brought to a conclusion. In a *direct* D. the premises are known or assumed truths, and the conclusion is necessarily true. In an *indirect* D. an hypothesis is assumed such that either *it or its contradictory* must be true; if the conclusion agrees with a known truth, the hypothesis must be true; if it disagrees with a known truth, the contradictory of the hypothesis must be true.

Demoph'ilus (Δημόφίλος), a philos. of the new Pythagorean school, whose age is not certainly known. He was the author of a work entitled *βίον θεραπεία*, from which there is still extant a collection of moral precepts entitled *γνώμικα δόγματα*.

Demoph'oön, or **Dem'o'phon** (Δημόφωον, or Δημόφων), in Gr. mythology, a king of Athens, son of Theseus and Phædra, who is said to have accompanied the Grs. on their expedition against Troy.

Demopolis, Ala. See APPENDIX.

De Mor'gan (Augustus), an Eng. math., b. June 1806, was prof. of math. in Univ. Coll., Lond., and pub. many valuable works. D. Mar. 18, 1871.

De'mos [Gr. δῆμος, the "people"], the name given to the smaller divisions of the Attic tribes (somewhat similar to the tps. into which cos. are divided), the number of which was 173 or 174. The demes were local divisions, in the registers of which the citizens had to enroll their names for political and other purposes. They had each its own presiding officer (δημαρχος), treas., and other officers, and its own assembly, in which the business of the deme was transacted.

Demos'thenes [Gr. Δημοσθένης], the most eminent orator of antiquity, and probably the greatest of whom hist. gives any account, b. in Attica, in the demes of Pæania, near Athens, about 382, or, according to some, in 385 B. C. His father (also named Demosthenes) was a cutter and maker of furniture. He d. when his son was 7 yrs. of age. D. studied rhetoric with Isæus, and philos., according to some authorities, with Plato. It is said that he had resolved to devote his whole attention to oratory, from witnessing the forensic triumphs of Callistratus. But his health was feeble, his manners ungraceful, his breath short, and voice stammering and indistinct. To remedy these defects we are told that he adopted the practice of speaking with pebbles in his mouth; that he was wont to declaim upon the seashore, so as to be able to be heard in the tumult of popular assemblies; and that he often practised before a mirror, so as to observe and rectify any awkwardness of gesture. Nevertheless, his first appearance before a popular assembly was, according to Plutarch, a failure, exciting only the laughter of the multitude. But encouraged by Satyrus, an actor, who gave him useful instruction, he devoted himself with the utmost diligence to his task. In 355 he delivered his oration against Leptines, with complete success. Soon after this he entered upon his great though unsuccessful life-work, the defence of Gr. liberty against the designs of Philip of Macedon. Between the yrs. 352 and 340 he pron. 11 or perhaps 12 orations against Philip. Four of these are especially denominated "Philippics." In 338 he took part in the disastrous battle of Cheronea. D. was accused (probably unjustly) of having received a bribe from the Macedonians, and was sentenced to pay a heavy fine, and left the country. He returned after the death of Alexander, but having been condemned to death by Antipater, he took poison and d. 322 B. C.

The success of his oratory was due in a very great degree to the steadfastness with which he kept the attention of his hearers riveted on the one great object in view. "Such was the first of orators," says Lord Brougham; "at the head of all the mighty masters of speech, the adoration of ages has consecrated his place, and the loss of the noble instrument [the Gr. lang.] with which he forged and launched his thunders is sure to maintain it unapproachable forever." (See BROUGHAM, *Dissertation on the Eloquence of the Ancs.*) [From *orig. art. in J. S. L. L. C. by PROF. J. THOMAS, LL. D.*]

Demotic Characters. See ENCHIRIAL WRITING.

Demp'ster (JOHN), D. D., a Meth. preacher, b. at Fla., N. Y., Jan. 2, 1794, was the son of the Rev. James Dempster, a Scot. Presb., who had been a Wesleyan preacher. The younger D. entered the itinerant ministry in 1816, and became a master of pulpit oratory. From 1836 to 1841 he was a missionary in Buenos Ayres. From 1845 to 1863 he was a prof. in the biblical insts. at Newbury, Vt., Concord, N. H., and Evanston, Ill. D. Nov. 28, 1863. (See STEVENS, *Hist. of the M. E. Ch.*, vol. iii.)

Dena'rius [a Lat. term, from *deni*, "ten"], a Rom. silver coin, originally equal to 10 asses, first coined 269 B. C. Its weight varied at different periods, and its value was afterward equal to 16 asses, or about 8d. Eng. money.

Den'derah (anc. *Tentyra*, probably taken from *Tei n Athor*, "abode of Athor"), a town of Upper Egypt, near the left bank of the Nile. Here are the ruins of a temple, one of the most imposing of the anc. monuments of Egypt. It is 220 ft. long, and has a portico supported by 24 columns covered with carved figures and hieroglyphics.

Den'drite [perhaps a corruption of *dendrolite*, from the Gr. δένδρον, a "tree," and λίθος, a "stone"], the name of a peculiar mineral, containing internally or having its surface covered with filamentary forms resembling moss, ferns, trees, etc. Moss agate and Mocha stone are examples.

Den'drolites [from the Gr. δένδρον, a "tree," and λίθος, a "stone"], the name given to petrifications found in secondary and coal formations. They consist of plants and fragments of trees, having, generally, nothing in common with those now growing in the same regions. They are mostly cycads, tree-ferns, conifers, etc.

Denham, den'am (Sir JOHN), an Eng. poet, b. in Dublin in 1615. He grad. at Trinity Coll., Cambridge, in 1634, and studied law. He wrote *Sophy*, a tragedy, and a poem entitled *Cooper's Hill*. He was a royalist in the c. war, and fled

to Fr. in 1648, but returned in 1652. D. Mar. 10, 1668. "Denham," says Dr. Johnson, "is deservedly considered as one of the fathers of Eng. poetry."

Denio (Hiram), a jurist, b. in Rome, N. Y., May 21, 1799, began the practice of law in 1821; was circuit judge 1834-38, judge of the court of appeals 1853-66. D. Nov. 5, 1871.

Denis, deh-né', SAINT [Lat. *Dionysius*], patron saint of Fr. and first bp. of Paris. According to Gregory of Tours (540-544 A. D.), he was one of 7 missionaries sent from Rome about 250 A. D. to preach the gospel to the Gauls, and after converting great multitudes suffered martyrdom, probably in 272, under Valerian. His festival is on Oct. 9.

Denison, cap. of Crawford co., Ia., on R. R., 64 m. N. N. E. of Council Bluffs. Pop. 1870, 326; 1880, 1441.

Denison (Rev. Charles Wheeler), b. in New London co., Conn., in 1809, has been a large contributor to periodical lit., and has pub. a vol. of poems, several works of fiction, etc. He was an early abolitionist and temperance writer, and editorially connected with the *Emancipator* and the *Free Branch*. He has resided in Eng., and was an ed. in Lond. He has been U. S. consul in Brit. Guiana, and wrote a popular life of Gen. U. S. Grant.

Denison (John Evelyn), LORD OSSINGTON, an Eng. statesman, b. in 1800, was elected an M. P. in 1823, and acted with the Liberal party. He was chosen speaker of the House of Commons in 1857, in 1859, in 1866, and in 1868, and became Viscount Ossington in 1872. D. Mar. 8, 1873.

Denison City, R. R. junc., Grayson co., Tex., 275 m. S. of Parsons City, Kan. Pop. 1880, 3975.

Denison University, formerly GRANVILLE COLLEGE, at Granville, Licking co., O., was established and located at Granville by a vote of the O. Bap. Education Society, May 1831. It was at first intended for a manual-labor school, and hence located on a 200-acre farm, $\frac{1}{2}$ m. W. of the town. As a manual-labor school it was, like most others of the time, a failure; as a school of instruction, a success. It was incorporated by the O. legislature Feb. 3, 1832, under the name of the "Granville Literary and Theological Inst." The name was changed in 1845 to "Granville Coll.," and this again under the gen. law of O. was changed, June 1856, to the name it now bears. Instruction was commenced in Dec. 1831, the prin. and sole teacher being Prof. John Pratt. The univ. has been removed from the farm, and in Sept. 1856 instruction was begun on the new site. The buildings are situated on a hill N. of the town, less than $\frac{1}{2}$ m. from the public square. The univ. is a proper coll., furnishing the regular 4 yrs.' course in classical, scientific, and philosophical studies, similar to the best Amer. colls., embracing also, under the same govt., a preparatory dept., classical, with a 2 yrs.' course as a feeder to the regular course, and Eng., to fit for business, school-teaching, or the scientific course.

Denman (Thomas), FIRST LORD DENMAN, an Eng. judge, b. in Lond. Feb. 23, 1779. He was called to the bar in 1806. He became atty.-gen. in 1830 and chief-justice of the king's bench in 1832. D. Sept. 22, 1854.

Denmark, a kingdom of N. Europe, consisting of the peninsula of Jutland, the adjacent islands of Seeland, Fünen, Falster, Lalaand, Samsøe, Bornholm, Langeland, and Møen, in the Baltic Sea, and the Færoe Islands. It is situated between 54° 34' and 57° 44' N. lat. and 8° 5' and 12° 40' E. lon.; area, 14,753 sq. m. To D. also belong, as colonies or appanages of the crown, Greenland, Iceland, and the islands of Santa Cruz (St. Croix), St. Thomas, and St. John, in the W. I.; area of these estimated at 87,258 sq. m. The area of D. proper was formerly 23,742 sq. m., the duchies of Schleswig and Holstein having formed a part of it till Oct. 1864.

Surface, Soil, Etc.—D. is really a congeries of islands, the peninsula being interlaced with bays or fiords, and extensive marshes extending between these. There is no considerable river, either on the peninsula or islands; Himmelberg, interior of Jutland, is the only considerable elevation, 565 ft. high. The soil is sandy, but yields good crops with the use of fertilizers. Much of it was formerly covered with forests of beech, birch, oak, etc. On the coasts of Jutland there are low sand-hillocks or dunes, rising 2 or 3 ft., and looking like windrows of hay at a little distance.

Climate humid; winters generally mild; annual mean temperature, about 46° F.; the W. wind prevails in spring and summer.

Industries.—Nearly $\frac{1}{2}$ of the pop. live exclusively by agriculture, most of the land being divided into small holdings, which are carefully cultivated. The marshes afford excellent pasture, and much live stock—cattle, horses, swine, and sheep—is raised. The chief farm products are wheat, rye, oats, barley, buckwheat, beans, peas, potatoes, flax, butter, and cheese. The cereal and root crops of 1880 were valued at \$91,588,000. The fiords abound in salmon, cod, herring, and other fish.

Manufactures.—Sugar from beets, refining sugar from the W. I. colonies, iron wares, paper, distilled spirits, linen goods, and woollen stuffs.

The **exports** are cereal grains, flour, potatoes, butter, bacon and hams, hides and skins, corn meal and linseed oil-cake, horses and cattle; the **imports**, manufactured goods (woolens, silks, and cottons), iron, hardware, wine, fruit, tea, and the products of its colonies.

Commerce and Finances.—D. has a mercantile marine of 3218 vessels, tonnage 255,539. Its imports average about \$63,000,000, including the products of its own colonies; its exports, about \$50,000,000. Of these imports, about \$23,500,000 are from Ger., \$15,000,000 from G. Brit., \$7,113,667 (in 1881) from U. S. The exports are about \$15,000,000 to Ger., \$17,500,000 to G. Brit., and \$866,408 (in 1881) to U. S.

Finances.—Public debt in 1880, \$48,150,000; revenue, 1880, \$13,200,000; expenditure, \$12,250,000.

Religion and Education.—Established religion, Lutheran; 99 per cent. of pop. adherents to it; other sects tolerated; 7 Lutheran bps.; no political power, but supervision over clergy and chs. Elementary education compulsory and gen., gratuitous to the poor; 2940 parochial schools, many

middle schools, 13 gymnasia or colls., 1 univ. at Copenhagen. D. sent 6576 emigrants to U. S. in 1880, nearly $\frac{1}{2}$ of them Mormons.

History and Government.—Hereditary constitutional monarchy; const. granted 1849; previously absolute monarchy; executive power vested in king, legislative in king and Rigsdag (diet) jointly; Rigsdag composed of 2 houses—Landsting (nobles) and Folkething (commons)—of about 100 members, elected by universal suffrage for 3 yrs. Army on war-footing, 47,500; navy, 28 steamers, 8 iron-clads. D. one of the 3 Scandinavian kingdoms; its people, as Northmen or Normans, addicted to piracy; Danes invaded Eng. in 9th century, and Canute or Knut conquered it in 1016; Margaret, Queen of D. and Norway, conquered Swe. in 1388, and by the Union of Calmar (1397) the 3 kingdoms were united under one ruler; Union broken in 1411; Christian I., count of Oldenberg, elected king in 1448, and that house have ruled ever since; monarchy elective till 1660; absolute and hereditary, 1660 to 1849; D. an ally of Nap., involved in war with Eng. and Rus.; Copenhagen bombarded Sept. 1807; D. ceded Nor. to Swe. in 1814; law of succession of D. proper extended to Schleswig-Holstein by "Open Letter" of Christian VIII. in 1846; Schleswig incorporated with D. 1848; war followed 1848-51, ended by intervention of Aus. and Prus., and indivisibility of D. declared 1850; D. gained a liberal const. in 1849, but the duchies (Schleswig-Holstein) not benefited by it; difficulties on this subject followed by war in 1864, and D. compelled to renounce all claim to the duchies, though she had, in 1863, accepted a Schleswig-Holstein prince as successor to Frederick VII.; the attempted sale of the W. I. islands of St. Thomas and St. John to U. S. in 1867 failed of effect, the Senate not ratifying the treaty.

Population and Chief Towns.—Pop. 1880, 1,969,039, of which 11,400 are in the Færoe Isles; in the colonies, about 130,000. Copenhagen (Kjöbenhavn), the cap., on the island of Seeland, pop. 234,850; Odense (in Fünen), 20,804; Aalborg (Jutland), 14,152; Viborg (Jutland), 9000. L. P. BROCKETT.

Denison (William), a statesman, b. in Chn., O., Nov. 23, 1815, grad. at Miami Univ. in 1835; became a lawyer, a railroad and bank pres.; was gov. of O. 1860-62, and P. M.-gen. 1864-66. D. June 15, 1882.

Density of the Earth. The mean D. of the E. is the number of times that the entire mass of the earth contains the mass of an equal volume of water. The mass of the earth is found by comparing the attraction which it exerts with that exerted by a body of known mass, the comparison being made in accordance with the Newtonian law. In Dr. Maskelyne's method, the attraction of the earth is compared with that of a mt. by means of the deviation of a plumb-line from the true vertical. In the Cavendish method, the attraction of the earth is compared with that of a leaden ball, the former being measured by the common pendulum, and the latter by a species of horizontal pendulum called a *torsion balance*. In Airy's method, the attraction of the entire earth is compared with that of a superficial shell of the same (1260 ft. thick), the former being measured by the common pendulum at the surface, and the latter being inferred from a comparison of 2 such pendulums, one at the surface and the other at the bottom of a mine 1260 ft. deep. The Cavendish method was used by Baily, who from an immense number of observations found that the mean D. of the E. is equal to 5.66—i. e. the average specific gravity of the material composing the earth is about 5½, water being taken as the standard. This result is generally accepted as the most reliable of any yet obtained. W. G. PECK.

Dentaliæ [Lat. *dens*, "tooth"], a family of gasteropods with shells, of a curved, tubular shape, resembling tusks or canine teeth. There are many living and fossil species, of which the *Dentalium elephantinum* is one of the best known.

Dentex [perhaps from the Lat. *dens*, on account of their numerous teeth], a genus of acanthopterous fishes belonging to the Sparidae, resembling the perch in form, with a deep compressed body, scaly cheeks, a single dorsal fin, and numerous small teeth, with 4 large canine teeth curved inward in each jaw. The *D. vulgaris*, sometimes called the 4-toothed sparus, is found in great numbers in the Mediterranean, and sometimes on the S. coasts of G. Brit. It is of large size, often 3 ft. long, and is an important article of commerce.

Dentin, or **Dentine**. See **TEETH**.

Dentiostræ [Lat. *dens* (gen. *dentis*), a "tooth," and *rostrum*, a "beak"], a tribe of birds of the order Insessores, characterized by a notch or toothlike process on each side of the margin of the upper mandible. These birds have rapacious habits, and prey on smaller birds as well as insects. The butcher-bird is an example of this tribe.

Dentistry [from *dens*, *dentis*, a "tooth," and *rya* a suffix denoting "art," "profession"]. In every age and country the teeth have been regarded as of great importance. To what extent the Grs. or Egyptians practised dental surgery as a specialty before the Chr. era there is but little upon record. But in the Egyptian tombs artificial teeth of ivory or wood have been found, some of which were fastened upon gold plates. The only ancient writings extant which speak of D. as an art are those of Galen, who wrote in the 2d century after Chr.; and from that time till about the middle of the 16th century, when Ambrose Paré wrote his celebrated work on surgery, we find but little to improve the practice or satisfy the student



Dentalium elephanthinum.

in dental surgery. During the 18th century dental surgery became a subject of more thorough investigation, and from that period it has progressed rapidly in importance. From the more simple operations of cleansing, extracting, and filling small and superficial cavities, it has extended to a thorough and scientific treatment of the mouth, with the view not only of saving teeth but slightly decayed, but all teeth, and also of anticipating decay by proper operations. The various materials used for filling or stopping teeth are gold, tin, amalgam, chloride of zinc, and gutta-percha. The chief requirements for a filling are ability to withstand the mechanical influences of mastication, resistance to chemical agents, ease of introduction into a cavity and consolidation, and the absence of properties injurious to the structure of the tooth or to the system at large. The very best material as a permanent filling is gold; after this amalgam and tin.

From what was originally called D. have been evolved 2 widely different occupations. They may properly be termed operative D., or dental surgery, and mechanical D. The early dentists carved from ivory the teeth and plate in one piece, and if a partial set was inserted, the teeth were fastened to the adjoining natural ones by means of ligatures; if a full set was required, springs were used. Ivory and natural teeth were objectionable from their liability to be acted upon by the fluids of the mouth. Absorbing as they do these secretions, they soon become offensive, and often rapidly decay. Porcelain teeth, well named incorruptible, perfectly resist the destructive action of these fluids and as they are made nearly perfect in color and shape, they are not easily detected. An artificial tooth must possess certain qualities apart from size, shape, and color, such as a front surface which must closely resemble the enamel or external covering of the natural tooth, and a body having the toughness which allows the vigorous use of the hammer in riveting without fracture, and the use of the blowpipe in soldering without liability to crack; a proper amount of translucency must be preserved or there will be the opaque, clay-colored tooth, which proclaims its artificial character to the most casual glance. These and many other valuable results have been secured by patience of research and skill in application. The prin. materials in the composition of mineral teeth are felspar, silice (flint), and kaolin (clay), with various fluxes, more familiarly characterized as *glazes*, used to determine the point of fusion desired, of different parts of the tooth.

In fitting artificial teeth it is very important to take a good impression of the shape of the mouth. Various substances have been used for the purpose, such as wax (either pure or mixed with paraffine, gutta-percha, or other materials); gutta-percha alone or combined; plaster of Paris alone. These substances have each their merits, and the choice for any particular case is to be determined by experience. The 2 materials principally employed in making the plate upon which the teeth are fastened are gold and vulcanized rubber. The prin. advantage of the latter material is its cheapness, which is more than counterbalanced by its clumsiness, fragility, and irritating effect on the mouth. [From orig. art. in *J. S. Dent. J.*, by C. NEWLIN PIERCE, D. D. S.]

Dentition. See TEETH.

Denton, Tex. See APPENDIX.

Denudation (Lat. *denudatus*, *denudatum*, to "lay bare"), in geol. the removal of solid matter by water in motion, whether of rivers or of the waves and currents of the sea, and the consequent laying bare of some inferior rock. Deep and wide channels or *valleys of denudation* have often been excavated in rocky strata by long continued action of rivers.

Denver, city and important R. centre, cap. of Col. and of Arapahoe co., on S. Platte River, 15 m. E. of the base of the Rocky Mts., 3200 ft. above the level of the sea. It commands a view of Pike's, Long's, and other noted peaks perpetually covered with snow. The climate is peculiarly serene and healthful. The city contains a U. S. branch mint and large smelting works. Pop. 1870, 4759; 1880, 35,629.

Denver (JAMES W.), a gen., b. at Winchester, Va., in 1818; removed to Cal.; was elected M. C. in 1854, and was gov. of Kan. from Dec. 1857 to the autumn of 1858. He became a brig.-gen. of U. volunteers in 1861.

Deo'datus, or **Deus'dedit**, SAINT, pope, succeeded Boniface IV. in 615, d. Nov. 9, 618, and was succeeded by Boniface V. He is regarded as a worker of miracles.

Deodorizers. See DISINFECTANTS.

De Pauw Univ. See APPENDIX.

De Pere, a tp. of Brown co., Wis., containing the villages of De Pere, R. K. June, and Nicolet, on R. R., situated on opposite sides of the Fox River. They are connected by a bridge 1500 ft. in length, and are reached by steamers from the lakes. Pop. 1870, tp. 2800; of De Pere, 1372; 1880, tp. 817; De Pere, 1954.

De Peyster, de pister (J. WATTS), a military and historical writer, b. in New York Mar. 9, 1821. He has written biographical sketches of several anc. and modern commanders, and numerous monographs upon events in the Amer. c. war and kindred topics.

Depilatory [Lat. *deplatorius*, from *de*, priv., and *pilus*, the "hair"], a name given to applications used to remove hair from any part of the body. A thin paste of powdered quicklime and water applied to any part until a burning sensation is produced, and then wiped off with a wet sponge, will generally remove hair.

Deposit. See BAILEMENT.

Depos't, situated partly in Broome and partly in Del. co., N. Y., on R. R. and the Del. River, 177 m. N. W. of New York. It has an acad. Pop. 1870, 1286; 1880, 1419.

Deposition, dep-o-zish'un [Lat. *depositio*, from *de*, "down," and *pono*, *positum*, to "put"], in law, the testimony of a witness set down in writing in answer to interrogatories legally exhibited. D. are taken either by a judge or a com. specially appointed for that purpose. The questions to which the D. are answers are usually put by the parties to the suit or their legal reps., under the control of the court by whose authority the commission to

take the testimony issues. It is a rule in the law of evidence that a D. cannot be read where the witness himself might be produced, because his oral testimony is the most satisfactory medium of proof.

D., in geol., the process by which sedimentary deposits or strata are formed. The greater portions of the strata of sandstone, limestone, and slate are the result of D.

De Quin'cey (THOMAS), an Eng. author, b. in Manchester Aug. 15, 1785. He entered the Univ. of Ox. in 1803, and there contracted a habit of using opium. In 1808 he quitted the univ. and became a friend and associate of Coleridge, Southey, and Wordsworth. In the prime of life he reformed the habit of the excessive use of opium, and wrote *Confessions of an Eng. Opium-Eater*. D. Dec. 8, 1859.

Derah [Ar. *deraa*], the unit measure of length in Egypt. The subdivisions are the *kadam*, $\frac{1}{2}$ of a D.; the *ahdal*, $\frac{1}{3}$ of a D., and the *kerat*, $\frac{1}{24}$ of a D. The anc. D. of the Nile was 20,699 inches; the present common D. of Egypt is 22.37 inches; the D. for dry goods is 25.5 inches; the D. of Constantinople, used for European dry goods, is 66.34 inches.

Derby, der'be or dar'be, a town of Eng., on river Derwent, at junction of main branches of Midland R. R., 119 m. N. N. W. of Lond. and 35 m. N. N. E. of Birmingham. It has a free gram. school, founded in 1162, and large manufactures, especially of silk and iron. Pop. in 1881, 81,168.

Derby, Conn. See APPENDIX.

Derby (EDWARD GEOFFREY SMITH-STANLEY), FOURTEENTH EARL OF, an Eng. statesman, b. in Lancashire Mar. 29, 1799, ed. at Ox.; elected to Parl. in 1820. He supported the Reform bill, and became chief sec. for Ire. in 1830. In 1833 he entered the Whig ministry as sec. for the colonies, but resigned office in 1834 and joined the conservative party. He was sec. for the colonies in the cabinet of Sir Robert Peel from 1841 to 1845. Having been created Baron Stanley in 1844, he then passed into the House of Lords. He resigned office in 1845, because he was opposed to the repeal of the Corn Laws, and soon after this date began to be regarded as the leader of the conservatives and protectionist party. On the death of his father, in 1851, he succeeded him as earl of D. He was prime minister from Feb. to Dec. 1852, and was then succeeded by Lord Aberdeen. He was the leader of the opposition during the administration of Lord Palmerston, who resigned in Feb. 1858. Lord D. then formed a new ministry, in which he was first lord of the treas. (premier). He introduced a bill for electoral reform, but the House adopted an amendment offered by Lord John Russell. Lord D. therefore dissolved Parl. and appealed to the country, but the liberals obtained a majority in the new House of Commons which met in June 1859, and Lord D. then resigned office. Russell and Gladstone, whose Reform bill had been rejected by the House of Commons, retired from power in June 1866, and Lord D. was then requested by the queen to form a new ministry. His prin. colleague was Disraeli, who prepared a new Reform bill, passed in 1867, extending the right of suffrage to great numbers of the middle class. He resigned in Feb. 1868, and was succeeded by Disraeli. D. Oct. 23, 1869.

Derby (EDWARD HENRY SMITH-STANLEY), FIFTEENTH EARL OF, C. L., privy councillor, b. at Knowles Park July 21, 1826; grad. at Trinity Coll., Cambridge, 1848, elected to Parl. in same yr. In Feb. 1858 entered the cabinet as sec. for the colonies, and next May became com. for the affairs of India. On the formation of a conservative ministry by his father in June 1866 he was appointed sec. for foreign affairs. He presided over the conference of the European powers which was held in Lond. in May 1867; resigned with his colleagues in Dec. 1868; became sec. of foreign affairs 1874, and resigned Mar. 28, 1878.

Der'byshire Spar, a name given to the fluoride of calcium or FLUORSPAR (which see).

Derçyl'idias [Δερκίλιδας], a Spartan commander sent to aid the Asiatic Grs. in their resistance to the Per. forces under Pharnabazus and Tissaphernes, B. C. 369.

Derç, Lough ("Red Lake"), a small lake of Ire., inclosing an isle called St. Patrick's Purgatory, which is the most celebrated place of pilgrimage in Ire.

Der'vish [from *darrësh* or *darrësh*, a Per. word signifying "poor"; also a "mendicant"], a name applied to Mohammedan monks in Per., India, and Tur. Some belong to communities, others roam solitarily through the land, living on alms, professing abstinence and holiness, but belonging to no particular sect. Their worship consists in prayers, mortifications, and religious dances.

Der'wentwater, also called **Keswick Lake**, a lake of Eng., an expansion of the river Derwent. It extends S. from Keswick, is 3 or 4 m. long and $1\frac{1}{2}$ m. wide. On this lake is a floating island, covered with vegetation and full of air-bubbles, which render it buoyant.

Derzha'vin, written also **Derzavin** or **Derjavine** (GABRIEL ROMANOVITCH), a Rus. lyric poet, b. at Kazan July 3, 1743; entered the army in 1760, and became col. Having gained the favor of the empress Catharine, he was appointed sec. of state in 1791; became minister of justice in 1802. Wrote an *Ode to the Deity* ("Oda Bogu"), which has been translated into Eng., Chi., and other langs. D. July 6, 1816.

Desaix de Veygoux, deh-sä' deh vä-goo' (LOUIS CHARLES ANTOINE), a Fr. gen., b. near Riom, in Auvergne, Aug. 17, 1768. In 1798 he took part in the expedition to Egypt. He gained a victory at Sidiman in Oct. of that yr., and completed the conquest of Upper Egypt in 1799. He afterward governed that prov. with such moderation and justice that the natives called him "The Just Sultan." In 1800 he joined the army in It. The Fr. were about to retreat at Marengo, when D. arrived with a reserve and converted defeat into a decisive victory, but he was killed in this action, June 14, 1800. (See THIERS, *Hist. of the Consulate*.)

Desault, deh'sö (PIERRE JOSEPH), a Fr. surgeon, b. Feb. 6, 1744, was a pupil of Antoine Petit. He was considered the most skilful Fr. surgeon of his time, and had a very large practice. D. June 1, 1795. His doctrines were pub. in

the *Surgical Works* of his scholar, Bichat.

Descartes, dā-kart' (RENE), a Fr. math. and philos., b. Mar. 31, 1596. He settled in Hol. in 1629, to devote himself to the study of math., astron., and philos. He made many important discoveries in math., some of which were pub. in 1637. His works on the subject of philos. exercised a potent influence, not only on his own but on succeeding generations. He is the father of modern philosophy, and his *Meditations* (1641) and *Principia* form its foundation. D. Feb. 11, 1650.

D'Esclot, Esclot, or Selot (BERNAT), a Catalan historian. The yrs. of D'E's birth and death are unknown, but his *Cronica del Rey En Pere e dels seus antecessors passats* appears to have been composed in 1285. It embraces a summary view of the earlier hist. of the Aragonese kings, but its proper subject is the reign of King Don Pedro, from 1276 to 1285. It is the oldest historical composition of any moment which remains in the Catalan lang.

Descriptive Geometry, a branch of applied math., whose object is to explain the graphic solution of problems relating to magnitudes of 3 dimensions. The magnitudes to be considered are usually represented by *orthographic* projections of their prin. lines on 2 rectangular planes, called planes of projection, though they may in some cases be represented by *conical* projections on a single plane. The relations between these magnitudes is generally shown by means of the projections of lines cut from their surfaces by certain auxiliary surfaces. The methods of D. G. are peculiarly applicable to the subjects of engineering, arch., and perspective.

Deseret, a name given by the Mormons to the Terr. of Ut. The Mormons claim that in the lang. of their sacred books this word means "honey-bee."

Deseret, University of, located in Salt Lake City, Ut., was incorporated in 1850 by an act of the legislative assembly of the State of Deseret, and in 1851, after the organization of the present Terr. of Ut., this act of incorporation was legalized by the Territorial legislature. In Nov. 1851 it was opened under the supervision of Orson Pratt, Sr. Owing to lack of patronage the school was discontinued till 1867, when, under David O. Caldee, it was started as a commercial coll. In 1869, under the presidency of John R. Park, M. D., a scientific, a classical, and a normal dept. were added, and in 1870 an academical and a model school dept. were established, preparing the students for the coll.

Desert [Lat. *deserto*, to "forsake"], a term generally used to designate a barren or uninhabited place, but applied more particularly to the vast sandy and stony plains of Afr. and Asia. There are considerable tracts of D. land in Nev., Ari., and other parts of the U. S. The prin. D. of S. Amer. is the nearly rainless Atacama region.

The great D. of Afr. are separated from those of Asia only by the valley of the Nile and the Red Sea, the sandy zone extending throughout the breadth of the old continent from W. Afr. to 120° E. lon. Except the Nile, the Euphrates, the Indus, and the Oxus, there are no large rivers in a region which embraces almost $\frac{1}{4}$ part of both Afr. and Asia. D., in the Heb. sense, is simply untillied pasture-land, which may be covered with a luxuriant vegetation. In the N. T. *epheuos* has the same sense, which of course is quite at variance with classic usage. R. D. HITCHCOCK.

Design, Schools of, are insts. where ornamental, artistic, or mechanical drawing is taught. The most perfect insts. of the kind are in Europe, but most of our large cities have similar schools. Mass. gives free instruction in these branches. One of the largest S. of D. is in the Cooper Union building in New York. The "National Acad. of D." is a beautiful building in the Venetian style, at the corner of 4th avenue and 23d st., New York. This acad. was founded in 1838. There is in it an annual exhibition (from Apr. to July) of paintings by artists connected with the inst.

De Smet, Dak. See APPENDIX.

Des Moines, de-moin', a river of the U. S., rising in the S. W. part of Minn.; it traverses Ia., flowing S. S. E. to the city of Des Moines, then nearly S. E., and entering the Miss. about 4 m. below Keokuk. Length estimated at 500 m.

Des Moines, an important R. R. centre, cap. of Ia. and

in 1857 to this place, at that time called Ft. Des Moines. The new State Capitol, to cost \$3,000,000, is nearly completed. The State library contains 26,000 vols., and the city has a free library. The State arsenal, a large building, contains, beside military equipments for the State, the flags of all Ia. regiments engaged in the war of 1861-65, and numberless other trophies and valuables of interest. The city has 3 colls., 3 opera-houses, and a U. S. c.-h. Mines of coal are extensively worked; has plenty of water, timber, and coal; largest city in State. Pop. 1870, 12,035; 1880, 22,408; 1885, about 34,000. J. S. CLARKSON, ED. OF "STATE REGISTER."

Desmoulins, dā-moo-lan' (BENOÎT CAMILLE), b. at Guise, Aisne, Fr., Mar. 2, 1760, studied law in Paris, and embraced the ideas of the Revolution with boundless enthusiasm. His 2 pamphlets, *La Philosophie au Peuple français* (1788) and *La France libre* (1789), and his wild, passionate addresses in the gardens of the Palais Royal (July 12, 1789) became the immediate introduction to the Revolution. In his periodical, *Révolutions de France et de Brabant*, which was reprinted in 1833, and is still read with a singular mixture of horror and admiration, he gave to the passion of the moment some of its most brilliant and some of its most revolting catchwords, and the Reign of Terror, although enacted by other persons, was nevertheless begotten within his brain. He was one of the founders of the Jacobin Club and one of the leaders of the rising Aug. 10, 1792; as a member of the Convention he voted for the death of the king without appeal, and he dealt the party of the Girondists the decisive blow by his *Histoire des Brissotins*, which covered them with ridicule and contempt. But when, after the fall of the Girondists, the Jacobins separated into 2 parties, the *Enragés* under Hébert and the *Indulgents* under Danton, he joined the latter, and his paper, *Le Vieux Cordelier*, is a courageous, often a noble denunciation of the excesses of the Revolution. He was guillotined in Paris Apr. 5, 1794.

De Soto, Mo. See APPENDIX.

De Soto (HERNANDO), a Sp. explorer, b. in Estremadura in 1500. He expanded in early youth the coasts of Guatemala and Yucatan. Having a high command under Pizarro, he contributed largely to the conquest of Peru. He conducted an expedition from Sp. to Fla. in 1539, and discovered the Miss. River. He d. in Fla. June 5, 1542.

De Staël-Holstein (ANNE). See STAËL, DE.

Det'mold (WILLIAM), M. D., b. in 1808 in Hanover, where his father was court-phys.; studied med. in Göttingen, where he grad. in 1830, and soon after entered the Hanoverian army as surgeon. After visiting Eng. and Fr. he came in 1837 to New York, where he settled after resigning his commission in the army. He introduced orthopedic surgery in this country, and held the chair of clinical and military surgery in the Coll. of Phys. and Surgeons, Columbia Coll. During the war of the rebellion he volunteered his services on most of the large battle-fields in Va. He introduced an improved knife, for the use of one-armed men, which is furnished by the govt. to all men who have lost an arm or hand in the line of duty.

De Toqueville, deh tok'vil (ALEXIS CHARLES HENRI CLEREL), a Fr. statesman and political economist, b. in Paris July 29, 1805. He studied law, and in 1827 became judge-auditor at the tribunal of Versailles. In 1831 he was commissioned to investigate the penitentiary systems of the U. S., which he visited in company with Gustave de Beaumont. Wrote *De la Démocratie en Amérique* ("On Democracy in America"). In 1849 he was minister of foreign affairs from June 2 to Oct. 31. The *coup-d'état* of Dec. 2, 1851, drove him from the public service. D. Apr. 15, 1859.

Detroit [Fr. *Détroit*, "the strait"], an important R. R. and commercial centre, the metropolis of Mich. and cap. of Wayne co., on the W. bank of the Detroit River, 18 m. from Lake Erie and 7 m. from Lake St. Clair, in lat. 42° 19' 53" N., lon. 82° 58' W. The Detroit River, forming the boundary-line between the U. S. and Canada, is of varying width, being $\frac{1}{2}$ m. broad opposite the city, and of great depth, forming the most perfect harbor on the whole chain of lakes. The site upon which the city is built rises from the edge of the river, the inclination being gradual, at the rate of about 58 ft. per m., affording the most perfect drainage. The prin. work of art adorning the city is the Mich. Soldiers' and Sailors' Monument, designed by Randolph Rogers, and built of bronze and granite at a cost of \$58,000. The structure is 55 ft. high, surmounted with a colossal bronze allegorical statue of "Michigan." The chief public building is the city hall, situated on the Campus Martius and facing upon 4 streets. The house of correction is also a very fine building, and has attained a national and European reputation. There are med. colls., public hospitals, orphan asylums, founding and women's hospitals, an insane asylum, and an old ladies' home. Some of the ch. edifices are noble specimens of arch. It is the seat of the U. S. circuit court for the 6th circuit, and the U. S. dist. court for the E. dist. of Mich. the Wayne co. circuit court, the superior court, the recorder's and the probate court of Wayne co. The U. S. custom-house for the pt. of D. and the internal revenue office are located here, as are also the prin. office of the U. S. lake survey, the dept. in charge of the lake light-houses, and the head-quarters of the military dept. of the lakes. Ft. Wayne, designed to be the most extensive Amer. fortification on the N. frontier, is located just below the city, commanding both it and the river. The Woodmere and Elmwood cemeteries are embellished by skilful landscape gardening and monuments of taste.

The present site of the city was occupied by Indian villages at the period of the discovery of the country. In 1610 it was first visited by the Fr., and remained under their dominion until 1763. The first legitimate settlement was made in 1701, at which time a ft. was erected called Ponchartrain, the first gov. being the Sieur de la Motte Cadillac; and from time to time emigrants were sent here by the Fr. govt. In 1763 the Brit. assumed possession, erecting 15 yrs. later a ft. In 1787 its govt. was assumed by the U. S., Gen. Arthur St. Clair being the first gov. In 1812 it was surrendered to the



New State Capitol (Des Moines, Ia.).

of Polk co., on the Des Moines River at the mouth of the Raccoon, 357 m. W. of Chicago. The State cap. was removed

Brit., and was retaken in 1813. The hist. of D. is intimately connected with the hist. of the whole N. W. Three different sovereigns have claimed its allegiance, and since the U. S. have held it, thrice has its govt. been transferred. It has twice been besieged by Indians, once captured in war, and once totally consumed by fire. It has been the scene of 1 surrender, 50 pitched battles, and 12 bloody massacres. Pop. 1870, 79,577; 1880, 116,340; 1885, about 140,000.

Detroit City, Mich. See APPENDIX.

Detroit River issues from Lake St. Clair, flows nearly S., forms part of the boundary between Mich. and Canada, and enters Lake Erie. It is about 24 m. long, and from $\frac{1}{2}$ m. to 1 m. wide. It is navigable for the largest vessels.

Deucalion, du-kä-le-on [Gr. Δευκαλίων], in Gr. mythology, was a son of Prometheus and the husband of Pyrrha. According to tradition, he saved himself and his wife from a deluge by building a ship or ark, in which the water subsided, rested on Mt. Parnassus.

Deuteronomy [Lat. *Deuteronomium*; Septuagint Gr. Δευτερονόμιον, the "duplicate law," from δευτερος, "second," and νόμος, "law"], the last book of the Pentateuch, consisting, in part, of a restatement of the law, as given in Ex., Lev., and Num.; containing also, beside special commands and admonitions not previously given, an account of the death of Moses.

Development Theory. See EVOLUTION and DARWINISM.

Dev'ens (CHARLES, JR.), LL.D., a jurist, b. in Charlestown, Mass., Apr. 4, 1830, grad. at Harvard in 1838, and admitted to the bar in 1841; member of the Mass. State senate 1848-49; U. S. marshal for the dist. of Mass. 1849-53. On the outbreak of the c. war he entered the service as major of the 3d battalion of Rifles, Mass. Volunteers, and became brevet maj.-gen. U. S. volunteers Apr. 3, 1865; Oct. 1873 was appointed associate justice of supreme court of Mass. and atty.-gen. by Pres. Hayes Mar. 7, 1877; afterward resumed his seat in Mass. supreme court.

De Vere (MAXIMILIAN SCHEELE), LL.D., a writer, b. in Swe. Nov. 1, 1820, emigrated to the U. S., and became in 1844 prof. of modern langs. and belles-lettres in the Univ. of Va. Wrote *Outlines of Comparative Philology and Stray Leaves from the Book of Nature*.

Dēvi (Sans. "goddess"). See PARVATI.

Deviation of the Compass is the variation of a ship's compass from the true magnetic meridian, caused by the proximity of iron. In iron ships it depends upon the direction, with regard to the magnetic meridian, in which the ship was built. It is least when the ship has been built with her head to the S.

Deviation of the Plumb-Line has been especially observed near mts., in which case it is evident that the attraction of the mt. has drawn the line out of the perpendicular. The same phenomenon has been observed on plains, and is probably caused either by great caves under ground or by large masses of matter near the surface greatly surpassing in density the average of the earth near the point of observation.

Dev'il [Per. *dev* or *dew*, a "demon"; Ger. *Teufel*; Gr. διάβολος (i. e., "accuser" or "slanderer"); Lat. *diabolus*; Fr. *diable*], the name among Chrs. of any evil spirit, but especially of the chief of evil spirits, nearly corresponding in the latter sense to the Heb. Satan and the Mohammedan Iblis or Shytān. During the Middle Ages and later, the D. was supposed to possess superhuman knowledge and perfect skill in magic arts. When a man had performed some achievement which apparently transcended human powers, it was popularly believed that he had been aided by the D., the condition being that he should make over his soul to his infernal assistant. He was supposed to be able to take upon himself a human or bestial form in order to lure mankind into sin or to destruction; but his wiles could be set at naught by imploring the aid of the saints.

Devil's Darning-Needle. See DRAGON-FLY.

Devil's Dust. See SHODDY.

Devil's Lake, Dak. See APPENDIX.

Devil-Worshippers, or Yezidees, a sect of religionists, founded by one Yezede, and living in Armenia, Koordistan, etc., numbering more than 200,000. They treat the devil with great respect, believing he will be restored to heaven, where they wish him to be their friend.

Devo'nian Age [named by Murchison from Devonshire, Eng., where rocks of this age abound], in geol., the time succeeding the Silurian and preceding the carboniferous age. The Amer. D. rocks are assigned to 5 divisions or periods of time. The D. strata of Europe are variously divided in different countries. The D. rocks of the U. S. are rich in fossil shells of mollusks, and in fishes.

Devonport, a maritime town of Eng., on E. shore of the estuary of the Tamar (called the Hamoaze), 2 m. W. N. W. of Plymouth. It is strongly fortified, and contains a dockyard and naval arsenal, perhaps the largest in G. Brit. It has a residence for the pt.-admiral, a military hospital, and a large barracks. Pop. of municipal borough, 48,939.

Dew [Sax. *deaw*; Ger. *Thau*], moisture deposited during the night on the surfaces of bodies exposed in the open air. D. is produced by the condensation of watery vapor from the atmosphere. Its deposition is, however, unaccompanied by the appearance of any visible mist. Such mist appears when the condensation takes place within the body of the air itself, and is then called "fog" in the lower regions of the atmosphere, and "cloud" in the higher. D. occurs only at the surfaces of contact with solids, the air above remaining clear. The deposit of D. is caused by the cooling of the bodies bedewed, and this takes place in consequence of the radiation of heat into open space, without any equivalent return. Clouds check the formation of D. by obstructing radiation, or restoring by counter-radiation some of the heat lost. When the sky is wholly overcast no D. is formed. Neither is any D. formed beneath an open shed or shelter, though the earth around may be so distinct-

ly wet as to leave the form of the roof plainly marked on the ground. Facts of this kind were long supposed to prove that the D. descends like rain—a belief of which the trace is still preserved in the expression "the falling of the dew."

F. A. P. BARNARD.

Dew (THOMAS R.), a writer, b. in Va. Dec. 5, 1802. He became prof. of political economy and hist. in William and Mary Coll. in 1827, and pres. of that inst. in 1836. Wrote an *Essay in Favor of Slavery*. D. Aug. 6, 1846.

De Wet'te (DR. WILHELM MARTIN LEBERECHE), a Ger. biblical critic, b. at Ulla, near Weimar, Jan. 14, 1780. In 1810 he became prof. of divinity at Berlin, and as a preacher and writer he soon won a wide fame. He was a moderate rationalist in his opinions. In 1821 he became prof. of divinity at Bäle, where he d. June 16, 1849. Among his works are a *Commentary on the Psalms*, *Jewish Archaeology*, and *Introduction to the O. and N. T.*

Dew'ey (CHARLES AUGUSTUS), LL.D., b. at Williamstown, Mass., Mar. 13, 1793, grad. at Williams Coll. in 1811. He began the practice of law in his native town in 1814, and removed to Northampton about 1836. He became judge of the Mass. supreme court in 1837, and retained the office till he d., Aug. 22, 1866.

Dewey (CHESTER), D. D., LL.D., a botanist and teacher, b. at Sheffield, Mass., Oct. 25, 1781. He was for many yrs. prof. of natural philosophy at Williams Coll., became prin. of the Collegiate Inst. at Rochester, N. Y., in 1836, and in 1850 prof. of chem. in the Univ. of Rochester. He wrote many excellent monographs on the Carices of N. Amer., etc. for the *Amer. Journal of Science* and other publications. D. Dec. 15, 1867.

Dewey (ORVILLE), D. D., LL.D., a Unit. minister, b. in Sheffield, Mass., Mar. 28, 1794; grad. at Williams Coll. in 1814, and preached in the pulpit of Dr. Channing as his assistant for nearly 2 yrs.; was pastor at New Bedford 1823-33, then for about 14 yrs. in New York. In 1858 became minister of New South ch., Boston. Wrote *The Unit. Belief and The Education of the Human Race*. D. Mar. 31, 1882.

De Witt, city and R. R. junc., Clinton co., Ia., 25 m. N. of Davenport. Pop. 1870, 1749; 1880, 1608.

De Witt (JOHN), a Dut. statesman and republican, b. at Dort Sept. 25, 1625. He was a leader of the party which was hostile to the house of Orange, or wished to reduce the power of the prince of Orange, who was supported by the populace and clergy. He was elected grand pensionary of Hol. in 1653, and had the chief control of the govt. during the minority of William, prince of Orange (who was afterward king of Eng.). He was re-elected grand pensionary for a term of 5 yrs. in 1658, and again in 1663. In a war against Louis XIV. of Fr., De W., being unable to repel the enemy, who captured several towns, was blamed for these misfortunes, and lost his popularity. William of Orange was chosen gen.-in-chief and stadtholder. De W. and his brother Cornelius were both murdered by the populace Aug. 20, 1672. (See P. SIMON, *J. de Witt en Zijn Tijd*.)

De Witt (THOMAS), D. D., b. at Kingston, N. Y., Dec. 13, 1791, grad. in 1812 at the theological sem., New Brunswick, N. J., entered the Dut. Reformed ministry; was minister of the Collegiate ch., New York, 1827-74. He was a man of profound learning, and an able preacher in Eng. and Dut. langs.; pres. of New York Historical Society, of New York City Mission and Tract Society, etc. D. May 18, 1874.

Dew-Point, the temperature at which watery vapor in the air begins to be condensed. Its determination is of great importance to the meteorologist, as by comparing it with the actual temperature he can tell the relative humidity of the air. He knows that at the actual temperature the air would be saturated if it contained a certain quantity of moisture; and also that the actual quantity present is only such as would suffice to saturate air at the observed D.-P.; the ratio of this last quantity to the former expresses the relation between the actual humidity of the air and the humidity of saturation at the observed temperature. The D.-P. in the evening further shows the temperature near which the minimum during the night is likely to be. When the temperature has fallen to the D.-P., the vapor in the air will be condensed, and an amount of heat will be set free which will raise the temperature of the air. The temperature will again sink by radiation somewhat below the D.-P.; dew will be formed, and the temperature again be raised.

F. A. P. BARNARD.

Dexip'pus [Δεξιππος], a Gr. philos., pupil of Iamblichus, lived about A. D. 355. He wrote commentaries on Plato and Aristotle. There is extant a treatise of his on the *Categories* of Aristotle, but only in a Lat. translation.

Dex'ter, Penobscot co., Me., on R. R., 70 m. N. E. by N. from Augusta. Pop. pt. 1870, 2875; 1880, 2563.

Dexter (FRANKLIN), LL.D., a son of Samuel Dexter, noticed below, b. at Charlestown, Mass., Nov. 5, 1793, grad. at Harvard 1812; practised law in Boston; was a member of the State legislature and senate, and in 1849 was appointed U. S. dist. atty. for Mass. D. Aug. 14, 1857.

Dexter (HENRY MARTYN), D. D., an eminent Congl. minister, b. at Plympton, Mass., Aug. 13, 1821, grad. at Yale in 1840 and at Andover in 1844; was pastor in Manchester, N. H., 1844-49, and of the present Berkeley st. ch., Boston, 1849-67. From 1859 to 1865 he was one of the eds. of the *Congregational Quarterly*, and in 1867 became ed.-in-chief of the *Congregationalist*. He is the author of *Congregationalism and Hist. of the Plymouth Colony*.

Dexter (SAMUEL), LL.D., a jurist and statesman, b. in Boston May 14, 1761; was admitted to the bar in 1784, attached himself to the Federal party, and was elected U. S. Senator in 1798; was appointed sec. of war in 1800 by John Adams, and became sec. of the treas. early in 1801. He had no superior and few equals as an advocate before the supreme court in Wash. D. May 4, 1816.

Dex'trine [from the Lat. *dexter*, the "right hand"], or **British Gum**, a gum-like substance produced from starch by the action of heat, dilute acids or alkalis, dias-

tase, saliva, bile, blood serum, pancreatic juice, etc., and by the action of sunlight on starch paste. It is soluble in water, and its solution turns the plane of polarization of a luminous ray to the right; hence the name *dextrine*. In the sprouting of seeds and buds it is produced from starch; hence it occurs in malt and malt liquors. In the baking of bread it is formed from the starch of the flour, and often constitutes 10 per cent. of the loaf. The glazing on the crust is chiefly a coating of D. D. is an uncrystallizable, translucent solid, resembling gum-arabic. It is soluble in water and in dilute alcohol, but insoluble in absolute alcohol. Its aqueous solution is clear and limpid when dilute, but adhesive, viscid, and gummy when concentrated. By boiling with dilute acids or caustic alkalis it is converted into glucose. It is precipitated from its solution by an excess of strong alcohol. It has the same percentage composition as starch and cellulose. D. is extensively used as a substitute for gum-arabic and other gums in stiffening, sizing, and glazing calicoes, nets, crapes, laces, silks, papers, cards, etc., as mucilage on every office-table, and for the adhesive layer on the back of postage-stamps and on self-sealing envelopes.

C. F. CHANDLER.

Dhawalaghi'ri, a peak of the Himalaya Mts., in Nepal, lat. 28° 42' N., lon. 83° 28' E.; formerly supposed to be the highest mt. of the earth. Altitude, 26,826 ft.

Dhole, (dōl (*Canis sceleratus*), a wild dog found in the W. Ghats and other mountainous parts of India. It is of a light-bay color, with a sharp muzzle, large and pointed ears, and in size is somewhat less than a wolf.

Dhun'chee, or **Dhanchi**, a plant of the natural order Leguminosae, of the genus *Sesbania*, having an extended loment with many seeds. It is an annual plant, cultivated extensively in some parts of India for its fibre, which is used in the manufacture of paper, cordage, canvas, and cloth. The plant has a slender stem about 8 ft. high.

Diabete's [Gr. διαβήτης, from διά, "through," and βαίω, to "go"], the name of 2 diseases characterized by the excessive excretion of urine; whence the name. In *D. insipidus* the urine consists chiefly of water. It is neither frequent nor formidable. But *D. mellitus*, "sweet" or "honeyed D.," is one of the most incurable and serious of diseases. The urine has its specific gravity greatly increased by the presence of diabetic sugar. The disease is further characterized by indigestion, intense thirst, wasting, prostration of mind and body, and in many cases by degenerative changes in the tissues. Its causes are obscure and its treatment not well understood. Some cases are greatly benefited by opium and the use of strictly nitrogenous food, like bran or gluten bread and skim-milk. Temporary D. has been observed after the administration of woarari poison and other drugs.

E. DARWIN HUDSON, JR.

Diagon'eter [from the Gr. διάγω, to "conduct," and μέτρον, a "measure"], an electric instrument for determining the conducting power of fixed oils. It is used especially for the detection of the adulteration of olive oil, which is said to have the lowest conducting power of such oils.

Diagonal [Gr. διά, "through," γωνία, an "angle"], in plane geom., a straight line joining the vertices of any 2 angles not having a common side; in solid geom., a line joining the vertices of any 2 angles of a polyhedron which have no common face.

Diag'oras (Διαγόρας), a Gr. poet and philos., b. in the island of Melos, lived about 425 B. C., and is said to have been a disciple of Democritus of Abdera. He was a citizen or resident of Athens. As he rejected or doubted the popular religion and polytheism, he was stigmatized as an atheist.

Dial [from the Lat. *diadē*, belonging to the day; Lat. *solarium*], an instrument which shows the hour of the day by the shadow of a gnomon or style cast by the sun on a graduated arc; it is also called **Sun-Dial**. The invention is of great antiquity, the Grs. having, it is said, learned its use from the Chaldeans.

Dialec'tic [Gr. διαλεκτική, from διαλέγομαι, "I converse"] is a technical expression much used both in the Gr. and Ger. philos., denoting in the former the art of defining, in opposition to logic as the art of making inferences; while in the latter it denotes the art of thinking in opposition to the mere process of demonstrating.

Dialy'sis [Gr. διάλυσις, a "separation," from διά, "apart," and λύνω, to "loose"], the separation of certain substances by means of liquid diffusion. (See **ENDOSMOSE**.)

Diamagnetism [for etymology see below]. The line joining the 2 opposite poles of a horseshoe magnet is called the *axial* line, while a line bisecting at right angles this axial line is called the *equatorial* line of the magnet. The space included between the opposite polar surfaces of the magnet is called the *magnetic field*.

When small bars of iron, nickel, cobalt, manganese, etc. are suspended between the poles of a magnet, they place their lengths in the axial line. Substances taking the above position are called magnetic substances, or, as Faraday termed them, *paramagnetic* substances. The majority of bodies, however (e. g. bismuth, antimony, phosphorus, heavy glass, wood, water, blood, bread, hydrogen, and ammonia), when delicately suspended in the magnetic field, place their lengths equatorially, and to distinguish them from magnetic substances they were called *diamagnetic* (διά, "across," and μάγνης, the "magnet") by Faraday, who in Dec. 1845 gave the discovery of D. to the world in a paper read before the Royal Society of Lond.

The difference in the behavior of magnetic and diamagnetic substances in the magnetic field was thus concisely stated by Faraday: Magnetic substances tend to go from weaker to stronger places of magnetic action, while diamagnetic bodies tend to go from stronger to weaker places in the magnetic field.

Faraday found that not only solids, but also liquids and gases, possessed magnetic and diamagnetic properties. In experimenting with these bodies he inclosed them in glass tubes, whose magnetic behavior was determined before they

were filled with the liquids or gases to be examined, and the previously determined action of the magnet on the empty tube was deducted from the resultant magnetic effect on both the tube and its contained liquid or gas. Or 2 tubes of exactly the same size and material were hung opposite each other from the ends of a short piece of light wood, which was then placed across the end of a longer wooden rod, and the latter was suspended by silk fibres or by a fine silver wire. The 2 tubes hung on opposite sides of the axial line of the magnet, and with their centres equidistant from it. By this ingenious arrangement it is evident that the actions exerted by the magnet on the glass tubes neutralized each other, and whatever motion he observed was due to the difference in the action of the magnet on the 2 substances they contained. By filling one of the tubes with water or air, and the other successively with different liquids and gases, he determined the *specific magnetism* of these substances relatively to water or air taken as unity. Further experiments on the action of the magnetic field on water and air inclosed in a vacuum gave the data for reducing all of his measures to what he would have found had all the substances been suspended *in vacuo* between the poles of the magnet. Plücker in Ger. and E. Becquerel in Fr. also made very refined measures of these actions. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. A. M. MAYER, PH. D.]

Diam'eter [Gr. διά, "through," μέτρον, "measure"], a line that bisects a system of parallel chords. All the D. of a parabola are parallel, but in the other conic sections they all intersect in a point called the centre. A *diametral* plane is a plane that bisects a system of parallel chords of a surface. If 3 diametral planes are so related that each bisects a system of chords parallel to the intersection of the other 2, they are said to be conjugate, and their lines of intersection are conjugate D. of the surface.

Diamond [Fr. *diamant*; Ger. *Diamant* or *Demant*, a corruption of "adamant"], the most valuable of precious stones and the hardest of known substances, consists of pure carbon. The primary form of the D. is a regular octahedron, but it often occurs in cubes and rhomboidal dodecahedrons, and sometimes in twin crystals; the faces are frequently convex. The finest D. are transparent and colorless, but those which are of decided tints of pink, green, or blue are prized, while those which are slightly colored are held in least estimation. They are found in alluvial deposits, from which they are extracted by washing. The most celebrated mines are those of India. In 1728 D. were found in Brazil, and since that time the mines of Minas Geraes have produced most of the D. of commerce until quite recently. At present there is a considerable importation from S. Afr., where they were first discovered in 1870. They have also been brought from Siberia, Borneo, and other countries. The largest known D. is probably that mentioned by Tavernier as belonging to the great Mogul. It was found in Golconda in 1550, and it is said to have weighed in its original state 900 carats. Among the crown-jewels of Rus. is a D. weighing 194 carats; it is of the size of a pigeon's egg, and was stolen from a Brahmanical idol by a Fr. soldier. It was ultimately bought by Catharine of Rus. for about \$450,000 and an annuity of \$30,000. One of the most perfect D. was brought from India by a gentleman named Pitt, who sold it to the regent-duke of Orleans for about \$625,000. The celebrated Koh-i-noor (the "mountain of light") became the property of Queen Victoria on the annexation of the Punjab by the E. I. Co. in 1850. It is mentioned by Tavernier in 1665 as the property of the Mogul emp., and, together with the Duriya-i-noor ("sea of light"), formed part of the plunder seized by Nadir Shah at the taking of Delhi in 1739. It weighed originally 186 $\frac{1}{16}$ carats, but it has been recut and reduced to 108 $\frac{3}{4}$ carats, and it is greatly improved in appearance. The D. was first proved to be combustible in 1694 by the Florentine academicians, who found that when exposed to the heat of the sun in the focus of a large lens it burned away with a blue lambent flame. The products of its combustion were first examined by Lavoisier in 1772, who showed that when burned in air or oxygen it produced carbonic acid. Subsequent experiments have demonstrated that nothing but carbonic acid is thus formed. D. of inferior quality have extensive employment in the D.-drill, and in machines for sawing stone, dressing millstones, etc. Attempts have been made to produce true D. by the crystallization of carbon.

C. W. GREENE.

Diamond Beetle (*Curculio*), a coleopterous insect belonging to the weevil tribe, remarkable for the splendor of its colors. It is golden-green, with 2 black bands on the thorax; on the wing-covers are rows of depressed spots of a sparkling green color, with intervals of black.

Diamond Harbor, in Brit. India, the port of Calcutta for large ships, is in the river Hoogly, 34 m. below. The adjacent country is so swampy and unhealthy that few Europeans reside here.

Diamond Necklace, valued at about \$400,000, ordered by Louis XV. of Fr. for one of his mistresses. The king d. before the necklace was completed, and it remained for some yrs. upon the hands of the jewellers. In 1783-84 Cardinal de Rohan was duped by Madame Lamotte into the belief that he could win the favor of Queen Marie Antoinette by advancing the money to buy the necklace for her, the sum to be repaid by instalments. It is unlikely that the queen knew anything of the matter; but the necklace fell into the hands of Lamotte and her accomplices, who broke it up and sold the stones piecemeal. It caused a scandalous trial, and much increased the popular disfavor in which the queen was held. (See **CARLYLE, Diamond Necklace**.)

Diana, an anc. It. divinity worshipped by the Romans as the goddess of light. She was identified by the later Romans with the Artemis of the Grs. She was said to be the daughter of Jupiter and Latona, and the sister of Apollo; was represented as a virgin armed with bow and arrows, and was regarded as the patroness of chastity. As the goddess of the moon she was often called Selene.

Diana, Temple of, at Ephesus, one of the Seven Wonders of the World. It is said to have occupied 220 yrs. in building, was 250 ft. long, 225 ft. broad, having 127 marble columns 60 ft. high. It was set on fire 356 n. c., by Erostratus, whose only object was to acquire notoriety. It was restored, and again burned by the Goths 256 a. d. Its site remained unknown for many centuries, but was excavated 1847-48 by Mr. John T. Wood. (See Wood's *Ephesus*.)

Diane de Poitiers. See VALENTINOIS, DUCHESS OF.

Dianthus. See PINK.

Diaper [Fr. *diaper*, a corruption of d'Ypres, in Flanders, where it was first manufactured], a linen fabric woven in flowers or regular patterns.

Diarrhoea [Gr. *diarrhoia*, from *dia*, "through," and *rhoia*, to "flow"], a disease characterized by frequent soft alvine discharges, acute or chronic intestinal catarrh. D. may be an independent ailment or a symptom of cholera, cholera morbus, cholera infantum, dysentery, typhoid fever, pulmonary consumption, and some forms of peritonitis. The "D. and cholera mixtures" for simple D. of adults contain usually astringents, opiates, chloroform, capsicum, and camphor.

Diastase [Gr. *diastasis*, "division," "separation," from *dia*, "apart," and *isthai*, to "stand"], a name given to the constituent of malt (germinated barley) which changes starch to dextrine and glucose (grape-sugar). It has not been obtained sufficiently pure for analysis. It is supposed to be a nitrogenous body. Its most characteristic property is its action upon starch. At a temperature of 158° F. it rapidly changes this substance to a mixture of dextrine and glucose. Payen and Persoz say 1 part of D. will change 2000 parts of starch. Starch is also changed to dextrine and glucose by dilute acids, putrid flesh, yeast, gastric juice, by animal membranes, and in fact by all albuminoids in a certain stage of decomposition. D. plays a very important part in the germination of seeds and the sprouting of buds in tubers and stems containing starch. It serves to render the starch and albumen soluble, and thus facilitates their circulation and assimilation. In manufacture of beer and spirits D. changes the starch into dextrine and glucose, and makes fermentation possible. C. F. CHANDLER.

Diatoma-ceae [named from *Diatoma*, one of the genera], an order of microscopic plants which are usually referred to the class Algae. Owing chiefly to the curious movements which the D. exhibit, they have been considered as animals, or as belonging to a class of organisms intermediate between the animal and vegetable kingdoms; but movements like those of the D. are by no means absent from the higher vegetable world, and are especially frequent among the Protophytes; while it is certain that the organisms we are considering are closely akin to the Desmidiaceae, which are confessedly of vegetable nature. Each diatom consists essentially of a single cell, and the wall of each cell is a layer of siliceous, interpenetrated by organic matter chemically identical with the cellulose of higher plants. Many diatoms have a protoplasmic layer outside the frustule, and it is upon contractions of this layer that the motions are supposed to depend. Many of the most interesting diatoms are strung together in filaments, others are agglutinated in masses. They increase by the conjugation of cells, and also by fission.

The D. are found fossil in vast deposits. Bergmehl, tripoli, flint, and rotten-stone consist principally of these fossils. Bog-iron ore consists chiefly of these plants, which in some of the species incorporate large proportions of iron. Diatoms are found in guano and in fresh and salt water, in some cases attached to fixed objects, and in other cases floating in the water in such numbers as to color it with their characteristic brown tint. They are eaten by the minute animals which form so large a part of the food of the whale. They abound especially in polar regions. A stratum 18 ft. thick of their fossil frustules underlies Richmond, Va. On the Columbia River there is a mass of these fossils 500 ft. thick. Living specimens are extensively found in soils and in the mud of many salt-water inlets and harbors. The ice in both polar regions is often colored with them; they also occur alive in springs whose water is near the boiling-point. C. W. GREENE.

Diaz, de'ahs (BARTOLOME), a Port. navigator, eminent for his learning, talents, and enterprise. He commanded an expedition sent in 1486 to explore the W. coast of Afr., when he sailed around the extremity of Afr. to the mouth of the Great Fish River. Returning homeward, he discovered the cape which he had previously doubled unawares, and called it *Tormentoso*, which was soon changed to Cape of Good Hope (Cabo de Buena Esperanza). On a voyage to India he perished by shipwreck, May 29, 1500.

Diaz de la Peña (NARCISSE-VIRGILE), a Fr. painter, b. at Bordeaux Aug. 20, 1809. He began as a landscape-painter, but later he occupied himself with subjects of pure fancy, filling a crowd of small canvases with nymphs and cupids, and with boys and girls dressed in costumes that might pass for Eastern, but in which no attempt at faithfulness to details is allowed to interfere with the effects of color, which is all the artist aims at, and which he is often successful in obtaining. At one time the pictures of Diaz brought high prices, and when he first made a name it was by work that showed an original vein; but he greatly deteriorated, and by flooding the market with pictures merely made to sell, he nearly lost all reputation. He obtained a third-class medal in 1844, a second-class in 1846, and the first-class in 1848. D. Nov. 18, 1876. CLARENCE COOK.

Dib'din (CHARLES), an Eng. musician and writer of songs, b. at Southampton Mar. 15, 1745. He composed over 1000 sea-songs, among them *Tom Bowling* and other favorites of the Eng. tars. D. July 24, 1814.

Dibrell (ANTHONY), a minister of the M. E. Ch. S., b. in Va. Aug. 19, 1805. He was ed. at the Univ. of N. C., studied law, entered on the practice of his profession at Lynchburg, abandoned it for the ministry, and in 1830 joined the Va. Conference. D. Sept. 1, 1855.

Dicaeum, a genus of tanagroid Oscines of small size. They weave a purse-shaped nest and inhabit India.



Dicaeum.

Dichroite [from the Gr. *dis*, "twice," and *chroma*, "color"], also called *Tolite*, a mineral so called from the different colors it exhibits, is a silicate of magnesia, iron, and alumina. It is found in prisms belonging to the trimetric system, and is sometimes used as a gem.

Dick (THOMAS), LL.D., a Scot. author, b. near Dundee Nov. 24, 1774, was ed. for the ministry in connection with the Secession Ch. He taught school for many yrs. at Perth, and wrote *The Philosophical Religion* and the *Sidereal Heavens*. D. July 29, 1857.

Dickens (CHARLES), an Eng. novelist, b. at Landport, Portsmouth, Feb. 7, 1812. His father was John Dickens, who held a position in the navy pay dept., and who afterward became parliamentary reporter for one

of the Lond. daily papers. After studying in a coll. near Rochester, young D. was placed in an attorney's office to learn the profession of the law. This pursuit proving ungenial to his taste, he left it and obtained a position as reporter on the staff of the *Morning Chronicle*. In this paper appeared the first efforts of his genius, his *Sketches of Life and Character*, which in 1836 were pub. under the title *Sketches by Boz*; in 1837 they were followed by *The Posthumous Papers of the Pickwick Club*, which raised its author at once to the first rank among the popular writers of the day. In its peculiar vein of humor it has never been equalled in Eng. lit. This was followed by several novels. In 1841 he visited the U. S., and in the following yr. appeared his *Amer. Notes for Gen. Circulation*, in which Amer. life and character were somewhat severely satirized. The *Notes* were followed in 1843-44 by the *Life and Adventures of Martin Chuzzlewit*, a work which reflected still more on the faults and foibles of our countrymen. Toward the end of 1845 he assumed the chief editorship of the *Daily News*, a Liberal journal then just established. He soon, however, resigned this position. In 1847-48 appeared his *Domby and Son*, followed by *The Personal Hist. of David Copperfield* and other works. *The Mystery of Edwin Drood* was left unfinished at his death. *Household Words*, a weekly periodical, was originated by him in 1850, and in 1859 he started another weekly journal entitled *All the Year Round*. In 1867 he made a second visit to the U. S., and met everywhere with a cordial reception, and gave in the prin. cities public readings from his own works. D. June 9, 1870. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. J. THOMAS, LL.D.]

Dickinson (ANNA ELIZABETH), a reformer and popular public speaker, b. of Quaker parents at Phila. Oct. 28, 1842. Her father d. when she was but 2 yrs. old, and her early yrs. were spent in poverty. She was ed. in the Friends' free schools. Her first public speech was delivered in Jan. 1860, at a meeting for the discussion of women's rights, and at once established her reputation. During the c. war she delivered many patriotic and political addresses. Wrote *What Answer?* a novel.

Dickinson (DANIEL STEVENS), LL.D., a lawyer, b. in Goshen, Conn., Sept. 11, 1800. He was elected as a Dem. to the senate of N. Y. in 1836, and became lieut.-gov. of that State in 1842, a U. S. Senator in 1844, and atty.-gen. of N. Y. in 1861. D. Apr. 12, 1866. (See his *Life*, by his brother.)

Dickinson (EDWARD), LL.D., a lawyer, b. at Amherst, Mass., Jan. 1, 1803, grad. at Yale with the highest honors in 1823, studied at the Law School of Northampton, Mass., and in 1826 became a lawyer of his native town. Was treas. of Amherst Coll. in 1835, holding that position nearly 40 yrs. In 1838, 1839, and 1873 he was chosen rep. to the gen. court of Mass.; was State senator 1842-43, State councillor 1845-46, and a Whig M. C. 1854-55. D. June 16, 1874.

Dickinson (JOHN), LL.D., a lawyer, b. in Md. Nov. 13, 1732. He received his legal education in Lond., and practised law with success in Phila. He was a member of the Continental Cong. in 1774, and wrote for that body the *Declaration to the Armies*. In 1776 he spoke against the Dec. of Ind., which he regarded as premature, and was one of the few members of Cong. who did not sign it. He consequently became unpopular, and was defeated in next election, but served as a private soldier in the Revolutionary war. In 1779 he was M. C. for Del. He was pres. of Pa. 1782-85. Wrote many political essays. In 1783 he founded and endowed Dickinson Coll., at Carlisle, Pa. D. Feb. 14, 1808.

Dickinson (REV. JONATHAN), a Presb. theol. b. at Hatfield, Mass., Apr. 22, 1688, grad. at Yale Coll. in 1706; preached at Elizabethtown, N. J., and was elected pres. of the Coll. of N. J. in 1746. D. Oct. 7, 1747.

Dickinson College, next to the Univ. of Pa., is the oldest coll. in the State; the former was founded in 1753, the latter in 1783. In consequence of the valuable gifts to and personal interest in the coll. of Hon. John Dickinson, pres. of Pa., the inst. received his name. The first pres. was Charles Nisbet, D. D., a native of Scot. and minister at Montrose. During the Revolutionary war his voice was in favor of the colonies. The inst. is denominational. Until 1833 it was under Presb. control, but the division of that Ch. into the old and new branches brought the coll. under grave embarrassments. The Old School kept the educational funds; the New School had a majority of the board of trustees, but, being without funds, transferred the coll.

to the Meth. denomination, under whose care it now remains. The method of study retains the old classical course, but allows a divergence in the junior and senior yrs. from the anc. langs. in two directions—one in favor of the Heb. lang. and lit., to accommodate those studying for the ministry, and the other in favor of natural science. The old prominence of the anc. classics has yielded much in favor of modern langs., lit., and the natural sciences.

Dickson (SAMUEL HENRY), M. D., LL. D., b. of Scot. parentage at Charleston, S. C., Sept. 20, 1798, grad. at Yale in 1819, and received the degree of M. D. at the Univ. of Pa. in 1819. In 1824 he became prof. of the insts. and practice of med. at Charleston med. school (S. C.); was prof. of practice in the Univ. of New York 1847-50, and again in Charleston. In 1858 he was called to the chair of practice at Jefferson Coll., Phila. He was the author of several valuable works upon med. and other subjects. D. Mar. 31, 1872.

Dicta'tor [Fr. *dictateur*, from Lat. *dicto*, *dictatum*, to "say often," to "dictate"], the title of a magistrate in anc. Rome who was invested with nearly absolute power for a period of 6 months. D. were appointed when the republic was in danger, or when an important crisis demanded the prompt decision and vigorous action of a single executive chief. The first D., according to some, was Titus Lartius, 501 B. C.; the last, Marcus Junius Pera, 216 B. C. D. were at first confined to patricians, and the first plebeian D. was C. Marcus Iulius, 356 B. C. The dictatorships of Sulla and Caesar were illegal, entirely different from the former dictatorships.

Dictio'nary [modern Lat. *dictionarium*, from *dictio*, a "word," and *-arium*, a suffix, denoting a "place where things are kept,"] Fr. *dictionnaire*; It. *dizionario*; Sp. *dicionario*, a book giving the words of a lang. in alphabetical order, and explaining their meaning. A D. may be in one lang. or more—i. e. the words in one lang., as the Lat., may be explained in another, as the Eng. It is also a gen. term for works on science, lit., and art. giving information under separate classified heads, in modern times alphabetically arranged for convenience of reference. The earliest known D. is one in the Chi. lang., compiled about 1100 B. C. The most celebrated D. of antiquity is the *Onomasticon* of Julius Pollux, completed early in the 3d century. The earliest modern D. of the Lat. lang. is that of Balbi of Genoa, 1460. There are few langs. that have been reduced to writing which do not possess D. All cultivated tongues have many of them, some being upon a very large scale.

Dicynodont'idæ [Gr. *dis*, "double," or *κυνων*, "dog," and *odon* (gen. *odontos*), "tooth,"] a peculiar extinct family of reptiles whose remains have been found in S. Afr. They had closed orbits and sharp, compressed jaws covered with a horny plate, sharp-pointed tusks growing downward, one from each side of the upper jaw, and the articulating surfaces of the vertebrae were hollow.

Didac'tic [Gr. *διδασκικός*, from *διδάσκω*, to "teach,"], a word signifying skilled in teaching, imparting instruction. D. POETRY is that poetry the chief object of which is to teach some art, science, or system of philos. Among the most remarkable D. poems are Lucretius's *De Rerum Natura*, Horace's *De Arte Poetica*, Boileau's *L'Art poétique*, and Pope's *Essay on Man*.

Didelphy'idæ [*Didelphys*, i. e. double-wombed], a family of marsupials, confined to Amer. and embracing the opossums. The teeth are especially characteristic—viz. I. $\frac{5}{4}$, C. $\frac{1}{1}$, M. $\frac{7}{7}$; the feet have 5 toes, of which the inner one on the hind foot is thumb-like, and the others regularly divaricated; the tail is long. There are a number of species, most of which are in S. Amer., ranging in size from less than a rat to that of the common opossum of the U. S.

Diderot, *déd-rô'* (DENIS), a Fr. philos., b. at Langres Oct. 5, 1713, and ed. by the Jesuits, was destined for the Ch., and later for the law, but eagerly embraced the study of lit. His father, a prosperous cutler of stern character, withdrew from him all support upon his refusal to pursue his professional studies. His *Lettre sur les Aveugles* (1749) established his reputation, but cost him a yr.'s imprisonment. His earlier works were all written under the duress of poverty. His reputation is founded chiefly on the *Encyclopædia* (*Encyclopédie*, or *Dictionnaire raisonnable des Sciences, des Arts et Métiers*), of which he and D'Alembert were joint eds. This work was finished in 1765. For this arduous labor he was qualified by great quickness of intellect and extent of information. He is considered as the chief of the sceptical philos. called Encyclopædists. D. July 30, 1784. (See DAMIRON, *Mémoire sur Diderot*.)

Didi'dæ [*Didus*, the typical genus], a family of extinct birds belonging to the order Columbæ, and embracing the dodo (*Didus*) and also the solitaire (*Pezophaps*). Their bill was large, hooked at the tip, and not serrated; their wings were unfit for flight, and the tail rudimentary. The sternum was deeply hollowed, with low and thick keel, no entolateral processes, and the body converging behind the ectolateral processes to the obtuse end; the coracoid grooves are divided from each other; the ulna is shorter than the humerus. Basis crani lacks basitryptoid processes. The family was represented by large terrestrial birds in the Mascarene Islands till their discovery by Europeans, but were shortly after exterminated.

Did'i-us (SALVUS JULIANUS), a Rom. emp., b. at Milan in 133 A. D. He was chosen consul with Pertinax, after whose death (193) the prætorians offered the empire at public auction to the highest bidder. D., who was very rich, gave 6250 drachmas to each soldier, and was proclaimed emp. Within 2 months he was killed (June 1, 193) by his soldiers. He was succeeded by Severus.

Did'o ("the fugitive") [Gr. *Διδώ*], whose real name was **Elissa** or **Elisa**, a daughter of the Tyrian king Matzen, after whose death she and her younger brother Pygmalion (Pimeliem) were to reign conjointly. But Pygmalion usurped the whole authority, and procured the assassination of her husband, Zicharbaal (the Sichæus of Virgil). She then

fled with many Tyrians by sea, and founded Carthage about 870-860 B. C. (See VIRGIL, *Æneid*, i., ii., and iv.)

Didym'ium [Gr. *δίδυμος*, a "twin"], a rare metal, discovered in 1841 by Mosander.

Did'y-mus [Gr. *Δίδυμος*], a grammarian of Alexandria in Egypt, b. about 62 B. C., was surnamed CHALCANTERUS. He was noted for his fecundity as a writer, and is said to have written nearly 4000 treatises.

Die (plu. **Dies**), in coinage, the instrument by which impressions are stamped upon coins, etc. The intended device is first engraved upon a plug of softened steel, which is hardened, and called the *matrix*. From this an impression in *relief* is taken upon a piece of soft steel, which is hardened and called the *punch*; from this counter-impressions are taken upon steel, which are the dies. D. are used for many purposes, such as for buttons, jewelry, etc. The cheapness of such articles arises from the use of D., which by a single blow do the work that formerly required much labor.

Die'men, van (ANTHONY), a Dut. naval officer, b. at Kullenburg in 1593; served in the E. I., and became an admiral; was appointed gov.-gen. of the Dut. E. I. in 1636, and sent out in 1642 an exploring expedition under Abel Tasman, who discovered Van Diemen's Land. D. Apr. 19, 1645.

Die'penbeck, van, written also **Diepenbeke** (ABRAHAM), a Dut. historical painter, b. at Bois-le-Duc in 1599. Among his works is a series of 58 designs called *The Temple of the Muses*. D. in Dec. 1675.

Dieppe, de-ep', a seaport and watering-place of Fr., on the Eng. Channel, at the mouth of the river Arques and at the N. terminus of the Rouen and D. R. R., 33 m. N. of Rouen, 143 m. by rail N. W. of Paris. It stands between 2 ranges of chalk cliffs, and is defended by a wall and a castle. Vessels of 500 tons can enter the harbor at high water, but at low tide it is nearly dry. Pop. in 1881, 22,003.

Dieskau, dees'kow, **von** (LUDWIG AUGUST), a Ger. officer, b. in 1701, entered the Fr. service. He commanded a force which marched from Canada in 1755 and attacked Ft. Edward in N. Y. Here he was taken prisoner by the Brit. D. Sept. 8, 1767.

Di'et [from the Gr. *διαίτα*, "manner of living," "maintenance,"] Lat. *diæta*, a term signifying in its popular sense the food and drink which are taken to maintain life. Originally, however, the term included all the conditions of living, such as clothing, shelter, and exercise. (See FOOD, by EDWARD SMITH, M. D., LL. B., F. R. S., Lond.)

Di'et [Lat. *diæta*; from the Gr. *διαίτα*, to "govern,"], the name of the assembly of the Ger. states, originating at a very remote period. The sessions were made permanent at Ratisbon in 1663, and were removed to Frankfurt by the Confederation of the Rhine in 1806. In the present Ger. empire the functions of the old D. are exercised by the *Reichstag*.

Dieu et mon Droit [Fr.] ("God and my right"), the motto of the royal arms of Eng., first appearing on the broad seal in the time of Henry VIII.

Differential Thermom'eter, a thermometer for indicating very slight variations of temperature. It consists of 2 glass bulbs connected by a narrow tube, which is usually bent in the form of a U. The bulbs are uppermost, and are filled with air, while the tube contains a column of mercury or sulphuric acid. The measurement is effected by the expansion of the air in one of the bulbs. It is estimated that a change not greater than the 6000th part of a degree F. can be indicated by it. It is now in a great measure superseded by the thermopile.

Digam'ma [Gr. *διγάμμα*, "double gamma," from *dis*, for *dis*, "double," and *γάμμα*, "gamma,"] (the third letter (Γ) in the Gr. alphabet), so called from its shape (F), an anc. aspirate or consonantal letter, chiefly found in the Æolic dialect. It does not occur in extant lit., various substitutes having been employed for it. In many instances it disappeared from the words where it was anciently employed; in others it became β, φ, υ, or ο, or took the form of a simple rough breathing. In Lat. and in the Teutonic langs. we find abundant traces of the Gr. digamma. It is not found in the Homeric writings, but its influence is perceptible in the metre. D. is the name of one of the most important definite integrals, now of extensive use in math.

Digest'er, Papin's [named from Denis Papin, a Fr. savant, who invented it in 1681], an invention by which bodies may be subjected to the action of high-pressure steam or water raised above its ordinary boiling temperature to 400° F., and sometimes higher.

Digestion, de-jest'yun [Lat. *digestio*, from *dis*, "apart," and *gero*, to "carry"], a physiological process observable in animals. This process, in man and the higher animals, commences as soon as the food is taken into the mouth. The process is further carried on by the other secretions of the alimentary canal. The action of the stomach upon food is partly mechanical, partly solvent, and partly chemical. The chemical action is to some extent catalytic—i. e. not explicable by ordinary theories of chemical reaction. The gastric juice, the prin. secretion of the stomach, contains 2 active elements—free acid (chiefly lactic acid) and pepsin. The most important part of their action is the solution of the nitrogenous parts of the food, and their conversion into albuminose (peptone). The albuminose is absorbed by the coats of the stomach, and passes directly into the portal circulation, while the sugar, much of the starch, and probably all of the fat, pass on to be subjected to the action of the pancreatic juice, the bile, and the intestinal fluids. The pancreatic juice has the power of digesting fats by converting them into a fine emulsion, which is absorbed to some extent by the veins, but principally by the lacteals. It also converts cane-sugar and starch into grape-sugar, which is rapidly absorbed by the intestinal veins. The pancreatic juice probably completes the D. of such albuminous matters as have escaped D. in the stomach, being assisted in this work by the intestinal secretion. The bile is believed to be auxiliary to the other secretions in the

intestinal D., but its part in the process is by no means well ascertained. *From orig. art. in J. S. Unit. Cyc.*, by C. W. GREENE, M. D.

Digit [Lat. *digitus*, a "finger" in arith., one of the 10 figures, 0, 1, 2, 3, etc., used in writing numbers by the Arabic method; in astron., the 12th part of the diameter of the sun, or moon, used in expressing the magnitude of an eclipse. That diameter of the body eclipsed which is directed toward the centre of the eclipsing body is divided into 12 parts, and the magnitude of the eclipse is denoted by the number of these parts that are covered. This method of expressing magnitudes is usually confined to partial eclipses.

Digitalis [Lat. *digitale*, the "finger of a glove;" Fr. *digitale*; Ger. *Fingerhut*], a genus of plants belonging to the order Scrophulariaceae. With the exception of the common foxglove (*D. purpurea*), which is a native of G. Brit., the species are mostly found in S. Europe and different parts of Asia. *D. purpurea* has narcotic and poisonous leaves and seeds, which are valued for their medicinal properties. The fresh leaves are cathartic and emetic, and when dried are administered in diseases of the heart, brain, and nervous system, in which they act as a powerful sedative. They contain a crystalline principle called digitalin. Several of the species are cultivated in gardens.

Dijon, de-zhôn' (anc. *Dibio*), a town of Fr., on the river Ouche, about 175 m. S. E. of Paris and 130 m. N. of Lyons, being connected with both by R. R., and was formerly the cap. of Burgundy. It is inclosed by ramparts; contains the palace of the princes of Condé, a Gothic cathedral founded in the 13th century, the noble Gothic ch. of Notre Dame, a town-hall, public library, botanic garden, and an *académie universitaire*; has considerable manufactures and a large trade in Burgundy wines. Pop. 55,453.

Dike [Dut. *dyk*; Ger. *Deich*; Fr. *digue* or *levée*], an embankment or mound erected on the shore of the sea or of a river in order to prevent inundation. Such embankments raised along the Miss. River are called *levées*. The coasts of Hol. are protected against encroachments of the sea by D. constructed on a grand scale and in a systematic manner.

Dilke, dilk (Sir CHARLES WENTWORTH), BART., an Eng. republican politician, b. Sept. 4, 1843, ed. at Cambridge, and called to the bar in 1866. He travelled through the U. S., and on his return pub. *Greater Britain, a Record of Travel in Eng.-Speaking Countries during 1866-67*, which procured the author's election to Parl. for Chelsea. He is a recognized leader of the republicans in Eng. and the proprietor and ed. of the *Athenæum*. Appointed under-secretary of state for foreign affairs in 1880, and president of the local government board, with a seat in the cabinet, in 1882.

Dill, a plant of the order Umbellifera, having compound umbels, yellow involute petals, dorsally compressed lenticular fruit, and the border of the calyx minute and 5-toothed. The common D. (*Anethum graveolens*), an annual or biennial plant, is a native of S. Europe and Asia, and has long been cultivated for its stimulant and carminative seeds. It is also highly aromatic, and the leaves are used to flavor sauces, etc. D.-seed is administered in the form of D.-water, obtained from oil of D., a pale-yellow essential oil.

Dillingham (PAUL), b. in Shutesbury, Mass., in 1800, removed with his father to Waterbury, Vt., in 1805; admitted to bar 1824; M. C. 1843-47; gov. of Vt. 1865-67.

Dillmann (CHRISTIAN FRIEDRICH AUGUST), a Ger. theol. and Orientalist, b. Apr. 25, 1823, became prof. of exegetical theol. at Tübingen in 1853, of Oriental langs. at Kiel, 1854, of exegetical theol. at Giessen, 1861, and at Berlin 1869. Author of *Grammatik der Äthiopischen Sprache*, *Lexicon lingue Æthiopice*, and of *ETHIOPIAN LANGUAGE in J. S. Unit. Cyc.*

Dillon, Mont. See APPENDIX.

Dilman (REV. JEREMIAH LEWIS), D. D., b. at Bristol, R. I., May 1, 1831, grad. at Brown Univ. 1851, and at Andover Theological Sem. 1856; was settled over First Congl. ch. in Fall River, Mass., in 1856, and over Harvard ch. in Brookline, Mass., in 1860; in 1864 was elected prof. of hist. and political economy in Brown Univ. D. Feb. 3, 1881.

Dimitry (ALEXANDER). See APPENDIX.

Dim'ity [from *Damietta*, in Egypt, where it was formerly manufactured], a cotton fabric of thick texture. The figure is raised on one side and depressed on the other, so that the 2 faces present reversed patterns.

Dimorphism [from the Gr. *dis*, "twice" or "two," and *μορφή*, a "form"], the property of assuming 2 distinct crystalline forms.

Dimorphous, a term applied to a body which has the property of crystallizing in 2 distinct forms.

Dindorf (WILHELM), a Ger. philologist, b. at Leipzig Jan. 21, 1802; became prof. of hist. and lit. in Leipzig in 1828, but resigned in 1833 in order to devote himself to the publication of a new ed. of the *Thesaurus* of Stephanus, which his brother Ludwig Dindorf (ed. of Xenophon) and Hase had begun in Paris. He prepared eds., with commentaries, of *Æschylus*, *Sophocles*, *Euripides*, *Aristophanes*, and of *Demosthenes*, for Univ. of Ox., beside critical eds. of *Athenæus*, *Eusebius*, of Gr. grammarians, lexicographers, etc. D. 1883.

Dingo, an Australian dog, somewhat larger than a shepherd's dog, of tawny color, with large head, ears short and erect, and tail bushy; it does not bark when wild.

Dinichthys [Gr. *deinos*, "terrible," and *ichthys*, "fish"], a remarkable placoderm fish found in the upper Devonian rocks of O., and described by Prof. Newberry. It was allied to *Coccoosteus*, but was very much larger; the head was 3 ft. in length, the lower jaws 2 ft. long and very massive, the central dorsal shield 2 ft. in diameter, etc. One species was without proper teeth, but the jaws played on each other like huge shears.

Dinornithidæ [Gr. *deinos*, "terrible," and *ornis*, "bird"], an extinct family of gigantic birds of the order Ratitæ, of which the bones have been found in the recent deposits of New Zealand. The wings were entirely atrophied. In the traditions of the country the birds are known by the name of moa. Some of the species were at least

twice the size of the ostrich. The frame-work of the leg was massive, and the bones are remarkable for their solid-



Dinornis robustus.

ity, the toe-bones of *Dinornis elephantopus* almost rivaling those of the elephant. A number of species have been described.

Dinosauria [Gr. *deinos*, "terrible," and *σαῦρος*, "lizard"], an order of reptiles characteristic of the mesozoic age. They had separate pelvic bones, ilia produced in front of acetabula, limbs well developed, and the tarsus with the astragalus and calcaneum alone constituting a proximal row. The group is considered by Marsh to be of sub-class of value, and has been divided into 5 primary groups (sub-orders or orders) and 14 families, of which the most noteworthy are the Iguanodontidæ, Megalosauridæ, and Compsognathidæ.

Dinotheriidae [Gr. *deinos*, "terrible," and *θηρίον*, "beast"], an extinct family of proboscideans, without upper incisors, but with lower developed as long tusks bent downward; 5 double-ridged grinders on each side of both jaws, and the nasal cavity large. The species were of elephantine size, and lived in the miocene epoch.

Dinsmoor (Gen. SAMUEL), b. at Londonderry, N. H., July 1, 1766, grad. at Dartmouth in 1789; was gen. of militia, M. C. 1811-13, and gov. of N. H. 1831-34. D. Mar. 15, 1835.

Dinsmoor (SAMUEL), LL.D., a son of the foregoing, b. at Keene, N. H., May 8, 1799, grad. at Dartmouth in 1814, and became a lawyer; was gov. of N. H. 1849-53. D. Feb. 24, 1869.

Dinwiddie (ROBERT), b. in Scot. about 1690; was appointed gov. of Va. in 1752, and filled that office until 1758, when he returned to Eng. D. Aug. 1, 1770.

Diocletian [Lat. *Diocletianus*], or, more fully, **Caius Valerius Aurelius Diocletianus**, a Rom. emp., b. of humble parentage in Dalmatia 245 A. D. On the death of Numerianus, in 284, he was proclaimed emp. by the army at Chæcedon. In the yr. 286 he adopted Maximian as his colleague in the empire, and in order to divide the labor of ruling so vast an empire they chose Galerius and Constantius Chlorus as their assistants in 292, and gave them the title of *cæsar*. This was the beginning of the division of the empire into E. and W. D. reserved to himself Asia and Egypt, Maximian received power over It. and Afr., Thrace and Illyricum were assigned to Galerius, and Gaul and Sp. to Constantius Chlorus. The supremacy of D. (whose court was at Nicomedia) was acknowledged by the other 3. D. protected or omitted to persecute the Chrs. until 303, when a persecution was commenced at the instigation of Galerius. D. abdicated the throne in 305. D. 313. (See TILLEMONT, *Histoire des Empereurs*; VOGEL, *Der Kaiser Diocletian*.)

Diocletian Era (called also the **Era of Martyrs**, on account of the persecution in Diocletian's reign) was used by Chr. writers until the introduction of the Chr. era in the 6th century, and is still employed by the Abyssinians and Copts. It dates from the day on which D. was proclaimed emp. at Chæcedon, Aug. 29, 284.

Diodontidae [Gr. *dis*, "double," and *ὄδους* (gen. *ὀδόντος*), "tooth"], a family of fishes of the order Plectognath, with the jaws of both sides united together, and with the teeth into an upper and lower jaw. The typical species are designated porcupine-fish, from their numerous spines, which stand out like those of a hedgehog.

Diodorus Siculus, a Gr. historian, b. at Agyrium, in Sic., flourished about 50-20 B. C. He travelled in Europe and Asia in order to collect materials for a universal hist., which he completed in 40 books, entitled *Historical Library* (*Βιβλιοθήκη ιστορικὴ*). It is a hist. of the world from the earliest times to 60 B. C. Fifteen entire books of his work and some fragments of the others are extant.

Diogenes, di-oj'-nēz [Gr. *Διογένης*, a famous Cynic philos., b. at Sinope in Asia Minor, flourished about 400-330 B. C. He was a pupil of Antisthenes at Athens. His habits were austere, eccentric, and frugal. According to tradition he usually lodged in a cask or tub. He was renowned for his witty and sarcastic sayings. He once received a visit from Alexander the Great, who inquired, "What can I do for you?" D. replied, "Cease to stand between me and the sun." Having been captured by pirates, who offered him for

sale in a slave-market of Crete, he was asked what he could do, and replied, "I can govern men; therefore sell me to some man who needs a master." He was purchased by Xenades, a citizen of Corinth, who was a kind master, and soon liberated him and employed him as tutor of his children. D. died about 323 B. C.

Diongenes Laërtius [Gr. Διογενής ὁ Λαέρτιος], a Gr. compiler, probably b. at Laerte in Cilicia. Nothing certain is known of the period in which he lived or of his personal hist., except that he compiled *The Lives and Doctrines of the Anc. Philos.*

Diongenes of Apollonia, a Gr. philos., b. in Crete, a pupil of Anaximenes. He lived about 470 B. C., and wrote a work on *Nature*, not now extant.

Diomedea. See ALBATROSS.

Diomedes, often anglicized **Diomedes** or **Diomed** [Gr. Διομήδης], a brave Gr. warrior and king of Argos. He fought with distinction at the siege of Troy. D. and Ulysses are said to have carried away the Palladium of Troy.

Dion [Gr. Δίων], a statesman of Syracuse, b. about 410 B. C. He acquired great influence at the court of Dionysius the Elder, who had married Aristomache, a sister of D. He was a pupil and intimate friend of Plato, who taught at Syracuse. After the accession of Dionysius the Younger, a dissolute tyrant, he was banished, and took refuge in Athens, leaving at Syracuse his wife Arete, who was compelled to marry another man. In order to revenge himself and liberate his country, he raised a small body of troops in 357, and captured Syracuse. He was assassinated by Calippus about 351 B. C. (See CORNELIUS NEPOS, *Dion*.)

Dion, or **Dio**, surnamed **CHRYSOSTOM** ("golden-mouthed"), a Gr. sophist or rhetorician, b. at Prusa in Bithynia about 50 A. D. He received a liberal education, perfected by travel. He became a resident of Rome in 96 A. D., and left many orations, of which 80 are extant. D. about 117.

Dionea [a name of Venus], a genus of plants of the natural order Drosaceæ. One species only is known, *D. muscipula*, commonly called Venus's fly-trap. It grows in moist sandy soil, and is indigenous only to the S. E. part of N. C. The plant is perennial, with a rosette of root-leaves, from the midst of which a scape about six inches high arises, terminating in a corymb of white flowers. It derives its popular name from the singular irritability of its leaves. The elongated leaf-stalk is winged, and bears an orbicular leaf at its extremity, having the margin set round with long bristly hairs. On its upper surface are many small glands, and three slender irritable hairs on each side, so that an insect can hardly cross the leaf without touching one of them, when the 2 sides of the leaf instantly close together, the marginal bristles crossing each other, and thus preventing any possibility of escape. The leaf remains closed until the insect is dead, macerated in a juice secreted by the leaf, and the juice re-absorbed. That the plant feeds upon the captured insect can now hardly be doubted.



Dionea: Venus's Fly-trap.

Dion Cassius, **Dio Cassius**, or, more fully, **Cassius Dion Cocceianus**, a historian, b. at Nicæa in Bithynia about 155 A. D. He became a Rom. senator, and was chosen consul in the yr. 220. He wrote in Gr. a *Hist. of Rome* in 80 books, from the arrival of Æneas to 229 A. D. Only 18 books (from 36 to 54) have been preserved entire.

Dionysia [Gr. Διονυσία], annual festivals in honor of Dionysus (Bacchus), chiefly celebrated at Athens, and said to have been introduced into Gr. from Egypt 1415 B. C.

Dionysius Exiguus, a learned monk, b. in Scythia; lived at Rome, and wrote a collection of apostolical canons and decisions of councils. He fixed the yr. of the Incarnation as coincident with the yr. 753 of Rome. He was the first who computed the Chr. era from the birth of Chr., instead of his death. Exiguus, "the little," refers to his small stature. D. about 556.

Dionysius of Halicarnassus [Gr. Διονύσιος ὁ Ἁλικαρνασσεύς], an eminent Gr. historian and critic, b. at Halicarnassus in Caria about 70 B. C. He removed to Rome in 30 B. C. and prepared a hist. (in Gr.) entitled *Rom. Antiquities* ("Ρωμαϊκὴ Ἀρχαιολογία"), in 20 books. Nine entire books and fragments of the others are extant. Among his critical works are a *Treatise on Rhetoric* and *De Compositione Verborum*. D. about 6 B. C.

Dionysius [Gr. Διονύσιος] the Elder, a celebrated tyrant of Syracuse, b. about 490 B. C. He was in his youth an obscure private citizen, and became a gen. in the service of the republic of Syracuse when Sic. was invaded by the Carthaginians. In the yr. 405 he usurped the supreme power in Syracuse, which then ceased to be a republic. He was an able ruler, displayed superior political talents, and was one of the most powerful princes of his time. At the request of Dion he invited Plato to his court, but the lectures of that philos. offended the tyrant, who ordered the capt. of a ship to take Plato away and sell him as a slave. D. 367. (See GROTE, *Hist. of Gr.*)

Dionysius the Younger, tyrant of Syracuse, was a son of the preceding, whom he succeeded in 367 B. C. He was indolent, dissolute, and inferior to his father in political talents. He was persuaded by Dion to invite Plato to his court, but the eloquence and wisdom of that philos. were unavailing to reform him. D. banished Dion, who in 357 B. C. returned with a small army and expelled the tyrant. The latter fled to Locri, and became the despotic ruler of that city. He recovered power in Syracuse about the yr. 346, but on the application of the Syracusans, Timoleon was sent with an army from Corinth and deposed him in 344.

Dionysus [Gr. Διώνυσος or Δίωνυσος], the original Gr. name of Bacchus, the god of wine.

Diophantus [Gr. Διόφαντος], a Gr. math. who lived at Alexandria, probably between 200 and 400 A. D. Wrote the most anc. extant treatise on algebra, and a work called *Arithmetica*, in 13 books, of which only 6 are extant.

Dioscorides Pedanius [Διοσκορίδης Πεδάριος], a Gr. botanist, b. at Anazarba in Cilicia, lived between 50 and 200 A. D. He travelled in Asia Minor, Gr., and It., to procure information about plants, and wrote in Gr. a celebrated work on materia medica.

Dioscuri [Gr. δίδασκουροι], (i. e. "sons of Jupiter"), a name given to Castor and Pollux.

Diospyros [probably the δίδυρον of Theophrastus, a name signifying in Gr. the "wheat" or "bread of Zeus"], a large genus of trees of the ebony family, comprising about 100 species, mostly natives of the tropical parts of the Old World. They generally have hard wood, and many of them yield edible fruits.

The persimmon tree of the Atlantic States and Miss. Valley (*D. Virginiana*) is well known for its fruit, which becomes edible late in autumn, and for its wood, used by makers of lasts for shoes; is represented in Tex. and N. Mex. by the *D. Texana* (persimmon, ebony, or japote).

The pishamin or date-plum (*D. lotus*) grows in Europe as far N. as Lond., and its name is made into preserves or eaten without cooking. Other species are prized for their fruit in Chil., Afr., and Japan. The calamander-wood and several other Diospyri of Asia are greatly valued for their timber. Among these is the true ebony (*D. ebenum*), which grows principally in Ceylon. Remains of many fossil species are found in the eocene of the U. S.

Dip and Strike. In geol., the angle of inclination of a stratum to the horizon is called its *dip* or *pitch*. Strata presenting this inclination must cut the surface in a line, and this line, called the *outcrop* of the rocks, has a definite direction, which in geological lang. is called the *strike* (from Ger. *streichen*, to "reach," to "extend"). The strike of rocks is therefore the compass direction of the intersection of their plane of stratification with the plane of the horizon. The amount of inclination for practical purposes can be measured by the clinometer.

Diphtheria [from the Gr. διφθερα, the "skin" of an animal, in allusion to the false membrane described below], an acute disease, characterized by inflammation of the mucous membrane of the pharynx, attended by an exudation of lymph, often assuming the character of a false membrane, which may extend into the larynx and air-passages, into the oesophagus, and into the mouth, occasionally also appearing upon raw or mucous surfaces of other parts of the body; it is also attended by prostration and albuminuria, which may or may not be persistent. D. is not a new disease, but its nature having been investigated by Bretonneau (who gave it the name *diphtheritis*), it has of late received much attention, more especially from its present frequency and the terrible fatality which distinguishes it. Its duration and symptoms are variable, and the distinctive exudation is by no means of uniform appearance. In general, the mucous membrane is dark and congested, and the exudation growing from one or more centres if torn away leaves a bleeding and sensitive surface. The prognosis is always grave, no case being free from danger. The mildest attack may be followed by paralysis or by fatal prostration. No routine treatment can be laid down for this disease. In mild cases it is permissible to use detergent chlorinated washes and local applications of carbolic acid, sulphate of zinc, and glycerine for the mouth, and the gen. treatment may be mainly expectant, provided the pulse is firm. When the constitution is depressed, sulphate of quinia has the happiest effects upon many cases. Tincture of iron, alcoholic stimulus, carbonate and muriate of ammonia, with nutritious liquid diet, are needed in severe cases. The inhalation of vaporized water is an excellent measure. The treatment of the various sequelæ of D. requires the careful use of tonics, such as strychnia and iron, with the best hygienic conditions. F. DARWIN HUDSON, JR.

Diplomacy is the art of conducting the official intercourse between 2 states, which is now generally committed to persons resident in a foreign land and accredited to its govt. These were formerly sent on a special business and, their commission being ended, they returned home. The advantage of the stay of a permanent envoy at a foreign court is to watch the changes of politics and manage affairs with better knowledge of opinion there. It is probable that many disputes are thus prevented and many intrigues nipped in the bud. The diplomatic corps, resident near a court, forms a fraternity, sometimes has meetings in which the oldest resident presides, and can, in crises, lend the influence of many states to prevent hasty plans which would lead to disaster and war. T. D. WOOLSEY.

Dip of the Horizon, in navigation, the angle of depression of a line from the point of sight tangent to the surface of the ocean below a horizontal plane through the same point. The dip, which increases the apparent altitude of a heavenly body, depends upon the height of the point of sight above the sea-level; its values for different heights are given in all treatises on navigation.

Dipper (*Cinclus*), a genus of birds of the family Cinclidae, found in Europe, Asia, and Amer. They feed chiefly on

aquatic insects, diving with great facility, and moving about under water by means of their wings. *C. Mercurius* inhabits the middle provs. of N. Amer.

Dipping Needle. When a magnetic needle is hung within a stirrup so as to move freely in a vertical direction, and the whole system is suspended by a thread, it will adjust itself in the magnetic meridian, and its pole will dip toward the N. pole of the earth. Such a needle is called a *dipping needle*, and its deviation from the horizontal line is its *inclination*. When the needle is carried nearer the magnetic pole, the inclination increases. Sir James Ross in 1832 saw the D. N. stand within 1 minute of a degree of the vertical position near Baffin's Bay. Approaching the equator, it becomes less and less inclined, until a point is reached at which it is quite horizontal. This point will be in the *magnetic equator*, or line of no dip, which is near, but not coincident with, the equator of the earth. (See MAGNETISM.)

Dip'sas [Gr. *δῖψας*, the name of a venomous snake whose bite caused intense thirst, from *δίψα*, "thirst," a genus of non-venomous serpents belonging to the Colubridæ. They are tree-snakes, greatly elongated in form, and having a broad, thick head. They are natives of the warmer parts of Amer. and Asia. Some of them are of large size.

Dipsomania [from the Gr. *δίψα*, "thirst," and *μανία*, "frenzy"] is a term sometimes applied to delirium tremens, but of late more especially used to designate a morbid craving for alcoholic drinks, sometimes called *methomania*. Of late, this craving is looked upon as a disease, and it has been very successfully treated in "inebriate asylums" in various countries.

Diptera [Gr. *δίς*, "two," and *πτερόν*, "wing"], an order of insects having 2 wings, corresponding to the anterior pair, and 2 short appendages, called "halter" or balancers, as rudiments of the posterior pair in 4-winged insects. The mouth is generally suctorial, and constructed of from 2 to 6 lancet-shaped, elongated scales, enveloping a canal upon the upper surface of a fleshy proboscis. The larvæ or maggots generally have a membranous head, and stigmata in the second and terminal segments of the body.

Dipteridae [Gr. *δίπτερος*, *ἰ. ἔ.*, having 2 fins], a family of ganoid fishes of the triassic age. They had a large and flattened head, and double anal and dorsal fins, opposite to each other.

Dipterocarpus [Gr. *δίπτερος*, "two-winged," and *καρπός*, "fruit"], a genus of plants of the order Dipteraceæ, comprises several species of the noblest trees of India. They bear clusters of large fragrant flowers, and abound in a resinous juice which is used medicinally and for burning in torches. The fruit is furnished with 2 membranes like wings. The *D. turbinatus*, or gourn tree, often attains a height of 200 ft., and has no branches except near the summit. The wood is hard, close-grained, and durable. From the trunk exudes a fragrant oil which is valuable for varnish, for an ingredient of paint, and for med.

Director [Fr. *Directoire*], in Fr. hist., the name given by the const. of 1795 to the executive body of the republic, consisting of 5 directors, selected by the Council of Elders from a list presented by the Council of Five Hundred, one to retire each yr. and be succeeded by another chosen in the same way. The first directors were Barras, Laréveillère-Lépaux, Rewbell, Carnot, and Letourneur. They soon split into 2 parties, and the first 3, named above, constituting a majority, removed their opponents by the *coup-d'état* of the 18th Fructidor (Sept. 4), 1797. In 1797 the directors were Barras, Ducos, Gohier, Moulins, and Sieyès. The D. was abolished by the *coup-d'état* of the 18th Brumaire (Nov. 9), 1799, in which Bonaparte and Sieyès were the prominent actors. (See BARANTE, *Hist. du Directoire*.)

Dirt-Bed, a name given to deposits of dark-brown or black earthy lignite situated in the lower Purbeck series in Europe, near the top of the middle secondary or mesozoic rocks. Through the beds, which are from 12 to 18 inches thick, are distributed stones from 3 to 9 inches in diameter, also the silicified trunks of cycadaceous trees like *Zamia*. For many miles this black earth may be traced, containing fragments of fossil wood. The name "dirt-bed" is also given by geologists to the strata in the carboniferous rocks, etc., in which fossil roots of trees are found *in situ*.

Disciples of Christ, or, as they generally call themselves, **Christians or Church of Christ**, a body of Chrs., frequently called **Campbellites**, taking the latter name from Alexander Campbell (see CAMPBELL, ALEXANDER), one of their most distinguished elders, and from his father, Rev. Thomas Campbell, a Scotch-Irish "Seceder," who came to the U. S. in 1807, and with his son began to labor in W. Pa. for the restoration of Christianity to apostolic practice. In 1811 they organized the Brush Run ch. in Washington co., Pa. In 1812 this ch. adopted Bap. views, and in 1813 they, with other sister congregations, joined a Bap. association. But as the principles and practice of the Campbells and their followers were distasteful to many Baps., much agitation followed, and in 1827 the Bap. chs. generally withdrew from fellowship with the reformers, who consequently organized themselves anew, professing to reject all creeds, and to receive the Bible alone as their authority in faith and practice. They, however, though rejecting the Trinitarian terminology, are, in fact, in essential agreement with other evangelical Chrs. in their opinions with regard to the person and work of Chr. and the future resurrection and judgment. They celebrate the Lord's Supper weekly, hold that repentance and faith should precede baptism, though, from the importance they attach to the latter ordinance, they are often charged with holding to baptismal regeneration. On all other points they allow and encourage independence of individual opinion. Their ch. organization is congl. Their officers are of 3 classes: (1) elders, called also bps., pastors, and presbyters; (2) deacons; and (3) evangelists who are itinerants supported by the free offerings of the congregations. This denomination is distinguished for its efforts in behalf of education. They hold that the laborer is worthy

of his hire, and teach the duty of the Ch. to provide amply for its ministers' support. They sustain several religious quarterly and monthly reviews and many weekly periodicals in the U. S., and several in G. Brit. and her colonies. Among their numerous insts. of learning are Bethany Coll. in W. Va.; Hiram Coll., Hiram, O.; the N.-W. Chr. Univ., Indianapolis, Ind.; Eureka Coll., Ill.; Ky. Univ., Lexington, Ky., and Oskaloosa Coll., Oskaloosa, Ia., beside a large number of sems. and schools of a high grade. B. A. HINSDALE.

Dishonor [from the Lat. *dis*, "un," and *honor*, "honor"], in mercantile lang., signifies to refuse or neglect to pay (or to accept) a draft or a bill of exchange. The act of drawing or indorsing such a bill or draft involves the drawer and indorser in an obligation to pay it in case the drawee dishonors the same. In order that the person in whose favor it is drawn may have recourse against the drawer and indorser, it is necessary that notice of the D. shall be given to these parties without unreasonable delay.

Disinfection [from the Lat. *dis*, "un," and *infectio*, *infectum*, to "stain," to "taint," to "poison"] is the destruction of the causes of disease present in any locality or material. It may be applied therefore to the atmosphere, to sewage or other liquid or solid filth, to ships, houses, clothing, merchandise, etc. The power of the substances commonly used for this purpose has been overrated; they seldom destroy the infectious materials, yet they often do good by removing the conditions which favor their dissemination. The modes of action of disinfectant substances may be classified as follows: 1. By absorbing gases and preventing their emanation—dry earth, lime, charcoal. 2. Neutralizing sulphuretted hydrogen gas—nitrate of lead. 3. Decomposing sulphuretted hydrogen and dead organic matter—chlorine, iodine, bromine, permanganate of potassa. 4. Arresting decay and putrefaction in vegetable and animal materials—sulphurous and hyponitric acid gases, chloride of zinc, protosulphate, protochloride, and sesquichloride of iron, wood-tar, coal-tar, carbolic acid. 5. Destroying minute organisms, vegetable or animal (disease-germs), in the atmosphere—carbolic acid; perhaps chlorine, iodine, and bromine.

Quantities of disinfectants for use may be thus stated. For privies or sewers, a pound of sulphate or chloride of iron or chloride of lime, diffused in a gal. of water, will answer for a large amount of foul material. A pint of Burnett's liquid in a gal. of water will be strong enough for use. For water-closets or bed-pans, Labarraque's solution of chloride of soda, a fluid-ounce in a quart of water; or permanganate of potassa, 10 grains to a quart of water; or carbolic acid, 20 grains to a pint. Drinking-water is best purified by filtration through charcoal. Articles of clothing may be disinfected by boiling them in a solution of the permanganate, an ounce to 3 gals. of water. Occupied rooms may be disinfected by fresh chloride of lime, placed about in saucers. But the only sure disinfectant agencies are *cold* and *heat*. Malaria is disarmed of its power by a single hard frost, and the same is true of the infection of yellow fever. Cholera disappears almost always in temperate climates with the approach of winter. The continuance of smallpox, typhus, etc. during cold weather is due to the closing up of houses to keep them warm, thus diminishing ventilation.

Heat was known by the anc. to exert an influence antagonistic to infection. Fires were in early times burned in the streets of cities to dissipate the plague. Yet only latterly has this been clearly verified by science. Dr. Henry of Manchester, Eng., in 1824, performed a series of experiments, by which he proved that the contagious property of smallpox and of vaccine virus, and that of typhus and scarlet fever, are destroyed by a temperature of from 140° to 200° F. In 1851 Dr. von Busch of Berlin made a trial of this agent in a lying-in hospital, in which puerperal fever had been very destructive. After all ordinary methods of D. had failed, he had all the patients removed and the wards heated by stoves, for 2 days, up to the temperature of 150° F. The same class of patients being reintroduced, not a single case of the fever followed. Dr. Bell of Brooklyn and Dr. E. Harris of New York also made use of superheated steam as a disinfectant in New York city during the cholera season of 1866. [From orig. art. in *J.'s Unit. Cyc.*, by PROF. HENRY HARTSHORNE, M. D.]

Dislocation [from the Lat. *dis*, "apart," and *loco*, *locatum*, to "place"], otherwise called **Luxation** [from the Lat. *luxo*, *luxatum*, to "loosen"], in surgery, is the displacement of a bone from its proper relation to another bone with which it is articulated. The restitution of a dislocated bone is called its "reduction."

Dis'mal Swamp, a great morass lying in several cos. in Va. and N. C., is about 30 m. long and 10 m. wide. A large portion of it is covered with dense forests. Near the middle of the swamp is Lake Drummond, area about 6 sq. m. A canal through the D. S. opens steam communication between Chesapeake Bay and Albemarle Sound.

Dispersion [Lat. *dispersio*, from *dis*, "apart," and *spargo*, *sparsum*, to "scatter"], in optics, is the angular separation of the constituent rays of light when decomposed by the prism. Owing to the unequal refrangibility of the rays of different colors, a beam of light admitted through a small aperture in the shutter of a darkened room, and refracted by passing through a prism, forms an elongated image or spectrum; the red rays, which are the least refracted, occupying one end of the spectrum, and the violet rays, which have the greatest refraction, the other end. The rays after refraction are no longer parallel, so that the index of refraction (the ratio of the sine of incidence to the sine of refraction) is different for each ray; and the difference of the indices for the extreme rays is called the D. of the light. It had been supposed by Sir Isaac Newton that the D. was proportioned to the refraction, but it was soon found that although the colors in spectra formed by prisms of different substances are always arranged in the same

order, they do not occupy the same relative amount of space; a prism of flint-glass giving, in proportion, less red and more violet than a prism of crown-glass, and that substances for which the index of refraction of the middle ray of the spectrum is nearly the same, produce spectra of different lengths.

F. A. P. BARNARD.

Disraeli, diz-rah'-el (Rt. Hon. BENJAMIN), D. C. L., an eminent Eng. statesman and novelist of Jewish extraction, b. in Lond. Dec. 21, 1805; wrote mediocre novels, *Trivium Grey* (1826), *The Young Duke* (1830), *Contarini Fleming* (1832), etc., some of which, however, were successful. *Endymion*, the last of his novels, was pub. in 1880. He offered himself as a radical candidate for Parl. in 1831, but was defeated. Having become a Tory, he was again repulsed by the electors of Taunton in 1835, but was elected M. P. for Maidstone in 1837. His maiden speech was so pretentious, and uttered with gestures so extravagant, that he excited the laughter of the House, and closed abruptly, saying, "I shall sit down now, but the time will come when you will hear me." Having gradually acquired skill as a debater, he became about 1842 the leader of the "Young England Party," and denounced Sir Robert Peel with unsparring invective because Peel advocated the repeal of the Corn Laws. In 1846 he was returned to Parl. for Buckinghamshire. He succeeded Lord G. Bentinck, who d. in 1848, as leader of the protectionist party in the House of Commons. He was chancellor of the exchequer in the conservative ministry of Lord Derby for nearly 9 months in 1852. Early in 1855 he was again appointed chancellor of the exchequer in the new conservative Derby-Disraeli ministry. In June 1859 he resigned with his colleagues. On the defeat of the electoral Reform bill of Russell and Gladstone, in June 1866, the liberal ministers resigned, and the conservatives formed a new cabinet, in which D. was chancellor of the exchequer. He was the prin. author and manager of the Reform bill which became a law in Aug. 1867, and extended the right of suffrage to every household in a borough. This bill enfranchised nearly a million of men, mostly workmen, and was considered a dangerous innovation by the conservatives. D. succeeded Lord Derby, who resigned the place of prime minister in Feb. 1868. After a long debate, Mr. Gladstone's resolutions to disestablish the Irish (Epis.) Ch. were adopted by the House of Commons May 1, 1868, by a majority of 64. D., though defeated on this important question, resolved not to resign office, but to wait for the result of the gen. election, which occurred in the next Nov. The liberal party having secured a large majority in the new Parl., he and his colleagues resigned, Dec. 2, 1868, and Mr. Gladstone then became prime minister. Wrote *A Vindication of the Eng. Const.* He was chosen lord rector of the Univ. of Glasgow 1873, and became prime minister again in 1874. In 1877 he took his seat in the House of Lords as Viscount Beaconsfield; in 1878 he sat in the Cong. of Berlin, and on July 22, 1878, the queen conferred on him the order of the Garter. Mr. Gladstone succeeded him as prime minister in 1880. D. Apr. 19, 1881.

Disraeli (ISAAC), D. C. L., an Eng. *littérateur*, father of the preceding, b. at Enfield in May 1766. He inherited a fortune from his father, a Heb. merchant originally from Venice, and belonging to one of the Jewish families who escaped to Venice from the Inquisition in Sp. in the 15th century, and devoted himself to the study of literary history. Wrote *Curiosities of Lit.* and *Calamities of Authors*. D. Jan. 19, 1848.

Disseizin [from *dis*, "un," and *seizin*], in law, a term signifying an unlawful ejection of one who is seized of a freehold in lands, so as to deprive him of the seizin and place it in another. The modern equivalent for this word is "adverse possession." There is also "D. by election," where a person chooses to consider himself disseized, though he is not so in fact, in order to avail himself of legal remedies applicable to a true D.

Dissenters [from the Lat. *dis*, "apart" (or "differently"), and *sentio*, to "think"], or **Nonconformists**, the name given to Eng. Prots. who differ in their views from the Ch. of Eng. After the passage of the Act of Uniformity (1662), about 2000 clergymen seceded, and were called D. In 1673 all persons who refused to take the oath of supremacy and to partake of the Eucharist according to the rites of the Ch. of Eng. were excluded from govt. employment. By the Toleration Act of 1689, D. obtained the legal right to celebrate their worship. The Corporation and Test Repeal Act (1828) enabled them to hold public office without taking the Eucharist. In 1836 they were first authorized to solemnize marriage in their own houses of worship or at a registrar's office.

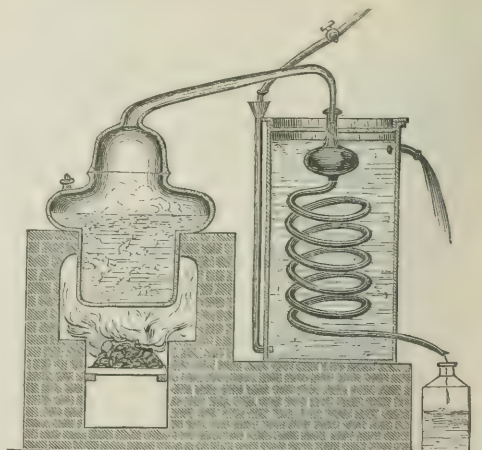
Dissidents. See DISSENTERS.

Dissolving Views are the enlarged images of transparent pictures thrown upon a screen by means of 2 magic lanterns placed side by side, with their lens tubes a little convergent, so that the projected images may be superposed. By means of mechanical contrivances, which differ in different forms of the apparatus, one of the images is gradually extinguished while the other is similarly developed. At the middle point the 2 are confusedly intermingled, and afterward one seems to swallow up the other.

Distillation [Lat. *destillare*, from *de*, "down," and *stillio*, *stillatum*, to "drip"], in chem. and the arts, a process by which substances which are vaporized at different temperatures are separated from each other, or substances which can be vaporized are separated from those which cannot. When the vaporized substance assumes a solid form after D., the process is called "sublimation." D. is usually performed by means of a boiler for raising the vapor, and a condenser for reducing the vapor to a liquid or solid form. The condenser is often a spiral tube or "worm," which is kept cool by water while in use. Various instruments for distilling are used in the laboratory of the chemist. "Dry" or "destructive" D. is the production of new compounds by submitting substances of organic

origin to a high but carefully regulated heat. These products are often complex, but sometimes perfectly definite. "Fractional" D. separates one volatile substance from another, by keeping the mixture at a temperature at which the most volatile will pass over into the condenser.

To produce spirits 2 distinct operations are required—one to convert vegetable principles into alcohol, the other the separating of the alcohol from the several substances with which it is united while being produced. Sugar is the prin-



Distillation Process.

ciple which is necessary to the formation of alcohol, and is used *directly* when molasses and similar saccharine products are submitted to quick fermentation; and *indirectly* when sugar is produced from the starch which certain grains contain, and afterward converted into alcohol. (See ALCOHOL, BRANDY, RUM, and WHISKEY.) C. F. CHANDLER.

Distilled Water, (*agua destillata*) is the condensed product obtained by the distillation of water, which separates from it all saline matter and impurities, and also most of the air which it had previously contained. On this account it is flat and rapid to the taste. It is much used in chemical and pharmaceutical operations. In some points on the Gulf Coast of the U. S., as at Brazos Santiago, Tex., where streams are unknown and springs scarcely exist, water is procured for drinking and other economical purposes by distillation from the sea. On some sea-going steamers the product of the condensers of the low-pressure engines is utilized for cooking, washing, etc., and is used for drinking to some extent.

District [from the Lat. *distringo*, *districtum*, to "bind," also to "divide"], a territorial division; a defined portion of a state or city, which is divided into D. for judicial, fiscal, or elective purposes. In the U. S. each State is divided into Congressional D. which are nearly equal in pop. and elect each 1 M. C. Every State is also divided into senatorial D., each of which sends a member to the senate of that State. Tps. in many parts of the U. S. are divided into school D., each of which maintains and manages one or more public schools. There are also military and other D.

District Attorneys of the United States. The name of these officers does not indicate their duties or the extent of their official jurisdiction. Formerly, in Eng. and now in some of the Amer. States, a dist. of country embracing several cos. was assigned to a judge, in which he held criminal court, called Oyer and Terminer, to "hear and determine." An atty. to represent the Crown or State was necessary to enter upon trials. As he was selected to proceed through the whole dist. he received the appellation of "district attorney." In the Federal courts, and in many of the States, the duties of this officer have become local, confined to a particular co. or place of holding a single court. But the name of the officer continues the same as formerly, when there was reason for its application to him. D. A. represent the U. S. in all their business in the circuit and district courts, both civil and criminal. In civil suits they stand in the same relation to the govt. that other attys. do to their clients. They also represent the U. S. in the prosecution of all crimes and misdemeanors. This office is one largely sought for by lawyers. The position is considered highly respectable, and is often exceedingly profitable. The D. A. receive a nominal salary of \$200, and the residue of their compensation is mainly derived from fees prescribed by an act of Cong. When they defend officers and others at the instance of the govt. their remuneration is not regulated by law, but depends upon agreement. The D. A. are required by law to report to the atty.-gen. an account of their official proceedings and the state and condition of their offices. T. W. DWIGHT.

District of Columbia. See WASHINGTON, D. C.

District Schools. See COMMON SCHOOLS.

Divan, in Turk., is the name of the great council or supreme judicial tribunal of the empire. In Persian it means a collection of poems. Other Oriental languages use the word in other ways.

Diver (*Eudytes*), a genus of birds typical of the family *Eudytidae*, with short tail and wings, and four-toed, palmate feet. The prin. species are the loon or great N. D. (*E. immer*), the black-throated D. (*E. arcticus*), and the red-throated D. (*E. lunum*).

Divers (in the pearl-fishery) descend through the water

to the bank round which the oysters are clustered, placing their feet, to secure greater rapidity, on a stone attached to the end of a rope, the other end of which is made fast to the boat. They carry with them another rope, the extremity of which is held by two men in the boat, while to the lower part, that descends with the D., there is fastened a net or basket. Beside these, every D. is furnished with a strong



Divers in the Pearl-fishery.

knife to detach the oysters or serve as a defensive weapon in case he should be attacked by a shark. As soon as the D. touches bottom he gathers the oysters with all possible speed, and having filled his net or basket, he quits his hold of the rope with the stone, pulls the rope which is held by the sailors in the boat, and rapidly ascends to the surface of the sea. Sponges are obtained by a similar process. (See JOHNSON'S *Nat. Hist.*, vol. ii. p. 525.)

Dividing Engine, a machine for marking the divisions of scales of measurement in scientific, mathematical, and astronomical instruments. They are of various kinds, their success depending upon the skill of the constructor. Test-plates for the microscope have been ruled with divisions only $\frac{1}{100000}$ of an inch asunder.

Di-vi-di-vi (*Casahuate Coriaria*), a leguminous shrub of tropical Amer., is valued for its pods, which contain tannin and gallic acid. It grows to the height of 20 ft., and the pod is 3 inches long. It is used principally for tanning leather and dyeing cloth, and large quantities are exported from Savanilla, Rio Hacho, and Maracibo.

Div'na Commedia [It.], or **Divine Comedy**, the name of one of the most remarkable productions of the human mind, a poem composed by Dante Alighieri. (See DANTE.)

Divination [Lat. *divinatio*, from *divino*, *divinatum*, to "foretell," to "divine"], the art of foretelling future events by superstitious experiments, etc., by observing the flight of birds, the planets, clouds, and also by the alleged influence of spirits. Among the anc. Roms. D. was practised in various forms, and is supposed to have originated among the Etruscans. The Israelites were forbidden by the law of Moses from performing D. of any kind. Among the anc. Grs. D. was extensively practised, but it flourished especially in Chaldea and Egypt.

Divine Right of Kings, a term used to express the doctrine that a monarch was the immediate representative of Deity, by whom alone he could be held responsible for his actions. It would appear that the idea was never clearly developed and systematically advocated till the early part of the 17th century, when the great controversies arose in Eng. between the royalists and the parliamentary or commonwealth parties. The doctrine was maintained by Hobbes, Filmer, and others; it was opposed by Milton and Algernon Sydney.

Diving Bell, a hollow, bell-shaped chamber, open at the bottom, used by divers to descend into deep water for the purpose of conducting various subaqueous works or explorations. The first notice of its practical use in Europe was in 1509. In 1665 it was used to raise portions of the Sp. Armada. Halley's plan for supplying fresh air was introduced about 1715. His D. B. consisted of a wooden chamber open at the bottom, where it was loaded with lead. Air was supplied by means of a hose attached to casks filled with air, which were let down lower than the bell. In 1779 Smeaton first applied the D. B. to engineering purposes, and in 1788 he contrived to supply it with air by the use of the force-pump. He constructed a D. B. of cast iron, resembling a square chest, 4½ ft. long, the same in height, and 3 ft. wide. This construction of the D. B. gives those within it no power to raise or sink it. On account of the cumbersomeness of this apparatus, it is little used except for heavy works of subaqueous engineering. For most operations carried on beneath the water a "submarine armor" or diving dress is employed.

Diving Dress, a water-proof dress worn by divers, enabling them to walk and work under water. An aquatic armor, consisting of a leather dress and a helmet, was described in 1664. An India-rubber cloth D. has been more recently used, with a metal helmet having in front pieces of

plate glass. Attached to the helmet are 2 tubes, one to admit fresh air, the other to carry off the waste air. Lead weights are attached to the diver, enabling him to descend and walk about. In the dresses now used the diver carries upon his back a reservoir containing air compressed to 30 or 40 atmospheres, which is supplied to him for breathing by a self-regulating apparatus at a pressure corresponding to his depth. When he wishes to ascend, he simply inflates his dress from this reservoir.

Divin'g Rod [Lat. *virgula dirina*], a forked branch of wood used for discovering mines, treasures, or water under ground. This use of the D. R. is a superstition of very great antiquity. In Europe it is usually a forked branch of the rowan tree. The favorite in the U. S. appears to be the witch-hazel.

Divinity. See THEOLOGY, by PRES. E. G. ROBINSON, D. D., LL.D.

Divisibility [from the Lat. *divido*, *divisum*, to "divide"] is that quality of bodies through which they may be separated into parts. The question whether matter can be infinitely divided or not has often been discussed by philos. The subdivision of matter in nature is beyond calculation, nor can it be appreciated by our senses. A tube of glass has been drawn out by the blowpipe to the fineness of a silk fibre, still preserving the form of a tube. In the gilding of buttons 5 grains of gold, applied as an amalgam with mercury, are allowed to each gross, so that the coating left must amount to the 110,000th part of an inch in thickness. A single grain of blue vitriol will tinge 5 gals. of water. The D. of matter is best illustrated in the case of odors. The particles which impress the sense of smell must fill the whole atmosphere for hundreds of cubic ft., and yet a grain of musk may perfume a large apartment for yrs. with scarcely a sensible loss of weight.

Division, de-vizh'un [Lat. from *divido*, to "divide"], the operation of finding from 2 quantities a third, which multiplied by the first shall produce the second. The first is called the *divisor*, the second is called the *dividend*, and the third is called the *quotient*. Both divisor and quotient are factors of the dividend; hence we may define D. to be the operation of finding one of 2 factors of a quantity when we know the other.

Division of Labor denotes the principle of political economy that for the most effective industry different kinds of labor must be distributed to different individuals and classes, so that all shall do that for which they are best fitted. It is illustrated on a broad scale in the peculiar industries of different countries and in the different trades and professions adopted by different persons in any community. But, technically, the term has a more specific application to labor employed on particular products, as when a watch is analyzed and its parts are assigned so that each workman shall confine himself as nearly as possible to a single operation. The system is complete when the several operations just keep each other going. The use of labor-saving machinery necessitates the D. of L.; hence the business of manufacturing is thrown into large establishments, and products of every kind are multiplied and cheapened. It is as applicable to intellectual as to manual labor, and in great cities the practice of the learned professions is to a considerable extent conformed to it. The minute D. of L. is a result and a sign of high civilization. A. L. CHAPIN.

Divorce [Lat. *divortium*, from *di*, "apart," "away," and *orto*, an old form of *orto*, to "turn"] is the dissolution of a marriage by a court of law, or, in some cases, by a legislative or parliamentary act. In heathen nations D. have generally taken place at the will of the parties concerned, and even the anc. Roms., during the later period of the republic and under the emps., allowed the greatest license in this respect. D. existed to some extent among the Grs., more especially at Athens. Easy D., which had prevailed among the Hebs., was restrained and discouraged, though not done away with, by the laws of Moses. Among Chr. nations marriage is for the most part looked upon as possessing at once a religious and a civil importance. The R. Cath. Ch. denies the possibility of D., although there are cases in which, according to the canon law, the union is declared to have been illegal from the first, and in reality never to have existed at all. In Eng. law, the word D. has been applied to 2 distinct classes of cases—one where the marriage is by competent authority declared to be void from the beginning; the other, where it is conceded to have been valid in its origin, but for some cause subsequently arising it is dissolved or suspended. The first instance is sometimes termed a case of nullity; the second, a case of dissolution or of judicial separation. Sentences of nullity and of judicial separation, not amounting to dissolution, might take place in the ecclesiastical courts. A marriage could only be dissolved by act of Parl. In the yr. 1857 an act was passed establishing the "Court for Divorce and Matrimonial Causes," in which was vested the power previously exercised by the ecclesiastical courts as well as by Parl. In the U. S., as there are no ecclesiastical courts in the Eng. sense, matrimonial jurisdiction is established by statutes in the different States, enumerating the causes of D., which are by no means uniform. These, as a rule, are more numerous in the W. States than in the E. The power to grant D. is in gen. exercised by courts having equity jurisdiction, though it exists in the legislature, unless taken away by the State const. This is the case in a number of the States, and among them N. Y. T. W. DWIGHT.

DIX, DOROTHEA LYNDEN, a philan. b. at WORCESTER, MASS., about 1794, was a school-teacher in her youth. She devoted much time to the work of ameliorating the condition and treatment of prisoners, lunatics, and paupers. She efficiently promoted the establishment of lunatic asylums in N. Y., Pa., N. C., Ill., Ind., and other States. By petitions to Cong. she induced that body in 1854 to appropriate 10,000,000 acres of public land in order to endow hospitals for the insane, but Pres. Pierce vetoed the bill.

Dix (JOHN ADAMS), LL.D., a statesman and gen., b. at Roseau, N. H., July 24, 1798. He entered the army in 1812 and became a capt. in 1825, but soon resigned and studied law. He removed to Cooperstown, N. Y., joined the Dem. party, and was elected sec. of state in 1833, and to the Senate of the U. S. in 1845, to fill a vacancy; in 1848 was the candidate for gov. of the Free-Soil Dems.; in Mar. 1849 he was succeeded by Mr. Seward in the Senate. He was sec. of the treas. of the U. S. for 2 or 3 months from Jan. to Mar. 1861, and as such issued this famous order: "If any man attempts to haul down the American flag, shoot him on the spot." In May 1861 he became a maj.-gen. of volunteers, and in July 1862 he took command of Fortress Monroe. He was appointed commander of an army corps in Sept. 1862, and ascending York River in June 1863, cut Gen. Lee's communications. He was minister to Fr. in 1867-68, and chosen pres. of the U. Pacific R. R. In 1872 he was elected gov. of N. Y. by the Reps. D. Apr. 21, 1879.

Dixie, a name popularly applied to the S. States of the U. The name originated from a well known song in praise of the charms of "Dixie's Land," a Utopian region so named, it is said, by slaves in honor of a gentleman named Dixie, who was celebrated for his kindness to his servants.

Dix Island, 10 m. S. by E. from Rockland, Me., contains about 55 acres, not of land but of rock, the very best of granite. The treas. building at Wash. was built of this stone. The U. S. P. O. and c.-h. building in the City Hall Park, New York, is built of granite obtained on this island; the stones were all fitted and marked for their place, and made ready before they were sent. There are about 1200 men on the island, beside about 100 women and children.

Dixon, in Silveryville tp., Solano co., Cal., on R. R., 21 m. W. by S. of Sacramento. Pop. tp. 1870, 1583; 1880, 1921.

Dixon, a city and R. R. junc., cap. of Lee co., Ill., on Rock River, 98 m. W. of Chicago. It contains a sem. and has good water-power. Pop. 1870, 4055; 1880, 3658.

Dixon (JAMES), D. D., an Eng. Meth. minister, distinguished as a preacher and thinker. He occupied important pulpits in his denomination, was pres. of its conference in 1841, and its delegate to the Amer. Meth. Gen. Conference in 1848. Wrote *Methodism, its Origin, Economy, and Present Position*, and a *Tour in Amer.* D. 1872.

Dixon (JAMES), a lawyer, b. at Enfield, Conn., Aug. 5, 1814, grad. at Williams Coll. in 1834; was M. C. from Conn. 1845-49, and U. S. Senator 1857-69. D. Mar. 27, 1873.

Dixon (JOSEPH), an inventor, b. about 1798, was a printer in his youth; made important improvements in photography, lithography, bank-note printing, lens-grinding, steel-refining, etc. D. June 14, 1869.

Dixon (WILLIAM HEPPWORTH), an Eng. author and critic, b. in Yorkshire June 30, 1821, commenced life in a counting-house. He settled in Lond. in 1846, and contributed to the *Daily News*. Wrote *William Penn, an Historical Biography*, and *Free Russia*. He was chief ed. of the *Athenæum* 1853-69. D. Dec. 27, 1879.

Dixwell (JOHN), one of the Eng. regicides, was a wealthy gentleman of Folkestone, Kent, b. about 1608. He was an active Parliamentarian and a col. under Cromwell. Having been a member of the high court which condemned Charles I., he fled, after the Restoration, to Ger., but finally came to New Haven colony in N. Eng. D. there Mar. 18, 1689.

Djemil Pasha, or **Jemeel Pasha**, a Tur. statesman, b. at Constantinople in 1827, was the eldest son of the late Reshed Pasha. He was ed. at Paris and Lond., and has for many yrs. been a public officer, especially in diplomatic affairs. In 1866 he was appointed ambassador to Paris.

Dniester, nee'pr (anc. *Borysthenes*), a river of Rus., rises in the govt. of Smolensk, flows nearly S. to Kiev, below which its direction is S. E. to Ekaterinoslaf. It afterward runs S. W. and enters the Black Sea. The greater part of it is navigable. Length, including windings, about 1170 m.

Dniester, nees'ter (anc. *Tyras*, afterward *Danaster*), a river of Europe, rises in the Carpathian Mts. in Galicia, flows S. E. into Rus., and enters the Black Sea about 30 m. S. of Odessa. The navigation is difficult. Length, about 760 m.

Doane (GEORGE WASHINGTON), D. D., LL.D., a bp. and poet, b. at Trenton, N. J., May 27, 1799. He grad. at Union Coll. in 1818, was ordained as an Episcopalian clergyman in 1821, preached in New York city, and was chosen bp. of N. J. in 1832. Author of a vol. of poems and several works on theol. D. Apr. 27, 1859.—One of his sons, WILLIAM CROSWELL DOANE, was, on Feb. 2, 1869, consecrated bp. of Albany.—A second son, GEORGE H. DOANE, is a R. Cath. priest, and became in 1873 vicar-gen. of diocese of Newark.

Dobbin (JAMES COCHRANE), b. at Fayetteville, N. C., in 1814; became M. C. in 1845, and was appointed sec. of the navy by Pres. Pierce in 1853. D. Aug. 4, 1857.

Dobb's Ferry, N. Y. See APPENDIX.

Dobell (SYDNEY), an Eng. poet, b. at Peckham Rye in 1824. He began his literary career by *The Roman*, a poem. Among his other works are *Bulwer, Eng. in time of War*, and *England's Day*. D. Aug. 1874.

Doce, Roi (i. e. "sweet river"), a river of Brazil, rises in Minas Geraes, flows N. E., and enters the Atlantic 60 m. N. of Victoria. Its navigation is obstructed by rapids. Length, including windings, about 500 m.

Doctre [from the Gr. *dokein*, to "seem"], an heretical sect which arose in the 1st century, denying the incarnation of God in Chr. Some of them affirmed the body of Chr. to be a mere deceptive appearance; others only denied its fleshly character. Doctetism was a form of Gnosticism.

Dock, a perennial herbaceous plant of the order Polygonaceæ and genus *Rumex*, found chiefly in temperate climates. They have large ovate and lanceolate leaves, and greenish flowers in panicles. They increase rapidly from the seed, and having long tap-roots become very troublesome as weeds. The roots of several species are valued in med. for their astringent properties; they are also used in dyeing. The yellow D. (*Rumex crispus*) is esteemed in the U. S. as an alterative.

Docks are artificial basins for the reception of ships, and are of 2 kinds, wet and dry. A *wet dock* is a large basin in which the water is kept at a certain level by means of walls, so as to be unaffected by tidal changes, to facilitate the loading and unloading of cargoes. A *dry dock* is intended for the repairing and examination of ships, the water, after the entrance of the vessel, being removed by pumps or other means.

In pts. where vessels would be naturally much exposed during rough weather, or where the changes in the tide are very great, the necessity of secure and well sheltered D. or artificial basins, in which ships may be safely moored and kept at one level, is especially manifest. In the N. parts of Europe the rise and fall of the tides are so great that every pt. which has any pretensions to a first-class mercantile harbor is necessarily supplied with one or more wet D.; at most of the pts. of Eng., and especially in Liverpool and Lond., D. have been constructed on a truly magnificent scale.

The D. establishments of Liverpool are not excelled in extent and arrangement by those of any pt. throughout the world. Though the number of vessels belonging to this pt. is less than that of Lond., yet the fact that they cannot lie with safety or ease in the Mersey on account of its rapid current and exposed situation, and the great rise and fall of the tides (21 ft. at neap and 31 ft. at spring tides), require the D. accommodations to be of sufficient extent for the entire trade of the pt.; while at Lond. the Thames affords a secure and convenient berth for a great number of vessels. The present importance of the pt. of Liverpool may be said to be chiefly owing to these magnificent D.; for, though it is the emporium of a dist. rapidly increasing in manufactures and pop., the advantages given to commerce and navigation by them have brought to it the greater part of its business and wealth. To give an idea of the importance attached in Eng. to D. accommodations may be mentioned the Barrow D. at Barrow-in-Furness, a town of 20,000 inhab., on the sea-coast opposite the Isle of Man. These D., opened in 1867, comprise 1½ m. in length of stone quays and 100 acres of wharf area. The entrance-basin is closed by gates in the usual manner, while the D. is closed by a caisson placed across the entrance, and held by a groove in the masonry on both sides. The caisson, when filled with water to the higher water-level, remains standing upon the D.-sill and closes the passage, but when water is allowed to escape from the caisson, so as to fall to the lower level, it floats, and can be drawn to one side, and leaves the entrance clear. The water kept in the D. is 23 ft. above the D.-sill, the tide outside varying from 25½ ft. at spring tides to 18 ft. at neap tides.

In many pts. throughout the world—such, for example, as that of New York, where the harbor is naturally protected, and as also in the Mediterranean, where the rise and fall of the tides is so small as not to obstruct the loading and unloading of ships—wet D. are not an absolute necessity to commerce, though there is no doubt that the excellent appendages which are attached to them, such as the wharf-rooms, the magnificent quays and warehouses, the railway connections, cranes, etc. of the D. of Liverpool and Lond., and, by no means least of all, the excellent police arrangements for effecting order and safety from fire and depredation, would most certainly greatly promote the commercial prosperity of any pt.

But, though in many cases wet D. may be dispensed with, all first-class pts. need dry D. for the examination and repair of those parts of a ship which are usually immersed in water. Dry D. may be separated into 2 classes—the *stationary dry D.*, to which the name *graving D.* is generally applied; and the *floating D.*, of which there are several varieties.

The U. S. naval graving D. at the Brooklyn navy-yard is, in its dimensions and workmanship, one of the finest in the world. It also possesses many features and improvements that at the time of its construction were unequalled by any other graving D. Owing to the nature of the soil selected for its site the excavation for the foundation was attended with many obstacles, and afforded opportunity for the display of great engineering skill. This lower soil was an almost impalpable quicksand, becoming semi-fluid when saturated with water, and before the required level for the foundation had been reached springs coming from a great depth burst up through it, rendering necessary measures to overcome it. This was finally done by driving piles into the cavities formed by the springs, on which a flooring of plank was laid; upon this bricks were laid in hydraulic cement, and upon the brick floor concrete masonry, the whole being done with the greatest despatch; vent-holes for the water were left until the permanent foundations were completed, but in this manner the flow of sand was checked.

The floor, from 4 ft. to 6 ft. in depth, is an inverted stone arch, to strengthen it against the pressure of water from below. The masonry foundations are 400 ft. in length and 120 ft. in breadth. The facing of the masonry is of granite, the side walls being laid up with Eng. bond—that is, alternate courses of headers and stretchers: the courses are generally 2 ft. thick, a few near the bottom being 27 inches. The facing stones, averaging 6000 lbs. in weight, were backed up with a course of scabbled stone, the interior and rear of the walls being laid up with coursed rubble. The mitre-sills and the keystone are massive granite blocks. The whole was laid in mortar made of the best hydraulic cement and sand. The gates, of iron, are supported on friction rollers, and, with the machinery for turning them, weigh near 200 tons. The caisson is an iron vessel, with keel and stems made to fit the grooves in the masonry at the entrance of the D. It is 50 ft. in length at the keel, and 68 ft. 8 inches in length at the rail; its breadth at the centre of the top is 16 ft., at the keel 7 ft. The grooves in the masonry, in which the stems and keel of the caisson fit, are 36 inches in width and 12 inches in depth, from the top to the bottom of the side walls and in the floor. By admitting water into the chambers of the caisson it settles into these grooves and closes the entrance; it is removed by pumping out sufficient

of Pius IX. Outside the R. Cath. Ch. the Gr. Fathers Athanasius, Basil, Gregory Nazianzen, Chrysostom, and the Lat. Fathers Jerome, Augustine, and Gregory the Great are more especially designated by the title "Doctors of the Church."

Doctrine. See THEOLOGY, by PRES. E. G. ROBINSON, D. D., LL.D.

Dod (ALBERT BALDWIN), D. D., a scholar and teacher, b. in Mendham, N. J., Mar. 24, 1805, grad. at the Coll. of N. J. in 1822. Though licensed to preach, he was never a pastor. Prof. of math. in the Coll. of N. J. 1830-45. He contributed largely to the *Princeton Review*. D. Nov. 30, 1845.

Dod (DANIEL), a machinist, b. in Va. in 1788; constructed the engine of the Savannah, the first steamboat that crossed the Atlantic. Killed by the explosion of a boiler near New York in 1823.

Dodd (CHARLES), the assumed name of HUGH or RICHARD TOOTLE, a R. Cath. priest of Eng.; author of *Dodd's Ch. Hist. of Eng.* D. about 1745.

Dodd (JAMES B.), a math., b. in Va. in 1807. In 1841 became prof. of math. in Centenary Coll., Miss., and in 1846 prof. in Transylvania Univ., of which he was acting pres. 1849-55. Author of several math. text-books.

Dodd (MARY ANN HANMER), b. at Hartford, Conn., Mar. 5, 1813, is the author of many poetical productions of unusual merit, printed chiefly in periodicals. A vol. of her poems appeared in 1843.

Dodd (RALPH), an Eng. engineer, b. in Northumberland about 1756. He was the first projector of the Thames Tunnel, and he planned the Surrey Canal. He wrote, beside other works, an *Account of the Prin. Canals of the World*. D. Apr. 11, 1822.

Dodd (WILLIAM), LL.D., an Eng. clergyman, b. at Bourne, Lincolnshire, in May, 1729. He was a popular preacher in Lond., and was also chaplain to the king and preceptor to Philip Stanhope, earl of Chesterfield. Wrote *Reflections on Death*. Being convicted of forging the signature of the earl of Chesterfield to a bond for £4000, he was put to death June 27, 1777.

Dod'der [Ger. *Dotter*, signifying the "yolk of an egg," so called from the color], (*Cuscuta*, *Engelmannia*, etc.), leafless parasitical plants, generally placed by botanists in the order Convolvulaceæ, but sometimes made a distinct order called Cuscutaceæ. They have twining, thread-like stems of an orange-yellow, and flowers in thick clusters. They are found native in the Old and New Worlds, and are sometimes injurious to crops by smothering the plants. The D. are remarkable for having seeds without cotyledons. The vine grows up from the ground, and having attached itself as a climbing parasite to herbs and shrubs, the proper root dies, leaving the vine to subsist upon the juices of the plant which supports it. This it does by means of papillæ, which penetrate the bark of the plant on which it lives. Huge D. in Afghanistan grow upon the trees, and even prey upon themselves. The D. of the U. S. are quite numerous, and have been especially studied by the botanist Engelmann.

Dodder-Laurels (Cassythaceæ), an order of parasitic plants having the habit and appearance of dodders, but in other respects resembling the laurels, to which they are generally referred. They replace the dodders in hot regions, where alone they grow. The U. S. have but 1 known species, the *Cuscuta filiformis* of Fla.

Dod'dridge (PHILIP), D. D., an Eng. preacher, b. in Lond. June 26, 1702; became pastor of a dissenting congregation at Kilworth in 1723, and removed in 1729 to Northampton, where he was prin. of a theological sem. Wrote *The Rise and Progress of Religion in the Soul* and *The Family Expositor*; also many hymns. D. Oct. 26, 1751. (See JOSEPH ORTON, *Life of Doddridge*.)

Dodecagon [from the Gr. δώδεκα, "twelve," and γωνία, "angle"], a regular polygon of 12 equal sides and 12 equal angles.

Dodecahedron [Gr. δώδεκα, "twelve," ἔδρα, "base"], in geom., a vol. bounded by 12 faces. The regular D., one of the Platonic bodies, is bounded by 12 equal regular pentagons; it has 30 equal edges and 20 equal polyhedral angles.

Dodge (EBENEZER), D. D., LL.D., a Bap. divine and scholar, b. at Salem, Mass., Apr. 22, 1819, grad. at Brown Univ. in 1840, and at Newton Theological Inst. in 1845; became prof. in the theological dept. of Madison Univ., Hamilton, N. Y., 1853-68, and pres. of the univ. in 1868. Wrote *Evidences of Christianity*.

Dodge (GRENVILLE M.), LL.D., a gen., b. at Danvers, Mass., Apr. 12, 1831; commanded a brigade at Pea Ridge in Mar. 1862, and became a maj.-gen. of U. volunteers in June 1864. He directed a corps of Gen. Sherman's army in the campaign against Atlanta (May to Sept. 1864), and succeeded Rosecrans as commander of the dept. of Mo. in Dec. of that yr. M. C. of Ia. 1867-69.

Dodge (HENRY), GENERAL, b. at Vincennes, Ind., Oct. 12, 1782; served in the war of 1812 and in various Indian wars; gov. of Wis. Terr. 1836-41 and 1845-48; delegate to Cong. 1841-45; U. S. Senator from Wis. 1849-57. D. June 19, 1867.

Dodge (WILLIAM E.), a philan., b. in Hartford, Conn., Sept. 4, 1805, removed to New York in his 13th yr. At the age of 21 he went into business on his own account, and became an extensive importer and manufacturer. He was an active member of many benevolent and religious societies, was a member of the peace convention of 1861, and a Rep. M. C. 1866-67. D. Feb. 9, 1883.

Dodge City, cap. of Ford co., Kan., on R. R. and Ark. River, 303 m. S. W. of Topeka. Pop. 1880, 996.

Dodgeville, Wis. See APPENDIX.

Do'do (*Didus*), a bird representing a peculiar family (*Dididae*), allied to the pigeons, and interesting from the fact that its extinction has but recently taken place—the *Didus ineptus* having been in existence less than 300 yrs. ago. The D. was an inhabitant of the island of Mauritius, being very abundant; but running slowly and being wholly unable to

fly, it was easily killed. It was larger than a swan, of a clumsy form, with a large head and enormous bill, the up-



Dodo.

per mandible being the longer and hooked at the point. Two allied extinct birds inhabited Réunion and Rodriguez.

Dodo'na (Gr. Δωδώνη), an anc. city of Epirus, the seat of a celebrated oracle and temple of Jupiter. This oracle was consulted by the Athenians, Spartans, and other nations, and its responses were delivered from an oak tree. The temple of D. was destroyed by the Ætoliens in 219 B. C. Its site has not been accurately identified.

Dog, a collective name for domesticated descendants of various wild species of *Canis*, erroneously combined under a specific name—*Canis familiaris*. The varieties of D. have been arranged in various groups, and are very numerous. The most noteworthy are the following: The common greyhound (*Canis familiaris leporarius*) is the type of a group of which there are many kinds, all characterized by a small head, slender limbs, and a gaunt form. In hunting they usually follow by sight, not by scent. They are not intelligent, nor are they distinguished by attachment to their masters. Some are favorites because of their swiftness, others for the extreme elegance of their shape. The Mt. St. Bernard D. (*Canis familiaris montanus*) is one of the most celebrated of the shaggy or woolly breeds. It originated in the Alps, and is noted for its sagacity, strength, and fidelity in saving the lives of travellers. The Newfoundland D. (*Canis familiaris Terra Novæ*) is of large size, remarkably docile, and very serviceable. The shepherd's D. is also very useful. The hunting-D., hounds, and spaniels are generally of medium size, with ears long and pendent, scent acute, and intelligence great. In most the covering is smooth. The spaniel has been supposed to be of Sp. origin, hence his name. The ears are large and pendent, the tail elevated, the fur longest about the ears, under the neck, behind the thighs, and on the tail, varying in color.

Dog'bane (*Apocynum*), a genus of plants of the natural order Apocynaceæ, having bell-shaped flowers, no style, and the fruit a pair of follicles. Some of the species are herbaceous, others shrubby, and some are found in colder climates than is usual for plants of this order. The D. of N. Amer. (*Apocynum androsaemifolium*) is a perennial herbaceous plant about 2 ft. high, with smooth stem, milky juice, smooth ovate leaves, and light pink flowers. It grows in open, barren places from Canada to Ga., and is valued for the medicinal properties of the bark of the root, which is emetic, diaphoretic, and in small doses tonic. This and the Indian hemp (*A. cannabinum*) yield a copious fine flax-like fibre, used by the Indians.

Dog Days, or **Canic'ular Days**, the name given to the 40 days between July 3 and Aug. 11. Canicular is derived from *Canicula*, the Lat. name of Sirius, the dog-star, which rose heliacally near the 1st of July. The anc. ascribed the great heat of summer to the influence of this star. The time of its rising depends on the lat. of the country, and, owing to precession, is later every yr.

Doge, dō [It. pron. do'ja, a modification of *duce* (from the Lat. *dux*), "duke"], the title of the chief magistrate in Venice and Genoa. The origin of the office in Venice dates as far back as 697. The D. were elected by the people, and were invested with almost absolute power till 1177, when the legislative power was placed in the hands of a great council of 470 members. This council elected 24 of their members, who in turn elected 12 of their own number, upon whom the choice of the D. devolved. From this time the council gradually narrowed the powers of the D., till in 1628 the offices of commander-in-chief of the army and high-admiral of the navy ceased to belong to the dogate unless by a special decree of the Council of Forty. In the 14th century the Council of Ten was established, and vested with the highest power in the state. About this time the powers of the D. became so restricted as to be no longer an object of ambition. In 1339 a law was passed prohibiting a D. from resigning his place. The office disappeared with the fall of the republic in 1797. Lodovico Manin, elected in 1788, was the 73d and last D. of Venice. The first D. of Genoa was elected in 1339. His office was originally for life. In 1528 a new constitution was framed by which the D. was to be re-elected every 2 yrs., and the powers of the office were restricted by 2 councils. In 1797, when the Fr. occupied Genoa, the office

of D. ceased to exist. In 1802 it was restored, but it finally disappeared in 1804.

Dog-Fish, a name variously applied: (1) Several small species of shark belonging to the genera *Squalium*, *Spinax*, *Mustelus*, etc., so named probably from their pursuing their prey like dogs hunting. Along the E. sea-coast of the U. S. the *Squalus Americanus* and *Mustelus canis* monopolize it. (2) The D. E. of the W. States is the *Ania cuba*.

Dog-Fox, the name of a small animal found in Asia and Afr., belonging to family Canidae and genus *Cynolope*. They have erect pointed ears, a sharp muzzle, somewhat resembling that of a greyhound, and a bushy tail.

Doggerbank, a sand-bank in the middle of the Ger. Ocean, between Eng. and Den. Length, about 320 m.; average width, 40 m. In some parts it is covered with only 9 fathoms of water. An indecisive battle was fought here between the Dut. and Eng. fleets, Aug. 1781. Here are important cod-fisheries.

Doggett (DAVID SETH), D. D., a bp. of the M. E. Ch. S., b. in Va. in 1810. He was ed. at the Univ. of Va., and entered the itinerant ministry in the Va. Conference of the M. E. Ch. in 1829. He was prof. in Randolph-Macon Coll., Va., for several yrs., and was consecrated bp. in 1866, after which he resided in Richmond, Va. D. Oct. 27, 1880.

Dog's-Tail Grass (*Eleusine*), a genus of grasses, the species of which are found native in Europe and Asia. The crested D. T. G. (*Eleusine cristata*) is much prized in Eng. for lawns and sheep-pastures. The *Eleusine Indica* is extensively naturalized in the U. S.

Dog Star, a popular name of Sirius, a star of the first magnitude in the constellation Canis Major, and the brightest fixed star in the firmament.

Dog-wood, a name given in the U. S. to several small trees, especially to the *Cornus florida* and others of its genus, which contains also the cornel trees or D. of Europe. The larger species are characterized by their hard wood, which is useful in turnery, and by their bitter tonic bark. The *Cornus florida* is well known for its white, showy, involucral blossoms, appearing in May and June. In the W. I., etc., are various other "dogwoods." One of these, the *Piscidia Erythrina*, or Jamaica D., a small leguminous tree, found also in Fla., has a valuable and very hard timber. Its bark is a powerful narcotic and anodyne poison.

The "poisonous D." or "poison sumach" (*Rhus venenata*) of the U. S. is probably much more poisonous to the touch of all our native plants. It closely resembles the *Rhus vernix* or varnish tree of Japan, and may be distinguished from the harmless sumachs by its panicles, which are loose (not thyrsoid or closely clustered in a spike, like the harmless ones), and which are axillary, while those of the harmless species are terminal.

Dolabelia (PUBLIUS CORNELIUS), a profligate Rom. patrician, b. about 70 B. C.; married Cicero's daughter Tullia; fought for Cæsar at Pharsalia in 48, and became consul about the yr. 44; was a partisan of Antony, and was defeated by Cassius in Syria, and killed himself 43 B. C.

Dolcinites, or **Dolcinitists**, a sect founded in It. by Dolcino. They opposed the popes, and held kindred tenets with the Fraticelli or spiritual Franciscans, with some leaven of the old doctrines of the Patarines of Lombardy. Dolcino and some of his followers were burned alive in 1307.

Dole (Rev. GEORGE THURLOW), b. Oct. 30, 1808, in (Byfield) Newbury, Essex co., Mass. Having spent 8 yrs. in the Lowell Machine-Shop, and become master of the arts, he left in 1833 and grad. at Yale Coll. in 1838; spent the 3 succeeding yrs. in the theological sems. of New Haven and Andover, Mass.; ordained pastor of the Washington st. Congl. ch. in Beverly, Mass., 1842-51; pastor in N. Woburn, Mass., 1852-55; pastor in Lanesboro', Mass., 1856-63; prin. of Williams Acad., Stockbridge, 1863-64; pastor in Stockbridge 1864-72.

Dolichocephalic [Gr. *δολιχός*, "long," and *κεφαλή*, "head"], a term applied to human skulls which have the occipito-frontal diameter (that from the back to the front) much in excess of the transverse diameter. The native Australians and W. Afr. races afford extreme examples of this form of skull. The term contrasts with *brachycephalic*—i. e. "short-headed." Among the historic peoples of Europe the D. form prevails among the Indo-European varieties, and the brachycephalic among the Finnic.

Dol'idæ [Gr. a "cask," from the form and hooped ap-

pearance of the shell], a family of gasteropods having spirally furrowed ventricose shells. The lingual teeth are

7-rowed, and the lateral unguiculate. Nearly a score of species inhabit the warm seas.

Doll [Fr. *poupée*; Ger. *Puppe*; perhaps a contraction of *Dorothy*, but supposed by some to be an abbreviation of *idol*, i. e. an "image"], a toy of wax, wood, or plaster, made like the image of a child, and used as a plaything. D. were in use in the earliest times, and those of the Gr. and Rom. children were buried with them when they died. G. Brit. was formerly supplied with D. mainly from the Netherlands, but now many of them are made in Lond. and other Eng. towns. Many are manufactured in Nuremberg, Ger., for the U. S.

Dollar [Ger. *Thaler*; Dan. *Daler*; see below], a gold or silver coin of different values current in the U. S. and several countries of Europe. Its name is derived from Joachimsthal (Joachim's Valley) in Bohemia, where D. were first coined (1518). The D. is the unit of account in the monetary system of the U. S. It was coined in silver only until 1849, when a coinage was authorized of D. in gold. Its value was originally the same as that of the Sp. piastre of 8 reals, but is now somewhat below. The weight of the silver D. was fixed by law in 1837 at 412½ troy grains. Its further coinage was prohibited by the law of 1873, but was resumed in 1878, under the bill known as the Bland-Allison bill, passed in that yr. The silver half-D. weighs 12½ grammes, or two silver half-D. 25 grammes. (Act of Cong., approved Feb. 12, 1873.) That act created also a silver "trade D.," weighing 420 grains, for use in commercial transactions in the E. The gold D. weighs 25.8 grains = 1.672 grammes, exceeding 13½ grammes, or 5 ter-grammes, by only 1/1000 of a gramme. The standard fineness of both silver and gold for coinage is 9/10 (i. e. 1/10 of it is alloy). The Brit. standard of fineness is 11/12 for gold and 9/10 for silver. Half-D., quarter-D., and dimes are coined in silver. A silver half-dime was also coined before 1873. The half-D. (since 1873) weighs 12½ metric grammes—the smaller coins proportionately less. The actual value of the U. S. gold D., in Brit. currency, is 48 1/2d. The gold coins of the U. S. are legal tenders for all sums; the silver coins, except the dollar, only for sums not exceeding 5 D. Accounts in D. and cents are written thus: \$13.78 = 13 D. and 78 cents. The coins are double-eagles, eagles, half-eagles, and quarter-eagles, valued at 20, 10, 5, and 2½ D.; also, three-D. and one-D. pieces. The Ger. thaler has different values. The most current, that of Prus., is worth 71 cents. F. A. F. BARNARD.

Dollart, The, a gulf of the Ger. Ocean, at the mouth of the river Ems, between Hanover and Hol. It is 10 m. long and 7 m. wide; formed by an inundation in 1276.

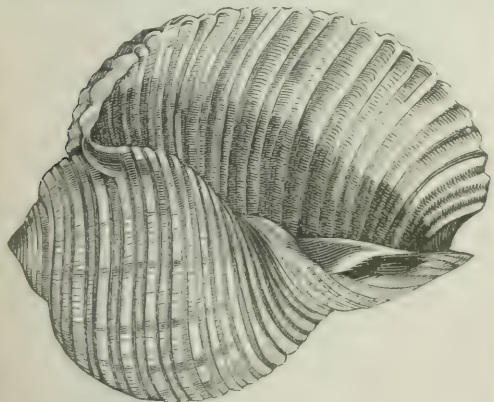
Döllinger (JOHANN JOSEPH IGNAZ), D. C. L., a Ger. divine and author, and leader of the "Old Catholic" movement, b. at Bamberg, in Bavaria, Feb. 28, 1799. He received priestly orders in 1822, and almost immediately after became chaplain to the diocese of Bamberg; was invited in 1826 to lecture on the hist. of the Ch. before the Univ. of Munich. The substance of these lectures appears in his *Treatise on the Hist. of the Ch.* (1838). He has subsequently represented the Univ. of Munich in the Bavarian Parl. In 1849, when a delegate to the Diet of Frankfurt, he voted for the absolute separation of the Ch. from the state. In 1861 he advocated the abandonment of the temporal power by the Holy See. Dr. D. has in particular obtained wide fame by his opposition to the decrees of the Vatican Council, and particularly to that one declaring the infallibility of the pope when addressing the Ch. *ex cathedra* on questions of faith and morals, and was commonly believed to be one of the authors of the *Janus*, one of the most important works pub. against Papal infallibility. As he emphatically declined to submit to the decrees of the Vatican Council, he was, on Apr. 17, 1871, formally excommunicated by the abb. of Munich. On July 29, 1871, he was elected rector of the Univ. of Munich. He took a leading part in the Old Catholic cong. of Munich (1871) and Cologne (1872). In the former he showed himself opposed to the measures adopted by the majority for effecting a permanent ecclesiastical organization of the Old Catholics; in the latter he was elected chairman of a special committee on the reunion of the Chr. chs. a subject to which he has for yrs. devoted special attention.

Dollond (JOHN), F. R. S., b. in Lond., Eng., June 10, 1706. He was a silk-weaver in his youth, and employed his leisure hours in the study of sciences and langs. In 1752 he became a partner of his son in the business of optician. They fabricated telescopes of superior quality, and D. invented the achromatic telescope. D. Sept. 30, 1761.

Dolmen, a word of Cymric origin, nearly synonymous with cromlech. The proper D. consists of one large unhewn stone, resting on 2 or more unhewn stones placed erect in the ground. The term is sometimes applied to structures where several blocks are raised on pillars so as to form a sort of gallery. Such structures are now generally referred to pre-historic races.

Dolomite [named in honor of the savant Dolomieu], or **Magnesian Limestone**, a mineral consisting of carbonate of lime and carbonate of magnesia in variable proportions, which are sometimes nearly equal. Its crystals are usually rhomboidal. D. is extensively used as a building-stone, and is converted into good lime by burning. The new Brit. houses of Parl. are built of this stone. In Eng. fossiliferous D. form the greater part of the Permian limestones from Durham to Nottinghamshire. Large mt.-masses of crystalline D. occur in the Tyrol. It is also abundant in the E. parts of N. Y., Pa., Md., and other States.

Dolphin [Gr. *δαλφίν*; Lat. *dolphin*; Fr. *dauphin*] is properly the name of a cetaceous mammal of the Mediterranean (*Delphinus delphis*), the D. of the classic poets. But the D. of modern sailors, the beauty of whose colors when dying is so celebrated, are true fishes, the *Coryphæna hippuris*, etc., abounding in the warmer parts of the Atlantic. These are often eaten, and are very palatable, but the flesh is sometimes poisonous.



Dolium Galea.

pearance of the shell], a family of gasteropods having spirally furrowed ventricose shells. The lingual teeth are

Domain, Eminent. See EMINENT DOMAIN.

Dom-boe or **Doom Book** (*Liber Judicialis*), the name of a code of laws compiled by King Alfred from various sources. Alfred made few original laws, but restored and renovated those already existing. The laws of Eng. up to the time of the Norman Conquest were administered in the vernacular speech of the people. The code was ratified by the Witam, as Alfred informs us.

Dombrow'sky (JAROSLAV), a Polish revolutionist, b. at Cracow in 1826, served first in the Rus. army, and fled in 1862 in consequence of having participated in the Polish insurrection. He formed in the beginning of the Fr.-Ger. war a Polish legion, and on May 9, 1871, succeeded Rossel as commander-in-chief of all the forces of the Paris Commune; was mortally wounded, and d. May 23, 1871.

Domesday Book. See DOOMSDAY BOOK.

Domes'tic Animals are such as are reared by man for his own use, and at the same time tamed or familiarized to some extent to man's presence; for bees, silkworms, and a few other insects reared by man are never really tamed, though modified in many cases in form by the influence of man. A great many animals may be tamed, and yet not truly domesticated, for true domestication implies a course of breeding for many generations.

The more important D. A. are the ox, buffalo, yak, sheep, goat, reindeer, camel, llama, alpaca (ruminant ungulates), swine (omnivorous ungulate), horse, ass (soliped ungulates), elephant (proboscidian), rabbit, guinea-pig (rodents), dog, cat, ferret (carnivores), and of birds, the hen, turkey, peacock, guinea-fowl, pheasant (gallinaceous birds), goose, duck, etc. (natatores), beside the pigeons and various song-birds. The breeding of fishes for food is not true domestication. Great changes of form, habit, and temper have been developed by selection in most of the domesticated animals. (See DARWIN, *On Domestic Animals and Cultivated Plants*.)

Domingo, Santo. See SANTO DOMINGO.

Dom'nic [Sp. *Domingo de Guzman*], SAINT, the founder of the order of Dominicans, was b. at Calahorra, in Old Castile, in 1170. He gained distinction as a preacher and as a persecutor. He was one of the instigators of the crusade against the Albigenses in 1208. In 1215 he founded the order of Preaching Friars or Dominican monks, which was approved by the pope in 1216. (See DOMINICANS.) D. was the first gen. of the order. He d. Aug. 6, 1221, and was canonized by Pope Gregory IX. in 1234. He was a canon, a priest, and an archdeacon successively.

Domin'ica ("Sunday Island"), discovered by Columbus on Sunday, Nov. 3, 1493, a Brit. W. I. island, 22 m. N. of Martinique, 29 m. long, and has an area of 291 sq. m. It is of volcanic origin, and is the highest of the Lesser Antilles, the summit having an altitude of 5314 ft. It was ceded to G. Brit. by Fr. 1763. Pop. 28,211.

Domin'ical [from the Lat. *dominica*, the "Lord's day"] **Letter.** The Romans used the first 8 letters of the alphabet (A to H) to mark the consecutive days of their recurring nundinal period. The early Chrs. adopted the same plan for marking the days of the week, dropping the last one (H) as unnecessary. In the Ch. calendar A has always stood for the first day of January, B for the second, and so on. G therefore marks the 7th day, and the cycle begins again with A on the 8th. A returns in like manner on the 15th, the 22d, and so on. Each day in the yr. has thus its calendar letter, and the letter which falls on Sunday is called the *dominical letter* of the yr. The 25th of Feb. has always the letter C, and the first of Mar. has always the letter D. The 29th of Feb. in leap-yr. has therefore no letter provided for it, and this makes a change in the Sunday letter after Feb., so that in leap-yr. there are 2 D. L. As the common yr. contains 52 weeks and 1 day, the D. L. changes from yr. to yr., going backward 1 place for every common yr., and 2 places every leap-yr. This mode of representing the days of the week has been uninterruptedly employed in the calendar of the Ch. throughout the world from the earliest ages of Christianity. F. A. P. BARNARD.

Domin'icans, an order of mendicant friars founded by St. Dominic at Toulouse, Fr., and confirmed by Pope Innocent III. in 1216. They were called Black Friars in Eng., and Jacobins in Fr., from the Rue St. Jacques (Jacobus), where they first established themselves. In 1216 Honorius III. constituted the order under the rules of St. Augustine, which enjoined almost continual fasts, perpetual silence, and other mortifications. In 1221 the order was introduced into Eng. The order has included many eminent men, but its reputation is stained by its part in the persecution of the Albigenses and in the establishment and administration of the Inquisition. For a time the D. and Franciscans disputed the control of the Ch. In the 16th century the Jesuits acquired much of the power formerly exercised by the D., but the D. are still numerous.

Dominion of Canada. See CANADA, DOMINION OF.

Dom'inis, de (MARCANTONIO), an It. theol., b. in the isle of Arba, near Dalmatia, in 1566; became prof. of philos. at Padua, and wrote a curious treatise on light entitled *De Radiis Visus et Lucis in Vitris Perspectivis et Tride*, in which the phenomena of the rainbow were explained for the first time. D. Sept. 1624.

Domitian, do-mish'e-an [Lat. *Domitianus*], or, more fully, **Titus Flavius Domitianus**, a Rom. emp., b. Oct. 24, 52 A. D., was second son of Vespasian. He succeeded his brother Titus in 81. In 87 he was defeated by the Dacian, and after 93 A. D. became extremely cruel and suspicious, causing many innocent persons to be put to death or banished. He was assassinated by conspirators in 96, and was succeeded by Nerva. (See SÆTONTIUS, *Domitianus*.)

Don (anc. *Tandis*), a river of Rus., flows first in a gen. S. E. direction, then nearly S. W., and enters the Sea of Azof; is connected with the Volga by a canal. Navigation is difficult except at high water (in Apr. and May), when vessels can ascend about 600 m. from its mouth. Length, about 950 m.

Don'alldson (JOHN WILLIAM), D. D., an Eng. philologist, b. in Lond. in 1812; fellow and classical lecturer of Trinity Coll., Cambridge, classical examiner in the Univ. of Lond. Wrote, beside other works, *The New Cratylus*, *The Varronianus*, a Gr. gram., and a Lat. gram. D. Feb. 10, 1861.

Don'alldsonville, cap. of Ascension parish, La., on R. R. and Miss. River at the origin of the Bayou Lafourche, 82 m. above New Orleans. It was formerly the cap. of the State. Pop. 1870, 1573; 1880, 2600.

Donat'i's Com'et. This most striking comet of the present century was discovered in June 1858 by Donati, and continued visible for many months. It was nearest to the earth in Oct., at which time its tail was over 40° in length and remarkably brilliant. It was carefully observed by Prof. Bond of Cambridge, who pub. an elaborate and elegantly illustrated memoir on the subject. Mr. G. W. Hill combined all the observations that were made on its position, and as a result assigned to it a period of about 1950 yrs. Newcomb says that the uncertainty arising from imperfect observations may amount to 50 yrs. W. G. PECK.

Donat'ists, a party in the N. Afr. Ch. which effected a schism that lasted from 311 A. D. till the 6th century. They took their name from Donatus the Great, who was their bp. after Majorinus, from 315 to 348. The early hist. of this deeply interesting movement is obscure and complicated. The D. advocated a rigorous discipline, but there were numerous other questions involved in the controversy, the most important being that of the union of Ch. and state. In doctrine the D. were essentially orthodox, and the charges of immorality brought against them appear to have been the inventions of their enemies. (See NEANDER, *Ch. Hist.*; RIBBECK, *Donatus und Augustinus*.) R. D. HITCHCOCK.

Donat'io, or **Donatello**, called **Donato di Niccolò di Betto Bardi**, a distinguished sculptor. (DONATELLO is simply a diminutive.) He was b. in Florence, probably in 1386, and d. in that city, according to Vasari, Dec. 13, 1466, but according to Palmieri in 1468. His most famous work is the statue of St. George, the patron saint of the sword-makers and armorers, which he made for that guild, and which was placed in a niche designed for it on the outer wall of the ch. of San Michele, under which was a bas-relief representing the fight of the saint with the dragon. Vasari makes D. one of the 3 successful competitors for the gates of the Baptistery—he and Brunelleschi withdrawing in favor of Ghiberti. Another famous work of this master is the bronze equestrian statue of Gattamelata, made at the command of the Signoria of Venice for the city of Padua. It stands on the platform of the ch. of St. Antony. D.'s life has been very entertainingly written by Vasari. (See also PERKINS'S *It. Sculptors*. Dr. HANS SEMPER began, in A. von Zahn's *Jahrbücher für Kunstwissenschaft*, part 1, a valuable series of articles: *Donatello, seine Zeit und Schule*.) CLARENCE COOK.

Donat'us (ÆLIUS), an eminent Lat. grammarian, b. about 333 A. D., taught rhetoric at Rome. He wrote a work on gram., from which the word Donat became synonymous with *grammar*.

Donc'aster (anc. *Danum*), a market town of Eng. in the W. Riding of Yorkshire, and on the river Don, 35 m. S. of York. D. has a fine parish ch., a public library, and a theatre. It was burned by lightning in 759 A. D. It is famous for its annual horse-races. Col. St. Leger founded in 1776 the stakes, for which the best horses of Eng. annually contend. Pop. 18,758.

Don'elson (ANDREW JACKSON), LL.D., b. Aug. 25, 1800, near Nashville, Tenn., grad. at W. Pt. in 1820. He served (1821-22) as aide-de-camp to his uncle, Maj.-Gen. Jackson, when gov. of Fla., just acquired from Sp.; resigned from the army Feb. 1, 1822, studied law, and became a cotton-planter near Nashville, Tenn.; was chargé d'affaires to Tex. 1844-45, negotiating its annexation to the U. S.; U. S. minister plenipotentiary to Prus. 1846-49, and to the federal govt. of Ger. 1848-49; became ed. of the Wash. *Union* 1851-52, and in 1856 the "American" candidate for V.-P. of the U. S. After his defeat he retired altogether from public life. D. June 26, 1871.

Donelson, Fort, a position on the W. bank of the Cumberland River, in Tenn., 2 m. below Dover and 12 m. E. of Ft. Henry, strongly fortified by the Confeds., and early in 1862 held by them with 15,000 men. An unsuccessful naval attack was made Feb. 14, but the next day it was assailed by Gen. Grant, and was surrendered on the 16th, with 14,623 prisoners, a portion of the garrison having escaped.

Donizetti, don-e-zet'tee (GAETANO), a musical composer, b. at Bérghamo Sept. 25, 1798; produced his first opera, *Enrico*, in 1818, *Lucia di Lammermoor* in 1835, and *Don Pasquale* in 1843. Was in 1844 struck by paralysis, and spent his last yrs. for the most part in a lunatic asylum. D. Apr. 8, 1848.

Don Juan, a mythical character belonging to Sp. tradition, the impersonation of sexual passion, the seducer *ex professo*, forms the subject of comedies by Tirso de Molina and Molière, of an opera by Mozart, etc.

Donkey. See ASS.

Don'ner Lake, a small lake in Cal., near the Central Pacific R. R., 154 m. from Sacramento.

Don'nybrook, a v. of Ire., about 2 m. S. E. of Dublin. It has a magdalen asylum, a dispensary, a hospital for incurables, and a lunatic asylum. Here is a famous annual fair, held during the week commencing Aug. 26. Pop. 1892.

Don Quixote (ke-hó'ta) **de la Man'cha**, a satirical romance by Cervantes, the most celebrated book in Sp. lit. The first part of it was pub. at Madrid in 1605, second in 1615, first collected ed. in 1617. It has been often reprinted, and has been translated into many langs. The name of its hero has become a designation for any wild undertaking.

Doo'little (JAMES ROOD), LL.D., b. Jan. 3, 1815, at Hampton, Washington co., N. Y., grad. at Hobart Coll. in 1834; was elected U. S. Senator from Wis. in 1857, and re-elected in 1863.

Doo'ly (JOHN M.), a lawyer and judge of Ga., and the most famous wit ever produced in the State. His sayings

and repatriates have formed the staple of the riciest bar associations throughout the commonwealth for more than half a century. B. 1772, d. 1827.

Doom or **Dum Palm** (*Hyphane Thebatica*), a native of Upper Egypt and Central Africa, where it sometimes forms forests, growing even in the deserts. The lower part of the stem is single and invariably divides at a certain height into 2 branches, each of these again being bifurcated, always in 2 sets. The wood is tougher than that of most other palm trees. It has fan-shaped leaves, globular fruit about the size of an orange, with the outer skin red, inclosing a thin spongy substance which resembles gingerbread. From this substance, which forms an article of food, it has been called the gingerbread tree. Ornaments are made from the hard, semi-transparent kernel of the fruit. This tree produces the gum resin called Egyptian bdellium, and its fibre is made into ropes which are dyed black.

Doomsday Book, or **Domesday Book**, often called simply **Domesday**, an anc. record of Eng. containing a statistical account of the state of a large part of that country made by William the Conqueror in 1086. The name seems to indicate the absolute authority of the book in doom or decision on matters of which it treats. The original record is still preserved at Westminster. It forms the basis of all historical accounts of those times. Several other anc. Eng. records are known as *Domesdays*.

Doo'ra, or **Dhurra**, called also **Indian Millet** (*Sorghum vulgare*), a kind of grain much cultivated in Asia, Afr., and S. Europe. The genus differs from *Andropogon* in having hermaphrodite spikelets and glumes, with 3 small teeth at the end. The species are mostly tall, broad-leaved annual grasses, with large panicles, and strong culms containing a sweet and juicy pith. The D. (sometimes called jowaree in India) has grain somewhat larger than mustard-seed; it yields abundant crops, and the stalks and leaves are food for cattle and horses. The sugar-grass or Chi. sugar-cane (*Sorghum saccharatum*), a sugar-producing plant, has been introduced into the U. S. and cultivated with success. The Caffer corn (*Sorghum Cuffurum*) is chiefly valued as food for horses. The D. grows well in the U. S., but has not been found profitable for culture.

Doornboom ("thorn tree," *Acacia horrida*), a tree growing abundantly in S. Afr., so named by the Dut. on account of its sharp and numerous spines. Its usual height is about 30 ft., and the wood is valued for building.

Doré, do-rä (PAUL GUSTAVE), a Fr. painter and designer, b. at Strasburg Jan. 6, 1833. He was ed. at Paris, and in 1848 made his first public appearance as an artist with some pen-and-ink drawings sent to the Salon. His first successes were obtained by his paintings, chiefly of landscape subjects, but in 1854 he illustrated an ed. of *Rabelais*, and in 1856 pub. a series of designs illustrating the story of the Wandering Jew, by which performances the public attention was strongly directed toward him. In the same yr. (1856) he illustrated an ed. of Balzac's *Contes Drolatiques*, which is the work that shows all his powers in their fullest and freest exercise. One would say that the stories were written for the designs, so perfectly do these follow and reflect the audacious indecencies of that most libertine of books. Meanwhile D. was making himself known in a wider and happier circle with his designs for Perrault's *Fairy Tales* (1861), *Don Quixote* (1863), the *Tuareks in the Pyrenees* of Taine (1859), which has been translated and pub. with D.'s designs in New York (1873), and the *Fables of La Fontaine* (1867). These works were suited to the artist's talent, but he overleaped the saddle when his ambition led him to try to illustrate Dante and the Bible. His *Rabelais*, however, pub. in 1873, an enlarged issue of his early work, shows him more at home in his proper field. In 1866-68 he was persuaded to illustrate Tennyson's *Idylls*. The work was an unhappy failure. D. was one of the most prolific designers that ever lived, but it would be unfair to conceal the fact that he owes much of his success to the admirable wood-engravers who have translated him to the public. In these successive publications Pisan and Dumont and Gauchard have created a new era in the art of engraving on wood. D. Jan. 23, 1889. CLARENCE COOK.

Dorée [Fr. *dorée*, "gilded"], the name of several species of fish of the genus *Zeus*. The one most common on the Brit. coasts is *Zeus fuber*, commonly called John dory, a corruption of the Fr. *jaune dorée* (golden-yellow). Its color is dusky-green tinged with gold; the head is large, and on each side of its body is a dark oval spot. It is highly prized by epicures.

Doremus (SARAH PLATT), b. in New York Aug. 3, 1802, married Sept. 11, 1821, to Thomas C. Doremus; in 1828, with 8 other ladies, organized the Gr. Relief Society; in 1836 aided Mme. Feller in her Grande Ligue mission to the Fr. peasantry of Canada; in 1842 with Miss Catherine Sedgwick established the Home for Women from Prisons, now called the Isaac T. Hopper Home; was one of the founders of the House and School of Industry, and a manager of the City Bible Society and of the City Mission and Tract Society; in 1849 labored for the relief of the famine-stricken people of Ire., in 1854 became V.-p. of the Nursery and Child's Hospital, in 1855 aided in organizing the Woman's Hospital Association, in 1863 assisted in organizing the Presb. Home for Aged Women. For 50 yrs. she labored in behalf of foreign missions, and her efforts in behalf of the sick and wounded soldiers from N. and S. during the c. war were not excelled by those of any other woman in the land. D. Feb. 5, 1877.

Do'ria, the name of one of the 4 most noble and powerful families of Genoa. It was attached to the Ghibelline party. In 1339 the families of Doria, Spinola, Grimaldi, and Fieschi, which had by their rivalry long troubled the republic, were exiled.—PAGANINO DORIA, a famous Genoese admiral, gained a naval victory over the Venetian admiral Pisani in 1352.

Doria (ANDREA), a Genoese admiral and patriot, b. at

Oneglia Nov. 30, 1468, is called the restorer of Genoese liberty. He entered the Fr. navy about 1490, gained the rank of admiral, and in 1524 defeated the imperial fleet near Marseilles. He also captured Genoa, from which he expelled the Adorni. In 1525 he abandoned the service of Francis I. and became an ally and adherent of Charles V., on the condition that Genoa should be a free and independent state. He entered Genoa in 1529, and gave it a free constitution, which remained in vigor until the republic ceased to exist. He afterward acted as admiral in the service of the emp. Charles V. gave him the title of prince of Melfi. D. Nov. 15, 1560. (SEE RICHER, *Vie d'André Doria*.)

Do'rians [Gr. *Dwpieis*], one of the 4 prin. branches of the anc. Hellenic people, claimed that they were descended from Dorus, a son of Hellen. They are supposed to have originally lived in Doris, from which they migrated to the Peloponnesus, where they founded Sparta, Argos, and Messenia. The migration of the D. to the Peloponnesus, which is called the return of the Heraclidae, and forms a celebrated epoch in anc. chronology, is said to have occurred soon after the siege of Troy, in 1104 b. c. The D. were the most powerful of the Hellenic tribes, and planted colonies in Crete, Sic., and Asia Minor. Their dialect was distinguished by its strength and the broadness of its sounds. (See K. O. MÜLLER, *Vie Doriae*.)

Doric Order, one of the orders of classic arch., takes its name from the Dorians, its possible inventors. It is popularly considered the oldest of the Gr. orders, but Ferguson, Viollet-le-Duc, and other scholars think the Ionic or Ionian style was brought earlier from Asia into Gr. However it may have been—whether the earlier buildings were built of wood and so perished, or whether the style was simply abandoned for the severer D.—it is certain that the Grs. showed a marked preference for the D., and used it in all the buildings of which we have any knowledge from their remains, until the time of the Rom. conquest. The order is characterized by an air of dignity and strength. The true D. column rests upon a stylobate of 3 courses, together equal to 1 inferior diameter of the shaft, which is itself from 4 to 6 diameters in height. Its superior diameter is $\frac{3}{4}$ of the inferior, the latter being the unit of measure. This diminution is reached by an entasis or slight curve. D. columns generally have 20 shallow flutes, separated by a sharp edge. The cap. is about half a diameter in height, composed of an abacus, resting upon an echinus of variable proportions. The columns incline slightly inward toward the main building. The architrave, frieze, and cornice were ornamented with simple yet beautiful mouldings of various forms. CLARENCE COOK.

Do'ris [from the Gr. *Dwpis*, the name of a daughter of Nereus], a genus of marine gasteropodous mollusks belonging to the section Nudibranchiata. They are found mostly in S. seas, but several species are native on N. coasts. They have an oval body; the mouth is a proboscis with 2 tentacula, and the vent is encircled by branched gills. They are sometimes called sea-lemons.

Dormant Animals. See HIBERNATION.

Dormouse [a contraction of *dormant mouse*], a small rodent animal of the genus *Myoxus*. They have ears like mice, their fur is soft and fine, and the tail long. Several are natives of S. Europe. The *Myoxus avellanus* is the only Brit. species. The *Myoxus glis*, about the size of a rat, is prized as food by the Its. The garden D. (*Myoxus nitela*), of the central parts of Europe, is often injurious to fruit trees. They all remain dormant the greater part of the winter.

Dor'ner (ISAAC AUGUST), D. D., a Prot. theol., b. in Würtemberg June 20, 1809; ed. at Tübingen, and became prof. of theol. at Tübingen 1838, Kiel 1839, Königsberg 1840, Bonn 1847, and Berlin 1857. He wrote a *Hist. of the Development of the Doctrine of the Person of Chr.* (1839), and an able work entitled *Hist. of Prot. Theol., especially in Ger.* (1867). He visited the U. S. in 1873 as a delegate to the meeting of the Evangelical Alliance. D. July 13, 1884.

Dor'pat, or **Derpt** [Rus. *Юрьев*], a town of Rus., on the river Embach, 138 m. N. E. of Riga. The old ramparts have been converted into gardens and public promenades. Here Gustavus Adolphus founded in 1632 a unit, which became a large and celebrated inst. Struve and Mädler have successively directed the astronomical observatory of D., which their labors have made famous. D. was founded in 1030, became important, declined, but revived at the beginning of the last century. It was captured by the Swedes in 1655 and by the Rus. in 1704. Pop. 20,727.

Dorr (THOMAS WILLIAM), b. at Providence, R. I., Nov. 5, 1805, grad. at Harvard in 1823, was a Dem. and a leader of the suffrage party. Under the old charter the right to vote was limited to men who possessed a certain amount of real estate, and to their eldest sons. In 1841 the suffrage party formed a new const. and chose Mr. D. gov. of the State. His official action was resisted in May 1842 by the gov. chosen according to the old charter. D. was arrested, convicted of treason, and sentenced to imprisonment for life, but was pardoned in 1847. D. Dec. 27, 1854.

Dorse (*Morhua callarias*), a fish sometimes called **Baltic Cod**, from the great numbers found in the N. seas. It is less in size than the cod, and has a longer upper jaw.

Dorsheimer (WILLIAM). SEE APPENDIX.

Dort, also called **Dordrecht** [Lat. *Dordracum*], a fortified town of the Netherlands, on an island in the Meuse, 10 m. S. E. of Rotterdam. It is traversed by canals, and is accessible to large ships. In 1421 an inundation destroyed 70 villages and converted the ground where D. stands into an island. The Synod of D. met here in 1618, and condemned the doctrines of Arminius. Pop. 1880, 27,292.

Dortmund, a walled town of Prus., in Westphalia, on the Embscher and on the Cologne and Minden R. R., 47 m. N. N. E. of Cologne. It was a city of the Hanseatic League, and was the chief seat of the Vehmte Court. D. was ceded to Prus. by the Cong. of Vienna in 1815. Pop. 1880, 66,544.

Dort, Synod of [Lat. *Synodus Dordracena*], a great synod of the Dut. national Ch., convened at Dort from Nov. 13, 1618, to May 9, 1619. It was convoked by the States-General on account of the controversies between the Gomarists (Calvinists) and Remonstrants (Arminians). Its prin. work was the preparation of canons setting forth the Calvinistic doctrines, and the publication of an ecclesiastical censure against the Remonstrants, calling upon the civil power to enforce the decrees of the synod by banishment, imprisonment, or fines. The canons were officially received by the Reformed chs. of the Low Countries, Fr., Switz., and the Palatinate, but were later rejected by the Ch. of Eng.

Douai, doo-ä' [Lat. *Duacium*], a fortified town of Fr., on the river Scarpe and on the Railway du Nord, about 21 m. S. of Lille. It has several fine chs. and hospitals, an arsenal, a botanic garden, a national coll., and a coll. for the education of Brit. R. Caths. Pop. 26,172.

Douai Bible, **The**, was translated by Eng. R. Cath. divines connected first with the coll. at Rheims, and afterward with the coll. at Douai. The N. T. was pub. at Rheims in 1582, the O. T. at Douai in 1609-10. Both were translated from the Vulgate. The annotations were copious and intensely R. Cath. Numerous eds. have appeared, which greatly vary, both in the text and in the notes. (See *Cotton, Rheims and Douay*.)

Douay (CHARLES ABEL), a Fr. gen., b. in 1809, served in Algeria, in the Crimean war, and in 1859 in It., where he distinguished himself at Solferino; became in 1866 gen. of division, and 1869 inspector of the military acad. at St. Cyr. In the Fr.-Ger. war he commanded the 2d division under MacMahon, and was killed Aug. 4, 1870, in the battle of Weissenburg.

Douay (FELIX), a Fr. gen., a brother of the preceding, b. in 1816, served in Algeria, the Crimea, in the It. war, and as gen. of division in 1862 in Mex. In the war against Ger. he commanded the 7th army corps, was taken prisoner at Sedan, and having returned to Fr. in 1871, organized an army against the insurgents in Paris. He was the first to enter Paris on May 22. After the restoration of order he was appointed to the command of the 4th army corps.

Double Consciousness, sometimes called **Double Personality**, is a form of mental disease involving confusion in the idea of personal identity. Persons with this disorder are variously affected. Some appear to be possessed at one time of one personality, at another of another. In this form of the phenomenon neither consciousness has any knowledge of the other, nor can the person affected remember in one state the events which happened during the other. (See *Waxland's Intellectual Philos.*)

Doubleday (ABNER), b. in Saratoga co., N. Y., June 26, 1819, grad. at W. Pt. in 1842; became a capt. in 1855, and was one of the garrison of Ft. Sumter in Apr. 1861. It is stated that he fired the first gun for the U. (Apr. 12); was made maj.-gen. of volunteers in 1862.

Double, or Binary Stars. It was announced in 1803 by Sir William Herschel that there exist systems of 2 stars which revolve around their common centre of gravity. Many such systems have been discovered since, some of which have immensely long periods, and some shorter ones. The period of 61 Cygni is about 500 yrs.; that of a Gemionum is about 250 yrs., and that of γ Coronæ is only 43 yrs. In some of the systems the 2 stars are of different colors, which are frequently complementary. Many thousand double stars have been observed and catalogued.

Doubloon [Fr. *doublon*; Sp. *doblon*, from *doblar*, to "double"], a Sp. gold coin nearly equivalent to \$16. It is the double of a pistole.

Douglass, the name of an anc. noble family of Scot., which has produced many eminent men. The first member of the family who appears on record was William of Douglass, who lived about 1175-1200.

Douglas (ARCHIBALD), fifth earl of Angus, surnamed **BELL THE CAT**, was a son of George, the fourth earl, who d. in 1462. He (the son) was a powerful and ambitious subject, and held the highest offices in the state. He was the father of Gavin Douglas, the poet, and of other sons. D. in 1514. His grandson Archibald became the sixth earl of Angus, and married in 1514 Margaret, who was a sister of Henry VIII. of Eng. and widow of James IV. of Scot. He had a daughter, who became the wife of the earl of Lennox and the mother of Lord Darnley. The sixth earl d. about 1660, and his title was inherited by his nephew George, who was a brother of Regent Morton. The eleventh earl of Angus was created marquis of Douglas in 1633. (See *Hume, Hist. of the Houses of Douglas and Angus*.)

Douglas (STEPHEN ARNOLD), one of the most eminent Amer. statesmen in his day, was b. at Brandon, Rutland co., Vt., Apr. 23, 1813, of poor but respectable parentage. His father d. soon, leaving him an orphan. Through his mother's exertions, and by energy and industry on his own part, he acquired a limited Eng. education; was a cabinet-maker by trade, but studied law, was admitted to the bar, moved to Ill., and rapidly rose to distinction. He was very small of stature, and at the bar and on the hustings he soon got the appellation of "Little Giant." He was elected atty.-gen. of Ill. in 1835; resigned, and took a seat in the legislature. In 1841 was chosen one of the judges of the supreme court of the State; resigned in 1843, and took a seat in U. S. House of Reps., where he immediately took position among the foremost. He opposed sectional agitation on the subject of slavery, was for leaving that question where the const. had left it, and took an active part with Mr. Clay in the adjustment measures of 1850. He was a prominent Dem. candidate for the presidency in 1852, when Franklin Pierce was nominated. He advocated and secured the passage of the Kan. and Neb. bills in 1854, and was again a prominent candidate for the presidency in 1856, when James Buchanan was nominated. His name was a third time presented for the presidency to the Dem. convention at

Charleston in 1860, when, though he received a large majority vote, yet failed to get a $\frac{2}{3}$ majority of the entire body, whereupon the minority seceded from the convention and subsequently nominated John C. Breckinridge of Ky. and Joseph Lane of Or.; the regularly constituted organization, however, notwithstanding the split, supported D. for Pres. and Herschel V. Johnson of Ga. for V.-P. The "American" party nominated John Bell of Tenn. and Edward Everett of Mass., and the Reps. Abraham Lincoln of Ill. and Hannibal Hamlin of Me. So there were 4 tickets in the field. The result was the election of Lincoln and Hamlin by a large majority in the electoral coll., while the combined vote of the other candidates gave a popular majority against them of over a million votes. Mr. D. d. June 3, 1861. He was a man of great ability and eloquence, and of inflexible integrity. ALEXANDER H. STEPHENS.

Douglass (DAVID BATES), a civil and military engineer, b. at Pompton, N. J., Mar. 21, 1790, grad. at Yale Coll. Sept. 18, 1813, and Oct. 1, 1813, was appointed a second lieutenant in the corps of engineers U. S. A. He entered upon duty at W. Pt. as commander of sappers and miners, and was later commander of the post. In the war with G. Brit. he participated in the battle of Niagara and siege of Ft. Erie, followed by the memorable sortie from that work Sept. 17, 1814, breaking the enemy's lines and compelling him to retire; on this occasion he was promoted first lieutenant and brevet capt. In 1815 he became a prof. at W. Pt. and was also astronomical surveyor of the commission for determining the U. S. boundary from Niagara to Detroit in 1819; Mar. 1, 1831, he resigned his position in the army and was at once appointed chief engineer of the Morris Canal Co., introducing inclined planes in place of locks on that canal, which was carried forward to a successful completion in 1832. During this yr. he was appointed prof. of natural philos. and civil engineering in the Univ. of the City of New York, but relinquished this position in 1833 and became one of the engineers of the Croton Aqueduct from 1833 to 1835, during which time he made the surveys, plans, and estimates for supplying the city of New York with water from the Croton River, the entire duty falling upon him. Major D. showed so clearly the practicability of the project that the necessary legislation to procure its execution was obtained in May 1834, and as chief engineer he completed the plans and laid out the line of the aqueduct. He then located and planned Greenwood Cemetery. In 1840 he resigned his superintendence of Greenwood to accept the presidency of Keyam Coll., Ct., with which inst. he remained till 1844, when he returned to New York, and was engaged until 1848 as chief engineer to plan and lay out the Albany and Que. cemeteries, and in engineering work for the supply of Brooklyn with water. In 1848 he accepted a call from Geneva Coll., N. Y., as prof. of math., which position he retained during the remainder of his life. D. Oct. 9, 1849.

Douglass (FREDERICK), an orator, originally a slave, b. in Talbot co., Md., about 1817. He learned to read and write by stealth, ran away from his master in 1838, and became a resident of New Bedford, Mass. In 1841 he began to give public lectures against slavery. He afterward became the ed. of the *North Star*, a journal pub. at Rochester, N. Y. In 1870 he began to edit the *National Era*. In 1872 he was the first in the list of presidential electors chosen by the Rep. party of State of N. Y.; U. S. Marshal, D. C., 1877-81.

Douro [Sp. *Duero*; anc. *Durius*], a river of Sp. and Port., rises in Old Castile, flows generally W. until it touches the N. E. extremity of Port. It next runs S. W. and forms part of the boundary between Sp. and Port. Resuming a W. direction, it traverses the N. part of Port. and enters the Atlantic 3 m. below Oporto. Its navigation is difficult. Length, nearly 500 m.

Dove (in nat. hist.). See **PIGEON**.

Dove (supposed to be derived from a root akin to "dive," Lat. *columba*; Ger. *Taube*). The D. in Chr. art is used as a symbol of purity and an emblem of the Holy Spirit. Issuing from the lips of dying saints and martyrs, it represents the soul purified by suffering. With an olive branch in its mouth, it is the emblem of peace. In Catholic chs. the pyx or ciborium containing the Host is sometimes in form of a D.

Dover (anc. *Dubris*), a seaport of Eng., on Dover Strait, 66 m. E. S. E. of Lond., 27 m. from Calais, Fr., and 21 m. from the nearest point on the Continent. It is the terminus of S. E. R. R., is connected by daily steamers with Calais and Boulogne, and is the chief port of communication with Fr. It is defended by Dover Castle, a large and strong work said to have been founded by the Romans, standing upon chalk cliffs 320 ft. high. The harbor is protected by a pier of solid masonry 60 ft. wide and extending about 1800 ft. into the sea. Pop. 30,270.

Dover, cap. of Del. and of Kent co., on R. R., 48 m. S. of Wilmington and about 5 m. W. of Del. Bay. It has a State-house, with a State library, and an acad. for boys and girls. It is the centre of a great fruit-growing-section. Pop. 1870, 1906; 1880, 2811; 1855, about 3500.

Dover, city and R. R. centre, cap. of Stafford co., N. H., on Cochecho River, 68 m. N. of Boston and 12 m. N. W. of Portsmouth; is at head of sloop-navigation and at lower falls of the river, which has here a fall of 32 ft. and affords abundant water-power. It has a high school, a private acad., and a city library. It was founded in 1623, and is the oldest town in the State. Pop. 1870, 9294; 1880, 11,687.

Dover, Morris co., N. J., on R. R., the Morris Canal, and the Rockaway River, 33 m. W. N. W. of Newark. Has extensive iron and steel works. Pop. 1880, 2958.

Dover's Powder [named from Dr. Dover, its inventor, an Eng. phys.] (*Pulvis Ipecacuanha et Opii*) consists of ipecacuanha and opium in fine powder, 60 grains each; sulphate of potassa, a troy ounce; rubbed together to a very fine powder. D. P. acts as a sudorific, and where the brain is unaffected and the tongue and skin moist is of great service. Its composition now differs considerably from that given in Dover's formula.

Dover, Strait of [Fr. *Pas de Calais*; Lat. *Fretum Gallicum*], separates Eng. from Fr., and connects the Eng. channel with the N. Sea. At the narrowest point it is about 20 m. wide, with a depth of from 6 to 29 fathoms.

Dow, or Douw (GERARD), a Dut. painter, b. at Leyden Apr. 17, 1613, was a pupil of Rembrandt. He excelled in chiaroscuro and in technical skill, and finished his works with excessive delicacy. Produced *The Charioteer*, *The Drunken Woman*, and *The Village Grocer*. D. Feb. 1675.

Dow (LORENZO), an eccentric Meth. preacher, b. in Coventry, Conn., Oct. 16, 1777. He labored in many States of the U. and also in Eng. and Ire. D. Feb. 2, 1834.

Dow (NEAL), a reformer, b. at Portland, Me., in 1803. As a member of the legislature of that State he procured in 1851 the passage of a law to prohibit the sale of ardent spirits, which is called the "Maine law;" became a brig.-gen. of U. volunteers early in 1862.

Dowagiac, city, Cass co., Mich., on R. R. and Dowagiac River, 105 m. E. of Chicago. Pop. 1880, 2100; 1884, 2351.

Dower [from the Fr. *douer*, to "endow"], in the common law of Eng., is an estate for life which a widow has in $\frac{1}{2}$ part of all the lands and tenements of which her husband was seized beneficially, or of an estate of inheritance at any time during the marriage.

1. *The Nature of the Estate*.—D. passes through 3 stages. While the husband lives it is but an inchoate right and incapable of enforcement. Should the husband sell to a stranger and leave her destitute, she would have no claim to the land while the husband lived. On her husband's death, and before D. is assigned, she has a right of action. After D. is assigned she has an estate in the land. The rights of D. depend upon a rule of law which is founded on public policy. The law of the place where the land is situated governs it.

2. *The Requisites of D.*—These are threefold—marriage, seizin of the husband, and his death. The leading questions on this subject concern seizin. By this is meant beneficial ownership of a present estate of freehold, which may descend to the husband's heirs. There can be no D. in an estate for yrs., however long it may last. Nor can there be in a reversionary estate which is preceded by a prior estate of freehold or for life owned by another person, though there may be where the prior estate is for yrs. The widow owner. This proposition would be applied to the widow of a deceased partner, who could only be endowed subject to the adjustment of the affairs of the partnership. Formerly, the trust estate itself was not the subject of D. This rule does not prevail in the U. S., and D. may sometimes be had in money, which by a legal fiction is a substitute for land. Whenever the husband's estate is defeated by a superior title, D. falls with it.

3. *Assignment of D.*—As D. is $\frac{1}{2}$ part of the husband's estate, it must be assigned either by the parties or by act of the law. Certain legal rules must regularly be followed, when D. is said to be assigned of common right. These may be relaxed by agreement under seal, when the assignment is said to be against common right.

4. *Barring of D.*—The right cannot be destroyed by the mere act of the husband. Creditors also take subject to this claim. It can in general be barred only by the wife's own act, as by joining in a conveyance with the husband, or by a jointure settled before marriage. The husband often in his will, either expressly or by implication, gives his wife property in lieu of D. In this case she may, after his death, elect to take such property or her D., but cannot take both. This right occasioned much inconvenience in Eng. by impeding the conveyance of property. For this reason, by the Dower act of Aug. 29, 1833, the right of D. was virtually placed entirely in the hands of the husband in the case of all marriages contracted after Jan. 1, 1834. The husband may now dispose of his lands by will or otherwise, free from any claim of D. on the part of his wife. If, however, he dies intestate, his widow, under the statute of distribution, receives not merely for life, but absolutely, $\frac{1}{2}$ of his personal estate. In the U. S. the gen. rules of the Eng. common law still prevail. As a gen. rule, also, at least $\frac{1}{2}$ of the husband's personal estate is given to the wife, as by the Eng. statute of distribution. T. W. DWIGHT.

Dowling (JOHN), D. D., b. in the co. of Sussex, Eng., May 12, 1807, became a resident of the U. S. in 1832, and a Bap. preacher of New York. Wrote *Vindication of the Baps*, and *Hist. of Romanism*. D. July 4, 1878.

Dow, or Dune [Fr. *dune*, from the Celtic *dun*, a "hill"], sand-banks or sand-hills which the sea gathers and forms along its shores. The term is also applied in Eng. to large tracts of poor hilly land covered with short grass, especially to 2 broad ridges of undulating chalk-hills S. of the Thames, known as the N. and the S. D., the former being nearly 120 m. long. They produce the aromatic grass upon which the S. D. sheep are pastured.

Downing (ANDREW JACKSON), a landscape-gardener and pomologist, b. at Newburg, N. Y., Oct. 31, 1815. He was almost entirely self-taught. Wrote *Treatise on the Theory and Practice of Landscape Gardening*, *Fruit and Fruit Trees of Amer.*, and *Cottage Residences*. D. July 28, 1882.

Downtown, Pa. See APPENDIX.

Downs, The, a portion of the N. Sea off the S. E. coast of Eng., protected by Goodwin Sands, a natural breakwater. This harbor of refuge is 8 m. long and 6 m. wide, is safe except during a S. wind, and in time of war is a rendezvous for the R. N.

Dowry [from the Fr. *douer*, to "endow"; Lat. *dos*; Fr. *dof*], the marriage portion brought by a wife to her husband. This term is often confounded with *dower*, but it has a different signification.

Doylestown, cap. of Bucks co., Pa., on R. R., 25 m. N. of Phila., has a public library and 2 private acads. It is much frequented by summer visitors from Phila. Pop. 1870, 1601; 1880, 2070.

Draca'na Dra'co, or Dragon Tree, a tree belonging to the order Liliaceae, some examples of which grow to prodigious size in the Canaries and India. The height is not proportioned to the thickness of the stem, and the head is crowned with short branches having tufts of sword-shaped leaves. It produces a part of the resin called dragon's blood. A specimen in the island of Teneriffe is described by Humboldt as having a stem about 45 ft. in circumference in 1799. It had the same measurement in 1402. It was worshipped by the Guanches, and its hollow trunk was converted by their conquerors into a chapel.

Drachm, or Dram [Gr. *δραχμή*; Fr. *drachme*; Lat. *drachma*], in avoirdupois weight (written *dram*), is $\frac{1}{16}$ of an ounce; in apothecaries' weight (written *drachm*), $\frac{1}{2}$ of an ounce troy. In apothecaries' measurement the fluid-drachm is $\frac{1}{4}$ of a fluid-ounce. The *drachma* was also a Gr. silver coin, varying in value in different states, that of Athens being worth nearly 20 cents.

Dra'co [Δράκων], a Gr. phys., son of the celebrated phys. Hippocrates, to whom some of the writings that pass under the name of the latter are ascribed.

Dra'co, or Dra'con [Gr. *Δράκων*], an Athenian legislator who was archon in 620 B. C., and author or compiler of the first written laws among the Athenians. This code remained in force until the time of Solon, who substituted milder penalties. The term *draconic* is sometimes applied to laws which are excessively severe.

Draco, or The Dragon, a constellation of the N. hemisphere. From observations upon the star γ Draconis, Bradley was led to his discovery of the aberration of light.

Draco [Δράκων], of Stratonicea, in Caria, a Gr. grammarian, who flourished probably about 125 A. D. A treatise on Gr. metres (*περί μέτρων ποιητικῶν*) is ascribed to him.

Drac'o'nium [Gr. *δρακόντιον*, a "little dragon,"] probably from the burning taste of some species, a genus of plants of the natural order Araceae. The *D. polyphyllum*, a native of Guiana, India, and Japan, has a powerful action on the nervous system, and is used as a remedy for asthma. The flower emits an intolerable stench when it first opens. The *D.* of the U. S. Pharmacopoeia is the skunk-cabbage (*Symplocarpus foetidus*), which has similar med. properties. It is kindred to the true *D.*, and like it has a strong offensive odor.

Drac'o'n'tius, a Chr. poet of Sp. who lived under Theodosius II., about 431 A. D. Isidorus ascribes to him a poem in hexameter verse entitled *Hexæmeteron*, a poetical narration of the 6 days of Creation.

Dra'goman [Fr. *dragoman*; It. *dragomano*, a corruption of the Ar. *tarjuman*, "interpreter"], a name given in the Levant to an interpreter or guide for foreigners. The D. of the Sublime Porte is a Tur. officer, who forms the medium of communication between his own gov't and foreign ambassadors. The term is also applied to the interpreters attached to European embassies and consulates in the Levant. They and their families are not subject to the Tur. laws, but are under the protection of the embassies which they serve.

Dragon. See ELIXIR DRAGON.

Dragon, a name given to a fabulous monster, represented in the mythology of many nations as a huge winged serpent. In the N. T. the word is used for the personification of sin, and in Chr. art it is the type of sin and idolatry. Hercules, Perseus, and Apollo in Gr. mythology, and Thor in the Scandinavian, were renowned as D.-slayers, as was St. George in the early Chr. legends. The D. is still an heraldic bearing in Europe.

Among the Chi. the D. was believed to be a being of superhuman power, a sort of deity, and hence became a symbol of divinity. According to Chi. tradition, some of the earliest emps. of that country are represented as having the form of flying D., and representations of such D. belong to the heraldry of the imperial coat-of-arms.

Dra'gonet, a name applied to species of *Callionymus*. The ventral fins are larger than the pectorals and placed under the throat, and the gill-openings are reduced to a small hole on each side of the nape. The common European species is *Callionymus lyra*.

Dragon-Fly, or Devil's Darning-Needle, the popular name of Libellulidae. They have large globular heads, strong mandibles, eyes lateral, large, and projecting, antennæ short, 4 narrow, gauze-like wings, strongly reticulated, and the abdomen often remarkably slender. They devour other insects with great voracity.

Dragonnade, the persecutions which the Fr. Prots. suffered in the reign of Louis XIV., so called because dragons (Fr. *dragons*) were employed, under ecclesiastical and civil functionaries, as instruments of the persecution.

Dragon's Blood, or Gum Dragon [Lat. *sanguis draconis*], a resin obtained from various trees growing in warm climates. Among these are the *Dracena Draco*, the red sandal-wood (*Pterocarpus Santalinus*) of the E. I., the *Pterocarpus Draco*, a leguminous tree of S. Amer., and the *Calamagrostis Draco*, an E. I. rattan palm. The D. B. of commerce is of a dark reddish-brown color, smooth and brittle, and dissolves in oil, alcohol, and ether. The solution is used for staining leather, wood, and even marble. The resin is also an ingredient of some varnishes and lacquers. It comes from the Moluccas, Socotra, Brazil, and Teneriffe.

Drain'age, the removal of the excess of water from the soil, either by means of canals and open ditches, or by underground sewers, pipes, and hollow tiles. There is very little ground that is not too wet in rainy weather and too dry in droughts. Thorough D. relieves the first evil and mitigates the bad effects of dry weather. When soil is drenched with water and dried by evaporation, it becomes hard. Land that is dried by D. is porous and permeable to the dews and showers, while the soil deepened by D. permits growing crops to put forth longer roots, and thus become secured against drought. Good D. also diminishes the number of malarial fevers. Underground D. is the best for all except marshy lands. Drains made of pipes of porous burned clay

are the most effective. They should be laid near enough to the surface to be thoroughly dried after rains, and deep enough to escape the plough, and without curves or angles in their vertical plane. Draining lakes and marshes requires much engineering skill. In Hol., steam-pumps, windmills, and tide-gates are extensively employed.

Drainage of Cities. See SEWER.

Drake (BENJAMIN M.), D. D., a minister of the M. E. Ch. S., b. in N. C. Sept. 11, 1800. He joined the Tenn. Conference in 1820, but the next yr. was transferred to the Miss. Conference, in which he rose to a very high position. He built the first Meth. ch. in New Orleans, was pres. of Elizabeth Female Acad. (the first Meth. school established in Miss.), and was pres. of Centenary Coll. D. 1860.

Drake (CHARLES D.), a jurist, a son of Dr. Daniel Drake, b. at Cin., O., Apr. 11, 1811. He served as mdpn. in the navy 1827-30, and was admitted to the O. bar in 1833; in 1834 he removed to St. Louis, was U. S. Senator 1867-71, and was appointed chief-justice of the U. S. court of claims in 1871. Edited *Law of Attachments*.

Drake (SIR FRANCIS), an Eng. navigator, b. in Devonshire about 1540. He obtained a commission from Queen Elizabeth in 1570, cruised in the *W. I.*, and enriched himself by plunder taken from the Spaniards. He conducted in 1572 an expedition against the Sp. in Amer., and saw the Pacific from the Isthmus of Darien. He sailed in 1577 with 5 vessels, entered the Pacific, and sacked several towns of Chili and Peru. Hoping to find another passage to the Atlantic, he sailed northward to lat. 48°, but failed, and took shelter in the Bay of San Francisco. He next steered to the Moluccas, returned by the Cape of Good Hope, and arrived at Plymouth in Sept. 1579. He was the first Englishman who circumnavigated the globe. The queen rewarded him with knighthood. In 1587, when Sp. was preparing the Armada, he entered the harbor of Cadiz, where he destroyed nearly 100 vessels and captured immense booty. The exploit was called "singing the king of Spain's beard." He was vice-admiral of the fleet which in 1588 opposed the Invincible Armada. In 1592 he was elected to Parl. D. Dec. 27, 1595.

Drake (FRANCIS SAMUEL), an author, b. at Northwood, N. H., Feb. 22, 1828; pub. a *Dict. of Amer. Biography and Life of Gen. Henry Knox*. D. Feb. 22, 1885.

Drake (JOSEPH RODMAN), a poet, b. in the city of New York Aug. 7, 1795. He studied med., and grad. about 1815. Among his works are *The Culprits Foy* and verses on the Amer. flag. D. Sept. 21, 1820.

Drake (SAMUEL GARDNER), an historical writer, b. at Pittsfield, N. H., Oct. 11, 1798. Wrote *Indian Biography and Hist. and Antiquities of Boston*. D. 1875.

Drama, *drāma* [Gr. *δράμα*, from *δράω*, to "do," to "act," literally, an "acting," a "performance," Fr. *drame*; Ger., Dut., Dan., Sp., and Port. *drama*; It. *dramma*; Swe. *dram*], signified originally the exhibition of human actions upon the stage. The anc. Gr. D. had its origin in the worship of Bacchus, which sometimes took the form of the wildest gayety, sometimes of the deepest sorrow. Hence arose the Gr. comedy, which gained its highest development in Aristophanes, and tragedy, which found its most perfect expression in Æschylus, Euripides, and Sophocles. The Rom. D. was borrowed from that of the Grs. Plautus and Terence were the chief comic dramatists, Seneca the only tragic one of note. The Hindoo D. possesses some works of great merit, notable among which is the *Sakountalā* ("Lost Ring") of Kālidāsa (about 50 B. C.), which is pronounced worthy to be ranked with the plays of Shakespeare. The Japanese and Chi. have also D., a feature of which is that the performance of one of them sometimes occupies several days. The D. of modern Europe had its origin in the "miracle plays" presented by the Ch., or with its sanction. But it has developed itself so as to form not merely a popular amusement, but to constitute an important part of the lit. of every land. Among the dramatists whose works have become classic are: In Eng., Shakespeare, Ben Jonson, Otway, Beaumont, Fletcher, Marston, Joanna Baillie, and Knowles; Fr., Corneille, Molière, Racine, and Voltaire; Ger., Goethe and Schiller; It., Alfieri, Manzoni, and Silvio Pellico; Sp., Calderon and Lope de Vega. Their works belong to the D. of the closet as well as of the stage. Beside these there are innumerable dramatists whose works are intended solely for scenic presentation.

Dra'per (HENRY), M. D., LL.D., b. in Prince Edward co., Va., Mar. 7, 1837, grad. at med. dept. of Univ. of City of New York 1858; became prof. of physiology there in 1860, and pub. *Textbook of Chem.* He devoted much attention to photographic and spectroscopic examination of the moon and other heavenly bodies. D. Nov. 20, 1882.

Draper (JOHN WILLIAM), M. D., LL.D., a chemist and writer, b. near Liverpool, Eng., May 5, 1811, ed. at the Univ. of Lond., and emigrated to the U. S. in 1833; grad. as M. D. in the Univ. of Pa. in 1836, was prof. of chem. and physiology at Hampden-Sidney Coll., and in 1841 was appointed prof. of chem. in the newly founded med. dept. of the Univ. of New York. In 1839 he took the first photographic portrait ever taken from the life. He discovered many of the fundamental facts of spectrum analysis, and pub. them (1841-50). Wrote *Human Physiology, Statical and Dynamical, of the Conditions and Course of Life in Man, and a Hist. of the Amer. C. War*. D. Jan. 4, 1882.

Draw'back, in commercial affairs, is a remission of duties paid on imports, on their re-exportation. It is also used of repayment of duties on articles produced in a country and entered specially for exportation. In the U. S. there can be no duties on exports, this being expressly forbidden by the const. Adam Smith holds that this latter form of D. can never occasion the exportation of more produce than would have been exported if there had been no duty. As for the other form, it may be highly advantageous to a merchant in sudden changes of commercial affairs to be able to change the destination of his cargo from a pt. where there is no demand for it to another where a demand has sprung up suddenly.

T. D. WOOLSEY.

Draw'ing, in the fine arts, is the delineation of form in contradistinction to color, light, and shade, and, as it includes a knowledge of anat., proportion, and perspective, is the foundation of everything in art, and the most important feature of a finished painting. In power and beauty of D. the It. and Flemish schools stand pre-eminent. When Gr. art had attained its highest perfection, D. was a regular branch of education, as it is now in Europe and the U. S.

Dray'ton (WILLIAM HENRY), a patriot, b. in S. C. Sept. 1742. Was chosen chief-justice of S. C. in 1776, and pres. of that State in 1777. In 1778 he became a member of the Continental Cong. D. Sept. 3, 1779, leaving in MS. a *Hist. of the Revolution*, which was pub. by his son.

Dredging and Scouring, terms applied to those processes by which materials are removed from the bottom of ship-channels and harbors, and the navigable depth of water increased thereby. By *dredging* is meant more particularly the raising of the materials to the surface by mechanical appliances, and their transportation and deposition elsewhere, while *scouring* implies their gradual and progressive removal by the force of the current. In order to increase the effective scouring-power of streams it is customary to narrow and straighten their natural water-way by bulkheads, jetties, and other works of improvement, and sometimes the drainage waters in inland and the ebb flow in tidal streams are held back by gates, and let out through the channel at stated periods with great violence. This method of scouring, called *flushing* or *flushing*, is a very efficient mode of D. in the few locations favorable for its application. At Ramsgate, Dover, and other places in Eng. large scouring-basins or reservoirs to retain the water have been constructed. To facilitate the scouring, the bottom may be loosened up by dragging heavy rakes over it during the period of strongest current. The oldest D.-machines were probably of this character, and were used in Hol. They consisted of floating frames, with teeth or bars projecting down to the bottom from the under side, which stirred up the sand and mud as the machine was floated along by the current.

Where bars are short, with deep water on either side, or where the bottom is lumpy, scrapers have been advantageously employed to smooth off the bottom. The material scraped from the shoal places subsides in deep water, and the available depth is thereby increased. The scrapers may be attached to a tug moving up and down the channel, or to a scow towed by a tug.

The mode of deepening channels by stirring up the bottom in streams where there are effective currents in one or alternately in both directions, has been successfully followed at the mouth of the Miss. River. The apparatus used was a large double-ender dredge-boat, of like shape and construction at both ends, provided with 2 strongly built 4-bladed propellers, one at each end, on separate shafts, powerfully driven by separate engines, and with water compartments or tanks, such that when they are empty and the coal bunkers full, the boat will draw 14 ft., and when full 22 ft. The blades of the propellers extend about 2 ft. below the vessel's keel. When operating, the boat is sunk by means of her tanks to a draught fully equal to and generally exceeding the soundings on the bar; she then steams alternately up and down the channel, cutting her way through and stirring up the bottom with the propellers. The material thrown into suspension is carried off by the current and subsides in deep water. In exceptional cases the boat, when drawing 15 ft., has cut her way through where there were but 10 ft. of water. The up-stream or stern end of the boat has a deflector a few ft. in rear of the propeller. When steaming down stream on an ebb current, the effect of this deflector is to carry upward into the upper and stronger current the backwater from the propeller, and consequently the solid material with which it is charged. Auxiliary scrapers are also used with this boat to stir up the bottom on each side of the propellers. To guard against stoppage from accidents, 2 boats are deemed necessary to maintain a constant depth of 20 ft. at low tide.

Scoops of various forms, filled by drawing them along the bottom, and then raising them to the surface and emptying them into scows, have been used in many places—a device which was afterward extended by attaching a series of scoops or buckets to an endless belt or chain attached to the side of the vessel, or over an opening amidships, and working over pulleys or wheels so arranged that the chain can be lowered or raised to suit various depths of water. The buckets descend empty, fill themselves at the bottom, and when they rise over the upper wheel discharge into troughs leading to scows alongside.

Wheel Dredgers.—Instead of an endless chain to carry the buckets, these are sometimes placed upon the perimeter of a wheel 25 to 30 ft. in diameter, or larger, according to the depth to be dredged. This wheel is set in a well in the boat, its axle or shaft working in boxes that can be lowered or raised by suitable machinery as the depth requires. As the wheel revolves the buckets scoop themselves full at the bottom, and in ascending lift in succession the upper end of a shoot adjusted against the perimeter of the wheel, which, falling back to its place, causes the bottom of the bucket to unlatch, and the contents to be discharged into the shoot, and thence into a scow alongside. The dredge-boat is drawn along by a cable leading to the engine at the precise rate which the progress of the excavation requires.

Clam-shell Dredgers.—Each dredge-boat operates but one bucket, which is in 2 parts hinged together horizontally, something like a clam-shell, with arrangements by which it is opened and closed by the same power which lowers and raises it through the water. The bucket, being opened and suspended from the end of a crane-jib, descends vertically through the water until it rests on the bottom. It is then filled by closing together the 2 parts, when it takes the form of a short horizontal trough or hollow semi-cylinder closed at the ends. It is then raised out of the water, swung round over a scow, opened and emptied.

Pump-Dredger.—A novel device for utilizing the powers of the centrifugal drainage pump has been put in successful operation by the writer in deepening the channel over the bar at the mouth of the St. John's River, Fla. Upon this bar the ocean swell, which constantly prevails, is of such exceptional magnitude and violence that the usual method of D. into lighters or scows, ordinarily pursued in still water with either of the dredgers above mentioned, is entirely impracticable. The plan adopted was to provide a suitable steamer by charter, and fit her out with a 9-inch centrifugal drainage pump, 2 branches of 6-inch suction pipe, and timber bins on deck for holding the sand pumped up from the bottom: the pump engine to be driven by steam from the steamer's boiler, and the sand to be discharged overboard at selected points by flooding the bins with clear water from the pump.

The Pump.—A No. 9 centrifugal drainage pump of the Andrews patent is located on the main deck aft, about 35 ft. from the stern-post. Its suction and discharge openings are each 9 inches in diameter. To the suction opening there are connected, by a 2-way branch-pipe, 2 6-inch suction-pipes, instead of one 9-inch, as usual, the object being not only to work on both sides of the boats simultaneously, but to render the necessary handling of the pipes as easy and prompt as possible. The engine used to drive the pump consists of 2 cylinders connected upon one crank at right angles to one another, and 10 inches in diameter by 10-inch stroke each. Steam is conveyed from the steamer's boiler to the pump-engine through a 3-inch iron pipe, the usual pressure carried upon the boiler being about 25 lbs. to the square inch. The manner of conducting the D. was as follows: The steamer, with the suction-pipes up, first crosses the bar to the outside, then turns around and steams slowly over the bar with just sufficient speed to maintain steerage-way, lowering the pipes and starting the pump as soon as the outer edge of the bar is reached. Arriving at the inside, the pump is stopped, the pipes raised, and the steamer turned round again. She then crosses slowly to the outside, pumping as before; and the quantity of sand discharged into the bins during these 2 passages over the bar is a load, whether great or small. While the steamer is turning around on the outside, preparatory to taking in another load, the side gates of the bins are opened, the suction-pipes are raised from the bottom, and the pump is run at full speed on clear water. By this means, assisted to some extent when necessary by men in the bins with hoes, the sand is all discharged into deep water by the time the steamer has again reached the outer edge of the bar, when the D. is resumed. The time required to turn the steamer twice is 12 to 13 minutes, one half of which, or the time occupied in making the turn on the inside, is lost, as neither the work of D. the sand nor discharging it from the bins is in progress during that interval.

With a centrifugal drainage pump sand can be easily discharged at a height of 30 ft. above the level of the water; and when the distance to which it has to be conveyed is so great that open troughs from the discharge-pipe to the dumping-ground cannot have sufficient inclination to secure a free flow of the sand and water, it would be necessary to make the discharge through pipes, increasing the power expended in proportion to their length, so as to insure a velocity that will transport the sand and prevent choking. The pump itself should in all cases be placed as low as possible, and it would generally be practicable to locate it from 3 to 5 ft. above the surface of the water. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. Q. A. GILMORE.]

Dred Scott Case (the case of *Scott vs. Sandford* in the supreme court of the U. S. in 1856, 19 Howard R. 393). A slave named Dred Scott was carried by his master (Sandford) from Mo. into Ill. and Wis., and thence back to Mo. Scott was descended from Afr. ancestors, who were slaves. He brought an action in the circuit court of the U. S. to assert his title to freedom. The judgment of that tribunal was carried by writ of error to the supreme court. It was there decided by a majority of the court that if Scott were assumed to be free, he was not a "citizen of a State," so as to bring the action; and further, that he was still a slave. Accordingly, the case was dismissed for want of jurisdiction on the part of the circuit court. In reaching the conclusion that he was still a slave, the court held that the act of Cong. which prohibited a citizen from holding slaves in the Terr. of the U. S., N. of 36° 30' N. lat., was unconstitutional and void. The action of the court has been severely criticised in respect to this last point, as being unwarranted after the decision was made that Scott, considered as a freeman, was not a citizen. It is maintained, on the other hand, that both questions under the pleadings were properly decided. Some recent information as to the circumstances under which the decision was rendered will be found in letters of Justices Campbell and Nelson in Tyler's *Life of Chief-Justice Taney*, pp. 382-385. The chief-justice, when delivering the opinion of the court, made an historical survey of the public opinion of the civilized world, at the time of the formation of the Amer. const., concerning the Afr. race. Among other things he said: "They (the Afrs.) had for more than a century before been regarded as beings of an inferior order, and altogether unfit to associate with the white race, either in social or political relations, and so far inferior that they had no rights which the white man was bound to respect." Much injustice has been done him by an erroneous statement, still occasionally repeated, that the chief-justice had himself affirmed that the negro had "no rights which the white man was bound to respect."

T. W. DWIGHT.

Dreissenidae, after Dr. Dreyssen, a family of conchiferous mollusks, with the mantle closed except at the branchial and anal siphons (which are prominent); the anterior adductor supported in a shell within the beak; the pedal muscle single and posterior, and the shell mytiliform and pearly inside.

Drepanius (LATINUS PACATUS), a Gallic rhetorician, b. in Aquitania, is classed among the Lat. Panegyrist. He attained the rank of proconsul A. D. 390. Of his poetry nothing remains but the panegyric which he delivered in the presence of the emp. Theodosius in 389 A. D.

Dresden, the cap. of the kingdom of Sax., on the river Elbe, 116 m. by R. R. S. of Berlin and 62 m. E. S. E. of Leipzig. Steamers navigate the river up to this point. D. is divided by the Elbe into the old town and new town, the latter of which is on the right bank of the river, here crossed by a fine stone bridge. The most remarkable public edifices are the royal palace, founded in 1534; the prince's palace; the Japanese palace or Augusteum; the Brühl terrace; the Frauenkirche, with a tower 355 ft. high; the R. Cath. ch., with a tower 378 ft. high, and the Sophienkirche. There is a public library containing over 300,000 vols., an acad. of art, a museum of nat. hist., and a picture-gallery, considered the richest collection in Ger. In the royal palace are the "Green Vaults," containing a valuable collection of gems, etc. D. was founded about the 11th century, became the cap. of Sax. 1270, was fortified in 1510, and suffered severely in the Thirty Years' war. In the summer of 1813 it was occupied by a Fr. force of 30,000. The allies under Schwarzenberg appeared before it Aug. 23. Nap., with the main Fr. army, came to its relief on the 26th. The allies bombarded and assaulted the city, but were repulsed by a sally of the Fr. guard. They renewed the attack on the 27th, and were repulsed in a great pitched battle. Pop. 220,818.

Drew (DANIEL), a New York capitalist, b. in Carmel, Putnam co., N. Y., in 1797, commenced active life as a cattle-drover, became conspicuous in the steamboat business, still later in that of R. Rs., and at last was recognized as a chieftain in the stock speculations of Wall st. Founded the Drew Ladies' Sem. at Carmel, N. Y., and the Drew Theological Sem. at Madison, N. J. D. Sept. 18, 1879.

Drew (SAMUEL), a Wesleyan theol. and metaphysician, b. at St. Annell in 1765, settled in Lond. in 1819. Wrote *Essay on the Immateriality and Immortality of the Soul and Essay on the Identity and General Resurrection of the Human Body*. D. 1833.

Drew Theological Seminary was founded in 1868 at Madison, N. J., by a donation of about \$500,000 from Daniel Drew. It was organized chiefly by the Rev. Dr. J. McClintock, who became its first pres. Its real estate and buildings are ample and beautifully located, and its faculty effective. It is under the control of the M. E. Ch.

Dreyse, drit'zeh, von (JOHANN NIKOLAUS), the inventor of the "needle-gun," b. at Sömmerda, in Prus., Nov. 20, 1787. He was the son of a locksmith, worked from 1809 to 1814 in a Paris gun-factory, established after his return to Ger., in his native town, an iron-ware factory. After several attempts, he perfected the famous needle-gun in 1836. It was introduced into the Prus. army in 1840. D. Dec. 9, 1867.

Drift, in geol. (more fully **Glacial Drift**), a term applied to boulder clay and collections of stones and earth formed in the tertiary period by the agency of glaciers. Some geologists limit the term *drift* to material that has been recently moved by water, thus including sands, marls, and gravels, stratified and unstratified. Such deposits are sometimes called *diluvium*. They include the remains of animals that have recently inhabited the earth, and of some species which are now extinct. Human remains have also been found in these D. deposits. D., in navigation, signifies the deviation in a ship's course when she is driven by the wind or waves and is not governed by the helm.

Drill, an old Eng. word for an ape, now applied especially to the *Cynocephalus leucopheus*, a baboon of Afr. (See also **MANDRILL**.)

Drisler (HENRY), LL.D., an Amer. scholar, b. Dec. 27, 1818, grad. at Columbia Coll. in 1839; prof. of Lat. 1857, and of Gr. in 1867. He prepared an enlarged ed. of Liddell and Scott's translation of Passow's *Gr. Lexicon*, and a revised and enlarged ed. of Yonge's *Eng.-Gr. Lexicon*; was one of the associate eds. of *J.'s Univ. Cyc.*

Drom'edary, drom'e-dare [Gr. δρόμος, "running," the name given to the Ar. and Afr. camel (*Camelus dromedarius*), having only one hump on the back. Its usual pace is a trot, which it often maintains for many hours together at the rate of 9 m. an hour. It is extensively used as a beast of burden in Afr. and Ar.

Dropsy [a corruption of the old Eng. *hydropsy*; Gr. ὕδρωσις, from ὕδωρ, "water;" Lat. *hydropnisis*; Fr. *hydropisie*; Ger. *Wassersucht* (i. e. "water-sickness"), a disease characterized by excess of the natural secretion of fluid in any of the serous cavities of the body or in the areolar tissue. If the cerebro-spinal fluid be increased, it constitutes *hydrocephalus*, or "water on the brain." If the excessive secretion (exudation) takes place from the pleura, it is called *hydrothorax*, or "D. of the chest." If the fluid collect in the abdominal cavity, the disease is called *ascites* (from the Gr. ἄσκις, a "skin," or leathern bag for water or wine, alluding to the form of the patient's body). Gen. D. of the serous and areolar tissues is called *anasarca* (from the Gr. ἀνά, "throughout," and σαρξ (gen. σαρκός), the "flesh"). Obstructive organic disease of the heart and degenerative diseases of the kidneys are the most frequent causes of gen. D., which is therefore a very important symptom. *Hydropericardium*, or "water on the heart," *hydrarthrus*, or effusion into a joint, *hydrorachis*, which is seated in the spinal canal, and *hydrocele*, in the scrotum, are forms of D. Ovarian D. or ovarian tumor is a fluid collection occurring in ovarian cysts. E. D. HUDSON.

Droste zu Vischering, drost'eh tsou vis'eh-eh-eh, von (CLEMENS AUGUST), FREIHERR, a Ger. abp., b. Jan. 22, 1773, became vicar-gen. in 1805, assistant bp. of the diocese of Münster in 1825, and abp. of Cologne in 1835. In consequence of difficulties with the Prus. govt. in regard to mixed marriages, which the abp. forbade the priests to solemnize unless they received the promise that all the children should be brought up in the Catholic religion, he was imprisoned

in the fortress Minden in 1837, but was released in 1841. His imprisonment called forth an extraordinary excitement in Ger., and greatly strengthened the influence of the Cath. Ch. D. Oct. 19, 1845.

Drouyn de Lhuys, droo-an' deh lu-e' (EDOUARD), a Fr. diplomatist, b. at Paris Nov. 19, 1805. He was appointed director of the commercial bureau in the ministry of foreign affairs in 1840. Having voted in the Chamber of Deputies against the ministry, he was removed from office in 1845. He was minister of foreign affairs in the first cabinet of Louis Nap. in 1848, minister to Lond. in 1849; was appointed minister of foreign affairs in July 1852, resigned in 1855, and was restored to that position in Oct. 1862. He again resigned office in 1866. D. Mar. 1, 1881.

Brown (THOMAS MESSINGER), M. D., b. in Phila. Mar. 19, 1842, grad. in 1859 at the Phila. High School; studied at the Univ. of Pa., whence he grad. M. D. in 1862; at the Sheffield Scientific School, New Haven, 1862-63; at the Lawrence Scientific School 1863-65; at Freiberg and Heidelberg 1865-68, and was appointed prof. of analytical chem. in Lafayette Coll., Easton, Pa.

Browning, death by long continued submersion in water. The recovery of persons after apparent death from D. is a very important subject. The following rules are derived from the experience of the best phys.: (1) Keep the body cool until respiration be re-established. (2) Respiration must be artificially established. The patient being in a horizontal position to facilitate the exit of water from the lungs, and the head being slightly raised, the lungs are alternately inflated and compressed by gently rolling the body from a prone to a half-prone position (upon one side), and reversing the process. (3) Expose the face and chest to the air, unless the weather be very cold. (4) Rub the limbs upward, and put dry clothing upon the patient. (5) Avoid the use of the galvanic battery. (6) Continue these operations until, if possible, natural respiration be re-established. Cases are reported where artificial respiration had to be kept up for hours before signs of life appeared.

Druids [Gr. *δρῦδαί*; Lat. *druidæ*, thought by some to be derived from the Celtic *deru*; Gr. *δρῦς*, an "oak," a tree which they revered, but perhaps from the Celtic *de-rouyd*, "God's speaker"], the priests of the anc. Celtic religion who presided at sacrifices, instructed the youth, and guarded the secret tenets of religion. They were skilled in minstrelsy, med., and other arts, practiced human sacrifices, held to the immortality of the soul, and revered the oak and mistletoe. Their importance ceased when Gaul became subject to the Romans, and their rites were abolished by the emp. Claudius.

Druids, Orders of, founded in Lond. in 1781 as a club for mutual entertainment, but soon developed into a secret society, with a system of rites, professedly based on traditions handed down from the anc. Druids. They are divided into many independent orders, and are found in G. Brit., Australia, and the U. S.

Drum-Fish (*Pogonias chromis*), a marine scienid of the U. S. coasts, found as far S. as Fla., distinguished by a "beard" of numerous small filaments pending from the front of the lower jaw. It derives its name from the peculiar sound it emits, somewhat resembling the beat of a drum. It produces this sound after it is caught as well as when in the water. It sometimes weighs 80 lbs.

Drummond (THOMAS), CAPTAIN R. E., a Scot. engineer, b. in Edinburgh in Oct. 1797. In 1825, while engaged in the trigonometrical survey of Scot., he made successful experiments with incandescent lime to render distant objects visible. He was appointed under-sec. for Ire. in 1835. D. Apr. 15, 1840.

Drummond Light [named from its inventor], also called **Lime Light**, **Calcium Light**, etc., an intense light produced by throwing the oxyhydrogen blowpipe flame upon a pencil of lime, which is thereby raised to very vivid incandescence.

Drunkness. See DIP-SOMANIA and INTENPERANCE.

Druses, written also **Druzes** and **Droozes** [from *El Dorazy*, a minister of state to El Hakem, caliph in Egypt; Ger. *Drusen*], a people of mixed race, almost limited to the Lebanon. Wady-el-Teim, and the Hauran, speaking the Arabic lang. and professing a peculiar religion. For about 800 yrs. they have maintained an independent nationality. El Dorazy is now repudiated by the D., who honor Hamzeh-ibn-Ahmed as the real founder of their religion, which dates from the early part of the 11th century. They emphasize the unity of God, successive manifestations of God, and the transmigration of souls. A bloody war between them and the Maronites led, in 1860, to European intervention on behalf of the Chrs. (See the EARL of CARNARVON, *Druses of the Lebanon*.)

Dru'sus (CLAUDIUS NERO), a Rom. gen., b. in 38 B. C. His mother Livia was a wife of the emp. Augustus. In 13 he defeated the Gers. near the Rhine. Having conquered the Sicambri and Frisii, he extended the Rom. empire to the Ger. Ocean and to the river Elbe. For these victories he received the surname of GERMANICUS. D. early in 9 B. C., leaving 2 sons, Germanicus and Claudius, the latter of whom became emp.

Dryad [Gr. *δρῦάς*, plu. *δρῦαδες* (from *δρῦς*, an "oak" or any tree); Lat. *dryades*]. In Gr. mythology, the D. were nymphs or goddesses supposed to preside over woods and groves.

Dryden (JOHN), an Eng. poet, b. at Aldwinckle, Northamptonshire, Aug. 9, 1631, was a grandson of Sir Erasmus Driden, created a baronet in 1619. Grad. at Cambridge as A. M. in 1657, and became a resident of Lond. He wrote *Heroic Stanzas on the Death of Cromwell* (1658), and celebrated the restoration of Charles II. in 1660 by a poem entitled *Astræa Redux*. In 1668 he was appointed poet-laureate, with a salary of £200 annually. He afterward wrote numerous comedies and tragedies, among which are *Marriage à la Mode* and *Aurungzebe*. His political and poetical satire

of *Absalom and Achitophel* (1681) is a very famous and brilliant production. He announced his conversion to the R. Cath. religion by his allegorical poem called *The Hind and the Panther* (1687). He produced in 1696 a metrical translation of Virgil. D. May 1, 1700, and was buried in Westminster Abbey.

Dry Dock. See DOCKS, by S. H. SHREVE, C. E.

Drying Machine, used for extracting the moisture from fabrics. One kind consists of 2 cylinders, one within the other. The inner one is the receptacle for the goods, and is made to revolve rapidly, expelling the water through perforations in the sides; the outer cylinder receives the water, and from thence it is carried off by means of a pipe. A more simple machine is constructed of 2 parallel rollers, so arranged that the distance between them can be varied. The end of the goods being inserted between the rollers, one is turned by a handle, causing both to revolve, and the clothes to pass between, thus extracting the moisture by pressure.

Drying Oil, the name given to linseed and several other seed-oils used in painting, and which have the property of drying quickly. The process of drying is hastened by heating the oil with oxide of lead.

Dry Rot, called also **Sap Rot**, is a diseased state of timber, which reduces its substance to a mass of dry dust by decomposing the fibres. It is caused by various species of fungi. The ends of the timber are generally affected by this disease, and the decay often makes great progress without being suspected. Various substances have been used for the prevention of D. R., one of the most successful of which is a solution of corrosive sublimate introduced into the pores of the wood by an air-pump.

Dry Tortugas [Sp. *tortuga*, a "tortoise"], a group of 10 small, low, barren islands belonging to Fla., situated over 40 m. W. of the most W. of the Fla. Keys proper. On the S. W. island, called Loggerhead Key, stands a brick light-house 150 ft. high. There is a smaller light-house inside Ft. Jefferson, on Garden Key. The D. T. served as a place of imprisonment during the c. war.

Du'alín [so called because it is a mixture of 2 different substances], an explosive compound introduced in 1868 by Dittmar, is composed of nitro-glycerine mixed with sawdust, or wood-pulp such as is used in paper mills, the latter being first treated with nitric and sulphuric acids.

Du'alism [from the Lat. *duális*, "containing two"], in metaphysics, the doctrine that the universe exists by the concurrence of 2 principles, the spiritual and the material, each necessarily independent and eternal. Chr. theists recognize the real being of mind and matter in the const. of man and the order of the universe, while they attribute self-existence and creative power solely to the Supreme Mind. The term D. has also been used to denote the soul and the modes of matter in relation and opposition while the mind is in the act of acquiring knowledge of the external world.

Duane, du-án' (JAMES), b. in New York Feb. 6, 1733. He became a lawyer and a leading revolutionist in the war of Independence, was M. C. 1774-77 and 1780-82, the first mayor of New York in 1784, and U. S. district judge 1789-94. D. Feb. 1, 1797.

Duane (JAMES C.), b. in 1824 in New York, grad. at W. Pt. in 1848, and 1867 lieutenant-col. of engineers. He served at the Military Acad. with engineer troops and as assistant instructor 1848-54, in the construction of fortifications 1849-56, as light-house engineer 1856-58, on Ut. expedition 1858, at the Military Acad. as instructor of practical engineering, etc., 1858-61. In the c. war he served in defence of Ft. Pickens, Fla., 1861; in the defences of Wash., organizing engineer troops and equipage, 1861-62; in the Va. Peninsula 1862, engaged in command of engineer battalion at Yorktown, Gaines's Mill, and construction of field-works, roads, and bridges; in the Md. campaign as chief engineer of the Army of the Potomac 1862, engaged at S. Mountain, Antietam, and several skirmishes; as chief engineer of the dept. of the S. 1862-63, engaged in the attack on Ft. McAllister, Ga., and operations against Charleston, S. C.; as chief engineer of the Army of the Potomac 1863-65, engaged at Manassas Gap, Rappahannock Station, Robertson's Tavern, Wilderness, Spottsylvania, Cold Harbor, Petersburg, Hatcher's Run, and Appomattox c.-h.; made brig.-gen. for gallant and meritorious services in siege of Petersburg and subsequent operations; served in construction of defences of E. entrance to New York harbor 1865-68; member of engineer boards 1867-73; became light-house engineer of N. E. Atlantic coast and supt. of fortifications in Me. and N. H.

Duane (WILLIAM JOHN), a lawyer, b. at Clonmel, Ire., in 1780, was a son of William Duane, an Amer. He practised law in Phila., and was appointed sec. of the treas. of the U. S. early in 1833, but was dismissed from office in Sept. of that yr. by Pres. Jackson, because he refused to remove the deposits of public money from the Bank of the U. S. D. Sept. 27, 1865.

Dub'lin [said to be derived from the Irish *dabh-linn*, i. e. "black pool;" anc. *Eblana*], the cap. of Ire., on the river Liffey at its entrance into Dublin Bay, 66 m. W. of Holyhead and 135 m. W. of Liverpool. It is the E. terminus of the Grand and Royal canals, is connected by R. R. with all the chief towns of Ire., and has a good harbor, in which vessels of 900 tons can come up to the wharves. The river divides the city into 2 nearly equal parts, which are connected by 7 stone and 2 iron bridges. The city is surrounded by the Circular Road, nearly 9 m. long. The prin. public buildings are the Bank of Ire., Trinity Coll., the custom-house, the Four Courts, Dublin Castle, occupied by the lord lieut., and St. George's ch. with a steeple 200 ft. high. Among the literary and scientific insts. are the Univ. of Dublin, the Royal Coll. of Science, the R. Cath. Univ., the Coll. of Surgeons, the Royal Dublin Society, the Royal Irish Acad., the Hibernian Acad. for Paintings, and the National Gallery. D. is the seat of a P. E. and a R. Cath. abp. Near it is Phoenix

Dunk, which contains nearly 2000 acres. D. is a very ancient town, occupying the site of the *Edinno* of Ptolemy, and was captured by the Danes in 9th century. Pop. 348,293.

Dublin, University of, otherwise called **Trinity College, Dublin**, is said to have been founded in 1590, but was re-established in 1592 by Queen Elizabeth. It was endowed by the corporation of Dublin and by private gifts, and still further by grants of James I., who in 1613 gave it representation in Parl., which it still possesses. Its govt. is modelled upon that of the Eng. univs., but its fellows are allowed to marry. There are 4 ranks of students: (1) Noblemen and their sons, who pay about \$500 a yr. in fees, and can take their degree without being examined. (2) Fellow-commoners, who pay half as much. (3) Pensioners, who form a majority of the students, and pay a little more than half as much as the fellow-commoners. (4) Sizaris, 30 in number, who pay a merely nominal fee.

Düb'ner (FRIEDRICH), a philologist, b. at Höselsgau, in Ger., Dec. 21, 1802. He was from 1826 to 1831 prof. at the gymnasium of Gotha, and after 1831 lived in Paris, where he at first took an active part in Didot's new ed. of the *Thesaurus* of Stephanus, and was one of the eds. of the *Bibliotheca Græca* of the same publs. D. Aug. 16, 1867.

Du Bois, Pa. See APPENDIX.

Dubois, du-brav'le (GUILLAUME), a Fr. cardinal and prime minister, b. at Brives-la-Gallienne Sept. 6, 1656. Among his important diplomatic acts was the treaty between Fr., Eng., and Hol., called the Triple Alliance (Jan. 1717). Though his morals were depraved, he was made abp. of Cambrai in 1720; became prime minister in 1722. D. Aug. 10, 1723.

Dubuat (THE CHEVALIER), a Fr. experimentalist and writer on hydraulics. He may be said to have laid the foundations of hydrodynamics, being the first who succeeded in ascribing to the different forces, friction, cohesion, etc., which act on fluids in a state of uniform motion, their effective share in determining their velocity. His most important work is entitled *Principes d'Hydraulique et de Pneumatique*. He was an officer of the "corps du génie" (engineers), in which he became a col.

Dubuque, du-bñk', a city, cap. of Dubuque co., Ia., on the W. bank of the Miss. River, 470 m. N. of St. Louis and 321 m. S. of St. Paul. It is the centre of a large and ever widening R. R. system and of a river trade. It is the seat of the Ia. Inst. of Science and Arts. D. is opposite the point where the line between Wis. and Ill. reaches the Miss. It is the chief depot of the lead region of Ia., Ill., and Wis. It has a large cathedral, a custom-house, a Ger. Presb. theological school, an Epis. and 4 Cath. sems. D. is connected with Dunleith (Ill.) by a railway iron bridge, which is a "marvel of lightness and strength," and cost several millions of dollars. The city was named in honor of Julien Dubuque, a Fr. trader, who with 10 others settled here in 1788 to mine the ores of lead. This was the first settlement in what is now the State of Ia. The settlement was abandoned after Dubuque's death in 1810, and the site was not again occupied till 1833. This last was the first permanent settlement in Ia. Pop. 1870, 18,434; 1880, 22,254; 1893, about 26,000.

Du Cange, du konz'h' (CHARLES DU FRESNE), a Fr. historical writer, b. at Amiens Dec. 18, 1610. He was liberally ed., and studied law. Among his most important works are a *Hist. of the Empire of Constantinople under the Fr. Emper.*, a *Glossarium ad Scriptores Mediæ et Infimæ Græcilitatis*, and a *Glossarium ad Scriptores Mediæ et Infimæ Latinitatis*. D. Oct. 23, 1688.

Du'cas (MICHAEL), [Gr. Μιχαήλ ὁ Δούκας], a Byzantine historian who flourished about 1450; wrote *Hist. of the Emperors of the Byzantine Empire, 1355-1453*. D. after 1463.

Duc'at [from the Lat. *dux* (gen. *ducis*), a "leader" or "duke," because it was first coined by dukes; It. *ducato*; Sp. *ducaido*], a gold coin which originated in It., and was afterward coined in several countries of Europe. There was much difference in the value of the D. in various countries. Those of Aus., Hol., and Hamburg contain about 52.8 grains of pure gold, and are nearly equivalent to \$2. The Sp. silver D. (*ducado*) is worth about \$1.

Du Chaillu, du shah-yu' (PAUL BELLONI), a Fr. traveller, b. about 1830, the son of a Fr. merchant in equatorial Afr., was naturalized as a citizen of U. S. Explored Gaboon region, etc., and pub. *Explorations and Adventures in Equatorial Afr., Land of the Midnight Sun*, etc.

Duché, du-shā' (JACOB), D. D., an Amer. Epis. clergyman, b. in Phila. in 1739. He was an eloquent preacher and a chaplain of the Continental Cong., but after the Brit. occupied Phila. he abandoned the popular cause, and wrote to Washington a letter in which he urged him to submit and become a Tory. D. soon fled to Eng., but returned to Phila. in 1790. D. Jan. 3, 1798.

Duchobor'zi (i. e. "champions of the Spirit"), a sect among the peasantry of Rus. founded by Ilarion Pobirochin, who taught the Trinity and the transmigration of souls, forbade his followers from serving in the army, and considered himself, it is said, to be the son of God. They were banished to the regions near the Sea of Azof, and in 1839 to the Trans-Caucasus, where they are now chiefly found.

Duck [from the verb *duck*, to "dive"; Lat. *anas*; Ger. *Ente*; Fr. *canard*], a name applied to many swimming birds of the family Anatidae. The common domesticated D. is a descendant of the mallard (*Anas boschas*), which is found wild in Europe, Asia, and Amer.

Duck-bill, or Water-Mole, Eng. names of the *Ornithorhynchus paradoxus* of Van Diemen's Land and Australia. It is about 15 inches long, and has dense brown fur. It inhabits ponds and quiet streams, where it swims about on the surface of the water with its head somewhat elevated, often diving for its food, which consists of insects and other small aquatic animals. It digs a burrow, often 30 ft. long, in the river-bank, with one opening above and another below water. (See ORNITHORHYNCHIDE.)

Ducrot (ALEX.), a Fr. gen., b. in 1817, commanded a brigade in the It. campaign, and the 1st division of the 1st

army corps in the Ger.-Fr. war; was taken prisoner of war at Sedan, but escaped to Paris, where he took a prominent part in the defence of that city. After the capitulation he was elected delegate to National Assembly. D. Aug. 17, 1889.

Ductility [Lat. *ductilitas*, from *ducilis*, "easy to be drawn" (from *duco*, *ductum*, to "draw"), a capability of being drawn out into a long and slender form without a breach of continuity. This term is applied almost exclusively to that property of certain metals which enables them to be elongated or drawn out into wire.

Dudevant, MADAME. See SAND, GEORGE.

Dud'ley (BENJAMIN WINSLOW), M. D., LL. D., b. in Va. in 1785. Receiving an imperfect preliminary education, he commenced the study of med. in Lexington, Ky., and took his degree in the Univ. of Pa. in 1806. He went to Europe in 1810, and during his 4 yrs. of absence studied with Sir Astley Cooper, Abernethy, Cline, Larrey, Dubois, Boyer, and Marjolin. In 1817, in conjunction with Blythe, Caldwell, Brown, Richardson, and Drake, he organized the medical dept. of the Univ. of Transylvania. In all its changes Dr. D. was its head, and occupied the professorships of anat. and surgery. A distinguished Eng. surgeon in Lond. declared him to be "the lithotomist of the 19th century." Dr. D. performed the lateral operation exclusively, and almost always with the gorget. D. Jan. 20, 1870.

Dudley (CHARLES EDWARD), b. in Staffordshire, Eng., May 23, 1780, emigrated to the U. S. in 1794; elected mayor of Albany 1821, and U. S. Senator 1829. The Dudley Observatory at Albany was founded by his widow. D. Jan. 23, 1841.

Dudley (JOSEPH), b. in Roxbury, Mass., July 23, 1647; was appointed chief-justice of Mass. in 1686, chief-justice of N. Y. in 1690, and was gov. of his native prov. from 1702 to 1715. D. Apr. 2, 1720.

Dudley (PAUL F. R. S.), a lawyer, a son of the preceding, b. Sept. 3, 1675; became atty.-gen. of Mass. in 1702, and chief-justice in 1745; founded the Dudgeon Lecture at Harvard Coll. D. Jan. 25, 1751.

Dudley (THOMAS), b. at Northampton, Eng., in 1576, served in Hol. in Queen Elizabeth's army, and in 1620 came to Boston as deputy-gov. of Mass. Bay under his son-in-law, Gov. Bradstreet. He held the office 12 yrs. He was gov. of the colony in 1634, '40, '45, and '50. D. July 31, 1683.

Du'el [Lat. *duellum*, perhaps a contraction of *duellum bellum*, a "war of two"; Fr. *duel*; Ger. *duell* and *Zweikampf*; It. and Port. *duello*; Sp. *duelo*] appears to have signified originally a trial by battle resorted to by 2 individuals, either for the purpose of determining the guilt or innocence of a person charged with a crime, or of deciding a disputed right. Duelling as a means of deciding private differences seems to be of comparatively recent date. In Eng. it does not appear to have prevailed until the latter part of the reign of Elizabeth. In 1713 a bill was introduced into Parl. for the prevention of D., but it failed to pass. To send a challenge is now a high misdemeanor; and in 1844, by a new article of the code of war, duelling in the army was made punishable by cashiering. In Scot. it appears that as late as the middle of the 16th century licenses to fight D. were sold by the crown; killing without such license was murder. In Ire. duelling was very common not many yrs. ago. In Fr. duels for settling disputes involving the honor of a gentleman were made an established inst. by Philip le Bel, 1308, and for some centuries D. were frequent and sanguinary. In the reign of Henry III. (1154-89) the custom of seconds taking part with their principals was probably introduced. It is said that in 2 yrs. of the reign of Henry IV. 4000 persons were killed in D. Strenuous efforts were from time to time made—notably by Louis XIV.—to check the practice of duelling, which, however, was prevalent for some yrs. after the restoration of the Bourbons. Killing in a D. is now in Fr. punishable as homicide, and a civil action lies on behalf of the friends of a slain person. In Amer. D. were formerly common, especially in the S. States, but they are now comparatively rare. They are not only illegal by statute, but in the army and navy are prohibited by the articles of war. *Fraternizing, not, and's Love, &c.*, by Phoe. J. Thomas, LL. D.]

Du'er (JOHN), LL. D., a jurist, b. at Albany, N. Y., Oct. 7, 1782, was a son of Col. William Duer; was elected a judge of the superior court of New York in 1849. Wrote *The Law and Practice of Marine Insurance*. He succeeded Oakley as chief-justice of the superior court in 1857. D. Aug. 8, 1858.

Duer (WILLIAM ALEXANDER), a jurist, b. in Dutchess co., N. Y., Sept. 8, 1780, a brother of the preceding. He was admitted to the bar in 1802, and was a judge of the supreme court of N. Y. from 1822 to 1829. In the latter yr. he was chosen pres. of Columbia Coll. D. May 30, 1858.

Dufaure, du-fr' (JULES ARMAND STANISLAS), a Fr. orator and statesman, b. at Saugon, in Charente-Inferieure, Dec. 4, 1798; practised law at Bordeaux. He was appointed minister of justice by Thiers in Feb. 1871. D. June 27, 1881.

Dufay (CHARLES FRANÇOIS DE CISTERNAI), a Fr. savant, b. in Paris Sept. 14, 1698. He was the author of the theory of vitreous and resinous electricity. D. July 16, 1739.

Duff (ALEXANDER), D. D., LL. D., a Scot. Presb. missionary, b. in Perthshire in 1806 or 1808, was ed. at St. Andrew's. He went to India in 1830, and labored there with great zeal and success for many yrs. as a missionary. Wrote *Our Faith and the Missions*. After the disruption of the Scot. Ch. in 1843 he was chief agent of the mission of the Free Ch. at Calcutta. He visited the U. S. in 1854, returned to India in 1855, and remained there until 1863. After his return to Scot. he became prof. of evangelistic theol. in the theological schools of the Free Ch. D. Feb. 13, 1878.

Duff'erin, EARL OF, FREDERICK TEMPLE BLACKWOOD, LL. D., first earl, b. in June 1826, was under-sec. of state for India 1864-66, and for war 1866, and was gov.-gen. of Canada 1872-78; became minister to Constantinople 1879, and in 1884 Viceroy of India.

Dufour, du-fu' (GUILLAUME HENRI), a SWISS gen., b. at Constance Sept. 15, 1787. In 1847 he was chosen commander-

in-chief of federal army raised to defend integrity of republic against R. Cath. Sonderbund; quickly quelled the rebellion. Wrote *Permanent Fortification*, and superintended the survey of the federal map of Switz. D. July 14, 1875.

Dugas (LOUIS ALEXANDRE), M. D., LL.D., b. in Washington, Wilkes co., Ga., Jan. 3, 1806, received his med. education at the Univ. of Md. and in Europe, and was one of the original founders of the Med. Coll. of Ga. (1832), where he became prof. of surgery. Wrote *New Principle of Diagnosis of Dislocations of the Shoulder-Joint*.

Du'gong [a word of Malay origin], a sirenia of the genus *Halidore*, characterized by its emarginated caudal fin and peculiar dentition. The upper lip is thick and fleshy, and forms a kind of snout; the upper jaw bends downward almost at a right angle; the eyes are very small, with a nictitating membrane; the skin thick and smooth. They grow from 8 to 12 ft. long or more, and feed chiefly on algae. The flesh is said to resemble beef, and is prized as food. The oil is recommended as a substitute for cod-liver oil. Species occur in the Red Sea, Indian Ocean, Australian seas, etc.

Duguay-Trouin, du-gā'troo-an' (RENÉ), a Fr. admiral, b. at St. Malo June 10, 1673. As cap. of a privateer frigate he took many prizes from the Eng. between 1690 and 1697. In the latter yr. he entered the royal marine with the rank of capt. He served with distinction in the war of the Sp. succession, which began in 1702. In 1707 he captured 3 Eng. ships of war and about 60 transports of merchant vessels. Among his famous exploits was the capture of Rio Janeiro in 1711. He was raised to the rank of lieutenant-gen. in 1728. D. Sept. 27, 1736.

Du Guesclin, du-gā-klan' (BERTRAND), a Fr. gen., b. near Rennes about 1314. He fought against the Eng., who occupied many places in Fr., and he defeated the duke of Lancaster at Rennes in 1356. In 1366 he commanded an army which fought for Henry de Trastamare against Peter the Cruel of Castile. He gained a victory over Peter, but was defeated and taken prisoner by the Eng. black prince in 1367. He paid a large ransom, and was soon released. Having been appointed constable of Fr. in 1369, he defended the country against the Eng. invaders, whom he expelled from nearly every prov. of Fr. before 1375. D. July 13, 1380.

Duilius, or **Duilius** (CAIUS), a Rom. gen.; became consul in 260 B. C., during the first Punic war; built ships of war after the model of one captured, and was the first Rom. who gained a naval victory over the Carthaginians, whom he defeated in 260 near the Lipari Islands.

Duiliian Col'umn, the *Columna Rostrata*, which was erected in the forum at Rome to commemorate the naval victory of C. Duilius. (See DULIUS.)

Duke [from the Lat. *dux* (gen. *ducis*)], a "leader;" Fr. *duc*; It. *duca*; Sp. *duque*; Ger. *Herzog*], a title originally given in the Byzantine empire to military gov's of provs., and previous to the time of Theodosius regarded as inferior to that of count. D. in Ger. became in course of time the chief princes of the empire. In Fr. and It. D. form the second rank in the nobility, being next below princes; in Eng. they are next in the peerage after the princes of the blood (who are also D.) and the abps. of Canterbury and York. The titles of D. and archduke are also borne by several reigning sovereigns of Europe. The wife of a D. is styled a duchess.

Duke Centre, on R. R., McKean co., Pa. Pop. 1880, 2068.

Dulse, the name given to many of the red-spored seaweeds. The *Rhodomenia palmata*, belonging to the Rhodomeniaceæ, grows on rocks on the coasts of G. Brit., the U. S., and other regions. It has sessile fronds of a dark-red or purple color, irregularly notched, and of a leathery texture. It is an important article of food in Iceland, where it is dried and stored in casks. It is abundant on all the Brit. coasts, and is sometimes used as food, either raw or cooked. The *Schyzymenia edulis*, of the order Cryptonemiceæ, is also called D., and is used as food. This also occurs in the U. S. "Pepper D.," of the genus *Laurentia* and order Laurentiaceæ, is eaten in Scot. It grows on our Pacific coasts.

Duluth, R. R. junc., a city, cap. of St. Louis co., Minn., at the W. extremity of Lake Superior, 155 m. N. N. E. of St. Paul. It is the E. terminus of the N. Pacific R. R., running W., and the N. terminus of the St. Paul and Duluth R. R., running from St. Paul. It has grain elevators, a customhouse, and some of the largest private docks in the U. S. In May 1869 the site of the city was a forest; the old D., at that time, situated on Minnesota Point, consisted of a few cabins. The place is named after Capt. John Duluth, a Fr. traveller, who visited it and built a hut in 1760. Large quantities of wheat and flour are shipped from here. Pop. 1869, 38; 1870, 3131; 1880, pt. including v. 2505; Duluth city, 838.

Dumas, du-mah' (ALEXANDRE), a popular Fr. novelist and dramatist, b. at Villers-Cotterets (Aisne) July 24, 1803. He was not liberally ed. In 1828 he produced *Henri III.*, a drama. He was a writer of the romantic school, and was remarkable for literary fecundity, and displayed much skill in the construction of plots. Wrote *The Three Musketeers*, *The Count of Monte-Cristo*, etc., and the comedy *Une Mariage sous Louis XV.*, etc. It appears that a large part of the works pub. in his name were written by other men. D. Dec. 5, 1870.

Dumas (ALEXANDRE), a novelist and play-writer, a son of the preceding, b. in Paris July 28, 1824. Abandoning the imaginative romance of his father, he sought by verisimilitude to make good his deficiency in dramatic construction. His works treat mostly of the equivocal aspects of Fr. life. Wrote *La Dame aux Camélias* (*La Traviata*), *Le Demi-Monde*, *L'Etrangère*, etc. In 1872, in *L'Homme Femme*, a social tract, he attacked the Fr. marriage system.

Dumas (ALEXANDRE DAVY DE LA PAILLETERIE), a Fr. gen., b. in St. Domingo Mar. 25, 1762, was the father of Alexandre Dumas (1803-70). His mother was a negress. He became a gen. of division in 1793, and defeated the Aus. gen. Wurmsier at Mantua in 1796. He commanded the cav. in Egypt in 1798. D. in 1807.

Dumas (JEAN BAPTISTE), a Fr. chemist and writer, b. at Alais (Gard) in 1800; became a resident of Paris, and acquired a European reputation by his discoveries in organic chem., isomerism, the law of substitutions, and other parts of chemical philos. His chief work is a *Treatise on Chem. Applied to the Arts*. He was minister of agriculture and commerce from Oct. 1849 to Jan. 1851; became member of the Senate and v.-p. of the Superior Council of Public Instruction.

Dumas (MATHIEU), COUNT, a Fr. gen., b. at Montpellier Dec. 23, 1753. He fought for the U. S. in 1780-82; became a gen. of division in 1805, and served at Ulm and Austerlitz. In 1812 he was intendant-gen. of the grand army in Rus. He wrote a narrative of the Fr. campaigns from 1798 to 1807, entitled *Précis des Evénements Militaires*. D. Oct. 16, 1837.

Dumb Cane (*Dieffenbachia Seguina*), a W. I. shrub, so named from its acrid juice causing the tongue to swell. It belongs to the order Araceæ. The root and the juice have medicinal properties, and are used in sugar-refining.

Dumb'ness, when associated with deafness, is usually the result of that deafness; the child, being unable to hear, is unable to learn to talk; but there are 2 important varieties of D. which are the direct results of disease. The first of these is what phys. call *aphonia*, a loss of voice which may be transient or permanent, functional or structural. Diseases of the larynx or of the nerves supplying it are frequent causes. A much more formidable disease or symptom is *aphasia*, which is a loss of lang. rather than of speech. It is a symptom of brain disease, the patient having the power to articulate, and even to think, but not to express his thoughts.

Dumont d'Urville, du-mon' dur-vêl' (JULES SÉBASTIEN CÉSAR), a Fr. navigator, b. in Normandy May 23, 1790. He commanded an expedition sent in 1826 to obtain tidings of La Pérouse and to survey the coasts of New Zealand, New Guinea, etc. Author of *Voyage of Discovery Around the World*. In 1837 he conducted an exploring expedition to the Antarctic regions. He discovered land, which he called Terre Adélie, in lat. 66° 30' S.; returned in 1840, and became a rear-admiral. D. May 8, 1842.

Dumouriez, du-moo-re-â (CHARLES FRANÇOIS), a Fr. gen., b. at Cambrai Jan. 25, 1739. He served as an officer in the Seven Years' war. Between 1776 and 1787 he was commandant at Cherbourg. In the Revolution he acted with the Girondists. He was appointed minister of foreign affairs in Mar. 1792. War having broken out between Fr. and Aus., he resigned office in June 1792, in order to take command of the army; invaded Flanders in Oct. 1792, and defeated the Aus. at Jemappes in Nov., and conquered Belg. Instead of prosecuting the war with vigor, he plotted a counter-revolution, and negotiated secretly with the Aus. The Convention, suspecting his design, sent 4 coms., in Apr. 1793, to summon him to Paris. D. refused to obey the Convention, and when the coms. ordered the soldiers to arrest him he sent them as prisoners to the Aus. camp. His army refused to support him in this defection, and he became a fugitive and exile. D. Mar. 14, 1823. (See *Mémoires de Dumouriez*, by himself.)

Dunbar, a seaport of Scot., at the mouth of the Frith of Forth, 27 m. E. N. E. of Edinburgh. Cromwell gained near this town a decisive victory over the royalists, Sept. 3, 1650. Pop. 3649.

Duncan (ADAM), VISCOUNT DUNCAN OF CAMPERDOWN, a Brit. admiral, b. at Dundee July 1, 1731. He entered the navy in 1746, and became a post-capt. in 1761. In 1789 he obtained the rank of rear-admiral of the blue. With the rank of vice-admiral he was appointed commander of a fleet in the N. Sea in 1795, and waged war against the Dut. He defeated the Dut. near Camperdown in Oct. 1797, and was raised to the peerage for that service. D. Aug. 4, 1804.

Duncan (JAMES HENRY), LL.D., b. at Haverhill, Mass., Dec. 5, 1793, grad. at Phillips (Exeter) Acad. and Harvard Coll. 1812; admitted to Essex bar 1815, and entered upon the practice of law in Haverhill, Mass., where he resided till his death, Feb. 8, 1868. He was a member of the Mass. gen. court 1827-28, 1837-38, and 1857; member of gov.'s council 1839-40; from 1848 to 1852 M. C. from the Essex dist., Mass.; for many yrs. chairman of the board of managers of the Amer. Bap. Missionary Union, a trustee of Newton Theological Inst., and a fellow of Brown Univ.

Duncan (JOSEPH), b. in Ky. about 1790. He served in the war of 1812, after which he removed to Ill. As a member of the senate of Ill. he originated a law establishing common schools; was chosen M. C. in 1827, and gov. of Ill. in 1834. D. Jan. 15, 1844.

Dun'ciad, The, a keen poetical satire, written by Alexander Pope, and pub. complete in 4 books (1742). It is a fierce onslaught on his numerous detractors, who have thereby obtained an unenviable immortality.

Dundas (HENRY), VISCOUNT MELVILLE, a Scot. lawyer and statesman, b. about 1741, the son of ROBERT DUNDAS, Lord Arniston (1685-1753), who was lord advocate of Scot. (1720-25), was admitted to the bar in 1763. He became lord advocate of Scot. in 1775, and M. P. in which he promoted the war against the U. S. He joined the party of Pitt, who appointed him pres. of the board of control in 1784, after which he was a constant supporter of that minister. In 1791 he was appointed sec. of state for the home dept., and in 1794 he became sec. at war. He resigned in 1801, received the title of Viscount Melville in 1802, and was appointed first lord of the admiralty in 1804. In 1805 he was impeached for malversation, but he was acquitted by the Peers. D. May 27, 1811.

Dundas Strait, N. Australia, separates Melville Island from Coburg Peninsula, and is 18 m. wide.

Dundee [Lat. *Tadounum*], a seaport of Scot., on the estuary of the Tay, 10 m. from the sea and 50 m. by water N. N. E. of Edinburgh. It has a good harbor, and is connected by R. R. with Edinburgh. It is the chief seat of the Brit. manufacture of coarse linens. It has a royal exchange,

St. Paul's ch., with a spire 217 ft. high, and a tower, built in the 13th century, to which 3 parochial chs. under one roof have been annexed. Pop. 140,075.

Dundee, N. Y. See APPENDIX.

Dundonald (THOMAS COCHRANE), TENTH EARL OF, an able Brit. admiral, b. Dec. 14, 1775, was a son of the ninth earl. He entered the navy in 1793, captured many prizes from the Fr., and became a post-capt. in 1801. In Apr. 1809 he was selected for the daring and perilous service of burning the Fr. fleet in Basque Roads, and he successfully performed that exploit. Before this date he had been elected to Parl. by the Whig voters of Westminster. In 1814 he was accused of complicity in fraudulent stock-jobbing transactions, and of spreading a false rumor of the fall of Nap. to raise the price of stocks. He was unjustly convicted, fined £1000, dismissed from the service, and imprisoned. His constituents re-elected him to Parl., and he escaped from jail to reappear in the House. He commanded the fleet of Chili (1818-22), and fought for the Grs. against Tur. 1827. He succeeded to the earldom 1831, restored to his rank in navy 1833, and appointed a vice-admiral 1841. D. Oct. 30, 1860.

Dune [from A.-S. *din*, a "hill"], low mounds of movable sand found on sea-coasts. They are formed by deposits of fine sand borne forward by the wind till it is obstructed by large stones or other obstacles, around which it accumulates. D. often cause great damage, the dept. of Landes in Fr. having been nearly overwhelmed by them. The annual inland progress of the sand is estimated at 72 ft. Trees and shrubs planted close together have been found to be the best protection against the encroachments of the D.

Dunedin, a seaport-town of New Zealand, the cap. of the prov. of Otago, is on the S. E. coast of the Middle Isle. It was founded in 1848, since when it has increased rapidly. It is the seat of an Anglican bp. The chief export is wool. Pop. 1881, with suburbs, 42,802.

Dunfermline, a burgh of Scot., 3 m. from the Frith of Forth and 15 m. N. W. of Edinburgh. It was a town as early as 1100. A Benedictine abbey, founded here about 1080, has some remains; D. has a ruined palace of the Stuarts. Robert Bruce was buried here. Pop. 17,084.

Dunfish, in the U. S. a name given to codfish cured in such a manner as to give them a "dun" color. Fish for "dunning" are caught in Feb. or in early spring. The fish are taken in deep water, are split and incompletely salted, then laid in a pile for 2 or 3 months in a dark place, and covered with salt hay, eel-grass, etc., and pressed by some weight. They are then uncovered and closely packed for several months, when they are ready for use. They acquire a peculiar flavor, which is greatly liked by many. The Isles of Shoals (Me. and N. H.) are a prin. seat for curing D.

Dung Beetle, or **Tumble-Bug**, names given to many Scarabæidæ which inclose their eggs in pellets or globes of manure which they roll by pushing with their hind legs into a hole prepared for them. The sacred scarabæus of the Egyptians was a true D. B., the *Ateuchus sacer*.

Dunglison (ROBLEY), M. D., LL.D., b. at Keswick, Eng., Jan. 4, 1798, received his med. education at Lond. and Erlangen; was prof. of med. in the Univ. of Va. (1824-33), of therapeutics in the Univ. of Md. (1833-36), and of the insts. of med. (1836-68) in the Jefferson Med. Coll., Phila. Author of a *Med. Diet., Therapeutics and Materia Medica*, and a dict. for the blind. D. Apr. 1, 1869.

Dunkers, **Dunkards**, or **Tunk'ers** [from Ger. *tunken*, to "dip"], a sect of Ger.-Amer. Baps., called by themselves **Brethren**, named for their manner of baptism by trine immersion of believers. Having been driven from Ger. between 1719 and 1729, they settled in Pa., and subsequently in other States. Their doctrines are similar to those of the Mennonites, and in dress and speech they somewhat resemble the Friends. They use the kiss of charity, love-feasts, feet-washing, laying on of hands, anointing with oil, etc. They have bps., elders, teachers, and deacons. They condemn war and will not engage in lawsuits. They hold an annual meeting, which is attended by the bps., teachers, and reps. chosen by the congregations. The belief in universal redemption, though not an article of faith, is commonly held by them.

Dunkirk [Fr. *Dunkerque*], a fortified seaport in the extreme N. part of Fr. on the Strait of Dover, about 40 m. N. W. of Lille and 46 m. E. of Dover. It is the N. terminus of the Railway du Nord. The harbor is shallow, but the roadstead is large and safe. A ch. is said to have been built here in the 7th century among the sand-hills or dunes, and hence its name, which signifies "ch. of the dunes." D. was taken by the Eng. in 1658, but was sold to the Fr. king by Charles II. in 1662. Pop. 37,528.

Dunkirk, city, port of entry, and R. R. centre, Chautauque co., N. Y., on Lake Erie, 40 m. S. W. of Buffalo and 459 m. W. of New York. It has a good harbor and an advantageous position for trade. Pop. 1870, 5231; 1880, 7248.

Dunlap, Harrison co., Ia., on R. R. Pop. 1880, 1246.

Dunlin, **Sea Snipe**, or **Oxbird** (*Pelidna alpina*), a species of sandpiper found in most parts of N. Amer. and Europe. Audubon calls it the red-backed sandpiper.

Dunning (JOHN), LORD ASHBURTON, an Eng. lawyer, b. at Ashburton, Oct. 18, 1731. He was called to the bar in 1756, was appointed solicitor-gen. in 1767, and became a Whig M. P. in 1768. He was a witty and sarcastic speaker, and stood in the foremost rank among Eng. advocates. He married Elizabeth Baring in 1780, and received the title of Baron Ashburton in 1782. D. Aug. 18, 1783.

Duns Scotus (JOHN), surnamed the SUTLE DOCTOR, a celebrated theol. and scholastic philos., b. about 1274. He is claimed as their countryman by the Scots, the Eng., and the Irish. He was of gentle blood, studied at Ox., became a Franciscan friar, and in 1296 prof. of theol. at that place. In 1301 he removed to Paris, where he taught theol. He wrote many works on theol. and metaphysics, and was a realist in philos. He opposed the teachings of Thomas Aquinas, and tried to identify their consequences with Averroism, which denied

individual immortality and the freedom of the will. He held that the faculties of the soul are not subjectively distinct from each other. He was the founder of a school called Scotists, who maintained a controversy with the Thomists (i. e. the disciples of Aquinas), D. pres. at Cologne Nov. 8, 1308.

Dunster (HENRY), the first pres. of Harvard Coll., b. in Lancashire, Eng., and ed. at Magdalen Coll., Cambridge. He came to N. Eng. in 1650, and entered upon his presidency Aug. 27 of that yr. In 1654 he was compelled to resign, in consequence of having borne public testimony against the baptism of infants, for which offence he was afterwards tried by a jury and placed under bonds. Still later he was again presented by the grand jury for neglect to have one of his children baptized. He was esteemed for learning and piety. D. Feb. 27, 1659. (See *Life of Dunster*, by J. CHAPLIN, D. D.)

Duodecimals [Lat. *duodecim*, "twelve"], a system of numbers whose uniform scale is 12. The primary unit is generally 1 ft.; *twelfths* of a ft. are called *primes*, *twelfths* of a prime are called *seconds*, *twelfths* of a second are *thirds*, and so on. D. may be multiplied together in the same manner as decimals, carrying by 12s instead of by 10s; primes by primes give *seconds*, in the same way that tenths by tenths give *hundredths*; primes by seconds give *thirds*, in the same way that tenths by hundredths give *thousandths*, and so on.

Dupanloup, ARCHBISHOP. See APPENDIX.

Dupleix, du-plâ' (JOSEPH), MARQUIS, a Fr. gov., b. about 1695. He amassed a fortune by commercial operations in India, and in 1742 was appointed gov. of Pondicherry and all the Fr. possessions in India. He formed the project of founding a European empire in that country, and soon made himself master of the Carnatic, partly by fighting and partly by political intrigues; was opposed by the Eng. gen. Clive, who defeated the Fr. in several battles. D. was removed from command in 1754, and returned to Fr. D. 1763.

Du Plessy-Mornay (PHILIPPE). See APPENDIX.

Du Pont (SAMUEL FRANCIS), U. S. N., of Fr. descent, b. Sept. 27, 1803, at Bergen Point, N. J., entered the navy as a mdpn. Dec. 19, 1815, became rear-admiral in 1862. Commanded the naval forces of the expedition that sailed from Hampton Roads on Oct. 29, 1861, and took possession of Ft. Royal Bay, after a brilliant engagement of 4 hours with 2 strong forts splendidly garrisoned and mounting 43 guns, all but 4 of which were of heavy calibre. On April 7, 1863, he engaged Ft. Sumter with 8 iron-clads, but without success. D. June 23, 1865.

Dupuytren, du-pu-e-tron' (GUILLAUME), BARON, a Fr. surgeon and anatomist, b. Oct. 6, 1777, became prof. of surgery in Paris in 1811. He made important discoveries in morbid anat., and invented several useful instruments. D. Feb. 8, 1835.

Duquoin, a city and R. R. junc., Perry co., Ill., 76 m. N. of Cairo. It has salt-works and coal-mines. Pop. precinct, 1870, 2212; 1880, precinct including city 5540, city 2807.

Durand (ASHER BROWN), a painter and engraver, b. at Jefferson, N. J., Aug. 21, 1796. After 1835 he devoted himself almost exclusively to painting, and became famous as a landscape-painter. Produced *The Capture of Major André* and *The Wrath of Peter Stuyvesant*.

Duran'go, a state of Mex., bounded N. by Chihuahua, E. by Cohahuila, S. by Xalisco, W. by Cinaloa. Surface mountainous. Area, 42,645 sq. m. Pop. 1880, 190,846.

Durango, or **Guadiana**, a town of Mex., cap. of the above state, is about 150 m. N. W. of Zacatecas. It is nearly 7000 ft. above the sea. It is the seat of a bp., and has a cathedral, a coll., a mint, and several convents. Pop. 27,000.

Durango, Col. See APPENDIX.

Durant (HENRY F.). See APPENDIX.

Durazzo, doo-raz'so [Tur. *Drasch*; anc. *Epidamnus*, afterward *Dyrrhachium*], a fortified maritime town of European Tur., in Albania, is on the Adriatic. It is the seat of a R. Cath. abp. It has a safe harbor and an active trade. The anc. *Epidamnus* was a populous city. The expulsion of its aristocracy in 436 B. C. was the origin of the Peloponnesian war. The Romans changed the name to Dyrrhachium. It was captured by the Norman chief Robert Guiscard in 1082, and by the Venetians in 1305. Pop. about 8000.

Durbin (JOHN PRICE), D. D., a Meth. preacher, b. in Bourbon co., Ky., in 1800, ed. at Miami Univ. and Cin. Coll., and entered the ministry in 1819; was president of Dickinson Coll. in Pa. 1834-45. Wrote *Observations in Europe, principally in Fr. and G. Brit., and Observations in Egypt, Pal., etc.*; was missionary-sec. of the M. E. Ch., and displayed great ability in its affairs. D. Oct. 17, 1876.

Dürer (ALBRECHT), a celebrated Ger. painter and engraver, b. at Nuremberg in 1471. The day of his birth is uncertain, owing to the way in which it is inserted in his father's diary, but it was probably May 21st. He was a pupil of Michael Wöhlgemuth, with whom he studied and worked 3 yrs. (1486-89). He afterward passed 4 yrs. in travel, visiting various parts of Ger., and returned to Nuremberg in 1494. In the same yr. he married Agnes Frey. He visited Venice in 1505, and while there painted a picture for the Tedeschi, or Guild of Ger. merchants, which was probably *The Feast of the Rose Garlands*, now in the monastery of Strahow at Prague. This was his first picture of importance. His most celebrated paintings are *The Four Apostles*, originally presented by him to the city of Nuremberg, but now in Munich; his own portrait in the Uffizi Gallery at Florence, and an *Adoration of the Magi*, a most beautiful picture, well worthy of the place it occupies in the tribune. His best wood-cuts are the 4 series, *The Apocalypse*, *The Great Passion*, *The Little Passion*, and *The Life of the Virgin*, but there are many fine single cuts. D. is not believed to have engraved all the wood-cuts that bear his monogram, but only to have made the designs. Perhaps the works by which D. is most widely known are his engravings on copper. Of these the most famous are the *Adam and Eve*, the *Melancholia*, the *Knight*, *Death*, and *The Devil*, the *St. Erasmus*, *St. Jerome*, and his *Study*, and *The*

Great Fortum. D. has left us valuable portraits of Melancthon, Erasmus, Pirckheimer, and many other notables of his time. Wrote *The Art of Fortification and Instruction in the Art of Mensuration with the Rule and Compass.* D. Apr. 6, 1528. (See his *Life*, by W. B. SCOTT.)

CLARENCE COOK.

Durfee (JOB), LL.D., a jurist, b. at Tiverton, R. I., Sept. 20, 1790, grad. at Brown Univ. in 1813; became M. C. in 1820 and chief-justice of R. I. in 1835. He wrote, beside other works, *What Cheer?* a poem on the adventures of Roger Williams. His life and writings were pub. by his son. D. July 26, 1847.

Durham (Sax. *Dunholme*, from *dun*, a "hill," and *holme*, a "river"), a city of Eng., on the river Wear, 14 m. S. of Newcastle, with which it is connected by R. R. It is built around a steep rocky hill, the top of which is occupied by a castle and cathedral. The castle was founded by William the Conqueror about 1072. The cathedral, founded 1093, is built in the Norman style, 507 ft. long, 200 ft. wide, with a central tower 214 ft. high, and contains the tombs of Sts. Cuthbert and Bede. The see was long the richest in Eng. D. is the seat of a univ., opened 1833. Pop. 14,932.

Durham, cap. Durham co., N. C., on R. R., 25 m. N. W. of Raleigh. The surrender of Gen. J. E. Johnston, Apr. 25, 1865, took place near by. Pop. 1880, 2041.

Durham (JOHN GEORGE LAMBTON), EARL OF, an Eng. statesman, b. in the co. of Durham Apr. 12, 1792. He was created Baron Durham in 1828, became lord privy seal in the cabinet of Earl Grey in Nov. 1830, and was one of the 4 persons who prepared the Reform bill of 1831, which he supported in the House of Lords. In 1833 he resigned the office of lord privy seal and received the title of earl. He was sent as ambassador to Rus. in 1835, and was appointed gov.-gen. of Canada in 1838. D. July 28, 1840.

Durham Breed of Cattle. See SHORT-HORNS.

Durian, or **Durion** (*Durio Zibethinus*), a tree of the order Sterculiaceae, a native of the Malay peninsula, cultivated by the Malays for its delicious fruit, which forms a great part of their food. It is a lofty tree, with simple leaves and large clusters of pale yellow flowers. The fruit is globular or oval, about 10 inches in diameter, and has a hard, thick, prickly rind inclosing a creamy pulp and about 10 seeds, which are eaten roasted. It combines the most delicious flavor with a very offensive odor.

Durkee (CHARLES), b. at Royalton, Vt., Dec. 5, 1807, removed to Wis. Terr. in 1830; was M. C. 1849-55, U. S. Senator 1855-61, and gov. of Utah 1865-70. D. Jan. 14, 1870.

Duroc, du-rok' (GÉRAUD CHRISTOPHE MICHEL), duke of Friuli, a Fr. gen. and diplomatist, b. at Pont-à-Mousson Oct. 25, 1772. He became in 1796 aide-de-camp to Bonaparte, whom he accompanied to Egypt in 1798. During the consulate and empire he was sent on diplomatic missions to Berlin, Vienna, and other courts. He was a favorite officer of Nap. D. May 23, 1813.

Duryea (JOSEPH TUTHILL), D. D., b. at Jamaica, L. I., N. Y., Dec. 9, 1832, grad. with the highest honors in 1856 at the Coll. of N. J., where he afterward taught Gr. and rhetoric 1857-59; grad. at the Princeton Theological Sem. 1859; was pastor of the Second Presb. ch., Troy, N. Y., 1859-62; associate pastor of the Collegiate Reformed ch., N. Y., 1862-68, and from 1868 to 1879 was pastor of the Classon avenue Presb. ch., Brooklyn, N. Y. In 1879 he was installed pastor of Central Congl. ch., Boston, Mass.

Dusky Bay, of New Zealand, is a large inlet on the S. W. coast of the Middle Island. It affords good anchorage. Lat. 45° 40' S., lon. 166° 20' E.

Düsseldorf, a town of Prus., on the Rhine, here crossed by a bridge of boats, and at the mouth of the river Düsseldorf, 17 m. N. W. of Cologne, with which and other Ger. towns it is connected by railways. It contains an old electoral palace, a town-hall, a public library, an observatory, a beautiful public garden, and several fine chs. D. is specially noted for its Acad. of Fine Arts, from which has proceeded what is known as the "Düsseldorf School" of painting, which has had an important influence upon art, especially in the U. S., many of our foremost painters having studied at D. Pop. 1880, 95,459.

Duston (HANNAH), was married to Thomas Duston Dec. 3, 1677, and became the mother of 13 children. She was taken prisoner by the Indians in the attack on Haverhill, Mar. 15, 1698, her nurse and infant 1 week old being also taken, but the child was soon after killed. She was placed in an Indian family of 12 persons on an island (Duston's Island) in the Merrimack River, near the mouth of the Contoocook, in N. H., and with the aid of the nurse and a white captive boy killed all the Indians in their sleep except a squaw and a boy who escaped. She returned to Haverhill with their scalps.

Dutch Flat, Placer co., Cal., on R. R., 67 m. from Sacramento; has productive hydraulic gold-mines. Pop. 1880, 939.

Dutch Gap Canal, a cut through the narrow isthmus of a peninsula known as Farrar's Island, in the James River, about 5 m. below Richmond, Va., designed to afford the national vessels a nearer approach to the Confed. works, to avoid the great obstructions which had been placed in the curve of the river, and to outflank the heavy Howlett House batteries. It was executed under Major P. S. Michie, by order of Gen. B. F. Butler. The work was undertaken Aug. 15, 1864, and finished Jan. 1, 1865, but a large part of the bulkhead of clay which was blown out by powder on that occasion fell back, so as to obstruct navigation for the time. It was of no use to either side during the war, but has since shortened the navigation of the river to Richmond 7 m.

Dutch Gold, an alloy of copper and zinc, closely resembling common brass, but having rather less zinc in its composition than brass generally has. It is used for beating into thin plates, resembling gold-leaf in appearance when new, and used for ornamentation instead of gold-leaf. It tarnishes readily, and may be tested by the application of strong nitric acid, which will not injure gold-leaf, but which readily dissolves the imitation.

Dutch Guiana. See GUIANA.

Dutch Language and Literature. The Dut. lang., spoken in the Netherlands, belongs to the Teutonic subdivision of the Indo-European family of langs. It closely resembles the Lowland Scotch, and bears to the Eng. and Ger. a relation very similar to that of the Doric to the Attic and Ionic dialects of Gr., being especially characterized by the broadness of the vowel sounds and the sharpness of the consonants. The alphabet is essentially the same as the Eng. and Ger., with some modifications in usage. Thus, a long vowel sound before a consonant in the same syllable is usually indicated by doubling the vowel, as *laet*, "late;" *zoön*, "son." Y (now usually written *ij*), *ey*, and *ei* have the sound of our *i* in machine, *oe* like our *oo*, *ui* or *uy* like *oi*, *d* at end of a word like *t*, *g* nearly like *k*, *sch* nearly like *sk*.

Nouns and verbs are inflected very nearly as in Ger. The plu. of nouns is usually formed by adding *n* or *en* to the singular, as *bede*, a "prayer," *beden*, "prayers;" *kerk*, a "church," *kerken*, "churches;" accompanied frequently, as in Eng., by a change in the final consonant, as *dief*, a "thief," *dieven*, "thieves." Sometimes a long vowel in the singular is changed to a short one in the plu., as *zoön*, "son," *zonen*, "sons." Nouns ending in *l*, *en*, and *em* frequently form the plu. by adding *s*, as *broeder*, "brother," *broeders*, "brothers;" *appel*, "apple," *appels*, "apples." The numerals are *een*, one; *twee*, two; *drie*, three; *vier*, four; *vijf*, five; *zes*, six; *zeven*, seven; *acht*, eight; *negen*, nine; *tien*, ten; *elf*, eleven; *twaaft*, twelve; *dertien*, thirteen; *twintig*, twenty; *een en twintig*, twenty-one; *honderd*, hundred; *duizend*, thousand; *miljoen*, million. The ordinals are *de eerste*, the first; *de tweede*, the second; *de honderdste*, the hundredth, and so on. The pronouns are very nearly as in Ger., though sometimes nearer the Eng.; thus: *ik* (Ger. *ich*), I; *mijner* (Ger. *meiner*), of me; *mij* (Ger. *mir*), to me; *my* (Ger. *mein*), me; *wij* (Ger. *wir*), we; *onzer* (Ger. *unser*), our; *ons* (Ger. *uns*), us; *gij* (Ger. *ihr*), ye; *van u*, or *uwer* (Ger. *euer*), of you, or your; *hij* (Ger. *er*), he; *hem* (Ger. *ihn*), him; *zij* (Ger. *sie*), she; *haar* and *ze* (Ger. *sie*), her.

The verb is inflected essentially as in Ger. and Eng., by auxiliaries, such as *ben*, am; *heb*, have; *zal*, shall; *zoude*, should, etc. *Zijn*, "to be," runs thus: *ik ben* (Ger. *ich bin*), I am; *gij zijt* (Ger. *ihr seid*), thou art; *hij is* (Ger. *er ist*), he is; *wij zijn* (Ger. *wir sind*), we are; *gij zijt* (Ger. *ihr seyd*), you are; *zij zijn* (Ger. *sie sind*), they are; *ik was* (Ger. *ich war*), I was; *gij waart* (Ger. *ihr wart*), thou wast; *ik ben geweest* (Ger. *ich bin gewesen*), I have been, etc. *Ik hoor*, I hear; *ik hoorde*, I heard; *ik heb gehoord*, I have heard; *ik zal hooren*, I shall hear; *ik zoude hooren*, I should hear; *ik word gehoord*, (Ger. *ich werde gehört*), I am heard; *ik zal gehoord worden zijn* (Ger. *ich werde gehört worden seyn*), I shall have been heard, etc.

There are fragments of Flemish or Old Dut. lit. which are supposed to be as old as the 9th century. In this lang. was written, about 1150, the first part of "Reynard the Fox" (*Reinaert de Vos*), which soon found its way into other langs. Jacob van Maerlant (b. 1235, d. 1300) is regarded as the father of Flemish poetry. Melis Stoke, about 1290, wrote the *Rhymykronik* ("Rhyming Chronicle"), an extract from which will show the close resemblance between the Flemish and the Eng. of that day. There is hardly a word that is not essentially an Eng. one. Thus:

"These pine ends det ghapens
send u u, Heer Grave Florens,
Dat ghi mogt sien ende hooren
Wien dat ghi wijt gesien.
Ende bi wat reden ghi in hant
Hebbet Zeeland ende Holland;
Ende bi wat reden dat ghi moet
Vriesland dat u soere docht."

These pains and these givings
Send I to you, Lord Count Florens,
That you might see and hear
Whence ('tis) that you were born,
And by what reason you in hand
Have Zeeland and Holland;
And by what reason that you seek out
Friesland, that you so sore doth float.

The literary development of the Dut. lang., as distinguished from the Flemish or Old Dut., dates from about 1570, when the *Rederijkkamer* ("Chamber of Rhetoric") was formed at Amsterdam. Soon after appeared Pieter Cornelius Hooft ("Head"), who has punningly been designated as "the illustrious head (Hooft) of the Dutch poets." Jacob Cats (b. 1577, d. 1660), lovingly styled "Father Cats," was the popular poet of his time, and his *Emblemen* have been translated into other langs. Joost van Vondel (b. 1587, d. 1679) wrote satirical and lyric poetry, and also at least one notable tragedy. Near the close of the 17th century a decline fell upon Dut. lit., owing to the prevalence of Fr. modes of thought and expression; but a new era began toward the end of the 18th century, marked especially by the publication (about 1770) of Bellamy's ballad *Rosje*, which like Gray's *Elegy* marks an epoch. Willem Bilderdijk (b. 1756, d. 1831) is an eminent name in modern Dut. letters; he wrote in verse and prose. But perhaps the first place must be accorded to Hendrik Korneliszoon Tollens (b. 1780, d. 1856), whose *Lierzang op Hugo de Groot* and *Egmond en Hoorn* won the prizes (1804, 1806) of the Acad. of Amsterdam. He was eminent in many depts. of lit.; wrote more than one fine drama, and the narrative poem, *De Overwintering der Hollanders op Nova Zembla*, describing the Arctic expedition of Barentz, and 2 magnificent war lyrics—the *Wapenkreet* ("Call to Arms") and the *Vaderlandsch Krijgshied* ("War-song of the Fatherland"). The Dut. race have moreover produced some of the foremost men in every dept. of thought. Among them are Arminius, Boerhaave, Erasmus, Grotius, Gronovius, Heinsius, Hemsterhuis, Huyghens, Leuvenhoek, Spinoza, Swammerdam, and Vossius; but as they wrote mainly in Lat., their works do not properly come under the head of Dut. lit. [From orig. art. in J.'s Univ. Cur. by PROF. J. THOMAS, LL.D.]

Dutch Liquid, or **Eth'ene Chlo'ride**, is a combination of ethene (elefant gas) with chlorine. It is a thin, inflammable, colorless liquid of an agreeable fragrance and pleasant taste, somewhat resembling chloroform. Like chloroform, it has great anæsthetic powers when its vapor is inhaled, but its safety is doubtful.

Dutch Reformed Church. See REFORMED CHURCH OF AMERICA.

Dutton (HENRY, LL.D., a jurist, b. at Plymouth, Conn., Feb. 12, 1796, grad. at Yale in 1818; was prof. of law in Yale 1847-55, became gov. of Conn. in 1854, and was a judge of the superior court and court of errors 1861-66. He prepared several digests, compilations of State statutes, etc. D. Apr. 26, 1869.

Duyekinek, di kink, (EVERT AUGUSTUS, an ed. and essayist, b. in the city of New York Nov. 23, 1816, and grad. at Columbia Coll. in 1835. With the aid of his brother George he pub. a *Cyc. of Amer. Lit.* Wrote *Hist. of the War for the Union*. D. Aug. 13, 1878.

Duyekinek (George Love), a brother of the preceding, b. in New York Oct. 17, 1823, grad. at the Univ. of New York in 1843. He was joint-author of the *Cyc. of Amer. Lit.* (1856), and pub. several biographies, among which was a *Life of George Haystack*. D. Mar. 30, 1863.

Dwarf, A-S. *dwarg*; Ger. *Zwerg*; Swe. and Dut. *dwerg*, the name given to any animal or plant greatly below the usual size of its kind. In Scandinavian mythology D. were deformed and crafty elves, distinguished for skill in working metals and having magical powers. Human D. have been often kept for the amusement of monarchs and nobles, and occasionally one of them has manifested considerable mental power. Several D. have acquired a fortune by exhibiting themselves to the public, among whom was the Amer. D. Charles S. Stratton, known as "Tom Thumb."

Dwarfed Trees may be produced in 3 different ways — by grafting on dwarf slow-growing stocks, as, for example, the pear on the quince; by planting in small pots filled with poor soil, by which the plant is starved and stunted; and by causing a portion of the extremity of a branch to produce roots, and then cutting it off and planting it in a pot with poor soil. The last is the Chi. method, and is thus performed: The extremity of a branch 2 or 3 ft. long in a fruit- or flower-bearing state is selected, and a ring of bark is taken off at the point where it is desired that roots should be produced. The part thus denuded of bark is covered with a ball of clay, kept moist with the frequent application of water. After the roots have grown out the branch is cut off, planted in a pot of poor soil, and sparingly supplied with water. The dwarf tree will remain nearly of the same size for yrs. The pear tree especially is often dwarfed, because in this condition it will produce fruit while still very young. Some varieties of pear may remain unfruitful for many yrs. unless dwarfed.

Dwight, R. R. junc., Livingston co., Ill., 72 m. S. W. of Chicago. Pop. 1870, 1044; 1880, 1295.

Dwight (BENJAMIN WOODBRIDGE), Ph. D., b. at New Haven, Conn., Apr. 5, 1816, grad. at Hamilton Coll., N. Y., in 1835; was prin. and proprietor of a high school for boys in Brooklyn and New York city for many yrs. Author of *The Higher Chr. Education, Modern Philology, and The Hist. of the Dwight Family in Amer.* He resides at Clinton, Oneida co., N. Y.

Dwight (FRANCIS), b. at Springfield, Mass., Mar. 14, 1808, grad. at Harvard Coll. in 1827, and at the Law School in 1830; travelled extensively in Europe, and afterward practised law (1834-38), but in 1838 turned his whole attention to the promotion of common-school education in our country, and established at Albany, N. Y., in 1840, *The Dist. School Journal*, under State patronage. D. Dec. 15, 1845.

Dwight (REV. HARRISON GRAY OTIS), D. D., b. at Conway, Mass., Nov. 22, 1803, grad. at Hamilton Coll., N. Y., in 1825, and became a missionary of the A. B. C. F. M. in 1830 to the Armenians, making Constantinople the centre of his field of operations. He was abundant in his labors, and met with great success in his work. Wrote *Researches of Smith and Dwight in Armenia and Christianity Revived in the E. D.* Jan. 25, 1862.

Dwight (JOHN SULLIVAN), a musical critic, b. in Boston May 13, 1813, grad. at Harvard in 1832. He studied divinity, entered the Unit. ministry, and preached about 6 yrs. In 1842 he joined the Brook Farm enterprise at W. Roxbury, Mass., where he remained until the institution was broken up. In 1852 he established *Dwight's Musical Journal*, of which he became editor. Author of many reviews and lectures.

Dwight (JOSEPH), BRIGADIER-GENERAL, b. at Hatfield, Mass., Oct. 16, 1703, grad. at Harvard Univ. in 1722; was judge of the court of common pleas of Hampshire co., Mass., and afterward of Berkshire co., and judge of probate. He was eminent both as a judge and a soldier. He commanded the Mass. artil. at the reduction of Louisburg in 1745 with distinction, and led a brigade at Lake Champlain in the second Fr. war in 1756. He was also for 11 yrs. member of the gen. council of Mass. D. 1765.

Dwight (REV. NATHANIEL, M. D.), brother to Dr. Timothy Dwight of Yale Coll., b. Jan. 31, 1770, at Northampton, Mass., prepared and pub. the first school geog. ever issued in this country; was also the author of *The Great Question Answered and of A Compendious Hist. of the Signers of the Dec. of Ind.* D. June 11, 1831.

Dwight (SERENO EDWARDS), D. D., a divine, b. at Greenfield Hill, Conn., May 18, 1786, was a son of Timothy Dwight, noticed below. Grad. at Yale in 1808, and practised law with success (1810-16); was afterward pastor of Park st. ch., Boston (1817-26), and was pres. of Hamilton Coll. 1833-35. Wrote *The Heb. Wife and a Life of Jonathan Edwards*. D. Nov. 30, 1850.

Dwight (THEODORE), a journalist, an uncle of the preceding, b. at Northampton, Mass., Dec. 15, 1764. He was M. C. 1806-07, practised law, and was a leader of the Federalist party. He was sec. of the Hartford Convention in 1814. In 1817 he founded the *New York Daily Advertiser*, which he edited until 1835. Author of *The Life and Character of Thomas Jefferson* and *The Hist. of the Hartford Convention*. D. July 12, 1846.

Dwight (THEODORE WILLIAM), LL.D., an Amer. jurist, prof., and ed., b. July 18, 1822, at Catskill, N. Y., grad. at Hamilton College, N. Y., in 1840, and studied at Yale Law

School. In 1846 he was elected Maynard prof. of law in Hamilton Coll., and there established a law school. In 1858 he was chosen prof. of municipal law in Columbia Coll., N. Y. He was soon made warden of the law school, a dept. of the coll. organized under his direction. He received the degree of LL.D. from Rutgers Coll., N. J., 1859, and from Columbia Coll. 1860. He pub. an *Argument in Rose Will and Charity Cases* (1863), and other arguments in leading law cases. In association with Dr. E. C. Wines he pub. *Prisons and Reformatories in the U. S.* He edited *Maine's Anc. Law*. He was elected non-resident prof. of constitutional law in Cornell Univ., N. Y. (1868), and lecturer in Amherst Coll., Mass., on the same subject (1869). He was a member of the N. Y. constitutional convention of 1867, and early in 1873 was v.-p. of the N. Y. board of State coms. of public charities, pres. of the N. Y. Prison Association, and an active member of the well known "committee of seventy" of the city of New York. In Jan. 1874 he was appointed by Gov. Dix of N. Y. a judge of the commission of appeals, a court sharing the duties of the court of appeals. He was one of the associate eds. of *J's Univ. Cyc.*

Dwight (TIMOTHY), D. D., LL.D., a divine and scholar, b. at Northampton, Mass., May 14, 1752. His mother was Mary, daughter of Jonathan Edwards. He grad. at Yale in 1769, after which he was a tutor in that inst. for 6 yrs.; was a chaplain in the army, and in 1783 became minister of a ch. at Greenfield, Conn., where also he was prin. of an acad. In 1795 he was elected pres. of Yale Coll. in which he also became prof. of theol. at the same time. Wrote *The Conquest of Canaan*, an epic poem (1785), and *Theol. Explained and Defended in a Series of 173 Sermons*. D. Jan. 11, 1817.

Dwight (WILLIAM B.), See APPENDIX.

Dwina, or **Duna** (anc. *Turunthus*), a river of Rus., its source being near that of the Volga; it flows in a gen. N. W. direction and falls into the Gulf of Riga. It is obstructed by rocks and sand-banks, but is navigable during the spring and autumn floods. Length, about 600 m.

Dwina, or **Northern Dwina**, a river of Rus., formed by the confluence of the Sookhona and Vitcheгда; flows nearly N. W. and falls into the White Sea, about 20 m. below Archangel. It is navigable, although there are shoals at its mouth which obstruct the passage of vessels drawing more than 14 ft. Length, exclusive of the branches, about 450 m.

Dyaks, the aborigines of BORNEO (which see).

Dyck, van (ANTHONY), See VANDYKE.

Dye'ing [Lat. *tinctura*; Fr. *teinture*; Ger. *Färben* or *Färbekunst*], the art of coloring yarn or cloth, has been practised from the most remote antiquity. The fibres and fabrics usually dyed are either cotton, linen, silk, or wool. The coloring-matters employed are either the natural products of animals or plants, or are the results of chemical processes. The D. is usually effected while the fibres are in the yarn, although the woven cloth is dyed in some cases. Some colors combine with the fibres very readily as soon as they are immersed in their solutions: such colors have been called *substantive*. Nearly all the aniline colors belong to this class. For dyes which will not unite directly with the fibres, called *adjective*, the aid of *mordants* is necessary. Mordants are bodies which possess an affinity for the colors, and which can be fixed in an insoluble condition on or within the fibres. Some are metallic oxides or salts, as alumina, oxide of iron, oxide of tin, tannate of tin, soap, etc.; others, as albumen, gluten, caseine, tannin, acids, etc., are of a different character.

In some cases the mordant is mixed with the color, and both are applied simultaneously, to be subsequently fixed. Thus, aniline colors are mixed with albumen, applied to the cloth, and fixed by steaming, which coagulates the albumen, rendering it insoluble. This method of fixing colors is extensively practised in calico-printing, as it renders it possible to produce patterns by applying the colors to certain portions of the cloth, or by applying different colors to different portions. Mordants often affect the natural tints of the dyes, thus enabling the dyer to produce a variety of shades with the same dye. The most durable blacks are obtained with oxide of iron, combined with logwood, sumach, catechu, etc. The oxide of tin tends to brighten the shades, while alumina fixes them in their natural tints. The oxides are rendered insoluble by hanging the cloth in the air (*ageing*), and by washing in alkaline solutions of silicate, arseniate, or phosphate of soda (*dunging*). On passing the mordanted cloth through a mixture of madder-root, Brazilwood, etc. in warm water, patterns in pink, red, purple, lilac, chocolate, and black are produced. Metallic pigments are often produced in the yarn or cloth by the successive application of the agents necessary for their production. The following periodicals are especially devoted to D. and calico-printing: *Moniteur de la Teinture, Industrie de la Soie, cité Industrielle de Mulhouse*, and REIMANN'S *Färbzeitung*; *Die Musterzeitung für Färberei, Druckerei*. (See O'NEILL'S *Dict. of Dyeing and Calico-Printing*.) F. CHANDLER.

Dyer (ALEXANDER B.), an officer, b. in 1817 in Va., grad. at W. P. in 1837, and Sept. 12, 1864, chief of ordnance with the rank of brig.-gen. He served in the artil. at Fortress Monroe, Va., in the Fla. war 1837-38, and in the ordnance at various arsenals 1838-46; as chief of ordnance of the army invading N. M. 1846-48, engaged at Canada, Taos (brevet first lieut.), and Santa Cruz de Rosales, Mex. (brevet capt.); on ordnance duty and in command of various arsenals 1848-61; member of ordnance board 1859. He served in the c. war in command of Springfield Armory 1861-64, largely extending the manufacture of small-arms; as member of ordnance board 1860-63, and as chief of ordnance and in charge of ordnance bureau at Wash., D. C., from 1864. Brevet maj.-gen. Mar. 13, 1865. D. May 20, 1874.

Dyers' Broom, called also **Woodwaxen**, **Dyers' Green-Weed**, and **Whin**, a low shrub with yellow flowers and simple leaves. It is the *Genista tinctoria*, a European leguminous plant now thoroughly naturalized in N. Eng. It is said to be the *genet*, the bush which gave its

name to the Plantagenet family. It was introduced into this country for garden cultivation, for its tops were formerly used to make a yellow dye for domestic purposes. It is used in Rus. as a preventive to hydrophobia, but it appears to be simply a hydragogue cathartic of no great value.

Dyers' Weed, or **Weld**, also called **Wood** and **Rocket**, the *Reseda luteola*, a European herb of the order Resedaceæ, naturalized about New York.

Dye-stuffs. The bodies used to impart color to textile fibres and fabrics are either derived from the animal or vegetable kingdom, or are prepared artificially, either from mineral or vegetable products. Many colors exist already formed in plants; others are produced from colorless bodies by oxidation or other processes. Lakes are compounds of coloring matters with metallic oxides, such as alumina, the oxides of tin, lead, antimony, and barium. They are generally prepared from cochineal, madder, weld, Brazil-wood, coralline, aniline colors, etc.

I. ANIMAL DYES.—The most important are cochineal, kermes, lac, galls, sepia, and murexide.

II. VEGETABLE DYES.—These are extremely numerous, although only a few are in gen. use. They are derived from different parts of plants: (1) From *roots* the most important are madder, munjeet, alkanet, barberry, turmeric, and saorance. (2) Among the more important *woods* are log-wood, Brazil-wood, sandal-wood, cam and bar wood, fustic or yellow-wood, and fustet ("young fustic") or Hungarian yellow-wood. (3) The only *bark* of special importance is the quercitron, which produces a rich yellow, and greens when combined with blue. Lo-kao, or Chi, green, is a green lake prepared by the Chi, from the bark of a species of *Rhamnus*, or buckthorn. (4) *Leaves* of the *Rhus cotinus* are known as sumach; chica consists of the leaves of *Bignonia chica*. (5) *Flowers*.—The petals of *Carthamus tinctorius* constitute "safflower." Saffron, a beautiful yellow dye, consists of the stigmas of *Crocus sativus*. (6) *Fruit*.—"Persian," "French," "Turkey," etc. berries are derived from several species of *Rhamnus*, anatto or annatto is an extract of the seed-pellicles of *Bixa orellana*; divi-divi is the pod of the *Cassipouia Coriaria*; catechu, terra japonica, and gambir are the extracts prepared from the fruit, wood, twigs, and unripe pods of several plants growing in India. Their active principle, as well as that of divi-divi, is tannic acid. (7) *Entire plants*.—Indigo, from various species of the *Indigofera*, and wood, from the *Isatis tinctoria*. **Lichens**.—A variety of lichens yield, by a kind of fermentation, a series of products known as archil or orseille, cudbear or persio, and litmus. Weld, the *Reseda luteola*, contains lutioline, which yields a rich but fugitive yellow.

III. ARTIFICIAL OR CHEMICAL COLORS.—(1) *Pigments* are insoluble metallic compounds, either produced in the yarn or cloth by successively applying the necessary reagents, or attached mechanically to the surface by albumen or other adhesive substances. Prus. blue is a ferrocyanide of iron; chrome yellow and orange are chromates of lead; Schweinfurt green is the aceto-arsenite of copper; Guignet's green is a hydrated oxide of chromium; ultramarine is a compound of alumina, silica, soda, and sulphur. (2) *Coal-tar colors*.—Within the past few yrs. a revolution has taken place in silk and wool dyeing, and even cotton-dyeing and calico-printing have been very considerably involved. An entirely new class of D. has been created by modern chem., all of which are derived from the refuse tar produced in gas-works from bituminous coal. These colors belong to 4 distinct series: (a) The aniline series, including the red rosaniline salts, the purple, violet, and blue substitution products derived from them, the greens, yellows, browns, black, and pinks. (b) The phenol or carbolic acid series, including picric acid (yellow), phenicene, coralline (red and orange), and azuline or phenyl blue. (c) The naphthaline series; Martin's yellow, dinitronaphthol yellow, Magdala red, and violet and blue substitution products derived from it. (d) Anthracene series, of which artificial alizarine and anthrapurpurine are the reps. (See O'NEILL'S *Dict. of Dyeing and Calico-Printing*, and KRIEGER'S *Theorie und Praktische Anwendung von Anilin in der Färberei und Druckerei*.)

C. F. CHANDLER.

Dyke, or Dike [from the Dut. *dijk*, a "dike" or "wall." Fr. *digue*], in geol., the molten material filling a wide fissure or rent in rocks, such as often occurs in volcanic formations. This molten matter on cooling was solidified, so as to form a wall separating the edges of the disjointed strata. Such walls of intruded matter occur in stratified rocks of all ages, are usually nearly vertical, and are supposed to have been caused by volcanic eruptions. Dyke, or dike, also is an artificial embankment, or levee, built to resist the encroachments of the sea or of a river.

Dynamics, di-nam'iks. The term *dynamics*, in its literal signification, as well as in its more modern acceptation, relates to or designates the science which has for its object the investigation of the laws and principles which govern the action of forces. The science of D. may be divided into various branches, each embracing the principles applicable to some special conditions of the action of forces or of the bodies acted on, such as the subject of *statics*, or the equilibrium of forces; the subject of *kinetics*, the action of forces in connection with the motions and changes which they produce; and the special applications of both these subjects to bodies in the *solid* and *fluid* states.

The abstract idea of force is derived from our knowledge and experience in regard to the forces of nature—gravitation, inertia, friction, molecular force, muscular force, etc. These forces are so far similar and identical in their effects as to admit of a common measure, and of being subjected to the same laws and principles. In gen. they arise from the action of one body on another, in such a manner that this action is distributed among all the particles, or is exerted through a surface. But it is nearly always possible to assume a single force acting through a definite point and in

a particular direction, which shall be equivalent, in its effects, to such combined or distributed forces. The force of gravity, for instance, is an attractive influence exerted between 2 bodies, which can only be supposed to be exerted by the separate particles or molecules of each, and yet a single force equivalent to the sum of the attraction of all the particles of a body, and acting through its centre of gravity, is usually assumed to represent this attraction. A force may thus be regarded as an influence or action which requires 3 elements for its determination—its *line of action*, its *point of application*, and its *magnitude*.

This abstract idea is applicable to all forces, and furnishes the starting point or basis of the system of principles which constitutes the science of force. These principles depend also on certain axioms of phys. science derived from a consideration of the nature of forces and their effects; and also upon certain geometrical laws involving the relation between the magnitudes of forces and motions, and their equivalent components. To compare the magnitudes of forces a standard unit or measure must be adopted which is applicable to all forces under all ordinary conditions. As all standards of measure are arbitrary, such a unit of measure may be found in the effects which a given force will produce under conditions which permit of the effect being measured by some other known standard of measure.

To explain the standard or unit of force adopted in dynamical science, it will be necessary to explain just what is understood by the mass of a body. If we suppose (*for the purpose of this explanation only*) that the ultimate particles or molecules of all substances are the same, and that we may designate by the term *density* the degree of proximity of the particles of any body to each other, then the number of particles in a given *volume* may be taken to denote the mass of the body—i. e. this number would represent the *quantity of matter in the body*. This quantity of matter or mass has important properties as regards force. First, the action of the force of gravity upon the body is directly proportional to the mass; and this mass possesses a peculiar power of resistance to any force which acts to change its condition in respect to motion. It is inert as regards any power in itself to change, but a force of resistance is developed with the action of an impressed force. The truth of this principle is so well established that the following relation between an impressed force, the mass of a body free to move without resistance (other than its inertia), and the velocity which is produced in a unit of time, has the force of a scientific axiom. This relation may be stated as follows: *The velocity produced in a body free to move without resistance in a unit of time will be directly proportional to the intensity or amount of the impressed force, and inversely proportional to the mass of the body.* In algebraic symbols, if v be the velocity, F the force, and M the mass, the relation will be expressed by the equation $v = \frac{F}{M}$. From this is de-

termined the value of the force $F = Mv$. If the mass M be that of a given volume of some substance assumed as a standard, the unit of force may be assumed to be that force which will produce a given velocity—the unit of velocity, for instance—in a unit of time. This is an *absolute unit of force*, and serves as a universal measure. Another measure adopted is more specific, but not an invariable standard. It is, however, that in most common use, and is perhaps the most universally understood as the standard of measure for forces. If the force F , instead of being any force, be taken as the force of gravitation, the total attraction of the earth at a given place on the mass M will be what is commonly called the weight of the body; representing this by W , we shall have $W = Mv$. If the same standard mass be chosen as before, the weight of this mass may be taken as the unit of force. Such a unit has been generally adopted for different national standards. For Eng. measures the mass M is that of a piece of platinum carefully preserved, the weight of which is called 1, or 1 lb. This weight will differ for different lats., because the force of attraction of the earth varies with the lat., and hence this measure is not absolute in its character, but it is convenient for use, and is universally employed. If any mass be allowed to fall under the influence of gravity, the velocity generated in one second may be determined experimentally, and the equation $W = Mv$ will give the relation between the weight, mass, and velocity under these circumstances. In the lat. of Lond. this velocity

is 32.2 ft., approximately; so that $\frac{W}{32.2} = M$. The mass of a

body is thus found by dividing the weight by 32.2. The unit of force, for Brit. measures, may therefore be said to be 1 lb. *avoirdupois*, and the mass of a body may be found by dividing the weight by the number 32.2; these quantities representing Brit. measures referred to the lat. of Lond. The corresponding Fr. unit of force is 1 kilogramme, equivalent to about 2.2 Brit. units. W. P. TROWBRIDGE.

Dynamic Units are units for measuring forces and their effects. The simple unit of force has been defined under DYNAMICS. A unit of work combines 2 elements—viz. force acting, and space through which it acts, and is the product of a unit of force and a unit of distance. Such is the foot-lb., which is the work done in raising one lb. one ft.; or the kilogrammetre, the work done in raising one kilogramme one metre. A unit of power, or of rate of working, involves the additional consideration of time. It is a definite amount of work conventionally fixed upon for purposes of comparison as the work of a unit of time. Thus, the horse-power, the unit of rate commonly used in this country in estimating the performance of machines, is 550 foot-lbs. per second, or 33,000 per minute. The *cheval-vapeur* (Fr. horse-power) is 75 kilogrammetres per second, or 4500 per minute; equal to 542½ foot-lbs. per second, or 32,550 per minute, nearly—a little less than the former.

W. P. TROWBRIDGE.

Dynamite, called in the U. S. "giant powder," was in-

vented in 1866-67 by Nobel; it consists of nitro-glycerine absorbed by some porous inert solid. The best material is a silicious infusorial earth found in Hanover, and known as *Kiesel-guhr*. It is when dried a white, impalpable powder. It will absorb and safely retain 3 times its weight of nitro-glycerine. D. made from kieselguhr has the appearance and consistence of heavy brown sugar. It possesses most of the virtues of the parent nitro-glycerine, with some peculiar to itself; of which the chief are, exemption from liability to spontaneous explosion and to detonation from moderate shocks, both of which result from the exceedingly fine granulation of the nitro-glycerine. D. possesses another decided advantage over nitro-glycerine. If kept in the state of loose powder without compression into cartridges, it may be exposed to any natural temperature without losing its explosive properties when subjected to the action of a primer charged with 15 grains of fulminating mercury, and this too without becoming more sensitive to ordinary shocks and handling. In the form of compressed cartridges it is as inexplusive when thoroughly frozen as nitro-glycerine itself. Saturated with water, it loses only a very small percentage of its explosive power, but requires a primer much more powerful than those ordinarily used. Ignited by a flame, and unconfined, it burns quietly without detonation. Experiment indicates that its explosive force is not quite so instantaneous as that of pure nitro-glycerine; hence, in certain kinds of resisting media, where a sustained pressure is required, the mechanical work performed by $\frac{3}{4}$ of a lb. of nitro-glycerine in the form of D. may largely exceed that produced by a full lb. of the unabsorbed material. This apparent paradox actually occurs in submarine mines, usually called torpedoes. For rock-blasting, D. should be pressed firmly home and tamped with sand. D. possesses another merit. By combining its ingredients in judicious percentages, a certain control can be exerted over the quickness of its action, and a classification similar to that of the different grades of gunpowder, but much more restricted in range, may be made. [From *orig. art. EXPLOSIVES, in J's Univ. Cyc.*, by GEN. H. L. ABBOT.]

Dynamometer [from the Gr. *δύναμις*, "force," and *μετρον*, a "measure"], an instrument or apparatus for measuring energy exerted or work performed. Any contrivance may be so called which indicates the intensity of a force used to produce motion. The work done is found by multiplying the mean effort thus indicated into the space passed over by the point where the force is applied. A D. may record only the intensities of the force, space being ascertained independently; or it may record both force and distance traversed. A spring attached to a plough-beam may, by suitable mechanism, be made to record the varying force of traction, and thus become a D. The mean force shown by it, multiplied into the length of the furrow, will give the work of the animals drawing the plough. Prony's friction D. is the form most easily applied to revolving shafts. A flexible band, enveloping either the shaft or a drum turning with it, resists the driving force by its friction. The resistance is measured by the weight required to keep the band from turning with the shaft; and this weight, multiplied by the distance it would have been carried in a given time if it had revolved with the shaft, gives the work of the prime-mover. Hirn's torsion D. measures the force applied to a shaft, by the torsion caused by such force in the shaft itself. The torsion D. and the spring D. are best suited to measure variable forces; but there are instruments of this class in which force is measured by the resistance of fluids driven through small apertures. For measuring the work of fluid-pressure, the steam-engine indicator is the D. in common use. In this, the pressure of the fluid upon a small piston is resisted by a spiral spring. A pencil which moves with the piston traces upon a moving slip of paper a curve, of which the ordinates give the pressure, while a straight line perpendicular to these shows the distance passed by the surface pressed. The mean pressure multiplied by this distance gives the work done.

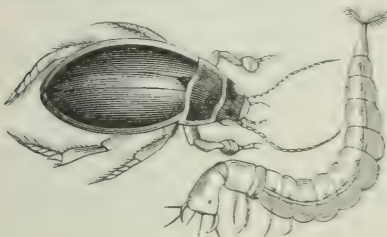
W. P. TROWBRIDGE.

Dyrrachium. See DURAZZO.

Dysentery [Gr. *δυσεντερία*, from *δύς*, "ill," "painful," and *εντερά*, "intestines"], a febrile disease, characterized by paroxysms of pain in the bowels, and by scanty though often frequent bloody mucous stools. Sporadic cases usually recover with little treatment. Pain is relieved by opium or Dover's powder. Gentle purgatives, as rhubarb or salines, are extremely useful. Enemata of warm water will often relieve tenesmus. Astringents, copaiba, opiated starch injections, etc., are useful adjuvants in some cases. Opium and belladonna are given as suppositories. Perfect rest on the back is desirable.

Dyspepsia [Gr. *δυσπεψία*, from *δύς*, "difficult," and *πέψις*, "to digest"], a disordered functional state of the stomach. See INDIGESTION.

Dytiscidae [*Dytiscus*, diminutive of Gr. *δύτης*, "diver,"



Dytiscus and Larva.

one of the genera], a family of aquatic coleopterous insects distinguished by an oval, flattened, elliptical body, very large

hinder coxae, and oar-like swimming legs. The species frequent marshes, lakes, and the still parts of rivers. When they come to the surface to breathe, they rest with the back downward and the extremity of the abdomen exposed to the air, the organs of respiration being in the last segment. They feed voraciously upon all kinds of animal food. They fly well, and often leave the water by night. Before changing into pupae the larvae secrete themselves in the earth. The larvae are called "water-tigers," from their habit of attacking and devouring insects, tadpoles, and even fishes.

Dzig'getai, or Koulan (*Asinus Onager*), a wild ass of E. Tur., Pers., Afghanistan, and the Punjáb. It is very swift. It lives in troops, under a leader. The animals are extremely wild, for they are much hunted, both for flesh and excitement of the chase. The color is brown with a black stripe along the back.

E.

E (pron. *ee*), the fifth letter and second vowel of the Rom. and of most modern alphabets. In most of the modern European langs. especially in Fr. and Eng., *e* occurs more frequently than any other letter. One reason for this is that *e* (mute) in these langs. replaces the Latin vowel of Lat. or Gr. words, as in *June*, from the Lat. *Junia*; *bile* (Lat. *bilis*); *come* (Lat. *comis*); *care* (Lat. *carus*); *force* (Lat. *fortis*), etc.

Eadie *Edie* (JOHN), D. D., LL.D., a divine of the Scot. United Presb. Ch., b. at Alva, Stirlingshire, May 9, 1814, ed. at Glasgow Univ. Author of a *Biblical Geog.* and a *Compendious Concordance to the Scriptures*. D. June 3, 1876.

Eads (JAMES B.), LL.D., b. at Lawrenceburg, Ind., May 20, 1830, removed with his parents in 1839 to Louisville, Ky., and in 1833, after death of his father, to St. Louis. In 1839 he served as clerk on a river steambot on the Miss., and in 1842 formed a company to recover sunken property, and raised wrecked steamers on the Mississippi and its tributaries. At the outbreak of the c. war in 1861 he submitted to the govt. a plan for the defence of the W. waters. He designed and constructed in 1862-63 the first 8 iron-clad steamers in the U. S. navy. He afterward designed and built 6 iron-clad gunboats with rotating turrets. He was the projector and constructing engineer of the Ill. and St. Louis Bridge, and has deepened, by means of jetties, the S. Pass of the Miss. from 8 ft. to 30 ft. Received the Albert medal in 1884 from Royal Society of Arts. He is now engaged in building a ship-railway across the Isthmus of Tehuantepec.

Eagle, *Ægl* [Lat. *aquila*; Fr. *aigle*; Ger. *Adler*], a common name for the large rapacious birds of the family Falconidae. They belong to the genera *Aquila*, *Haliaeetus*, etc., and have all very hooked beaks and powerful, much curved and pointed claws. The golden E. (*Aquila chrysaetos*) is found in Europe, Asia, and N. Amer., and derives its name from the golden-red color of the feathers which cover its head and neck. The plumage of the body is a rich dark-brown. The imperial E. (*Aquila imperialis*), which inhabits Asia and S. Europe, may be distinguished by the white patch on its scapulars.

The bald E. (*Haliaeetus leucocephalus*), the national bird of the U. S., has a white head, neck, and tail. It is widely distributed through different regions of N. Amer., and frequents the sea-coasts, lakes, and large rivers. (See BALD EAGLE.)

The harpy E. (*Thrasaetus harpyia*) is a fierce and powerful bird of tropical Amer., which occasionally wanders into the S. E. U. S.

Eagle, a gold coin of the U. S., is equivalent to \$10, and bears the figure of an E. The largest gold-piece coined in the U. S. is a double-E = \$20. The E. weighs 258 grains troy, and being $\frac{9}{10}$ fine, contains $232\frac{2}{10}$ grains pure gold. E. is also the name of an anc. coin of Ir. current in the 13th century.

Eagle, in heraldry, a bearing often assumed as the emblem of empire. The E. of Rus. is *or*, with 2 heads displayed, *sable*, each ducally crowned of the field; the whole imperially crowned, beaked, and membered *gules*. The E. of Aus. is also displayed with 2 heads. The Prus. E. has only 1 head. The U. S. adopted (1785) the bald E., his wings displayed, *proper*, as the national emblem. The E. was also one of the most anc. Rom. military standards. In 104 B. C. it became the distinctive ensign of the Rom. legions. It was made of bronze or silver, and was carried upon a short staff. An E. of gold was the royal emblem of anc. Per.

Eagle, Bald. See BALD EAGLE.

Eagle Bridge, R. R. junc. Rensselaer co., N. Y., on Hoosick River and on the line of White Creek tp., Washington co., 24 m. N. E. of Troy. Pop. in 1880, 96.

Eagle Hawk, a name given to several birds of the genera *Morphnus* and *Spizaetus* (family Falconidae), similar in form to the eagle, but inferior in size. They are natives of S. Amer., the E. I., and Afr. They have short wings and long legs.

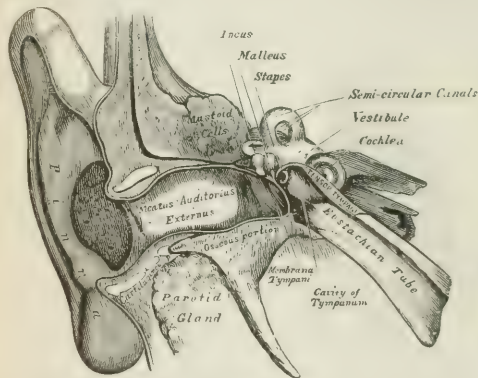
Eagle Pass, a p.-v., cap. of Maverick co., Tex., on the Rio Grand, about 450 m. S. W. of Austin City. During the c. war it had a large trade with Mex. Pop. 1880, 1627.

Eagle Wood, the fragrant wood of *Aloexylon Agallochum* or *Aquilaria ovata*, a tree of the order Aquilariaceae, indigenous in the tropical parts of Asia. It is used for burning as incense.

Ea'gre [probably from the sea-jotun *Eggr*], a Norse word used to express the sudden rise of the tide in the mouth or estuary of a river. It is often called the "bore."

Ear, Anatomy of the. For the perception of sound the essential structure is a nerve capable of receiving and transmitting sonorous vibrations. Some animals (as spiders), possessing no special organ of hearing, nevertheless show a distinct recognition of sounds. The lowest animals, Protozoa, have no specialized organs of sensation. In some Acalepha small sacs arranged around the margin of the disk appear to represent the E. Many Mollusca have auditory organs. In Gasteropoda (e. g. snails) these are connected with the pedal ganglia, seeming thus to aid directly in the guidance of locomotion. Cephalopoda have the organs of hearing connected with the head. Worms often have auditory vesicles in the head, connected with the œsophageal nervous ring. Grasshoppers and locusts have similar organs, either at the sides of the first abdominal segment or on the main segments of the anterior legs. In the lobster and other large Crustacea they are placed in the basal joints of the first pair of antennæ. All vertebrate animals, except *Amphioxus*, have distinct organs of hearing. Fishes have no external or middle ear, and no cochlea. Amphibia have without a cochlea; some have a tympanum, others none. Reptiles, except serpents, have a tympanum, and several an externally visible membrana tympani. Comparative anatomists generally consider the malleus to be homologous with the "quadrate" bone, which supports the jaws in birds, and reptiles, being thus, in all of these animals, outside of the ear. No external ear exists in any fish or reptile. Birds, especially owls, present it in the form of a circular arrangement of feathers. In birds the tympanum contains a single bone, the columella. The cochlea of the internal ear is a conical, slightly twisted double canal; the semicircular canals are large. Mammals always have the internal and middle ear complete, and mostly also an external ear. This is slight, however, in diving quadrupeds, as the otter and beaver, and wanting altogether in the whale, seal, mole, ornithorhynchus, and armadillo. Several aquatic animals have a valve near the entrance of the external meatus or canal of the outer ear, which closes when they are under water. Bats are endowed with very large and sensitive external ears. Many quadrupeds have considerable muscular power over their ears. Man has 3 rudimentary muscles of the same kind.

The Human Ear.—This consists of 3 distinct, though connected, parts—the *external ear*, the *middle ear* or tympanum, and the *internal ear* or labyrinth. Of the *outer ear*, the expanded part is the pinna; its prominent rim or margin is the helix. The ridge next within this is called the anti-helix; it divides above. Its lower and front part encircles a cavity, the concha, below which are 2 opposite prominences, tragus and anti-tragus. The lowest, soft, flexible part is the lobule. The entrance to the ear is the meatus audito-



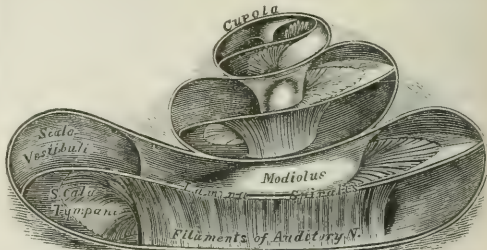
The Human Ear.

rius externus. It is about $1\frac{1}{4}$ inch long, directed forward and inward, slightly curved. Near its orifice are the ceruminous glands, secreting the ear-wax. At the bottom of the meatus is the membrana tympani.

The *middle ear*, or tympanum, is a sort of drum or hollow organ, containing air, and through its middle a small chain of bones—the malleus, or hammer-bone, the incus, or anvil, and the stapes, or stirrup. The tympanum communicates with the throat (pharynx) by means of the Eustachian tube. The fenestra ovalis, or round window of the tympanum, is a membranous partition between the internal part of the tympanic cavity and the vestibule of the labyrinth or internal ear. The fenestra rotunda is a round membranous "window" between the tympanum and the cochlea of the labyrinth. Three muscles are asserted by most anatomists to exist in the tympanum—the tensor tympani, luxator tympani, and stapedius. The second of these is considered by some to be only a ligament.

The *internal ear* is composed of the vestibule, cochlea, and 3 semicircular canals. The vestibule is the middle portion, the cochlea is anterior, and the 3 canals are above and behind the vestibule. Within the latter are 2 small bodies, the otoliths, or ear-stones, composed of carbonate and phosphate of lime. The semicircular canals always differ definitely in their direction, 2 being vertical and 1 horizontal. The cochlea is shaped somewhat like a snail-shell. In its centre is a conical bony axis, the modiolus. Around this is a spiral canal, within which is the lamina spiralis, partly composed of bone and partly membranous. This divides the canal into 2 passages or scala—the upper, communicating with the vestibule, scala vestibuli, and the lower, communicating through the fenestra rotunda with the tympanum, scala tympani. The bony part of the lamina spiralis has a

grooved margin, the uppermost edge of which, toward the scala vestibuli, supports a finely toothed membrane, lamina denticulata. Between these is a space called the scala media. Within this space are arranged 2 sets of minute rod-like bodies, parallel to each other, radiating from the axis of the cochlea. These are the rods of Corti. The whole inner surface of the bony labyrinth is lined by a fibro-serous periosteal tissue. This secretes a thin fluid, the perilymph. The membranous inner labyrinth, which duplicates, as it were, the osseous wall of the vestibule and semicircular



The Cochlea (enlarged).

canals, secretes a similar liquid, the endolymph. The auditory nerve is subdivided into branches which are distributed to all the parts of the internal ear. Those filaments which enter the cochlea form a sort of ganglionic plexus in the scala tympani; thence proceed some very delicate nervous extremities, which, in the scala media, are brought into relation with the rods of Corti. [From orig. art. in *J's Univ. Cyc.*, by Prof. HENRY HARTSHORNE, M. D.]

Ear, Diseases of. The auditory canal is frequently the seat of foreign bodies, as in children, who put beads, buttons, etc. in the ear, or when insects, as bugs and bees, enter the ear. The canal, however, is chiefly obstructed by cerumen, or ear-wax, which may accumulate in great quantity, so as to occupy and occlude the entire passage and exclude sounds. It may press on the tympanum (drum of ear). It is a most frequent cause of deafness. Cerumen is to be removed by the surgeon with forceps or probes, and also by the ear-syringe and warm water or weak alkaline solutions. The auditory canal is frequently the seat of little abscesses or "boils in the ear." They are painful, though not dangerous. For a time they occlude the passage and cause partial deafness, which subsides with the pain when the abscess discharges. The treatment should be warm poultices and fomentations to the region of the ear, leeching in severe cases, and free use of sweet oil and laudanum in the ear until the abscess breaks. The membrana tympani, or drum of the ear, may be injured by the introduction of sharp instruments, or ruptured by sudden impaction of air compressing it from without, as by a box on the ear, the noise of a loud explosion, as of blasting, cannon, or even firearms. It may also be ruptured by air from the throat through the Eustachian tube suddenly and forcibly pressing from within, as in violent blowing of the nose, vomiting, and paroxysms of whooping-cough. Such ruptures usually heal. Ulcerative perforations may be minute or include nearly the whole drum. Often, if the Eustachian tube be not closed, the person can blow air from the throat through the perforated drum into the external auditory canal with a perceptible sound. An artificial drum or membrana tympani of hard rubber can be worn. Moistened cotton wool, introduced clean each day, effects the same result in a measure. The Eustachian tube is liable to be occluded by catarrhal thickening of its lining membrane, the product of catarrhal throat troubles. This is the explanation of the most frequent form of deafness—catarrhal deafness. The Eustachian tube is to be restored to its open state by the Eustachian catheter or Politzer's bulb. Often deafness is associated with symptoms of cerebral disease, which indicate that the auditory nerve is involved at its origin or course in the brain.

The chief D. of the E. are these: 1. Deafness; 2. Otorrhœa, or purulent discharge from the ear; 3. Otalgia, pain in the ear, the result of abscess or acute catarrh or inflammation, and often reflex or sympathetic, dependent on sore throat, or, again, a pure neuralgia, with no existing ear disease, caused by poor health, impoverished blood, or nervous and hysterical temperament. (See DEAFNESS; also *Treatise on Diseases of the Ear*, by D. B. ST. JOHN ROOSA.)

E. DARWIN HUDSON, JR.

Earlham College, Richmond, Ind., was chartered in 1859. The president's chair was not filled for a few yrs. at the first. The first pres. was Prof. Barnabas C. Hobbs, A. M. The chair for several yrs. has been occupied by Joseph Moore, LL D. Both sexes are admitted.

Earlville, La Salle co., Ill., on R. R., 73 m. W. S. W. of Chicago. Pop. 1880, 963.

Early (JOHN, D. D., bp. of the M. E. Ch. S., b. in Bedford co., Va., in 1786, joined the Va. Meth. conference in 1807, was one of the chief founders of Randolph-Macon Coll., Va. He took a prominent part in the proceedings which in 1844 divided his denomination into N. and S. sections, and in 1854 was ordained as one of the bps. D. Nov. 5, 1873.

Early (JUBAL A.), a gen. and lawyer, b. in Va. about 1818, grad. at W. P. in 1837. He afterward studied law, and served in the Mex. war as a major. He joined the Confed. army, was a maj.-gen. at Gettysburg in July 1863, and commanded an army which invaded Md. in July 1864. He was defeated by Gen. Sheridan near Winchester, and at Fisher's Hill in Va., on the 19th and 20th of Sept. On the 19th of Oct. 1864 he attacked the U. army at Cedar Creek, Va., in the absence of Gen. Sheridan, who arrived in time to rally his retreating army and to gain a decisive victory. After the war he returned to the practice of law in Richmond, Va.

Earth, The, is the dwelling-place of man, the scene of his activity, the means of his development, and the theatre of his hist.

I. *The Earth in the Universe and the Solar System.*—The E. is a star among the innumerable stars which float in the boundless space of the heavens. Unlike those bright bodies, however, it is not self-luminous, but is a member of a small group of stars, called planets, revolving around the sun, with which they form the **SOLAR SYSTEM** (which see). The arrangement of the planets in the solar system shows law and order everywhere, and strongly favors the idea of a common origin, which makes it really a *family* of stars, whose parent is the sun. The planets, in their order from the sun, are Mercury, Venus, the Earth, and Mars, all of small size, which form a first group; then comes the cluster of the asteroids, followed by another group of 4 large planets—Jupiter, Saturn, Uranus, and Neptune—whose orbit forms the extreme boundary of the solar system. The *intervals* between them increase with their distance from the sun, going on about doubling: from Mercury to Venus, 31,000,000 m.; to the Earth, 56,000,000; to Mars, 105,000,000, and so on. The number of satellites also increases; the Earth has 1 (the Moon), Mars 2, Jupiter 4, Saturn 8, together with a broad, flat, double ring; Uranus 4, and perhaps more; Neptune as yet is known to have but 1. The motions of the planets are also subject to law. They all revolve in the same direction as the sun itself, and nearly in the plane of its equator. The velocity of revolution around the sun is greatest in Mercury, and gradually diminishes in the other planets, as their distance from the sun increases, to Neptune, in which it is slowest. The velocity of rotation, on the contrary, is greatest in the large planets more distant from the sun, Jupiter and Saturn turning upon themselves in about 10 hours, while the 4 smaller planets have, like the E., a day of about 24 hours. The *density* of the planets, again, varies with their distance from the sun. Mercury, the most dense, has a specific gravity of about 8 times that of water, which is a little more than that of iron; the E. 5½, the other small planets nearly the same; while that of Jupiter is 1½, and that of Saturn, the lightest of all the planets, only ¼, or less than water, which makes it comparable to a similar volume of cork or light wood. (See **DENSITY OF THE EARTH**.) Thus, in all respects, the E. occupies a happy intermediate position. By its size it belongs to the group of the small planets, but is the largest of them. Its distance from the sun makes it equally free from the intense glare and the burning heat which prevail on Mercury, and from the dimness of light and the cold which probably are the share of the sister planets, Jupiter and Saturn. The relative length of its day, seasons, and yr. establishes harmonious relations between them, such as cannot exist in the outer planets, owing to the great disproportion between the excessive shortness of their days compared with the great length of their yr. The E. thus seems to be better fitted than any other member of the solar system for sustaining the noble world of living forms, vegetable, animal, and human, which adorn its surface, and give to our globe its highest value.

II. *The Earth considered in itself*, as a great individual organization, can be studied under 2 aspects—either in its past or its present condition. The hist. of its gradual formation and of the development of the life-system previous to the appearance of man, is **Geology** (which see). Phys. geog. considers the globe in its present condition, as the full-grown E., with man upon it, in its state of highest perfection.

III. *Form and Dimensions of the Earth.*—The gen. form of the E., like that of most of the heavenly bodies, is a sphere. The extremities of the axis of rotation are called the *poles*. The great circle, equidistant from both poles and whose plane cuts the axis in 2 equal parts, is the *equator*. Geodetic measurements have shown that the equatorial diameter is longer by 26½ m. than the polar diameter, or axis, proving the E. to be slightly compressed at the poles and bulging in the equatorial regions. This small deviation from the regular spherical figure is such as would be produced by the rotation of a slightly plastic globe upon its axis, and indicates that the E. was in a semi-fluid state before it was consolidated in its present shape. The following table gives the prin. dimensions of the E. in Eng. statute m., as at present ascertained:

DIMENSIONS OF THE EARTH.

Equatorial diameter	7925.65	Radius	3962.82 m.
Polar diameter	7899.17	Radius	3949.58 "
Difference	26.48	Difference	13.24 "
Mean diameter	7916.17	Radius	3958 "
Circumference at the equator	24,899 m.		
Surface of the globe	196,900,278 sq. m.		
Contents or bulk	260,000 millions of cubic m.		

In round numbers, diameter, 8000; radius, 4000; circumference, 25,000 m.; surface, 197,000,000 sq. m.

IV. *The Globe and its Circles.*—The representation of the E. most true to nature is the artificial globe, which, however, looks like a perfect sphere, for the polar compression is too small to be visible to the eye. The outlines of the continents and oceans, the course of rivers, and other geographical features of the surface can be drawn correctly on the globe, while on flat maps there can be only an approximation to their true form. On the globe are seen several sets of circles not belonging to the natural features of the surface, the object of which will be easily understood.

Parallels and Meridians.—In order to find out the precise location of a place or of any point on the face of the E., 2 sets of circles are traced—one in the same direction as the equator, the other at right angles, passing through both poles. The first are called *parallels*, because they are parallel to the equator and to one another. The last are called *meridians* (from the Lat. *meridies*, "noon"), because all places situated on such a circle have mid-day at the same time. All the parallels except the equator are *small circles*—i. e. smaller than the greatest circumference. All the me-

ridians are *great circles* which intersect each other at the poles, and the planes of which pass through the axis of the E. All these circles, great or small, are divided into 360 equal parts or degrees, each degree into 60 minutes, and each minute into 60 seconds; further subdivisions are given in decimal parts of a second. The following is the mode of expressing these divisions in writing: 20° 32' 5".9 means 20 degrees, 32 minutes, 5 seconds, and 9/10 of a second. (See **DEGREES OF LATITUDE AND LONGITUDE**.)

Climatic Zones.—There are 4 parallels, usually made prominent in globes and maps, which are peculiar limits in the distribution of light on the surface of the E. Two are traced at the distance of about 23½° on each side of the equator, and are called on the N. the *Tropic of Cancer*, and on the S. the *Tropic of Capricorn*. The other two, 23½° from either pole, are the *North Polar* and the *South Polar Circles*, also called the *Arctic* and *Antarctic Circles*. The 2 tropics mark the extreme limits of the central region where the sun, in its yearly course, can be seen vertical, the sun being vertical on these parallels on the longest days of the yr.—viz. the 21st of June in the N. and the 21st of Dec. in the S. hemisphere. The polar circles are the parallels on which the longest day is 24 hours, and mark the limits of the circular area around the poles within which the summer sun does not set every day. The globe is thus divided into 6 bands or *zones*, in 3 groups, which, from the gen. character of their temperature, are termed the warm or *torrid*, the *temperate*, and the *frigid* zones. The portion of the E.'s surface occupied by each of the zones is very unequal. Their comparative area, in Eng. sq. m., is as follows:

N. tropical zone	39,109,628	Warm regions	78,219,256
S. tropical "	39,109,628		
N. temperate zone	51,110,763	Temperate regions	102,221,526
S. temperate "	51,110,763		
N. polar "	8,229,748	Cold regions	16,459,496
S. polar "	8,229,748		
The whole globe	196,900,278	Eng. sq. m.	

It is thus seen that, by a wise arrangement of Providence, the temperate regions, most favorable to man's development, are the most extensive; next are the warm regions; while the frigid zones, unfit for man's progress, cover but an inconsiderable portion of the E.'s surface.

Ecliptic.—A last great circle is to be noted, which intersects the equator at an angle of about 23½°, and touches the 2 tropics. When the axis is inclined 23½° from the perpendicular position, the plane of this circle is horizontal, representing the plane of the orbit in which the E. moves around the sun. This circle is the line through which the plane of the orbit cuts the surface of the E., and marks the apparent course of the sun from one tropic to the other during the seasons. It is called *ecliptic* because eclipses happen only when the moon is in the same plane, or very near it.

V. *Density and Weight of the Earth.*—To find out the specific and absolute weight of the enormous mass of the E., and by it that of all the bodies of the solar system and of the sun itself, seems so bold an undertaking as to savor of rashness. Still, it has been done quite satisfactorily by physicists and astronomers. (See **DENSITY OF THE EARTH**.) It was said above that the mean specific gravity of the E. was 5½ times that of pure water. Considering that the surface materials, water and rocks, have respectively a specific gravity of only 1 and 2½, so much smaller than the average, we must surmise that in the interior of the globe either the metallic substances greatly prevail, or that matter is in a state of great compression.

VI. *The Earth's Internal Temperature.*—While at the surface we look to the sun as the source of nearly all the heat we enjoy, the high temperature of the warm or thermal springs and boiling geysers, of the artesian wells and deep mines, and still more of the fiery volcanoes, indicates that the E. has a temperature of its own, independent of that which it receives from the sun. Like the last, it is a warm body in the cold space of the heavens. (See **THERMAL SPRINGS, GEYSERS, VOLCANOES**.) An idea of the amount of this internal heat may be formed from the law of the increase of temperature from the surface downward, in Artesian wells and mines. Among the deepest Artesian wells in which observations have been recorded by self-registering thermometers are those named in the following table, which gives their depth, temperature, and observed rate of increase:

Depth in ft.	Temperature, F.	No. ft. for 1° F. increase of 1° F.
Grenelle, Paris	1798	82.4
Neu Salzwirk, Prus.	2288	92.5
St. Louis, Mo.	2199	79.2
Louisville, Ky.	2086	82.5
Columbus, Ohio.	2775	88.0
Sperenberg, Prus.	4162	122.0

This shows that the temperature invariably increases from the surface downward, but also that temperature, at the same depth, is not the same in different wells, and therefore a rate of increase greater in some places than in others.

Temperature in Mines.—Observations of temperature made in deep mines give similar results. The increase of heat downward is constant, but the rate of increase often differs widely, even in mines situated at no great distance from each other, according to the nature of rocks and their power to transmit heat. In the Prus. mines, where a long series of investigations has been made with the greatest care, the most rapid rate is 1° F. for every 27 ft.; the slowest, 1° for every 197 ft.; the average, 1° for 92 ft. In the mines of Sax. the average is 1° for 72 ft. Six of the largest mines in Eng. give 1° for 44 ft.; Dalcouth mine, in Cornwall, 1° for 75 ft. In Amer. the Va. coal-mines show an increase of 1° for 60 ft. Even the frozen soil of the middle Siberian plains, which has a thickness of nearly 600 ft., and near the surface a temperature of only 10° F., shows a steady in-

crease down to the depth at which the temperature reaches the melting-point. The average of all known observations, made in various parts of the globe, both in artesian wells and mines, gives an increase of heat toward the interior of about 1° F. for every 55 ft. Should that rate of increase continue, in a regular progression downward, the temperature of boiling water will be reached at 9000 ft., or less than 2 m. from the surface. At 30 m. the heat would be sufficient to melt all the rocks and metals contained in the E.'s crust. But as we have some reason to believe that the progression becomes gradually slower, we may admit as probable that the solid, unmelted crust has a greater thickness, reaching, perhaps, if not exceeding, 100 m. Startling as this result may be, it is the hypothesis which best accounts for the facts just mentioned, and for the phenomena of geology.

Volcanoes.—Artesian wells and thermal springs prove an internal temperature reaching the boiling-point of water; but volcanoes, and the torrents of melted, fiery lava which escape from their open mouths, demonstrate the existence in the bowels of our planet of extreme temperatures, which tell us that the above conclusion is not a mere fancy, for the volcanic phenomena are too gen. and too much connected with the great fractures of the E.'s surface, to be accounted for by mere local chemical causes. (See VOLCANOES.)

VII. The Earth as a Great Magnet.—The E. exerts a directing force upon the magnetic needle, acting like a magnet whose poles are in the vicinity of but not coinciding with the astronomical poles. The magnetic poles being nearly 18° from the geographical poles, the magnetic meridians, or lines connecting the places having the same declination, do not coincide with the geographical meridians. The angular difference between the two is called the *magnetic declination* or *variation of compass*, which may be E. or W. of the true meridian, or noon (line of no declination), and varies every yr. At Paris the declination was, in 1580, $11^{\circ} 20'$ E.; in 1663, 0° ; in 1700, $8^{\circ} 10'$ W.; in 1814, $22^{\circ} 34'$; since that time it moves backward toward the E.; in 1854 it was $22^{\circ} 10'$. The extent of the variation was thus over 31° , but the rate not uniform.

Magnetic Inclination.—A steel needle freely suspended and perfectly horizontal when magnetized will adjust itself along the magnetic meridian and point downward. This deviation from the horizontal position is called the *inclination* or the *dip*. In New York the dip amounts to 75° . At the magnetic poles the dipping needle would stand perpendicular; nearer the equator it gradually becomes less, until it reaches a line where it is horizontal. By connecting the points of similar inclination we obtain the *magnetic parallels*. The line of no dip is the magnetic equator, which is found to be in the neighborhood of the geographical equator, without coinciding with it. The dip, like the declination, is subject to periodic and secular variations. In Paris it was, in 1671, 75° ; in 1780, $71^{\circ} 48'$; in 1853, $66^{\circ} 28'$. (See DIPPING NEEDLE.)

Magnetic Intensity.—The intensity of magnetic force can be measured by causing a dipping needle to oscillate, and counting the number of its oscillations in a given time. The greater the number of oscillations in a minute of time, the more intense is the attractive force. The lines of equal magnetic force, though not identical with are very similar to those of equal inclination.

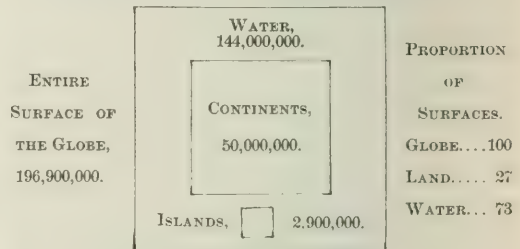
VIII. The Surface of the Earth.—The surface of the E., as stated before, measures 197,000,000 Eng. sq. m. Nearly $\frac{3}{4}$ of it are covered by the waters of the sea, $\frac{1}{4}$ only of the solid crust rising above them. Both dry land and water are surrounded by the atmosphere as by a common garment.

The solid land, the liquid surface, and their gaseous envelope are the 3 geographical elements which, under the influence of the sun, support life, vegetable and animal, and the mutual play of which it is the province of phys. geog. to consider. As the extent and forms of the land-masses and oceans, and their relative situation, deeply modify the nature of the climate and regulate the distribution of life, the study of their gen. arrangement is of primary importance.

General Arrangement of Land and Water.—The prin. facts in this respect are the following:

1. The solid land is not gathered together in a single large mass, nor is it uniformly scattered over the sea in fragments of about equal size, but forms a few large bodies, called continents, and a multitude of much smaller fragments, called islands, which surround the coasts of the continents and dot the broad expanse of the oceans. This peculiar division into individual bodies favors diversity of climate and richness of development in the domain of life. The relative amount of land and water on the surface of the globe is made clear to the eye in the following diagram, in which the large square is the surface of the globe, the inner squares the area of the continents and islands, and the surrounding area the water-surface. The figures indicate the areas in Eng. sq. m.:

FIG. 1. Relative Area of Land and Water, in Eng. sq. m.



2. Looking on the artificial globe from above, we see the masses of land crowded around the N. pole to about the 70^{th} degree of lat., and from there extending toward the S. pole in 3 directions, dividing into 3 bands of land, which taper as they advance, and terminate in 3 points—S. Amer., Afr., and Australia, far away from the Antarctic pole. Looking on the globe from the opposite side, we see the broad sea surrounding the S. pole, and sending 3 great arms between the bands of land, the Pacific, Atlantic, and Indian oceans. The N. pole might be called the *continental*, the S. pole the *oceanic* pole.

3. We observe, further, that each of these main bands of land is cut transversely in two by a region of inland seas and broken lands, isthmuses, peninsulas, and islands; the Gulf of Mex. and the Caribbean Sea, with the great isthmus of Central Amer. and the Antilles, separating as well as uniting N. and S. Amer.; the Mediterranean Sea, with its peninsulas and islands, lying between Europe and Afr.; and the Malayan Archipelago, with its lines of islands and land-locked seas, between Asia and Australia. These regions are parts of a broad transverse band, whose position can be traced from Bering's Strait as a centre, with a meridian arc of 80° as a radius, and which we would call the *central zone of fracture*. This disposition is shown in the accom-

FIG. 2. Radiating Arrangement of the Land Masses.



praying maps, in which the zone of fracture is marked by a circle passing through the middle of it, and whose centre is on the Arctic circle in Bering's Strait.

4. As the lands are nearer the N. pole, and expand to the N. while they taper to the S., the N. hemisphere contains nearly 3 times as much land as the S. hemisphere, in which water correspondingly predominates.

5. As there are 2 pairs and 4 continents in the E. hemisphere, and only 1 pair and 2 continents in the W., the land surface is double in the E. and the water surface greater in the W. The first may be called the *continental*, the second the *maritime* hemisphere.

6. As the lands are crowded on the N. and E. sides of our planet, the N. E. hemisphere contains more land and the S. W. hemisphere more water than any other we can devise. They are therefore contrasted by the celebrated Carl Ritter as the *Land and Water Hemispheres*. In the land hemisphere are gathered together the largest parts of all the great continents, making over $\frac{2}{3}$ of all the land, and occupying only a little less than $\frac{1}{2}$ of the surface. In the water hemisphere, Australia, the smallest of the continents, stands alone, with only the S. points of Asia and S. Amer., making less than $\frac{1}{7}$ of the land, and leaving $\frac{12}{13}$ of the surface to the water. The centre of the land hemisphere is about London; that of the water hemisphere at some point in the ocean S. of New Zealand.

7. The central zone of fracture divides the land masses into 3 N. and 3 S. continents, which form 2 groups of a very different nature, the N. continents being mostly situated in the temperate and the S. in the tropical regions. The relative extent of the various groups just mentioned are here tabulated for convenient reference, and the areas given in Eng. sq. m.:

FIG. 3. The Areas of Continents compared, in Eng. sq. m.

	EUROPE, 3,785,800.	
N. AMERICA, 8,892,000.		ASIA, 17,317,900.
	AFRICA, 11,556,700.	
S. AMERICA, 6,957,500.		AUSTRALIA, 3,425,200.

Relative amount of Land and Water in each hemisphere, in Eng. sq. m.

	Land.	Water.	Total.
The earth.....	52,900,000	144,000,000	196,900,000
N. hemisphere.....	38,780,000	59,670,000	98,450,000
S. hemisphere.....	13,965,000	84,485,000	98,450,000
E. hemisphere.....	36,100,000	62,350,000	98,450,000
W. hemisphere.....	15,900,000	82,550,000	98,450,000
Land hemisphere.....	45,000,000	53,450,000	98,450,000
Water hemisphere.....	7,000,000	91,450,000	98,450,000

The general distribution of land and water, and the extent and relative position of the great land masses among themselves, are of the utmost importance. The action and reaction of land and water upon each other greatly modify the distribution of heat and moisture, due to the general laws arising, as we shall see, from the spherical form of the globe. Land absorbs and radiates heat more readily than water, and thus causes extreme temperatures, which never occur on the surface of the ocean. Similar extremes of moisture and dryness are found only on the continents. As heat and moisture essentially regulate the development of organic life, the final character and value of each part of the globe, in this respect, are determined by the size, form, and grouping of the bodies of land in the midst of the oceans. We now turn our attention to the specific forms of the continents and oceans, on which so much depends.

IX. *Land and its Configuration.*—In the emerged portions of the earth's crust, continents and islands, we must notice the *horizontal forms*, or the line of contact of land and water as shown in maps, and the *vertical forms*, the elevations and depressions, the mts. and plains, or the forms of relief.

The *Horizontal Forms*.—Though the general form of all continents approximates that of a triangle, the special outlines of their coasts offer striking differences. With a map of the world before us, it is easy to perceive, at a glance, how much the continents differ in this respect. The outlines of N. continents, especially of Europe and Asia, are varied by innumerable projecting peninsulas, deep bays, gulfs, and border seas, while the S. continents have but simple outlines, without indentations of any note. It is evident that many indentations considerably increase the length of the coast-line, compared with the total area of the continent; while in continents without indentations the coast-line is relatively shorter. The following table indicates the amount of indentation in each of the 6 continents. The areas do not include the islands.

Area and length of coast-line in Eng. miles.

	Area.	Coast-line (m.).
Europe.....	3,579,000	19,800
Asia.....	16,229,000	35,500
N. America.....	7,736,400	27,700
S. America.....	6,894,400	15,700
Africa.....	11,306,800	16,200
Australia.....	2,984,500	8,700

The table shows that Europe has 4000 m. of coast more than Afr., which is 3 times larger; and that N. Amer., which is only little larger than S. Amer., has 12,000 m. more of coast. It is a fact full of meaning, that the indented, well articulated continents are also, and have always been, the abode of the most civilized nations. The unindented ones,

shut up in themselves, and less accessible from without, have played no important part in the drama of history. We must remember, however, that the variety of contours is but the expression of a more complicated inner structure, which, together with the climatic situation of the N. continents in the temperate regions of our globe, has a large share in this remarkable result.

Vertical Forms, or Relief.—The configuration of their surface, as diversified by plains, highlands, mts., and valleys, constitutes the *relief* of the continents, the characteristic features of which reveal their internal structure. The elevation of a place above the level of the sea is usually reckoned from the level of the sea as a common base, and its height above the ocean is called its *absolute height* or *altitude*. The elevation above any other higher plane, as, for example, that of a mt. above its base and the surrounding country, is the *relative height*. Though the loftiest mts. of the globe, compared with the diameter of the earth, are but as grains of sand on a globe of several ft. in diameter, this element of altitude acts so powerfully on climate and organic life that it is of primary importance. An elevation of 350 ft. is sufficient to diminish the mean temperature of a place by 1° F.; that is to say, the effect is the same as if the place were situated 70 m. farther N. A few thousand ft. of height change entirely the aspect and usefulness of a country. It is, again, the relief which controls the drainage of the continents, directs the course of the flowing waters, and shapes the river-basins. Although the forms of relief are infinitely varied, we may refer them to 2 great classes: 1. The elevations in mass and by great surfaces, which are called plains or lowlands when they are only a little elevated above the level of the ocean, and plateaus or table-lands when their elevation is more considerable and presents a solid platform, a basis of great thickness. 2. The linear elevations or chains of mts., which are distributed on the borders of the plains and table-lands, or more rarely, scattered in isolated groups. To the mt.-chains the valleys correspond, as the low plains to the plateaus.

Plains and Lowlands.—The lowlands and plains occupy nearly $\frac{1}{2}$ of the surface of the continents. They are most extensive and unbroken on the Arctic slopes of the 3 continents of the N., and on the E. or Atlantic side of the New World. The great Siberian plains extend from the N. E. part of Asia to the Ural Mts. and the Caspian Sea, and continue through Rus. and N. Ger. to the low land of Hol. In N. Amer. we find extensive lowlands marked by the valley of the Mackenzie River and the plains of the Miss. Valley. In S. Amer. the llanos or plains of the Orinoco, the selvas or plains of the Amazon, the pampas or plains of the La Plata basin, form an uninterrupted series of lowlands which continue through the Patagonian plains to the extremity of the continent, along a line of 3500 m. We may mention, again, among the large plains of the world, the interior of the Australian continent. The historical plains of Chi., Hindostan, and the Euphrates in Asia, celebrated and useful as they always have been, are smaller and of a more local character. The nature of the surface in the lowlands is extremely variable. The vast alluvial plains, almost perfectly level, which are formed along the great streams and in the deltas at their mouths, correspond best with the idea of a low plain. Such are the plains of the delta of the Miss., including the flat bottom, from 30 to 80 m., comprised between the bluffs of the river; the plains of the Amazon; those of the Orinoco and La Plata; the plains of the lower Ganges and Brahmapootra; the delta of the Nile; the plain of Lombardy, and others of less note. In all these the view stretches unobstructed, as on the broad ocean, without meeting an elevation deserving the name of a hill. Other plains, like those of N. Ger., the Caspian Sea, and a part of the Siberian plains, are the sandy bottom of an anc. ocean, and offer slight inequalities incident to local accumulation, of sand drifted by the currents, or to some other accidental cause. Others, again, are undulating, like many of the vast treeless plains which cover most of the W. portion of the Miss. basin, or like the E. Siberian plain, are diversified by numerous hills. The nature of their surface is not less varied. In the Siberian plains large tracts called tundra are endless frozen swamps full of mosses and lichens, while the hilly parts are covered with forests. To the S. W. stretch immense grassy steppes, in which roam the nomadic Kirgheez. Salt sandy plains surround the Caspian Sea. Dense forests cover Central Rus., open treeless but fertile prairies its more S. plains. In N. Amer. the wet, alluvial plain of the Miss. delta, the open and fertile prairies of the upper Miss., the barren and, in part, salt plains of the far W., are very distinct types, with a value to man not less different. In S. Amer. the llanos of the Orinoco, a burnt waste $\frac{1}{2}$ the yr., a rich pasture the other half; the plains of the Amazon, covered with a luxuriant forest of over a million of sq. m.; and the treeless pampas, with their tall grass and forests of thistles, are all forms which exhibit the endless variety of nature. The low plains may be counted among the most valuable portions of our globe. There the waters, rushing down the slopes of the continents, meet, and bringing with them the spoils of the uplands, accumulate the rich alluvial soil on which at all times men have gathered by millions. There civilization began and developed, and an inexhaustible fertility supplied all the wants of the full grown nations. Chi., India, Babylonia, and Egypt had their heart and centre in the alluvial plains, fertilized by the mighty rivers which traversed them. The altitude of these useful basins is remarkably small. The central part of each of those just mentioned does not average 500 ft. above the sea-level. The Miss. at St. Louis, 1000 m. from the sea, is hardly 400 ft. above it. The Amazon, at a similar distance inland, does not reach 250 ft. of altitude. The Siberian plains, those of the Ganges, Euphrates, and the valley of the Nile, have all altitudes of the same order. It would require, therefore, but a slight depression of the continents to cover all these rich countries with the waters of the ocean.

Plateaus and Highlands.—The name of plateau is usually applied to elevations in mass, or surface elevations, the absolute height of which exceeds 1000 ft. Plateaus or tablelands are swelled portions of the continents, often raised to a great height between 2 chains of mts., which form their margin, as the plateau of the Great Amer. Basin between the chains of the Rocky Mts. and the Sierra Nev., and that of Tibet between the snowy chains of the Himalaya and Kuen-Lun. Or they descend by a series of terraces to the sea, as the plateau of Mex.; or, again, slope gradually into the lowlands, as the great plains of the far W. in N. Amer., which from an altitude of 5000 or 6000 ft. at the foot of the Rocky Mts., pass by imperceptible steps into the centre of the Miss. basin. Though the name plateau rather implies a flat surface, it may also be hilly, or even mountainous, but in all cases the lowest part of it still remains thousands of ft. above the ocean. If no well defined limit can be given at which a rising surface begins to deserve the name of plateau, striking differences in the climate and the vegetable and animal life distinguish the table-lands as one of the main types of geographical forms. The plateaus most remarkable for their elevation are the elongated, valley-like highlands situated between the 2 chains of the Andes in S. Amer., which have an altitude of from 10,000 to 13,000 ft., and those of Tibet between the Himalaya and the Kuen-Lun, which average from 10,000 to 16,000 ft. These may be called plateaus of the first order. The plateaus of a second order, though less elevated, averaging from 4000 to 7000 ft., are the most extensive, such as those of E. Turkestan and Mongolia in Central Asia, of Iran in W. Asia, the vast plateau which extends over all the S. half of Afr. and Abyssinia, the long and broad swell which fills the W. half of N. Amer. with a continuous mass of highlands from Alaska to Mex. Plateaus of a third order, with from 2000 to 3000 ft. altitude, occupy the large peninsulas of Deccan in India, of Ar. Asia Minor, and Sp. The central part of Fr., Switz., and Bavaria, at the N. foot of the Alps, and Transylvania, are plateaus of the same order. The plateaus, together with accompanying mt.-chains, form the backbone or kernel of almost every continent, determining its gen. shape, and to a great extent its drainage and water-courses. But

they are in nearly all the least fertile and useful portions of the surface.

Mountains and Valleys.—Unlike the broad, elevated surfaces just described, the mts. rise in long and comparatively narrow lines or ridges, the tops of which are often deeply indented, offering to the eye a series of peaks apparently detached from each other. Each peak being often called a mt., and receiving a special name, the appearance suggests for such a structure the usual term of a *chain* of mts.

A mt.-chain, therefore, is not to be considered as a necklace of isolated mts., touching each other only by their base, but rather as a solid prism, with a broad base and 2 opposite slopes, of which the upper edge is either nearly even, as in the middle Appalachian chains in Pa., or indented, as in the Rocky Mts. and the Alps. These indentations, however, even in extreme cases, as in the Alps, do not reach lower than half the height, leaving the larger part an unbroken, continuous mass.

The top of the chain from which the waters flow on opposite sides is the *crest*, and the notches between the peaks are the *passes*, from which usually descend transverse valleys, like deep furrows along the slopes. The mt.-ridges are seldom isolated, but usually united into *systems of mts.*, composed of a large number of more or less parallel chains with their intervening valleys. The Alleghanies, the Alps, and the Andes are such systems, and not simple chains.

Formation of Mountains.—Geol. demonstrates that the mt.-chains are mostly formed by the uplifting of the layers of rock which compose the earth's crust. (See GEOLOGY.) These rocks having been deposited at the bottom of the ocean, as is proved by their texture and the abundant marine-shells which they contain, were originally in a horizontal position, and are still so in the plains at the foot of the mts. In the mt.-chains, however, the same are found in all degrees of inclination, up to a vertical position, thus testifying that they have been disturbed since their materials were produced. Indeed, most of the mt.-chains seem to have been produced by tremendous lateral compressions in the crust of the earth, which caused either a series of long folds, as in the Appalachians, or, when the action was more

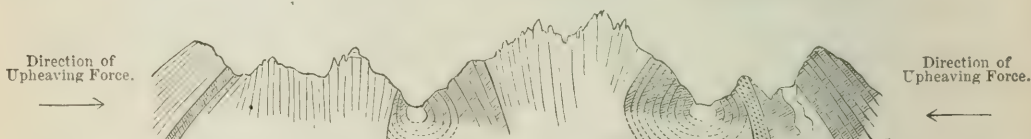
FIG. 4. Chain of Mountains by Folds.
THE JURA. TRANSVERSE SECTION.



violent, deep fissures, whose upturned edges rose into high ridges, as in the Rocky and Sierra Nevada Mts., the broken strata forming ragged peaks. There are, accordingly, 2 main types of mt.-chains, very distinct from each other. One we call *mts. by folds*, which are generally of moderate elevation; and the other, *mts. by fractures*, to which belong the highest of the globe. The Appalachian system in N. Amer. and the Jura Mts. in Switz. are examples of the first; the Rocky Mts., the Alps, and the Himalayas, of the second.

In the Appalachian and the Jura the mts. are curved into arches, either entire or broken on the top, forming a system of long, straight parallel ridges of about equal height, with intervening trough-like valleys, justifying a comparison to the folds of a garment. The crest of the ridges, seen at the horizon, appears like a uniform unindented line without sharp peaks or deep passes. The main valleys are longitudinal, the transverse valleys being few and unimportant. Here and there, however, deep gaps cut the chains transversely

FIG. 5. Chain of Mountains by Fracture.
THE ALPS. MONT BLANC. TRANSVERSE SECTION.

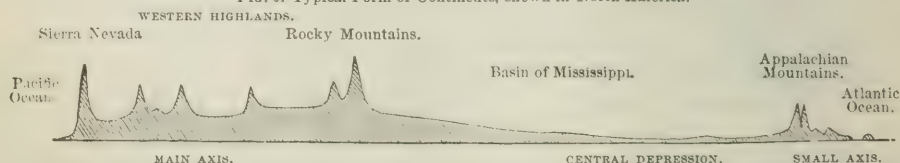


to their base, allowing the rivers to escape from one valley to the other. In systems by fracture, like the Rocky Mts. and the Alps, there is one main central with lower subordinate chains. The parallel chains and the longitudinal valleys which separate them have not the same regularity. The crests are deeply indented, and cut down, to $\frac{1}{2}$ or $\frac{1}{3}$ their height, into isolated mt.-peaks and passes, presenting to the eye the appearance of a saw, or in Sp. *sierra*, in Port. *serra*, which names are applied to mt.-chains of this description. The longitudinal valleys, though sometimes of considerable size, are few, the transverse valleys numerous, with bald picturesque outlines and a series of fertile basins united by deep gorges and defiles. These systems of mts. are not to be conceived as one single chain; they are large mountainous zones, several hundred m. broad, whose gen. slopes, therefore, average but a few degrees. It is the peculiar combination of mt.-systems with plateaus and plains which

constitutes the distinctive forms of relief of each continent, and also determines its gen. contours.

General Laws of Relief.—The examination of the gen. vertical forms of the masses of dry land leads to a recognition of certain great laws of relief which apply to every continent, or to certain groups of continents, or to the whole E. 1st. Each continent has on one side a large system of highlands, plateaus, and mt.-chains, which constitutes the prin. feature of its structure, and may be called its main axis. On the other side, along the opposite shore, is found a similar system, but diminutive in all its dimensions, extending over only a part of the continent, and forming a secondary axis. Between the 2 gen. depression or low plain fills the interior. The direction of these two fundamental lines of highlands is not parallel, but converging, which gives to all continents the triangular form mentioned in the article CONTINENT (which see).

FIG. 6. Typical Form of Continents, shown in North America.



A large and high swell on one side, a smaller and lower one converging on the other, and a depression between the two, is the *typical* form of a continent. An island, however large, is never more than a part of it.

This typical structure can be traced in all continents, but in none more clearly than in N. Amer. Here the main axis is formed by the large swell of the W. highlands, stretching from the N. W. to the S. E., without interruption, for 4500 m., steadily growing in height from the shores of Alaska to

the S. end of Mex., and filling from $\frac{1}{4}$ to $\frac{1}{2}$ of the width of the continent. The plateaus contained between the border chains of the Sierra Nev. and the Rocky Mts. average full 4000 ft., and reach in Mex. double that altitude, the high peaks of the mt.-ranges reaching from 12,000 to 15,000 ft. The secondary axis is the Appalachian system, extending from N. S. to Ala., in a S. W. direction, for 1,500 m. Its average width is hardly $\frac{1}{4}$, and its elevation, plateaus, and peaks not $\frac{1}{2}$ that of the W. highlands; but still it determines the

trend of the Atlantic coast. Between the two axes the lowlands of Brit. Amer. and the vast plains of the Miss. Basin stretch for 3000 m. from the Arctic shores to the Gulf of Mex., hardly interrupted by a slight central swell of 1000 or 1600 ft. in the region of the sources of the Miss.

3d. From this peculiar structure of the continents results the fact that, in all, the line of greatest elevation is placed out of the centre, on one of the sides. Hence arise 2 slopes, unequal in length and inclination. In N. Amer., for example, the Rocky Mts., which divide the Pacific and Atlantic slopes, are 800 m. from the Pacific shore and over 2000 m. from the Atlantic, the W. slope being less than $\frac{1}{4}$ of the E. In S. Amer. the inequality is still greater. The Amazon takes its rise hardly more than 100 m. from the Pacific, and its waters reach the Atlantic 300 m. farther E., making the E. slope 20 times longer than the W. This peculiarity controls the drainage and the arrangement of the river-systems in each continent.

3d. All the prominent plateaus and mt.-systems of the globe are found to stretch chiefly in 2 prin. directions. They extend either from E. to W., with a slight deviation toward the N., on a line nearly parallel to the ecliptic, or else from N. to S., slightly deviating to the E. or W., and thus on a line at right angles with the first. The direction E. and W. predominates in the Old World, and controls the high ranges and plateaus which form the main body of the continents of Asia, Europe, and N. Afr. The direction N. and S. predominates in the Amer. continents, and gives them the great elongation toward the S. which is characteristic of the New World. It is also found in S. Afr. and Australia.

4th. The mt.-ranges and plateaus in the New World all belong to the N.-and-S. system, the transverse being almost absent; hence the great simplicity of structure and of outlines which characterizes the Amer. continent. In Asia and Europe the 2 intersect each other. Though the main body is due to the chains and plateaus of the E.-and-W. system, it is crossed at right angles by numerous chains of the second system, which greatly diversify the surface, divide it into distinct regions, and, projecting far into the sea, form the beautiful peninsulas which so much vary their contours and enrich these continents. The Ural Mts., the chains which fill the peninsulas of Kamtchatka, Corea, and of Indo-Chi., the Ghauts of India, the mts. of the Hellenic peninsula, the Apennines, the Scandinavian Alps, all belong to the N.-and-S. system. The same can be said of the S. half of Afr. and Australia.

5th. The altitude of both the surface elevations and the mt.-peaks gradually increases along the axes of the continents to a maximum which is placed beyond the centre, toward one end, from which the heights rapidly decrease. The following table of altitudes will exhibit this law, and also show that the two Americas form together one system of increasing heights from N. to S., interrupted only by the zone of broken and sunken lands in Central Amer., and that Europe and Asia form another, increasing from W. to E. Volcanoes, being but exceptions in the gen. relief, are omitted, unless they owe their altitude to the elevation of the base on which they stand.

NEW WORLD.

North America—Western Highlands.

Surface Elevations.	Eng. ft.	Mountains.	Eng. ft.
Plains of Alaska	800	N. Rocky Mts.	4,000
Pelly Banks, Upper Yukon	1,400	Mt. Murchison, Brit. Colum.	
Central Plateau of Brit. Co.			14,431
Jumbia	2,000	Mt. Hood, Or.	11,225
Great Plains of the Columbia	2,000	Mt. Shasta, Cal.	14,440
Great Basin, Ut., average	4,500	Fremont Peak, Wyo. Terr.	13,576
Great Salt Lake	4,236	Gray's Peak, Col. Terr.	14,290
Colorado Plateau	6,000	Pike's Peak, Col. Terr.	14,000
Plateau of Mex.	8,000	Mt. Whitney, Sierra Nev.	15,000
City of Mex.	7,473	Popeocatepetl, Mex.	15,754
City of Toluca	8,818	Orizaba	15,759

South America—Andes.

Surface Elevations.	Eng. ft.	Mountains.	Eng. ft.
City of Bogotá, New Granada	8,655	Tolima, New Granada	15,360
City of Quito, Ecuador	9,520	Cayambe, Ecuador	19,386
City of Cuzco, Peru	11,500	Chimborazo	21,414
Lake Titicaca, Bolivia	12,590	Ilhampti, or Nevada de So.	23,000
City of La Paz	12,200	Ilhampti, Bolivia	21,155
City of Potosí	13,390	Ilhampti	21,155
Plateau of Catamarca, Argentine Republic	12,900	Aconcagua, Chili	22,422
Valley of Tenuyan, Andes of Chili	7,500	Yanteles, Patagonia	8,030
		Sarmiento, Terra del Fuego	6,910

Thus the highest lands of the New World, surface elevations, and mts. are found in the plateau of Bolivia, around Lake Titicaca, and the heights steadily increase from the shores of the Arctic Ocean to that point for 7500 m., while the line of descent to the S. Ocean is only 2500 m.

The same law is shown in the smaller axes, along the Atlantic in both continents, with some modification in the Appalachian system. Here the lowest part is a little above the middle point, about New York and N. J. Thence the heights increase toward the N. and the S., but more gradually and to a greater altitude in the S. half, as in following table:

Appalachian Mountains—N. half, from S. to N.

Eastern Chain.	Eng. ft.	Green Mountains.	Eng. ft.
Mt. Wachusett, Mass.	2,018	North Beacon, Highlands	1,471
Grand Monadnock, N. H.	3,718	Greylock, Mass.	3,505
Moosilloc, N. H.	4,790	Killington Peak, Vt.	4,251
Mt. Lafayette, W. Mts., N. H.	5,290	Mansfield Mt.	4,389
Mt. Washington	6,288	Mt. Marcy, Adirondack Mts.	5,370

S. half, from N. to S.

The Great Central Valley.	Eng. ft.	Mountains.	Eng. ft.
Easton, Pa.	155	Blue Ridge, N. J.	1,500
Harrisburg, Pa.	328	Peaks of Otter, Va.	3,993
Salom, Upper Route	1,014	White Top, Va.	4,590
Mt. Airy, Va.	2,595	Black Dome, or Mitchell's	
Bristol, Va.	1,678	High Peak, N. C.	6,707
Knoxville, Tenn.	900	Chingman Mt., N. C.	6,500
		Great Frog Mt., Tenn.	4,256

In S. Amer. the Atlantic border of the Brazilian highlands rises to an altitude of about 3000 ft. in the N., 4000 in the centre, and culminates with 9000 in the Serra Mantiqueira, S. W. of Rio de Janeiro.

OLD WORLD.

Europe and Asia, from W. to E.

Surface Elevations.	Eng. ft.	Mountains.	Eng. ft.
Plateau of Spain	2,300	Pyrenees, Pic Anethou	11,163
" " Bavaria	1,800	Alps, Mt. Blanc	15,781
" " Asia Minor	3,000	Caucasus, Mt. Elborz	18,572
" " Armenia	4,500	Hindoo-Koosh Chain	20,000
" " West Iran, Persia	4,000	Karakorum Chain, Mt. Dap.	28,373
" " East Iran, Afghani-	8000		
stan	6,000	Dhawalagiri, Himalaya	28,226
" " W. Tibet	15,000	Gaurisankar, or Mt. Everest	29,002
" " E. Tibet	11,000	Chamalaizi, Bhootan	23,944

In Afr. the course of the Nile marks a long slope running southward from the Mediterranean up to the highlands of Abyssinia, 6000 to 8000 ft., with mts. of 16,000 ft.; and far beyond on the same line, under the equatorial sun, the snowy peaks of Kilimandjaro rise to 19,000 ft.

In Australia the same tendency is observed; the lands rise toward the S. E. corner, and culminate in the Australian Alps, where Mt. Hotham exceeds 7000 ft.

6th. On the whole, the reliefs begin with the vast low plains around the polar circle, and go on increasing from the shores of the Arctic Ocean toward the tropical regions. The highest elevations, however, are not found at the equator, but N. of the Tropic of Cancer in the Old World, in the Himalayas, 28° N. lat.; and N. of the Tropic of Capricorn in the New World, in the Andes of Bolivia, 16° S. lat. The effect of this law is to temper the burning heat of the tropical regions, and give them a variety of climate which seems not to belong to these countries. If this order were reversed, and the elevation of land went on increasing toward the N., the now most civilized part of the globe would become a frozen and uninhabited desert.

7th. The distribution of low plains, plateaus, and mts. is far from being uniform. Not only has each continent a different share, but also one or the other form of relief so predominates as to give it a special character, which has the greatest influence upon its climate and functions, both in nature and in man's hist. The large, fertile basins of the Miss. and Amazon are the most valuable and characteristic parts of the Amer. continents; they are the continents of low plains. Afr. has no low plain or mt.-chain of any great extent, but is filled with vast table-lands; it is the continent of plateaus. Europe, in its W. and most important half, is but a network of mt.-chains without high plateaus, and is the continent of mts. Asia, as the common root of all, has all the forms of relief on the grandest scale and in equal proportion; the most extensive plains in the N., the largest plateaus in its centre, the highest mts. on its border, with the greatest variety in their combination. It is the master continent, the full type of all the others.

8th. All that has just been said of the gen. reliefs of the globe is summed up in a single great fact which can be thus expressed: All the long, gentle slopes descend toward the Atlantic and its prolongation, the Arctic Ocean, while all short and rapid slopes are directed toward the Pacific and its dependant, the Indian Ocean.

Formation of the Relief.—These gen. laws which regulate the inequalities of our globe seem to point to a common geological cause, which may perhaps be found in the gradual cooling of our planet. We may conceive that owing to the contraction of the semi-fluid interior the hard crust, having become too large for its contents, shrivelled. Vast portions of its surface subsided, and formed the basins of the oceans where the waters are gathered together. Between these sinking areas the other portions of the crust were forced up in large swells, wrinkled into folds or broken into high mt.-ranges, and formed between the Pacific and the Atlantic the Amer. continents on one side, Europe and Asia on the other; between the Indian Ocean and the Atlantic, S. Afr.; between the same and the Pacific, Australia. This view is confirmed by the fact, pertinently pointed out by Prof. Dana, that the height of the border mts. and plateaus is in proportion to the width of the oceans which bathe their feet. The Pacific, which is the largest ocean, having the greatest pushing force, has on its border the high chains of the Andes and Sierra Nev., and the short slopes; while the Atlantic has the Brazilian and the Appalachian Mts., and the long slopes; and a similar arrangement is found in the other continents. The interior, more remote from the seat of the upheaving force, remains depressed. The cause of the typical structure of all continents above described therefore becomes evident. Thus the almost infinite variety of the inequalities of the E's surface is actually subject to a gen. law. Here, as elsewhere, everything has been made with order and measure, and no doubt with regard to a final aim, which it is for science to discover by patient and intelligent research.

Islands.—The innumerable smaller bodies of land called islands form only $\frac{1}{17}$ of the total surface of the dry land. They are of 2 classes—the *continental* and the *pelagic* (or oceanic) islands. The continental islands are mere fragments of the continental structures, situated by the side of them or not far away, as the Brit. Isles; or in lines parallel to their coasts, as the Japanese and Australian islands and the W. I.; or forming a continuation into the ocean of their chains of mts., only partially submerged, as the long line of the Sunda Islands. They have the same kind of rocks and of mt.-forms, the same variety of plants and large animals, as the neighboring coasts of the continents to which they belong. They vary in size, from a mere isolated rock to such large bodies as the Brit. Isles, the Japanese Islands, Madagascar, Sumatra, and the most extensive of all (if we exclude Greenland), Papua, whose area exceeds 300,000 sq. m. The pelagic (or oceanic) islands are scattered, far away from the continents, in the midst of the oceans to which

they belong. Their size is always small. Though sometimes found in lines, they are oftener arranged in groups. Navigators distinguish among them 2 classes, the *high* and the *low* islands, which are found actually to correspond to 2 natural groups, distinct in their forms, geological nature, and mode of growth. The high islands are volcanic cones with craters, many still active. The low islands are all of a coralline nature, and are the tops of submarine coral reefs.

Volcanic Islands.—It is a remarkable geological fact that the rocks which make up the body of the continents, such as sandstones, slate, granite, and the various metamorphic rocks, are entirely absent in the oceanic islands. We cannot, therefore, expect here the variety of mt.-forms, hills, and valleys which diversifies the surface of the continents. The volcanic islands being the tops of volcanic cones rising above the surface of the ocean, the more or less circular form of their outlines, their elevation and rapid slopes, and their moderate size are easily understood. Some hardly reach the surface, their crater being filled by the water of the sea, as in Barren Island; others rise to alpine heights, as the peaks of Hawaii in the Sandwich Islands, reaching nearly 14,000 ft., the Pico de Teyde, over 12,000 ft., in the Canary Islands, and Tahiti, over 7000. Sometimes 2 or more volcanoes clustered together form a single island, which may then have a larger size and more irregular outlines.

Coral Islands and their Formation.—The coral islands are among the most striking phenomena of the tropical seas. (For description, see CORAL ISLANDS.)

IX. Water.—Water is the second great geographical element to be considered. It is the universal solvent which, by disintegrating and rearranging the materials of the E.'s crust, was in geological times the principal agent in forming what is now the solid land. It is equally indispensable in fertilizing the soil and carrying on the process of animal and vegetable life. The common reservoir of water is the sea, which, as we have seen, covers nearly $\frac{3}{4}$ of the surface of the globe. By slow but constant evaporation it is carried into the atmosphere in the shape of invisible vapors, which, borne by the winds over the continents, are condensed into clouds, and fall in beneficent rains. A portion of the rain-water evaporates again in the atmosphere, another sinks into the ground, through which it percolates, and reappears at the surface in the form of springs, or fills the quiet sheets of water which feed the Artesian wells. The remainder flows over the surface in riviulets and brooks, which unite, and, receiving new accessions at every step, form the mighty rivers which carry the surplus water back to the ocean from whence it came. Thus is produced the vast network of streams which, like the arteries of the human system, convey the life-giving element to all parts of the globe. Surface depressions filled by streams or springs form the numerous lakes spread over the continents. In this ceaseless circulation we have to consider the oceanic, the atmospheric, and the inland waters (for which see OCEAN, RIVERS, LAKE, RAINS).

Earth-Closet, a form of close-stool, designed to take the place, to some extent, of the water-closet, and frequently made portable for convenience. It is well known that dry soils have wonderful disinfecting powers, owing to their property of absorbing ammonia and other gases. It is upon this absorbent quality that the usefulness of manures, when applied to soil, depends. Advantage is taken of this absorbent in the construction of the E.-C. The feces are covered by a small quantity of thoroughly dried soil or peat, which completely absorbs all unpleasant and injurious vapors, and after a time the mass becomes perfectly inodorous. It is found that the same earth may, if necessary, be used over and over again, and that finally when it has become thoroughly charged with excrementitious principles, it is one of the best forms of concentrated fertilizing material known. Considering the increasing value of commercial manures, and the serious prevalence in country as well as city, and in winter as well as in summer, of diseases caused by defective sewerage, it may be readily seen that the E.-C. question may become one of much importance. (See WARREN, *Earth-Closets and Earth-Severage*.)

Earth Currents. See MAGNETISM.

Earth Nut, a popular name given to the tubers or subterranean stems of several plants—viz. the *Buntum flexuosum*, an umbelliferous plant which grows in Europe; the *Cyperus rotundus*, a native of Egypt; and the *Arachis hypogea*, a leguminous plant often called *peanut*. The tubers of the *Buntum*, which resemble chestnuts, and are sometimes called *earth chestnuts*, are extensively used for food.

Earthquakes. These movements of the earth's crust are of all degrees of intensity, from the almost imperceptible vibration to the most violent convulsions, which change the face of the ground, and reduce the most substantial works of human handicraft to a mass of ruins. The appalling nature of these commotions, and the phenomena attending them, were fully exhibited in the oft-described E. at Lisbon, Port., on the morning of Nov. 1, 1755, the great festival of All Saints. The chs. of the city were full to overflowing, when at 40 minutes after 9 a rumbling noise was heard like distant thunder, which gradually increased until it resembled the sound of heavy artill. A faint shock was followed by a more terrific one, which levelled to the ground a greater part of the city, and in the space of 6 minutes 30,000 persons were buried under the ruins of the chs. and other edifices, and 30,000 more perished before the end of the catastrophe. The ground seemed to undulate like the waves of the sea, the surrounding mts. of Arrabida and Estrella were seen rocking violently on their base, and broad chasms were opened in the earth and shut again. More than 3000 persons had taken refuge on a broad marble quay just constructed on the banks of the Tagus, when the sea, which had before retreated, came back with fury in a wave 40 ft. high, and swallowed up that unfortunate multitude, of which not one was ever seen again; then, rushing against the doomed city, continued its work of devastation. These

oscillations of the sea were repeated several times, and on the spot occupied by that massive structure several hundred ft. of water were found. After this great disaster the commotion of the ground lasted for several weeks, and a very severe shock was experienced in Dec. One of the notable features of the E. of Lisbon is the great extent of country over which it was felt. On land it was not confined to the Sp. Peninsula, but shook all W. Europe, pervading Fr., N. It., Switz., Ger., the Brit. Isles, reaching as far as Scandinavia. On the N. coast of Afr. nearly all the cities in Morocco were destroyed. The ocean was hardly less disturbed. An Eng. ship, the Nancy, when 100 m. W. of Cape St. Vincent, in Port., experienced a shock from below so violent that the men on the deck were thrown over a foot from the floor. Huge waves, raised by these oscillations, were hurled on the shores of the continents. In Cadiz a monstrous wave 60 ft. high was seen to come from the high sea and dash against the city. In Tangier, on the Afr. coast, the sea rose and fell 18 times, and 15 times in Funchal, on the island of Madeira. These commotions of the sea crossed even the Atlantic to the Antilles, and similar waves were observed in the harbors of New York and Boston. The movement seems to have been such that Lisbon was the centre of a system of undulations or E. waves, decreasing in violence with their distance from that centre.

Another E. is that which occurred in Calabria in the yr. 1783. Like that of Lisbon, it was a central E., but its area did not much exceed 500 sq. m. The violence of the convulsions, however, and the variety of their effects were perhaps still more remarkable. On Feb. 5, 1783, the first shock threw down, in 2 minutes, most of the houses of the numerous cities and villages in a radius of 14 m. around the city of Oppido, which seems to have been the centre of the E. The undulations were so great that tall trees, bent to the earth, were seen touching the ground with their tops alternately on each side of the wave. The surrounding mts. were all in motion. Some of them seemed to jump up and down, and the shape of their summits was permanently changed. Houses were thrown up bodily, as by the power of an exploding mine, and placed on higher ground. Deep chasms opened and shut again; others remained gaping; land-slides obstructed the rivers, the courses of which were altered, and the surface of the country changed its aspect.

Three kinds of earthquake motions are distinguished. The first is the *undulatory* or *wave-like* motion, which is the most common and the least destructive. The waves travel either in one direction, like the waves of the sea, or from a centre in somewhat concentric lines. The second kind of motion is the *vertical*, acting from beneath, as the explosion of a subterranean mine. When violent, no human structure can resist its action. This kind, as well as the first, was repeatedly exhibited in the E. of Calabria. In the catastrophe which in 1797 destroyed the city of Riobamba in the Andes of Quito, says Humboldt, many corpses of the inhabs. were thrown several hundred ft. high, on a hill beyond the brook Lican. In the terrific E. of 1868, in the cemetery of Arica, on the coast of Peru, a large number of skeletons were disinterred and spread on the surface of the earth. The third kind is what is termed the *whirling* motion, the most dangerous, but also the rarest of all. In the formidable E. of 1692 in Jamaica, the surface of the ground was so agitated and broken up that some fields planted in different crops changed places, and were found as if twisted into each other. The normal motion, however, is the wave-like, and it is possible that the other kinds are but the effect of various systems of waves intersecting each other.

The *propagation* of these undulations takes place either in a linear direction, along the mt.-chains, the undulations being then at a right angle with them, as in most of the E. of the Andes; or from a centre, forming a series of concentric waves diminishing in intensity and gradually dying out, as in the E. of Lisbon and Calabria. The first are *linear*, the second *central* E.

Velocity of the Earthquake Waves.—The velocity with which the E. waves move is variable. According to actual observations it varies from 12 to 20 m. a minute, and the experiments of Mallet, made in rocks of different nature, give nearly the same result.

Duration of Earthquakes.—The great E. hardly ever consist of a single shock, but of a series of successive shocks, some of which are of exceptional violence. These convulsions of the ground may be repeated at longer or shorter intervals during a period of several days and weeks, or even of several months and yrs. During the E. of Calabria, a careful and intelligent local observer, Dr. Pignataro, counted 949 shocks in the yr. 1783, 501 of which were of the first magnitude, and 151 in 1784, of which 90 were classified by him as of the first degree of force. Nearly 4 yrs. elapsed before these oscillations ceased entirely. After the E. which laid the beautiful city of Messina in ruins, the ground continued to be convulsed almost daily for 10 yrs. In the appalling calamity which destroyed the city of Lima and its harbor, Callao, in Peru, in Oct. 1746, the shocks were repeated every 7 or 8 minutes, and over 200 of the most violent kind were counted within 24 hours. All the phenomena above described have been repeated in the latest of the great E., that which shook the W. coast of S. Amer. and the mt.-region of the Andes from Chili to Ecuador, on a line of over 1000 m., in Aug. 1868. The flourishing city of Arica in Peru, the main harbor of commerce for Bolivia, was obliterated in a few moments. The beautiful city of Arequipa, in the Andes of Peru, was levelled to the ground, and its 50,000 inhabs. left houseless and starving in the midst of its ruins. In the Andes of Ecuador the city of Catocachi disappeared, and a lake covers the spot where it once stood. The cities of Ibarra, Ottavalla, and others were swallowed up, and not one of their 10,000 inhabs. was ever seen again. Over 300,000 people were left houseless, and the whole number of victims of that awful catastrophe is yet to be counted. The movements of the sea were not less striking. In Arica the

sea retreated from the shore, carrying with it 5 ships which were in the harbor, and returning in a high and furious wave dashed to pieces 4 of them, and carried the 5th, the U. S. steamer *Waterlee*, 2 m. inland. Similar motions were observed on the coast of Chili and of Peru, and an immense E. wave is said to have crossed the Pacific Ocean, striking in its course the Polynesian Islands, and reaching the Australian shores.

The frequency of E. is much greater than is generally supposed. Catalogues of all recorded cases, such as those carefully prepared by Perrey, Kluge, Mallet, and others, swell their number to several thousands. Indeed, the record of the last century, which, owing to the increased attention bestowed on natural events, is certainly more complete, shows that we may place E. among the regular and continuous terrestrial phenomena; for though the great catastrophes may be rare, a week, nay, a day scarcely elapses without a commotion of the ground worthy of notice taking place somewhere on the surface of the globe.

Connection with Volcanic Eruptions.—The immediate connection of E. with volcanic eruptions is evident in many instances, but these are of a special kind. On the other hand, volcanic eruptions take place without E., as in the Sandwich Islands; and even in volcanic dists. the most extensive E. bear apparently no relation to the surrounding volcanoes, while a considerable number of severe and extensive ones occur in regions far removed from any active volcano, or even deprived of all volcanic rocks. Though the 2 phenomena may have a common cause or condition, they cannot be confounded in the same class.

Connection with the State of the Atmosphere.—The popular belief is that E. are accompanied by some extraordinary condition of the atmosphere, such as a very low or high barometric pressure, profound calm or high wind, sultry and damp weather, a prolonged drought, or peculiar electrical or magnetic disturbances; all of which have been considered as warnings of the coming event. But a careful scrutiny of the cases leaves this matter at present doubtful.

Influence of the Seasons.—The number of E. seems to be greater about the time of the equinoxes, especially the Sept. equinox, than at any other. In the Molucca Islands during these periods, which are marked by the tempests accompanying the change of monsoon, the inhabs. do not dare to remain in their houses, but spend the season under tents. According to the records a greater number of E. occur in winter than in summer, which is the reverse of what is observed in volcanic eruptions.

Astronomical Influences.—By comparing 7000 observations, Perrey found that the number of E. is greater at the time of the syzygies, when the attractions of the sun and moon are combined and the moon is nearest to the earth, than at the time of the quadratures, when the moon is more distant.

The distribution of earthquakes on the surface of the globe is of paramount importance for the explanation of these mysterious phenomena. The most gen. facts in this respect are the following:

1. There is no part of the globe absolutely free from E.; the phenomenon is general.

2. There are circumscribed regions in which the surface is liable to be shaken simultaneously; such a region is an earthquake area.

3. A very significant fact, however, is that the most extensive of these areas of concussion, and those in which the E. are the most numerous and violent, are situated within the 2 great zones of broken lands described above—the border zone around the Pacific Ocean, and the central zone separating the N. from the S. continents. In the first are found the celebrated E. areas of the Andes, that of the W. coast of N. Amer., and those of Kamtchatka, Japan, and New Zealand. In the second we meet with the great Mediterranean area from Sp. to Syria, with It., Gr., Asia Minor, and N. Afr. The Ar. and Indian areas are in the same zone; and the 2 regions of the earth most convulsed by these terrific shocks, the E. areas of Central Amer. with the Antilles, and that of the E. I. Archipelago, the really classic soil of E., are situated at the intersection of the 2 zones. The analogy of this distribution with that of volcanoes is evident, but the domain of E. extends far beyond that of volcanoes. Both are most intense in their action along the great fractures of our planet, but it would be rash to infer from this fact that one is the cause of the other; they only require similar conditions for their manifestation.

Theory of Earthquakes.—E. are obviously due to various causes. Those preceding or accompanying a volcanic eruption must be, no doubt, referred to the action of the volcano; but the extensive E. disturbing areas of hundreds of thousands of m., and those which take place outside of volcanic dists., require a more gen. cause. Perhaps this may be found, which is also the opinion of Dana and Mallet, in the increasing tension produced in the earth strata by the steady contraction of our cooling planet. To this cause geol. refers the rising of mt.-chains on long fissures or folds in the hard terrestrial crust with internal cavities. The lateral pressures thus engendered, and perhaps the settling under their own weight of these vast structures, coming from time to time to a paroxysm, might perhaps explain these crackings of the ground and convulsions along the mt.-chains and in the broken parts of the earth. From the deep focus where they occur start a series of waves, which gradually reach the surface. In this view every difference of pressure, atmospheric or astronomical, from lunar and solar attraction, may have a share of influence in the phenomenon.

ARNOLD GUYOT.

Earth-shine, a reflection of the sun's light from the earth to the moon, and back to the earth again. This phenomenon is often seen when the moon is very old or very new, the outlines of the full moon being rendered visible by the reflection.

Earth-worm, the popular name of the species of Lumbricidae. These are numerous, and generally distributed.

The common E. has a succession of rings, from 100 to 200 in number, each bearing short bristles, which it uses in locomotion. The mouth is anterior, and has a lip for prehension, but no teeth. Worms are omnivorous, but partly subsist by swallowing particles of earth, which, after the digestible matter has been extracted, is voided often on the surface of the ground in small masses called *worm-casts*. These castings play an important part in the economy of nature by covering the surface with new earth.

Ear Trumpet, an instrument for the relief of defective hearing. E. T. are of a great variety of forms, but they all depend upon the same principle—that of collecting and condensing the sound-waves, and thereby intensifying the impression made upon the ear. A nice adjustment of parts is not necessary, sound being readily reflected along conical tubes, either straight or coiled.

Earwig [A.-S. *eor-wiega*, literally, "ear-beetle"], the popular name of the Forficulidae, given from the popular delusion that they have a propensity to creep into the ear.

Easement, a legal term denoting, in its most comprehensive sense, the right which the public or an individual has in the lands of another, not inconsistent with a gen. property in the latter. It is in the nature of a charge or burden upon land. It is called a *dominant right*, while the land burdened is termed the *servient estate*. E. may be mere personal rights, when they are said to be *in gross*, or they may be connected with the ownership of land. The latter only will be considered. 1. They are incorporeal. 2. They are imposed on corporeal property. 3. They confer no right to the substance of the land. 4. There must be two distinct estates—the dominant, to which the right belongs, and the servient, upon which the obligation rests. They are affirmative or negative—affirmative, when the owner of the dominant estate may do some act on the servient, and negative, when the owner of the servient estate must refrain from doing some act, otherwise lawful, on his land. The most important instances are the right of way (the right of the owner of one piece of land to pass over the land of another), of water (the right of the owner of the dominant estate to receive water from or discharge it across the servient estate), of support of the soil or of the buildings of the dominant estate by the adjacent soil or buildings of the servient estate.

E. may be extinguished by a release given by the owner of the dominant to the owner of the servient estate, or by abandonment. The failure to make use of an E. (technically called non-user for 30 yrs. is strong evidence of abandonment if the E. was acquired by prescription, although the presumption may be rebutted; but if the E. were acquired by actual grant, no length of mere non-user would operate as an abandonment. In that case there must be acts inconsistent with the existence of the E. An E. may also be extinguished by a union of the 2 estates in the same person. This is technically called "merger." T. W. DWIGHT.

Eastburn (MANTON), D. D., a P. E. bp., b. in Eng. Feb. 9, 1801. He came to New York, grad. at Columbia Coll. in 1816, was ordained in 1822, became rector of the ch. of the Ascension in New York in 1827, and bp. of Mass. in 1843. Author of *Lectures on the Epistle to the Philippians* and other works. D. Sept. 12, 1872.

East'er (Ger. *Oster*; Gr. *πάσχα*; Lat. *pas'cha*; Fr. *pâques*; etymology doubtful), the prin. festival of the Chr. yr., observed in commemoration of the resurrection of our blessed Lord. The returns of this anniversary were originally regulated, and in imitation of this early usage have always continued to be, by the calendar of Judea, in which the months were continuous with the revolutions of the moon. A mean lunation being roughly, 29½ days long, 12 lunar months, or a lunar yr., fall short of a solar yr. by about 11 days. The beginning of the Jewish yr. therefore goes backward on the natural yr. 11 days annually, requiring an intercalary month to be introduced in the 3d yr., and again in the 6th, 9th, 11th, 14th, and so on. Any anniversary regulated by such a calendar as this is consequently *movable* in reference to a calendar regulated by the sun. The Resurrection took place just after the Jewish feast of the Passover, which was held on the 14th day of Nisan, the first month of the yr.—that is to say, the 14th day of the moon, or not far from the time of full moon. The Chrs. of Jerusalem, and after them those of the Asiatic chs. generally, were accustomed to hold the feast of E. on this same day or simultaneously with the Jewish Passover. This usage was unacceptable to the Gentile chs. in It. and the W. generally, which preferred to celebrate E. on the Sunday following the 14th day of the moon; and the difference of practice in this particular led to grave dissensions between the E. and W., which were at length pacified by the agreement reached in the Council of Nicæa (A. D. 325), to make the W. usage universal. Since this early period E. has always been observed throughout the world on the Sunday following the 14th of that lunation of which this 14th day falls on the 21st of March or next later. In order to find the time of E. for any given yr., it would seem that we should calculate the exact time of the new moon in that yr. for Mar., and try whether the 14th day of that moon (the day of new moon itself being counted the *first*) would fall not earlier than the 21st, in which case the Sunday following this 14th day might be presumed to be E. But should this 14th day fall earlier than the 21st of Mar., we should conclude that the new moon of Apr. must be taken. The ecclesiastical calendar, however, is only nominally dependent on the moon in the heavens, the true moon and the calendar moon sometimes differing in their age more than 2 days. The practical reason for this is, that if the astronomical time of new moon is taken, this time will not be the same in the local times of different lons., so that a meridian may always be assigned such that the same new moon may fall on different calendar days on different sides of it. And if the calculation is very nicely made, when new moon happens exactly at midnight of Saturday or Sunday

in the middle of a large city like Lond., the E. and W. halves of the city may have their E. upon 2 very different days. The ecclesiastical moon is therefore an ideal or artificial moon, and in determining the beginning and end of each lunation no account is taken of any differences smaller than a day. In order to divest the ecclesiastical calendar as much as possible of complexity, advantage is taken of the fact discovered by Meton, an Athenian astron. in the 5th century before our era, that in a period of 19 solar yrs. the sun and the moon return almost exactly to the same relative positions which they occupied at the beginning of this period, the difference amounting to little more than the space the moon would move over in 2 hours. The calendar therefore assumes that the moons determining E. will recur in the same order every 19 yrs. throughout an entire century, and sometimes throughout 2 or 3 centuries. The E. themselves do not therefore necessarily recur on the same days of the month of Mar. or Apr. in each of these successive series of 19 yrs., but would do so if the same days of the week always corresponded to the same days of the month. This, however, is not usually the case; and as E. must be Sunday it is necessary, in order to fix definitely the date of E. in any given yr., to know both the place of the yr. in the series of 19 (or in the Metonic cycle) and also the day of the week on which the yr. began, or (what is practically the same thing) the dominical letter for the yr. Various methods have been given for finding E., but all of them commence, expressly or implicitly, with the determination of these 2 elements. The rules given by Prof. de Morgan in the *Companion to the Brit. Almanac* for 1845 occupy about a page. The formulæ of Delambre, in the first vol. of his *Hist. of Modern Astron.*, and those of Gauss, given in the first vol. of the *Theoretical and Practical Astron.* of the same writer, though concise as mathematical expressions, involve much laborious computation in their practical application. Much more simple rules than these may be found in *J.'s Univ. Cyc.*, devised by the present writer.

F. A. P. BARNARD.

East'er Island, a small island of volcanic origin in the Pacific, in lat. 27° 6' S., lon. 109° 30' W., and is 11 m. long and 4 m. wide. It rises 1200 ft. above the level of the sea, and is scantily supplied with water. It is the easternmost inhabited Polynesian island. Its people were quite recently cannibals. They have traditions of their ancestors having come from the island of Oparo, 1900 m. distant. The island has colossal statues in stone, but the natives have no account of their sculptors.

Eastern Archipelago, **The**, also called **The Malay Archipelago** and **Australasia**, comprises all those islands which lie in the N. E. part of the Indian Ocean. They are divided into 3 groups. The first group comprises the Molucca Islands, the Spice Islands, Banda, Amboina, Ternate, and the Philippines; the second consists of Sumatra, Java, and the Sunda Islands; the third comprises Borneo, Celebes, and a large number of smaller islands. The original inhabs. consisted of many tribes, but all belonged to the Malay race; there are now many Chl. At a later age the Arabs came to these islands, and Mohammedanism gained many followers. At last the Europeans came, and subjugated almost the entire archipelago. The Dut. have become masters of the greatest number of islands; the Spaniards have only the Philippines, the Port. Dill and part of Timor, the Brit. Singapore and Labuan. Area, about 650,000 sq. m. Pop. about 32,829,000.

Eastern Churches is a title given to certain bodies of Chrs. of W. Asia, E. Europe, and of Afr. These are the Gr., the Armenian, the Jacobite (or Syrian), the Nestorian, the Coptic, and the Abyssinian Ch., and the Chrs. of St. Thomas. The entire pop. connected with the E. C. may be estimated at about 76,500,000, of whom 70,000,000 are of the Gr. Ch., 3,000,000 Armenians, 3,000,000 Abyssinians; the remainder belong to the other communions.

Eastern Empire. See BYZANTINE EMPIRE.

Eastern Rite, or **Oriental Rite**. Those branches of the R. Cath. Ch. which acknowledge the supremacy of the pope, but which do not employ the Lat. ritual, are said to be of the E. R. They employ several different rituals. They have reported bishoprics of the following rites: I. Armenian; II. Coptic (1, Egyptian; 2, Ethiopian or Abyssinian); III. Gr. (1, Roumanian; 2, Ruthenian; 3, Bulgarian; 4, Melchite); IV. Syrian (1, Syrian; 2, Syro-Chaldean; 3, Maronite). The aggregate number of epis. sees was 78, of which 5 were patriarchal and 26 archiepiscopal. The United Chrs. of St. Thomas have no bp. of their own, but are under the vicar-apostolic of Verapoli, who is of the Lat. rite, but the people and clergy use, in part, a modified Syrian rite. The E. R. differs from the Lat., not only in the langs. used in the service (Gr., Slav., Armenian, Syr., Ethiopic, Coptic), but generally also in the use of both elements for the laity in the Eucharist, and in permitting marriage to the lower clergy.

Eastern Shore, a name given to those parts of Md. and Va. which are E. of Chesapeake Bay, and sometimes applied to the whole peninsula, including the entire State of Del. The W. side is indented by navigable rivers and creeks; the waters on both sides abound in oysters; the fisheries are extensive. Most of the surface is low and level, but healthy.

East Greenwich, cap. of Kent co., R. I., on R. R. and Narragansett Bay, 14 m. from Providence. It has an acad. and a free library, also a good harbor. Pop. tp. 1870, 2660; 1880, 2887.

East Hamp'ton, R. R. junc., Hampshire co., Mass., 5 m. S. W. of Northampton. It is the seat of Williston Sem., a school for young men, and has a public library. Pop. tp. 1870, 3620; 1880, 4306.

East Humboldt Mountains, a lofty range in Nev., some of whose peaks exceed 12,000 ft. in height. Secret Valley and Fremont Pass enter the range, which is in parts well timbered. Its snows feed the springs by which Lakes Franklin and Ruby are supplied.

East India Company, a famous joint-stock trading

company, formed in Eng. to carry on commerce with the E. I. In 1600 a royal charter was granted to a number of Lond. merchants giving them exclusive right to trade with the E. I. for fifteen yrs. The charter was renewed from time to time, and the company grew immensely rich and powerful; but by an act of Parl. of 1834 the company was dissolved and its rights and property absorbed by the crown.

East Indies [Fr. *Les Indes Orientales*], a collective term vaguely applied to Hindostan, Farther India, and the Malay Archipelago.

East'lake (Sir CHARLES LOCK), F. R. S., D. C. L., an Eng. historical painter, b. at Plymouth Nov. 17, 1793. He visited it. in 1817, and passed about 9 yrs. in Rome (1820-29). He was chosen a Royal Academician in 1830, and became pres. of the Royal Acad. in 1850. Among his works are *Christ Weeping over Jerusalem*, *Violante*, and *Beatrice*. He was appointed director of the National Gallery in 1855, and wrote *Materials for a Hist. of Oil Painting*. D. Dec. 23, 1865.

East Liver'pool, Columbiana co., O., on R. R. and the O. River, 44 m. W. N. W. of Pittsburg; has potteries and manufactures of stone-ware. Pop. 1870, 2105; 1880, 5568.

Eastman (Hon. HARVEY G.), LL.D., b. in Marshall, N. Y., Oct. 16, 1832; ed. in common school and the academy; taught school; founded Eastman's National Business Coll. in 1859 in Poughkeepsie, N. Y.; was thrice mayor of that city; member of N. Y. Assembly 1871 and 1876; was 8 yrs. com. of public charities. D. July 13, 1878.

Eastman (PHILIP), LL.D., b. in Chatham, N. H., Feb. 1799, grad. at Bowdoin Coll. in 1820, became a lawyer, and practised at N. Yarmouth, Harrison, and Saco, Me. He was one of the eds. of the *Gen. Statutes of Me.*, and pub. a *Digest of Me. law reports*. D. Aug. 7, 1869.

Eastman National Business College, Poughkeepsie, N. Y., an inst. founded in 1859 for commercial and practical education of young men. Up to 1884 more than 30,000 students had enjoyed its advantages.

East New York, R. R. centre, New Lots tp., Kings co., N. Y., 6 m. S. E. of New York city. Pop. New Lots tp. 1870, 9800; 1880, 13,655.

Easton, cap. of Talbot co., Md., on Tred Haven Creek, a navigable branch of the Great Choptank River, 16 m. from Chesapeake Bay, and 35 m. E. S. E. of Annapolis, on R. R., 42 m. from Clayton, Del., in a peach-growing region. Pop. 1870, 2110; 1880, 3005.

Easton, a city and R. R. centre, cap. of Northampton co., Pa., at the confluence of the Del. and Lehigh rivers, the scene of the famous treaty with the Five Nations, recorded as having taken place at the Forks of the Del., 75 m. from New York. E. is the seat of Lafayette Coll. There are numerous rolling-mills and furnaces in its vicinity. Pop. 1870, 10,987; 1880, 11,924.

Easton (NICHOLAS), b. about 1593, emigrated from Wales to Ipswich (Mass.), in 1634, and afterward lived in Newbury, Mass., and Hampton, N. H. Having had trouble with the officials, he removed to R. I. in 1638, and built the first house in Newport. He was gov. of the United Colonies (R. I., Providence, etc.) 1650-52. D. Aug. 15, 1675.—His son, JOHN EASTON, was gov. of R. I. 1690-95, and wrote a *Narrative of the Causes which led to Philip's Indian War*.

East Orange, Essex co., N. J., on R. R., 12 m. from New York. Pop. tp. 1870, 4315; 1880, 8349.

Eastport, a port of entry of Washington co., Me., on Moose Island in Passamaquoddy Bay, at the extreme E. point of the terr. of the U. S. It has a good harbor in which the tide rises 25 ft., is largely engaged in the lumber-trade and fisheries. Pop. tp. 1870, 3736; 1880, 4006.

East Portland, Or. See PORTLAND, Or.

East River is a strait connecting L. I. Sound with New York Bay and separating the city of New York from Brooklyn, which is about 3/4 of a m. distant. It is nearly 20 m. long, and is navigable by large vessels. About 7 m. from that city, on this strait, is a narrow pass called Hell Gate, from which the obstructions are being removed. The E. R. is an important arm of New York harbor, and for miles its shores are lined with piers and slips. Its tides are higher and somewhat later than those which enter the harbor through the Narrows.

East River Bridge. See BROOKLYN.

East Saginaw, a city and important R. R. and commercial centre, Saginaw co., Mich., on the navigable Saginaw River, 17 m. from its mouth. It has a large trade by lake and rail in lumber and salt, and is the base of supplies for a large lumber-region. It is nearly opposite the city of Saginaw. Pop. 1870, 11,350; 1880, 19,016; 1884, 29,100.

East St. Lou'is, city and R. R. centre, St. Clair co., Ill., on the Miss. River opposite St. Louis. It is the seat of a R. Cath. coll. Pop. 1870, 5644; 1880, 9185.

East Weymouth, a v. of Weymouth tp., Norfolk co., Mass., on R. R., 14 1/2 m. S. of Boston. Pop. Weymouth tp. 1870, 9010; 1880, 10,570.

Eaton, cap. of Preble co., O., on R. R. and Seven-Mile Creek, 53 m. N. of Cin. Pop. 1870, 1748; 1880, 2143.

Eaton (DORMAN B.), b. in Vt., grad. at Vt. Univ. 1848; studied law at Harvard law school, and commenced practise as a lawyer in New York in 1850; drew up the health laws of New York, which created the Board of Health in New York city; became member of Civil Service Commission in 1873, and its chairman till its dissolution in 1875; pub. in 1877 a vol. on the civil service of Great Brit.; drafted the national civil service act approved 1883; in Mar. 1883 became a member of the new Civil Service Commission.

Eaton (GEORGE W.), D. D., LL.D., a scholar and Bap. minister, b. at Henderson, Huntingdon co., Pa., July 3, 1804, ed. at O. Univ. and Union Coll., Schenectady, N. Y. After holding professorships in Georgetown Coll. and at the Literary and Theological Inst., Hamilton, N. Y., became pres. of Madison Univ. (1856-68), pres. of Hamilton Theological Sem. and prof. of homiletics (1861-71). D. Aug. 3, 1872.

Eaton (HORACE), M. D., b. at Barnard, Vt., June 22, 1804, grad. at Middlebury in 1825, and in med. in 1829; was prof.

of chem. and natural philos. at Middlebury Coll. 1848-54, and gov. of Vt. 1846-48. D. July 4, 1855.

Eaton (JOHN, JR.), LL.D., an educator, b. Dec. 5, 1829, at Sutton, N. H., grad. at Dartmouth in 1854; was supt. of public schools, Toledo, O., 1856-59, studied theol. at Andover Mass.; Theological Sem. 1859-61, ordained by the Maine C. Presbytery 1861; commissioned chaplain of the 37th U. S. Volunteers Aug. 15, 1861; appointed supt. of contrabands, Nov. 14, 1862, by Gen. Grant; gen. supt. of freedmen for Miss., Ark., W. Tenn., and N. La., Dec. 15, 1862, and served as supt. till May 27, 1863; col. of the 63d U. S. colored troops Oct. 2, 1863, brevetted brig.-gen. of volunteers Mar. 13, 1865; established and edited the *Daily Post* at Memphis, Tenn. 1866-70, State supt. of public instruction for Tenn. 1867-69; became U. S. com. of education Mar. 17, 1870.

Eaton (JOHN HENRY), b. in Tenn. about 1790, and represented that State in the U. S. Senate 1818-29; was sec. of war under Gen. Jackson 1829-31, gov. of Fla. Terr. 1834-36, and U. S. minister to Sp. 1836-40. Wrote a *Life of Jackson*. D. Nov. 17, 1856.

Eaton (GOV. THEOPHILUS), b. in Stony Stratford, Eng., about 1591, and was the son of a clergyman. He was Eng. agent at the Dan. court, and afterward a reputable merchant of Lond. He came to Mass. in 1637, and was chosen a magistrate; went to New Haven in 1638, and was the first gov. of New Haven colony (1638-57). D. Jan. 7, 1658.

Eat-on Rap-ids, Eaton co., Mich., R. R. junc., on Grand River, 24 m. N. N. W. of Jackson. It is noted for its mineral magnetic springs, which are visited annually by thousands. Pop. 1870, 1221; 1880, 1785; 1884, 2131.

Eau Claire, *ô klair'*, a city, cap. of Eau Claire co., Wis., R. R. centre, at junction of Eau Claire and Chippewa rivers, and head of navigation on Chippewa River. It has a Wesleyan sem. The prin. business is lumbering. Pop. 1870, 2293; 1880, 10,119.

Eau de Cologne, *ô deh koh-lôn'*, or **Cologne Water**, a perfume invented by Jean Maria Farina of Cologne, Ger., where there are now several branches of the family, each of which professes to be in sole possession of the secret of preparing the genuine article. C. W. is also prepared in Fr. and in almost every other country. There are numerous recipes for the preparation of this perfume, but all of them are simply scented alcohol, the important thing being that the alcohol shall be perfectly deodorized and freed from fusel oil. The following recipe affords a good imitation of the original article: Take of alcohol 1 pint; of the oils of bergamot, orange peel, and rosemary, each 1 drachm; of bruised cardamom seeds, 1 drachm; orange-flower water, 1 pint; distil 1 pint from a water-bath.

Eau de Javelle, or **Javelle's Solution**, a chlorinated solution of potash, analogous to Labarraque's solution of soda. It has bleaching and disinfecting properties, and is employed in removing fruit-stains, etc. from linen. When swallowed in considerable quantity it has remarkably poisonous effects.

Ebal. See GERIZIM.

Ebe'lians [called in Ger. *Mucker*, "hypocrites"], a sect taking their name from Johann Wilhelm Ebel (1784-1861). Teaching that the relation of the sexes is a symbol of the relation between the spiritual and material principles, he was joined by many, and his followers are accused of making this doctrine a pretext for immorality.

Eb'ensburgh, cap. of Cambria co., Pa., on R. R., 26 m. W. of Altoona. Pop. 1870, 1240; 1880, 1123.

Eber'hard (JOHANN AGUST), D. D., a Ger. philos., b. at Halberstadt Aug. 31, 1739, studied theol. at Halle. He gained distinction as an elegant writer, and became prof. of philos. at Halle in 1778. He was a rationalist in theol. and an adversary of Kant in philos. Among his best works are an *Apology for Socrates*, a *Gen. Hist. of Philos.*, and a *Dict. of Ger. Synonyms*. D. Jan. 6, 1809.

Eber'ling (CHRISTOPH DANIEL), a Ger. scholar and writer, b. at Hildesheim Nov. 20, 1741. He devoted himself chiefly to geographical studies, and for his great work, *Geog. and Hist. of N. Amer.*, he was thanked by the Cong. of the U. S. His collection of books and maps relating to this subject was purchased in 1818 by Israel Thorndike and presented to Harvard Coll. D. June 30, 1817.

Ebers (GEORGE MORITZ), an Orientalist, b. in 1837, lectured since 1865 in Jena on the lang., hist., and monuments of anc. Egypt, and became in 1870 prof. of Egyptian archaeology in Leipzig. His chief work is a *Commentary on the Books of Moses* (*Die Bücher Moses. Sachlicher Commentar zu Genesis und Exodus*).

Eb'ionites [Heb. *ebion*, "poor"], a name given at first to all Chrs. on account of their poverty; then by Gentile Chrs. to Jewish Chrs., and finally restricted to heretical Jewish Chrs. Trenew (between 182-188 A. D.) is the first to mention the E. by name, though they are thought to be the "heretics" spoken of by Hegesippus some yrs. earlier. The Pharisee E. rejected the writings of Paul and insisted upon the observance of the Mosaic ritual. The Essenite E. were more speculative and ascetic. Ebionism dates, according to Gieseler, from about 107 A. D., and in the 5th century had wholly disappeared.

Eb'onite [named from its resemblance to ebony], a hard black compound of caoutchouc and sulphur. It is called vulcanite in the U. S. (See INDIA RUBBER).

Eb'ony [Lat. *ebœnum*; Fr. *ébène*], a very hard, heavy, black wood, is the duramen or heart-wood of several species of *Diospyros*, a tree of the natural order Ebenaceæ. It is heavier than water, takes a good polish, and emits an aromatic odor when burned. One species of *Diospyros* produces the beautiful wood called calamander. E. is produced in Tex., Mex., and Cal. from japote or persimmon.

Ebro [anc. *Re'rus*; Fr. *Ebre*], a river of Sp., rises in the Cantabrian Mts., flows nearly S. E., and enters the Mediterranean 22 m. E. of Tortosa. Its navigation is obstructed by rapids and rocks. A canal nearly 100 m. long has been cut along the E. below Tudela. Length, about 350 m.

Ecbat'ana, or **Agbatana** [Fr. *Ecbatane*], an anc. city, the cap. of Media, near the base of Mt. Orontes, about 165 m. S. W. of Teheran. Its foundation is attributed by tradition to Semiramis, but according to Herodotus it was founded by Deiocees (708 B. C.). It stood on a conical hill, and was surrounded by 7 walls, each higher than the next outer one. It was the summer residence of the kings of Media and Persia. Alexander the Great captured it in 331 B. C. This city is called *Achmetha* in the book of Ezra.

Eccaleo'bion [from the Gr. *ἐκκαλέω βιον*, "I call out life"], a mechanical contrivance for hatching eggs by artificial heat. It consists of an oven with shelves, on which the eggs are placed. The temperature is kept of uniform warmth by steam or hot water. A somewhat similar machine has long been employed in Egypt.

Ecce Homo. See APPENDIX.

Ecclesiast'ics [Septuagint Gr. *ἐκκλησιαστίς*, the "preacher," from *ἐκκλησία* an "assembly," Heb. *Kohleleh*, a noun feminine in form, meaning "preacher" or "gatherer"], a canonical book of the O. T. Its author is called "Kohleleh" (i. e. the "preacher"), and he is described as king in Jerusalem and son of David—i. e. Solomon. The Solomonic authorship of the book is questioned by many critics. The 2 leading ideas of the Preacher are the vanity of earthly good and the certainty of judgment.

Ecclesiastical History I. *Nature and Object*.—E. H. is one of the 4 divisions of theological science—viz. exegetical, historical, systematic, and practical theol. Historical theol. begins with the creation of man and comes down to the present time. It embraces within these limits all that belongs to the religious development of the race within the line of revelation—the origin, progress, and fortunes of the kingdom of God, and its relations to the kingdoms of this world. In a narrower sense, ch. hist. is the hist. of Christianity, beginning with the birth of Christ.

II. *Periods and Epochs*.—These represent the different stages in the religious development of the race, and must be taken from the actual stops or starting-points and circuits of the hist. itself. The following are the natural divisions:

A. *Sacred or Biblical History*, the hist. of the Divine revelation from the creation to the close of the apostolic age, running parallel with the Scriptures from Gen. to Rev. Here we must distinguish the dispensation of the Law and the dispensation of the Gospel, or the hist. of the O. T. religion and of that of the N. T. religion.

B. *Christian History*, or *Church History* proper, from the close of the apostolic age to modern times. Subdivisions:

(a) Hist. of Ancient Christianity, embracing the first 6 centuries to Gregory I. (590); Græco-Lat., patristic, Catholic, the common stock from which the Gr., the Rom., and the Prot. chs. have sprung. Subdivisions: (1) The apostolic age; (2) the age of persecution to Constantine the Great and the Council of Nicæa (325); (3) the age of patriarchs, Chr. emps., and œcumenical councils (to 590).

(b) Hist. of Medieval Christianity, from the close of the 6th to the beginning of the 16th century, or from Gregory I. (A. D. 590), the first mediæval pope, to Luther (A. D. 1517). Character: The Gr. and Rom. chs., divided, pursue their independent course; the Lat. Ch., extending W. among the Celtic and Germanic races, the Gr. N. E. among the Slavonians (in Rus.); conversion of the barbarians; conflicts with Mohammedanism; the crusades; rise and progress of the papacy, scholasticism, mysticism; the reformatory councils of Pisa, Constance, and Bale; revival of letters; invention of printing; discovery of Amer.; forerunners of Protestantism. Subdivisions: (1) The missionary period of the Middle Ages, from Gregory I. to Hildebrand or Gregory VII. (590 to 1049); (2) the palmy period of the papacy, from Gregory VII. to Boniface VIII. (1049 to 1294); (3) the decay of the mediæval papacy, and the preparation for the Ref., from Boniface VIII. to Leo X. or Martin Luther (1294-1517).

(c) Hist. of Modern Christianity, from the Ref. of the 16th century to the present time. Protestantism and Romanism; founding of the various evangelical chs., the Lutheran, Calvinistic, Anglican, etc.; restoration of Romanism; Jesuitism; Jansenism; Puritanism and Methodism in Eng.; Pietism and the Moravians in Ger.; settlements in N. Amer.; growth of the Gr. Ch. in Rus., and of the Prot. in the U. S.; conflict of faith with modern rationalism and infidelity; immense activity in theol., lit., missions, and all forms of Chr. philanthropy. Subdivisions: (1) The age of the Prot. Ref. and the R. Cath. counter-reformation or reaction (from 1517 to 1648); (2) the age of scholastic and polemic confessionalism in conflict with nonconformity and subjective piety (from the middle of the 17th to the middle of the 18th century); (3) the age of revolution and revival, and conflict between Christianity and various forms of scepticism and secularism (from deism in Eng. and the Fr. Revolution to our time).

III. *Sources*.—They are mostly written, in part unwritten. The written sources include (a) the official documents of ecclesiastical and civil authorities, such as acts of councils, creeds, liturgies, hymn-books, ch. laws, papal bulls and encyclicals; (b) the writings of the personal actors in the hist. and contemporary observers and reporters, such as the Fathers for anc. Christianity, the Schoolmen for mediæval, the Reformers and their opponents for the Ref. period; (c) inscriptions on walls, pictures, chs., tombstones, and other monuments.

IV. *Duty of the Historian*.—He must (1) master the sources in the original langs. in which they were written (Gr., Lat., and the modern langs. of Europe); separating the genuine from the spurious, the original from corruptions and interpolations; sifting the truth from falsehood, the facts from fiction and partisan judgment; aiming in all this laborious investigation at "the truth, the whole truth, and nothing but the truth." (2) He must then reproduce the clearly ascertained facts and results of his investigation in a faithful and lifelike narrative, so as to present the objec-

tive course of hist. itself as it were in a miniature photograph. The historian must have a judicial mind, which deals impartially with all persons and events coming before his tribunal, and is swayed by no consideration but that of strict justice.

V. *Value*.—The study of hist. enables us to understand the present and to labor wisely for the future. It is the richest storehouse of wisdom and experience. It is the best commentary of Christianity. It exhibits the life and power of Chr. in all its forms and phases, and the triumphant march of his kingdom from land to land and generation to generation. The Chr. religion has the dew of perennial youth, survives all changes, makes steady progress from age to age, overcomes all persecution from without and corruption from within, is now stronger and more widely spread than ever before, directs the course of civilization, and bears the hopes of the human race.

PHILIP SCHAFF.

Ecclesiastical Law. See CANON LAW.

Ecclesiasticus [Gr. ἐκκλησιαστικός, probably meaning the "church-book," because anciently read in "church" (ἐκκλησία)], or the **Wisdom of Jesus the Son of Sirach**, a book considered apocryphal by Jews and Prots. and received as canonical by the R. Cath. and Gr. chs. By the Anglican Articles it is recommended to be read for edification. It appears to have been written in Heb. by one Jesus (Joshua), the son of Sirach, at Jerusalem, at an uncertain date.

Eccleston (JAMES HOUTON), b. in Baltimore, Md., in 1838, grad. at Princeton Coll. in 1856; studied law, and was admitted to the bar. After practising law for 2 yrs, he began the study of theol. at the Phila. Divinity School, where he grad. in 1864. He was rector of St. Matthew's parish in Phila., and subsequently became rector of the Ch. of the Saviour in the same city. In 1875 was elected bp. of the diocese of Iowa.

Echeneid'idae [*Echeneis*; Gr. ἐχηνίς, ἰδος, "stopping" or "retarding vessels"], a family of fishes, characterized by the development of a broad oval sucking-disk on the top of the head. The body is elongated; the head oblong and very depressed; the eyes lateral, and just under the disk; the mouth moderate, slightly oblique, and cleft laterally, and the lower jaw projects considerably beyond the upper; the sucking apparatus is especially remarkable. The dorsal anterior fin, instead of being a true fin, is developed into the broad oval disk characteristic of the group; of this the skeletal portion is constituted by the spines, whose dichotomous elements divaricate, and are depressed sideward in opposite directions and otherwise modified; the cutaneous portion is a leathery development of the membrane which completely invests the skeleton, and gives rise to the spines, or cross-pieces, to numerous denticles; the structure is surrounded by a smooth, broad leathery margin; by means of this disk the fishes are enabled to adhere to various objects; the posterior dorsal is normally developed as a true rayed fin, and the anal fin corresponds in form and structure with it; the ventral fins are thoracic, and formed each of a spine and several rays. The fishes comprised in this family are generally designated as suckers, a name given to many different animals. They are to a large extent commensals, or parasitic upon other fishes, and to a considerable degree they seem to restrict their attentions to special animals. Thus, of the common species, one (*Echeneis remora*) chiefly attaches itself to large sharks (e. g. *Eulania Galeorcedo*, etc.), and another (*Leptecheneis naucrates*) is partial to the sea-turtles. Both of these are cosmopolitan; the others are more limited and much rarer. The more notable are *Remoropsis brachyptera*, which is a parasite of sword-fishes, and *Phlegrichthys lineatus*, which is parasitic upon the barracuda (a large *Sphyrapna*).

THEODORE GILL.

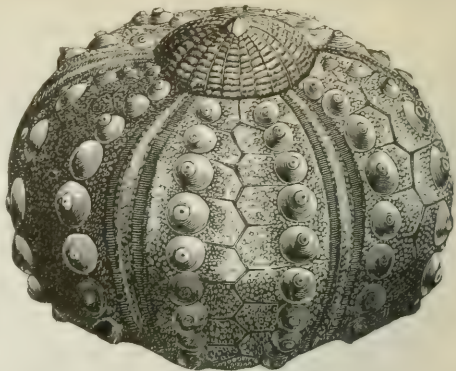
Echid'na [Gr. Ἐχίδνα], in Gr. mythology, a monster, half serpent and half woman, supposed to be the daughter of Tartarus and the mother of Cerberus and the Chimæra.

Echidna. See TACHYGLOSSIDE.

Echi'mys [from the Gr. ἐχίμος, a "hedgehog," and μῦς, a "mouse"], a S. Amer. genus of rodent mammals called "spiny rats." They are about the size of large rats, and have numerous spines scattered through their hair. They are of 6 or 8 species, and are a link between the rats and the true porcupines.

Echin'idae [Gr. ἐχίνος, a "hedgehog"], a family of ectobranchiate echinoderms, with anal plates all secondary,

only 5 pairs of plates on the buccal membrane, the auricular arch complete, and without gills. The species are nu-



Echinus, divested of its spines.

merous, and some are used for food. The names sea-urchin and sea-eggs are popular names.

Echinoder'ms, or pl. **Echinoder'mata** [Gr. ἐχίνος, "hedgehog," and δέρμα, "skin"], a primary division of the animal kingdom characterized by more or less radiate symmetry and the development of a special free intestinal canal. The prin. nerve-centre is a peri-oesophageal ring. The various species are all marine. They are subdivided: the holothurians, the sea-urchins (echinoids), the star-fishes (asteroids), the ophiuroids, and the erinoids are the prin. types.

Echin'odea, a group (class or order) of echinoderms with calcareous shells provided with interambulacral movable spines, and with ambulacral feet well developed. The prin. groups are the Antechinida, comprising all the existing types, and the Palechinida, represented by certain extinct forms.

Ech'o [Gr. Ἠχώ], in classic mythology, was a nymph who aided Jupiter in escaping the watchfulness of Juno, by detaining the latter with her talkativeness; but Juno ordained that she should not be able to speak until some person had spoken to her, nor to be silent after any one had spoken to her. Cherishing for Narcissus a vain passion, she pined away until nothing remained of her but her voice.

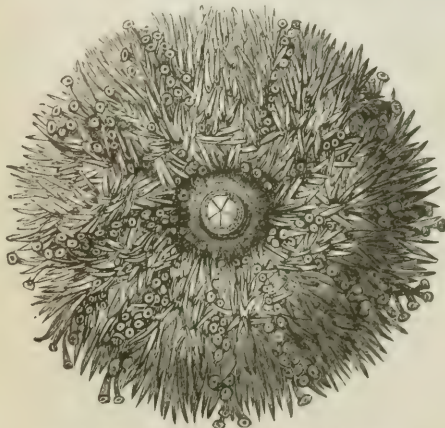
Eck, von (JOHANN MAYR). [Lat. *Eck'ius*, or *Ecc'ius*], D. D., a Ger. theol. and able adversary of Luther, b. at Eck, in Suabia, Nov. 13, 1486; was a prof. in the Univ. of Ingolstadt, and noted for his skill in disputation. He went to Rome in 1530, and instigated the pope to persecute Luther. At the Diet of Augsburg in 1530 he controverted the Lutheran confession of faith. Wrote a *Manual of Controversy*. D. Feb. 10, 1543.

Eck'hart, Meister (Master), the greatest of the Ger. mystics, b. in Strassburg about 1260; vicar of the Dominican order in Erfurt, then vicar-gen. in Bohemia, and in 1327 provincial in Cologne. He introduced many reforms into the monasteries, attracted great attention by his sermons, and was connected with the Brethren of the Free Spirit. He has been called the "father of modern pantheism," and is regarded as one of the greatest men of the Ger. race, and one of the deepest thinkers of all ages. D. 1329. (See second vol. of *Deutsche Mystiker*, by PREIFFER.)

Eckmühl, ek'mül [Ger. *Eggmühl*], a v. of Bavaria, 13 m. S. E. of Ratisbon, where the Fr. gained, Apr. 22, 1809, a victory over the Aus. Davoust, who was conspicuous in this battle, was rewarded by Nap. with the title of prince of Eckmühl.

Eclectic [Gr. ἐκλεκτικός, from ἐκ, "out," and λέγω, "to choose." Lat. *eclecticus*; Fr. *eclectique*], selected or chosen from several others, a term applied to or chosen by those who at various times have endeavored to select what they regarded as the best parts of the teachings of others, and to combine these into a harmonious system. In the widest sense of the term, Plato and Aristotle were eclectics. More specifically the designation is given to philos. of lower rank and later date, such as Epictetus and Plutarch, who attempted to harmonize morals with the old mythology; and Plotinus and others, who tried to harmonize Christianity with the anc. faiths. In still more recent times the term has been applied to such men as Cousin, who endeavored to frame a complete system of philos. out of old materials. The designation is now specially assumed by a school of phys., who claim to select the best parts from the teachings and practice of all med. schools.

Eclipse, e-klips' [Gr. ἐκλείψις, from ἐκλείπω, "to fail." Lat. *defectus*], the obscuration of a celestial body by another. E. are divisible into 3 classes—viz.: 1, the obscuration of the sun by the moon, which is called a *solar E.*; 2, the obscuration of the moon by the shadow of the earth, which is a *lunar E.*; and 3, the obscuration of a satellite of a planet by the shadow of the primary, which is called the *E. of a satellite*. The most interesting of these phenomena are the E. of the sun and moon. The moon is eclipsed when it enters the shadow of the earth; in other words, when the earth is interposed between it and the sun. Solar E. occur at the time of new moon, or when the moon is between the sun and the earth. To all parts of the earth on which the moon's true shadow falls, the E. is total; to those from which only a portion of the solar disk is concealed, it is partial. At the time of new moon, or when the moon is between the sun and the earth, her shadow may fall on a part of the disk of the earth, and produce the phenomenon of a total or partial E. of the sun, which is limited to the portions of the earth



Shell of Sea-Urchin (*Echinus*) with the spines.

on which the moon's shadow falls. The shadow of the moon does not always extend so far as the earth. In the 2 following diagrams the former represents the case in which the shadow does reach, and the latter illustrates the case



in which it does not reach, the surface of the earth. The shadow of the moon in the first diagram falls upon the earth between m and m' , and the inhab. of that portion will witness a total E. of the sun. In the second diagram it



will be obvious that to any inhab. of the portion $m m'$ of the earth, the central part of the sun will be obscured by the moon, and the unobscured part will present the appearance of a luminous ring.

The largest number of E. of both sun and moon which can occur in any one yr. is 7, of which 5 will be of the sun and 2 of the moon. The smallest number possible in one yr. is 2, both of which will be of the sun. The duration of an E. is the time between the immersion and the emersion. Immersion signifies the moment when the luminary begins to be obscured, and emersion is the reappearance of the luminary from behind the body by which it has been obscured. A total E. of the sun is an impressive phenomenon, and was regarded by the anc. as a very alarming event. The Chrs. of the Dark Ages offered formal prayers in order to avert the recurrence of E. F. A. P. BARNARD.

Ecliptic [so called because eclipses can only occur when the moon is on or very near its plane], in astron., the great circle of the heavens which the sun appears to describe in his annual revolution. It is the circle to which lions and lats. in the heavens are referred. From time immemorial the E. has been divided into 12 equal parts, called signs of the zodiac—Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, and Pisces. These signs, however, do not coincide with the constellations of the same names, but are merely arcs of 30 degrees reckoned from the intersection of the E. and equator, which is not a fixed point, so that they are carried backward by the precession of the equinoxes. The sign Aries is now in the constellation Pisces. The angle which the plane of the E. makes with the plane of the equator is called the obliquity of the E., which is a variable quantity—about $23^{\circ} 27' 30''$. The change of seasons is the result of this angle.

Economy, Political. See POLITICAL ECONOMY.

Ectoza'a [Gr. *ἐκτός*, "outside," and *ζῷον*, "animal"], a term used in contradistinction to Entozoa to indicate parasitic animals which live upon the outside of other animals. (See EPITZOA.)

Ecuador, ek-wah-dōr' [Fr. *L'Équateur*; Port. *Ecuador*], (i. e. "equator"), a S. Amer. republic, so called because it is situated under the equator. It is between lat. $1^{\circ} 50' N$. and $4^{\circ} 50' S$. and 70° and $81^{\circ} W$. lon.; area, including Galapagos or Tortoise Islands, which belong to it, 251,322 sq. m.; bounded N. by Colombia, E. by Brazil, S. by Peru, from which the Amazon River separates it, and W. by the Pacific Ocean.

Topography, Mountains, Rivers, Etc.—E. is traversed by 2 cordilleras or ranges of the Andes, the E. and W. Between these is the long valley or table-land of Quito, more than 9500 ft. above the sea, and, though directly under the equator, enjoying a temperate and very equable climate. On the W. toward the ocean the land is low and intensely hot; E. of the E. range there are elevated plateaus, without mt. summits, called *llanos*; these have a temperate but dry climate. Some of the loftiest of the Andean peaks are in E., many of them volcanoes, and crowned even in that lat. with perpetual snow. There are 16 active volcanoes, among them the symmetrical truncated cone, Cotopaxi, 19,498 ft. high. In the same W. range is Chimborazo, 21,422 ft., the highest peak in E. In the E. range are Cayambe, 19,535 ft., and Antisana, 19,137 ft. E. is subject to frequent and disastrous earthquakes. E. is drained by the Amazon, or Marañon, and its tributaries, the Napo, Tigre, Pastaza, and Putumayo or Ica. The last named is the N. E. boundary of the republic. These rivers are all navigable, the Putumayo and Napo for 500 m.

Climate.—All the elevated valleys have a delightful and healthful climate, a perpetual spring. There is a copious rainfall W. of the E. range, but less on the *llanos*; the heaviest rains are from Sept. to May. Guayaquil and the coast generally are very hot, often above $100^{\circ} F$.

Minerals.—The prin. rocks of E. are granite, syenite, trachyte, and porphyry; its minerals, gold, silver, quicksilver, copper, antimony, lead, iron, zinc, and salt; emeralds of great value occur on the coast, and sulphur abounds near Chimborazo and Cotopaxi.

Animals.—The cougar or panther, the jaguar, or Amer. tiger, the ounce and other members of the cat tribe, the bear, tapir, armadillo, monkeys (lemurs) of many species, the sloth, vicuña, guanaco, llama, and the antelope are the prin. denizens of the forests; immense herds of wild horses and cattle roam over the *llanos*; noxious and dangerous reptiles and insects are numerous and troublesome in some parts; the turtles of the Amazon ascend the rivers.

Vegetation and Soil.—There are extensive forests on the mt. slopes and along the rivers; the timber is the finest in the world. The cinchona, whose bark forms so important an article of med., abounds here. The caoutchouc or India-rubber tree is found in large numbers, as are many other very valuable woods for fine work. Among the other trees and shrubs are the cacao, orange, cherimoya, *Croton tiglium* (which produces croton oil), the tolu balsam tree, cocopal-m, Brazil-nut, vegetable ivory, vanilla, pineapple, plantain, banana, and many other tropical fruits and nuts. The prin. products are cotton, sugar-cane, rice, pepper, coffee, bananas, etc., in the lowlands, and maize, wheat, and barley in the higher valleys and table-lands. There are produced and gathered, mainly for export, cocoa, vegetable ivory, Brazil-nuts, cotton, coffee, caoutchouc and gutta-percha, orchilla weed, cinchona bark, yams, tobacco, tropical fruits, sarsaparilla, wheat, and the straw hats known as Guayaquil hats, hides and skins, and the hair of the guanaco and alpaca.

Industries.—These are few and rude. Leather is made, and saddles with trappings of silver and gold are produced; some cotton and wool are spun and woven; flour is ground to a limited extent, and jewelry and precious stones manufactured after a rude style; the straw hats of Guayaquil are well known; crude India rubber, cinchona bark, and sarsaparilla packed in mats; other medicinal barks, gums, and resins; cocoa and vanilla beans, pepper and coffee, gathered and packed for shipping, and the preparation of rice, cotton, and brown sugar for exportation, constitute the greater part of the industries of the people.

Finances, Commerce, Etc.—The public debt in 1880 was \$12,322,500, a reduction of nearly \$7,000,000 since 1877; the public revenue is about \$2,845,000, and the expenditure nearly \$2,585,000; total exports in 1880, \$5,752,565, and were increasing, in 1880 the exports to G. Brit. were \$3,236,655, to Fr. over \$600,000, to the U. S. \$107,000, and probably half a million to other S. Amer. states. The largest exports are Peruvian bark, cocoa and vanilla, and India rubber. The imports are much less than the exports, not much exceeding \$2,300,000, of which \$1,838,275 are from G. Brit.; they are mostly of cotton goods, oils, and provisions. Guayaquil is the only considerable port, and the mercantile marine is small.

Religion, Education, Etc.—The established religion is R. Cath., and no other religion is tolerated; there are 1 abb. and 6 bps.; all the people except the uncivilized Indians belong to the R. Cath. Ch. There is a univ. at Quito (established 1684), 4 colls., 11 high schools, several sems., and nearly 300 primary schools, of which only 30 are for girls; the instruction is in the hands of the Jesuits; the Indians and many of the whites are entirely illiterate.

Railways and Telegraph. none; the roads in gen. are only practicable for mules and horses.

History and Government.—A republic after the S. Amer. pattern; a pres. and v.-p. (who is also minister of the interior), elected for 4 yrs.; a senate of 18 members, and a house of deputies of 30, both elected by universal suffrage—such is the theory; the practice is an unlimited dictatorship, more or less absolute. The hist. of E. before the Sp. invasion is legendary; a powerful kingdom (Quito), the inhabs. Quichos or Quichuas; these conquered about the 10th century by the Cara, a nation from the E. coast, and these 500 yrs. later by the great inca, Huayna-Capac, from Peru, and his descendants by the Spaniards; the Sp. rule, as always in Amer., was despotic and cruel; it terminated, after 12 yrs. of war, under Bolivar and his compatriots, in 1824; E. was first joined with the other states in the Republic of Colombia, but in 1831 became independent, and J. J. de Flores, the companion of Bolivar, was its first pres.; Flores continued in power either as pres. or gen.-in-chief till 1845, when he was forced to sign an agreement to leave the country; from 1831 to 1878 the country was either in revolution or at war with neighboring republics, and generally both; its present ruler, Don J. de Veintimilla, was elected pres. in 1876, and appointed dictator for an unlimited period by a convention in 1878; he has held his position to the present time (1882).

Population.—The latest census (1875) gives a pop. of 1,066,137; of these, about 200,000 are uncivilized Indians, 40,000 mestizos, 10,000 negroes, and the remainder of Sp. descent, though largely mingled with Indian blood. E. is divided into 3 depts.—Quito, Guayaquil, and Assuay, also called Cuenca. There are 12, or, including the Galapagos Islands, 13 provs.—viz. Chimborazo, Los Rios, Esmeraldas, Guayas, Imbabura, Leon and Assuay, Loja, Manavi, Oriente, Pichincha, and the E. terr. of the Indian tribes. Quito, the cap., has from 75,000 to 80,000 inhabs., Guayaquil about 25,000; Cuenca, Riobamba, and Loja are the only other considerable towns.

L. P. BROCKETT.

Ec'zema [Gr. *ἐξέμα*, an "eruption," from *ἐκ*, "out," and *ζωω*, to "boil"], commonly called **Salt Rheum**, a vesicular disease of the skin, characterized by watery blisters smaller than those of herpes and larger than ordinary sudamina. E. is often accompanied by intense itching, and is frequently transformed into a pustular or scabbing disease. It is generally chronic. Its treatment is both local and gen. The local treatment, when the epidermis is thickened, is by alkaline applications, with or without tarry or astringent admixtures. The "benzoated ointment of oxide of zinc" is an excellent application.

Edda. See APPENDIX.

Ed'dy (SAMUEL), LL.D., a jurist, b. at Johnston, R. I., Mar. 31, 1769, grad. at Brown Univ. in 1787; became a lawyer, was clerk of the supreme court of R. I. 1790-93, sec. of State R. I. 1798-1819, M. C. 1819-25, and chief-justice of R. I. supreme court 1827-35. D. Feb. 2, 1839.

Eddy (THOMAS M.), D. D., a Meth. divine, b. Sept. 7, 1829, in Hamilton co., O.; studied in the classical sem. of Greensboro', Ind.; joined the Ind. conference in 1842; was ed. of the *N. W. Chr. Advocate* from 1856 to 1868, served as pastor

in Baltimore 3 yrs., was appointed to the Metropolitan ch., Wash., D. C., in 1872, and elected the same yr. corresponding sec. of the Meth. Missionary Society. He was pre-eminent as a journalist, and was author of a Hist. of Ill. during the c. war. D. Oct. 7, 1874.

Eddy (ZACHARY), D. D., b. at Stockbridge, Vt., Dec. 19, 1815, ordained by the (Cumberland Presb.) presbytery of Pa. in 1835; was for several yrs. a home missionary in W. N. Y. and Wis., was pastor of the Congl. ch. at Warsaw, N. Y., 1850-55, of the First ch. at Northampton, Mass., 1857-67, of the ch. on the Heights, Brooklyn, N. Y., 1867-70, of a Congl. ch. in Chelsea, Mass., and then in Detroit, Mich. Author of *Immanuel, or the Life of Jesus Christ*, and prin. compiler of *Hymns of the Ch. Reformed*.

Eddystone Light-house is in the Eng. Channel, 14 m. S. S. W. of Plymouth Breakwater and 9 m. from the coast of Cornwall, lat. 50° 10' 54" N., lon. 4° 15' 53" E. It stands on the Eddystone Rocks, which are daily submerged by the tide, and it rises about 85 ft. above the high-water mark in the form of a circular tower, which gradually decreases in diameter, with a curved outline resembling the trunk of a tree, from the bottom to the top. It was erected in 1757-59 by Mr. Smeaton. The material is Portland limestone. It has a fixed light 72 ft. high, visible at a distance of 13 m. The first light-house here (1699-1703) was destroyed by a storm; the second was burned in 1755. The foundation-stone of a new light-house was laid Aug. 19, 1879, about 130 ft. S. of the present one; completed 1882.

E'den [a Heb. term signifying "delight"], the name given in the book of Gen. to the region where at first dwelt Adam and Eve, and from which they were expelled in consequence of disobedience. Much discussion has prevailed as to the country where E. was situated. At present our choice appears to lie between Armenia and Babylonia. The chief difficulty consists in identifying the 4 rivers mentioned in the biblical narrative.

Edenta'ta [Lat. *ē*, privative, and *dens*, *dentis*, "tooth"], an order of mammals so named because they are either without teeth or without front incisors. The order includes the true ant-eaters, the sloths, and the armadillos of tropical Amer., and the aard-varks, and pangolins of the Old World. The fossil extinct *Megatherium*, *Glyptodon*, etc. were tertiary forms of this order of large and even elephantine size. The types thus indicated are so unlike and diverse in structure that they have been distributed under sub-orders—Vermilingina (ant-eaters), Squamata (pangolins), Fodicitia (aard-varks), Tardigrada (sloths and megatherians), and Loricata (armadillos, glyptodonts, etc.).

E'des'sa [Fr. *Édesse*], or **Callirrhoe**, an anc. city of Mesopotamia, 78 m. S. W. of Diarbekir. It became the cap. of an independent kingdom in 337 b. c. Christianity was introduced there not very long after the crucifixion of our Lord. E. became a tributary of Rome during the reign of Trajan (98-117 A. D.), was noted in the early hist. of the Chr. ch., and was long a centre of Oriental learning. In 1097 Baldwin of Bouillon, one of the leaders of the crusades, afterward king of Jerusalem, was accepted as prince of E., establishing a Chr. principality, which was overthrown by the Saracens in 1144. Afterward E. fell successively into the hands of the Byzantines, Mongols, Pers., and Turks. Its site is now occupied by the town of *Orfa*, pop. about 40,000.

Ed'foo, or **Ed'fon** [anc. *Apollinopolis Magna*; Coptic, *At-bō*], a town of Egypt, on the Nile, about 60 m. above Thebes. It has 2 temples, one being in excellent preservation. It was built chiefly by Ptolemy Philometor (181-145 B. C.), the last king of Egypt who is noticed in sacred hist. Its entire length (including court and temple) is 405 ft. On each side of the entrance is a pyramidal tower 108 ft. high, adorned with gigantic sculptures. Pop. 2,000.

Edgar, Neb. See APPENDIX.

Edgartown, a pt. of entry and cap. of Dukes co., Mass., on the E. shore of the island of Martha's Vineyard, 30 m. from New Bedford. It has a small but safe harbor, and a pier on which is a fixed light, 37 ft. high. The whaling business here has of late declined. Cottage City, including the camp-meeting grounds of Oak Bluffs, has been set off from this tp. since 1870. Pop. 1870, 1516; 1880, 1903.

Edge'hil, a ridge in Eng., 7 m. N. W. of Banbury, was the scene of the first great battle of the c. war, Oct. 23, 1642. The royalist army was commanded by Charles I., and that of the Parl. by the earl of Essex. Prince Rupert, by a charge of cav., broke left wing of the Parliamentarians, while right wing of Essex's army defeated the royalists.

Edgerton, Wis. See APPENDIX.

Edgeworth (MARIA), b. near Reading, Eng., Jan. 1, 1767; removed with her father to Edgeworthstown, in Ire., in 1782. In 1801 she produced *Castle Rackrent*, the first of a series of novels, among which are *Belinda*, *Patronage*, and *Helen*; wrote *Tales of Fashionable Life*. D. May 21, 1849.

Edgeworth (RICHARD LOVELL), F. R. S., the father of the preceding, b. at Bath in 1744; inherited from his father an estate at Edgeworthstown, in co. Longford, Ire. Among his works are *Professional Education*. D. June 13, 1817.

Edhem Pasha, a native of Scio and of Gr. family, b. in 1823; was purchased as a slave, in his boyhood, by the well known Khosr Pasha, and was sent by his master to Paris, where he entered the École des Mines, and distinguished himself in engineering studies; in 1839 returned to Constantinople, was placed on the gen. staff, and rose to the rank of col.; was also the French tutor to the sultan; in 1849 was aide-de-camp to Abd-ul-Medjid and capt.-gen. of the imperial guard. In 1867 he was minister of foreign affairs, and for the next 8 yrs. ambassador at different European courts. In Dec. 1876 he represented Tur. in part at the gen. conference of the powers. In Feb. 1877 he succeeded Midhat Pasha as grand vizier. He belongs to the "Young Turkish," "anti-Softa" party.

Edict of Nantes was issued by Henry IV. of Fr. in 1598, to secure to the Prots. the free exercise of their religion. This act was repealed by Louis XIV. in 1685, and its revoca-

tion led to a renewal of the persecutions which had been carried on against the Huguenots. Over 500,000 of her most useful and industrious subjects deserted Fr. About 50,000 passed into Eng., and many into Ger. and Amer.

Edina, Mo. See APPENDIX.

Ed'iburg, Johnson co., Ind., on R. R., 29 m. S. of Indianapolis. It contains a high school and has good water-power. Pop. 1870, 1799; 1880, 1814.

Ed'inburgh, the cap. of Scot., about 1 m. S. of the Frith of Forth, 399 m. by R. R. N. N. W. of Lond., is the terminus of several important railways, and has 2 ports—Leith and Granton—on the Frith. It is divided into the Old and the New Town, the former occupying the middle and highest of 3 ridges, and separated by a narrow ravine from the New Town, which is built upon a lower and broader ridge. On the S. E. border, a hill, called Arthur's Seat, rises 822 ft., and about 4 m. S. W. is the range of the Pentland Hills. Among the public structures are the Castle, standing 443 ft. above the sea, a strong fortress capable of holding a garrison of 2000 men; Holyrood House, the former royal palace; the old Gothic cathedral of St. Giles; Victoria Hall, with a spire 241 ft. high, in which the Gen. Assembly of the Ch. of Scot. holds its annual sessions; the Parl. House, now occupied by courts of law; the old Tron ch., St. George's ch., the Free High ch., the Univ. buildings, the Observatory, the National Gallery of Art, the Royal Inst., the national monument, an imitation of the Parthenon, crowning the summit of Calton Hill, and a noble monument, 200 ft. high, erected in honor of Sir Walter Scott. The univ., founded in 1582, has a library of about 140,000 vols.; the Advocates' Library has about 170,000 vols., being especially rich in works relating to Scot. E. was recognized as a burgh by King David I. in 1128; a Parl. was held here in 1215, and it became the cap. of Scot. about 1436. The city, which was then limited to the central ridge, was inclosed by walls in the 15th century, the hollow between the ridge and the next one being filled with water, and known as the N. Loch. The New Town originated about 1765, when a bridge was built across the N. Loch. Pop. 1881, 328,190.

Edinburgh (ALFRED ERNEST ALBERT), DUKE OF second son of Victoria, queen of G. Brit., b. at Windsor Castle Aug. 6, 1844; was ed. chiefly by private tutors. He entered the Brit. navy in 1858; in 1862 declined the crown of Gr., which was offered him; and in 1866 took a seat in the House of Peers by his present title; in 1867 he set sail in command of the frigate *Galatea*, visiting Australia, Japan, Chili, India, etc. At a picnic at Clontarf, New S. Wales, Mar. 12, 1868, he was slightly wounded by a pistol-shot fired by a Fenian named O'Farrell. The latter was soon afterward executed. His full title is, "His Royal Highness Prince Alfred Ernest Albert, Duke of Edinburgh, Earl of Kent, and Earl of Ulster, K. G., K. P." He is also a duke of Sax. and prince of Saxe-Coburg-Gotha.

Edinburgh, University of, was founded by James VI. of Scot. (James I. of Eng.) in 1582. In 1600 the senatus academicus consisted of a prin. and 4 regents. The first chair of theol. was founded in 1642, and the first prof. of med. was appointed in 1685. In 1760 the senatus academicus consisted of a prin. and 18 profs. Since that date 10 chairs have been added. The univ. consists of the faculties of arts, med., theol., and law. The faculty of arts comprises 11 chairs. Connected with the univ. are a large library, a museum of nat. hist., and a botanic garden.

Ed'ison (THOMAS ALVA), Ph. D., b. at Milan, O., Feb. 11, 1847, ed. himself while a train-boy on the road between Pt. Huron and Detroit; received some instruction in telegraphy, and became an operator successively in Pt. Huron, Memphis, Louisville, Cin., and Boston, but became suddenly famous as an inventor by his gold-indicator 1871, duplex transmission 1872, etc., and built in 1876 a magnificent laboratory at Menlo Park, N. J., from which he has sent out the telephone, the phonograph, chemical telegraph, electric light. He was made Chevalier of the Legion of Honor at Paris 1882.

Ed'isto, a river of S. C., formed by the N. and S. Edisto. The main stream flows S. E. and S., and enters the Atlantic by 2 channels, called the N. and S. Edisto Inlets.

Edisto Island, one of the most important of the Sea Island group in S. C., between the N. and S. Edisto Inlets, produces sea-island cotton. Pop. 2762.

Ed'monds (JOHN WORTH), a lawyer, b. at Hudson, N. Y., Mar. 13, 1799, grad. at Union Coll. (now Union Univ.), Schenectady, N. Y., in 1816. In 1819 he was admitted to the bar, and in 1820 commenced the successful practice of law in his native town. In 1832 he became a State senator, in 1836 was appointed a U. S. Indian agent. In 1841 he entered upon the practice of law in New York, which was from that time his home. In 1843 he was appointed one of the State prison inspectors, and introduced reforms in prison discipline. In 1845 he was appointed a circuit judge, and in 1847 became one of the judges of the supreme court, New York. In 1852 he was appointed to the bench of the court of appeals, from which in 1853 he retired to the private practice of law. In 1851 Judge E. became a convert to the doctrines of Spiritualism, and in 1853 openly avowed and defended his belief by the publication of a work entitled *Spiritualism*. He also became an active medium, and believed himself to be in almost constant communication with departed spirits; his advocacy of Spiritualism probably cost him his place on the bench. D. Apr. 5, 1874.

Edmore, Mich. See APPENDIX.

Ed'mund I., king of the A.-S., b. about 922 A. D., was a son of Edward the Elder and a grandson of Alfred the Great. He became king in 941, and conquered the Britons of Cumbria. Was assassinated by Liof May 26, 946.

Edmund II., surnamed IRONSIDE, king of Eng., b. in 989 A. D., was a son of Ethelred II. At the death of the latter, in 1016, the Danes possessed the greater part of Eng. E., who was renowned for courage, waged war against Canute the Dane, and gained several victories, but was defeated at Assandun. The 2 rivals then agreed to divide the

kingdom, of which E. received the S. part. D. Nov. 30, 1016, and became then sole king.

Edmunds (GEORGE F.), a lawyer, b. at Richmond, Vt., Feb. 1, 1828; was chosen in 1854 a member of the legislature of Vt., which in 1865 elected him to the Senate of the U. S.; was re-elected for 1869-75, 1875-81, and 1881-87. Elected pres. *pro tem.* of U. S. Senate Mar. 3, 1883.

Edmon, a name of ESAT (which see).

Edmon, a country of Asia. See IDUMEA.

Ed'mred, king of the A.-S., was a son of Edward the Elder. He succeeded his elder brother, Edmund I., in 946 A. D. St. Dunstan was his most powerful minister. D. Nov. 23, 955, and was succeeded by his nephew Edwy.

Edriophthal'ma (Gr. *εδριαος*, "fixed," and *ὀφθαλμος*, "eye"), a name given to the crustaceans generally called Tetradeapoda.

Edri'si, or **Edree'see**, an Ar. geog., b. at Centa, in Afr., about 1100. He was descended from the royal family of Edrisites. He passed many yrs. at the court of Roger II., king of Sic. E. made for this prince a silver terrestrial globe, and wrote a large book on geog., which was long a standard work. D. about 1175.

Education, ed-yu-ka'shun [Lat. *educatio*], regarded as an historical fact, is well described by J. S. Mill as "the culture which each generation purposely gives to those who are to be its successors, in order to qualify them for at least keeping up, and if possible for raising the level of improvement which has been attained." The kind and degree of this culture depends on the state of civilization. As the earliest E. is that of the family, so originally E. was confined to the family, the children being taught the arts known to their parents. The first schools were ecclesiastical, to give the training and knowledge required for religious ceremonies. In the countries where the priesthood did not exist as a separate body, E. became secular. The Grs. were the first to develop a science of E. distinct from ecclesiastical training. They divided their subjects of study into music and gymnastics, the former comprising all mental and the latter all phys. training. Plato is the author of the first systematic treatise on E. He proposes to intrust E. to the state, and lays great stress on the influence of race and blood, holding that strong and worthy children are likely to spring from strong and worthy parents. At Rome in the days of the republic, the child was trained for public service in the forum, the senate-house, and the camp. The Roms. knew little of systematic training except in oratory, but the great work of Quintilian on the subject contains incidentally a complete sketch of a theoretical E. His object is to show how to form a man of practice. To form the perfect orator he would form the perfect man. The culture of the earliest generations of Chrs. was obtained in the pagan schools. The E. of the Middle Ages was either that of the cloister or the castle. The object of the one was to form the young monk, of the other to form the young knight. The discipline of the cloister was severe, the rod ruling all with impartial cruelty, and the instruction was made repulsive and distasteful. The 7 arts of this training were gram., dialectics, rhetoric, music, arith., geom., and astron.—the first 3 forming the *trivium*, and the last 4 the *quadrivium* of the 7 yrs. course. The 7 knightly accomplishments were to ride, to swim, to shoot with the bow, to box, to hawk, to play chess, and to make verses. The young knight was trained to hardship in sharing the dangers of a chief whose valor he emulated, and to obedience in the service of a mistress whom he loved.

These mediæval forms of E., so extreme and diverse, were replaced by that of the Renaissance represented by Erasmus, and that of the Ref. represented by Luther. The former taught how to mould the child, by wise methods, into a good Gr. and Lat. scholar and a pious man. Lat. is to be taught so as to be of practical use; obedience must be strict but not too severe; individual peculiarities must be regarded. The E. of girls is as necessary and important as that of boys. This reformed system was well adapted for the favored few. Luther gave the first great impulse to popular E.; he opened the school-house to the masses, and foreshadowed the great principle that it is the right and duty of the state to provide for the E. of all youth.

The educational reformers who have since most powerfully influenced E. are the following, named in chronological order: Sturm of Strasbourg, Ratich of Ger., Comenius of Moravia, Montaigne of Fr., Locke and Milton of Eng., Franke of Ger., Rousseau of Fr., Basedow and Salzmann of Ger., Pestalozzi of Switz., Richter and Goethe of Ger., Jacotot of Fr., Herbert Spencer of Eng., and Bain of Scot., the author of *Education as a Science*, a recent work of rare merit. Comenius and Rousseau were the reps. respectively of the *information* and *training* types of E. By a synthesis of the truth contained in these extreme types, Pestalozzi evolved a better ideal, characterized by completeness and symmetry, which has had a widespread and enduring influence. Thus, by the contributions of philosophers and educators, the science of E., or pedagogy as we call it, came into existence in Ger., which is the classic land of the science. This made possible the normal school, which in its universality and multifarm development appears to be destined to become the most potent of all instrumentalities for the practical improvement of E.

An integral E. must include at least 5 branches—phys., moral, intellectual, æsthetic, and religious. 1. Phys. E. is the rearing of a healthy human being by good nursing, feeding, clothing, exercising, and gen. regimen. This must be shared by the parents and recognized teachers. The school should aim, by its hygienic conditions, gymnastics, and avoidance of overtaking, to preserve and increase the pupil's bodily health and strength, and to give sound instruction in practical hygiene. 2. Moral E. is designed to increase a conscientious and steadfast devotion to duty. The foundation of all virtue is in self-control. The cardinal virtues to be inculcated are prudence, probity or justice, and be-

nevolence. The school is only one of the means of this E.; it is imbibed from innumerable sources. The most effectual moral training of the school is indirect and incidental, resulting from its operations and the unconscious tuition of the teacher. Perhaps the greatest pedagogical question of the day is the question whether morality, totally separate and distinct from the Bible and religious dogma, can be effectively taught in schools. Bain maintains the practicability and expediency of the separation. The prin. means of moral teaching are (a) living examples, parents and teachers, etc.; (b) reading of examples in hist. and fiction; (c) the inculcation of moral precepts; (d) instruction in systematic treatises on the subject of duty. 3. Intellectual E., the branch about which schools and teachers must be chiefly occupied, is composed of 2 elements, the element of knowledge and the element of discipline. Discipline is the result of mental activity in acquisition and expression. Extremists are apt to sacrifice one of these elements to the other. The tendency of modern pedagogy is to condemn and discard all studies and exercises which have little or no value as knowledge (hence the abolition of Lat. verse-making), on the assumption that the requisite discipline will result from the teaching of useful knowledge in the shortest and most efficient way. The most gen. division of the branches of instruction is into the scientific and literary. Both are deemed necessary to a liberal E. The Lat. lang. has hitherto occupied the largest space in the curriculum of liberal learning, and is perhaps the most indispensable branch. 4. E., whether viewed as aiming at complete development or as a means of human happiness, cannot omit the culture of taste, or susceptibility in regarding beauty. Art cultivation means the calling forth, intensifying, guiding, purifying the æsthetic sense. Art has been defined to be the endeavor after perfection in execution. One of the results of art cultivation is to render us intolerant of the faults in anything we do. Plato regarded beauty and goodness as inseparable, and Goethe says, "The beautiful is greater than the good, for it includes the good and adds something to it; it is the good made perfect." Among the recognized branches of common E. coming within the scope of art are drawing, music, elocution, good breeding, and lit. 5. There is doubtless an intellectual element in religion, but the essence of religion is regarded as something emotional. The intellectual element may be taught in schools, not mixed as to confession, by means of Bible lessons and a doctrinal catechism; but emotional culture cannot be well carried out in ordinary school-teaching. The tendency is to remove all purely religious teaching from all institutions of public instruction, leaving it to the family and the Ch. Hence the great development of the Sunday-school.

The whole E. of a nation consists of 2 great classes—1. That which trains and matures the man, which forms cultivated and capable human beings without regard to the special occupation for which they are destined; this we call gen. E. 2. That which is required to fit men for some special mode of gaining a livelihood, or of fulfilling the specific duties which the subdivision of labor imposes on the individual as his contribution to the commonwealth; this is professional or technical E. Gen. E. should precede technical, and the more solid and complete the former the more successful will be the latter. The former develops the requisite mental activity—i. e. aptitude and capacity—the latter gives requisite special knowledge and skill. Systems of E. are organized in 3 grades—primary or elementary, secondary, and superior. The first is either complete as a whole or preparatory to a higher instruction; the second is the first stage in liberal E., and the third includes all E. above the secondary, whether gen. or technical. The rapid development of technical schools in all their variety is a striking characteristic of modern society. In industrial pursuits it is realized as never before that knowledge is power. The future of nations depends largely upon the degree of instruction they shall attain. The highest and consequently the most powerful nation of the future is to be that which shall put the most knowledge into its labor. The multiplication of the *kinds* of insts. of instruction is at once an effect and a cause of social progress. Few kinds denote low civilization. The development is from the homogeneous to the heterogeneous. Differentiation and specialization is the law of educational progress. The simplification of function both in respect to teacher and inst., with certain limitations in the early stages, is the movement of progress. Democracy and popular E. had a common origin, and they are indispensable to each other. In the development and advancement of public instruction, the chief opposing forces have been religious bigotry, aristocratic influence, and ignorant suffrage.

JOHN D. PHILBRICK.

Education, Commissioner of. See NATIONAL BUREAU OF EDUCATION.

Ed'ward, surnamed the CONFESSOR, an A.-S. king of Eng., b. at Islip in 1004. He was a son of Ethelred II. After the death of Ethelred, in 1016, Canute the Dane became master of the kingdom, and married Emma, the mother of E. The latter succeeded his half-brother, Hardicanute, in 1042. He married Editha, a daughter of Earl Godwin, but did not permit her to share his bed, and for this asceticism was surnamed "the Confessor." D. Jan. 5, 1066, and was succeeded by his wife's brother, Harold.

Edward I., surnamed LONGSHANKS, king of Eng., the eldest son of Henry III., b. at Westminster in 1239; in 1245 he gained a decisive victory over the barons at Evesham; in 1271 took part in a crusade to Pal., and in 1274 succeeded to the throne. The conquest of Wales he completed in 1282. In 1291 several competitors for the crown of Scot. recognized E. as lord-paramount, and chose him as umpire. He decided in favor of John Baliol, who took the oath of fealty to the Eng. king. The Scots took arms to maintain their independence. In 1296 E. invaded Scot., dethroned Baliol, and made himself master of the kingdom. The national cause was defended by Sir William Wallace, who

gained a victory at Stirling in 1297. E. invaded Scot. in 1298, and captured Wallace, who was hanged as a traitor in 1305. The Eng. king was marching against Robert Bruce, who had renewed the contest, when he d. near Carlisle July 7, 1307. E. greatly promoted the improvement of law and the reformation of civil abuses. Among the important events of his reign was the institution of the House of Commons. He was succeeded by his son, Edward II. (1284-1327), a feeble prince.

Edward II., king of Eng., the eldest son of Edward I., b. at Windsor Nov. 13, 1312. He ascended the throne Jan. 24, 1327, but during his minority the royal power was exercised by the queen-mother and Roger de Mortimer. E. married Philippa of Hainault in 1328. In 1330 Mortimer was arrested, tried, and executed by the order of the young king, who then assumed the royal power. To support Edward Baliol, who claimed the Scot. throne at the death of Robert Bruce, E. invaded Scot. and defeated the Scotch at Halidon Hill in 1333. The Scot. people generally refused to recognize Baliol, and fought resolutely for independence. When his uncle, Charles IV. of Fr., d. without male issue, E. claimed the throne of Fr., but Philip of Valois was recognized by the Fr. people. The Eng. king began war in 1339, and in 1346, after several truces, E., with his son, the Black Prince, invaded Fr., marched to the gates of Paris, and gained a complete victory at Crécy (Aug. 26); in 1347 a long truce was concluded between the 2 powers. The war having been renewed in 1356, the Black Prince defeated the Fr. at the great battle of Poitiers, Sept. 19 of that yr., and took King John prisoner. In 1360 the war was suspended by a treaty, in accordance with which E. retained the Fr. provs. which he had conquered. King John's successor, Charles V., renewed the war in 1370, gained a series of victories, and recovered nearly all the Fr. terr. which the Eng. had occupied. D. June 21, 1377, and was succeeded by his grandson, Richard II.

Edward IV., king of Eng., b. at Rouen in 1441, was a son of Richard, Duke of York. After the death of his father, in 1460, E. was the head of the house of York, then waging a c. war against the Lancastrians, who fought for Henry VI. E. gained a victory at Mortimer's Cross, near Hereford, entered Lond. in Feb., and was proclaimed king Mar. 4, 1461. The cause of the Lancastrians was supported by Margaret of Anjou, the ambitious queen of Henry VI., whose army was defeated at Towton in Mar. 1461. E. gained another victory at Hexham in 1464, and took Henry VI. a prisoner. By his marriage with Elizabeth Woodville (1464) E. offended the earl of Warwick. Warwick expelled E. from the country in 1470, but the latter returned in 1471, defeated Warwick at Barnet (Apr. 14), and recovered the throne. On May 4, 1471, he gained a decisive victory at Tewkesbury, which ended the War of the Roses. D. Apr. 9, 1483.

Edward V., king of Eng., b. in Westminster Nov. 4, 1470, was the eldest son of Edward IV., whom he succeeded Apr. 9, 1483. His uncle Richard, duke of Gloucester, then became protector of the kingdom, and obtained possession of the person of Edward V. The young king and his brother disappeared in June 1483, and were probably murdered in the Tower by the order of Richard, who then usurped the throne.

Edward VI., king of Eng., a son of Henry VIII. and Jane Seymour, b. at Hampton Court Oct. 12, 1537, and succeeded his father Jan. 28, 1547. His uncle, Edward Seymour, earl of Hertford (afterward duke of Somerset), acted as regent with the title of lord protector. The latter promoted the Prot. cause. During this reign the Ref. made great progress in Eng. Somerset invaded Scot., because the Scot. govt. refused to form a matrimonial alliance between Mary Stuart and Edward VI. He defeated the Scots at Pinkie in 1547. Somerset's enemy, John Dudley, earl of Warwick, obtained the ascendancy in 1550, and caused him to be executed. Dudley persuaded the young king to exclude the princesses Mary and Elizabeth from the throne, and to appoint Lady Jane Grey as his successor. D. July 6, 1553. (See SHARON TURNER, *Hist. of the Reigns of Edward VI., Mary, and Elizabeth.*)

Edward, prince of Wales, called the **Black Prince** (from the color of his armor), b. June 15, 1330, was the eldest son of Edward III. of Eng. He commanded a part of his father's army at the battle of Crécy (1346), and then adopted the crest of ostrich feathers and the motto *Ich dien* ("I serve"). This crest and motto had been borne by John, king of Bohemia, who was slain at that battle. Ever since it has been borne by the princes of Wales. He gained in 1356 a brilliant victory over the Fr. at Poitiers, and took their king, John, a prisoner. He defeated Henry de Transmarie in battle, and in 1367 restored Henry's rival, Peter the Cruel, to the throne of Castile. D. June 8, 1376, leaving a son, who became king as Richard II.

Edwards (BELA BATES), D. D., a theol., b. in Southampton, Mass., July 4, 1802, grad. at Amherst Coll. in 1824; founded the *Amer. Quarterly Observer* in 1833, became ed. of the *Biblical Repository* in 1835, prof. of Heb. at Andover in 1837, and ed. of the *Bibliotheca Sacra* in 1844; became prof. of biblical lit. at Andover Sem. 1848. Author of *Life of Elias Cornelius*, a work on the Epistle to the Galatians, and other works. D. Apr. 20, 1852.

Edwards (HENRI MILNE). See MILNE-EDWARDS.

Edwards (HENRY WAGGAMAN), LL.D., b. in New Haven, Conn., in 1779, was a grandson of Jonathan Edwards; grad. at Princeton in 1797, and studied at Litchfield law-school; was M. C. from Conn. 1819-23, U. S. Senator 1823-27, and gov. 1833 and 1835-38. D. July 22, 1847.

Edwards (JONATHAN), a divine and metaphysician, b. at E. Windsor, Conn., Oct. 5, 1703. His father, Timothy Edwards, a man of talents and of uncommon learning for those times, was settled as minister at E. Windsor. Jonathan is said to have commenced the study of Lat. when only 6 yrs. old. When he was 10 yrs. of age he composed

an essay in which he ridiculed the idea, which some one had recently put forth, of the materiality of the human soul. In 1716 he entered Yale Coll., and grad. in 1720. He dated his "conversion" from about his 17th yr., after which all nature seemed changed in his view, everything revealing to his purified understanding the wisdom, glory, and love of God. In 1723 he took at Yale the degree of A. M. He was tutor at Yale 2 yrs. (1724-26). In the early part of 1727 he was settled as pastor of a ch. at Northampton. It had become a custom in the ch. to admit to the communion-table all who professed with the congregation, without any inquiry as to whether they had been truly converted, or whether their spirit and life were consistent with their external profession. E. believed that it was his duty to adopt a higher and purer standard. But his attempted reform caused great dissatisfaction, and he was at length driven forth from his congregation, not knowing whither to go and without any means of support for his family. Not long afterward, however, he was offered the situation of missionary at Stockbridge, among the Housatonic Indians. In 1757 he was appointed pres. of Princeton Coll. in N. J.

As a close and subtle reasoner E. has no superior, perhaps no equal, among those who have written in the Eng. lang. But he has a still higher claim to our respect and admiration—the spotless purity of his character and the faultless consistency of his Chr. life. Wrote *An Inquiry into the Qualifications for Full Communion in the Ch., An Inquiry into the Modern Prevailing Notions respecting that Freedom of the Will which is supposed to be Essential to Moral Agency, The Great Chr. Doctrine of Original Sin Defended, and The Hist. of Redemption*. D. Mar. 22, 1758. (See SAMUEL HOPKINS, *Life of Jonathan Edwards.*)

Edwards (JONATHAN), D. D., a son of the preceding, b. at Northampton, Mass., May 26, 1745, grad. at Princeton in 1765; was minister of a ch. at White Haven, Conn., from 1769 to 1795, and was dismissed for his religious opinions. He became pres. of Union Coll., Schenectady, in 1799. Wrote several theological treatises. He is commonly known as "the younger Edwards." D. Aug. 1, 1801.

Edwards (JONATHAN W.), a lawyer, a son of the preceding, b. at New Haven, Conn., Jan. 5, 1772, and grad. at Yale 1789; practised law at Hartford. D. Apr. 3, 1831.

Edwards (JUSTIN), D. D., a clergyman and writer, b. at Westhampton, Mass., Apr. 25, 1787. He grad. at Williams Coll. in 1810, and for 15 yrs. was pastor of a Congl. ch. at Andover. He removed to Boston, where he preached for 2 yrs. more; resigned on account of failing health, and became sec. of the Amer. Temperance Society, of which he was the originator; prepared the *Temperance Manual*, and was one of the founders of the Tract Society at Boston. Wrote *Sabbath Manual*. D. July 23, 1853.

Edwards (NINIAN), a lawyer, b. in Montgomery co., Md., in Mar. 1775. In 1808 he became chief-justice of Ky., and in 1809 gov. of Ill. He was U. S. Senator from Ill. 1818-24, and gov. 1826-30. D. July 20, 1833.

Edwards (PIERREPOINTE), a lawyer, and son of Jonathan Edwards, b. Apr. 8, 1750; commenced practice in New Haven in 1771. He served in the Revolutionary army, and was M. C. 1787-88; became judge of the U. S. dist. court of Conn. D. Apr. 14, 1826.

Edwards (WILLIAM), an inventor, b. Nov. 11, 1770, at Elizabethtown, N. J. He was a grandson of the elder Jonathan Edwards. He introduced the system now employed in nearly all Amer. tanneries by which leather is made in about $\frac{1}{4}$ the time required by the old European process. His first tannery was built at Northampton, Mass., about 1793. The supply of hemlock bark having failed in the valley of the Conn., he removed in 1817 to Hunter, Greene co., N. Y., and erected on the Schoharie Creek his model tannery. From this establishment about 10,000 sides of sole leather were sent to the city of New York annually. He not only invented several machines, but he adapted many devices previously used for other purposes to the art of tanning, and thus he was enabled to make water-power take the place of manual labor to a great extent. D. Dec. 1, 1851.

Edwardsville, city, cap. of Madison co., Ill., on R. R. and Cahokia Creek, 19 m. N. E. of St. Louis, Mo. Pop. 1870, 2193; 1880, 2887.

Eel [*Lat. anguilla*; Fr. *anguille*; Ger. *Aal*; A.-S. *æl*], a name applied to many fishes of elongated serpentine shape, but especially to the Anguillidae, a family of which the common *Anguilla* of Europe and Amer. are well known to all.

Ee'lee, a river of Central Asia, rises on the N. side of the Thian-shan Mts., flows through a part of Chi. Tartary, and empties, after a course of 600 m., into Lake Balkash.

Ef'ingham, R. R. junction and city, cap. of Effingham co., Ill., 98 m. E. N. E. of St. Louis and 199 m. S. by W. from Chicago. Pop. 1870, 2383; 1880, 3065.

Eff, or **Ev'et**, the popular name of many small lizards and of several tailed batrachians.

Eg'bert, king of the West Saxons, b. about 775, was a descendant of Cerdic. He passed many of his early yrs. at the court of Charlemagne, and began to reign in 800 A. D. He ruled over all the states of the Heptarchy, and gave the name of Eng. to the whole. In 835 he defeated an army of Danes who had invaded Eng. D. 836 A. D., and was succeeded by his son Ethelwolf. (See LAPFENBERG'S *Hist. of Eng. under the A.-S. Kings*, translated by Thorpe.)

Eg'ede (HANS), a Dan. missionary, b. at Harstad, Nor., Jan. 31, 1686. He became pastor of the ch. of Vaagen in 1707, and went in 1721 to Greenland, where he founded a mission for the conversion of the natives. He endured great privations; in 1735 he returned to Copenhagen, where he was appointed a bp. in 1740. Wrote a *Description of Greenland* (1741-44). D. Nov. 5, 1758. (See RUDELBACH, *Christl. Biographie*, part vi.) His son PAUL, b. in 1708, went with his parents to Greenland in 1721. He assisted Hans, and remained there until 1740. He became bp. of Greenland in 1776. Prepared a valuable dict. (1754) and gram. (1760) of the Esquimaux. D. June 3, 1789.

Egeria, *o-jér-é-a*. Fr. *Egeria*, a nymph who, according to the Rom. mythology, was a prophetic divinity from whom Numa derived inspiration. The poets feigned that Numa had interviews with her in a grove, and that when he died she melted away in tears, which became a fountain.

Egeria, one of the asteroids of the solar system, was discovered at Naples in Nov. 1850, by De Gasparis.

Egerton FRANCIS HENRY. See BRIDGEWATER, EARL OF. **Egg** [Lat. *ovum*; Fr. *œuf*; Ger. *Ei*], originally the name of the ovum of certain animals (birds, reptiles, fishes, insects, etc.) discharged with its envelopes before the development of the organism, but also used to include all ova. The most typical examples of the E. are those of birds and the higher reptiles. These have a shell (*putamen*) consisting of carbonate of lime, a little animal matter, and traces of magnesia, phosphorus, iron, and sulphur. Lining the inside of the shell is a tough shell-membrane. The albumen or white of E. differs from the albumen of the blood in some of its chemical reactions, and is distinctively known as E.-albumen. The yolk (*vitellus*) is a highly nutritious substance, containing large proportions of nitrogenous and fatty matter. (See EMBRYOLOGY.)

Egg Bird, or **Sooty Tern** (*Sterna fuliginosa*), the name of a Central Amer. bird of the family Laridae; white, with the crown, back, and wings sooty black.

Egger (EMILE), DR. LIT., b. in Paris July 13, 1813, and received his degree in letters in 1833. He has held various professorships of anc. langs. in Paris, and has pub. *Latini Seminis Vestustioris Reliquia Selecta*, *La Critique chez les Grecs*, *Mémoires d'Histoire Ancienne et de Philologie*, and numerous other works.

Eggleston (EDWARD), D. D., a Meth. divine and author, b. in Vevay, Ind., in 1837, joined the Meth. ministry in his 19th yr., and preached during 10 yrs. in Minn. He began his literary career in 1866 as ed. of *The Little Corporal*, commenced in 1867 the *Sunday-School Teacher*, in 1870 went to New York city and became ed. of *The Independent*, was some time ed. of *Heath and Home*, and contributor to *Scribner's Monthly*. Wrote *Hoosier Schoolmaster* and *The Mystery of Metropolisville*.

Egg Plant (*Solanum Melongena*), an annual herbaceous plant of the same genus as the potato and nightshade, is a native of India and N. Afr. The fruit is a globose or egg-shaped berry about 4 inches in diameter, but the size varies much according to the quality of the soil and climate. It is cultivated for food in India, the U. S., and various warm climates, and is cooked before it is eaten. This plant flourishes in N. J., but not so well in the more N. States of the U. The seeds should be sown in a hot-bed in Apr. and transplanted in May or June. There are several varieties of this plant, which produce purple, white, or red fruits. In some countries it is called aubergine or aubergine.

Egina. See EGINA.

Eginhard, or **Eginard**, a Fr. historian, b. in Austria; Charlemagne appointed him his sec. He accompanied that emp. in his journeys and military expeditions. After the death of Charlemagne he passed into the service of Louis le Débonnaire. According to a doubtful tradition, he married Emma, a daughter of Charlemagne. His chief works are a *Life of Charlemagne* (in Lat.) and *Annals of the Fr. Kings*, from 741 to 829. D. 844 A. D.

Eglantine [Fr. *eglantine*, probably akin to the Fr. *aiguille*, a "needle," so called on account of its prickles], a name of the *Rosa rubiginosa*, a species of rose sometimes called sweetbrier. It is a native of Europe, and is naturalized in the U. S. The flower is single and fragrant. The leaves also emit a peculiar fragrant odor from their russet-colored glands.

Eggleston (THOMAS), A. M., E. M., Ph. D., LL.D., b. in the city of New York Dec. 9, 1832, grad. in 1854 from Yale Coll., went in 1855 to Europe, was assistant in the laboratory of geol. at the Garden of Plants, and in the palaeontological laboratory at the School of Mines in Paris; grad. at the latter inst. in 1860; was appointed mineralogist at the Smithsonian Inst. in 1861; formed in 1863 the plan for the School of Mines in Wash., and was appointed prof. of mineralogy and metallurgy at the School of Mines in New York in 1874.

Eglington and Win'ton (ARCHIBALD WILLIAM MONTGOMERIE), EARL OF, a Brit. peer, b. Sept. 29, 1812. He succeeded the 14th earl of Eglington in 1819. In politics he was a conservative. He was appointed lord lieut. of Ire. in 1852 and in 1858. A famous tournament occurred at his castle, a magnificent Gothic structure, surrounded by a park of 1200 acres, in 1839, and was attended by Louis Nap., afterward emp. D. Oct. 1861.

Egmont or **Egmond** (LAMORAL), COUNT OF, and PRINCE DE GAVRE, a Flemish nobleman and gen., b. in 1522. He was descended from the dukes of Gelderland. He served in the armies of Charles V. In 1557 he commanded the cav. of the Sp. army, and defeated the Fr. at St. Quentin. He gained a decisive victory at Gravelines in 1558. As an associate of William, prince of Orange, he opposed the intolerant and despotic policy of Philip II., but he constantly adhered to the Catholic Ch. He was appointed a member of the council of state in 1569. He ceased to act with the popular party after they revolted against the Sp. king, but the latter regarded him with jealousy and hatred, and sent the duke of Alva to Flanders with viceregal power in 1567. Alva was a bitter enemy of E., and is said to have brought his death-warrant from Philip. E. and count Horn were arrested, tried for treason, and executed June 5, 1568, at Brussels. This cruel act provoked a gen. revolt against Philip II. A statue was erected to E. in 1865. (See MOTLEY, *Rise of the Dut. Republic*.)

Egret, or **Aigret** (the diminutive of the provincial Fr. *égrou* or *agrion*, a "heron"), a name applied to several species of heron. The common Amer. E. (*Herodias alba*) is a handsome bird with soft flowing plumage and pure white.

Egribo, or **Egripos**, a TOWN OF GR. See CHALCIS.

Egypt, (Gr. *Aiguptos*; Lat. *Aegyptus*; Heb. *Mizraim*; Fr. *Égypte*; Ger. *Ägypten*; Coptic, *Cham* or *Khem*; It. *Egitto*; Arab. *Misr* or *Misr*), a country in the N. E. part of Afr., bounded N. by the Mediterranean, E. by the Red Sea, S. by Nubia, W. by the Great Desert. It comprises the lower portion of the valley of the Nile, from the cataract of Asswan to the mouth of the river. This region is renowned as the home of the first civilized nation of the world. The area of E. Proper is estimated at 210,000 sq. m., annexed and conquered districts, including Nubia, Kordofan, Darfur, the Soudan, and the Equatorial Provinces, being estimated at 1,026,250 sq. m. Beside the Delta and several oases in the Desert, E. Proper is a valley about 500 m. long, confined between 2 ridges of barren limestone hills, not much over 1200 ft. high. The average breadth of the valley is about 7 m. Its fertility presents a remarkable contrast to the desolation on either side. The most important feature of E. is the Nile, which is the source of all the country's fertility. Its periodical overflow is among the most remarkable instances of the stability of the laws of nature. For several thousand yrs. the average height and duration of the inundation have continued nearly the same. About 100 m. from the sea its narrow valley expands into the vast alluvial plain of the Delta. E. Proper is divided from old into 3 dists.—viz. Masr-el-Bahri, or Lower E., El Wustani, or Middle E., and El Said, or Upper E.

The great Libyan desert west of the Nile is diversified by oases; the Great Oasis and the oasis of Seewah (anc. Ammonium). The date-palm, grapevine, and fig tree flourish in this oasis, but all E. is destitute of forests; some have been planted by the khedive in the Delta, and the annual rainfall has been increased thereby. The climate is remarkably dry; rain seldom falls in Upper E. In the Delta the mean temperature of winter is about 54° F., and that of summer 82°. A hot S. wind (khamseen or simoom) prevails for 2 months in spring. During 8 months the N. wind blows. The Nile begins to overflow in July, and continues to rise until Sept. In Oct. the country resembles a sea, in which the towns appear as islands. After the inundation has subsided, grain and seeds are sown, and nature displays the brightest green in the months of Dec. and Jan. The chief productions are wheat, barley, maize, cotton, tobacco, sugar, beans, millet, durrah, indigo, hemp, flax, onions, clover, oranges, figs, and grapes. Two crops are raised in a yr. on the same piece of land.

Minerals, Animals, Etc.—Limestone, sandstone, and red granite or syenite are abundant. Between Asswan and Esneh is an extensive sandstone formation. The Pyramids are built of limestone quarried in their vicinity. In the Jebel Mokattam, between the Nile and Suez, is a tract covered with the silicified trunks of trees. The soil of Lower E. consists of a dark-brown mould or argillaceous loam mixed with sand. Among the minerals of E. are alabaster, porphyry, and emeralds. The prin. wild animals are the wolf, hyena, jackal, antelope, crocodile, and jerboa. The domestic animals of E. are camels, horses, horned cattle, asses, sheep, etc. Among the birds are the vulture and the ibis. The flora abounds in dicotyledonous plants, as the acacia. The prin. trees are the date-palm, the drom-palm, the sycamore, the cypress, and the tamarisk. Among the indigenous plants are the papyrus, the lotus, a species of water-lily, and the *Acacia vera* (or *nilotica*), from which gum-arabic is obtained.

The Turks have been the ruling class in E. since they conquered the country. The Bedouins, whose number is estimated at about 400,000, are the unmixed descendants of the Arabs, while the Arabs of the towns and the Fellahs are believed to descend from a mixture of the anc. Arabs and the anc. Egyptians. The Copts are the unmixed descendants of the anc. Egyptians. Nominally, E. is still a pashalic of Tur., but in 1841 a hatti-sharif made the rule over it hereditary in the family of Ismail Pasha. In 1866 the sultan, at the request of Ismail Pasha, changed the law of succession so as to make the pashalic hereditary in the direct male line. A large majority of the inhabs are Mohammedans of the Sunnite sect. Among the Mohammedan high schools, the one which is connected with the Mosque al Azhar at Cairo, often called the Univ. of Cairo, is the most celebrated. It was formerly one of the chief seats of Arabic learning, and had sometimes as many as 20,000 students; and even at present it attracts students from all parts of the Mohammedan world. Great progress in the cause of education was made by the establishment in 1838 of govt. schools in the large towns. These schools number about 4000 pupils, and embrace both primary and secondary instruction.

Population, Etc.—The pop. of E. Proper is 5,517,000, and with its dependencies is 17,419,980. The 2 largest cities are Cairo, the cap., and Alexandria. The revenue in the budget for 1880 was estimated at \$42,808,110, the expenditures at \$30,558,110; the public debt at the end of 1880 was \$489,765,200. The commerce of E. is very large, but consists largely of goods carried in transit. In the yr. 1879 the total value of the imports amounted to 560,900,000 piastres, and of the exports to 999,500,000 piastres. To the entire foreign trade G. Brit. contributed 53 per cent., and the rest was divided between Fr., Aus., It., and Rus., in descending proportions. The army is raised by conscription, and numbers 15,000 men. The Egyptian navy comprised, at the end of June 1880, 2 frigates, 2 corvettes, 3 large yachts for the use of the khedive, and 4 gunboats, the whole of a burden of 16,476 tons. The commerce of the world has derived great advantages from the construction of the Suez Canal, opened for navigation Nov. 17, 1869. The number and tonnage of vessels which passed through the canal in 1880 was 2017, with 4,378,064 tonnage.

Ancient History and Monuments.—The sacred hist. of the Hebs. informs us that the Egyptians were descendants of Ham. The first mortal who reigned over all E. was Menes, the founder of the first of 30 dynasties. He founded Memphis. The great pyramid of Cheops was built by a king of the 4th dynasty, and is among the oldest Egyptian monu-

ments that are extant. Among the oldest cities of E. was Thebes, the temples and palaces of which are the most magnificent ruins on the globe. Among the famous kings of the



Sphinx and Pyramid.

12th dynasty was the warlike Osirtesen I., the Sesostris of the Grs. Amenemha, a king of the 12th dynasty, excavated Lake Moeris and constructed the famous Labyrinth. It contained 12 palaces and 3000 saloons. After the 14th dynasty the Hyksos or "shepherd kings," who were of foreign origin, ruled over Lower E. for several centuries. With the 18th dynasty, about 1525 B. C., commences the most brilliant period of Egyptian hist. and the greatness of Thebes. Among the most famous of the Theban kings were Amenoph I., Thothmes I., Thothmes III., Amenoph II. and III., and Horus, of the 18th dynasty, and Sethos and Rameses II. of the 19th. These kings builded the grand temples and palaces of Karnak and Luxor. Their conquests and victories over the Assyrians, Ethiopians, and other nations are recorded on obelisks, temples, and tombs. Among the kings of the 26th dynasty was Psammetichus, who began to reign about 670 B. C., and favored the immigration of the Grs. into E. A revival of art occurred in his long reign. His son and successor, Necho, defeated Josiah, king of Judah. E. was conquered about 525 B. C., by Cambyes, king of Per, but regained its independence under Amyrtæus, a king of the 28th dynasty. In the yr. 350 B. C. E. was again conquered by Darius Ochus, king of Per. In 332 B. C. Alexander the Great invaded E. The next year founded Alexandria, and partially Hellenized the country, but the Egyptians continued to be governed by their own laws. E. continued to be a powerful kingdom under several Gr. or Macedonian kings named Ptolemy. Under the rule of the Ptolemies and of the Romans, who became masters of E. about 30 B. C., Alexandria was a famous centre of learning and philos. as well as a great commercial emporium.

Among the peculiarities of this nation was the hieroglyphic mode of writing, and the practice of covering their obelisks and the walls of temples with bas-reliefs and hieroglyphic symbols, which recorded historical events, and represented their social customs and private life. The govt. was a limited hereditary monarchy. The priests were the real governing body, the depositaries of learning and science. The chief priests were the judges of the land, the councillors of the sovereign, the legislators, and the guardians of the great mysteries. The king himself was anciently a priest. The anc. Egyptians were believers in the immortality of the soul and in the resurrection of the body, but they worshipped beasts, reptiles, and even vegetables. They were brave in war, and less cruel than the Assyrians. They excelled in magic arts, and had made much progress in various sciences before the time of Moses. They carried astron. to the highest point it could attain without modern instruments. They were well versed in geom., arith., mechs., hydraulics, and chem. More than 1000 yrs. before Phidias they had attained proficiency in sculpture. In their temples and palaces we see grandeur of form, taste in design, finish in decoration, and an expression of repose. Among the arts in which they acquired skill was music, and they played on the harp, lyre, and sistrum during the 12th dynasty. They also fabricated glass bottles and beads, some of which are marked with symbols indicating a date of 1500 B. C. Women were so well treated that their condition was more favorable in E. than in other anc. nations. According to Strabo, there were 3 castes—priests, soldiers, and husbandmen. The stamp of caste was not indelible.

Modern History.—When the Rom. empire was divided, on the death of Theodosius in 395 A. D., E. became a part of the dominions of the East. For several centuries after the time of Constantine the Great (306-337 A. D.), E. was disturbed by religious controversies between the different sects of Christians, who were numerous there. The Arians and orthodox caused much bloodshed in E. In 640 A. D. the Arabs, under Omar, invaded E. The oppressed Egyptians offered little resistance, and the conquest of the country was easily effected in Dec. 640. About 970 A. D. E. was conquered by the Fatimite dynasty, under which Cairo became the cap. Saladin obtained the sovereign power as sultan of E. about 1170. He d. in 1193, leaving several sons, among whom his empire was divided. Louis IX. of Fr. conducted a crusade against E. in 1248, but was taken prisoner by the Saracens. In 1250 the govt. was revolutionized by the Mamelukes, who usurped the chief power. This country was conquered in 1517 by the Ottoman sultan, Selim I., who reduced it to a Tur. prov. The turbulent Mamelukes afterward filled the country with disorder, and under their domination it was invaded by the Fr. in 1798. A Fr. army of about 35,000 men, commanded by Bonaparte, arrived at Alexandria in 1798. This expedition was accompanied by a large number of savants and artists. Bonaparte defeated the Mamelukes at the battle of the Pyramids, and took Cairo. The conquest of E. was soon completed. The Fr.

savants and artists explored the topography, nat. hist., and antiquities of E., and obtained materials for a great descriptive work, *Description de l'Égypte*, etc. In Aug. 1799 Bonaparte returned to Fr. After several battles, the Fr. were expelled in 1801. Mehemet Ali was appointed pasha of Cairo in 1804, and massacred a large number of the Mamelukes in 1811. Mehemet Ali d. Aug. 2, 1849. The rulers of his dynasty are Ibrahim Pasha (d. Nov. 10, 1848), Abbas Pasha, Said Pasha (1854-63), Ismail I. (1863-79), and the present sovereign, Mohamed Tewfik (b. Nov. 19, 1852; married, Jan. 10, 1873, to princess Eminah, daughter of El Hamy Pasha). To the exclusion of the natives every source of revenue was given to foreigners, and a revolution broke out in 1882. The Eng. intervened, Alexandria was bombarded July 11, 1882, and after a short invasion under Sir Garnet Wolseley, E. was restored to order. (See BUNSEN, *Ägyptens Stelle in der Weltgeschichte*, and LEPsius, *Denkmäler aus Ägypten und Aethiopien*.)

Egyptian Architecture is characterized by simplicity, solidity, and heaviness of structure. The pyramid, though not peculiar to E. A., lent its solidity to all the important buildings, the walls of which generally incline inward, and are never more than one story high. The use of columns far exceeded the requirements of safety or strength, the shafts being very large and short, and set very near each other. Burnt or sun-dried brick, granite, limestone, marble, syenite, and a great variety of materials were employed. The roof of important buildings was of great masses of stone, requiring the use of numerous interior columns. All buildings, with scarcely an exception, were rectangular. The decorations were chiefly hieroglyphic. It is a great mystery how the anc. Egyptian builders could have raised to position the prodigious blocks of stone which they employed.

Egyptian Culture. See CULTURE.

Ehrenberg, a'ten-berz (CHRISTIAN GOTTFRIED), M. D., a Ger. naturalist and microscopist, b. at Delitzsch, in Prus. Sax., Apr. 19, 1795; studied med. at Leipzig, and grad. as M. D. in 1818. Wrote *Phys. Symbols of Birds, Insects, etc.* (in Lat.), and *The Infusoria as Perfect Organisms*. He discovered that cretaceous and other strata of great extent are composed of microscopic organisms. D. June 27, 1876.

Ehrenbreitstein, a'ten-brit-stin (i. e. "honor's broad stone"), a fortified town of Prus., on the Rhine, opposite Coblenz, with which it is connected by a bridge of boats. It is at the base of a rocky hill, on the summit of which stands the citadel of E., on a rocky promontory 400 ft. above the water, inaccessible on 3 sides, and defended on the N., and only assailable front by a double intrenchment. It was besieged without success in 1688 by the Fr., who took it after a long siege in 1799. The citadel was rebuilt in 1815 by the Prus. The present construction has been regarded as impregnable except to famine. Pop. about 5692.

Eichhorn, ik'horn (JOHANN GOTTFRIED), a Ger. scholar and biblical critic, b. at Dörenzimmern Oct. 16, 1752. He was ed. at Göttingen, became prof. of Oriental langs. at Jena in 1775, and of Oriental and biblical lit. at Göttingen 1788, which office he filled nearly 38 yrs. As a biblical critic he belongs to the rationalistic school. Wrote *Introduction to the O. T., Introduction to the N. T.*, and a *Hist. of Lit. from its Origin to the Most Recent Times*. D. June 25, 1827.

Eider (G'der) **Duck** (Old Icelandic *eddr*), a name applied to a genus of sea-ducks (*Somateria*) natives of the N. circumpolar region. The male of *Somateria mollissima* is white, with the under parts, rump, quills, and crown black; the female reddish-brown, transversely marked with darker shades. During incubation the female deposits in the nest the down which she plucks from her breast. When this is removed by the hunters she furnishes more. This down is of the finest quality, and is an important article of commerce.

Eisenach, i'ze-nahk, a town of Ger., in Saxe-Weimar, on the river Hösle and on the R. R. from Leipzig to Cassel, about 48 m. W. of Weimar. Near it is the castle of Wartburg, memorable as the place of refuge in which Luther was secreted 10 months (1521-22), having been carried there for safety by his friend the elector of Sax. Pop. 18,624.

Eis-leben, a town of Prus. Sax., about 20 m. W. of Halle, with which it is connected by a R. R. It has an old castle and a gymnasium. Martin Luther was b. here Nov. 10, 1483, and d. here Feb. 18, 1546. Pop. 18,187.

Ejectment [Lat. *ejec'tio fin' mæ*, from *ejic'to*, *ejec'tum*, to "cast out"], in law, is a *mixed* action, as it is resorted to in order to recover the possession of land, and damages for the wrongful withholding of it, though the damages are nominal. Originally, it was a "possessory" action—i. e. adapted to the recovery of the possession of land. By a series of fictions it finally came to be a convenient means of testing the title. Should the plaintiff succeed in his action, he has also an independent cause of action for the loss of profits sustained by reason of the defendant's wrongful possession. This is known as an action of trespass for *mesne* (intermediate) profits. In some of the Amer. States—e. g. N. Y.—this cause of action may be united with the action of E. The recovery would, by the statute of limitations, commonly be limited to the mesne profits for the last 6 yrs.

Elæ'is [from the Gr. *ἐλαίον*, "oil"], a genus of trees of the natural order Palmaeae. The *El. Güineen'sis*, or oil-palm, a native of W. Afr., produces the palm oil which is extensively used in the manufacture of candles and soap. This tree abounds in the tropical parts of Afr., and bears a very large quantity of fruit, from the outer fleshy rind or coating of which the oil is obtained by boiling in water. This oil is made into soap more readily than any other known oil. A still further supply of oil can be obtained from the fruit by treatment of the boiled fruit. This is called "palm-nut oil." This species and others of the genus have been naturalized to some extent in tropical Amer., where they are cultivated for their oil. They also yield a pleasant alcoholic drink.

Elæococ'ca [from the Gr. *ἐλαίον*, "oil," and *κόκκος*, a "berry"], a genus of plants of the natural order Euphor-

biaceæ. Useful oil is obtained from the seeds of several species. A tree called *E. verrucosa* is cultivated in Mauritius and Japan for its oil, which is used for burning. One or more species in Chi. yield drying oils, used in that country for preparing varnishes and paints.

Eleodendron [from the Gr. *ελαον*, "oil," and *δένδρον*, a "tree"], a genus of trees belonging to the order Celastraceæ. *E. croceum*, commonly called saffron-wood, grows near the Cape of Good Hope, where it is prized for building and cabinet-work. *E. glaucum*, found in S. India, is called the Ceylon tea tree. Some of the species yield a fixed oil resembling oil of olives.

Elagabalus, or **Heliogabalus** [Fr. *Elagabal*, or *Héliogabale*] (MARCUS AURELIUS ANTONINUS), a Rom. emp., b. at Antioch in 204 A. D. His original name was Varius AVIRUS BASSIANUS, but on being appointed a priest of the god whom the Syrians called Elagabal, he assumed that name. Caracalla was assassinated Apr. 8, 217 A. D., and Macrinus was proclaimed emp. Apr. 11, 217. E. was proclaimed emp. by the army in Syria May 16, 218. A battle was fought between Macrinus and E. June 8, 218, and Macrinus was put to death some days afterward. E. was cruel, and indulged in excessive debauchery. He was assassinated by his soldiers Mar. 11, 222, and was succeeded by Alexander Severus.

Elain [from the Gr. *ελαον*, "oil"], that portion of oil or fat which remains liquid at ordinary temperatures; the oily principle of solid fats. It is generally called olein. (See FATS and OILS.)

Elam, the name in the Bible and the cuneiform inscriptions of part of the anc. Per. empire called Susiana and Cissia, by the Grs. Shushan or Susa was its chief city.

Eland [Dut. for elk], a name incorrectly applied by the Dutch colonists of S. Africa to the (*Boselaphus oreas*), the largest of the antelopes. It is about the size of a horse, 5 ft. high at the shoulder, with nearly straight horns about



Eland.

1½ ft. long, less slender in the body and limbs than most antelopes. It has a large protuberance on the larynx. The E. are gregarious and found in large herds in S. Afr. The flesh is highly prized. The species has been bred in Eng. with success. It is called *impoofo* or *pohu* by the natives.

Elanet. See KITE.

Elapide [Lat. *elaps*], a family of venomous snakes, natives of tropical Amer., Australia, etc. Three species are found in the U. S. The *Elaps fulvis* is one of the handsomest snakes known, having bands of jet black, carmine red, and golden yellow.

Elateiride [Gr. *ελατήριον*, a "driver"], a family of sericorn Coleoptera, having a narrow, elongated body, and distinguished by the presence of a strong spine projecting from the posterior margin of the prosternum, and a groove or socket fitted for the reception of the spine. If they fall on their back, they recover their feet by a violent muscular effort, which throws them into the air with a jerk and a clicking sound. Hence they are called click-beetle, snap-bug, etc. Their larvæ are the wireworms of the U. S., and are very destructive to growing crops. The firefly of tropical Amer. is *Pyrophorus notilucus*.

Elateirium [Gr. *ελατήριον*, a "cathartic," from *ελαύνω*, to "force"], a drug obtained from the *Ecbatium agreste*, or wild cucumber, called also squibbing cucumber. It is an annual belonging to the order Cucurbitaceæ, with a trailing stem, heart-shaped leaves, lobed and toothed, yellow flowers, axillary; fruit grayish-green, about 1½ inch long, covered with soft prickles. The fruit in parting from its stalk expels the seeds, along with a mucus, through the opening in which the stalk was inserted. E. is contained in the thick green mucus surrounding the seeds. It is a powerful and dangerous cathartic, and is very irritating to the eyes and skin. The active principle called elaterin is obtained from it. E. is sometimes used in dropsy.

Elath [Heb. *Eloth*, "trees"; Lat. *Elath*, or *Elath*], a town several times mentioned in the Bible, was built at the foot of the valley El Ghor in Idumæa, and at the head of the Elanitic arm of the Red Sea (now known as the Gulf of Akabah), near lat. 29° 30' N., lon. 30° E., 10 m. E. of Petra. It was conquered by King David, and under Solomon became an important commercial emporium. It continued to be a seaport of importance under the Romans. It was taken by the crusaders in 1116, was lost in 1167, and after that fell into decay. It stood on or near the spot now occupied by

the fortress of Akabah, which is held by a small garrison of Egyptian troops; has extensive ruins.

Elba [Fr. *Elbe*; anc. *Ilva* and *Alba*; Gr. *Αἰθαια*], an island of It. in the Mediterranean, between Corsica and Tuscany, from which latter it is separated by a channel about 5 m. wide. It is about 18 m. long, and varies in width from 2½ to 10 m. By the treaty of Paris E. was designated as the residence of Nap. I., who removed to it in May 1814 and escaped in Feb. 1815. Pop. 21,755.

Elbe, elb [anc. *ALBIS*; Bohemian, *La'be*; Dut. *El've*], a river of Ger., rises in the N. E. part of Bohemia, one of its sources being about 4500 ft. above the sea. It flows in a gen. N. W. direction, intersects Sax. and Prus., and enters the Ger. Ocean near Cuxhaven, draining an area of 59,000 sq. m. For a distance of nearly 70 m. the E. is several m. wide, and has large affluents. Vessels drawing 14 ft. ascend as far as Hamburg, above which point it is navigable for some distance by small steamers. Length, about 700 m.

Elberfeld, a manufacturing town of Prus., on the Wipper, 16 m. E. of Düsseldorf, with which it is connected by a railway. It extends a distance of several m. along a valley. Barmen, also a considerable town, joins upon the E. part of E. Pop. 93,503.

Elbert (SAMUEL), a Revolutionary officer, b. in S. C. in 1743. He distinguished himself as col. in the war for independence. In 1785 he became gov. of Ga. At the time of his death he was maj.-gen. of militia. D. Nov. 2, 1788.

Elbrooz, **Elbruz**, or **Elburz**, a range of mts. in Per., forming the connecting chain between the Anti-Taurus and the Kuen-Lun. The E. extends nearly parallel with the S. shore of the Caspian Sea, and forms the S. boundary of the basin of that sea. The highest point is the volcanic peak of Demavend, 20,000 ft. or more above the sea. This name is also applied to the loftiest range and summit in the Caucasus, between the Black and Caspian seas. Mt. Elbrooz has an altitude of 18,326 ft.

Elcesaites, or **Elkesaites**, a sect of Essenian Ebionites, or of Jewish Chrs. who mingled Judaism and Christianity in their doctrines, adding to them certain pagan or Gnostic views and magical practices. This sect appears to have originated in the early part of the 2d century, and probably lasted till the 4th century.

Elchingen, el'king-en, a v. of Bavaria, on the Danube, 8 m. N. E. of Ulm. Here, Oct. 13, 1805, Ney defeated the Aus., from which victory he was created duke of Elchingen.

El'der [Fr. *sureau*; Ger. *Holunder*] (*Sambucus*), a genus of shrubby plants belonging to the order Caprifoliaceæ. The common E. (*Sambucus nigra*) is indigenous to Europe and parts of Asia and N. Afr. It sometimes attains the size of a small tree, having pinnate leaves, terminal cymes of creamy white flowers, and small black berries, 3-seeded. The young shoots contain a great deal of pith. The common E. (*Sambucus Canadensis*) of N. Amer. grows from 5 to 10 ft. high. Another Amer. species is the red-berried E. (*Sambucus pubens*), which is found in rocky woods and among mts. The *Sambucus glauca* grows in the W. There is also a scarlet-fruited E. (*Sambucus racemosa*) found in some parts of Europe, which is prized as an ornamental shrub in G. Brit. The dwarf E. or danewort (*Sambucus Ebulus*) is found in G. Brit. The flowers of the E. are used in med., and E.-flower water, employed in perfumery, is distilled from them. Wine is also made from the berries.

El'don (JOHN SCOTT), EARL of, lord chancellor of Eng., b. at Newcastle June 4, 1751, ed. at Ox.; was called to the bar in 1776; after 4 yrs. of moderate success, he gained great distinction; became in 1783 a member of Parl., in which he supported Mr. Pitt, and showed himself an able debater. He was appointed solicitor-gen. in 1788, and atty.-gen. in 1793. In 1799 he became chief-justice of the court of common pleas, and was created Baron Eldon. On the formation of a new ministry by Mr. Addington in 1801, Lord E. was appointed lord chancellor. He continued to fill that office under several successive administrations for 36 yrs., except an interval of nearly a yr. in 1806-07. His reputation as a judge was very high, but as a statesman his merit was not great. He was an enemy of religious liberty, and opposed the abolition of the slave-trade and parliamentary reform. He received the title of earl in 1821, and was compelled to resign the great seal when Canning became prime minister in 1827. D. Jan. 13, 1838. His brother William was an eminent judge, and bore the title of Lord Stowell.

Eldo'ra, cap. of Hardin co., Ia., on R.R. and the Iowa River, about 66 m. N. N. E. of Des Moines. It has a State reform school. Pop. 1870, 1368; 1880, 1384.

El Dorado, a Sp. term signifying "golden" region, was the name given in the 16th century to a country supposed to be situated in S. Amer. between the rivers Amazon and Orinoco. This region was represented as abounding in gold and precious stones. The term El Dorado is used to express a land of boundless wealth.

El Dorado, R. R. junc. cap. of Butler co., Kan., situated on Walnut River has a large public school building and good water-power. Pop. 1880, 1411.

Eldred, Va. See APPENDIX.

Eleanor (el'e-nor) [Fr. *Éléonore*] OF GUIENNE, queen of Fr., and subsequently queen of Eng., b. about 1122; was the daughter and heiress of the last duke of Aquitaine, and was married in 1137 to Louis VII. of Fr.; in 1152 she was divorced from Louis, and was soon married to Henry II. of Eng. It appears that she instigated her sons to rebel against their father (Henry II.), who imprisoned her for 15 yrs. She acted as regent while her son, Richard I., conducted a crusade to Pal. D. 1183.

Eleatic School, a system of philos. founded by Xenophanes of Elea, who flourished about 530 B. C. While the Ionic school gave their attention to outward nature, the E. philos. directed their speculations to the idea of Being in itself, which they conceived to be the only object of real knowledge. Time, space, and motion they considered as

phantasms, caused by the deceiving senses, and incapable of scientific explanation. They distinguished between the pure reason and common understanding, which judges according to the impressions of sense. Parmenides and Zeno were the most celebrated disciples of Xenophanes.

Elecampane (*Inulin*), a genus of plants belonging to the order Compositae. The common *E. (Lula Helentum)* is indigenous to Middle and S. Europe and grows in various parts of the U. S. The root somewhat resembles camphor in taste, and has sudorific and diuretic properties. It contains the principles *helenin* or *E. camphor*, and *inulin*, which resembles starch.

Electio[n] [Lat. *electio*, from *electum* (from *e*, "out," and *lego*, to "gather"), to "choose," to "read"], in law. The law frequently imposes upon a party the duty to choose between 2 inconsistent or alternative rights or claims. This obligation may present itself in all branches of the law, and often occurs as a rule of practice. In a court of *E.* as distinguished from equity, there may be a case of *E.* where a contract is to be performed in the alternative, as where an insurance company stipulates that in case of loss of a building by fire it may either pay its value or rebuild. In such a case, should the company elect to rebuild, its *E.* would be irrevocable. It may also happen that a creditor will have a right, from the circumstances of the case, to elect one of 2 persons as his debtor. A case of this kind occurs in the law of agency, when an agent purchases goods on credit for an undisclosed prin.; the seller, on subsequently discovering the prin., may elect to regard the sale as having been made to him or to the agent, as he may see fit. An instance of *E.* in the case of real estate is that of dower in land which the husband exchanged for other land. The widow has her choice to take dower in either parcel, but she cannot take it in both. In courts of equity the doctrine of *E.* assumes great importance. *E.* in procedure may take place in the choice of remedies; as where an owner has been wrongfully deprived of a chattel, he may elect to sue for its value or for the chattel itself. A court will in some cases require a party to an action to elect as between inconsistent allegations as to the cause of action. T. W. DWIGHT.

Election, in politics, is the choice of public officers by those persons who possess the right of suffrage, as distinguished from "appointment," which is such choice made by superior officers. Popular *E.* were held in the Rom. *comitia* and the Athenian popular assemblies; but soon after the establishment of the Rom. empire *E.* became obsolete. *E.* reappear in mediæval Europe in the choice of rep. burgesses, who stood for the third estate. Certain rulers, as the Ger. emps., the kings of Poland, and the doges of Venice, were also elected, but not as popular reps. In no other European country did the *E.* of reps. become so important in the Middle Ages as in Eng.; and the rep. systems of other nations have been chiefly imitations of, and in some cases improvements upon, the Eng. system. Especially is this the case in the U. S. *E.* are called *direct* when officers are chosen by a direct vote of their constituency; *indirect*, when electors are chosen for the purpose of designating the persons who shall exercise official powers.

Electo[r] [Fr. *electeur*; Ger. *Kurfürst*; Lat. *elector*, from *el'igo*, *electum*, to "choose"], a title of those Ger. princes who had the right of electing the emp. of Ger. There were originally (1356 A. D.) 7—namely, the *E.* of Cologne, Mentz, Treves, Bohemia, Brandenburg, Sax., and the *E.* Palatine. The first 3 were abps. of Cologne, Mentz, and Treves. Changes were from time to time made in the const. of this electoral body, especially in 1692, when the electorate or dignity of *E.* was conferred on the dukes of Brunswick-Lüneburg, who were afterward styled *E.* of Hanover. On the dissolution of the Ger. empire in 1806, the office became obsolete, but the title was retained by the rulers of Hesse-Cassel until 1866, when that state was united to Prus.

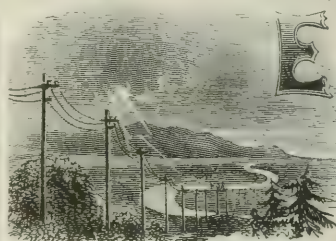
Electoral Commission. See PRES. ELECTORAL COM. **Electors**, in the political system of the U. S., is the title of the persons who are chosen by the people of the several States to elect the Pres. and V.-P. Each State chooses a number of *E.* equal to the whole number of members it sends to both houses of Cong. No senator or rep., or person holding an office of profit or trust under the U. S., can be appointed an *E.* The *E.* must be chosen on the same day in all the States—i. e. on the Tuesday next after the first Monday in Nov. The const. ordains that the *E.* shall meet in their respective States on the first Wednesday in Dec., and vote by ballot for Pres. and V.-P., one of whom at least shall not be an inhab. of the same State with themselves; and they shall make distinct lists of all persons voted for as Pres., etc., and of the number of votes for each; which lists they shall sign and certify, and transmit sealed to the seat of govt. of the U. S., directed to the pres. of the Senate. The *E.* of all the States constitute the electoral coll. A majority of the whole number of electoral votes is necessary to elect the Pres. and V.-P. They meet at the caps. of their respective States. The electoral votes are opened and counted on the second Wednesday of Feb. by both houses of Cong., which meet in the chamber of the reps. In the actual mode of performing their duty the *E.* do not exercise any judgment or discretionary power in the choice of Pres. and V.-P. but cast their votes for the candidates previously nominated by their party, usually in a national convention. If no candidate has a majority of all the votes, the House of Reps. has a right to choose either of the 3 persons having the highest number of votes.

Electra (Gr. Ἠλέκτρα), a daughter of Agamemnon, king of Mycenæ, was sister of Orestes and wife of Pylades. Her story is variously treated in dramas written by Æschylus, Euripides, Sophocles, and Racine.

Electrical Fishes are remarkable as being probably the only animals having the power to give sensible shocks of electricity. They belong to 3 very distinct families—the Torpedinidæ, Gymnotidæ, and Malapteruridæ. The Torpedinidæ are marine and widely diffused. The *Gymnotus elec-*

tricus or "electrical eel" inhabits the fresh waters of tropical S. Amer. The species of *Malapterurus* dwell in Afr. rivers. The electrical apparatus is developed in quite different regions in the several types, but in all cases probably from muscular substance. Other fishes claimed to be more or less electric are species of *Mormyridæ*, *Gymnarchidæ*, *Tetodontidæ*, etc.

Electric Clocks are of several kinds, but are nearly all constructed on one of the 2 following principles: (1) electricity is the motive-power which propels the machinery of the clock; or (2) power is obtained from weights or springs, and electricity is used for controlling or regulating the motion. In some *E. C.* there is an electro-magnet, which attracts a soft iron keeper whenever a current passes through it. The keeper gives motion to the clock-hands by an extremely simple arrangement of levers and wheels. The current is made and interrupted by the vibrations of a standard clock, which may serve to give time to any number of secondary *E. C.*, even if they are at a great distance from each other. Bain's clock has a soft hollow electro-magnet for a pendulum, swinging between the like poles of 2 permanent magnets, the current in the pendulum being broken and reversed in every swing, so that it is forcibly repelled from each magnet. *E. C.* are capable of running a long time without attention, but when moved by electricity alone are not very regular in their motion, owing to slight irregularities in the electric currents; but when electricity is used as a regulating power, it is capable of rendering important services in making ordinary clocks do accurate work. For example, an astronomical clock of great precision is connected in the proper manner by telegraph wires with a great number of common clocks, in such a way that signals are sent at given intervals. Now, suppose that any one of the common clocks has gained or lost a small interval of time between 2 signals, the electric current is found in practice to retard or accelerate the motion just enough to correct the work, and to impart to all the common clocks the precision of the astronomical clock. In these cases the common clocks are often fitted with a Bain's pendulum, but there are other modes of attaining the same result.



Electricity.

Electricity owes its name to the fact that when amber is rubbed it attracts light bodies; the Gr. name of amber is ἤλεκτρον. Afterward it was found that many effects, such as those produced by magnets upon certain metals, were due to the same force; thus the title "*electricity*" includes all actions depend-

ing upon the force seen in the amber, and is divided into statical or frictional, dynamic or galvanic, and magnetic electricity. We first consider **STATIC ELECTRICITY**.

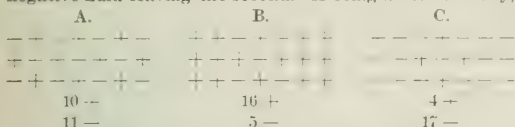
If a light body *A* is attached to the end of a thread or light rod, suspended in the manner shown in Fig. 1, it will form a sensitive means of recognizing the existence of attraction or repulsion. If, then, a piece of amber is rubbed with a woollen cloth, and brought near to *A*, it will be found that this moves toward it. A piece of metal held in the hand and similarly treated will fail to produce any such effect, but if cut off from contact with the body it will act. We therefore divide substances into electric "conductors," which transmit this influence from one place to another, and "non-conductors," which refuse so to do.

But this is only a question of degree, the best conductor offering some obstacle to the transfer of electric force through it, and the worst conductor allowing some to pass. If we allow *A*, when attracted by the rubbed amber, to touch it, we find that in place of being attracted, it is repelled; thus, whatever caused the excitement of the amber is self-repellent in its nature. If, while *A* is in this new state, we bring near it the "rubber," it will be powerfully attracted. Care must be taken that the "excitement" in this case is not lost by contact with the hand. This teaches us that there is something in the "rubber" opposite to that found in the amber. If we take a rod of glass and a silk handkerchief, and rub them together, and then, while *A* is in the condition which causes it to fly from the amber, approach it with the excited glass, we find that the glass attracts it as did the woollen cloth, while at the same time the silk handkerchief repels it as did the amber, and thus the cause of the opposite excitations did not lie in the fact of one being the rubber and the other being rubbed, but in the nature of the substances themselves. If all bodies were arranged in a list, according to their ability to secure one or other of these sorts of excitement, any one when rubbed with a substance above it would acquire one kind, and with one below it the other kind of excitement. These kinds are called positive and negative, the kind produced in glass when it is rubbed with silk being positive, that developed in amber when rubbed with wool, negative.

Most Positive.	Cotton.	Sulphur.
Cat-skin.	Linen cloth.	India-rubber.
Diamond.	White silk.	Gutta-percha.
Flannel.	The dry hand.	Prepared paper (i. e. parchment paper).
Ivory.	Wood.	Collodion.
Rock-crystal.	Sealing-wax.	Gun-cotton.
Wool.	Rosin.	
Glass.	Amber.	—Most Negative.

A piece of rock-crystal, rubbed against ivory, will acquire negative excitement; rubbed with wool, positive.

The theory of single fluid, due to Franklin, assumes that all matter in its normal condition contains an imponderable fluid which attracts matter generally, but is self-repellent. Friction of dissimilar substances causes this substance to accumulate in one at the expense of another. The theory of double fluid, due to Dufay, assumes the existence of 2 fluids, alike in certain properties, but opposite in what we regard as their electric actions. These, in a proportionate mixture, exist in all substances without affording any indication of their presence. Friction of unlike materials separates them. According to the double-fluid theory, a non-excited body contains equivalent quantities of the 2 opposite fluids, which we designate by + and -. When 2 such bodies are excited by friction, some of the positive fluid goes out of one into the other, being replaced by an equal amount of negative fluid leaving the second. A being a normal body,

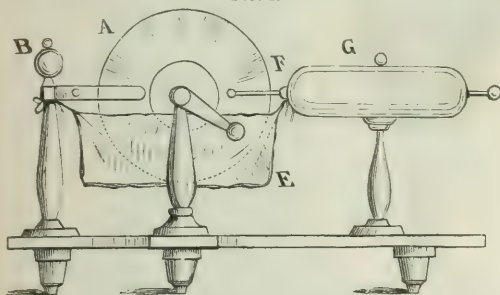


with about equal numbers of positive and negative units, B would be the same, positively charged, while C would represent the same in an equal negative state. According to the self-repellent character of each fluid, the particles of the fluid in excess, flying as far as possible from each other, will accumulate on the surface, especially on points and edges. Some bodies allow the electric fluids to pass freely from particle to particle, while others resist their transfer. Bodies of the first class are called conductors, and of the latter, non-conductors, or insulators. This is a distinction of degree. When the electric fluids acquire power enough to force their way through a resisting material, their passage through is always accompanied by an evolution of light and heat.

SOURCES OF ELECTRICITY.—Friction is the most evident source of electric action; in order that it should be developed by this means with the greatest facility, certain electrical machines have been devised.

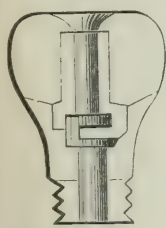
The *Plate Electrical Machine* consists of a glass disk A mounted on an axle and turned by a handle. Against this

FIG. 2.



is caused to press a "rubber" (below B), made of 2 brass plates covered on their faces with leather sprinkled with "mosaic gold," and held against the opposite sides of the plate by a spring sustained under B. At F are 2 brass rods, armed on their inner sides with points, which are turned toward the surfaces of the plate rotating between them. These are supported from the end of a metal cylinder G, resting on a glass column. The glass plate takes positive fluid from the rubbers, giving them negative in exchange, and passes in the direction

FIG. 3.



BEF inside of a silk bag or apron. When the plate comes between the points attached to F, it gives to them positive fluid, receiving negative. The positive fluid thus brought to F passes into G, and is diffused generally over it. If B were allowed to remain insulated, the amount of positive electricity which it could give up would be soon exhausted; we therefore connect it by a wire with the ground.

The *Hydro-Electrical Machine* consists essentially of a steam-boiler placed on insulated supports, and provided with a series of jets, by which wet steam may be made to escape with much friction. Fig. 3 shows the structure of the individual jets. The particles of water carried by the steam play the part of the glass plate in the ordinary machine, while the metal surfaces of the jets act as the rubber. The jets and boiler thus become negatively charged, while the water-spray is positive.

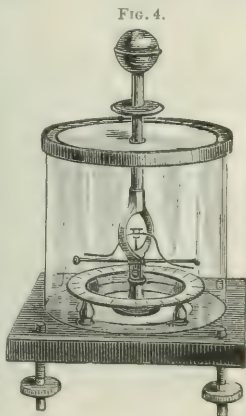


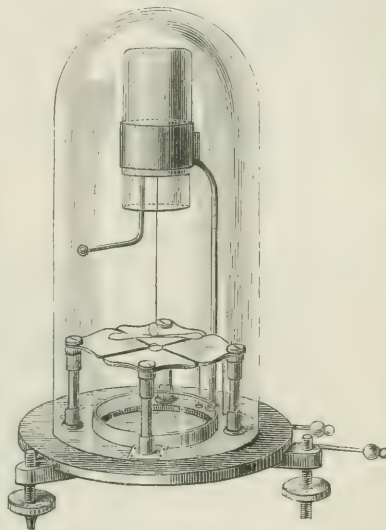
FIG. 4.

APPARATUS FOR THE RECOGNITION AND MEASUREMENT OF ELECTRICITY.—The gold-leaf electroscope consists of two strips of gold-leaf hung side by side from an insulated metallic support within a cylinder of glass, on whose inner surface are strips of tin-foil. When an excited body is brought in contact with the metallic support, the fluid, entering both strips of gold-leaf alike, causes them to recede from each other; and lest they should be in danger of touching the glass, the strips of tin-foil are placed there to discharge them.

Peltier's electrometer (Fig. 4) consists of a convenient support, etc., carrying a light bent rod of aluminium turning on a pivot, and having a small compass-needle attached to it: a charge communicated to the central part, which is insulated, will cause the aluminium rod to be repelled from the heavier brass one. The amount of displacement is read on the graduated circle.

Thomson's quadrant electrometer (Fig. 5) has 4 metallic segments supported in the same plane, but not in contact.

FIG. 5.

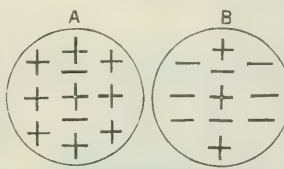


They are connected alternately with the two projecting rods at the right. Over these hangs a piece of aluminium by a fine wire from the inside of a Leyden jar feebly charged. If one pair of sectors are charged while the others are connected with the earth the strip will move toward them if the charge is opposite to that of the jar; or away from them and over the others if the charge is the same in kind as that of the jar. To give directive force, a

magnet is attached with the aluminium strip.

INDUCTION is the mutual action of the electric fluids in adjacent but electrically separated bodies. All the effects produced by this means are called inductive. This force acts with different amounts of energy through different substances. This difference is designated as specific inductive capacity. Let A and B be metal spheres sustained by non-conducting supports, and let A be positively charged. Let B be in its normal state. The positive fluid in A will attract the negative in B, and repel its positive; hence, we may figure B as having all its negative on its left, and all its positive on its right side. When for a moment B is put in connection with the earth, a reservoir of both electricities, the repelled positive fluid will escape, and its place will be supplied by negative, and the body B will be negatively charged. The negative fluid added to B was brought there by the attraction in A, and if it had had any power of repulsion under that influence, it could not have been forced against its nature to enter with the negative fluid already in B. It is simply because it has been bound by the positive A that it is in B, and cannot, while under this influence, exert its natural powers like a free agent. If A is removed, B will become a body negatively charged, and capable of giving out its excess of negative fluid. The negative fluid in it while A is present is called "bound electricity."

FIG. 6.



The subject of induction owes its thorough exposition to Faraday, according to whom it is an action conveyed through the substance separating the bodies under consideration by successive polarization of its particles. Thus the influence of the fluid in A is transmitted to B by a change in the particles of the intervening air. If the little circles in Figs. 7 and 8 represent the atoms of air, and their

FIG. 7.



black halves the negative fluid, we may imagine them when between 2 normal bodies (Fig. 7) to have these negative sides turned in all directions. If, however (Fig. 8), A is positively charged, then in the adjacent particles the negative sides will be turned toward A. The positive fluid will then exert a similar influence upon the next row of particles, and so on. When this action has reached a certain in-

tensity, a transfer of the fluids occurs bodily from one particle to another, and this is conduction.

FIG. 8.



Induction concerned in Simple Illustrations of Attraction and Repulsion.—When an excited body is brought near to a neutral one, the unlike fluid of the latter is drawn near, and its like fluid repelled, and expelled if any outlet is available, and thus the effectiveness of the attractive force is increased. Moreover, the "induced" excitement of the second body will react upon the "mixed" fluids which still exist in the charged object, and by separating them in the same manner as its own were before separated will yet further intensify the action. A large part of the apparent repulsion exhibited by excited bodies is due to the attraction of surrounding objects excited by induction. To an electrical machine is attached a doll's head covered with long hair; on working the machine the individual hairs stand out in every direction by their mutual repulsion. If any conductor connected with the ground is brought near, all the hairs in its vicinity turn toward it, and even crowd upon each other to approach it.

The *Electrophorus* consists of a metal dish filled with rosin or shellac, and of a metallic plate smaller than the dish and provided with an insulating handle. We first beat the shellac with a cat-skin, and then, setting the plate on the surface of the shellac, touch it with the finger. After this, if the plate is lifted up by its insulated handle, it will be found to have acquired a positive charge. The friction with the fur excites in the shellac negative E. When the metal plate rests upon it the repulsion between the negative E. causes that of the brass plate to be repelled, and to escape in part when the plate is touched with the finger, its place being supplied by an equal amount of positive entering from the hand at the same time. This, as long as the plate is near the shellac, is "bound." But when we raise the plate by its handle, the restraining force is escaped as the plate recedes from the shellac, and the lately "bound" fluid exhibits its properties as free positive E. A form of this machine is shown in the figure.

FIG. 9.

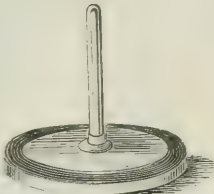
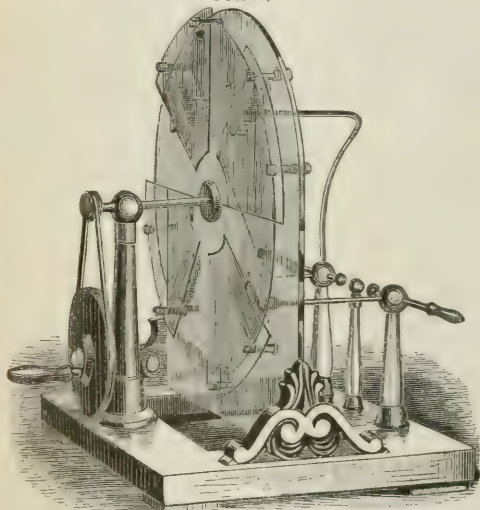


FIG. 10.



of glass serves as the support for the various parts of the machine. From its edges are sustained 4 glass sectors, and between these and the plate is a glass disk capable of rapid rotation, and driven by the pulley seen at the left. Between this disk and the large plate are 4 combs, corresponding to the sectors, and connected with the discharging posts by wires piercing the plate. On one edge of each sector is a narrow strip of varnished paper with a projecting point. We set the disk in rotation, and hold an excited body against one of the paper slips. This gives the paper a charge—let us say, of positive electricity; this, acting upon the disk, repels the positive electricity from the corresponding part of its farther surface into the metallic combs which are there located. When the disk rotates, every point is in succession brought under the same influence. The portions of the plate are therefore negatively charged, having lost some of their positive, and having acquired a corresponding amount of negative fluid. As soon as they pass the farther edge of the first sector, they experience the following action with the point attached to the paper of the next sector: Being negatively charged, they tend to repel negative E., and thus this negative charge, being on the farther side of the disk, repels some negative from the nearer side, and

drives it into the paper strip, so making it negative. Thus, while the first paper was positive, the second will be negative; hence it will tend to drive out of the rotating disk into the second comb that negative fluid which had been drawn from the first comb; and so, the first comb being made positive, this will be negative.

The next application of induction is found in the Leyden jar, which consists of a glass jar coated inside and out to within a few inches of its edge with tin-foil, and having a wooden cover, through which passes a metallic rod

terminating above in a knob, and below being in connection with the inner lining of tin-foil. Suppose this jar to stand on a table and within a short distance of an electric machine, so that a spark might go to its knob. If a spark of positive E. enter, it will diffuse itself over the inner surface of the glass by aid of the conducting power of the tin-foil, and by induction it will draw into the outer coating and surface of the glass a nearly equal quantity of negative fluid. The mutual attraction of these, acting through the glass, will cause each to bind the other to a great extent, and thus the original positive charge is confined to the inner surface of the glass.

TRANSFER OF ELECTRICITY.—There are 3 methods by which E. may pass from place to place—conduction, convection, and discharge. Conduction is the passage of E. between particles sensibly in contact; convection is the transfer of E. from one body to another by moving particles of an interposed fluid; discharge consists of the simultaneous transfer of the E. developed by induction along a line of resisting particles between 2 conductors, and is always accompanied by some development of light and heat. Discharges are divided into two kinds—the flash, spark, or disruptive discharge, and the flame, or diffused discharge. The spark discharge is illustrated by the flash which passes from the prime conductor of an electrical machine to the hand or any other conductor brought suddenly near to it. It then appears as a blue, irregular line. The most magnificent display of the disruptive discharge is the lightning; here flashes occur as much as 3 m. in length.

While air at its normal density and temperature offers so great a resistance to the passage of E., it is found that when highly rarefied its power of transmission is greatly increased, and that under these conditions the discharge passes in a diffused and flame-like form. To exhibit the characteristics of this discharge in various gases and at various degrees of rarefaction, we employ glass vessels, provided with metallic caps cemented to their ends, and sliding rods, stop-cocks, etc. These may be exhausted with the air-pump and the flashes of a coil be passed through. Under these conditions we find that the color of the discharge varies in different parts, being usually blue near the negative pole and pinkish near the positive. Moreover, at a certain degree of exhaustion the discharge is seen to be crossed by dark layers or strata, as shown in Fig. 12.

Geissler, a glass-blower in Bonn, was employed to make some permanently exhausted tubes, and, enlarging on the idea, has developed one of the most beautiful illustrations in the whole range of the subject. These instruments, called "Geissler tubes," are of an infinite variety in pattern, containing different gases variously rarefied. They are often made of fluorescent glass, or are surrounded with glass jackets (Fig. 13), which are filled with fluorescent solutions, thereby increasing the brightness of their appearance.

DYNAMIC ELECTRICITY OR GALVANISM owes its introduction into science to the observation that a frog's leg made a convulsive movement when brought in contact with 2 dissimilar metals, and from Galvani, by whom the observation was made, it has derived its name. If a plate of metal having a strong affinity for oxygen is immersed in some liquid which contains oxygen and is capa-

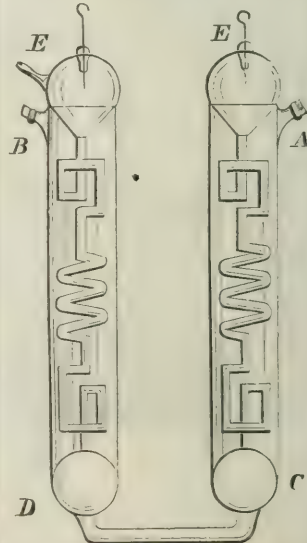
FIG. 11.



FIG. 12.



FIG. 13.

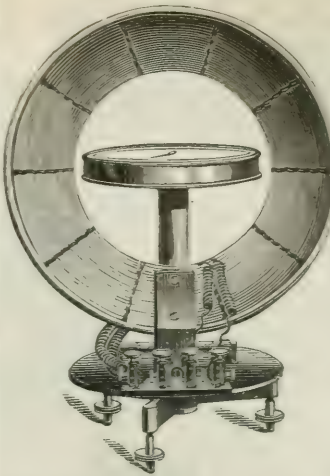


ble of being decomposed, the metal will, by reason of its superior chemical attraction, take a certain portion of oxygen to itself, liberating a corresponding amount of hydrogen. In this act of separation the electric fluids also are divided, the negative going with the oxygen to the metal, and the positive with the hydrogen being repelled. The force which was able to separate the E. would evidently be able to keep them apart, but yet there would be a tendency toward a recombination, and this would render it difficult for the metal to decompose successive portions of the liquid, since it would be obliged to force the hydrogen and positive fluid into a surrounding region, getting more and more highly charged with this same fluid. A point would therefore soon be reached where the power of the metal to decompose more liquid would be annulled by the tendency of the positively charged and liberated hydrogen to return into combination. Under these conditions, suppose that some good conductor is introduced in some other part of the vessel, and connected by a wire with the metal. It will share with the metal its negative charge, and so become as attractive to the hydrogen and positive fluid as the metal, but will be without any of that chemical force which acted as a repellent influence in the case of the metal and hydrogen. The freed hydrogen will run to this conducting plate, discharge itself, and relieve the tension in the liquid, so that the action of the metal upon the liquid may go on again. The power of separating the E. of the water possessed by the metal constitutes what is called the "electro-motive force" of the system. We have here the fluids separated by a feeble power of dissociation, but in quantities which will be great if the resistance opposed to their reunion is slight. We may regard this action of the metal on the liquid with reference to either of the electric fluids as a power of raising its level. Suppose that a sieve placed vertically in a trough of water had the power of pushing the water toward one end, and so raising the level a very little on one side. When the water had reached the full height at which the power of the sieve would maintain it, all action would cease; but if we now made a communication by which the water from the higher side could run around to the lower, then the sieve would continue to keep up the head, and a constant current would result. If several sieves were placed in series, then each in turn starting with the water which had been raised by its predecessor, and raising it higher, the level at the end of the tank would be as much higher as the sieves were more numerous. This is an imaginary illustration, which may aid us in remembering the fact that the nature of the action of the elements in a galvanic couple on the electric fluids is to accumulate, each one slightly on opposite sides; in consequence of which they act in all respects as would material liquids in whose level a similar slight change had been effected. It will, in fact, be found to be of the greatest convenience to acquire the habit of thinking of the E. developed in galvanic actions as fluids with certain "levels," which give the corresponding tendencies to flow. Carrying this view back into our former subject, we would regard the fluids in charged bodies as having a great "head" or high level. It will be evident that a sufficient number of galvanic elements in series should give us a "head" equal to that of a statically charged body. In fact, a battery of 3400 pairs of zinc and copper plates in distilled water, produced all the effects of attraction, repulsion, discharge, etc., which are obtained from bodies excited by friction. We have spoken only of a metal (say zinc) and water as the active agents; but the oxide of the metal would soon cover its surface and cut off all action. For this reason we introduce with the water some acid capable of dissolving the metallic oxide, but not able to attack the other conductor. This introduces another element. The solution of the oxide in the acid furnishes another source of force, and our numerical relation of energies takes a new shape.

INSTRUMENTS FOR THE MEASUREMENT OF THE GALVANIC CURRENT.—The *Voltmeter* is based upon the principle that a current can only pass through such a substance as water by decomposing it, and that thus the amount of water de-

composed or of gas liberated will afford a true indication of the amount of E. transmitted. In 1820 Oersted discovered that when a galvanic current was passing through a wire a

FIG. 16.



magnetic needle suspended in a coil of wire, which is placed in the magnetic meridian. To the needle is attached a pointer, by which the angular displacement which it suffers may be read off on a divided circle. For various uses different forms and combinations are adopted. Fig. 16 shows one of these instruments.

One of the most complete instruments is Sir W. Thomson's

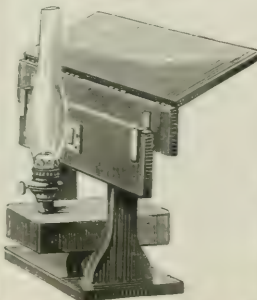
FIG. 17.



double coil astatic galvanometer. In this instrument we have 2 coils, which are equal in resistance. These 2 magnets are connected with reversed poles, and the upper one carries a small mirror. Above them is a bar magnet, which serves to regulate their sensitiveness. The binding screws at the base allow us to bring the 2 coils into any relation we please. The movements of the astatic combination of needles are read in the following manner: At a distance of about 2 ft. in front of the instrument is placed the frame and lamp shown in Fig. 18. The light from the lamp, passing through the vertical slit in the frame, falls on the mirror in the upper part of the galvanometer, which is curved so as to throw an image of the flame back upon a scale attached to the other side of the frame. The motion of this image indicates the movement of the needles.

Resistance Coils.—For use with these various instruments we have sets of "known resistances," consisting of bobbins of insulated Ger. silver wire, carefully graduated to correspond with fixed standards. These bobbins are placed in a box with their terminals attached to a series of heavy brass pieces, between which fit conical plugs. When these plugs are in place they form with the brass pieces a conductor of inappreciable resistance, but by taking out any one, the current is obliged to pass through the corresponding coil, and experience its resistance (Fig. 19).

FIG. 18.



Thermoelectric Couples.—A separation of the E. similar in character to that which we have just described as accomplished by chemical force is brought about by the direct action of heat on dissimilar conductors in contact. Thus, if we have a series of bars of antimony and bismuth united at their alternate ends, as shown in Fig. 20, and heat one side, DC, while the other, AB, is cooled, a separation of the electric fluids will be effected, and one extremity of

FIG. 14.

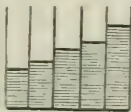
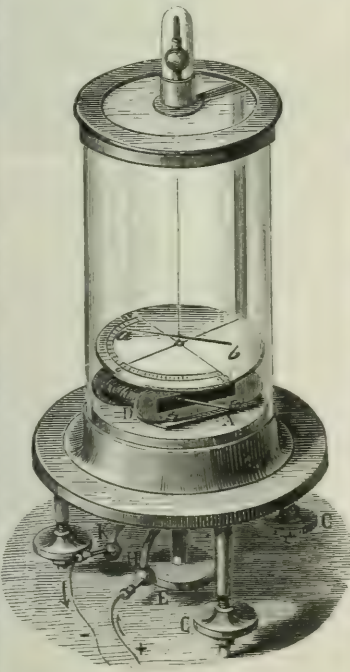


FIG. 15.



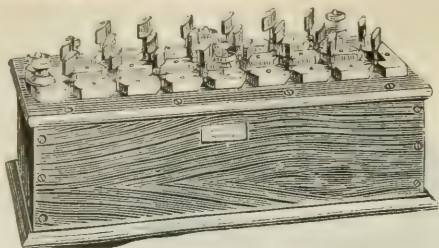


FIG. 19.

the series will acquire a positive, while the other gains a negative charge. By uniting a large number of minute bars of antimony and bismuth in the manner indicated into a square prism, a "thermo-electric pile" is formed. This is generally inclosed in a brass case, provided with hollow conical reflectors, such as *a* for its ends, and supported on a stand. It then forms with an astatic galvanometer the most delicate means we possess of indicating changes of temperature.

ANIMAL ELECTRICITY.—It has been shown that pieces of muscular tissue from animals recently killed will develop actions identical in character with those produced by chemical or heat forces, and that certain animals have the power of giving at pleasure heavy discharges by means of an apparatus which resembles in its structure a series of galvanic couples. It has been shown that in living animals an electric current is perpetually circulating between the internal and external portions of the muscles.

Mechanical Effects of Electric Currents.—Our consideration of galvanic or dynamic E. has led us to notice its identity with the static or frictional form of the same action; but while there is this close relation between the two, it is true that this amount of difference is great enough to make 2 classes of phenomena, which, while equally existing in both, are each of them pre-eminent in one of the two subjects, and practically inappreciable in the other.

Attractions and Repulsions of Electric Currents.—The attraction for light bodies exhibited by those excited by friction depends upon the accumulation of one or the other fluid in the excited body; but nothing like this can exist with a current, which being, as we have seen, duplex in its character, can have no accumulation or charge of either fluid at any point. Thus, no phenomena of attraction and repulsion are to be expected from closed circuits upon light bodies. We may expect that 2 currents should attract or repel each other, and that this attraction and repulsion should depend upon the relation of their directions. This is found to be the case. If 2 currents flow in parallel wires in the same direction, the wires tend to approach; if the directions are opposite, they tend to recede.

Relations between Magnets and Currents.—The theory of Ampère develops all the properties of magnets, from the assumption that they are equivalent to spirals carrying currents, or are made up of particles each of which has in it a closed circuit, all moving in the same direction. (See Figs. 22 and 23.) From this it would naturally follow that mutual actions would exist between magnet and currents, such as

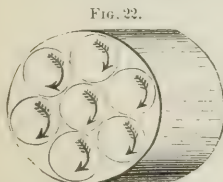


FIG. 22.

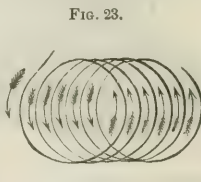


FIG. 23.

might be derived from the elementary law and examples given above. Thus, we have the fact discovered by Oersted that a magnet tended to set itself at right angles to the line of a current, and that a conductor carrying a current would set itself at right angles to a magnet. A solenoid is a helix or spiral, with the wire of which it is formed returned along its axis. When therefore a current traverses it, the longitudinal effect of the spiral is counterbalanced by that of the return wire, and it becomes in all respects equivalent to a series of equal and parallel circular currents.

Magnetization by Currents.—If a bar of soft iron is inserted in a solenoid, it is found to become powerfully magnetic as long as the wire is traversed by a current. If we surround the iron bar with a multiple coil of many layers of insulated wire, the current acting repeatedly will produce a greatly increased effect. By this means magnets of the greatest power are produced. They are called electro-magnets. On the peculiar properties of the electro-magnet was founded the invention of the electro-magnetic telegraph.

Laws of Electro-Magnetism.—1. Magnetism in any given bar is directly proportional to the number of coils which act upon it. 2. The diameter of the coils has no effect, the

greater length of the larger coil exactly compensating for its greater distance. 3. The thickness of the wire has no effect, the condition first named of a constant current being maintained. 4. The strength of the magnetism is proportional to the quantity of the current. 5. The attractive power of the electro-magnet for a saturated steel bar varies with the inverse square of the distance, but for a bar of soft iron, where induction comes in, with some function approaching the inverse cube of the distance. 6. The retentive power varies with the square of the charge or of the quantity of current. 7. The amount of magnetism developed is largely influenced by the surface of the iron, though not depending only on that. 8. The length of the bar has no effect on its magnetic force, beyond that of diminishing the interfering action of the opposite poles by separating them. 9. The position of the bar in the helix, whether in or out of its axis, is immaterial.

Electrolysis, or Chemical Action of an Electric Current.—As a chemical combination is on the one hand an effective source of the electric current, so on the other side this current may expend itself in reversing this action, or in decomposing such compounds as in their formation gave it birth. Thus, if a current from a series of galvanic elements be made to pass through a solution of sulphate of zinc, the oxide of zinc will be decomposed, metallic zinc appearing at one side, and oxygen gas being given off at the other. So with the sulphate of copper and other salts not too difficult to decompose; and in such cases it is found that if the conductor to which the oxygen goes is of a metal, such as copper, iron, zinc, etc., which can combine readily with that element, an oxide will be formed and dissolved by the liberated acid. On this fact are founded the various processes of electro-plating, of electrotyping, and the like. A conducting object is suspended in a solution of the metal to be deposited, in connection with the zinc or negative pole of the battery, and a plate of the same metal is suspended in the same liquid and in connection with copper, carbon, or other positive pole of the battery. The metal is then deposited gradually on every portion of the mould or object, and may either be left there, as in plating, gilding, etc., or stripped off, as in electrotyping, where it becomes the cast or duplicate original which is to be used.

TRANSFER OF DYNAMIC ELECTRICITY—Conduction.—Conduction in dynamic E. resembles in all respects the same action in the static condition of the fluids. It varies in the same way with different substances, but can be more readily studied and measured. On account of the inappreciable "condensation" of a current, the conductor does not act mainly by its surface, but by its entire section.

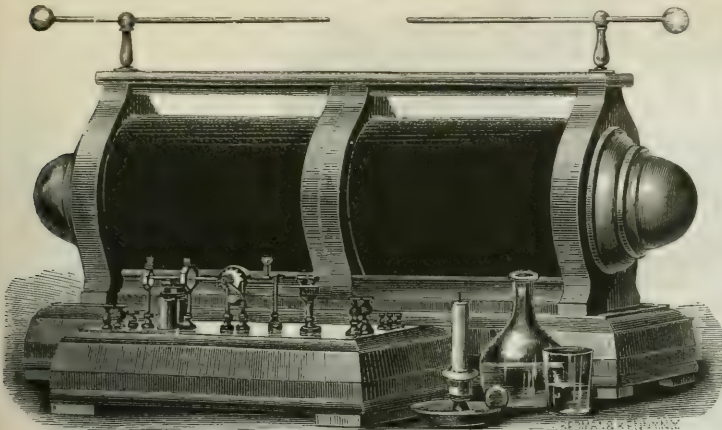
Heating and Luminous Effects.—When a galvanic current passes through a conductor, heat is developed to a degree varying with the amount of the current and the resistance of the wire. Other things being equal, an increase of resistance will diminish the amount of the current, but if we keep the current constant by adding to the electro-motive forces urging the current, then we shall find the heat developed increase with the resistance. In ordinary experiments it is more easy to increase the amount of the current transmitted by decreasing the length of the resistance, and thus obtaining a greater development of heat in a part of the line. If electric fluid could be forced in any amount through a non-conducting substance, very intense effects of heat and light ought to be produced. This is in fact observed in the case of the static discharge in air, which affords us the most intense exhibition of these forces with which we are acquainted. With galvanic E. it is under ordinary conditions impossible to obtain sufficient concentration to rupture the resistance of air. If the poles of a powerful battery are brought into contact and then slightly separated, a bridge of particles torn off from the positive and hurled upon the negative pole is formed, and maintains the connection. Resistance enough is offered to develop a light of the most dazzling brightness.

Galvanic or Dynamic Induction.—Suppose that 2 wires are arranged side by side, but mutually insulated for some length, and that one of them is connected in closed circuit with a delicate galvanometer, while the other may be made at will the path of a current from a galvanic battery. If this connection is made, we will notice an instantaneous movement of the needle in the galvanometer, indicating a momentary current in the opposite direction to that of the battery. While this battery flows all is absolutely at rest, but the moment that an interruption occurs, another instantaneous current is shown by the galvanometer, but now in the same direction as the battery current followed. These momentary currents are called induced currents, and that producing them is called the "primary" current. The induction coil consists of a thick wire wound into a spiral around a bundle of soft iron needles. This receives, through a "break-piece" or "interrupter," either automatic or moved by hand, a discontinuous current from a galvanic battery. Around this primary spiral, but most thoroughly insulated from it, even by a heavy glass jar, is another or secondary spiral of very fine wire and of great length. The terminals of this furnish the positive and negative fluids. To do away with the interfering action of the "extra current," a condenser is connected with the primary circuit at either side of the break-piece. This condenser is equivalent to a Leyden jar of great surface, and is made of tin-foil separated by oil-silk. The battery connections being made, and the interrupter put in action, at each break of circuit flashes of E. pass between the terminals with a length and brilliancy depending upon the size and perfection of the instrument. (Fig. 24.) In addition to its numerous applications in scientific connections, this instrument has been used with great success as a means of lighting instantaneously the numerous gas burners in public buildings.

Magneto-Electric Machines.—If a coil of wire is rapidly caused to approach and recede from a permanent magnet, a series of induced currents will be developed in it. An easy

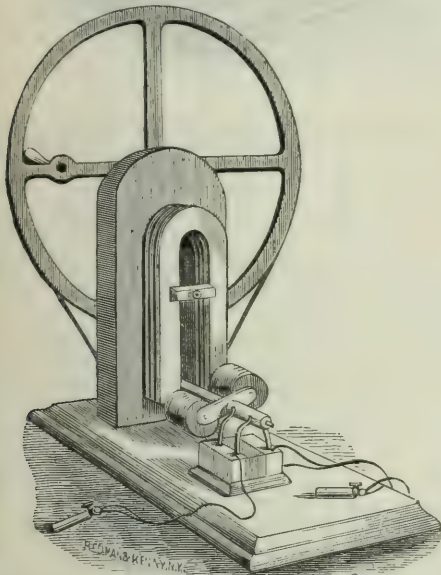
way of securing this approach and withdrawal is to make several such coils rotate in front of large magnets in the manner shown in the cut. (See Fig. 25.)

Fig. 24.



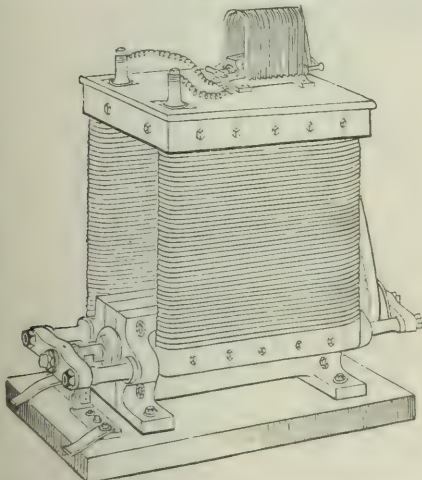
Wilde was the first to apply the discovery that the current developed by one magneto-electric machine could charge

Fig. 25.



electro-magnets with a far greater force than existed in the magnets of the first machine. Thus, by having one machine

Fig. 26.



to charge the electro-magnets of another, a very great electric current could be readily produced. This plan was adopted in the machine shown in the accompanying cut.

(See Fig. 26.) A number of permanent magnets placed above produce in the armature rotating between them a current which charges the large electro-magnets below, and the armature rotating within these electro-magnets yields a current of great power. [From orig. art. in *L. & U. Rev.*, by PRES. HENRY MORTON, Ph. D.]

Electric Light. The question of the practicability of substituting the E. L. for the ordinary modes of artificial illumination in the business of life has been in recent yrs. a subject of much investigation and experiment. To a certain extent, the desired object has been satisfactorily attained. For all purposes for which lights of great power can be advantageously used, as for the illumination of large open areas, such as public squares, parks, or pleasure-grounds, or of spacious interiors, like those of theatres, chs., assembly-halls, legislative chambers, great railway-stations, foundries, workshops, factories, etc., the E. L. is to be preferred to the light of gas-beaks or oil lamps, not only on grounds of economy, but on account also of its vastly superior power and quality. For apartments of moderate dimensions, and for the ordinary uses of domestic life, the prob-

lem appears not as yet to have been so satisfactorily solved, although the indications are that its complete solution is not far distant.

Generation of Electric Currents.—A complete account of E. L. should include the theory of electric currents and a description of the apparatus or instrumentalities by which such currents are generated.

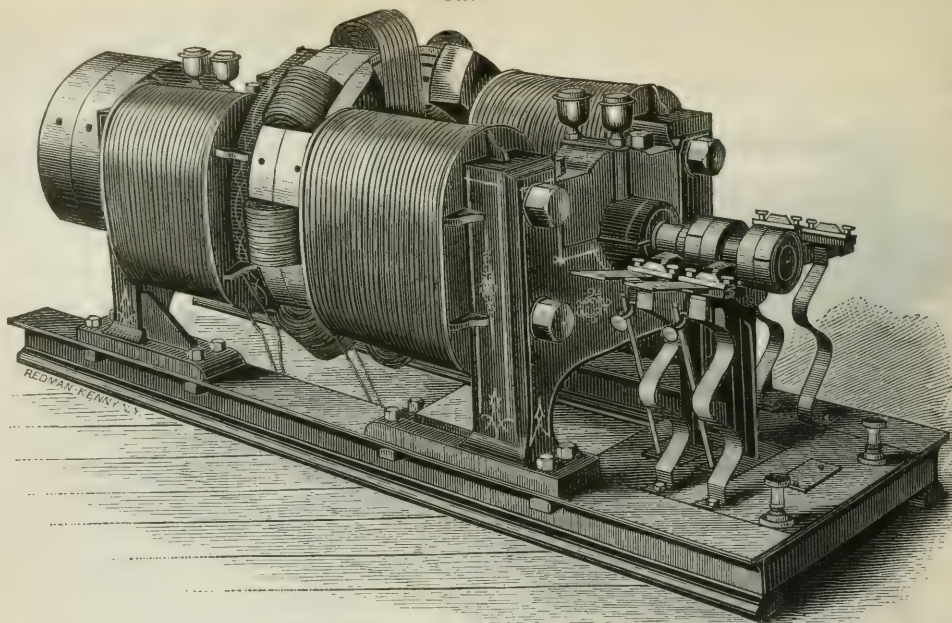
In the Brush machine, or magneto-electric generator, the device of Mr. Charles F. Brush of Cleveland, O., which is shown in Fig. 1 on the following page, the armature is an iron ring wound with coils of insulated copper wire; but the ring is not, as in such machines generally, wholly covered by the coils, there being uncovered spaces alternating with the covered spaces at equal intervals; these uncovered parts being also larger than the covered, the wire coils falling into and somewhat more than filling the intermediate grooves. The coils on the armature are 8 in number, the opposite ones being connected end to end, and the terminals carried out to the commutator. The ring revolves between the poles of 2 large field magnets, the 2 positive poles being opposed to each other at one extremity of the diameter of the armature, and the 2 negative at the other. The commutators are so arranged that, at any instant, 3 of the 4 pairs of coils are interposed in the circuit of the machine, the remaining pair, which occupies the neutral point, being thrown for the moment out of circuit; while in the Gramme machine the numerous armature coils are connected end to end throughout, forming always 2 sets of coils in multiple arc interposed at the same time in the circuit; each set consisting of $\frac{1}{2}$ the coils of the armature. It is claimed that the exposure of large surfaces of the armature ring intermediate between the coils, as in the Brush construction, facilitates the dissipation of the heat occasioned by the rapid alternations of magnetic polarity, and thus allows, without disadvantage, a higher rapidity of rotation of the armature than would otherwise be practicable.

With his machine in its latest form Mr. Edison claims that he realizes, in useful effect, $\frac{9}{10}$ of the driving power. He claims also that the machine will convert and deliver twice the number of foot-lbs. of energy that any other machine will deliver under like conditions. Comparing it with the Siemens machine, it is said that while that and nearly all other machines make the external resistance equal to that of the machine, and thus utilize only half the energy, "in Mr. Edison's generator 5-horse power is transferred upon a resistance of 5 ohms, of which $\frac{1}{2}$ an ohm is in the machine, thus delivering $\frac{9}{10}$ of the total current upon a circuit exterior to the machine, so that nearly the maximum economy is attained, where other machines, under like conditions, will scarcely give any current at all."

Production of Light.—The luminous phenomena produced by the electric current are in all cases due to the resistance arising from the occurrence in some part of the circuit of imperfectly conducting materials. The energy expended in overcoming the resistance disappears as electricity, but reappears as heat, and, when the temperature is sufficiently raised, of light also. These effects are most strikingly manifested when the continuity of the metallic conductor joining the terminals of a voltaic battery or other source of electricity is interrupted at some intermediate point, and the electrodes or extremities of the interrupted conductor are slightly separated. The resistance is that of the intervening air, which is heated to incandescence by the force expended in bridging the gap. The electrodes themselves become also white hot at the extremities, and, unless of very refractory material, are fused, and to some extent volatilized, the vapors being transported by the current, and, by their added incandescence, exalting the intensity of the light. The electrodes are thus connected by an apparent flame of vivid brightness, which, when they are held horizontally, is convex upward, and is hence called the voltaic or electric arc.

No material substance is a perfect conductor of electricity. All substances offer more or less resistance to the current flowing through them, and experience, accordingly, in transmitting the current, a greater or less elevation of temperature, dependent in degree on their conducting power, their dimensions, and the volume of the current.

FIG. 1.



Brush's Magneto-Electric Generator.

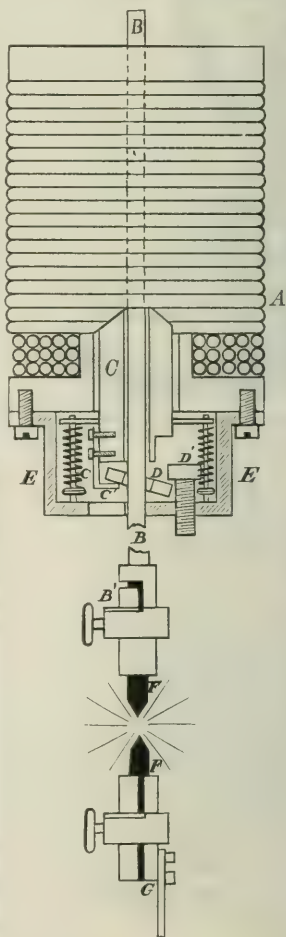
A comparatively good conductor of small cross-section and limited length may thus be heated to whiteness by a passing current, and so become a source of light. It thus appears that in endeavoring to apply the light of electricity to useful purposes resort may be had to contrivances of 2 distinct classes—viz. those which aim to utilize the electric arch, which is an incandescent gas or vapor, and those which employ an incandescent solid. Each of these modes of generating light has its advantages and its difficulties. The electric arch gives a light of great intensity, which it has not been found practicable so far to subdue as to adapt it to ordinary domestic uses. It requires very delicate adjustments, without which it is liable to annoying fluctuations of brightness, and which even the best automatic regulators yet constructed fail perfectly to effect. It is nevertheless well adapted for the illumination of large spaces, and under these circumstances several lights compensate each other's irregularities, and produce a satisfactory general effect. The light of an incandescent solid varies in intensity only with the variations of the current; and when this is derived from a dynamo-electric generator, it may be made almost absolutely uniform. But the heat of incandescence is far above the melting point of most metals, and very near to that of the most refractory, such as platinum or iridium. Carbon, which will endure a very high heat without change, is extremely combustible, and when heated in the free air is soon consumed. Carbon and platinum have, however, both been employed in electric lamps of the second class, and it seems probable that some of the forms of those constructed of carbon will be successful.

Electric lamps employing the electric arch may be subdivided into such as are governed by mechanical regulators and those that regulate themselves. In all of these the material employed for the terminals or electrodes is carbon. In the early list of this subject, while the E. L. was only a subject of laboratory experiment and illustration, ordinary wood carbons, first introduced by Sir Humphry Davy, sufficed for the purpose. Foucault, in the yr. 1844, suggested as a substitute the hard carbonaceous incrustations formed in the interior of gas-retorts, which are very compact and durable. The electrodes formed from this substance, however, have serious defects. Owing to the presence in them of saline and earthy impurities, they conduct irregularly, and sometimes splinter. In recent yrs. they have been to a great extent superseded by carbons artificially prepared of pure material and solidified by great pressure. Many processes have been invented for this manufacture—the difficulty not being to prepare a good article, but to prepare one which shall be cheap as well as good. Among the names of inventors may be mentioned those of Stalte and Edwards, Le Molt, Lacassagne and Thiers, Curmer, Feyret, Archereau, Carré, Gaudoin, and Sawyer-Mann. (For information in regard to the several processes in detail, reference must be had to systematic treatises.) In order to improve the conducting power of the carbons, which is a matter of some importance when the current is sent through a considerable length of the substance, as takes place in many regulators and in the Jablochkoff candles, they are sometimes coated externally with precipitated copper or nickel. The Brush carbons are so treated. To the same purpose it has been proposed to introduce powdered metal into the substance of the material during the process of manufacture, or to form the rod around a wire as a core. The external coating is to be preferred.

Electric Lamps with Mechanical Regulators.—The electric current being supposed to be uniform and the electrodes homogeneous, the steadiness of the E. L. will be dependent

on maintaining the distance between the terminals invariable. As the carbons are gradually consumed by vaporization and combustion, it is necessary to provide some means of compensating the increase of distance between them which would otherwise take place. In the early laboratory experiments the correction was made from time to time by hand, the light being therefore subject to unequal and irregular fluctuations. Later, a variety of automatic contrivances were invented for accomplishing the adjustment by the action of the current itself. All of these depend on bringing in some manner into action the force of electro-magnetism; in order to which a solenoid, or a proper electro-magnet, is introduced into the circuit conveying the current. When the distance between the electrodes begins to increase by the consumption of the carbons, the magnetic energy diminishes, with the result of causing the carbons to approach each other. The various regulators in use are known by the names of their inventors, and are very numerous. Descriptions of them must be sought in systematic works, though 3 or 4 are figured and described in *J.'s Univ. Cyc.*, under the head **ELECTRIC LIGHT**. Those which came earliest into use were Duboscq's, Foucault's, Scarrin's, and the Siemens. Later, and especially in this country, Brush's has come into more gen. use than any other. It is now employed in the street illumination of New York. The Brush regulator, an Amer. invention of much simplicity and well adapted to large lights for gen. illumination, is shown in principle in Fig. 2, in which A is a solenoid (seen partly in section toward the bottom), C is a soft iron core perforated from end to end, moving freely

FIG. 2.



The Brush Regulator.

on maintaining the distance between the terminals invariable. As the carbons are gradually consumed by vaporization and combustion, it is necessary to provide some means of compensating the increase of distance between them which would otherwise take place. In the early laboratory experiments the correction was made from time to time by hand, the light being therefore subject to unequal and irregular fluctuations. Later, a variety of automatic contrivances were invented for accomplishing the adjustment by the action of the current itself. All of these depend on bringing in some manner into action the force of electro-magnetism; in order to which a solenoid, or a proper electro-magnet, is introduced into the circuit conveying the current. When the distance between the electrodes begins to increase by the consumption of the carbons, the magnetic energy diminishes, with the result of causing the carbons to approach each other. The various regulators in use are known by the names of their inventors, and are very numerous. Descriptions of them must be sought in systematic works, though 3 or 4 are figured and described in *J.'s Univ. Cyc.*, under the head **ELECTRIC LIGHT**. Those which came earliest into use were Duboscq's, Foucault's, Scarrin's, and the Siemens. Later, and especially in this country, Brush's has come into more gen. use than any other. It is now employed in the street illumination of New York. The Brush regulator, an Amer. invention of much simplicity and well adapted to large lights for gen. illumination, is shown in principle in Fig. 2, in which A is a solenoid (seen partly in section toward the bottom), C is a soft iron core perforated from end to end, moving freely

within the solenoid, and B a brass rod moving also freely within the core, and sustaining the positive carbon-holder B'. The iron core C is partially sustained by the spiral springs shown in the figure, which rest on the bottom of a box E E screwed to the base on which the solenoid rests. A flat ring D of brass is supported at one side by a bracket C' attached to the core, and in the oblique position represented in the figure takes hold of and supports the rod B. The head of a set screw D' limits the upward movement when the core is attracted by the solenoid. Supposing the circuit broken, the core drops and rests on the base of the box, the bracket C' passing through an opening made for it, so that the ring D may lie flat. The action of the contrivance is this: When no current is passing, the core and ring rest on the base of the box, the rod B drops freely, and the carbons come into contact. When the current passes, the core rises, lifts the ring D into the oblique position in which it seizes the rod B, and thus lifts the rod also, separating the carbons. As the carbons consume and the resistance increases, the magnetic energy of the solenoid diminishes, and the ring D touches the base by its lower edge, and presently loses its grip of the rod. This, descending, revives the energy of the solenoid, which lifts the ring again free of the base. The action here described takes place, however, by insensible steps, and the distance between the carbons is maintained to all appearance invariable.

Lamps without Regulators—Electric Candles.—Within the past 2 or 3 yrs. the public interest in the subject of E. L. has been strongly reawakened by the introduction of some forms of electric lamp in which the cumbersome and costly mechanical contrivances previously regarded as indispensable for maintaining the steadiness of the illumination are dispensed with. The first device of this kind, proposed and patented as long ago as 1846 by Staite of Lond., though apparently feasible enough, attracted little attention and failed to command success. It consisted in bringing 2 inclined rods of carbon near to each other at their lower extremities, where they were supported by some solid and refractory substance, the rods descending in guiding grooves as fast as consumed. The distance between the extremities could be varied by a lateral movement given to the support of one of the rods. A more successful form of electric candle is that now so well known by the name of its inventor, Jablochhoff, an officer of the Rus. army. This invention dates as far back as 1876, but it was first introduced into public use in May 1877, at the grand magazines (commercial establishments) of the Louvre. It was not long after this that the same mode of illumination was employed in a number of the large open squares in Paris and in some of the public streets of that city. Early in 1879 more than 300 Jablochhoff lights were in operation in Paris alone, and perhaps an equal or greater number in other parts of Fr. During the winter and spring of 1878-79 experiments were made with this light on the Thames Embankment, on the Holborn Viaduct, and in the Billingsgate Market in Lond., with results satisfactory so far as illumination is concerned, but less so as regards economy. The construction of this candle is so simple as to require no figure to explain it. It consists of 2 flat strips or cylindrical rods of carbon, not more than $\frac{3}{8}$ of an inch thick and about 10 inches long, placed vertically side by side, and about $\frac{1}{2}$ of an inch distant from each other, the space between them being filled with some insulating substance like kaolin or gypsum. The current ascends one of the rods and descends the other. In order to establish the arch some conducting substance, like a bit of carbon, must be laid across the top. This candle does not perform well with a continuous current, the positive carbon wasting faster than the negative—a fault which the inventor endeavored to correct, but without success, by making the positive carbon of double thickness. With a machine giving a reciprocating current, however, it works perfectly. The prin. objection to it is the rapidity with which it burns out, each candle lasting only about an hour and a half. Wilde has shown that the insulating substance between the carbons is unnecessary, provided they are well insulated from each other at the base. The presence of this substance to some extent diminishes the brilliancy of the light. Wilde's lamp, therefore, is a Jablochhoff without the insulator; and it has the advantage that in it the carbons may be adjusted to different distances at pleasure, and also that, by inclining one of them till the extremities meet, the arch may be established without employing any auxiliary conductor.

Another improvement on the Jablochhoff candle is that of De Meritens, who introduces, between the 2 carbons conveying the current, a third one wholly insulated and out of contact with either. This serves as a kind of intermediate pier in the bridge which the arch forms between the prin. carbons, and increases, according to the inventor, the brilliancy of the light.

Another form of E. L. which may most properly be called a candle is the Rapiëff, in which there are 2 carbon rods on the positive and 2 on the negative side, the members of each pair being inclined to each other and meeting in an angle. This light has been successfully employed in the office of the *London Times*.

Electric Lamps employing Incandescent Solids.—The light of the voltaic arch in the ordinary forms of self-regulating lamps is too powerful for the purposes of domestic illumination, and the lamps themselves are too cumbersome and too costly. Much ingenuity has been, therefore, directed to the endeavor to obtain from a given current many lights of moderate power in the place of one of excessive brightness; or, in other words, to accomplish what is called the subdivision of the light. There is no difficulty in obtaining many lights from one circuit. The misfortune is, that the sum-total of the intensities of such a series of lights is by no means equal to that of the single light which the same current will produce—in other words, there is a large absolute loss of light by subdivision.

Lamps employing incandescent solids, or, more briefly,

lamps by incandescence, were among the forms earliest proposed for making electricity available as a source of light. In 1841 Mr. F. Moleyns of Cheltenham, Eng., patented a contrivance of this sort, in which a spiral of platinum wire inclosed in a glass globe is made white hot by the passage of a current of electricity through it. The globe was air-tight, but a funnel-shaped tube filled with powdered charcoal let into it at the top allowed a minute stream of this powder to fall, like sand in an hour-glass, through a minute orifice upon the incandescent spiral, very materially heightening the brilliancy. In 1849 the same idea, omitting the charcoal, was reproduced by Petrie, who employed iridium instead of platinum. In 1858 it was reported to the Fr. Academy of Sciences that De Changy, a Fr. inventor, had solved the problem of the divisibility of the light, and had succeeded in producing 12 steady lights, independent of each other, from a single battery of 12 Bunsen elements. He also employed incandescent spirals of platinum. All these inventions were, however, practical failures. The difficulty in the case is, that the temperature of incandescence is too near that of fusion in platinum for safety, and that the spiral is almost inevitably destroyed by the current. In 1878 Mr. Edison imagined that he had overcome this difficulty by means of a contrivance for switching off the current the moment the temperature approached the point of danger; but his contrivance, which was theoretically beautiful, failed in practice, because the rods or wires on which the success of the operation depends changed their figure under the high heat. More recently, therefore, he has discarded platinum, and in fact all metals, and has confined himself to the perfection of a lamp in which the incandescent substance is a filament of carbon. This filament is in the form of a horseshoe, and is prepared by stamping out a strip of proper shape from card-board, and carbonizing it under pressure. The filament is inclosed in a glass ball from which the air has been exhausted. A similar lamp is constructed by Mr. Maxim of New York, in which the carbonized filament has the form of the letter M. The globe of Mr. Maxim's lamp is filled with hydrogen carbide instead of being exhausted. The carbon of the gas is said to repair the waste of the filament.

Several incorporated companies have been formed which propose to furnish E. L. for domestic purposes in New York. While there is sufficient reason to believe that the object aimed at will be successfully accomplished, we are obliged to say that, up to the present time, no one of them has as yet gone into successful operation.

ACTUATORS.—The literature of this subject is as yet to a large extent floating in the scientific and technical journals. The prin. authority is Fontaine, *Éclairage à l'Électricité*, 2d ed., Paris, 1879. The work of Paget Higgs, *The Electric Light in its Practical Applications*, Lond., 1879, is next in importance. This author has also translated Fontaine's work, *Electric Lighting and its Practical Application*, is a smaller treatise by S. S. Shoobred, Lond., 1879, which gives a very good summary of the present state of progressive electric lighting. For electric sea-coast lights the fullest information may be obtained from the official report made to the Light-house Board of the U. S. by Major Geo. H. Elliot in 1874, and pub. as a Congressional document. F. A. P. BARNARD.

Electricity, Animal. See ELECTRICITY.

Electric Railways. The transmission of power by dynamo-electric machines, and their application to elevated railways, was first discussed by Dr. Werner Siemens in 1867, but it was not till 1879 that the idea took shape in the form of a model exhibited by Messrs. Siemens and Halske at Berlin, and which is now in operation at the Crystal Palace, Sydenham. It consists essentially of a dynamo machine, mounted on a carriage by itself, which draws 3 carriages holding 6 persons each. The electric current comes by a third rail from the primary machine (stationed at some convenient point), and is taken off by brushes fixed to the machine and sliding on the centre rail, returning to the primary machine by the outer or bearing rails. The speed is about 10 m. per hour. In May 1881 a line $1\frac{1}{2}$ m. in length was opened in one of the suburbs of Berlin, essentially the same as the above, except that the current reaches the dynamo by one of the bearing rails and returns by the other. In the Siemens tramway, so successful at the Paris electrical exhibition, the direct and return currents are transmitted through copper tubes, split longitudinally on the under side and slung securely above the track. They are connected with the machine in the vehicle by 2 small copper blocks sliding in the tubes, each of which has attached to it a light frame carrying a wheel, whose close contact with the outer side of the tube is insured by springs. F. N. OWEN.

Electric Telegraph. See TELEGRAPH.

Electrodes (plu.) [from *electricity* and the Gr. $\epsilon\delta\omicron\varsigma$, a "way"], the surfaces by which electricity passes into and out of different media. The poles of the voltaic battery or pile are especially termed *electrodes*. The so called positive E. is the "anode," and the negative is the "cathode."

Electro-dynamic Engine, a form of engine in which the motive power is derived from electricity. Immediately after the invention of the electro-magnet in 1827 by Prof. Henry, the instantaneousness with which, in this contrivance, force may be developed, destroyed, or reversed, led many persons of an inventive turn to attempt its application to some useful purpose in the arts. Many forms of vibrating and rotating apparatus were constructed by Prof. Henry and others to illustrate the principle; but the first E.-D. E., properly so called, was the invention of Thomas Davenport of Vt., by whom it was exhibited to Prof. Henry in 1835, and brought out publicly in New York a yr. or two later. The success of a small machine of this construction was such as to encourage Mr. Davenport to attempt one on a scale sufficiently large, by calculation, to drive a power printing-press; but this last proved a complete failure, and the engine was heard of no more. The discrepancy in this case, as in many others where similar disappointment has been

encountered, between calculation and experimental results, was in great part owing to the fact that moving magnets, whether permanent or temporary, always generate, in closed conducting circuits in their neighborhood, secondary or induced electric currents, which act in opposition to the primary currents, and tend in all E.-D. E. to diminish the effective energy of the magnets, whether they act by attraction or by repulsion. But had not this difficulty existed, the engine would hardly have been an economical success, since the materials consumed in the battery, metallic zinc and acids or salts, are products of industry prepared by the aid of heat; and the heat necessary for such preparation is capable, if directly applied to the production of steam, of performing a larger amount of work than would be derived from the E.-D. E., even were it not subject to the disadvantage above mentioned. In *J. S. Unit. Cyc.* will be found descriptions of several forms of electro-magnetic engines adapted to small industries; but since the construction of the powerful mechanical generators of electricity on the principle first indicated by Ladd and Wilde, and since so highly improved by Siemens, Brush, Edison, and others, it has been found that these machines may be economically used as motors, receiving electricity from outward sources. Such motors were first introduced in 1879 by E. W. Siemens, on an experimental electrical railway in Berlin, with entire success. They were also used in Paris, on a similar railway, during the international exhibition of electricity in 1881.

F. A. P. BARNARD.

Electro-Dynamics is the science which treats of the phenomena of electric currents. (See ELECTRICITY.)

Electro-Magnetism. See ELECTRICITY.

Electrometer [from *electricity* and the Gr. *μετρον*, a "measure"] is sometimes used as the name of an instrument employed in detecting electric excitation, but more commonly called *electroscope*; but the term properly designates those instruments by which the attempt is made to measure the amount of the electric force. Coulomb's E. measures this force by the amount of twist it will give to a silken thread; others measure the arc through which a suspended pith-ball is repelled by electricity.

Electro-plating, the coating, by means of electro-galvanism, of articles formed of the cheaper metals, with gold, silver, platinum, nickel, copper, etc. Where iron, zinc, or pewter are the substances to be electro-plated, they are first coated with copper and then readily take the silver, gold, or nickel by the E.-P. process. There are many classes of objects to which this process is applicable, and each has its special methods. The plating of the metallic trimmings of harness and carriages with nickel, silver, or gold; of the surface of the bed-plate and trimmings of sewing-machines with nickel or silver; of lamps, door-knobs, curtain-fixtures, window-trimmings, buttons, etc., with nickel, silver, or gold, and of numerous other articles in the building, furniture, and other trades, are familiar to all. These employ much cap., and produce goods of large value.

The most important application of E.-P. is in its use for the production of table- and hollow-ware, and its extension to articles of artistic elegance and ornament. This application was first made in Eng. about 1840, and in the U. S. in 1845. The first beginnings in the U. S. were small, and success doubtful for a time, but the business has now attained great magnitude, producing goods annually of more than \$20,000,000 value, a part of which is exported and supercedes the Eng. goods even in the Eng. market. The bases on which the E.-P. is deposited are of 2 kinds—Ger. or nickel silver, composed of about 2 parts copper to 1 each of zinc and nickel, and alba or white-metal, which is compounded of block-tin, antimony, zinc, etc., and is softer and less durable. The designs and patterns are very numerous, and embrace every variety of articles for use, ornament, or decoration of the table, parlor, or office, and elegant prize pieces for fairs, yacht, boat, and other races, etc. (See ELECTROTYPING AND ELECTRICITY.)

L. P. BROCKETT.

Electroscope [from *electricity* and the Gr. *σκοπεω*, to "see"], an instrument for the detection of the presence of electricity. Suspended balls of pith or slips of gold-leaf, from their extreme lightness, will readily diverge from each other; and this, or some similar device, is the essential element of most E. They depend for their action on the elementary law that bodies charged with like electricity repel, while those charged with unlike electricity attract each other. The E. most used is Bennet's gold-leaf E. This consists of a glass shade with a wide mouth, which is closed by a wooden stopper which can be taken out and replaced at pleasure. A glass tube passes vertically through the centre of the wooden stopper, while a metallic rod is fixed in the centre of the glass tube. The lower end of the rod terminates in a small flat plate, to the sides of which 2 narrow strips of gold-leaf are soldered, and are thus attached opposite each other; and the upper end of the rod is furnished either with a circular horizontal plate or with a brass knob. If an electrified body be brought near to the top of the instrument, the top becomes electrified oppositely to the body presented, and the gold leaves similarly. As they are both charged with the same kind of electricity, they repel each other, and diverge more or less in proportion to the strength of the charge and to the nearness of the electrified body, and thus show us the presence of free electricity.

Electrotint, an art by which drawings are made with any substance insoluble in the solution of sulphate of copper. When the design is completed the plate is immersed in the solution, and a reverse made by the electro-coppering process, called *electrotype* or *voltatype*.

Electrotype [from *electricity* and *type*] is the name given to the cast of an object procured by the gradual deposition of a metal from a solution by means of a current of electricity. When 2 pieces of clean platinum are put into a solution of sulphate of copper no change takes place. But if an electric current is transmitted through the solution by means of these platinum plates, copper is at once

precipitated upon the platinum, which forms the cathode, the anode remaining clean. If the current be reversed, the copper will be transferred from the platinum plate on which it had been deposited to the clean plate. By thus reversing the direction of the current the copper may be sent backward and forward, being always deposited upon the negative pole, or that surface by which the electric current leaves the electrolyte or solution that is undergoing decomposition. By continuing the electric currents, and keeping up the strength of the solution by adding fresh portions of the salt of copper, the metallic film on the cathode may be made of any required thickness, and afterward peeled off the platinum surface. The texture of the copper deposited varies with the battery-power employed and with the strength and temperature of the solution, and may be hard, brittle, and crystalline, or tough and malleable, according to the management of the operator. A current of low intensity, a moderately strong solution of sulphate of copper acidulated with sulphuric acid, and a temperature not below 60° are the most favorable circumstances for obtaining the best deposit of copper. When the negative pole or cathode is irregular (like a coin or medal), instead of being a plain surface of platinum, an exact impression of the device may be taken off on the precipitated copper. Gold and other metals may be substituted for copper by proper management, or if the precipitated metal be left upon the surface on which it is thrown down, gilding, silvering, etc., may be done extensively and with fine effect. This art is called *electro-plating*. Proficiency in electrotyping or the galvano-plastic art requires but little apparatus, and involves no great expense. A medal may be either copied directly, and an inverted impression obtained from which a second E. can be taken, or a cast of the medal may be first made in stearine or plaster. In the latter operation, which is the most generally used, the mould, if of plaster, must be first soaked in oil, tallow, or melted spermaceti, so as to render it impervious to water. It must then be made a conductor of the current, and this is done by thoroughly brushing black lead over the surface which is to be reproduced. In case the medal itself is used, in order to prevent the deposition of copper which would take place upon the edges and upon the reverse of the medal, those parts should be covered with sealing-wax, varnish, or shell-lac. The introduction of this valuable art has been ascribed to different persons. Electrotyping has to some extent superseded the old stereotype process for making plates for printers' use, especially for the reproduction of engravings and where large numbers are to be printed.

Electrum, the Lat. name of amber, also a natural alloy of gold and silver, in the proportion of 2 of gold and 1 of silver. It is found in Siberia, Nor., and Cal., in tabular crystals or imperfect cubes of a silver-white color.

Elements, Chemical, those forms of matter which have never been decomposed. They are enumerated in the following table, with their symbols and atomic weights:

Aluminium	Al.	27.0	Manganese	Mn.	55.0
Antimony	Sb.	120.0	Mercury	Hg.	200.0
Arsenic	As.	74.9	Molybdenum	Mo.	96.0
Barium	Ba.	136.8	Nickel	Ni.	59.0
Bismuth	Bi.	210.0	Nitrogen	N.	14.0
Boron	B.	11.0	Osmium	Os.	199.0
Bromine	Br.	79.7	Oxygen	O.	16.0
Cadmium	Cd.	112.0	Palladium	Pd.	106.0
Cæsium	Cs.	133.0	Phosphorus	P.	31.0
Calcium	Ca.	40.0	Platinum	Pt.	197.0
Carbon	C.	12.0	Potassium	K.	39.0
Cerium	Ce.	141.2	Rhodium	Rh.	104.0
Chlorine	Cl.	35.4	Rubidium	Rb.	85.4
Chromium	Cr.	52.4	Ruthenium	Ru.	104.0
Cobalt	Co.	59.0	Selenium	Se.	79.0
Columbium	Cb.	94.0	Silicon	Si.	28.0
Copper	Cu.	63.1	Silver	Ag.	108.0
Davyum	Da.	154.0	Sodium	Na.	23.0
Didymium	D.	147.0	Strontium	Sr.	87.5
Erbium	E.	169.0	Sulphur	S.	32.0
Fluorine	F.	19.0	Tantalum	Ta.	182.0
Gallium	Ga.	69.9	Tellurium	Te.	128.0
Glucium	Gl.	9.2	Thallium	Tl.	204.0
Gold	Au.	196.2	Thorium	Th.	231.5
Hydrogen	H.	1.0	Tin	Sn.	118.0
Indium	In.	113.4	Titanium	Ti.	50.0
Iodine	I.	126.5	Tungsten	W.	184.0
Iridium	Ir.	198.0	Uranium	U.	240.0
Iron	Fe.	56.0	Vanadium	V.	51.2
Lanthanum	La.	139.0	Yttrium	Y.	60.0
Lead	Pb.	207.0	Zinc	Zn.	65.0
Lithium	Li.	7.0	Zirconium	Zr.	90.0
Magnesium	Mg.	24.0			

NOTE.—The Ariads are printed in Roman, the Perissads in italics. (See ATOMIC WEIGHTS.) C. F. CHANDLER.

Elephant [Gr. *ἑλέφας*; Lat. *elephas*, gen. *elephantis*], the common name of well known animals of the order Proboscidea, the largest of existing quadrupeds, and celebrated for sagacity and docility. They represent a peculiar family, characterized by grinders composed of alternating vertical plates of ivory, enamel, and cementum, 2 ivory tusks in the upper jaw, and a proboscis or trunk longer than the head. The proboscis presents an astonishing combination of flexibility and strength. Two tubes or canals, which are prolongations of the nostrils, extend through its whole length. It is capable of performing operations as different as picking up a pin and tearing up a tree by its roots, and is used to convey food and drink into the mouth. The tusks, which correspond to the incisor teeth of other quadrupeds, sometimes measure 9 ft. in length and weigh 150 lbs. each, but the average weight is not over 100 lbs. They are formidable defensive and offensive weapons. Beside many species which are extinct, there are 2 now living—the Asiatic or Indian E. (*Elephas Indicus*) and the African (*Loxodonta*

Africanus. The former has small ears and a concave forehead. In the latter the forehead is somewhat convex, and it has enormous ears, which cover the shoulders. The height of the Indian E. from the ground to the top of the shoulder seldom exceeds 10 ft. The Afr. is larger, and sometimes measures 12 ft. high. A large E. weighs about 7000 lbs. The ordinary period of gestation is 30 months and some days; only one calf is produced at a birth. The quantity of food consumed daily by a full-grown E. is enormous, probably not less than 300 lbs. The skin is hard, thick, and nearly naked, or furnished with a few scattered hairs. The Asiatic species is found in all the S. countries of Asia and in the adjacent islands. The Afr. abounds in nearly all parts of the continent S. of the Desert of Sahara. Both species live in large herds, reigning the almost exclusive occupants of immense forests, and marshy plains covered with long grass and jungle. Their favorite habitat is in well watered regions and plains of extinct species of E. have been found in many parts of Europe, N. Amer., and Siberia. Among them is the mammoth (*Elephas primigenius*), which occurs in the post-pliocene deposits. THEODORE GULL.

Elephan'ta, an island of Brit. India, in the harbor of Bombay, 7 m. from that city, derived its name from a gigantic stone figure of an elephant which formerly stood on the shore. The island is 6 m. in circumference. Here are several remarkable anc. cave-temples excavated out of the native rock, and adorned with numerous sculptured figures of the Hindoo mythology. The largest of these cave-temples is about 133 ft. long, and is supported by 26 pillars.

Elephantidae, the typical family of Proboscidiæ, with 2 upper incisors developed as enormous extorsely curved tusks, and enlarged molars; the molars successively displace each other from behind forward (and therefore no premolars replace the deciduous ones), and not more than 2 (or 1) are fully exerted at the same time. The external characters are familiar to everybody. The family is represented by 2 types—Elephantinæ, including the recent species of elephant and the mammoth, and Mastodontinæ, now extinct.

Elephant'iné, an island of the river Nile, on the boundary between Egypt and Nubia, is opposite to Asswan, (the anc. Syene). It is 1 m. long, and is partly occupied by gardens and houses interspersed among ruins of anc. temples erected by the Pharaohs. Among its monuments is the Nilometer mentioned by Strabo, and designed to record the height of the inundations of the Nile.

Elephant Seal, Sea Elephant, and Proboscis Seal, names given to species of *Macrorhinus*, the largest of the Phocidæ or seal family, the animals sometimes attaining 20 or 30 ft. in length. The color varies from grayish to dark brown; the nose of the male is prolonged into a short proboscis, which, however, does not serve the same purpose as that of the elephant. The skin is thick and strong, and is used for harness-making; the flesh is dark and unwholesome, the tongue only being prized as food. Only 2 species are certainly known, the *M. leoninus* and the *M. angustirostris* of W. Mex., also found in the Falkland Islands, S. Georgia, Kerguelen's Land, etc. They are hunted for their oil, which is of excellent quality and yielded in great quantity, one seal sometimes affording 70 gals.

Elephant's Foot (*Testudinaria elephantipes*), a plant sometimes called "Hottentots' bread," belongs to the order Dioscoriaceæ, having a large, fleshy root-stock, abruptly truncated at the end. This root-stock is eaten by the Hottentots. It is covered with a soft, rough bark, from which springs a climbing stem, bearing the leaves and flowers. The same name is also given to a genus of the order Compositæ (*Elephantopus*), of which 2 species are found in the S. Atlantic States.

Eleusinæ, a genus of grasses (Graminaceæ), comprises several species which are natives of India and other warm climates, and are cultivated for food. *E. Coracana* is extensively cultivated for its large farinaceous grain in India, Chi., and Japan. The grain called *tocusso* in Abyssinia is produced by the *E. tocosso*. The *E. Indica* is naturalized about dooryards, etc. in the U. S.

Eleusin'ia, or **Eleusin'ian Mysteries** [Gr. Ἐλευσινία], an annual festival celebrated in anc. Gr. in honor of Demeter (Ceres) and Persephone (Proserpine). The festival consisted of the greater and the lesser mysteries, the former beginning on the 15th day of the month Boëdromion, and closing on the 23d. Each day had its special rites, those of the 6th day being the most solemn of all. On that day those who had been previously initiated into the lesser mysteries were admitted, under an awful oath of secrecy, into the inner sanctuary, where they were allowed to see the sacred things, after which they were called *επωπιά-ι. ε.* "contemplators." Nothing certain is known respecting the doctrines revealed to the initiated, but they are supposed to have contained comforting assurances with regard to a future state.

Eleus'is [Gr. Ἐλευσίς or Ἐλευσίν], an anc. city of Gr., in Attica, near the N. shore of the Gulf of Salamis, and about 12 m. N. W. of Athens. It was the chief seat of the worship of Ceres, whose mystic rites, called Eleusinian Mysteries, were here performed annually with great pomp. Here was a large temple of Ceres. The site of E. was near the modern v. of Levensia.

Eleuthe'ria [from the Gr. Ἐλευθερος, "free"], a national festival of the anc. Grs., instituted in 479 B. C. to commemorate their deliverance from the Per. armies which had invaded Gr. It was celebrated annually at Platea in the early part of autumn.

Elf, plu. **Elves** [A.-S. *elf*; Ger. *Elfe*; Swe. *elf*; Dan. *alf*], imaginary beings whose existence is especially believed in among the peasantry of Scandinavia and N. W. Europe, in whose mythology they had a prominent place. They were of 2 kinds, the good and bad E. It appears that the E. were celebrated among Germanic peoples, while fairies

were described in Celtic legends; but in Eng., at least, the names were confounded.

El'gin, a royal burgh of Scot., cap. of the co. of Moray or Elgin, on the river Lossie, 5 m. from the sea and 118 m. N. of Edinburgh, with which it is connected by R. R. It is beautifully situated in a fertile valley, has 10 chs., a hospital, and an inst. which Gen. Anderson endowed with £70,000 for the education of orphans. E. has the ruins of a cathedral founded in 1224. These are the most extensive and beautiful of anc. Scot. remains. Here are the ruins of a castle which was the residence of the earls of Moray. E. has iron-foundries and woollen-factories. Pop. 6733.

Elgin, a city and R. R. centre, Kane co., Ill., on Fox River, 36 m. W. by N. from Chicago; has a fine water-power, and is the seat of the National watch-factory, the N. Insane Asylum, and an acad. Pop. 1870, 5441; 1890, 8787.

Elgin JAMES BRUCE, EIGHTH EARL OF, b. in Lond. July 20, 1811, ed. at Ox. He succeeded his father in 1841. This earldom was a Scot. peerage, which did not admit him into the House of Lords. He became gov. of Jamaica in 1842, and of Canada 1846-54. He was created a peer of the United Kingdom in 1849, was sent on a mission to Chi. in 1857, and negotiated the treaty of Tien-Tsin 1858. In 1859 he was P. M.-gen., and in 1861 was appointed gov.-gen. of India. D. Nov. 20, 1863.

Elgin (THOMAS BRUCE), SEVENTH EARL OF, the father of the preceding, b. in Scot. July 20, 1766. Was gen. in the army, and was sent as envoy extraordinary to Berlin in 1795, and as ambassador to Constantinople in 1799. He expended a large sum of money (about £50,000) in the removal of statues, bas-reliefs, and other remains of anc. art from the Parthenon and Acropolis of Athens to Eng. D. Nov. 14, 1841.

Elgin Marbles, a collection of sculptures taken from the Acropolis of Athens, mainly from the Parthenon. They are so called from the earl of Elgin, who, by permission of the Porte, brought them to Eng. from 1808 to 1812. They consist of colossal statues and pieces of statues, bas-reliefs, caryatides, bits of column, urns, etc. The marbles from the Parthenon exhibit Gr. art in its highest perfection.

Elia. See LAMB (CHARLES).

Elie de Beaumont, a-lé' deh bë-mon' (JEAN BAPTISTE ARMAND LOUIS LÉONCE), a Fr. geol., b. at Canon (Calvados) Sept. 25, 1798. He was ed. in Polytechnic School, and became prof. of geol. in the Coll. of Fr. in 1832, chief engineer of mines in 1833, and a member of the Inst. in 1835. In conjunction with Dufrenoy he prepared a geological map of Fr. Among his works are *Lectures on Geology* and *A Treatise on the Mountain Systems*, giving his theories on the elevation of mt. ranges. He succeeded Arago as perpetual sec. of the Acad. of Sciences in 1853. D. Sept. 21, 1874.

Eli'jah, a Heb. prophet, appeared before King Ahab, and announced a drought as a punishment for the introduction of the idolatry of Baal, and fled then, to avoid the wrath of the king. Three yrs. afterward, when the king had gathered all the priests of Baal at Mt. Carmel, E. again appeared; and this time the idolatrous priests were massacred; but the prophet was compelled to flee and seek refuge in a cavern of Mt. Horeb, in order to escape the revenge of Jezebel. Once more he returned to public life, appointed Elisha as his successor, and announced to Ahaziah, the son of Ahab, that his illness should end with death; visited the school of prophets at Bethel, and retired with Elisha to the other side of the Jordan, whose waters he divided by smiting them with his mantle; and while stopping there he was taken up into heaven in a chariot of fire.

Eli'ot (ANDREW), D. D., b. Dec. 28, 1718, grad. at Harvard in 1737; was pastor of the New North ch., Boston, Mass., from 1742 till his death, Sept. 13, 1778. He was elected pres. of Harvard Univ., but declined the honor.

Eliot (CHARLES WILLIAM), LL.D., b. Mar. 20, 1834, at Boston, Mass., ed. at the Boston Public Lat. School (1844-49) and at Harvard Coll. (1849-53); was tutor in math. at Harvard Coll. 1854-58, assistant prof. of math. and chem. 1858-61, of chem. 1861-63, prof. of chem. in Mass. Inst. of Technology 1865-69, became pres. of Harvard Coll. May 19, 1869; pub., with F. R. Storer, a manual of chem.

Eliot (GEORGE). See EVANS (MARIAN C.).

Eliot (JOHN), "the apostle to the Indians," a minister of Roxbury, Mass., b. in Eng. about Nov. 1604, ed. at Cambridge, and came to Boston in 1631. He acquired the lang. of the Indians, and from 1646 he devoted himself to improving their condition and converting them to Christianity. He travelled extensively among them, and acquired great influence over them, and many of them embraced the Chr. faith. He translated the Bible into the Indian tongue (1661-63) and pub. an Indian gram. D. May 20, 1690.

Eliot (JOHN), D. D., a preacher and biographer, b. in Boston May 31, 1754, grad. at Harvard in 1772. With Jeremy Belknap, he founded the Mass. Historical Society; was auth. of *N. Eng. Biographical Dict.* D. Feb. 14, 1813.

Eliot (SAMUEL), LL.D., a historian, b. in Boston Dec. 22, 1821, grad. at Harvard 1839; he projected a *Hist. of Liberty*, a part of which, *The Liberty of Rome*, appeared in 1849, and *The Early Chrs.*, the second part, in 1858; wrote a *Manual of U. S. Hist. from 1492 to 1850*; was pres. of Trinity Coll., Hartford, in 1860-64.

E'lis [Gr. Ἐλῆς], a small state of anc. Gr. in the N. W. part of the Peloponnesus, bounded N. by Achaia, E. by Arcadia, S. by Messenia, W. by the Ionian Sea. The surface is diversified by hills and fertile plains and valleys. The Olympic games, the greatest national festival of the Grs., were celebrated at Olympia in E.

Elis, an anc. city, cap. of the above state, on the river Peneus, about 10 m. from its mouth. It had an acropolis on a hill nearly 500 ft. high, and contained several fine temples, a theatre, and the largest gymnasium in Gr. About 175 A. D. it was one of the most splendid and populous cities of Gr. The site is occupied by the modern *Palæopoli* or *Kalocampi*.

El'isha, a Heb. prophet, was called to the prophetic office by Elijah, and received his mantle when he was taken

up into heaven; was recognized by the other prophets as their spiritual head, and enjoyed great respect from the people of Israel. His death is commonly fixed at 840 B. C.

Elizabeth, city and R. R. centre, cap. of Union co., N. J., on Staten Island Sound and Elizabeth River, 14 m. S. W. of New York. E. was formerly the cap. of N. J., and ceased to be such in 1790. Pop. 1870, 20,832; 1880, 28,220.

Elizabeth, the last sovereign of the house of Tudor, b. at Greenwich Sept. 7, 1533. She was a daughter of Henry VIII. and Anne Boleyn. Her childhood was passed in comparative retirement, and she was ed. by persons who favored the Reformed religion. In 1554 she was confined in the Tower by order of Queen Mary, who regarded her with jealousy because she was the favorite of the Prot. party. It appears that E. narrowly escaped death, and that some of the bps. and courtiers advised Mary to order her execution. After she had passed several months in the Tower she was removed to Woodstock, and appeased Mary by professing to be a Catholic. On the death of Queen Mary (Nov. 17, 1558) E. ascended the throne. She appointed William Cecil sec. of state and Nicholas Bacon keeper of the great seal. The Prot. were the majority in the Parl. which met in 1559, abolished the mass, adopted the Thirty-nine Articles as the religion of the state, and recognized the queen as the head of the Ch. "Thus," says Hume, "in one session, without any violence or tumult, was the whole system of religion altered by the will of a young woman." She declined an offer of marriage made to her by Philip II. of Sp. Her foreign policy was pacific, but to promote the stability of her throne she aided the Prot. insurgents in Scot., Fr., and the Netherlands with money and troops. In 1563 the Parl., anxious that she should have an heir, entreated her to marry, but she returned an evasive answer. Among her suitors were the Fr. duke of Anjou, the archduke Charles of Aus., and Robert Dudley, earl of Leicester, who was for many yrs. her chief favorite. Mary queen of Scots, fleeing from her rebellious subjects, took refuge in Eng. in 1568, and was detained as a prisoner by E. The latter regarded Mary as a dangerous rival, because the Eng. Catholics wished to raise her to the throne of Eng., and formed several plots and conspiracies for that object. Mary was beheaded Feb. 8, 1587. Philip II. of Sp. had long meditated a hostile enterprise against E., who had offended him by aiding his revolted Dut. subjects and by persecuting the Eng. Catholics. For the invasion of Eng. he fitted out the Invincible Armada, which consisted of about 130 vessels, with over 19,000 soldiers, and sailed in May 1588. A violent storm dispersed the Sp. ships, many of which were wrecked, and the rest were beaten by the Eng. fleet under Admiral Howard, Aug. 8, 1588. After the earl of Leicester d. (1588) the earl of Essex was the queen's favorite courtier. The Puritans were severely persecuted in the latter part of her reign. D. Mar. 24, 1603, and was succeeded by James VI. of Scot., who became James I. of Eng. Her reign is considered one of the most prosperous and glorious in Eng. hist., and she displayed superior abilities as a ruler, but was vain and selfish. The Elizabethan age was illustrated by the genius of Shakespeare, Spenser, Bacon, Sidney, and Raleigh. (See HUME, *Hist. of Eng.*)

Elizabeth'an Architecture, a term applied to a style of arch, which prevailed during the reigns of Elizabeth and James I. It is characterized by a rich but cumbersome style of ornament, within and without, by vast apartments and galleries, and by enormous square windows.

Elizabeth Christina, queen of Prus., b. at Brunswick Nov. 8, 1715, was a daughter of the duke of Brunswick-Wolfenbützel; was married to Frederick the Great in 1732. D. Nov. 13, 1797.

Elizabeth City, N. C. See APPENDIX.

Elizabethine Nuns, a congregation of monastic women in the R. Cath. Ch., belonging to the third order of St. Francis. The name Elizabethines was at first applied to voluntary associations of women who imitated the zeal of St. Elizabeth of Hungary, without taking monastic vows or retiring from the world. But from the tradition that St. Elizabeth belonged to the third order of St. Francis, the name is sometimes given to Franciscan nuns. It is probable, however, that the Franciscan nuns of the third order were not established till 1395, long after St. Elizabeth's death.

Elizabeth Islands, a group of 16 small islands belonging to Mass., lying between Vineyard Sound and Buzzard's Bay. One of the islands, containing 100 acres, Penikese or Pune, was presented in 1873, by John Anderson of New York, to Prof. Agassiz, for the purpose of establishing a school of nat. hist. upon it. Pop. 152.

Elizabeth Petrovna, empress of Rus., b. in Dec. 1709, was a daughter of Peter the Great and Catherine I. She was dissolute in morals, and made little effort to obtain the throne. Ivan, an infant, was proclaimed emp. in 1740, but the Fr. surgeon Lestocq and other partisans of E. conspired against Ivan with success, and she became empress in 1741. As an ally of Aus. and Fr. she waged war against Frederick the Great, and her army gained a victory at Kunersdorf, and entered Berlin in 1760. She had several children by Count Rasumovski, who was first her servant, subsequently her chamberlain, and was at length secretly married to her. D. Jan. 5, 1762, and was succeeded by her nephew, Peter III.

Elizabeth Stuart, queen of Bohemia, a daughter of James I. of Eng., b. Aug. 19, 1596. She was married in 1613 to Frederick V., elector palatine, who was chosen king of Bohemia in 1619 by the Prot. party. Her husband was defeated in battle in 1620, and she passed the remainder of her life in exile and adversity. She was the mother of the famous Prince Rupert and other children. D. Feb. 13, 1662. George I. of Eng. was her grandson. (See MISS Benger.)

Elizabethtown, R. R. junc., cap. of Hardin co., Ky., 42 m. S. by W. from Louisville. Pop. 1870, 1743; 1880, 2526.

Elizabethtown, N. Y. See APPENDIX.

Elk, or Moose (*Alces macchis*), a deer, native of the N.

parts of Asia and Europe, as well as N. Amer. It is the largest of the Cervidae, and is about 6 ft. high. It has a short, compact body raised on long, stilt-like legs, a short, thick neck, and a large, narrow head, nearly 2 ft. long. The antlers are flattened, displaying a broad blade with numerous snags on each horn. Its color is brownish black. It frequents marshy dists. and swampy forests, feeding on lichens, leaves, and branches of trees. The flesh is esteemed for



Elk or Moose.

food. In Amer. it is known as the moose, and is still found in Me. and N. N. Y., and north-westward, and is hunted for its flesh and skin in winter, when the frozen crust of the snow, not strong enough to bear the animal's weight, seriously impedes its progress. The beast generally known in Amer. as the E. is the *WAPITI* (which see).

Elk, Irish (*Cervus*, or *Megaceros Hibernicus*), the name given to a fossil deer found in pleistocene strata of Europe, distinguished by the great size and form of its antlers. The beam of the antler is wide and flattened into a palm, and in one specimen the distance between the tips was nearly 11 ft. The weight of the antlers in one specimen was 81 lbs.

El Khar'geh, a town of Upper Egypt, cap. of the Great Oasis. Here are ruins of a temple and an anc. necropolis. It is also the name of the Great Oasis itself, 80 m. long, 10 m. broad, with many ruins, chiefly Macedonian and Rom.

Elkhart, a city and R. R. centre, Elkhart co., Ind., on Elkhart River, 100 m. E. by S. from Chicago. The combined water-power is estimated at 8300 horse-power. Pop. 1870, 3265; 1880, 6953.

Elkhorn, Wis. See APPENDIX.

Elkhorn River, Neb., rises in the N. E. part of the State, flows nearly S. E., and enters the Platte. Length, estimated at 250 m.

Elko, cap. of Elko co., Nev., on R. R. and Humboldt River, 603 m. N. E. of San Francisco. It has silver-smelting works, and here are hot mineral springs of great value for bathing purposes. Pop. 1870, 1160; 1880, 752.

Elkton, cap. of Cecil co., Md., on R. R., 52 m. E. N. E. from Baltimore, and at the head of navigation on the Elk River. It has an acad. E. was settled by the Swedes in 1694. Pop. 1870, 1797; 1880, 1752.

Elle [Lat. *ulna*; Fr. *aune*; Ger. *Elle*; Dut. *eln*], a measure of length adopted from the length of a man's fore-arm. The Eng. E. is 3 ft. 9 inches, and the Flemish is equal to 27 inches, or $\frac{3}{4}$ of a yard.

Ellenborough (EDWARD LAW), LORD, an Eng. lawyer, b. in Cumberland Nov. 16, 1750. He pleaded with success in 1785 as the leading counsel for the defence in the trial of Warren Hastings; became atty.-gen. in 1801, and in 1802 was made lord chief-justice of the king's bench and Baron Ellenborough. D. Dec. 13, 1818.

Ellenborough (EDWARD LAW), EARL OF, a statesman, a son of the preceding, b. Sept. 8, 1790, and succeeded his father as baron in 1818. He was lord privy seal in 1828-29, and gained distinction as an orator in the House of Lords. In 1841 he was appointed gov.-gen. of India, but was recalled in 1844 by the E. I. Co., and then received the title of earl and viscount. He was first lord of the admiralty in 1846 for a short time in the cabinet of Peel. On the formation of a new Tory ministry in Feb. 1858 he became pres. of the board of control. He resigned in 1858. D. Dec. 22, 1871.

Ellettsville, Ulster co., N. Y., 30 m. W. of the Hudson River, at the foot of the Shawangunk Mts., on R. R. and the Del. and Hudson Canal. It is a summer resort, and the seat of Ulster Sem. Pop. 1880, 2750.

Ellety (WILLIAM), b. at Newport, R. I., Dec. 22, 1727. He was a merchant in his youth, and began to practice law in 1770 at Newport; was a delegate from R. I. to the national Cong. of 1776, in which he signed the Dec. of Ind. He was re-elected, and was in Cong. until 1785. D. Feb. 15, 1820.

Ellet (CHARLES), an engineer, b. at Penn's Manor, in Bucks co., Pa., Jan. 1, 1810. He began mathematical and engineering pursuits, first as a rodman, then as a voluntary and subsequently as a paid assistant on the Chesapeake and O. Canal, where he acquired the means to visit Europe and complete his self-education in Paris, following the course of the Ecole Polytechnique. He shares with Roebling the honor of being a pioneer of wire suspension bridges, building in 1842 the bridge across the Schuylkill at Fairmount (on the site of the famous "Colossus" wooden bridge destroyed in 1838 by fire), "the first structure of its kind in this country, and considered at the time a triumph of engineering skill." Among his most noteworthy labors was his investigation of the hydraulics of the O. and Miss. rivers, and his work, pub. by the Smithsonian Inst., he regarded as "the crowning conception of his professional career." He was among the first to advocate the use of "steam-rams," and was commission-

ed by the war dept. to do what he could to protect the Miss. gunboat squadron against a fleet of hostile rams understood to be coming up the river. He hastily equipped a fleet of 9 river steamboats as "rams," of which he was given the command, and on June 6, 1862, defeated the Confed. squadron, sinking 3 of their vessels outright by 2 of his rams, but was fatally wounded. D. June 21, 1862.

Ellicott (ANDREW), a C. E., b. in Bucks co., Pa., Jan. 24, 1754. He founded Ellicott's Mills in Md. and removed to Baltimore. In 1790 he was employed by the Federal govt. to survey and layout the cap. of the U. S. He was appointed surveyor-gen. of the U. S. in 1792, and became prof. of math. and engineering at W. P. in 1812. D. Aug. 29, 1820.

Ellicott (CHARLES JOHN), D. D., since 1863 bp. of Gloucester and Bristol, was b. at Whitwell, near Stamford, Eng., Apr. 25, 1819. In 1859 became Hulsean lecturer, and in 1860 Hulsean prof. of divinity, at Cambridge. His commentaries on the Epistles of St. Paul, which began to appear in 1854, have put him into the front rank of biblical scholars. His *Historical Lectures on the Life of Our Lord Jesus Christ* were the Hulsean Lectures for 1859.

Ellicott City, cap. of Howard co., Md., on R. R. and the Patapsco River, 10 m. from Baltimore and 31 m. from Wash. It has 3 colls., one of which is for females. Pop. 1870, 1722; 1880, 1784.

Ellicott (CHARLES), D. D., LL.D., a Meth. minister, b. in the county of Donegal, Ire., May 16, 1792; emigrated to O., where he edited the *Western Christian Advocate*; was prof. of langs. at Madison Coll., Uniontown, Pa., 1827-31, and pres. of Ia. Wesleyan Univ. 1856-60 and 1864-67. Wrote *A Treatise on Baptism, Delineation of Roman Catholicism, and The Bible and Slavery*. D. Jan. 3, 1869.

Ellicott (CHARLES LORING), a portrait painter, b. in Scipio, N. Y., Dec. 1812. He worked in the city of New York, and painted the portraits of several eminent men. His works are commended for fidelity of likeness. D. Aug. 25, 1868.

Ellicott (CHARLES WYLLIS), descended from John Elliot, "the apostle of the Indians," b. in Guilford, Conn., May 27, 1817. Wrote *St. Domingo and Hist. of N. Eng. from Discovery of the Continent by Northmen in 986 to 1776*.

Ellicott (EBENEZER), a poet, called the "Corn-law Rhym-er," b. near Rotherham, Yorkshire, Mar. 17, 1781. He was not liberally ed., and was considered a dull boy at school. In early youth he worked in an iron-foundry, in which his father had been employed; removed in 1821 to Sheffield, where he engaged in the iron-trade on his own account, and was successful. His most popular poems are *The Corn-law Rhymes*, which promoted the repeal of the Corn Laws, and were much admired. D. Dec. 1, 1849.

Ellicott (EZEKIEL BROWN), b. in Sweden, Monroe co., N. Y., July 16, 1823, grad. at Hamilton Coll. in 1844. In 1863 was a member of the International Statistical Cong. at Berlin, in 1865 became sec. of the commission for revising the U. S. revenue laws, in 1871 entered the civil service reform commission. Author of *Tables of the Money, Weight, and Measure of the Prin. Commercial Countries in the World*, and wrote *COINAGE, in J.'s Univ. Cyc.*

Ellicott (JESSE DUNCAN), a com., b. in Md. July 14, 1782; became lieut. in 1810, and was second in command under Com. Perry at the battle of Lake Erie, in Sept. 1813. Cong. voted him a gold medal for his conduct in this action. D. Dec. 10, 1845.

Ellicott (ROBERT WOODWARD BARNWELL), S. T. D., b. at Beaufort, S. C., Aug. 16, 1840, grad. at S. C. Coll. 1861; was aide-de-camp 1861-62 to Brig.-Gen. Lawton of the Confed. army, wounded in second battle of Manassas, and adjutant-gen. of McLaw's division 1864-65; was ordained a deacon in 1868 and bp. of W. Tex. in 1874.

Ellicott (STEPHEN), LL.D., a naturalist, b. at Beaufort, S. C., Nov. 11, 1771, grad. at Yale Coll. in 1791; was prof. of nat. hist. in the med. coll. at Charleston, and pres. of the Bank of S. C. Wrote for the *Southern Review*, and pub. *The Bot. of S. C. and Ga.* D. Mar. 28, 1830.

Ellicott (STEPHEN) D. D., son of the preceding, and prof. of sacred lit. in S. C. Coll., b. at Beaufort, S. C., Nov. 13, 1805; became bp. of Ga. in 1841. D. Dec. 21, 1866.

Ellipse (Gr. *ἐλλειψις*, "omission" or "defect") a plane curve that may be generated by a point moving so that the sum of its distances from two fixed points shall always be the same. The fixed points are called *foci*, the point midway between the foci is the *centre*, the line through the foci is the *transverse axis*, and the line through the centre and perpendicular to the transverse axis is the *conjugate axis*. The E. is one of the conic sections; thus, if any cone is intersected by a plane which cuts its opposite sides obliquely, the curve cut out is an E. An E. may be regarded as the orthographic projection of a circle; from this point of view the E. may vary in form from a circle to a straight line equal to the diameter of the circle projected.

Ellis (ALEXANDER JOHN), F. R. S., F. S. A., b. at Hoxton, a suburb of Lond., June 14, 1814; grad. at Trinity Coll., Cambridge, 1837; studied law at the Middle Temple, but devoted himself finally to the study of phonetics, and pub. *Alphabet of Nature, Essentials of Phonetics, Plea for Phonetic Spelling, and Universal Writing and Printing*.

Ellsworth, cap. of Ellsworth co., Kan., on R. R., 223 m. from Kansas City and 415 m. from Denver. It is one of the leading markets in the State for Tex. cattle. Pop. tp. 1870, 448; 1880, 1378, including 929 in v.

Ellsworth, a city, port of entry, and cap. of Hancock co., Me., on the navigable Union River, 2 m. from its mouth and 30 m. S. E. of Bangor. Its main industries are lumbering, ship-building, and cooperage. It has a public library. Pop. 1870, 5257; 1880, 5052.

Ellsworth (EPHRAIM ELMER), b. in Mechanicsville, Saratoga co., N. Y., Apr. 23, 1837, became a resident of Chicago. He organized a well disciplined body of Zouaves before the c. war, and in Mar. 1861 he escorted Pres. Lincoln to Wash. In Apr. he became col. of a Zouave regiment of New York firemen. To Col. E.'s regiment was assigned the seizure

and occupation of Alexandria, opposite Wash., on May 24, 1861. Observing a secessionist flag flying over the "Marshall House" (a hotel kept by one Jackson), he ascended to the roof himself and took it down. Descending with it in his hand, he was met and shot dead by the innkeeper, who immediately encountered a similar fate from the attendant soldiers.

Ellsworth (OLIVER), LL.D., b. in Windsor, Conn., Apr. 29, 1745, and grad. at Princeton in 1766; was admitted to the bar in 1771, and elected a delegate to the Continental Cong. in 1777; in 1787 was a member of the convention which framed the Federal const. Having joined the Federal party, he was elected in 1789 to the U. S. Senate. In 1796 was appointed chief-justice of the supreme court by Washington; in 1799 was sent as envoy extraordinary to Paris, where he and his colleagues negotiated a treaty with Fr.; resigned the office of chief-justice in 1800. D. Nov. 26, 1807.

Ellsworth (WILLIAM WOLCOTT), LL.D., b. at Windsor, Conn., Nov. 10, 1791, grad. at Yale in 1810; became a lawyer, was prof. of law in Trinity Coll., Hartford, Conn., 1827-68, M. C. 1829-33, gov. of Conn. 1838-42, and a justice of the State supreme court 1847-61. D. Jan. 15, 1868.

Elm [Lat. *ulmus*; Ger. *Ulm*; Fr. *orme*], a genus of trees of the order Ulmaceae, natives of Europe and N. Amer., with alternate serrate leaves, which are oblique or unequally heart-shaped at the base. This genus comprises numerous species, 5 or more of which are indigenous in the U. S. The most remarkable of these is the *Ulmus Americana* (white or Amer. E.), a large ornamental tree, usually with spreading branches and drooping, pendulous boughs. It grows rapidly, and often attains the height of 100 ft. Its favorite habitat is in moist woods where the soil is rich, and in the vicinity of rivers and creeks. The trunk sometimes ascends without branches 50 or 60 ft., and then separates into a few primary limbs, which gradually diverge and present long arched pendulous branches floating in the air. The wood of this tree is used for making hubs of wheels. Another species native of the U. S. is the slippery E. (*Ulmus fulva*), a smaller tree with a very mucilaginous inner bark, which is used in med. as a demulcent. Among the important trees of this genus is the common Eng. E. (*Ulmus campestris*), which grows in many parts of Europe, and is extensively planted in G. Brit. It is one of the chief ornaments of Eng. scenery. The wood of this tree is compact, fine-grained, very durable in water, and is used for various purposes by wheelwrights, machinists, joiners, and shipbuilders. It has a mucilaginous bark, which is esteemed as a med. The *Ulmus montana*, or wych E., is a native of Scot., and a tree of rapid growth, valuable for timber, which is used for the same purposes as the Eng. E. Europe also produces the cork-barked E. (*Ulmus suberosa*), a tall tree extensively planted in Eng. and named with reference to the corky ridges or wings on its branches. A valuable fine-grained wood is obtained from the *Ulmus ala'ta*, winged E. or wahoo, which grows wild in the U. S.

El Mahdi. See MAHDI, EL, in APPENDIX.

Elmer (LUCIUS Q. C.), LL.D., b. at Bridgeton, N. J., in 1793, grad. at Princeton in 1824; was a prominent lawyer and State politician, M. C. from N. J. 1843-45, atty.-gen. of the State 1850-52, and a judge of the State supreme court 1852-59. He pub. *A Digest of N. J. laws* 1838. D. Mar. 11, 1883.

Elmhurst, on R. R., Du Page co., Ill., 16 m. W. N. W. of Chicago. Pop. 1870, 329; 1880, 723.

Elmina, a fortified town and seaport of Afr., the former cap. of the Dut. possessions on the Guinea coast, is in lat. 5° 5' N. and lon. 1° 23' W. It is defended by a strong fort. E. was taken from the Port. by the Dut. in 1637. In 1872 it was ceded, with the Dut. possessions in Guinea, to G. Brit. In 1873 it was burned by the Brit. troops on account of its sympathy with Ashantee. Pop. about 15,000.

Elmira, a city and R. R. centre, cap. of Chemung co., N. Y., 274 m. by rail N. W. by W. of New York, on the Chemung River. The Chemung Canal extends to Seneca Lake, and the Junction Canal connects E. with the interior of Pa. The large shops of the Erie R. R. and the prin. shops of the N. Central R. R. are situated here, also the State Reformatory and the Elmira Female Coll. (Presb.). It was the site of a military prison, where many Confed. prisoners were confined. Pop. 1870, 15,863; 1880, 20,541.

Elmore (FRANKLIN HARPER), a lawyer and financier, b. in S. C. in 1799; became M. C. in 1837, and pres. of the Bank of the State of S. C. in 1840; was elected to the U. S. Senate in 1850. D. May 29 of the same yr.

Elmore (RUSH), a son of Gen. John Elmore, ed. for the bar, served in the Mex. war, and in 1854 was appointed by Pres. Pierce a judge of the U. S. court in Kan. D. during the war.

Elmo's Fire, Saint [*Elmo* is an It. form of the name *Elijah*], an electrical light which at sea sometimes attaches itself to the ends of masts and spars. When 2 such lights are seen it is considered by sailors a sign of fair weather and good luck; one ball of light is regarded as a bad omen.

Elmwood, Peoria co., Ill., on R. R., 163 m. S. W. of Chicago. Pop. 1870, 1476; 1880, 1504.

Elonga'tion, in astron., the angular distance of a planet from the sun, either E. or W. The superior planets may have any E. from 0° to 180°, but the E. of the inferior planets are limited; the greatest E. of Mercury is 28½°, and that of Venus about 47½°.

Elo'ra, or **Ellora**, a decayed town of Hindostan, near Dowlatabad. Here are numerous cave-temples, which surpass in magnitude all others in India, and are adorned with statues and other sculptures. Beside the cave-temples hewn out in the slope of a rocky hill, there are vast edifices carved out of solid granite hills, so as to form magnificent monoliths, having an exterior as well as interior architecture, richly decorated. The most remarkable of these is the temple *Kailasa*, about 145 ft. long and 100 ft. high. The date of the construction of these temples is not known.

El Paso, a city and R. R. junc., Woodford co., Ill., 17

m. N. of Bloomington. A coal-shaft has been sunk here. Pop. 1870, 1564; 1880, 1300.

El Paso, Tex. See APPENDIX.

Elsass-Lothringen [Fr. *Alsace-Lorraine*], a crown-land of the Ger. empire, formed of parts of Alsace and Lorraine which in 1871 were ceded by Fr. to Ger. About $\frac{2}{3}$ of the pop. are of Ger. descent and speak the Ger. lang.; about $\frac{1}{3}$ are R. Caths. Area, 5580 sq. m. Pop. 1880, 1,564,670.

Elsinore, el-sin-or' [Dan. *Helsingør*], a seaport of Den., on the island of Seeland and on the W. shore of the Sound (here only 2 $\frac{1}{2}$ m. wide), 24 m. N. by E. of Copenhagen. It is defended by the Castle of Kronborg, which commands the Sound at its narrowest part. At E. the Sound dues were formerly collected from foreign vessels navigating the Sound. Here was laid the scene of Shakspeare's *Hamlet*. Pop. 8879.

Elton', a shallow saline lake of Rus. in the basin of the Caspian. It is 14 m. long, and has an area of 78 sq. m. In the summer it appears as if it were covered with snow.

E'ty (SMITH, JR.), b. in N. J. in 1825; studied law, and was admitted to the bar in 1846; did not practice, but entered a wholesale leather business in New York; was elected a school trustee in 1856, member of the State senate in 1857, co. supervisor from 1866 to 1870, Rep. from N. Y. to the 42d and 44th Congs., com. of public instruction 1872, chairman of the committee on expenditures in treas. dept. 1875, mayor of New York 1877.

Elyria, el-ir'e-a, R. R. June, cap. of Lorain co., O., at the confluence of the E. and W. branches of Black River, 25 m. W. of Cleveland. It has a telegraph coll. and valuable water-power. Pop. 1870, 3038; 1880, 4777.

Elysium, el-iz'yum, or **The Elysian Fields** [Gr. *ἡλύσιον πεδῖον*; Fr. *Elysée* or *Champs Elysées*], in classic mythology, the place to which the souls of the virtuous were supposed to be transported after death. Some of the anc. imagined that the kingdom of Pluto was divided into 2 regions—Tartarus, in which the wicked were punished, and E., the abode of the good.

Emanation [from the Lat. *e*, "out," and *ma'no*, *ma-nu'm*, to "flow"], in the religions of India, of anc. Per., in Neo-Platonism, and in Gnosticism, a theory which ascribes the origin of the universe and of all inferior beings to an outflow from the Deity. The name has also been applied to the good and evil influences which the heavenly bodies were formerly believed to send forth, and which were thought to determine the destinies of men.

Emancipation [from the Lat. *eman'cipo*, *emancipa'tum*, to "liberate" from *e*, "from," and *man'cipium*, a "slave"], the act of freeing from subjection of any kind. In Rom. law a son was regarded as the slave of his father, and could by a fiction of that law be freed by being sold (*man'cipatus*) three times by the father. This enfranchisement was termed emancipation. In countries where that law prevails the word signifies the exemption of the son from the power of the father, either by express act or implication of law. By the civil law of Fr., majority (and E.) are attained at 21, and a minor is emancipated by marriage. The word E. is used in a gen. sense to signify the liberation of a slave, or the admission of certain classes to the enjoyment of civil rights.

Emancipation, Proclamations of, issued by Pres. Lincoln for the liberation of all the slaves in such portions of the U. S. as were in armed resistance to the govt. The first of these, issued Sept. 22, 1862, was preliminary Jan., announcing that upon the first day of the succeeding Jan. "all persons held as slaves within any State, or any designated part of a State, the people whereof shall then be in rebellion against the U. S., shall be then, thenceforward, and forever free; and the military and naval authority thereof will recognize and maintain the freedom of such persons, and will do no act or acts to oppress such persons, or any of them, in any efforts they may make for actual freedom; that the Executive will, on the first day of Jan. aforesaid, by proclamation, designate the States and parts of States, if any, in which the people there of respectively shall then be in rebellion against the U. S." In pursuance of this announcement the real proclamation was put forth on the day designated. It announced the E. "as a fit and necessary war measure," of all the slaves in the seceding States, with the exception of certain parishes in La. and certain cos. and towns in Va. then in actual possession of the forces of the U. S., "which excepted parts are for the present left precisely as if this proclamation were not issued." The proclamation continues: "I hereby enjoin upon the people so declared to be free, to abstain from all violence, unless in necessary self-defence, and I recommend to them that in all cases, when allowed, they labor faithfully for reasonable wages," and adds that "such persons of suitable condition will be received into the armed service of the U. S." The proclamation concludes: "And upon this, sincerely believed to be an act of justice, warranted by the Constitution, upon military necessity, I invoke the considerate judgment of mankind and the gracious favor of Almighty God."

Embalming [remotely from the Gr. *en*, "in," and *βάλλω*, "balm," "resin," alluding to the anc. process], the preservation of dead bodies from decay by the application of antiseptic drugs or of suitable chemical reagents. This art early attained great perfection in Egypt. In the most expensive method the brain and viscera were removed, their places being filled with bitumen and aromatic substances; the body was washed in the oil or tar of cedar, bound up in linen smeared with spices, asphalt, and various gums, and the whole was placed in a solution of natron for 70 days. The cheap methods dispensed with the evaporation, and yet many mummies are found completely preserved by the inferior methods. It appears also that salt was freely used. During the present century many improvements have been made in the process, which no longer aims at rendering bodies imperishable, but merely

preserves them indefinitely. In some, arsenical liquids are injected into the blood-vessels. The chlorides of zinc, mercury, and aluminium, various other salts of aluminium, solutions of creosote, carbolic acid, etc., are successfully employed.

Embankment, a mound of earth for a pier or quay, for defence against the sea or streams, or for carrying a roadway. In building E. the slopes should be of a permanent nature, and the weight of the bank should not be so great as to force out the foot. The tendency of the subsoil of an E. to be compressed under the load brought upon it may be resisted by filling the core with light materials and by widening the base. The best way to counteract this tendency is to isolate the foundation by driving piles. Care should be taken to free the seating of an E. from any water that may filter through it. Covering the slopes with turf is a useful precaution, but this cannot be done when the bank is formed of gravel.

Embarzo [a Sp. word signifying "arrest," "impediment"], a restraint or prohibition imposed by the govt. of a country on vessels to prevent their leaving its ports. They may sometimes prohibit the arrival as well as the departure of vessels. In Dec. 1807 the Cong. of the U. S., at the request of Pres. Jefferson, laid an E. as a retaliation against the Brit. "Orders in Council." This E. was repealed by Cong. in Feb. 1809.

Embassador. See AMBASSADOR.

Em'ber Week [Lat. *quad'or tem'pora*, the "4 seasons" (from this the Eng. is probably a corruption); Fr. *quatre-temps*; Ger. *Quatember*; Dut. *temper*], a name given in the calendars of the Anglican and R. Cath. chs. (1) to the week after the first Sunday in Lent; (2) to the week after Whit-sunday; (3) to that after the 14th of Sept.; and (4) to that after the 13th of Dec. The Wednesday, Friday, and Saturday of these weeks are "ember days," fasts for imploring the Divine blessing on the fruits of the earth and upon the ordinations which are performed at these times.

Embezzlement, in criminal law, is the act of fraudulently appropriating to one's own use property held under some fiduciary relation, such as that of clerk or servant. It is not to be confounded with larceny. The definition of this offense is rigid, so that this branch of the criminal law is entangled with perplexing distinctions. Larceny is defined to be "the felonious taking and carrying away the personal property of another." The word "taking," as here employed, has been closely interpreted by the courts, and generally considered not to include the case of property held in trust, particularly where it came into the possession of the trustee without first having passed into the possession of the real owner. There must have been a taking equivalent to a trespass. It became a maxim that without a trespass there could be no theft or larceny. This imperfection in the law led many yrs. ago, to a statute in Eng., which created a new form of crime called "embezzlement." This form of legislation was copied in this country. In the civil law E. is recognized as a wrong, subjecting him who commits it to an action for damages, or other proceeding by way of reparation. A sailor may forfeit his share of salvage compensation by "E.," the forfeited share accrues, not to the other members of his class, but to the owner of the property saved. T. W. DWIGHT.

Embitot'idæ [*Embitotia*—*ἐμβίος*, "living," and *τόκος*, "bringing forth"—the typical genus], a remarkable family of fishes limited to the Pacific Ocean, and especially represented on the shores of the Pacific U. S., distinguished by their viviparity. The body is compressed and oblong; the scales cycloid and covering the entire trunk as well as head; on the back they form a separate sheath of from 1 to 3 rows wide at the base of the dorsal fin; the lateral line is continuous and parallel with the back; the head is compressed and moderate; the nostrils double; the mouth has a moderate or slight lateral cleft; the lips simple and more or less developed; teeth are present on the jaws, but absent from the palate; the anterior portion of the anal fin is developed in a peculiar way as a conduit for the milt; the lower pharyngeal bones are confluent together; the stomach is simple, and pyloric cæca are absent. The family exhibits 2 distinct modifications of structure—(1) The Embitotinae, with numerous forms, and the species marine. (2) The Hysterocephala, as far as known represented by but 1 species (*Hysterocephalus Trauttki*), which is peculiar to the fresh waters of the Sacramento River. Some of the species are among the most common of the Cal. fishes, and are brought to the markets in large numbers; they are known to the inhabs. of the coast indicated under the name of "perch," although they have no relation with the perches properly so called of Europe and the E. U. S. THEODORE GILL.

Em'blements [Norman Fr. probably from the Fr. *blé*, "grain," with the particle *en*, "in" or "on," prefixed], a term applied by the growing crops of cereal grains and vegetables reaped by a tenant. By the common law a tenant for life, or other tenant, whose estate depends on an uncertain event, is entitled to the E. although his lease may terminate before harvest-time. If a tenant for life die, his personal representatives may after his death claim the products of his labor. But if a term be brought to a close by the voluntary act of the tenant, he is not entitled to the E.

Em'blia officinalis [the generic name is of Malay origin], a species of trees of the natural order Euphorbiaceæ, is a native of India and the Malay Archipelago. It produces a small round fruit, which is very acid, has medicinal properties, and is used to make pickles. The wood is hard and valuable. The bark is used for tanning and for dyeing cotton black.

Em'bolism [Gr. *ἐμβολισμός*, from *en*, "in," and *βάλλω*, to "throw"], in the calendar, is an intercalation of a day, as the 29th of Feb. in leap-year, or of a lunar month, as in the Gr. and Heb. calendars.

Em'bolite, a chloro-bromide of silver, found in the silver ores of Mex. and Chili.

Embracery, in law, the offence of endeavoring to corrupt or bribe a jury or to influence a jury by any corrupt motive. To use indirect means to cause one's self to be chosen a jurymen is also E. This offence is punishable by fine and imprisonment.

Embroidery [from the Fr. *broder*, to "embroider," probably from the Gaelic *bruid*, a "goad," "something pointed"] is the art of working figures with a needle and thread on muslin and other fabrics. The art of E. is of very anc. origin, and was brought to great perfection by the women of Gr. and Sidon. It was extensively practised in mediæval times in Europe.

Embryology [from the Gr. *ἐμβρυον*, "something that grows or sprouts internally," and *λόγος*, a "discourse"], the hist. of the development of the young animal before birth. In all cases the development of the young animal begins from an *ovum*, or egg. The ova exist originally in the interior of the body of the female parent, where they are produced in certain organs contained in the cavity of the abdomen, termed *ovaries*. The ova at a certain period arrive at maturity, and are spontaneously discharged. If fecundated at this time by the influence of the male, they become developed into embryos. The ovum in its simplest form consists of a globular mass of albuminous matter mixed with oleaginous granules, and invested by a transparent, colorless, homogeneous membrane. The oleo-albuminous mass is termed the *vitellus*, or yolk; the investing layer is called the *vitelline membrane*. The vitellus is the essential part of the ovum. It is that which yields the material for the first formation of the body of the embryo. The vitelline membrane is intended to protect the vitellus, to maintain its shape, and to regulate for a short time the absorption of fluids. The vitellus, while still remaining in the ovary, contains a delicate vesicle, termed the "germinative vesicle," marked with a minute dot, called the "germinative spot."

In the human species and in the quadrupeds the ovum forms a little sphere about $\frac{1}{150}$ of an inch in diameter, and is nearly invisible to the naked eye. But in the oviparous classes the egg is larger in size and more complicated in structure, and contains a store of nutritious material, as well as certain additional protective envelopes.

In all instances, the first indication of the commencing formation of the embryo in the ovum is the spontaneous division, or *segmentation*, of the vitellus. This process consists in the

separation of the globular vitellus into 2 hemispheres by a furrow running round the vitellus, which deepens until it

FIG. 2.

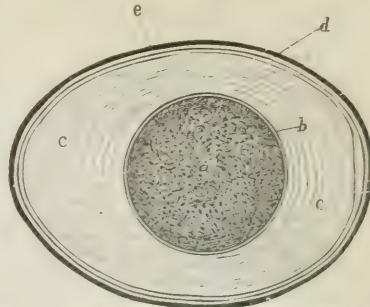


FIG. 2. a, vitellus; b, vitelline membrane; c, albumen; d, shell-membrane; e, segmentation.

has separated the 2 hemispheres from each other. At the same time a second furrow, placed at right angles to the first, runs round the vitellus in another direction: and thus the 2 globules are divided into 4. By a repetition of this process the vitellus becomes converted into a mulberry-shaped mass of minute globules, the "vitelline spheres." These globules become condensed into the form of organized cells, and from these cells the body of the embryo is directly formed.

In the vertebrate animals the vitelline spheres, resulting from the segmentation of the vitellus, when converted into organized cells, form a cellular layer upon the surface of the impregnated ovum. This membrane, formed of similar flattened cells, adherent to each other by their edges, is called the *blastodermic membrane*. It is the first appearance of a truly organized structure in the interior of the impregnated ovum, and forms the basis for the formation of the body of the embryo. This development takes place as follows: An elongated oval spot appears upon a certain part of the blastodermic membrane, where the tissue of the membrane is thicker than elsewhere. This spot is called the *embryonic spot*. Its anterior extremity will subsequently become the head, and its posterior extremity the tail. As the cells of the embryonic spot become more numerous, smaller, and more closely amalgamated, its appearance changes toward its central portions, where it becomes pellucid in appear-

FIG. 1.

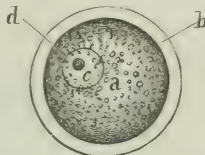


FIG. 1. Ovum of the rabbit, from the ovary, magnified 50 diameters: a, vitellus; b, vitelline membrane; c, germinative vesicle; d, germinative spot.

FIG. 3.

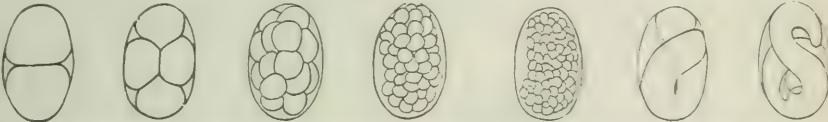


FIG. 3. Segmentation of the vitellus and formation of the embryo in *Ascaris nematoda*, a parasitic worm.

ance. The central area in which this change occurs is called the *area pellucida*; and finally there appears, in the middle of this transparent space, a longitudinal line or trace, indicating the position of the future spinal column, and called the *primitive trace*.

FIG. 4.

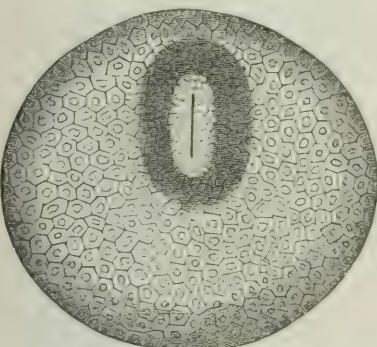


FIG. 4. Impregnated ovum of the rabbit, showing the blastodermic membrane formed of cells, the embryonic spot, the area pellucida, and the primitive trace.

In every vertebrate animal the subsequent development of the body goes on simultaneously in 2 different directions, from before backward, and from behind forward. From the edges of the primitive trace, on the right and left sides, the substance of the blastodermic membrane becomes thickened and elevated into two longitudinal and parallel ridges which include a longitudinal furrow. These ridges are called the *dorsal plates*. As they increase in growth their upper edges approach each other, and the furrow between them becomes deeper. In this canal, which is still open along the back, are formed the spinal cord and the brain. But the dorsal plates at last meet, and unite by their edges along the median line of the back, thus converting the furrow into a closed cavity, in which are now contained the brain and spinal cord. Thus, the dorsal plates complete the

formation of the external parts of the body in a posterior direction, and the brain and spinal cord are inclosed in an elongated cavity situated behind the column of the bodies of the vertebrae. At the same time a similar growth extends from the edges of the primitive trace in a direction outward and forward. These growing portions are called the *abdominal plates* of the blastodermic membrane, and they continue to extend forward until they embrace the abdominal cavity in front, just as the dorsal plates embraced the spinal canal behind. At last they also unite with each other by their edges. The alimentary canal and its accessory organs are thus inclosed by the abdominal plates in an abdominal cavity, situated in front of the column of the bodies of the vertebrae.

As thus far described, the process of development relates to the growth of the external portions of the body, and that part of the nervous system which corresponds with them. The dorsal and abdominal plates, as they grow thicker, begin to show in their substance the distinction of the various tissues. The external integument, the tissue of the voluntary muscles, the bones, the organs of special sense, the nerves, and the matter of the brain and spinal cord are thus formed. All the organs and tissues just enumerated are related to each other in one respect: they are destined to bring the animal body into relation with the external world. They are accordingly known as the "organs of animal life," and they are all formed from the original cells of the *external layer* of the blastodermic membrane. There is also an *internal layer* of the blastodermic membrane, and from this layer are formed the alimentary canal and its glandular appendages, or the organs in which digestion, absorption, and secretion are to be carried on. They may be regarded as the "organs of vegetative life." The alimentary canal is at first an oval sac, inclosed on all sides by the external abdominal walls. But subsequently 2 openings are formed, one at its anterior and one at its posterior extremity—namely, the mouth and the anus—and the original sac is thus converted into a true canal, open at both ends. At the same time the alimentary canal grows in the direction of its length, thus becoming converted into a long, narrow, and convoluted tube, and afterward showing the distinctions between the esophagus, the stomach, and the different parts of the small and large intestine.

Beside the essential features of embryonic development, there are, in all the higher classes, certain secondary or accessory organs developed during embryonic life. The first of these is known as the *umbilical vesicle*. In the process of

development the abdominal walls inclose directly the whole of the vitelline cavity, which subsequently becomes the cavity of the intestine. But in many of the fishes and reptiles, and in all birds and quadrupeds, the abdominal walls approach each other before they have embraced the whole of the vitellus, so that the vitelline cavity is thus separated, by a kind of constriction, into 2 parts. The internal part is the cavity of the intestine, but the external part, which is left outside the abdomen, is the umbilical vesicle. This name is given to it because it is really a vesicle, containing some of the remains of the vitellus, and because it still communicates with the cavity of the intestine through the umbilicus or navel. This communication is at first short and wide, but as development proceeds, the umbilical vesicle gradually retreats farther from the abdomen, while the passage of communication becomes converted into a comparatively long and narrow canal. In many of the quadrupeds and in the human species the walls of this canal even coalesce with each other at an early period, so that the umbilical vesicle then forms a separate cavity or sac, connected with the abdomen only by a slender solid pedicle. One or two minute blood-vessels run out along this pedicle, and ramify upon the surface of the umbilical vesicle. The next accessory organ of the embryo is the *amnion*. This is a transparent membrane, which turns up from the edges of the abdominal walls over the back of the embryo, and envelopes it in a secondary cavity. This is called the "cavity of the amnion;" the albuminous liquid which it contains is called the "amniotic fluid." Thus the external layer of the blastodermic membrane in these cases is developed into 2 different parts. That which immediately invests the body of the embryo is its integument, and part of its permanent structure; that which turns backward at the edges of the abdominal opening is the amnion, and an organ of embryonic life. The last accessory embryonic organ is the *allantois*. In all instances it is an outgrowth from the lower part of the intestine. It shows itself at first as a small bud, shaped like the finger of a glove, which protrudes from the abdominal opening in front, and then expands in every direction until it has enveloped the embryo in a second exterior covering. Its walls are exceedingly vascular, their vessels being derived from those of the intestine, of which the allantois itself is an offshoot. Thus, when the allantois has become completely formed, the external surface of the embryonic mass is a continuous vascular membrane, in which the blood-vessels of the embryo ramify in great abundance.

This anatomical feature will serve to indicate the function of the allantois. It is the organ of nourishment and respiration for the embryo. In the fowl's egg, the allantois, which is placed immediately underneath the calcareous shell and shell-membranes, is very active during the latter half of the period of incubation. It absorbs oxygen from the external air through the porous egg-shell, and exhales carbonic acid. In the viviparous animals, as the quadrupeds, the action of the allantois is still more important. With these animals the young embryo is entirely dependent upon the maternal system both for respiration and nourishment. The vascular allantois here, enveloping the embryo, comes in contact with the vascular lining membrane of the uterus, and thus the blood-vessels of the embryo constantly absorb from the blood-vessels of the mother the substances requisite for its nourishment and growth.

FIG. 5.

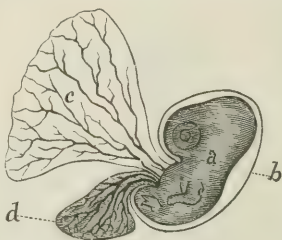


FIG. 5. Embryo of the chick on the 7th day of incubation: a, body of the embryo; b, amnion; c, a portion of the umbilical vesicles; d, commencing growth of the allantois.

FIG. 6.

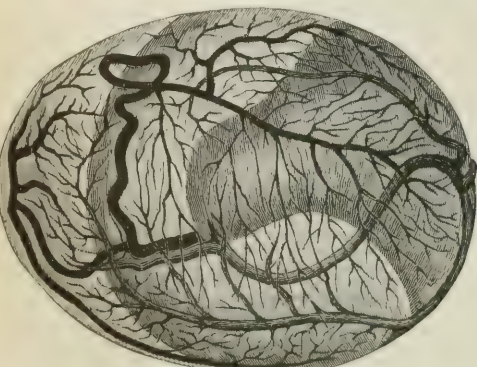


FIG. 6. Egg of fowl on the 12th day of incubation. The shell and shell-membranes have been removed, showing the vascular allantois, which has grown so as to envelop all remaining portions of the egg.

In the human species the allantois commences its growth in the same manner as in the inferior animals, but exhibits certain modifications in its subsequent development. It is irregularly globular in form, corresponding to the shape of the cavity of the uterus in which the embryo is developed. It forms a complete envelope for the embryo, consisting of

a continuous vascular membrane of fibrous texture. It has accordingly received the name of the *chorion*. The human embryo is enveloped in 3 distinct membranes, the chorion externally and the amnion internally. Both these membranes are vascular, but the blood-vessels of the amnion are derived from the integument of the embryo, those of the chorion from the intestinal canal. Another modification of the human chorion is that at an early period it becomes shaggy by the growth of a multitude of minute filamentous projections or "villousities" upon its outer surface. These villousities become branched, forming so many tufted filaments, by which the activity of absorption by the chorion is augmented. Soon after the first month these villousities cease their growth over about $\frac{3}{4}$ of the surface of the chorion, while over the remaining quarter they grow more rapidly than before, become excessively developed, so that the chorion here becomes converted into a spongy mass of villousities, which are penetrated everywhere with an abundance of ramifying blood-vessels. When this portion of the chorion is fully developed, it forms a distinct organ, the *placenta*, which is the especial organ of nourishment for the embryo. It has become easily distinguishable by the end of the 3d month of embryonic life.

The amnion and the chorion are in reality a part of the body of the embryo. The placenta includes also a portion of the tissues of the mother: for at the same time that the chorion is becoming shaggy and vascular at the spot which is to be the placenta, the lining membrane of the uterus assumes a similar increased development. In both cases it is the blood-vessels which preponderate over the remaining tissues, mutually interpenetrating through the entire thickness of the organ. Thus, the placenta is a double organ, containing both embryonic and maternal vessels.

When the development of the embryo is complete the muscular walls of the uterus contract, the membranes are ruptured, the placenta is separated from its attachments, and the whole expelled from the uterine cavity. The placenta is no longer available as an organ of nourishment, and is cast off as useless. But in the mean time the lungs and the alimentary canal have been developed, and are capable of performing their natural functions. [From *orig. art. in J. s. Univ. Cyc.*, by PROF. J. C. DALTON, M. D.]

Embury (PHILIP), the "founder of Amer. Methodism," b. in Ire. Sept. 21, 1728 or 1729; became a "local preacher" of Wesley's society; emigrated to New York 1760, and began to preach in his own house 1766. Later he preached in an old rigging-loft, and at last succeeded in erecting "Old John st. ch.," being a carpenter. E. worked on it himself, built with his own hands its pulpit, and on Oct. 30, 1768, preached from it the dedicatory sermon of the first Meth. chapel of the New World. He afterward settled in Salem, N. Y., in 1769. D. Aug. 1775.

Emerald [Gr. *σμεραλδος*; Fr. *émeraude*; Sp. *esmeralda*; Ger. *Smaragd*], a beautiful green precious stone, a variety of beryl, a silicate of alumina and glucina. Its color, which is perhaps the most beautiful of all the varieties of green, is ascribed to the oxide of chromium that it contains. Its value depends chiefly on its color. The largest E. occur in Siberia; one in the Royal collection weighs 16 $\frac{3}{4}$ lbs. troy, another 6 lbs. The finest modern E. are found in S. Amer., especially at Muzo in Colombia. A rare green sapphire is sometimes called Oriental E.

Emerald Bird of Paradise. See BIRD OF PARADISE.
Emerson (GEORGE BARRELL), LL.D., a teacher and writer, b. in Kennebunk, Me., Sept. 12, 1797. He lived in Boston for many yrs., and was president of the Boston Society of Nat. Hist. He was the first head-master (1821-23) of the Boston Eng. High School for boys. Among his works are *Lectures on Education* and *Report on Trees and Shrubs growing naturally in the Forests of Mass.*

Emerson (RALPH WALDO), LL.D., a poet and essayist, b. in Boston, Mass., May 25, 1803, and was the son of Rev. William Emerson and Ruth (Haskins) Emerson. He had a minister for an ancestor in every generation for 3 generations back, either on the paternal or maternal side. He was fitted for coll. at the public schools of Boston, and grad. at Harvard coll. in 1821. In 1826 he was "appointed to preach," though his name does not appear among the graduates of the Harvard Theological School. In Mar. 1829 he was ordained as colleague to Rev. Henry Ware of the Second Unit. ch. in Boston. In 1832 he resigned his pastoral charge, having announced in a sermon his unwillingness longer to administer the rite of the Lord's Supper. In Dec. 1832 he sailed for Europe, remaining absent nearly a yr. Soon after returning he began his career as a lecturer before the Boston Mechs. Inst., his subject being *Water*. He gave also 3 other lectures—2 on *Italy*, and 1 on the *Relation of Man to the Globe*. Since that time he has given many courses of lectures throughout the U. S. and in Eng. In 1835 Mr. E. took up his residence in Concord, Mass., and issued in the following yr. a work called *Nature*. This was followed by several orations on such themes as *The Method of Nature*, *Man Thinking*, *Literary Ethics*, and his remarkable *Address before the Senior Class at Trinity Coll., Cambridge*, delivered July 15, 1838. From these various addresses and publications may be dated the intellectual movement then vaguely stigmatized as "Transcendentalism." This was a reaction against formalism and tradition, and brought together a variety of minds, some profoundly mystical, others full of projects for action. It led to some excesses and affectations, but was on the whole a valuable impulse toward many good things. The *Dial* contains a lasting memorial of that important seed-time of thought. He wrote *Essays*, *Poems*, *The Conduct of Life*, and *Society and Solitude*.

Though Mr. E. is often assigned to the class of metaphysicians or philosophers, yet the actual traits of his intellect clearly rank him rather among poets or literary men. All his methods are literary rather than scientific. His statements are sometimes subtle, sometimes profound, sometimes noble and heroic, but scarcely ever systematic. He rests in

his intuitions, and rarely attempts even the rudiments of method. More than any previous literary man among us, he set the example of ignoring European traditions, methods, and literary properties wherever these could be better superseded by our own. He drew his habitual illustrations from Amer. society and manners, and was more ready to write of the pine woods and the humble-bee than of the nightingale and asphodel. His position on religious questions has been that of a philosophical radical, and he has been quite detached from the ch. organizations of the time. He took this position, once for all, in a sentence which attracted much attention in his *Divinity Hall Address*: "The assumption that the age of inspiration is past, that the Bible is closed, the fear of degrading the character of Jesus by representing him as a man, indicate with sufficient clearness the falsehood of our theology." His precise attitude as to the conception of a Deity and the belief in personal immortality might be harder to define. He has always lent his voice in behalf of any momentous public interest, and was always frankly identified with the anti-slavery movement. He became a v.-p. of the Free Religious Association, and has several times addressed its conventions; also an overseer of Harvard Univ., and received from that inst. the degree of LL.D. in 1866. He was a member of the Amer. Acad. of Arts and Sciences, of the Amer. Philosophical Society, and of the Mass. Historical Society. D. Apr. 27, 1882. [From orig. art. in *J. s. Univ. Cyc.*, by COL. T. W. HIGGINSON.]

Emerson (REV. WILLIAM), the father of Ralph Waldo Emerson, b. at Concord, Mass., May 6, 1769, grad. at Harvard 1789; was the first minister of Harvard, Mass., and afterward (1799-1811) pastor of the First ch. (Unit.) of Boston, of which he wrote a *History*. D. May 12, 1811.

Emerton (E) and (J. H.). See APPENDIX.

Emery, one of the hardest minerals known, ranking next to the diamond in its power of cutting or abrading hard substances. It is a variety of the species corundum or sapphire, of a dark reddish-brown, black, or gray color, and consists of nearly pure alumina and oxide of iron. It is found in large masses, and much resembles fine-grained iron ore, for which it has often been mistaken. E. is scarcely inferior to the sapphire or ruby in hardness, and it will not only cut the hardest steel or chilled castings, but will wear away quartz, agate, topaz, and other gems, being for the last named purpose the chief reliance of the lapidary. It is used in the arts in a pulverized form, being obtained in grains or in powders of various degrees of fineness by crushing and sifting or by elutriation. The methods of application are various. Lapidaries sprinkle it with water or oil on their lead-wheels. Mixed with glue or other adhesive substances, it is spread in a thin layer upon wood, leather, paper, or cloth, or it is moulded into solid blocks or wheels. It is in the latter form, known as "solid emery-wheels," that the mineral has the widest application and its greatest utility. When carefully mounted and run at a high speed, such wheels will instantly take the teeth off the hardest file and reduce it to a plane, smooth surface, or will cut away parts of chilled castings that a file will not touch. They as far exceed files in efficacy as the E. exceeds steel in hardness, and as the velocity of a wheel exceeds the velocity of a file upon the work. The rapidity of abrasion depends not only on the velocity of movement, but upon the size of the grains of E. For very heavy work, very coarse E. is used, while the finer sorts are made into wheels for fine grinding and surface work on brass or steel. It is obtained chiefly from Asia Minor and the island of Naxos in the Gr. Archipelago. It has also been found at Chester, Mass.

Emetic [Gr. *emetikos*, from *emetos*, to "vomit"], a med. capable of causing the stomach to contract and discharge its contents through the esophagus. E. are of 2 classes: (1) those which appear to stimulate the action of the muscular coat of the stomach directly, such as alum, blue vitriol, and white vitriol; (2) those which enter the circulation, and cause E. action by their operation upon the nervous centres, such as ipecacuanha, tartar E., lobelia, blood-root, etc.

Emeu. See EMEU.

Emigration [Lat. *emigratio*, a "removal" or "departure" of one or more individuals], the transference of permanent abode from one country to another. *Immigration* is the removal into a country, and presupposes E. On any theory of the origin of the human race, the fact that the earth has been almost wholly peopled by numerous migrations must be admitted. The proofs of these successive E., even in the earliest pre-historic times, are too abundant to permit of doubt. In the earlier ages the movement was in all directions. Adopting the scriptural narrative, as there seem conclusive reasons for doing, that the cradle of the human race was in the vicinity of the sources of the Euphrates, the early migrations seem to have been E. and perhaps S. E., then S. and S. W., and at a considerably later period W. and N. W. and N. The present Chi. empire is the growth of a very early E., which extended very possibly within one or two centuries to the islands of the E. coast of Asia. The migration to India and that to Assyria and Egypt were not much later, and that to Phœnicia and the E. shores of the Mediterranean must have been about the same time. But some divisions or families of the human race were much more restless and migratory than others. The Semitic family, nomads by early occupation, were possessed with the very spirit of unrest. They overran Assyria, Asia Minor, Syria, Ar., invaded Egypt as the *Hyksos* or shepherd kings, and after several centuries of residence made their exodus to S. Pal. in a body of 2,500,000. There are traces of their settlement in the extreme E., and from Per. to the Capes of Ceylon. The Hamitic family were hardly less roving in their disposition. Early settlers in Egypt, they had penetrated S. to Ethiopia and beyond, had moved N. to the Lebanon range, and their most enterprising branch, the Phœnicians, had sent out their colonies to Gr., It., and both shores of the Mediterranean, even to the pillars of Hercules, and not impossibly to Ultima Thule.

The Grs., one branch of the Japhetic family, were also active in promoting E. From their rocky peninsula and isles they pushed forth in all directions, carrying their lit., lang., and culture with them, till at the commencement of the Chr. era Gr. was the prevalent lang. of every part of the Rom. empire. The Romans were not often voluntary emigrants, but they transplanted their captives from the nations they conquered, by myriads, wherever it pleased them. The vast hordes of the Asiatic nations, Tartars of various tribes, Goths, and Scythians, commenced a general E. toward Europe about A. D. 200; the Goths coming S. from Gothland or Swe. first to the banks of the Danube, and thence, about A. D. 250, to Gr., while the Franks and Allemanni, crossing the Rhine and the Rhaetian Alps, were pressing hard upon the W. provs. of Rome. The Huns, a Tartar race from the Siberian table-lands, crossing the Ural Mts., drove the Goths before them over the Danube, through Gr. and It., capturing Rome A. D. 410. Vast hordes of Tartars, Finns, Slavs, and Turkomans overran Rus., Poland, Aus., Wallachia, Roumania, Servia, Bosnia, Roumelia, Dacia, Thrace, Albania, Dalmatia, Slavonia, and Hungary, for the next thousand yrs., new swarms coming every few yrs., until it seemed as if N. and Central Asia must be depopulated. When at last the E. empire succumbed, in 1453, Turk, Tartar, Slav, and Finn possessed all E. Europe from the N. Cape to the Isthmus of Suez, and the Mongol race, of which these were constituent tribes, occupied nearly the whole of Asia—Chi., India from the Ar. to the Chi. Sea, Japan, and all the rest of the continent except Ar.—was ruled by Mongolian princes and settled by Mongolian nations. The Chi., in turn, had invaded other lands, emigrating largely to Siam, Cochín Chi., Malacca, Java, and Borneo.

In W. Europe, after the conquest of Rome, the N. nations were constantly pressing S. and W. The Sax. sought the milder climes of Central Europe, and drove out the Celtic tribes from Eng.; the Norsemen, the old Goths, now calling themselves Normans, the most daring navigators of the Dark and Middle Ages, came by hundreds and thousands from Swe., Nor., Iceland, and Den. to the Eng. and Fr. coasts, and planted their Norman and Dan. colonies there, and even sent colonies to Greenland and the N. Eng. coasts. When the Dan. power ceased in Eng., it was only to be replaced by the Norman emigrants, a branch of the same family who had settled in Fr. 150 yrs. before. The Tartar invasion of E. Europe was turned back in the 16th century by a counter-movement of the Russian Slavs, who planted their colonies in Siberia, and having crossed the Asiatic continent at its line of greatest breadth, planted a colony on the N. W. coast of Amer. Another movement which affected E. Europe was the colonizing of S. It., Sic., Sp., and Port. by the Saracens in the 9th, 10th, and 11th centuries. They were expelled after some centuries of strife, but did not leave Granada till 1492. Emigration into Afr., except the N. states, has not been attempted to any great extent within the historic period, though large colonies of Dut., and later of Eng. emigrants, have settled S. Afr., and smaller colonies of Port. have been planted on both the E. and W. coasts, and Fr. on the Senegal.

The Amer. continent has been peopled by successive E. From the N. of Asia Arctic tribes peopled the N. shores and islands. The various Indian tribes, in their manners, customs, lang., and worship, give evidence of Asiatic origin; the Toltecs and affiliated tribes, possibly of Aryan ancestry, overran W. and S. Amer. before A. D. 600, and when decimated by famine were replaced, about A. D. 700, by the Chichuacs, Chichimecas, and Toupis, whose lang. was so nearly identical that they could understand each other's speech all over S. Amer., and perhaps also in W. Amer. Early in the 9th century the Aztecs entered Mex. from Cal., and, driving the other nations farther S., occupied their lands and their temples until subdued by European invaders. The other races of N. Amer. Indians had probably an Asiatic origin, and in their nomadic life spread over a whole continent.

Ever since their discovery, both N. and S. Amer. have been lands of promise to voluntary emigrants, and have also been the prin. destination of enslaved Afrs. The W. I. were settled by Sp., Eng., Fr., and Danes; Brazil by Port., and the rest of S. Amer. by Sp., except the Guianas (settled by Eng., Fr., and Dut.) and recent Ger. colonies in Brazil and the Argentine Confederation. In N. Amer., the Sp. settled Fla. and La. in part, a portion of Tex. and Mex., including Cal., Ari., N. M., and Central Amer.; the Fr. Canada and some outposts connecting with La., which they then held. G. Brit. sent her emigrants to all the Atlantic States except Fla., and slaves with them; after the Revolutionary war emigrants came in great numbers to Canada, and later to Mich. Since the U. S. became a nation, the tide of E. has been constantly increasing and has come from all civilized nations. There are no definite statistics before 1820, but in the 30 yrs. between 1790 and 1820 the number is estimated at 250,000; from 1820 to 1830 it was 151,824; 1831-40, 599,125; 1841-50, 1,713,251; 1851-60, 2,598,214; 1861-70, 2,491,451; 1871-81 (11 yrs.), 3,847,163—total, 1790-1881, 11,375,108. Of these immigrants about $\frac{2}{3}$ were females; 5,025,653 came from G. Brit. and Ire., 3,316,071 from Ger. and 117,548 from Austro-Hungary, 311,117 from Fr., 501,753 from Scandinavian states, 54,392 from Hol., 60,313 from Rus. and Poland, 87,942 from It., 96,206 from Switz., 34,228 from Sp. and Port., 737,002 from Brit. Amer., 104,069 from Mex., Central Amer., and W. I., 9,316 from S. Amer., 225,348 from Chi., 20,644 from Australia, etc., and about 450,000 from other countries. Baudin estimates the number of slaves who reached Amer. from 1517 to 1807 as between 5,000,000 and 6,000,000. Not less than 300,000 have reached Cuban S. Amer., and our own S. ports since that time; but that traffic is ended on this continent. Another form of forced E. is what is known as the coolie trade, by which laborers from Chi. and Ind. are brought to W. I. and S. Amer. ports, nominally as apprentices, really as slaves, to the number of about 30,000 a yr. This traffic is not wholly suppressed, but will be ere long. In the amount of

voluntary immigration, the U. S. have surpassed all other nations of modern times, and the number of immigrants increases with each yr.

L. P. BROCKETT.

Eminent Domain. Domain is the terr. under the jurisdiction of a sovereign, and *eminent domain* the inherent sovereign power which the people or govt. retain over the estates or private property of individuals to resume or appropriate the same for public uses, and for public uses only. The difference between the power of taxation and the right of E. D. should be carefully noted. Taxation proceeds upon the notion of contribution; it falls upon a class of persons, and is apportioned among them by rule. In the exercise of the right of E. D. the state takes from an individual his property without reference to a burden imposed upon any other person. It is not necessary, however, that the exercise of the power should benefit the entire public. It is enough if it promotes the industrial capacity or resources of a considerable number of inhabs., or in any manner indirectly contributes to the gen. welfare. It is not necessary that the state should act directly. The power may be delegated to a municipal body or to a private corporation. A State may delegate it to the U. S. The mode of exercising it is regulated by constitutional provisions and by statutes. In some cases only an easement in land is acquired; at other times the entire fee is appropriated. The constitutional prohibition (U. S. const., amendments, Art. V.) against taking private property for public use without just compensation is a limitation on the power of the Federal govt. and not on that of the States. There are similar provisions in the State const. binding the State legislatures. The compensation includes not only the property actually taken, but consequential damages to adjoining property. The same right to compensation as is secured in this country by constitutional provisions is recognized generally among civilized nations, and may be considered as a gen. rule in jurisprudence.

T. W. DWIGHT.

Emir, or Emeer (written also **Amir and Ameer**), an Arabic word signifying "chief" or "ruler." The caliphs took the title of emir-al-Mumenin, "chief or commander of the faithful." The title is now given to those who claim descent from Mohammed through his daughter Fatima. Many chiefs of N. Afr. assume the title of E.

Em'enton, R. R. junc., Venango co., Pa. Pop. 1870, 488; 1880, 1140.

Emmanuel [Port. *Manoel*], surnamed THE GREAT, king of Port., b. May 1469. He succeeded John II. May 3, 1495, and married Isabella, a daughter of Ferdinand and Isabella of Castile. During his reign Port. was probably the greatest naval power of the world, but he injured his country by the banishment of all Jews and the enforced conversion of their young children. D. Dec. 13, 1521.

Em'met (ROBERT), an Irish patriot and orator, b. in Cork 1780. He was devoted to the independence of Ire., and was a leader of the United Irishmen. Having secretly collected arms and powder in Dublin, and formed a conspiracy, he and his friends revolted in July 1803, killed the chief-justice, Lord Kilwarden, but were soon dispersed by a party of soldiers. E. was arrested, tried for treason, convicted, and executed Sept. 20, 1803.

Emmet (THOMAS ADDIS), LL.D., brother of the preceding, b. in Cork Apr. 24, 1764. He was a leader of the United Irishmen, was arrested in 1798, and imprisoned for nearly 3 yrs. His sentence was commuted into exile, and he emigrated in 1804 to New York, where he practised law with distinction; was atty.-gen. of State of N. Y. 1812. D. Nov. 14, 1827.

Emmettsburg, on R. R., cap. of Palo Alto co., Ia., on the Des Moines River, 55 m. N. W. of Ft. Dodge. Pop. 1870, 44; 1880, 879.

Emmittsburg, on R. R., Frederick co., Md., 10 m. from Gettysburg, Pa. It was laid out by William Emmitt, its founder, about the yr. 1773. The original pop. were Scotch and Irish. Mt. St. Mary's Coll. was established near it in 1809 by Rev. John Dubois, late bp. of New York; it is a R. Cath. inst. St. Joseph's Acad., about ½ m. from town, was established in 1810, by Mrs. Eliza Ann Seton of New York. It is the mother-house of the Sisters of Charity in the U. S. Pop. 1870, 706; 1880, 847.

Em'mons (EBENEZER), M. D., an Amer. geologist, b. at Middlefield, Mass., May 16, 1799; became in 1833 prof. of nat. hist. in Williams Coll.; was one of the geologists selected by the gov. of N. Y. in 1836 to make a geological survey of that State. In 1838 became prof. of chem. in the Albany Med. Coll., in 1856 State geologist for N. C. Wrote reports and text-books on mineralogy and geol. D. Oct. 1, 1863.

Emmons (GEORGE F.), U. S. N., b. at Clarendon, Vt., Aug. 23, 1811; entered the navy as a mdpn. 1828, became lieut. 1841, commander 1856, capt. 1863, com. 1868, and rear-admiral 1872. In the early part of the c. war he was in command of various vessels of the Gulf blockading squadron; in 1863 was capt. in operations against Ft. Sumter; from 1864 to close of the war commanded a division of blockading fleet in Gulf of Mex. Retired, 1873. D. July 23, 1884.

Emmons (NATHANIEL), D. D., a theologian, b. at East Haddam, Conn., Apr. 20 (O. S.), 1745, graduated at Yale 1767; was ordained pastor of the Congl. ch. in Franklin, Mass., 1773, and was its pastor until his death, and its sole pastor for 54 yrs. He trained nearly 100 young men for the ministry; was also a prominent advocate of foreign missions and of the anti-slavery cause. D. Sept. 23, 1840.

Em'ory (JOHN), D. D., a clergyman, b. in Md. Apr. 11, 1789; was ed. a lawyer, became a Meth. preacher in 1810, preached extensively for many yrs. through the Middle States, and was sent as delegate in 1820 to the Brit. Wesleyan conference; was appointed in 1824 book agent at New York, and elected bp. in 1832. Wrote *The Divinity of Christ Vindicated and Defence of Our Fathers*. D. Dec. 16, 1835.

Emory (ROBERT), D. D., son of the preceding, b. in Phila. July 29, 1814; was pres. of Dickinson Coll., Carlisle, Pa., and author of the *Life of Bp. Emory and Hist. of the Discipline of the M. E. Ch.* D. May 18, 1848.

Emory (WILLIAM H.), an officer, b. in Md. 1811, graduated at W. Pt. 1831; served chiefly at seaboard posts 1831-36, and in the Creek nation 1836-38; was appointed first lieut. topographical engineers 1838, serving on Del. River improvements and in topographical bureau 1839-44; on N. E. boundary survey 1844-46, in the war with Mex. 1846-48, as astron. of boundary between Cal. and Mex. 1848-53, and com. and astron. 1854-57; in suppressing Kan. disturbances and on Ut. expedition 1858; on frontier, board, and inspection duties 1858-61. He was lieut.-col. of 6th Cav., serving in Va. peninsula 1862, in dept. of the Gulf 1862-63, in Red River campaign 1863-64; in command of 19th corps 1864-66, in command of dept. of W. Va. 1865-66, of dept. of Wash. 1869-71, and of dept. of the Gulf 1871-75; retired with rank of brig.-gen. 1876.

Em'ory College is in Oxford, Newton co., Ga., 40 m. E. of Atlanta. It was chartered in 1837, and was opened to students in 1838, under the presidency of Rev. Ignatius A. Few, D. D., LL.D. It is under the control of the M. E. Ch. S. The sons of itinerant preachers in the States of Ga. and Fla. are ed. free of tuition fees. The curriculum of study embraces Lat., Gr., math., natural science, with mental and moral science, evidences of Christianity, belles-lettres, and the Eng. Bible. There is also a scientific course.

Emott (JAMES) and (JAMES, JR.). See APPENDIX.

Empedocles [Gr. *Εμπεδοκλής*], a Gr. philos., b. at Agrigento in Sic., lived about 450 B. C. He maintained the theory that the world is developed or compounded from 4 primary elements—fire, air, earth, and water. He wrote, beside other works, a poem on *Nature*, of which fragments are extant. The tradition that he threw himself into the crater of Mt. Etna to immortalize his name is not generally credited.

Em'peror [Lat. *imperator*, from *im'pero*, to "command;" Fr. *empereur*; Ger. *Kaiser*], the sovereign who rules over an empire. The title *imperator* was conferred by the anc. Roms. on consuls in their military capacity. The signification of *imperator* depended on that of *imperium*, which was the name given to the supreme power of the senate and people of Rome over the city and subject provs. After any great victory the soldiers were accustomed to salute their commander as *imperator*. Under the republic there might be many *imperatores* at one time. On the subversion of the republic the title was conferred on Augustus for life. With the early Rom. E. the term *imperator* did not denote the sovereign power. It is not easy to determine at what time the word came to be used in the modern sense of E. as the proper name for the sovereign of the Rom. state. The title of E. of the Roms. was conferred on Charlemagne by Pope Leo III. in 800 A. D., and was borne by his successors until the dissolution of the Holy Rom. empire in 1806. Peter the Great assumed the title of E. of Rus. in 1721, Nap. I. that of Fr. in 1804, Nap. III. in 1852. In 1871 King William I. of Prus. took the title of E. of Ger. The Queen of G. Brit. assumed the title of empress of India Jan. 1, 1877. The rulers of Chi., Japan, and Morocco are sometimes designated as E. The sovereign of Brazil has the title of E., and futile attempts have been made to establish an empire in Mex. The modern idea of an empire in gen. seems to be a union of states, each with a local govt. under the protection or political preponderance of one powerful state. But there is a tendency toward a looser use of the term as a mere title of the head of a kingdom.

Emperor Moth (*Saturnia pavonia minor*), the largest Brit. lepidopterous insect, is allied to the silkworm moth, and belongs to the Bombycidae. Its wings when expanded measure 3½ inches, each wing having a large transparent spot. The peacock moth (*Saturnia pavonia major*) is 5 inches across the wings, being the largest species in Europe.

Empiricus. See SEXTUS EMPIRICUS.

Empo'ria, R. R. junc. and city, cap. of Lyon co., Kan., 61 m. S. S. W. of Topeka. It is between the Neosho and Cottonwood rivers, 6 m. above their junction. It is the seat of the State normal school. Pop. 1870, 2168; 1880, 4631.

Emporium, Pa. See APPENDIX.

Ems, or Bad-Ems (i. e. "bath of Ems"), a watering-place of Ger., in Hesse Nassau, on the river Lahn, about 7 m. S. E. of Coblenz. It is surrounded by picturesque scenery, and is situated in a beautiful valley among wooded hills. Here are warm mineral saline springs, the temperature of which varies from 93° to 135° F. Pop. 6943.

Em'ser (HIERONYMUS), a Ger. Catholic theol., b. at Ulm Mar. 26, 1477; issued (1527) a translation of the N. T., which he called his own, but which is only a copy of Luther's with unimportant verbal alterations. D. Nov. 8, 1527.

E'mu, or E'men (*Dromaius Nova Hollandiae*), a large Australian bird, belonging to the Casuariidae. It differs from the cassowary in being taller, and in being destitute of the bony crest and pendent wattles. When full grown it is of a brown color, mottled with gray. It has only rudimentary wings,

but is exceedingly fleet in running. Its plumage is long and almost hair like. The eggs are dark green, and about 7 in number. Both the eggs and flesh are esteemed excellent for the table. The plumes are readily dyed of various colors, and appear to some extent in commerce as a substitute for ostrich feathers. It has become rare in the more settled parts of Australia, having been hunted for its oil, which the skin contains in large quantities. It feeds mostly on fruit, herbage, etc., and is easily domesticated.



Emu.

Emu-Wren (*Stipiturus malacurus*), a passerine bird of Australia. It takes its name from the long, erect tail-feath-



Emu Wren.

ers, which are 6 in number, and have some resemblance to the feathers of the emu.

Emydidae, a family of cryptodirous Testudinata, with hard carapace and plastron connected by lateral ligaments covered with corneous scales, and with webbed feet and well developed toes. The group is rich in species, and there are about 17 in the U. S. The painted tortoise (*Chrysemys picta*) is especially abundant. Almost equally common, and in some sections the prevailing species, is the spotted tortoise (*Chelopus guttatus*). Other species are generally known as terrapins, and several are prized for the table. (See TERRAPIN.)

Enallisaureans [Gr. ἐνάλιος, "marine" (ἐν, "in," and ἄλς, the "sea"), and σαύρος, a "lizard"], a name formerly used for the large extinct reptiles with paddle-like limbs, of the orders Ichthyopterygia and Plesiosauria.

Enamelled Leather, leather the surface of which is rendered glossy by successive coats of linseed oil, and finally of a varnish of copal and asphaltum.

Enamel Painting, the art of applying artistic painting to glass, pottery, or the metals; most glass-staining at present being simply E. P. The various colors are mixed with some glass or "flux," ground, made into a paint with a volatile oil, applied with a soft brush, and then burned in at a great heat.

Encaustic [Gr. ἐγκαυστική, from καῖσις, a "burning"], a method of painting practised by the anc. Grs., so called from the process of burning the picture when completed. The pictures were executed with wax colors (ceræ), and finished by the application of a hot iron.

Encaustic Tiles, a variety of tiles used for the flooring of buildings and other purposes. In the Middle Ages they were frequently employed for the ornamentation of walls. Plain tiles are made by pressing dry clay into a mould and afterward burning them. Figured tiles are moulded from moist clay, and the figures are added to the surface before burning.

Encheirial [Gr. ἐγκήριος, from ἐν, "in," and χώρα, "country," i. e. belonging to the country, not foreign], or **Demotic Writing**, a cursive alphabet used in anc. Egypt. It was an abbreviation of the hieratic writing, which was itself an abridged form of the true hieroglyphics. Its remains are difficult to decipher.

Enchina. See ENZINA, DE LA (JUAN).

Encke enk'keh (JOHANN FRANZ), a Ger. astron., b. at Hamburg Sept. 23, 1791. He received a prize for determining the orbit of Halley's comet; he also investigated the orbit of the comet discovered by Pons, now known as E.'s comet. He was director of the Royal Observatory at Berlin and sec. of the Acad. of Sciences. D. Aug. 26, 1865.

Encke's Comet, discovered by Pons in 1818; its orbit was determined by Encke, who assigned to it a period of about 1200 days. It has been found that its period is slowly diminishing, and this fact has been attributed to the action of a resisting medium.

Encratites (Gr. Ἐγκρατίαι, the "self-restraining," the "continent"), a name applied by the Ch. Fathers to a supposed Gnostic sect. They were dualistic, and in some instances were hardly Chr. They forbade marriage, the eating of flesh, the drinking of wine, and in some cases substituted water for wine in the Eucharist.

Encrial Limestone, a name given by geols. to any

limestone which is largely composed of the remains of crinoids, but more specifically applied to certain beds in the Helderberg and Hamilton groups in N. Y.

En'crinites, an obsolete or quasi-popular name for the CRINOIDEA (which see).

Endecagon. See HENDECAGON.

Endermic [from the Gr. ἐν, "in," and δέρμα, the "skin"] **Meth'od**, a manner of administering meds. formerly sometimes employed, by which the skin was made to absorb the remedy used. In some instances a blister was raised, and the med.—for example, sulphate of morphia—was applied to the blistered surface. This plan, though often surprisingly effective, has been superseded by the hypodermic method, in which the med. is introduced under the skin by a small needle-pointed syringe.

En'dicott (JOHN), colonial gov. of Mass., b. at Dorchester, Eng., 1589. He came to Amer. 1628, was acting gov. of Mass. Colony in 1629-30, and was elected to that office in 1644, again in 1649, and re-elected to it every yr. from 1650 to 1665, except in 1654. D. Mar. 15, 1665.

Endicott (W. C.). See APPENDIX.

Endive [Lat. *intibum* or *intybum*] (*Cichorium endivia*), a biennial herbaceous plant of the order Compositæ. Its blanched leaves are used as salad; is native of E. Asia.

End'less Screw, a piece of mechanism formed by combining the screw with a cog-wheel, or by making a screw act on the threads of a female screw sunk in the edge of a wheel. In its mechanical principle it is a combination of the inclined plane and the lever.

Endlicher, ent'lik-er (STEPHEN LADISLAUS), a botanist and linguist, b. at Presburg, Hungary, June 24, 1804; studied several Oriental langs. and the natural sciences; in 1828 became director of the Imperial Library of Vienna; obtained in 1840 the chair of bot. in the univ. of that city. Wrote *Rudiments of Chl. Gram.* D. Mar. 28, 1849.

Endocarditis. See HEART DISEASES.

Endochrome [from the Gr. ἐνδον, "within," and χρώμα, "color"], the coloring-matter of plants, especially of the lower classes. In the higher classes it is called chlorophyll when green, and various modifications of it are believed to produce the colors of flowers, of autumn leaves, etc.

Endogens, or **Endog'eous Plants** [from the Gr. ἐνδον, "within," and γένω, to "be born," to "grow"], one of the primary classes of plants, sometimes called **Monocotyledonous**. All flowering plants are divided into the endogens and the exogens. The former are so called because their stems grow by additions to the inside, so that the outer part is the oldest and hardest. The stem generally ceases to increase in thickness long before it attains its full height. The E. of temperate and cold climates are mostly small herbaceous plants, as grasses, lilies, and rushes, but in warm climates occur many large endogenous trees.

Endorse, or **Indorse**, to write on the back of a promissory note or other written instrument; to sanction; to become responsible for (a bill or note). The party who endorses is called the **endorser**. Each endorser is liable for the payment of a bill or note in case the drawee or acceptor fails to pay, as the case may be, provided that protest is legally made in time.

Endosmose, or **Endosmo'sis** [from the Gr. ἐνδον, "within," and ὠθεῖν, to "impel"], and **Exosmose**, together called **Liquid Diffusion**, **Osmose** or **Osmotic Action**, are properties of animal and vegetable membranes. If 2 different liquids or gases which are capable of mixing with each other, as water and alcohol, are separated from each other by such a membrane as paper, caoutchouc, or a bladder, the one liquid being suspended in a bladder in the other, the liquid in the bladder will pass through the bladder into the other (exosmose), or the liquid without will pass into the bladder (endosmose), or both E. and exosmose will take place at the same time; and in this case the current continues until there is an equal proportion of both liquids on either side of the bladder. These phenomena are due to the attraction which the two liquids have for each other and for the diaphragm separating them. These phenomena are essential to organic life, and perform important parts in many physiological acts. Advantage is taken of them in dialysis and many other operations of the chemist. Diffusion is applied in Fr. and Ger. to the extraction of the saccharine juice from beets and to the separation of alkaline salts from beet molasses. For the latter purpose the "osmogene" was devised by Dubrunfaut. (See DIALYSIS.)

Endymion, en-dim'e-on [Gr. Ἐνδυμίων], in Gr. mythology, a beautiful youth beloved by Diana (Selene), who cast him into an everlasting sleep.

Enfantin, on-fon-tan' (BARTHÉLEMI PROSPER), a Fr. socialist, b. in Paris Feb. 8, 1796. He became a disciple of St. Simon, after whose death (1825) he and Amand Bazard were the chief priests of the sect. They formed in 1830 an association who had their property in common, but they soon ceased to co-operate. E. assumed the name of the "Living Law and the Messiah." He wrote several socialist works and advocated "free love." In 1832 he was imprisoned on a charge of corrupting public morals. D. May 31, 1864.

En'field (WILLIAM), LL.D., an Eng. clergyman, b. at Sudbury 1741. He preached in the Unit. chs. of Liverpool, Warrington, and Norwich, and pub. several vols. of sermons, a *Preacher's Directory*, and a *Hist. of Philos.* D. Nov. 3, 1797.

Enfield Rifle-Musket, a variety of small-arms manufactured at Enfield, Eng., at the royal small-arms factories. During the late c. war the U. S. govt. and the Confeds. each purchased large quantities of these and other European arms, on account of the difficulty of supplying the large numbers of troops with the necessary weapons. The E. rifle, though a very serviceable weapon, much better than the Belg. and Aus. arms then imported, was in almost every respect inferior to the old Springfield (U. S.) rifle-musket, which it much resembles. All these weapons have now given place to various breech-loading arms.

Engadine, en-gah-deen', or **Engadin**, a valley in Switz., about 45 m. long, with an average width of 1½ m. It is the upper part of the valley of the river Inn, which runs in a N. E. direction between 2 chains of the Alps. The highest part is 5900 ft. above the sea. The climate is cold, and snow and frost occur even in July. There are several glaciers and a number of valuable mineral springs. Pop. about 12,000, mostly Prots., who speak a peculiar Romanic dialect, called Ladin.

Eng ("right") and **Chang** ("left"), the "Siamese Twins," b. at Bangesau, Siam, Apr. 15, 1811, of a Chi. father and a Chino-Siamese mother. They were brought to the U. S. in 1829; were on exhibition in Amer. and Europe a number of times, and d., after having lived, as Eng and Chang Bunker, about 20 yrs. in the neighborhood of Mt. Airy, N. C., in Jan. 1874, the death of Chang preceding that of Eng a few hours. They differed in appearance and character more than average twins, and were addicted to different habits, Chang being intemperate and irritable, Eng sober and patient. Both were married and had large families of children, a number of whom d. young, but none exhibited any malformation. Chang received a paralytic stroke in Aug. 1870. He d. unexpectedly while his brother was asleep. Eng d. a few hours afterward, probably chiefly from nervous shock on learning the sudden death of his brother. The connection of the Siamese Twins took place in their epigastric regions, between the navel, which was common to both, and the ensiform processes, which were bent out in a forward direction and met very closely, held together by a ligamentous apparatus. The connecting band was a few inches long, 8 inches in circumference, and was covered with skin, which had a narrow zone with common sensi-



Eng and Chang (The Siamese Twins).

tiveness. The livers were located in close proximity to the connecting band, and connected with each other by small blood-vessels, which were lined with a thin layer of genuine liver tissue. The question whether a separation of the twins by surgical means would have been possible must be answered negatively. [From orig. art. in *J's Univ. Cyc.*, by PROF. A. JACOBI, M. D.]

Eng-edi (Heb. *Eyn Gedi*, the "kid's fountain;" the modern *Ein Fdy*), a town of Pal., also called *Hazezon-tamar*, alluding to its palm trees, which have now disappeared. It stood on the W. side of the Dead Sea, at a point about equally distant from its N. and S. extremities. Here are some ruins of the old town, near the fine fountain which gave it a name.

Eng-el (ERNST), a Ger. statistician, b. 1821; became in 1860 director of the statistical bureau in Berlin, and presided in 1863 in the International Statistical Cong. in Berlin. Pub. the *Zeitschrift des statistischen Bureau*.

Engel (JOHANN JAKOB), a Ger. author, b. Sept. 11, 1741; became prof. of belles-lettres in Berlin 1776. Among his works are *Ideen zu einer Mimic* and *Lorenz Stark*, a romance. D. June 28, 1802.

Engel (JOSEPH), a Ger. anatomist, b. 1816; became prof. of descriptive anat. at Univ. of Zurich 1844, of pathological anat. in Prague 1849, of descriptive anat. at Joseph Acad., Vienna, 1854. Wrote anatomical works.

Engelbert, SAINT, a son of Engelbert, count of Berg-Geldern, b. 1185; became in 1215 elector of the empire and abp. of Cologne. He paid off the debt of the electorate, enlarged its territory, and reformed its administration; reformed the corrupt clergy, checked the power of the nobles, and zealously advanced that of the Ch. His energy and rigor made many enemies, and he was murdered by Count von Isenburg, his own nephew, Nov. 7, 1225.

Engelbrecht, eng-gel-brekt (JOHANN), a Ger. enthusiast, b. at Brunswick 1599. He was a tailor's son, and worked at his father's trade until his health failed; was liable to cataleptic attacks, during which he went for many days without food or drink. In 1622 he set himself up for a prophet. Though he was quite unlettered, some of his books display considerable power. D. 1644.

Eng'elmann (GEORGE), a Ger. botanist and phys., b. at Frankfurt-on-the-Main Feb. 2, 1809; was ed. at Frankfurt, Berlin, and Heidelberg; removed to the U. S. in 1832, and in 1835 settled at St. Louis, where he founded a journal called *Das Westland*. He has pub. various monographs on bot. and meteorology.

Eng'elstoft (CHRISTIAN THORNING), a Dan. theol., b. 1805; became in 1845 prof. of theol. at the Univ. of Copenhagen, and in 1851 bp. of Fühnen; wrote, among other works, a *Manual of Ch. Hist.*

Enghien, d', don'-ge-an' (LOUIS ANTOINE HENRI DE BOURBON), Duc, a Fr. prince, b. at Chantilly Aug. 2, 1772, was the eldest son of the duke of Bourbon. He became an *émigré* in 1793; joined in 1792 the army of his grandfather, the prince of Condé; fought against the Fr. republic until 1799. In 1804 became a resident of Ettenheim in Baden, where he was seized by the order of Bonaparte, carried to Vincennes, tried by a military court, and shot, on the pretext that he was an accomplice of Cadoudal in a conspiracy against Bonaparte. D. Mar. 21, 1804.

Engine. See ELECTRO-DYNAMIC ENGINE, FIRE ENGINES, GAS ENGINE, HOT-AIR ENGINE, HYDRAULIC ENGINE, and STEAM ENGINE.

Engineering is the art and science by which "the mechanical properties of matter are made to serve the ends of man," or, as otherwise defined, it is "the useful application of mechanical science" to those ends. The branches of science which are applicable to the engineer, in the words of Rankine, "fall under the gen. head of *mechanics*"; but they are distinct in method and application (though not in principle) from astronomical mechanics, which treats of the motion of the stars, and from those parts of phys. mechanics which relate to such subjects as the transmission of sound and light. They are also so far to be kept distinct from *pure* or *abstract* mechanics that, in treating specially of mechanics as applied to E., certain fundamental principles are to be taken for granted, the demonstration of which forms part of the course of natural philos. To that course also must be left all mechanical problems which are interesting in a scientific point of view only, and not practically useful. The objects to which the science of the engineer relates are divided under 2 heads—viz. *Structures* and *Machines*. Strictly speaking, all machines are structures, though all structures are not machines; but it is convenient to limit the term *structures* to those combinations of solid materials whose parts are not intended to have relative motion, and which are thus to be distinguished from *machines*, whose parts are intended to have relative motion and to perform work. The theory of structures is founded on the principle of statics, or the science of equilibrium. It is divided into 2 parts, relating respectively to the 2 requisites of a structure, stability and strength—stability being the power of resisting forces tending to overthrow the structure, or to derange the parts of which it is made from their proper relative position; and strength, the power of resisting forces tending to alter the figures of those parts or to break them in pieces. The theory of machines is founded on the principles of cinematics, or the science of motion considered in itself, and on those of dynamics, or the science of the relations between motion and force. The dynamical part of the theory of machines considers them as transmitting at once both motion and force, or performing *work*. It treats of the resistances, whether from solids or fluids, which impede the action of machines, the means of regulating that action, and the nature of the sources of motive-power, whether animal strength, the gravitation of water, the currents of the air, or the mechanical action of heat. The entire theory of the work of machines is founded on one principle, that of the *conservation of energy*. The term *civil engineering* is applied to a wide and somewhat indefinite range of subjects, but it may be defined as embracing those applications of mechanics, and of the arts of construction generally, which belong to lines of transport for goods and passengers, whether roads, railways, canals, or navigable rivers; to works for the conveyance of water, whether for drainage or water-supply; to harbors and works for the protection of the coast.

Military E. embraces fortification, whether permanent or temporary, and its auxiliaries, such as floating obstructions and torpedoes for harbor defence; the works of attack or defence of fortresses, or, in other words, sieges, both active and passive; the construction and the laying of military bridges; reconnaissances and surveys for military purposes, including the operations of armies in the field; the works of field fortification, whether lines for the holding of extensive areas of the theatre of war, or those transient works (*fortifications improvisées*) by which troops are protected in line of battle; and in gen. it embraces the *constructions* for military purposes as distinguished from warlike *machines*, though perhaps the line is not so sharply drawn as in civil E. Military E. embraces also artill., gunnery, military pyrotechny, transportation, including vehicles, railways (especially their repair and preservation, and the renewal of destroyed bridges in war).

Mining E. embraces the methods of underground surveys, which in many respects differ from those on the surface; the proper modes of reconnoitering, reaching, and attacking mineral deposits; drifting galleries, sinking shafts, and timbering and walling the same; the ways and means of interior transportation; methods of hoisting in shafts or slopes; the construction of engines for lifting minerals or miners, and of pumps for the extraction of mine water; and, finally, the proper ventilation of underground works. It describes the miner's methods of attack in detail, the dangers which he has to encounter, and his means of precaution and defence; and further treats of the mechanical preparation or milling of ores, and of those constructions in the open air which are part of the plant of a mine, but which are operations referable to civil E. and building.

J. G. BARNARD.

England, *ing-land* [Lat. *Anglia*; Fr. *Angleterre*], the S. and larger division of the island of G. Brit. Under the title GREAT BRITAIN, the geog., statistics, and hist. of the United Kingdom, after the union of Scot. and Ire. with E., will be treated. This article only describes what is peculiar to E. and its hist. up to the time of the union. Bounded N. by Scot., E. by the Ger. Ocean, S. by the Strait of Dover and Eng. Channel, S. W. by the Atlantic Ocean, W. by St. George's Channel and Irish Sea; is between lat. 49° 57' 30" and 55° 47' N., and lon. 1° 46' E. and 5° 41' W.; greatest length, N. and S., 400 m.; greatest breadth, 280 m. It is triangular in shape, and has a sea-coast, if the prin. indentations are followed, of about 2000 m.; area, 58,320 sq. m. or 37,319,221 acres, of which 7,397.6 sq. m. or 4,734,486 acres belong to Wales, and 50,922.4 sq. m. or 32,544,735 acres to E. It is not quite as large as the State of Mich.

Topography.—From the Cheviot Hills on the N. border (2669 ft. high) to the centre of Derbyshire, a range of hills known as the Pennine chain extends, in 2 groups, the culminating point of the S. group (the peak of Derbyshire) being 1981 ft. in height, and the gen. elevation 1150 to 1400 ft. The N. group is higher, the Cross Fell, its culminating point, being 2928 ft. The Cumbrian Mts. in Cumberland connect with this N. group, and have several peaks. Seafell, 3230 ft., being the highest in E. The Welsh Hills are of greater elevation, and occupy most of the principality. Snowdon is 3590 ft., and overlooks Menai Strait. A chain of low hills, mostly chalk, extends across the S. cos., seldom rising above 1000 ft., and a spur of them on the E. passes through Suffolk and Norfolk cos. The remainder of E. is nearly level, and in some places depressed and marshy, nowhere rising more than 500 ft. above the sea. The rivers are small, but some of them navigable for a short distance. They are, on the E., the Thames, Stour, Ouse, Trent, Humber, Tees, and Tyne, with the Tweed as the N. boundary; on the W. the Mersey, Dee, Severn, Wye, and Avon are the only important streams. Nearly all these rivers have wide estuaries at their mouths. There are many good harbors on the W. 3 or 4 on the S., and 5 or 6 on the E. shore. The coast at many points is rocky and dangerous to shipping, and the tides at the mouths of some of the rivers are of great height.

Climate moist, but generally healthy, and, owing to its insular position and the influence of the Gulf Stream, much milder than in the same lat. on the Continent. The mean annual temperature is 49.5° F.; the maximum is seldom more than 81° or 82° F., and the minimum not far from 20° F. S. W. winds are most prevalent, and often bring rain. On the E. side the rainfall does not often exceed 30 inches per annum, but in the W., especially in Wales and Cumberland, it is very great, in the latter, 189.5 inches having fallen in a single year.

Soil and Productions.—Much of the soil is fertile, and what is naturally sterile is made productive by careful fertilization. The cereal crops are very large, and the root crops, hops, and other special products occupy a considerable area; yet her import of breadstuffs amounts to an average of \$305,000,000 a yr. The production of live stock is very large, but over \$200,000,000 of meat is annually imported. The lands are mostly held in large estates, and rented.

Industries.—E. probably manufactures more goods than any other country in the world. Her textile industries alone employ 783,000 persons, consuming 1,281,156,576 lbs. of cotton, 173,724,091 lbs. of wool, and large quantities of silk, hemp, flax, hair, jute, and shoddy. Of mining and metallic products there are produced over 115,000,000 tons of coal, 14,000,000 tons of iron ore and 4,880,000 tons of pig iron, 80,850 tons of lead ore, tin ore, 14,142 tons of copper ore, 73,141 tons of salt, 2,735,001 tons. The value of the minerals and metals produced was \$341,000,000; the whole value of industrial products aggregates more than \$4,000,000,000.

Education and Religion.—There are about 21,000 primary schools, with an average attendance of 3,555,000 children, maintained at an annual expenditure of about \$28,000,000; about 450 schools of secondary instruction, many of them endowed; the great univs. of Ox., Cambridge, Lond., Durham, and Manchester; 6 public cos. not connected with univs.; 10 public professional schools, military, naval, and agricultural; 5 law schools, 30 med. schools beside those connected with the univs.; 63 theological and professional schools under control of different religious denominations. There are 4 ladies' univ. colls. and 6 ladies' colls., not univ.

The Established Ch. of E. is Epis.; about 14,000,000 of the pop. adhere to it. Nearly 12,000,000 are dissenters; of these, the Wesleyans are most numerous, and next the Independents or Congregationalists and Baps. The R. Caths. have about 1,000,000 adherents; they have 1 abp., 2 cardinals, and 13 bps. The Established Ch. of E. has 2 abps. and 28 bps., 12,000 parishes, and 200 extra parochial places; it holds a vast amount of property; its bps. and abps. are appointed directly or indirectly by the Crown; some of the "livings" or clerical appointments are in the gift of the Crown, some of the univs., others of nobles, many of wealthy patrons.

Population in 1881.—E. is divided into 40, or, counting the 3 "ridings" of York as separate shires, 42 shires or cos., as follows: Bedford, 149,473; Berks, 218,363; Buckingham, 176,323; Cambridge, 185,594; Chester, 644,037; Cornwall, 330,686; Cumberland, 250,647; Derby, 461,914; Devon, 608,595; Dorset, 191,028; Durham, 867,258; Essex, 576,434; Gloucester, 572,433; Hereford, 593,470; Hertford, 121,062; Huntingdon, 303,069; Kent, 59,491; Lancaster, 977,406; Leicester, 3,454,441; Lincoln, 321,258; Middlesex, 469,919; Monmouth, 2,920,485; Norfolk, 211,267; Northampton, 444,749; Northumberland, 272,555; Nottingham, 434,066; Oxford, 391,815; Rutland, 179,559; Salop, 21,434; Somerset, 248,014; Southampton, 469,109; Stafford, 981,013; Suffolk, 356,893; Surrey, 1,436,899; Sussex, 490,505; Warwick, 737,339; Westmoreland, 64,191; Wilts, 258,965; Worcester, 380,283; York, E. Riding, 315,460; York, N. Riding, 346,290; York, W. Riding, 2,175,314. Wales is divided into 12 shires: Anglesey, 51,416; Brecknock, 57,746; Cardi-

gan, 70,270; Caernarthen, 124,864; Caernarvon, 119,349; Denbigh, 111,740; Flint, 80,587; Glamorgan, 511,433; Merioneth, 52,038; Montgomery, 65,718; Pembroke, 91,824; Radnor, 23,528. The entire pop. of E. and Wales, Apr. 3, 1881, was 25,974,439, an increase of 3,256,020 since 1871.

Principal Cities.—London, 4,764,312; Liverpool, 552,425; Birmingham, 400,757; Manchester, 393,676; Leeds, 309,126; Sheffield, 284,410; Bristol, 206,503; Bradford, 180,459; Hull, 161,519; Stoke-sur-Trent, 152,457; Newcastle on Tyne, 145,223; Salford, 176,233; West Ham, 128,692; Portsmouth, 127,958; Sunderland, 124,960; Nottingham, 111,631; Oldham, 152,511.

History.—The W. part of E. was known to the Phenicians, and their vessels visited it for tin more than 4 centuries B. C. They named the country the Cassiterides or Tin Islands. When Julius Cæsar invaded it, 55 B. C., it was known as Britain, or oftener as Albion. The Roms. conquered E. and part of Wales and Scot., and ruled it for 450 yrs., when they withdrew. The Britons, whom they subdued, were allied in race to the Celts, Picts, and Scots. Their N. neighbors, the Picts and Scots, had annoyed the Roms. greatly by their frequent raids into Brit., but early in the 4th century small bands from Ger. and Hol. landed upon the E. shore of E., and not only devastated the country but settled upon it, and founded the kingdom of Kent in 457. Continuing their inroads, the Saxons, Jutes, and Angles had, by A. D. 584, overrun and conquered nearly all E. forced the Britons into Wales and Scot., and established 7 distinct kingdoms, known as the Heptarchy. The Britons held Wales and Cumberland, and had 5 small states. These 12 states were almost constantly at war with each other for the next 240 yrs., but in 827 Egbert, king of Wessex, became the first king of all E. The Danes commenced, in the latter part of Egbert's reign, their invasions of E., which were continued for almost 200 yrs., till they finally became masters of the kingdom in 1017. Canute, the first Dan. king, reigned 18 yrs. The throne reverted to the A.-S. in 1042, but Edward the Confessor and Harold II. were much hampered by powerful Dan. nobles. In 1066 Harold was slain in battle, and William the Norman, his conqueror, succeeded to the throne, and the great estates were distributed among his followers. The Norman dynasty retained the throne till 1154, when the Plantagenets succeeded, and reigned without serious disturbance till 1399, when Richard II., grandson of Edward III., was deposed by Henry IV., son of John of Gaunt, fourth son of Edward III. A. C. war between the houses of Lancaster and York raged for 86 yrs. Richard III., the last king of the house of York, was defeated and slain by Henry Tudor, earl of Richmond, who succeeded him as Henry VII. in 1485. To the house of Tudor belonged Henry VII., Henry VIII., and his 3 children, Edward VI., Mary, and Elizabeth. In 1603 James VI. of Scot. succeeded Elizabeth as James I. of E., and founded the house of Stuart. James was proclaimed Mar. 24, 1604, and he assumed the title of king of G. Brit., Fr., and Ire. Oct. 24 of the same yr. Under him E. and Wales, Scot. and Ire. were in fact one empire, though the legislative union with Scot. was not consummated till 1707, and that of Ire. not till 1800. James reigned 21 yrs., and his son Charles I. 24 yrs. Then came a revolution; Charles was beheaded, and E. became a commonwealth, with Oliver Cromwell as lord protector. His administration was a brilliant and prosperous one, but 2 yrs. after his death, in 1658, the Stuarts were restored, and Charles II. and James II., sons of Charles I., succeeded. James II. was deposed in 1688, but after a brief interregnum the Stuarts continued, the succession being in the female line, till 1714, when the house of Hanover, collateral descendants of James I., ascended the throne, and still retain it, the monarchs of this dynasty being the 4 Georges, William IV., and Victoria I. The special political hist. of E. closes with the union of the 3 crowns in the accession of James I. of the Stuart dynasty. The following table gives the names and period of the reign of each monarch from the time of Egbert, the first king of all E., to the present time:

<i>Saxons and Danes.</i>	
Egbert, first king of England.....	827-836
Ethelwolf, son of Egbert.....	836-858
Ethelbald { first and second sons of Ethelwolf.....	858-860
Ethelbert {	860-866
Ethelred, third son of Ethelwolf.....	866-871
Alfred the Great, fourth son of Ethelwolf.....	871-901
Edward the Elder, son of Alfred.....	901-925
Athelstan, eldest son of Edward.....	925-940
Edmund, brother of Athelstan.....	940-946
Edred, brother of Athelstan.....	946-955
Edwy, son of Edmund.....	955-958
Edgar, second son of Edmund.....	958-975
Edward the Martyr, son of Edgar.....	975-979
Ethelred II., half-brother of Edward.....	979-1016
Edmund Ironside, eldest son of Ethelred.....	1016

<i>Danes.</i>	
Canute, by conquest and election.....	1017-1035
Harold I., son of Canute.....	1035-1040
Hardicnute, son of Canute.....	1040-1042
Edward the Confessor, son of Ethelred II.....	1042-1066
Harold II., brother-in-law of Edward.....	1066

<i>Norman Line.</i>	
William the Conqueror.....	1066-1087
William Rufus, third son of William I.....	1087-1100
Henry I., youngest son of William I.....	1100-1135
Stephen of Blois, son of Adela, fourth daughter of William I.....	1135-1154

<i>House of Plantagenet.</i>	
Henry II., son of Matilda, only daughter of Henry I.....	1154-1189
Richard I., eldest surviving son of Henry II.....	1189-1199
John, sixth son of Henry II.....	1199-1216
Henry III., eldest son of John.....	1216-1272
Edward I., eldest son of Henry III.....	1272-1307
Edward II., eldest surviving son of Edward I.....	1307-1327
Edward III., eldest son of Edward II.....	1327-1377
Richard II., grandson of Edward III.....	1377-1399

House of Lancaster.

Henry IV., son of John of Gaunt, fourth son of Edward III.....	1399-1413
Henry V., eldest son of Henry IV.....	1413-1422
Henry VI., only son of Henry V. (deposed).....	1422-1461

House of York.

Edward IV., great-grandson of Edward III.....	1461-1483
Edward V., eldest son of Edward IV.....	1483
Richard III., younger brother of Edward IV.....	1483-1485

House of Tudor.

Henry VII., Henry Tudor, duke of Richmond, descended from Henry V. and Edward III.....	1485-1509
Henry VIII., son of Henry VII.....	1509-1547
Edward VI., son of Henry VIII.....	1547-1553
Queen Mary I., daughter of Henry VIII.....	1553-1558
Queen Elizabeth, daughter of Henry VIII.....	1558-1603

House of Stuart.

James I., grandson of Henry VII., son of Mary, queen of Scots.....	1603-1625
Charles I., son of James I. (beheaded).....	1625-1649

The Commonwealth.

Commonwealth declared.....	May 19, 1649
Cromwell, Oliver, Lord Protector.....	1653-1658
Cromwell, Richard, Lord Protector.....	1658-1660

The Restoration.

Charles II., son of Charles I.....	1660-1685
James II., second son of Charles I. (deposed).....	1685-1688
Queen Mary II., 1694, daughter of James II. }.....	1689-1702
William of Orange, 1702, grandson of Charles I. }	
Queen Anne, second daughter of James II.....	1702-1714

House of Hanover.

George I., great-grandson of James I.....	1714-1727
George II., only son of George I.....	1727-1760
George III., grandson of George II.....	1760-1820
George IV., eldest son of George III.....	1820-1830
William IV., third son of George III.....	1830-1837
Victoria I., daughter of Edward, fourth son of George III.....	1837-

L. P. BROCKETT.

England, Church of, that portion of the Chr. Ch. which has existed in Eng. since the time of St. Augustine (A. D. 597). Christianity was introduced into Eng. soon after the days of the apostles, but in the 6th century its influence was limited to the N. parts of the island. Augustine, prior of St. Andrew's monastery at Rome, undertook the mission to the heathen Saxons, and he arrived in Kent 596. The conversion of the kingdom of Kent was followed by the triumph of Christianity in all the kingdoms of the Heptarchy, but the influence of the It. missionaries did not extend far beyond the limits of the kingdom of Kent. The whole N. part of Eng. was converted by Brit. and Irish clergy. At that time the doctrines of the C. of E. were the common faith of Christendom. The primacy of the pope had not then developed into a supremacy. The controversies about image-worship did not reach their height until the 8th century. The teachings of purgatory and pardons were not developed until the 12th, and the idea of papal supremacy was kept in check until the 11th. As time went on these teachings made progress in Eng. As the papal authority took the form of claiming a right to confirm the nominations of bps. and to hear appeals, it was met with vigorous opposition. When in the reign of Henry VIII. the Ch. and Parl. of Eng. resolved to put an end to appeals to Rome, and to the claims of the pontiffs to a right to confirm the nominations of bps., they conceived that they were merely reasserting those anc. rights of the C. of E. which had never been abandoned. This position was taken with unanimity, and was adhered to by Bp. Gardiner and the national party in Eng.

The efforts of the C. of E. to regain its anc. liberties were contemporaneous with the continental Ref., and in the reign of Edward VI. men who sympathized with Luther or Calvin had gained control over the Eng. Ch. and nation. Under their influence Eng. was becoming rapidly Protestantized. But the accession of Queen Mary led to a violent reaction. The Prot. school of Cranmer and Ridley was suppressed, and the authority of the pope was restored in more than mediæval plenitude. Queen Elizabeth, on coming to the throne, found herself encompassed with difficulties. There were then 3 parties in the Eng. Ch.: first, that of Gardiner, which was now disposed to maintain the papal supremacy; second, that of Parker, which went beyond the former national school in its desire to reform abuses; and third, the Prots., many of whom had taken refuge in Switz. during the reign of Mary, and who returned anxious to introduce into Eng. the form of religion established there. The private opinions of the queen were not known, and it was doubtful to which school she would give her approbation. The Prot. school speedily put itself out of the question by the fact that its teachings would have led to the establishment of a new form of religion. Various circumstances tended to alienate the queen from the papal party. The haughty discourtesy with which Pope Paul IV. received the information of her accession, the assumption of the title of queen of Eng. by Mary of Scot., and the persistent attitude of opposition to all reforms maintained by the Marian bps. compelled Elizabeth to put herself in the hands of the reforming party, of which Matthew Parker was the leader. This school was prepared to remove the jurisdiction which the pope had exercised within the realm of Eng.; it desired to preserve the faith and discipline of the Ch. unaltered, but it went beyond them in proposing to remove certain abuses of teaching and practice—viz. the use of images, the invocation of the saints, transubstantiation, and the idea of purgatory. Parker was made abp. of Canterbury, and the majority of the bps., refusing to co-operate with him, resigned their sees, and their places were filled by men

whom he could trust. The reforms in doctrine were carried out, but care was taken to avoid touching any part of the common faith of Christendom. The principle of Vincent of Lerins, of universal acceptance as the test of Chr. truth, was affirmed, and the authority of gen. councils was acknowledged. This settlement, the joint work of Convocation and Parl., was accepted by the great body of the nation, and it was hoped that the unity of the Eng. Ch. would continue unbroken. In 1570, however, after the excommunication of Queen Elizabeth by Pius V., the R. Caths. separated from the Ch. In those ages politics and religion were so intermingled that any religious agitation involved plots against the state, and sometimes war, and in this condition of affairs the motive is to be found for the laws which were enacted against "popish recusants." Some of the extreme Prots. followed the example of separation in 1580 under the leadership of Robert Brown. They were successively known as Brownists, Independents, and Congregationalists.

The remaining hist. of the C. of E. may be passed over briefly. After its suppression during the c. war, it was restored in 1660, since which time no change has been made in its doctrine or discipline. The exciting scenes of the 16th and 17th centuries led, first to a reaction, and after the revolution of 1688 to a long period of religious indifference. The latter part of the 17th century was an age of immorality; the earlier part of the 18th was a time of indifference. Since the middle of the 18th century there have been 3 great religious revivals. The first was that of John and Charles Wesley, who set themselves to the task of developing personal holiness in the members of their ch. The second was that of the "Evangelicals," about 1798, of which such men as the Rev. Charles Simeon and the late bp. Daniel Wilson were the leaders. The guiding thought in this movement also was the development of personal holiness. While the aim of the Oxford divines was the development of personal holiness, they endeavored to avoid the tendency of the first to schism, and of the second to neglect dogma. Hence they dwelt much upon the authority of the Ch.; of late yrs., however, the leaders of this school have given much thought to the question of the restoration of visible unity among Chrs., and much attention has been given to the study of ch. hist. Both these schools still exist, and are known as Low Church and High Church. The former claims to be the representative of the Prot. or Puritan part of the Ch. in the reign of Elizabeth; the latter, of the Catholic or national school. The peculiar character of the former is its claim to great liberty of private judgment; of the latter, its deference to authority. These 2 schools may be regarded as comprising the whole C. of E. [From orig. art. in *J.'s Univ. Cyc.*, by REV. BEVERLEY R. BETTS, *Lib. of Columbia Coll.*]

England (JOHN), D. D., b. in Cork, Ire., Sept. 23, 1786; was ed. at Carlow Coll., and took orders in the R. Cath. Ch. in 1808. He was distinguished for his championship of Catholic emancipation, and was once fined £500 for his boldness in discussing political questions. In 1820 he became bp. of Charleston, S. C., and founded the *Catholic Miscellany*, the first journal of his Ch. in Amer. D. Apr. 11, 1842.

England (SIR RICHARD), b. at Detroit, Mich., 1793; entered the Brit. army, gained distinction in S. Afr., India, Afghanistan, and the Crimea, and was made a full gen. in the army 1863. D. Jan. 1883.

Engle (FREDERICK), a naval officer, b. in Pa. 1799; became mdpn. 1814, lieutenant 1825, commander 1841, capt. 1855; in 1866 was made a rear-admiral and placed on the retired list. D. Feb. 12, 1868.

Engles (JOSEPH PATTERSON), D. D., b. at Phila. Jan. 3, 1793, grad. at the Univ. of Pa. 1811; in 1813 became co-master of the gram. school of that inst., and was (1817-45) master of the Classical Inst.; in 1845 became publishing agent of the Presb. Board of Publication. D. Apr. 14, 1861.

Engles (WILLIAM MORRISON), D. D., b. in Phila. Oct. 12, 1797, grad. at the Univ. of Pa. 1815; in 1820 became pastor of the 7th Presb. ch. in Phila., in 1834 ed. of the *Presbyterian*, in 1863 pres. of the Presb. Board of Publication; was author of a *Bible Dict.* and other works. D. Nov. 27, 1867.

Englewood, R. R. junc., Cook co., Ill., 7 m. S. of Chicago; here is the co. normal school. Pop. 1880, 2850.

Englewood, Bergen co., N. J., on R. R., 14 m. N. of New York. The tp. has been organized since the U. S. census of 1870. Pop. tp. 1880, 4076.

English (GEORGE BETHUNE), b. at Cambridge, Mass., Mar. 7, 1787, grad. at Harvard 1807; studied law, afterward read divinity, was licensed to preach, and wrote a work in favor of Judaism; became an ed., afterward lieutenant of U. S. marines; resigned his commission, and entered the Egyptian service, serving as an officer ofartil.; afterward became U. S. agent in the Levant, and returned to the U. S. 1827. D. Sept. 30, 1828.

English (JAMES E.), an Amer. statesman, b. at New Haven Mar. 1812; became a merchant and manufacturer; was M. C. 1861-65; elected gov. of Conn. 1868, re-elected 1870; appointed to fill vacancy in U. S. Senate 1875; was Dem. candidate for gov. of Conn. 1880.

English (THOMAS DUNN), M. D., an Amer. lawyer and author, b. in Phila. June 29, 1819; became in 1856 a med. practitioner near New York; has written novels, dramas, tales, and poems.

English (WILLIAM H.), b. in Lexington, Ind., Aug. 27, 1822, ed. at S. Hanover Coll.; practised law, held several public offices; M. C. 1852-60, pres. of a bank in Indianapolis, and was Dem. candidate for V.-P. 1880.

English Channel [Fr. *La Manche*, "the sleeve"], that portion of the Atlantic which separates Eng. from Fr. It extends on the Eng. side from Dover to Land's End, and on the Fr. from Calais to the island of Ushant. On the E. it communicates with the Ger. Ocean by the Strait of Dover, 21 m. wide, and on the W. it opens into the Atlantic by an entrance 100 m. wide. At its greatest width it is about 150 m. The Channel has a current that sets from the W., and it is noted for its roughness.

English Language and Literature. The E. lang. is the speech of the Anglo-Saxons, who between A. D. 425 and 600 took possession of the greater part of Brit.; they came from that part of the mainland which is now called Schleswig-Holstein, and their lang. belonged to the "Low German" or Platt-Deutsch branch of the Teutonic stock. The A.-S. was a homogeneous and inflectional lang.—i. e. it expressed time, condition, etc. by changes in the forms of words, and not by the use of auxiliary words. It received very slight addition from the Celtic tongue of the subdued Britons, and more considerable accessions from that of the Danes, who began their inroads about the end of the 8th century, and obtained control over the island for about 50 yrs. In 1066 the Normans took possession of the island, bringing with them their lang., the Norman-Fr. dialect of the Fr. tongue. In this period the E. tongue lost its distinctive forms and nicer inflections, yet it never became Fr. or Romanic, but remained in its essence and its structure E.

The A.-S. furnishes modern standard E. with its real character: it forms the bulk of the spoken lang. If all other elements were taken away, the lang. would yet exist, with its life and vigor unimpaired. But were this element to be removed, the lang. would fall to pieces in lifeless masses. And yet in all copious diets, the words of other than purely E. origin are quite $\frac{3}{4}$ of the whole vocabulary. This seeming paradox is owing to the fact that almost all our words of most necessary use are pure E., while those which belong to lit., science, and art, which express abstract ideas and the subtle variations of thought, are of foreign and chiefly of Romanic origin. Notwithstanding, we have to remark that in the lang. of E.-speaking peoples to-day the purely E. part is so unlike that spoken by their forefathers before the Norman Conquest as to be a different lang. The E. of Alfred is far more unlike that of Victoria than the Gr. of Homer is unlike the dialect now spoken in the Morea. And yet the course of the lang. is distinctly traceable step by step; for in its remnants and records of early lit. E. is richer than any other tongue known to philology. The question has therefore arisen, What propriety is there in any distinction between E. and A.-S., and where shall the line of demarcation be drawn? It is urged by some philologists, and with much reason, that as a man is the same individual in infancy, youth, and old age, although no recognizable likeness could be found between the old man and the infant, so E. is E. under all the varieties of form which it has taken. The changes which in the course of yrs. the old E. lang. underwent, until about 1525 it assumed the form in which we have it now, may be said to have been: The gradual disappearance of the case-endings of nouns; a complete change in the adjective, which loses all distinction of the form and the sense of case and number; the entire disappearance of gender; the loss of the infinitive and imperative form of the verb, with the distinctions of person. The next change in the E. lang. in the order of time is the introduction of Romanic words: words which came through the Norman-Fr. and are ours by inheritance from the Normans; words of gen. use formed by scholars in later yrs. directly from the Lat., and words common to science in all langs. In tracing the hist. of our lang. the only Romanic element of importance is, however, that which is due chiefly to the presence of the Normans in Eng., and which became welded into E. speech about A. D. 1350.

For about 100 yrs. after the Norman Conquest the conquerors and the conquered held themselves as much as possible aloof from each other, and for nearly 2 centuries more the govt. of Eng. was carried on in Lat. and in Norman-Fr. About 1350 E. took the place of Lat. in the schools and in the courts of law, and the speech of the whole of the people became E. It was not, however, the E. which the Norman invader heard at Hastings which obtained this victory, but a speech largely mixed with strange elements. What has come down to us of what was written in Eng. during these 300 yrs. is worthless as lit., but its worth in the hist. of the lang. cannot be overrated. Before the Conquest there were 2 broad dialectic distinctions in E. speech—the N. (having a marked infusion of Norse) and the S. (more Saxonish, free from Dan. mixture, a softer speech). But the change to which living lang. is always subject caused such modifications after the Conquest that in the 13th and 14th centuries 3 great dialects of E. can be plainly distinguished—the N., the Midland, which became standard E., and the S. Of the E. written between 1100 and 1350 that of hardly any 2 authors was alike. The lang., having no recognized standard, was used by each scribe according to the mode of speech that prevailed among the people among whom he was bred, and writing was therefore as dialectical as speech.

The following are the most significant of the E. writings of this period: Layamon's *Brut* is a rhymed chronicle of the traditional hist. of Brit., and written in the S. dialect, about 1200. It shows that the E., although it had broken up as to its forms, had yet kept itself free from Romanic intermixture during 150 yrs. The same fact is established by a very important work, a metrical paraphrase of the Gospels, written in the N. dialect, by a monk named Orm, and called *Ormulum*. But with the next work we enter a period at which a flood of Fr. words was turned into the pure E. The introduction of Fr. words was largely due to the influence of the priests. These men were dependent upon the Norman nobles; they were their beneficiaries, their chaplains, and a large proportion of the whole order were of Norman race. Their intercourse with women and children, and the reverence in which they were held by them, gave them an influence upon the lang. which can hardly be overrated. What sort of E. the priests began to use about this period is shown by the *Ancren Riwle*, a treatise on monastic life, written by a priest for the guidance of 3 ladies about 1220; the number of Rom.-Fr. words in this work is 496, 421 of which may be regarded as referring to the affairs of common life. The earliest rep. of E., essentially modern in substance, form, and structure, is found in the

Handlyng Synne, written by Robert Manning of Bourne, in Lincolnshire, about 1305. It is a translation in rhyming verse of a Norman-Fr. poem written 30 yrs. before, and is a fair rep. of the lang. spoken by the rural Midland Englishman. It was in that part of the country that the E. of lit. took form, and the new E., now fully formed, was in structure and vital substance Teutonic; but amalgamated with it by centuries of contact was a mass of Norman-Fr. words, which must be regarded as a part of native E.

Although the E. lang. was formed, there was yet no E. lit. worthy of the name. One author soon appeared who is worthy of notice because of the wide circulation of his book. It was the prose-writer, Sir John Mandeville, whose *Travels* contains a larger proportion of Romanic words than is found in the works of any poet of his century. Standing between the old E. and the new, uniting the form of the one to the spirit of the other, is the author of *The Vision of Piers Ploughman*, William Langland. *Piers Ploughman* is a satirical poem, written, about 1365, in the alliterative verse which was common to the A.-S. and Dan. bards. It is the first great original work in E. lit. The writer was a humane satirist, and his purpose was to set forth the wrongs his humbler countrymen suffered at the hands of nobles, priests, and lawyers. The *Vision* bears the stamp of a great historical period: at the time of its production John Wycliffe was disturbing the established religion of Eng. to its very foundations. The Wycliffite translation of the Bible was made about 1380, and no other single work ever exercised so much influence upon the whole future of a people.

We now see rising in Geoffrey Chaucer (1328-1400), the author of *The Canterbury Tales*, the day-star of E. lit. He is a narrative poet, and as Langland's poems were addressed to the lower classes, so Chaucer wrote for the nobles and gentry. Above all Chaucer's other charms is that of a clear imagination; but Chaucer stands alone; he had but few contemporaries worth mentioning; John Barbour was the only one worthy of comparison with him. For nearly 200 yrs. after his death darkness fell upon the E. mind, the Ch. repressing all free thought, and the War of the Roses desolating Eng.

Hastening to the consideration of that remarkable school of writers, the Elizabethan dramatists proper, we only mention men worth, however, more than a passing notice: Sir Thomas More (beheaded 1535), the first E. prose-writer of merit after Chaucer, who wrote many controversial works of timely interest, and in Lat. his famous *Utopia*; William Tyndal, who made the first translations of parts of the Bible from the original Heb. and Gr.; Sir Walter Raleigh (1552-1628), whose bright intellect, daring spirit, and checkered life made him one of the most conspicuous figures in E. hist. and lit.; Sir Philip Sidney (1554-1586), the author of *Arcadia*; the great poet Edmund Spenser (1553-99), the most purely poetical of all Eng. poets (*Fairie Queen*, *Mother Hubbard's Tale*, etc.); and finally the dramatists, Thomas Sackville and John Lyly. At this period the theatre was the chief intellectual entertainment of all classes. Young men of literary ability who found themselves in need of money turned to the stage as a means of support. Conspicuous among these dramatic adventurers was Christopher Marlowe, a man of genius, but of genius wild, irregular, ill-trained. His prin. dramas are *Faustus*, *Tamburlaine the Great*, and *Edward II.* Born about 1564, after a life of wretched irregularity he was killed in a brawl 1593. William Shakespeare (1564-1616) became the greatest name in all lit., and there was no limit to his capacities. All the world knows that *Hamlet*, *King Lear*, *Othello*, and *Macbeth* are his greatest tragedies, and his Sonnets are inferior in thought, and in expression only to his best plays. Chief among his contemporaries were Benjamin Jonson, Francis Beaumont (1586-1616), John Fletcher (1576-1625), and Philip Massinger (1584-1640). Among the great intellects of the Elizabethan era only one man is more conspicuous than Francis Bacon (1561-1626), the wisest man of modern times. To E. lit. strictly speaking his contributions were not large, for the most of his writings were in Lat., but his *Essays* were written in E., and they alone would have made his name immortal. A notably important fact in regard to this era in lit. is that the E. lang., which was fully formed at the beginning of the 16th century, was used in that era with a freedom from formal restraint that since then has been unknown. The parts of speech changed places at the will of the writer. Thus was born at a blow, in full strength and activity, the genius of the E. lang., which is that the nature and quality of a word depend not upon its form, but upon its place in the sentence and its logical relation to other words. That it was prevented from degenerating into chaotic license is probably due to King James's translation of the Bible, which was pub. in 1611. The influence of this book upon E. lit. has been as great as upon the morality of E. life. It contains the best E. that was ever written. Its narrative style is beyond that of all other writing in its own or in other tongues.

To the time of the Commonwealth and the Restoration belongs Edmund Waller, whose verse unites grace and dignity, and the gallant Sir Richard Lovelace (about 1618-58), whose songs give the soul of chivalry and true love voice. But all the poets of this period were eclipsed by John Milton. His father acquired money enough to give his gifted son a univ. education, to enable him to study at home for 5 yrs., and then to travel on the Continent, particularly in It. He was summoned home by the beginning of the great c. war. His earlier and minor works have a serene and lofty grace of expression, united with a sustained power, that preludes the coming epos, his immortal *Paradise Lost*. The style of this work in its most characteristic passages has an almost indescribable grandeur. His thought and his purpose are always supreme. He is able to handle such subjects as omnipotence and archangelic rebellion, and to keep himself up to the lofty level of his stupendous theme. In one remarkable respect Milton is eminently un-English: he is en-

tirely without humor, that peculiarly E. quality of mind. He d. 1671. Abraham Cowley (1618-67) was a contemporary of Milton, of whom great things were thought during his lifetime, but his cold conceits are passing into deserved oblivion. Sir John Denham (1615-68) was his superior in every natural gift, and wrote in a much higher school. His *Cooper's Hill* will always command admiration for its nervous thought and fine imagery. Of the prose-writers of the period of the Commonwealth, the most conspicuous and characteristic are Sir Thomas Browne (1605-82), Thomas Fuller (1608-61), Jeremy Taylor (1613-67), the earl of Clarendon (1609-74), and Richard Baxter (1615-91). But above all the prose-writers of this period rises one mighty figure—that of John Bunyan (1628-88). *The Pilgrim's Progress*, the book which has won its author his fame, is an allegory purely religious in its original purpose; and of all allegories ever written it is the one which most effectually attained its end. But in its literary character it is a work of fiction, a tale of human experience and of human passion, a story of struggle, of sorrow, and of triumph. Thus considered it is matchless: in all lit. there is nothing like it. Moreover, the style of the *Pilgrim's Progress* shows a mastery of E. in which its writer has no rival. To the period of the Commonwealth we owe the appearance of the newspaper. News-letters, as they were called, had been pub. earlier in the century, but it was not until the times of the Long Parl. that the genuine newspaper was demanded by the eagerness of the public for information as to what was taking place from day to day. To the period of the Restoration, when the repressed forces of society burst forth, we owe the satirical poem by Samuel Butler (d. 1680), *Hudibras*. The dramatists of a period to which the court of Charles II. gave the tone were licentious to the last degree. They revelled in the violation of external decency, and the nature of their plots was such that it would seem as if they were intended to illustrate the life of their royal master. Of the minor poets of this period we shall make brief mention only of Charles Cotton, Sir George Etherege, who is the father of the modern comedy of intrigue; Sir Charles Sedley, Wycherley (about 1640-1715), and the earl of Rochester (1647-80), the most indecent of them all. The chief poet of the period was John Dryden (b. 1632). He was nearly 40 yrs. old before he showed his power, which is that of an impetuous flow of versification, embodying cogent argument, stinging satire, or graphic portraiture. His sentiments are never of the highest or the purest kind. He belongs to the race of time-servers and men-pleasers. But his satirical power is almost equal to Juvenal's, and his portraits of his contemporaries are grand historic caricatures. He wrote 30 plays, both comedies and tragedies. They have little poetic merit and no real dramatic power. But in the prefaces to some of these plays Dryden stepped upon the field of dramatic criticism, of which he showed himself a master.

The latter part of the 17th century was adorned by several prose-writers of eminence, among whom one man, John Locke, demands more particular attention. Locke is the father of political and social ideas which since his time have shaped the political and the social development of the E. race. But it is his *Essay concerning Human Understanding* which has given him his most enduring fame and power. Contemporary with Locke was Sir Isaac Newton. Newton (1642-1727) is the greatest master of exact science that ever lived. His discovery of the law according to which the force of gravitation acts, and of the refraction and composite nature of the ray of light, are the most important in their kind of modern times. Locke and Newton were the great ornaments of the reign of William and Mary; with Jonathan Swift we enter the period known as that of Queen Anne. Swift, Irish by birth (1667), but the most E. of men by blood and nature, first appeared in lit. by the publication of his renowned *Tale of a Tub* and *Battle of the Books*, the former a religious satire, the latter a literary one. The success of these works was very great, and their reputation has continued even to the present day. It is as the author of *Travels by Lemuel Gulliver* that he commands the widest circle of readers. This production had a political purpose, and contains caricatures of some of the public men of that day; but the genius of its author impelled him to deal with mankind even more than with party, and his satire is upon the human race. He d. in a state of wretched imbecility, 1745. Alexander Pope, b. 1688, before he was 30 yrs. old had taken a position which makes his name the most illustrious in the literary roll of the 18th century. Pope was a satirist and an egoist. But he had tact and delicacy, and was an accomplished man of the world. His mind had also a strong philosophical turn, and this he showed in his *Essay on Man*, which is the finest didactic poem in any lang. He never wrote with passion or with strong imagination, but in writing of his own feeble, crippled, weary phys. life he utters his woes with a simple pathos which is touching and dignified. With the assistance of some minor versifiers he translated Homer, making a brilliant and very readable version. He d. 1744, having established a school of poetry. Two of the eminent men of this period are Richard Steele and Joseph Addison. The former is the father of the brief periodical essay, the latter the master of this kind of writing. It is as the essayists of the *Tatler*, the *Spectator*, and the *Guardian* that their names live in our memory. The purpose of Steele (d. 1729) and Addison (d. 1719) was the elevation of E. society in intellectual and moral tone, and in manners. In the yr. when Addison d. appeared *The Life and Strange Surpassing Adventures of Robinson Crusoe, Mariner*. Its author was Daniel Defoe, and the book has been more widely read than any other in E. fiction. In reigns of William III. and Anne, William Congreve (1670-1729), John Vanbrugh (1606-97), and George Farquhar (1678-1707) gave brilliancy to our stage.

In the middle of the 18th century E. lit. returned to truth and nature. The new style was introduced by Samuel Richardson, who wrote *Pamela*, *Clarissa Harlowe*, and *Sir*

Charles Grandison; he was the occasion of the appearance of Henry Fielding (d. 1754). Fielding's novel was *Joseph Andrews*, and the vigor and spirit of his style have never been surpassed. Tobias Smollett (d. 1771) soon appeared on the field; he has fine touches of satirical humor in his *Peregrine Pickle* and *Roderick Random*. David Hume (1711-76), who first appeared in the field of philos. as a doubter and an inquirer (*Philosophical Essays concerning the Human Understanding*), wrote the *Hist. of Eng.* down to the revolution of 1688; Edward Gibbon (1737-94) produced the *Hist. of the Decline and Fall of the Rom. Empire*, and William Robertson (1721-93) wrote the *Hist. of Scot.* The middle of the 18th century was adorned by the poems of Thomas Gray (1716-71) and William Shenstone (1714-63), and by the works of Laurence Sterne (1713-68), one of the greatest humorists in E. lit., and author of *The Life and Opinions of Tristram Shandy* and of *A Sentimental Journey through Fr. and It.*; the latter half of the century by Samuel Johnson (1709-84) and his eminent contemporaries, Adam Smith, the founder of the science of political economy, and Philip Francis, who under the signature of *Junius* was a terror to the statesmen of his time. To the same period belong Edmund Burke, whose dept. is that of philosophical statesmanship; Goldsmith, the author of *The Vicar of Wakefield*, *She Stoops to Conquer*, etc.; William Cowper (1731-1800), whose best works are *Lines on My Mother's Picture* and *John Gilpin*, and Robert Burns (1759-96), the Scotch poet, who must be placed at the head of the lyric poets.

In the 18th century the E. race began to manifest its power in a new quarter of the world. The men who had left the old Eng. and had crossed the Atlantic were, very many of them, not only energetic and enterprising, but intelligent. Colonial lit. has, however, nothing worthy of notice until we reach Jonathan Edwards (1703-58), whose *Enquiry into the Freedom of the Will* is still the stronghold of the necessitarian theologians. The next author of eminence among his countrymen was Benjamin Franklin (1706-90), the great apostle of common sense. He is hardly better known for his discoveries in electricity than for the prudential maxims of his *Poor Richard's Almanac*. Among Franklin's younger contemporaries were the men who roused the colonists to resistance to the tyrannical govt. of George III.—John Adams, Thomas Jefferson, Patrick Henry, Thomas Paine, Jonathan Trumbull, Philip Freneau, and Alexander Hamilton. The triumph succeeding the Amer. war of Independence and the Fr. Revolution was one of great activity in E. lit., and as authors crowd upon us it will be convenient for the reader that we shall consider the various depts. of lit. each by itself.

Poetry.—The link that binds the poetry of the 18th century to that of the 19th is George Crabbe (1754-1832). Walter Scott (1771-1832), who followed soon after him, is the poet of chivalry and romance. He was replaced in public favor, as a poet, by Lord Byron (George Gordon) (1788-1824), who was followed by his friend Thomas Moore (1779-1825), a poet of Irish birth, whose excellence was in lyric compositions. Next we have to notice Thomas Campbell (1777-1844), a Scotsman by birth and a Celt by blood; Percy Bysshe Shelley (1792-1822), and John Keats (1795-1828). At this time appeared the Lake School of Poets, the first and chief of which was William Wordsworth (1770-1850). We next notice Robert Southey (1774-1843) and Samuel Taylor Coleridge (1772-1834), and mentioning Samuel Rogers (1763-1855) and Thomas Hood (1798-1845), we pass to poetical writers of our own day, chief among whom are William Cullen Bryant (1794-1878), Henry Wadsworth Longfellow (b. 1807), and Alfred Tennyson (b. 1809). Robert Browning (b. 1812) is regarded as at the head of the dramatic poets of the day; he married Elizabeth Barrett (1809-61), the most eminent of E. poetesses; James Russell Lowell (b. 1819) and Matthew Arnold (b. 1822) are exemplars of the union of the poetical and the critical faculty in an uncommon degree. Algernon Charles Swinburne (b. 1837) is the most prominent of the younger E. poets, and William Morris's *Jason* and *Earthly Paradise* have placed him high in the second rank of E. poets. Of the poets of minor fame we mention Whittier and Bret Harte; the prin. dramatists of the century are Sheridan Knowles and Richard Brinsley Sheridan (1751-1816), the latter of whom belongs partly to the last century and partly to this.

Novels.—In no dept. of lit. has the increased intellectual activity of the present century been so copiously manifested as in that of prose fiction. The great novelist of the century is Sir Walter Scott, simply the greatest writer of stories that ever lived. No other writer but Shakespeare has filled the world's memory with such a throng of living figures. Miss Jane Austen (1785-1817) followed him as a younger contemporary, George P. R. James (1801-60) was his imitator, and Edward Lytton Bulwer (1806-74) introduced to the world the novel of fashionable society. Among the other novelists of the century we mention Benjamin Disraeli (1805-81), Charles Dickens (1812-70), and William Makepeace Thackeray (1811-63); Charlotte Brontë, the authoress of *Jane Eyre*, holds a conspicuous place among the many women of the day who have written novels; she, however, must yield to the writer who appeared under the name of George Eliot (Marian C. Evans). To prose fiction Amer. has contributed James Fenimore Cooper (1789-1851), Nathaniel Hawthorne (1804-64), Edgar Allan Poe (1811-49), Mrs. Harriet Beecher Stowe (b. 1812), and Francis Bret Harte (b. 1831). The novel of modern society has attained its highest development in the works of Anthony Trollope (b. 1815), and among the crowd of novelists we finally mention Charles Reade, Thomas Hughes, Charles Shirley Brooks, William Wilkie Collins; moreover, William Black, William Starbuck Mayo (*Never Again*), George William Curtis, etc.

Essayists and Miscellaneous Writers.—Few tasks are more difficult than the classification of books and their writers. Where shall we place William Cobbett (1762-1835), who wrote upon politics, gardening, lang., and what not? William

Godwin 1776-1836 wrote a novel, *Caleb Williams*, and his wife, Mary Wollstonecraft 1759-97, *The Rights of Woman*. Charles Lamb 1755-1834 will be always read for the exquisite humor which appears in his *Essays of Elia*. To him there could not be a stronger contrast than Walter Savage Landor (1775-1864). John Wilson (1785-1854) is remembered for his *Christopher North*. Thomas De Quincey (1785-1859) for his *Confessions of an Opium-Eater*. William Hazlitt (1778-1830) was the 19th century embodiment of the ideal literator; James Henry Leigh Hunt (1784-1859) another writer of the same sort; but the great modern master in E. of grace and ease is Washington Irving (1783-1859), whose *Sketch Book*, *Knickerbocker's Hist. of New York*, and *Legends of Sleepy Hollow* secure his enduring fame. Notably unlike Irving in every way is Thomas Carlyle (1795-1881), who is a critic of the first class. To him Ralph Waldo Emerson (b. 1803) has been compared, although the manner of the two writers is entirely different. Among the wits of the generation which is passing away two were pre-eminent—Sydney Smith (1771-1845) and Douglas Jerrold (1803-57). Another, whose wisdom is greater than his wit, is Oliver Wendell Holmes, M. D. The study of human follies and human weakness drove Henry David Thoreau (1817-62) to a hermit's life, while Arthur Helps (b. 1817) has won for himself a long-enduring place in lit. Among other writers of this class in Amer. we notice Donald Grant Mitchell, Thomas Wentworth Higginson, Edward Everett Hale, and William Dean Howells, whose pictures of European and N. Eng. life are marked with penetrating observation and a charming grace of style.

History.—Thomas Babington Macaulay (1800-59) produced, in his *Hist. of Eng. from the Accession of James II.*, the most striking and picturesque historical work of the century. With its author's essays upon the characters of Bacon, Milton, etc., it forms a body of historical writing of almost unequalled splendor and interest. James Anthony Froude (b. 1818) has produced a very valuable hist. of Eng. during the times of the Reformation, and Edward A. Freeman (b. 1823) is the author of a *Hist. of the Norman Conquest*. Thomas Carlyle's *Hist. of the Fr. Revolution* is rather an expression of the spirit of the time of that great event than a record of its facts. John Lothrop Motley (1814-77) has taken the highest position as the historian of the Netherlands and the Dut. Republic, and the *Hist. of the U. S.* has been written by George Bancroft. S. Amer. and Sp. as connected with it have been illustrated by the labors of William Hickling Prescott (1796-1859), and the hist. of Gr. by William Mitford (1744-1827); but the work which displaces all others in Eng. lit. upon this subject is that of George Grote (1794-1871). Pre-eminent is the *Hist. of Civilization*, left unfinished by Henry Thomas Buckle (1822-62).

Books of travel are so considerable an element of modern lit. that they cannot properly be passed over. John Ledyard (1751-88) was the first of those travellers who have set out with the purpose of examining the polar regions, and he made his journeys on foot. He afterward undertook to discover the source of the Niger, but d. in Afr. with his purpose unattained. Among the many Brit. travellers who have described the condition of the U. S., Frances Trollope (1778-1863) did more than any other to form the opinion upon that subject which has prevailed in Europe until very recently. Another woman, Harriet Martineau, treated the same subject in an entirely different spirit. The most important travellers in Afr. are David Livingstone (d. 1874), who penetrated to the heart of the country, and Sir Samuel White Baker, who followed the Nile up to the lake which he called Albert N'yanza; eminent among those for whom the N. pole has had an irresistible attraction is Elisha Kent Kane; and Ephraim G. Squier and John L. Stephens are conspicuous among Amer. explorers.

Among the philosophical writers during the present century we notice Sir William Hamilton (1788-1856), John Stuart Mill (1806-73), George Henry Lewes (1817-78), and Laurens P. Hickok, 1798-; and among the theological, Theodore Parker (1810-60), whose faith was in God and in man, but not at all in revealed religion; Octavius B. Frothingham (b. 1822), the leader of rationalistic religion in Amer., and Henry Ward Beecher (b. 1813), the greatest pulpit orator in Amer.

Political and Social Science are the product of the present century. Among the Eng. works in this field the most important are those of Jeremy Bentham (1749-1832), David Ricardo (1772-1823), Thomas Robert Malthus (1766-1834), in his *Essay on the Principles of Pop. as it Affects the Future Welfare of Society*, and John Stuart Mill (1806-73), whose works are masterpieces of far-reaching thought and subtle reasoning. But the most eminent of recent writers in this department is Herbert Spencer, whose work is a complete system of practical philosophy. Here, between our record of the lit. of political and social science and of natural science, is the fittest place to mention Henry Lord Brougham (1779-1868). By his varied and voluminous writings Lord Brougham produced a marked and an enduring effect upon his time; and his efforts were always for the diffusion of knowledge and toward liberty of thought and of action.

Natural Science is hardly lit., but it would be difficult to deny a high literary quality to the works of many of the naturalists who have given to the present century that scientific eminence which is its peculiar glory. Of these the most eminent are Joseph Priestley (1733-1804), Joseph Black, Thomas Young (1773-1829), Sir Humphry Davy (1778-1829), Sir David Brewster (1781-1868), Sir John Frederic William Herschel (1792-1871), Sir Charles Lyell (b. 1797), William Buckland, Sir Charles Bell (1778-1842), Sir Roderick Impey Murchison (1792-1871), Michael Faraday (1794-1867), Mary Somerville, and Hugh Miller (1802-56). In 1845 appeared an anonymous vol., *Vestiges of the Nat. Hist. of Creation*, a work which proved to be the first utterance of the new school of development. Charles R. Darwin (b. 1809) is the leader of this school. He had pub. several works on natural science, the high value of which was recognized, when his *Origin of*

Species by means of Natural Selection renewed the surprise which followed the publication of the *Vestiges of Creation*. *The Descent of Man and Selection in Relation to Sex* was received with a mingling of admiration and horror for the author who seemed to prove that "man is descended from a hairy quadruped furnished with a tail and pointed ears." Louis John Rodolph Agassiz (1807-74) is eminent among the natural philos. of the century; John Tyndall (b. 1823), distinguished for his glacial researches; Thomas Henry Huxley (b. 1825), as the author of works of a "positive" character and materialistic tendency. Of Amer. scientific writers, some of the most distinguished are Alexander Dallas Bache, Samuel George Morton, George R. Gliddon, Asa Gray (b. 1810), one of the most eminent botanists of the day; Benjamin Silliman (1776-1864), John Torrey (b. 1798), and Arnold Henry Guyot (b. 1807). Among naturalists, John James Audubon (1780-1851) must not be forgotten, and Henry Maudsley's writings upon mental physiology are of the profoundest interest, and have a singular literary charm. His *Body and Mind*, *Psychological Essays*, and *Physiology and Pathology of Mind* are his prin. works. To such a point has the E. lang. and lit. advanced from the rude condition and remote period at which we first considered it. [From orig. art. in *J. S. Univ. Cyc.* by RICHARD GRANT WHITE.]

English Seventh-Day Baptists. SEE SEVENTH-DAY BAPTISTS.

Engraft'ing, or Grafting [a word kindred to the Gr. *γράφω*, to "write;" *γραφίον*, a "pencil," referring to the pencil-shape of the scion or graft], the uniting of a shoot of one variety of plant upon the stock of another variety, or even another species, so that the scion shall live and grow as if a part of the tree upon which it is grafted. In selecting stocks for grafting, care should be taken not to insert a free-growing variety upon one which is slow of growth. In some cases, however, as when dwarfs are desired, the stock to be grafted upon is to be of much smaller growth. Thus, the pear is dwarfed when set on the quince, the apple on the thorn. There are many styles of grafting, but in all the principle is to place the albumen (or sap-wood), and the cambium (or new wood) of the scion against that of the stock. The hard wood of scion and stock never unites. Some stocks decidedly affect the quality of the fruit grown upon the graft, but in most cases the effect is not strongly marked. In most varieties of grafting it is necessary to tie the scion to its place. In all cases it is necessary to exclude the air from the cut, either by means of grafting-wax or of clay mixed with horse-dung. Grafting succeeds best when the scions have been kept for some time and become partly dried. The scion should be cut before the buds swell.

Engrat'ia, SAINT, lived at Saragossa, Sp., in 304. She was persecuted as a Chr., and, according to Prudentius, she underwent the most fearful tortures, but she survived to a great age. Her relics are preserved at Saragossa. She is honored by the R. Cath. Ch. Apr. 16.

Engraving. Engraving on precious stones, glass, or metals, in such a manner as to represent the figures or objects in relief, is, strictly speaking, a branch of sculpture. E., in the restricted sense of producing designs upon wood or metal, in such a manner that when charged with coloring matter they may be reproduced upon paper or other proper material, is a modern invention, and grew into use and importance with the art of printing, of which it forms a constituent part.

1. **Wood Engraving.**—Blocks of hard wood are sawed across the fibre, in thickness equal to the length of ordinary metal types. The surface of the wood is then made smooth and covered with flake-white. Upon this is drawn in fine lines, with pen or lead-pencil, or photographed, the design required. The white or untouched parts between the lines of the drawing are then cut out by means of chisels and gouges. This process leaves the outlines and shadows elevated, like the faces of type in a printer's form. When the blocks are inked by an ordinary roller, impressions may be taken off upon paper by means of a press. By the process of electrotyping the prepared block the impression is now taken from a metal plate.

2. **Etching.**—For this process a plate of metal, generally copper, is prepared with a perfectly even and smooth surface. It is then thinly covered with a varnish composed of various proportions of white wax, black and white pitch, and asphaltum. This varnish, technically called the "ground," is spread in a thin coating over the prepared plate, and afterward smoked to give a black surface, the better to show the drawing of the artist's design. The drawing is made in reverse upon the varnished plate, generally by transfer of a drawing made upon paper with colored chalk. When the outlines are clearly marked upon the blackened surface, they are cut through the varnish by the etching-needle, laying bare the surface of the copper or metal used. When the outlines and shadows of the object to be etched are thus cut through the "ground," some corroding mixture (generally nitric acid mixed with an equal quantity of water), is poured upon the plate. By the action of the acid the lines laid bare with the etching-needle are bitten into the plate, each with a breadth corresponding to the surface laid bare by the needle. The ground or varnish is then removed from the plate, the oxidized portions are cleansed, and a proof is taken. If the work is in any part unsuccessful, it may be touched up and rendered more expressive by the "dry-point." This is a fine and sharply pointed steel instrument, by which scratches or shallow grooves are made on the smooth portion of the plate.

3. **Line Engraving.**—For this, metal plates, whether of copper or softened steel, are prepared as for etching. The work of art to be engraved is drawn from the original in the reduced size on the copper required for the E. The burin or graver is a square or lozenge-shaped piece of steel inserted in a pear-shaped handle. The end is diagonally ground, so that one side of the instrument presents an acute angle, which, when pushed forward by the hand, cuts out

triangular grooves in the metal. Thus equipped, the engraver cuts grooves into the plate which, when filled with ink, come to represent, by their curves, crossings, and varying depth and breadth, all the outlines, shadows, and transitions of the picture from which he works.

4. *Mezzotint*.—For this process the plate should be prepared as for the graver. By the means of a machine covered with fine teeth, the whole surface of the plate is covered with a compact series of minute incisions—so compact that if filled with ink the plate would give a printed surface on paper quite black. Upon this surface, thus covered with "burr," the outlines of the picture are drawn, and where lights are desired the burr is removed by the scraper and made smooth by the burnisher. The transitions from the high lights to the deep shadows are delicately marked by the continuously increasing amount of the "burr" which is left on the plate.

5. *Stippling*.—This consists in puncturing the metal plate by dots made with the point of the graver or by corrosion with acid. Sometimes these dots are made by slight blows upon the graver. The greater or less number of these dots gives in printing all varieties of shading. This was a favorite method with Bartolozzi and his school.

6. *Combination of Processes*.—For the sake of clearness we have described the different modes of E. as distinct processes, but they are quite often combined. In etching, the dry-point is constantly made use of, and not seldom the graver. In line engravings the outlines are often etched, while the most important and expressive parts are worked out with the graver. Stippling is made use of at times to give softness to the expression of the face.

7. *Handling*.—Every engraver of note adopts some methods of producing his desired effects peculiar to himself. This is technically called "handling." Many of the elements which enter into handling are common to the painter and the engraver. Both alike must attend to drawing, anat., and perspective, both linear and aerial; to chiaroscuro, or the gen. distribution of lights and shadows in a picture, and the various gradations of depth and delicacy of the latter as they recede from the focus of light. They must both alike seek for truth and force in the representation of the outline surface and texture of bodies; they must alike take account of the variations which distance, quality of the light, and atmosphere produce in objects by their manifold changes. In addition to these, the engraver (if he does not engrave his own design) must be a translator of another's thought into a different lang. This he can never accomplish without the greatest familiarity with his own processes, as well as that of the painter. Literal interpretation will fail as really as in the case of translating a great poem. The chief study of the engraver is so to arrange his lines as to mark the character of each object and feature, distinguish it from every other, and give it the proper prominence and importance with regard to the total scene or event which the picture is designed to represent. The color of the picture, it is true, cannot be, strictly speaking, translated, but it is possible to convey an accurate idea of the relations of the lights and shadows which the different colors embody. Painters select colors with reference to their desire to make special objects prominent, and to attract and fix upon them the eye of the spectator. Now the engraver, if he cannot imitate the color, can produce by his lines such an effect as shall imitate the emphasis which the painter expresses by actual color. From this point of view critics speak of "color" in an E.

8. *Printing*.—Much of the effect of all engravings is dependent upon printing. In wood E., by reason of the lines being raised in relief like types, the difficulty of printing is less than in other branches of the art. It requires, however, to make good impressions, all the accessories for the best work of the printer's art. Clearness, delicacy, and softness in wood-cuts are greatly dependent upon the skill and judgment of the printer. In those depts. of the art in which the ink or coloring-matter is received into grooves or dots sunk beneath the surface, the process of printing is much slower and more difficult. The ink is forced carefully into the depressions with a soft ball or dabber, and afterward the portions of the plate between the grooves, and also the lightly worked parts which represent the lights, are carefully cleaned with a soft cloth and the palm of the hand before it is ready for the press. This process is a slow one, and requires special training on the part of workmen. The printing of etchings is so important that many etchers provide themselves with hand-presses, and work off their own proofs.

9. *Painter-Engravers*.—This is the designation given by Bartsch to those artists who have engraved their own designs, either as studies for paintings or with a purpose of giving them no further representation in color. These works are not translations or copies as are ordinary E., but real autographs—direct expressions of the artist's mind. Collectors place a high value upon these autographs. Bartsch's great work, *Peintre-Graveur*, is devoted entirely to E. and etchings of this class.

10. *Relative Artistic Value*.—The relative importance, for art purposes, of the different modes of E. is difficult to determine. Each has its own advantages and limitations. New processes like the graphotype have not yet been sufficiently tested to determine their permanent value. Wood E. has a very decided advantage over the other forms of the art in respect to cheapness and facility of execution and printing. These circumstances adapt it to the purpose of illustrating books, magazines, and newspapers, and also render it liable to degradation through haste and carelessness in execution. In the hands of good artists, however, it is capable of high excellence. The best wood E. has a softness and grace which are attractive to all. But in all the elements of truthfulness and force the distinct, sharp lines of the etching-needle and dry-point are vastly superior. In etching the artist must secure his effects by clear outlines, each of which must tell its own distinct story. The softness and amenity of wood

E. are denied to the etcher, but he may accomplish results which are vastly superior in all the higher elements of expression. For this very reason etching is never popular with persons untaught in the gram. of art. It generally fails in rendering the delicate gradations of shadow in clouds, and rarely succeeds in perfect modelling of flesh. But in "freedom, precision, and power" it is superior to all methods of E. For this reason, high success in etching requires special capacity, which stands somewhat apart from the art-faculty in general.

Mezzotint, like wood E., is popular from its softness and the perfect gradations of tint which it secures. The process is also cheaper than that of line E., and the facility with which it can represent strong contrasts in lights and darks and the faces of the young and fair makes it a process next in popularity to wood E. In the hands of masters like Earlom, McArdell, and Bond it has given us works of great beauty and power. Line E., if not the most difficult, is the most laborious method of E., and for this reason, as well as for its inherent capacity for force and variety of effect, stands in the first rank among methods of E. It is likely, by the time which it consumes and the great manual dexterity which it requires, to become mechanical, and deficient in the breadth, freedom, and boldness of etching. But when, under the hand of a real artist, it combines these elements with perfect moulding of flesh, delicacy of tone, and gradation of shadows, it stands unrivalled among its sister branches of the art.

The place of E. in the general study of art is important. It interprets all the fundamental ideas of painting with the exception of color. This, within certain limits, it can suggest, if it cannot imitate. Autograph E., or etchings from artists of distinction, enable the art-student or amateur to study in his own lines the artist's chosen expressions for his thought. In a country like ours, in which access to large collections of paintings is not possible, E. furnishes the readiest, cheapest, and most practicable means of studying the hist. and growth of the arts of design in all depts. Arch., sculpture, and pottery are alike dependent upon E. for making their results intimately known to the great majority of those interested in their study. Relatively to art in gen. it sustains the same relation as does printing to lit. It makes the best ideas of the few available for the elevation of the many. As a means of popular education in art, engravings stand unrivalled.

The lit. of E. is extensive. The collector will find catalogues of the works of the most eminent engravers pub. as separate vols., and often many catalogues of the same engraver by various editors. He will find gen. catalogues of all the important engravers, as *Le Peintre-Graveur* of Bartsch and the *Kunstler-Lexicon* of Nagler. Our limited space will not permit the discussion of its hist. (See OTTLEY, *Inquiry into the Origin and Early History of Engraving*, and JACKSON and CHATTO, *Treatise on Wood E.* M. B. ANDERSON.)

ENGRAVING MAPS AND CHARTS.—The best maps are engraved on copper, and sometimes on steel, which is, however, at present not much used, being liable to rust. The design is drawn on paper, and is transferred to tracing paper by going over the lines of the drawing with a material composed of Frankfort black and urine. The design is then divided both ways through the centre by lines drawn to match similar lines on the copper plate. Designs for engraving are also photographed and transferred (ready for engraving) to the plate. Maps are not printed directly from the copper plates, but the printing is generally done by the lithographic process, as follows: The copper plate is used for making an impression upon autographic paper, prepared with a coating of starch, gum, etc., in variable proportions. The ink used is a mixture of ordinary lithographic ink with oil, soap, tallow, varnish, etc. The impression is made with great care upon the starched side of the paper. This paper, carefully moistened, is laid upon a polished lithographic stone, "backed" with great care by folds of paper, and then pressed with great force, in a lithographic press, upon the stone. The paper, on being stripped away, leaves, if the work is well done, all its lines beautifully transferred to the stone. After washing and drying, the stone is used for printing as in ordinary lithography. From 2000 to 5000 first-class impressions can be taken from one transfer if skillfully done.

Lithography proper [from the Gr. λίθος, a "stone," and γραφή, to "write"] may be considered as a branch of E. It owes its existence to the fact that certain slates of the middle oolite (found in the highest perfection at Solenhofen in Bavaria) and various subcarboniferous and other limestones of greatly inferior quality, found in Mo., Canada, and other regions, though compact, have a surface of somewhat open grain, capable of absorbing and retaining water, oils, and inks made with fats, etc. Now, if parts of the smooth stone be covered with a drawing in oil, the remaining parts can be wet without wetting the oiled parts. If "fat" ink be now applied to the stone, it will adhere to the dry parts, but not to the wet. By alternately wetting and inking the stone, a great number of impressions can be taken.

Engraving on Steel, the Processes.—The plate on which the E. is executed is ground and polished by the plate-maker until its mirror-like surface is free from all scratches or blemishes. The edges are bevelled, so that it may readily pass between the rollers of the printing-press when completed. An etching-ground is then laid upon the plate by the engraver. This ground consists of a mixture of burgundy pitch, rosin, and asphaltum; it is applied to the heated plate by "dabbing" it over the surface; it resists acid, but great care must be taken in preventing any dust settling in the ground when heated, else when the acid is applied "false biting" of dust-specks will result. When the ground is cold, the outline of the subject, prepared by finely-traced lines with the "dry-point" on gelatine paper, is transferred upon the ground by laying thereon the traced side of the paper filled with scrapings from a lead-pencil or red chalk,

JOHNSON'S NATIONAL



UNITED STATES



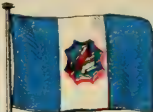
American Jack



Commodore U.S.N.



Rear Admiral U.S.N.



Guatemala



San Salvador



Honduras



American Customs



American Quarantine.



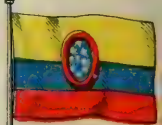
Mexico.



Hayti
Merchant same without Arms or square



San Domingo Man of War.
Merchant same without Arms



U.S. of Columbia



Chili



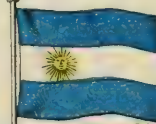
Peru

Merchant same without Arms



Venezuela Man of War.

Merchant same without Arms



Argentine Republic
Man of War
Merchant same without Sun



Uruguay



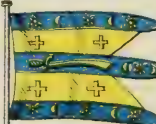
Paraguay Merchant



Liberia



Persia



Persia
The Shah



Persian Standard



Arabia



Batavia



Society Islands
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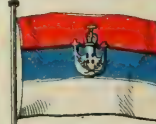
Hawaiian Ids



Turkey
Man of War.



Roumania



Servia



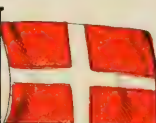
Montenegro



Danish Standard



Danish Man of War



Danish Merchant



Swedish Royal Standard



Swedish Man of War



Swedish Merchant



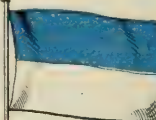
Portuguese Man of War



Papal Standard



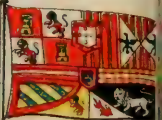
Wurtemberg



Bavaria



Baden



Spanish Standard



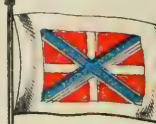
Russian Man of War



Russian Merchant



Russian Transport



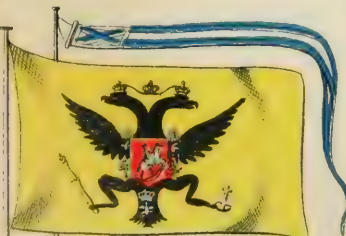
Russian Jack



Poland



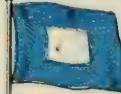
Hesse Darmstadt



RUSSIAN STANDARD



Russian



Blue Peter



Austro-Hungarian



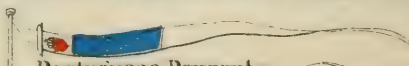
Netherlands



Danish



French



Portuguese Pennant

SIGNALS

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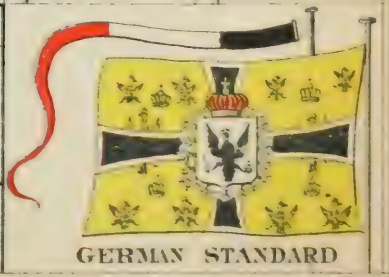
NEW CHART OF EMBLEMS.

 Russia	 Nicaragua	 Costa Rica Man of War <i>Merchant same without Arms</i>	 Isle of Man	 Union Jack	 Association of the Congo	 Royal Standard of the United Kingdom Great Britain & Ireland
 Ecuador	 Bolivia	 British Admiralty	 Trinity House	 British Merchant	 British Man of War	
 Brazil	 Morocco, Tripoli, Zanzibar.	 Tunis	 Algiers	 Egypt The Khedive	 Egypt Man of War	
 Korea	 Kingdom of Siam	 Birman	 Japan	 China	 New Zealand	
 Montenegro Man of War	 Kingdom of Italy <i>Merchant same without Crown</i>	 Switzerland	 Greece	 Greek Man of War <i>Merchant same without Crown</i>	 Fiji Id.	
 Norwegian Merchant	 Norwegian Man of War	 Swedish Norwegian Union Jack	 The Netherlands Royal Standard	 The Netherlands	 Belgium <i>Navy & Merchant without Arms</i>	
 Spanish Man of War	 Spanish Merchant	 French in General	 French Colonies Eastern	 French Colonies Western	 Konigsberg	
 Standard of the Emperor of Austria & King of Hungary	 Austro Hungarian Admirals Flag	 Austro Hungarian	 German Merchant	 German Navy Dept	 German Man of War	

PILOTS.

 Dutch	 Spanish	 Italian	 Portuguese	 French	 German
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Johnson & Co.



and the back of the paper gently rubbed with a burnisher. The etching process is then commenced by cutting the lines or dots desired with the dry-point through the etching-ground. The width between the lines or dots is carefully studied, and laid in with reference to the final result when "bitten-in." When completed, a wall of wax is placed around the edges of the plate to prevent the acid from running off, and the "biting-in" process is begun by pouring on the acid (generally 1 part of nitric acid to 3 parts of water), which is immediately poured off for the more delicate biting, and water washed over the work and removed, and the surface blown dry with a common bellows. The delicate work is then "stopped out" with asphaltum varnish, and the biting resumed until the darkest or heaviest lines are bitten sufficiently. The ground is then removed with turpentine, and such parts of the work needing further biting may be "rebitten" by laying a rebiting ground dexterously dabbed on the surface, so as to leave each line or dot perfectly clean; and then proceed with the acid as at first. Most plates are etched at first, whether completed in line, mezzotint, or stipple style, the style of the etching being varied according to the manner in which the work is to be finished.

Pure line E. is produced by cutting lines, broken lines, or dots on the steel with a tool called the graver; but this style is now rarely ever used except in bank-note E., the vignettes of which are engraved in this style, on die steel, which is hardened for transferring to other steel plates; and so any number of copies of the original plate may be duplicated on other softer plates, which, when hardened, are used in printing the E.

Line-and-stipple E. is rendered by cutting or etching the lines on draperies, and dotting (stippling) the lighter parts of draperies and flesh with the graver or dry-point. **Mezzotint E.** is produced by laying a "mezzotint ground" over the surface of the etched subject by means of a "rocking-tool" (sometimes termed a "cradle") with fine teeth, which are impressed into the plate by a rocking motion of the tool; after rocking over the plate a great number of "ways," the surface becomes filled with fine dots, which, if printed from, would give a perfectly black tint. The high lights, half tints, and gradations are then "scraped" out with a tool termed the "scraper," and the work finished with the burnisher. This style produces a very soft and pleasing E., and with a well prepared etching of under-work in line-and-stipple is extensively used by some engravers in producing the finest E. It is more generally known as the *mixed* style—line, mezzotint, and stipple. Pure mezzotint E. has become quite obsolete, as it will not admit of being printed from in large quantities, but when mixed with other styles from 30,000 to 50,000 fair impressions may be taken from a single plate.

Aquatint E. is often confounded with mezzotint from its resemblance to it, but the process is quite different. An aquatint ground is laid on the surface of the plate by pouring a resinous substance which has the peculiarity of separating its particles so as to leave bare spaces, or eccentric rings left bare, which when exposed to acid are corroded. The laying of the ground requires the greatest dexterity and judgment, and must be done in a dry atmosphere. The tone produced resembles that of a washed drawing in India ink, soft and harmonious. Aquatint E. is used for reproducing geological specimens, as fossils, shells, stones, etc., with great success. [From orig. art. in *J.'s Univ. Cyc.*, by GEO. E. PERINE, Engraver.]

Engraving, Bank-Note, embraces the chief characteristics of gen. E., with a number of special processes peculiar to itself. It is a combination of the highest style of the art and the greatest perfection in machinery and in the details of the business, requiring a system of accounts and checks, together with discipline and watchfulness, almost unknown in any other pursuit. The variety of its work makes necessary the employment of the best talent in all branches, and the constant demand for something new wherewith to baffle illegitimate imitation brings into use the inventive faculties and skill of the best experts in the business. B.-N. or vignette E., while it is in the order of line E. and etching as otherwise described, requires special treatment to render it useful for the purposes designed. Boldness must be produced without destroying the delicacy of the work, the object being to render the subject capable of reproduction by machinery without losing in the process the faintest line which the genius of the artist conceived necessary for the perfection of the picture. The great expense attending the execution of these E. makes this reproduction necessary, so that a limited number of vignettes and pieces of lathe-work, variously combined for different notes, may, in effect, be as practically distinct from each other as if special work had been used for each. The invention of Jacob Perkins, known as the "transfer press," is here most potent, and, combined with a thorough knowledge of the manufacture of steel and its treatment in the various processes of hardening and softening, the power to reproduce the original E. to an unlimited extent is effected.

The original E. or "bed-piece," as technically known, is hardened to a degree rendering it capable of resisting a pressure of 20 tons without breaking the steel or even crushing the delicate E. The experience required to determine the precise temperature necessary for complete and perfect hardening here becomes manifest, when it is understood that a degree of heat beyond the extent required will destroy the E. and render useless the labor of weeks. The bed-piece being properly hardened, a polished steel cylinder or "roll" is passed over the bed-piece, and the E. "taken up" on the roll in relief. This roll is then hardened, and becomes the "die," to be used indefinitely. Another and most important adjunct to the business of B.-N. E. is the geometrical lathe. This machine is used in making the "counters" on bank-notes, which are the pieces of work usually containing the denominations. The borders and the backs of notes

are also made up of this class of E. A not unimportant feature of B.-N. E. is the lettering and ornamentation, which are as distinct from vignette E. as either is from lathe-work. The arrangement of the wording of bank-notes, the style and symmetry of the individual letters, and the necessary ornamental work to blend the whole into perfect harmony, bring into action the best cultivated taste and capacity for designing. In the leading bank-note establishments much of the lettering and ornamentation is done by machinery—inventions conceived and built by their own mechanicians, and used exclusively in the execution of their own work.

B.-N. E. in its present perfection is the result of improvements and skill encouraged and fostered exclusively in the U. S.; and in this particular branch of the arts our country is supreme, sending its handiwork to all parts of the civilized world. [From orig. art. in *J.'s Univ. Cyc.*, by C. L. VAN ZANNE.]

En'nemo'ser (JOSEPH), M. D., a Ger. writer, b. in the Tyrol Nov. 15, 1787, grad. as M. D. at Berlin 1816; became prof. of med. at Bonn 1820, removed to Munich 1841, where he practised with success. Among his works is a *Hist. of Magnetism*. D. 1854.

En'nis, city, Ellis co., Tex., on R. R., 20 m. N. by W. of Corsicana. Pop. 1880, 1351.

En'nios (QUINTUS), a Roman epic poet, b. of a Greek family at Rudia, in Calabria, 239 a. c. He acquired the rights and privileges of a Rom. citizen. It is said that he supported himself by teaching the Gr. lang. Beside his most important work, an epic poem entitled *The Annals*, he wrote tragedies and comedies, which are all lost except some fragments. D. 169 B. C.

E'noch, or **He'noch** (Heb. "initiated" or "teacher"), the name of 5 persons mentioned in the sacred books (canonical and apocryphal) of the Hebs. The second in the order of time, and the most important, was "the seventh from Adam," who "prophesied," and was translated at the age of 365.

Enoch, Book of, quoted by the apostle Jude, an apocryphal book of unknown authorship and of uncertain date, critical conjecture ranging from 144 B. C. to 132 A. D. The early Chr. Fathers used it, but for some centuries only fragments of it were known to European scholars, till in 1773 Bruce brought from Afr. 3 copies of an Ethiopic version of it, made apparently from the Gr. about 350 or 400 A. D. The book contains many curious passages, but its leading idea is that of Divine justice dealing sternly with sinners.

Enomoto, or **Inomoto**, b. in the prov. of Shizuoka, Japan, but known as a Yedo-man; went to Hol. when young as a naval student; was appointed an admiral under the old govt.; toward the close of the rebellion in 1868 he took a fleet of 7 ships to Yezo for the purpose of making a last stand against the imperial govt.; was forced to capitulate at Hakodadi; was imprisoned for 3 yrs.; on his release in 1872 was appointed to a position in the colonization dept. of Yezo, and in 1874 vice-admiral of imperial navy, and envoy extraordinary and minister plenipotentiary to Rus.

E'nos (ROGER), GENERAL, b. 1736, was a lieutenant-col. in Arnold's Que. expedition 1775, but was sent back to Cambridge with a part of the troops, on account of lack of provisions. He commanded at Castleton, Vt., 1781; became a maj.-gen. of Vt. militia, and one of the first men of the State. D. Oct. 6, 1808.

En'sign [Lat. *insigne*, neut. of *insignis*, "remarkable," "striking" (from in, "in" or "for," and *signum*, a "sign"); Fr. *enseigne* or *drapeau*], the national flag or banner carried by a ship of war. Its chief purpose is to indicate the nationality of a ship when it meets another vessel at sea. In the U. S. N. the E. is the national flag. All Brit. men-of-war since 1864 carry the St. George's E.—viz. a white E. with a red cross, and a union-jack in the left-hand upper quarter. The Eng. E. is a red, white, or blue flag, having the union in the upper corner next the mast. E. is the title of the lowest commissioned officer in the Brit. army. E. in the U. S. N. is the 8th grade of commissioned officers, ranking below that of master and above that of mdpn.

En'silage, a method of preserving crops in a green state for fodder, which has been practised in the E. and middle Atlantic States since 1875. The most approved method is as follows: A green crop, which may be held or sweet corn or the large white S. corn, millet, Hungarian grass, Egyptian rice corn, sorghum, alfalfa, lucerne, or red clover, must be sowed at such time as to be in blossom or even with the grain in the milk late in Aug. or early in Sept. (before frost). A *silo* must be prepared to receive it. The silo is a pit or cellar built or dug near the barn or stables. It may be of any convenient size, but perhaps 40 ft. in length, 13 in width, and 20 in depth will be as good as a larger one. This will hold about 200 tons. It must have solid walls, and floor of stone grouted with cement on the inside or of cement throughout (which is not quite so good). A cover is to be provided for this of 2-inch plank, tongued and grooved, and which may be made in sections of 4 ft. battened together, with the battens of each section projecting and fitting into those of the next one. The cover is to be one inch shorter than the width of the silo. On one side of the silo a doorway is to be left, and filled up with brick, but not grouted. The corn or other green fodder is to be cut and brought in directly from the field, and subjected to the action of a provender cutter, which will reduce it to half-inch or inch lengths. It is then thrown into the silo, and each successive layer tramped down thoroughly. It is well to add a small quantity of salt to each layer, say a bushel to 12 tons. When the silo is filled, heaped, and beaten down, from 3 to 6 inches of straw are to be spread over it, and the battened cover laid on, the battens fastened, and pressed down by a weight of from 75 to 250 lbs. to the square ft. This pressure may be made with broken stone, barrels of sand, bags of grain, or any sufficient weight. It is well to have a light but substantial roof over the silo. It should not be opened till late in Nov. or Dec., and then

from the door on the side, and the fodder cut out with a hay-knife. It should be very slightly fermented and acid, and will be greatly relished by cattle. L. P. BROCKETT.

Entail. By this term is meant an estate in fee limited to certain classes of descendants, as an estate given to "A" and "the heirs of his body" (see *Fee*). The descent might be still more strictly confined, as to male issue or the issue born of some specified mother. The peculiar features of an E. depend upon a well known Eng. statute termed *De donis*, the regular effect of which was to confine the property to the specified mode of descent. The result was that the tenant in tail had the gen. characteristics of owner, except that he could not sell, and that the land could not be seized for his debt. The courts permitted the E. to be destroyed by fictitious legal proceedings which are now abolished; in Eng. the tenant may now, under certain limitations, resort to a conveyance called a "disentailing deed," and thus acquire a fee simple. In the U. S. words constituting an estate tail according to Eng. law will usually be construed to create a fee simple.

Entellus Monkey. See *HONUMAN*.

Enteralgia [Gr. *εντερον*, the "intestine," and *αλγος*, "pain"], NEURALGIA (which see) of the intestines.

Entomology is the dept. of zoology which treats of insects. It includes the study of their form, structure, development, habits, names, classification, and geographical distribution; and also the examination of the relations which insects sustain to other animals and to man. The name of the science is derived from 2 Gr. words—*εντομον*, *entomon*, an "insect," and *λογος*, *logos*, a "discourse."

In gen. terms it may be stated that the science of E. dates from the time of Aristotle; for this accurate observer and learned scholar, whose writings on nat. hist. are the more admired the more they are studied, considered insects also as well as other animals, scientifically, pointing out the limits of this interesting group of animals, and subdividing them into minor groups, with a considerable degree of accuracy. From the time of Aristotle for a period of about 1800 yrs., little or nothing was done, so far as we know, in the science of E. After this long period of inactivity in the science, Conrad Gesner, a poor Swiss, b. in 1516, became a phys. at Zurich, and, in addition to his other duties, gave much time to nat. hist. subjects, collecting all that was then known of the nat. hist. of animals in gen., and writing special papers on insects, which were pub. after his death, by Thomas Mouffet, an Eng. phys. and naturalist, who d. about the yr. 1600, and whose entomological writings were pub. in 1 folio vol., illustrated with 500 wood-cuts, in Lond. in 1634.

From the times of Gesner and Mouffet the science of E. has always had many votaries—so many that the whole space allotted to this article would not contain even a list of their names and the titles of the books and papers which they have pub. on this interesting and important subject. Nay, it requires 2 octavo vols. to enumerate the writers on E., and to give the full titles and dates, and places of their publication, as may be seen by examining Dr. Hagen's valuable work, *Bibliotheca Entomologica*, 2 vols. 8vo, Leipzig, 1862-63. And it should be added here, that since the publication of that work new writers have come forward, so that several scores of writers and hundreds of papers must be added to the lists enumerated in Dr. Hagen's vols. of 20 yrs. ago. The vast numbers of insects, their varied forms, beautiful and in many cases splendid colors, wonderful transformations, and their not less wonderful instincts and habits, and the intimate and important relations which they sustain to other animals and to man, combine to render the science of E. exceedingly fascinating and highly important, and worthy the attention it has received and is still receiving from the ablest minds.

The science of E. is of the highest importance, when considered merely from the so called practical point of view; for it teaches what kinds of insects are beneficial to man, and what kinds are injurious, and thus it shows him which to preserve and which to destroy. It makes him acquainted with the habits of insects, and thus enables him the better to preserve those that are beneficial, and to meet and resist the ravages of those that are injurious to the crops of the field, orchard, and garden, and of those which are injurious to the food and clothing in the storerooms and closets. The important relations, however, which insects hold to man, and the corresponding importance of E., are but little understood except by those who have given some attention to these animals, and to this fascinating and exceedingly important science. The masses of men little realize the fact that some kinds of insects destroy millions of dollars' worth of property annually in every country, and that other kinds furnish the world with many of the comforts and even with the luxuries of civilized life—with silks, satins, and velvets, and with dyes whose fame is as old as hist. and as wide as the civilized world, and even with every drop of black ink which flows from the pen of the schoolboy, accountant, philos., and poet. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. SANBORN TENNEY.]

Entomos-traca [Gr. *εντομον*, "insect," and *δοσρακον*, "shell"], a name variously applied, but by most Amer. naturalists restricted to crustaceans with a cephalothorax developed without gills, with mandibles and 3 pairs of maxillæ, 5 pairs of thoracic feet but no abdominal ones, and the young nauplius-like. Many become degraded, however, and are parasitic. As thus defined, the group includes the Copepoda and Siphonostoma (*Lernæa*, *Argulus*, *Caligus*). The species are numerous and of small size, and differ greatly in gen. form.

Entozoa [Gr. *εντος*, "in," and *ζωον*, "animal"], a name applied to those animals which dwell within the bodies of other animals. (See *PARASITES*.)

Entry, the act of entering. In criminal law, in addition to breaking, E. is necessary to constitute the crime of burglary, but this need not be with the whole body. If the hand or any part of the body goes into the building with in-

tent to commit a felony, it is sufficient; and if only the instrument intended to be used in the commission of the crime enters, it is enough to constitute the offence. (See *BURGLARY*.) In the law of real estate, E. is the taking actual possession of land. A writ of E. was a common-law action, now disused, to recover the possession of land from one who wrongfully withheld it. Any going upon the land of another is often termed an E., and unless done with the permission of the owner is in most instances unlawful and a trespass.

En'voy [from the Fr. *envoyer*, to "send" (that is, to "put or start on the way"), from *en*, "in" or "on," and *voie*, "way"], a person sent on any mission, but particularly one sent on business to a foreign court; a diplomatic minister of the second order. Beside the ordinary E., there is a class of diplomatists styled E. extraordinary and ministers plenipotentiary, who in U. S. diplomacy rank next below ambassadors and next above ministers resident. They are now accredited to the following nations: G. Brit., Fr., Rus., Ger., Aus., It., Sp., Chi., Brazil, Mex., Peru, and Chili.

Eny'o [Gr. *Ενυω*], the goddess of war in the Gr. mythology. (See *BELLONA*.)

Enzina, en-thee'nah (or *Encina*), de la (JUAN), a Sp. poet, b. 1468. In 1496 he pub. a vol. containing several comedies and odes and a poem. He is considered the founder of the Sp. theatre. Among his best dramas is *Placida y Victoriano*. D. 1534.

Eocene [from the Gr. *ἠώς* "dawn," and *καινος*, "recent," i. e., belonging to the dawn of the cenozoic period], in geol., a term applied to the lower tertiary strata, and originally suggested by the occurrence of a few faint dawnings of living species of fossils. The E. beds occupy small areas compared with the older formations. They contain many fossils of vertebrates, mollusks, radiata, etc. In Amer. the E. strata form a belt extending from N. J. around, parallel with the Atlantic and Gulf coasts, to the Miss., and are represented in the interior of the continent by estuary and fresh-water deposits of Wyo. Terr., etc. On the W. coast the E. has not been distinctly recognized. In E. Amer. the E. strata are divided into several beds, which contain numerous fossils, mostly marine mollusks, but also include some gigantic vertebrates, as *Zeuglodon cetoides*, 70 ft. in length, and *Carcharodon megalodon*, a shark of which the teeth are sometimes 6 inches long. Like the flora of the European E., they indicate a tropical or sub-tropical climate. The E. beds of Wyo. have furnished the remains of a group of mammals, which are thought by Prof. Marsh to form a new order, which he has named "Dinocera." The largest of these (*Dinoceras mirabilis*) had the bulk of an elephant, and was provided with 3 pairs of horns and a pair of great sabre-like canine teeth.

Eon de Beaumont, d', da-on deh bō-mon' (CHARLES GENEVIÈVE LOUIS AUGUSTE ANDRÉ TIMOTHÉE), called **Chevalier d'Eon**, a Fr. diplomatist, b. at Tonnerre Oct. 5, 1728. He was employed in a mission to Rus. 1755, and served as capt. in the Fr. army 1759. About 1761 he became minister plenipotentiary in Lond., but he was soon deprived of that office. He remained in Eng. for many yrs., during which much sensation was excited by a report that he was a female. He returned to Fr. in 1777, after which he wore the female dress, in compliance, it is said, with the order of the king. D. May 21, 1810.

E'os [Gr. *ἠώς*, the "dawn"], in Gr. mythology, a daughter of Hyperion, a sister of Helios (the sun) and the wife of Tithonus. She corresponds to the Lat. Aurora, the goddess of the morning.

Eosine, an artificial dyestuff. See *PTHALIC ACID*.

Edt'vös, or **Eoetvöes** (JOSEPH), FREIHERR VON, a Hungarian author and statesman, b. at Buda Sept. 3, 1813, was ed. at the Univ. of Pesth. About the age of 20 he produced *Revenge*, a tragedy, and 2 successful comedies. His *Carthusian*, a novel, was generally admired. He also gained distinction as a political writer and orator. He was minister of public instruction in 1848, but he resigned the same yr. In 1865 became ed. of a political paper. In 1867 he was again appointed minister of public instruction. D. Feb. 2, 1871.

Eozo'on [from the Gr. *ἠώς*, "dawn," and *ζωον*, "animal," implying an animal existing at the dawn of creation], according to Dawson and Carpenter, the oldest animal, its remains having been found in the Laurentian rocks of Canada, and referred to the Foraminifera. By others the organic character of E. is denied.

Epact [Gr. *ἐπακτός*, "added," from *ἐπάγω*, to "bring to"], the excess of the mean solar month (the 12th part of a tropical yr.) over the mean lunar synodical month, or mean lunation; i. e. inasmuch as the mean lunation is less than the mean solar month, the E. is properly the amount to be added to the former to bring it up, or make it equal to the latter. Practically, in the Ch. calendar, however, the E. is the number of days which intervene between the end of the ecclesiastical yr. in Dec. and the first day of Jan. succeeding; or, as it is commonly expressed, the E. is the age of the moon, estimated in entire days, at the beginning of the civil yr. According to the definition given first above, it is manifest that the E. must increase from month to month, but for the purposes of the ecclesiastical calendar this monthly increase is not considered; the entire increase for each yr. being supposed to take place at the end of the yr. This calendar is extremely artificial, the calendar moon being a sort of fiction of which the periods only approximately correspond with those of the moon in the heavens; so that the calendar months and the true or mean astronomical lunar months rarely begin or end exactly together. In the reckoning of the E. the following arbitrary assumptions are made: 1. The mean synodical month is 29½ days long (it is, in fact, 44 minutes 2.84 seconds longer). 2. The lunar yr. consists of 12 lunar months, or 354 days. 3. The solar yr. is always 365 days (it is really 5 hours 48 minutes 46.0544 seconds longer). 4. The calendar months are alternately 30 days and 29 days long. Thus, the first day of the 2d

ecclesiastical month is the 31st of Jan.: the first day of the 3d ecclesiastical month is the 1st of Mar.: of the 4th, Mar. 31st; of the 5th, Apr. 29th, and so on. Thus, the last day of the lunar yr. is Dec. 30th: so that if new moon occurs at the beginning of the civil yr. exactly, the E. at the beginning of the next civil yr. is 11. In another yr. this E. will be doubled, and become 22; and at the end of a 3d it will be 33 days, or more than a month: so that on the 1st of Jan. the moon will be somewhat advanced in a 2d lunation. The completed lunation is counted 30 days, and the E. is thus reduced to 3 days at the beginning of the 4th yr. The month thus passed over, or dropped, is called an *embolismic* month. As the E. accumulate, 6 such embolismic months of 30 days each are dropped; and finally we reach a point where the E. is 29, which we consider to be a complete embolismic month also, and drop it: so that the next following yr. begins with the E. 0, like the first. This occurs at the end of the 19th yr., so that in every cycle of 19 yrs. the E. recur in the same order. (For the more full discussion of this subject, see same title in *J.'s Univ. Cyc.*) F. A. P. BARNARD.

Epaminondas [Gr. Ἐπαμεινώνδας or Ἐπαμεινώνδας, a Gr. statesman and gen., b. at Thebes about 418 B.C. His youth was passed in retirement and study. In 385 he served with distinction at the battle of Mantinea, after which he passed many yrs. in private life. He was one of the deputies sent by Thebes in 371 B.C. to a cong. of the Gr. states, in which he opposed the policy of Sparta. War ensued between Sparta and Thebes; E. was chosen commander of the Theban army, and defeated the Spartans at the battle of Leuctra, July 6, 371 B.C., owing his success partly to his novel manoeuvres and combinations. He invaded Peloponnesus in 369, and marched against Sparta, which was defended with success. He commanded the Theban army which defeated the Spartans at Mantinea July 3, 362 B.C., and he was killed in this action.]

Épée, de P., *deh là-pâ* (CHARLES MICHEL), Abbé, a Fr. teacher of the deaf and dumb, b. at Versailles Nov. 25, 1712. He was a Jansenist preacher, and for some time canon at Troyes. About 1755 he began to devote himself to the instruction of the deaf and dumb. He is said to have been the first who used the lang. of signs in their education, on which subject he wrote several treatises. D. Dec. 23, 1789.

Epeirus. See **EPÍRUS**.

Ephab, a Heb. measure of capacity containing 27.83 pints, or 3 Eng. pecks and 3 pints.

Epheméride [Gr. ἐφημερίς, "lasting for a day"], a family of neuroptera allied to the dragon-flies, and with a long, slender body provided with two or three caudal filaments, the hind wings much smaller than the front, and the mouth parts rudimentary. In the larva and pupa states they live nearly a yr. or even more in the water, but their existence in the perfect state is very brief. They are used by anglers as bait, and are known as may flies.

Epheméris [Gr. ἐφημερίς, a "diary"], **Astronomical Ephemeris**, **Nautical Almanac**. Ephemeris and almanac are applied to 2 distinct classes of publications. An almanac is usually an annual which gives a calendar of the civil and ecclesiastical divisions of the yr., with the dates of festivals and fasts and other days of special commemoration, and for each day or some longer interval the times of passing the meridian and of the rising and setting of the sun, moon, and prin. planets, and their places in the zodiac, together with the phases of the moon and the times of eclipses and other important astronomical phenomena. With these is combined a variety of other matter, according to the special object of the publication.

An E. of a fixed star is a table of its apparent right ascension and declination at equal intervals of time. An E. of a primary body of the solar system gives for each day, or for some regular longer or shorter interval, its direction and distance from the earth or sun, or both. The apparent semi-diameter, horizontal parallax, phases, and degree of brilliancy may also be given at stated intervals. The ephemerides of satellites give their positions with reference to their primaries, with their occultations, eclipses, and transits.

An astronomical E. is a collection of ephemerides for a particular yr. or a series of yrs., with the times of eclipses, occultations, and other astronomical phenomena, or the means of determining them. The more complete works of this kind are intended to furnish the astronomical observer, whether at an observatory, in the field of a survey, or at sea, with all the data relating to the sun, moon, planets, and some of the prin. fixed stars, which he needs to facilitate the prosecution of his work. From the design of some of them, and the special adaptation of portions to the wants of navigators, they are also called "nautical almanacs." Although prepared for a particular meridian, they can readily be adapted to any other by interpolating for the difference of lon. or of the local times of the 2 meridians. [From *orig. art.* in *J.'s Univ. Cyc.*, by PROF. J. H. C. COFFIN.]

Ephe'sians, **The Epistle of Saint Paul to the**, was written probably in the yr. 61 or 62, during the apostle's first imprisonment at Rome, and about the same time with the Epistle to the Colossians. Of the many commentaries which have been written, those of Harless (Ger.) and Eadie (Scotch) are among the best.

Éphestus [Gr. Ἐφεσός], one of the 12 cities of the Ionian confederation, on the river Cayster, which falls into the Gulf of Scala Nova on the W. coast of Asia Minor. Its earliest traditions connect it with the birthplace of the goddess Diana. Amazons are said to have been the earliest priestesses of Artemis (Diana), and Herodotus tells us that Hercules founded a city in the Ephesian terr. B.C. 1250. Androclus the Athenian (B.C. 1044) drove out the inhabs. and established a Gr. colony. E. increased in importance with the culture of the worship of Diana, became the chief mart of Asia and the metropolis, and was in turn ruled by tyrants, oligarchies, and republics. It paid tribute to Per. for 2 centuries from the time of Cyrus (B.C. 558-529) to Darius

III. It was chiefly remarkable for its magnificent temple of Diana, which was burned by Eratosthratus in B.C. 356. The Romans finally possessed themselves of this and other cities in Asia Minor (B.C. 41), and under Cæsar Augustus and the succeeding emps. E. was rebuilt. It was sacked by the Goths A.D. 262. The temple was then destroyed, and from that time the city declined in importance. The explorations directed by Mr. John T. Wood for the Brit. govt. from 1863 to 1874 resulted in very important discoveries; 462 Gr. and Lat. inscriptions were brought to light, and the remains of the famous temple were discovered 22 ft. below the present surface. He found remains of 3 temples which were built successively on the same site. N. E. of the city the foundations and some of the cellar walling of the temple built B.C. 500 were found. Four ft. above the pavement of this temple was found the pavement of the one burned by Eratosthratus, and the pavement of the peristyle of the last temple was found 7 ft. 6 inches above the most anc. of these 3. The last temple was 164 ft. wide, 343 ft. long, with 100 columns in the peristyle; 36 of these were sculptured with figures life-size, some of the columns having as many as 10 figures in their circumference. The large theatre was 495 ft. in diameter, and seated 24,500 persons. The Odeon was 153 ft. in diameter, and seated 2000 persons. [From *orig. art.* in *J.'s Univ. Cyc.*, by JOHN T. WOOD.]

Ephial'tes, a famous giant in the Gr. mythology, said to have been a son of Neptune.

Eph'od [from the Heb. *aphad*, to "put on"], a Jewish robe or tunic worn originally by the high priest, afterward by all priests. The E. of the high priest had a breastplate attached to it containing 12 precious stones, on which were engraved the names of the 12 tribes.

Eph'ori, or **Eph'ors** [Gr. ἐφοροι (sing. ἐφορος, from ἐφί "on" or "over," and ὀραω, to "see"); Lat. *ephori*], the title of magistrates in many of the states of anc. Gr. In Sparta they exercised supreme power. They were 5 in number, and were elected for 1 yr. from the body of the ruling caste. Beside their judicial authority, they exercised a control over the functions of the kings and the senate, negotiated treaties, and possessed nearly all the executive power of the govt.

Ephraem or **Ephraim**, THE SYRIAN [Lat. *Ephraem Syrus*], an ecclesiastical writer, b. probably about 308 A.D., at Nisibis, in Asia Minor. He was a zealous opponent of Arianism, became a hermit, in the prime of life, lived in a cave near Edessa, and was venerated as a saint and a prophet. He wrote in Syriac numerous religious works, among which are hymns and commentaries on Script. D. about 373 A.D.

Ephraim, one of the Heb. patriarchs, the second son of Joseph, and the head of one of the 12 tribes of Israel. The terr. of the tribe extended from the Jordan to the Mediterranean, and was bounded N. by Manasseh, S. by Benjamin and Dan, and was about 55 m. from E. to W. by 70 from N. to S.

Epicharmus [Gr. Ἐπίχαρμος], a Gr. poet and philos., b. in the island of Cos about 540 B.C., was a pupil of Pythagoras; passed the greater part of his mature life at Syracuse. He wrote, beside dramas, treatises on philos., mythology, etc. His works are not extant. D. about 450 B.C.

Épic Po'etry, or **The Épos**, is that class of poetry which relates the hist. of a series of events. It is chiefly of a narrative nature. In a wider sense, E. P. comprises the ballad, the romance, and even the fable, but in its more limited use it may simply denote the popular legends and tales of a nation or tribe which have been collected and arranged. Of the Gr. epics, 2 only, the *Iliad* and the *Odyssey*, have come down to us. Until the close of the last century, Homer was regarded as the original author of these epics. But in 1795 F. A. Wolf broached the theory that the so called poems of Homer were not the work of one, but of many poets. They appear to be, to some extent at least, a collection of Gr. legends and tales, arranged by the master-mind of a great poetical genius. A similar origin must be predicated for the Hindoo epics *Râmâyana* and *Mahâbhârata*, the *Shah Namah* of the Per. Firdousee, the Finnish *Kalevala*, and the Gr. *Nibelungen*. The origin of the epic indicates what must be its character. As the poetical summation of the popular legends of a race, it will embody them in such a manner as to form a complete picture, taking from the primitive hist. a prominent fact as a central figure around which the separate legends are grouped. A modified form of the epic has been attempted by single poets, as by Virgil and Lucan, and in more modern times by Dante, Ariosto, Tasso, Camoens, Milton, and Klopstock. (See ZIMMERMANN'S *Ueber den Begriff des Épos*.)

Épictète's [Gr. Ἐπίκτητος], an eminent Stoic philos., b. at Hierapolis, in Phrygia, about 60 A.D. He was in his youth a slave at Rome, but became a freedman; was banished from Rome by Domitian in 89 A.D., after which he lived at Nicopolis in Epirus. He acquired a high reputation as a teacher of philos. His disciple Arrian collected his maxims and doctrines in 4 books, and a Manual (*ἐγχειρίδιον*) of his philosophic precepts. (See FARRAR, *Socrates and his school*.)

Epicure'an Philos'ophy, a system of philosophical teaching which took its name from Epicurus (347-270 B.C.), its founder. It originated in a reaction against the teachings of Socrates and his followers. Throughout the period of Gr. decline and the last ages of republican Rome it exercised a profound influence, which was perpetuated through the days of the Rom. empire, in spite of the opposition of Stoicism and of Christianity. It is a remarkable fact that it always remained substantially as Epicurus left it. The writings of Epicurus are lost, with the exception of fragments chiefly preserved by Cicero, Seneca, and Diogenes Laertius, but the sublime poem of Lucretius, *De Rerum Naturâ*, is an exposition of the teachings of Epicurus.

In theol., Epicureanism was essentially atheism. The gods were eternal, immutable, and entirely unconscious of human affairs. Human responsibility for wrong-doing was

consequently reduced to the minimum. The highest positive duty was made to be the pursuit of pleasure—not necessarily sensual enjoyment, for Epicurus himself taught that repose was the highest pleasure. Whatever the virtues of Epicurus may have been, the results of his system of ethics were thoroughly bad. The moral corruption of anc. Gr. and Rome was in part the fruit of this system. The genial temper, the elegant habits of life, and the moral indifference exhibited in the writings of Horace were among the least objectionable of the effects of the widespread Epicurean teachings. It is not too much to assert that Epicureanism produced not one thoroughly admirable character in anc. hist. The phys. doctrine taught by Epicurus and Lucretius was not unlike that of certain modern evolutionists. They held that matter is uncreated, indestructible, and that all material things were self-evolved, without a supervising or directing intelligence. (See GASSENDI, *Syntagma Philosophiæ Epicuri*, and HENNE'S *Epicure in the Dictionnaire des Sciences Philosophiques*.)

Epicurus [Gr. Ἐπίκουρος], a Gr. philos., the founder of the Epicurean sect, b. in the island of Samos in 337 (or, as some say, 341) b. c. He travelled in Ionia, and opened a school at Mitylene, where he taught new doctrines. About the yr. 306 he removed to Athens, where he purchased a garden and founded a celebrated school of philos. He was very popular as a teacher, and gained a great number of disciples. He recognized pleasure as the chief good, but taught that the gods live in a state of passionless tranquillity, and give no attention to the affairs of men. He wrote numerous works on ethics, natural philos., etc., which are not extant, but several of his letters have been preserved by Diogenes Laertius. Our knowledge of his doctrines is derived chiefly from the works of Cicero, and Lucretius in his poem *De Rerum Naturâ*. D. 270 b. c.

Epicycle [Gr. ἐπί, "upon," and κύκλος, a "circle"]. In anc. astron., the alternate direct and retrograde motions of the planets were explained by supposing each planet to move uniformly around a circle whose centre was carried uniformly around a second circle. The first of these circles was called the *epicycle*, and the second the *deferent*.

Epicycloid [Gr. ἐπί, "upon," κύκλος, "circle," εἶδος, "form"]. If one circle is rolled along a second circle on its convex side (both being in the same plane), the curve generated by any point in the circumference of the first circle is an *epicycloid*. The curve generated by any other point in the plane of the rolling circle is an *epitrochoid*. Both the E. and the epitrochoid belong to a class of curves called *roulette*s.

Epidamnus. See DURAZZO.

Epidaurus [Gr. Ἐπίδωρος], an anc. town of Gr., on the E. coast of the Peloponnesus and on the Saronic Gulf, about 45 m. S. W. of Athens. It was an independent state, and possessed a small terr. called *Epidauria*. As early as 600 b. c. it was one of the chief commercial cities of the Peloponnesus. It derived importance from its temple of Æsculapius, 5 m. from the town, which was frequented by patients from all the Hellenic states. Here are the ruins of a magnificent theatre, 370 ft. in diameter, which are said to be in better preservation than any other in Gr. Once in 4 yrs. a festival was celebrated here in honor of Æsculapius.

Epigram. See APPENDIX.

Epilepsy [Lat. *epilepsia*; Gr. ἐπιληψία, from ἐπί, "upon," and λαμβάνω, to "take," to "seize"], a disease of the nervous system, in which there are occasional seizures or fits of sudden and complete loss of consciousness, usually associated with convulsions, which become clonic, and finally impede respiration. The attack may last from 2 to 20 minutes, and is followed by exhaustion and sleep. In other cases, called *petit mal* (Fr. for "little sickness"), the loss of consciousness is but momentary, and there is no convulsion or falling down, as in ordinary attacks. When occurring in childhood, and especially during the period of dentition, it may after a time be spontaneously cured. It is sometimes hereditary, and often is caused by various excesses, by blows on the head, or by excessive fright. During the paroxysm, place the patient where he cannot hurt himself, loosen his clothing, and give him plenty of fresh air. Between the paroxysms the patient should avoid all excesses of eating, of drinking, or of any other kind. Systematic exercise and gymnastics are often beneficial. Nutritious food, with avoidance of coffee, tobacco, and stimulants, is usually advisable. Of meds., the bromides of potassium and of ammonium are useful in warding off the attacks, and the continuous use of the bromides for a term of 1 or 2 yrs. will effect a cure in many cases. Tonics, such as iron, arsenic, and quinia, are useful in special cases, but in others are apparently worse than useless. E. D. HUDSON.

Epimachus. See PLUME-BIRD.

Epimenides [Gr. Ἐπιμενίδης], a Gr. poet and prophet, was a native of Crete, and flourished about 600 b. c. According to tradition, he fell asleep in a cave, and awaked after the lapse of more than 50 yrs., with a large increase of wisdom and inspiration.

Epimetheus [Gr. Ἐπιμηθεύς], in the Gr. mythology, was said to be a brother of Prometheus and the husband of Pandora. His name signifies "afterthought."

Epiphania. See HANUKA.

Epiphanius [Gr. Ἐπιφάνιος], SAINT, b. at Eleutheropolis, in Pal., about 310 A. D. He was ed. in Egypt, where he imbibed ascetic notions, and was afterward a disciple of Hilarion. In 367 he became bp. of Constantia in Cyprus. He was an adversary of Origen, and co-operated with those who deposed Chrysostom. He wrote a treatise against heresies, entitled *Panarion*, which is important for the hist. of the anc. Chr. Ch. D. 402 A. D.

Epiphany [Gr. Ἐπιφάνεια, from ἐπί, "on," "over," "before," and φαίνωμαι, to "appear"] Lat. *Epiphani'a*, a festival celebrated the 12th day after Christmas (Jan. 6), to commemorate 4 events: (1) Christ's baptism; (2) his birth; (3) his manifestation to the magi; (4) the manifestation of

his divinity in the miracle at Cana. Later, especially in the W. Ch., it popularly commemorated the visit of the 3 wise men to the infant Jesus. The eve of E., called "Twelfth Night" in Eng. and "Three Kings' Night" in Ger., was anciently a great popular festival.

Epiphyte [Gr. ἐπί, "upon," and φυτόν, a "plant"], plants which attach themselves to the bark of trees, and derive their nourishment chiefly from the air, whence the popular name of air-plant. They are found generally in tropical countries. The orchideous E. are cultivated in green-houses, many of them being of great beauty.

Epírus, or Epeírus [Gr. Ἠρεπρος, a country of anc. Gr., bounded E. by the chain of Pindus, S. by the Ambracian Gulf, W. by the Ionian Sea. It corresponds to the S. portion of the modern Albania, a wild and mountainous region which in all ages has been occupied by semi-civilized and robber tribes, called *Epirots* or *Epirotes*. The most celebrated king of E. was Pyrrhus (d. 272 b. c.), who waged war against the Romans. In It. E. became a Rom. prov. in 168 b. c., and was conquered by the Turks in 1466 A. D.

Episcopal Church, The Protestant, or "The Protestant Episcopal Church in the United States of America," a name assumed to distinguish it from those Chrs. who acknowledge the papal supremacy, and from those who reject the authority of bps. This Ch. is the descendant of that branch of the Ch. of Eng. which was established in the N. Amer. colonies in the 17th century. The Eng. adventurers of that and the preceding age carried their national religion with them, and introduced it wherever they gained a footing. Without tracing the hist. of the Ch. through the colonial period, it may be sufficient to say that it had in the yr. 1766 gained a respectable position. It had been all along obliged to contend with injudicious friends. The attempts which were made from time to time to procure bps. for Amer. had failed, and the Ch. was necessarily crippled in the performance of its functions. The want of bps. threw difficulties in the way of raising up a native ministry. Young men who sought holy orders were obliged to make a voyage to Eng. to be ordained. The smallpox in the 18th century was the scourge of the colonists who visited Eng.; and this disease carried off many of the youths of Amer. The devotion of colonial churchmen, however, to their religion continued firm.

At the beginning of the Revolutionary war there were in the Middle and E. States about 80 parochial clergymen. These gentlemen were for the most part dependent for their support upon the Society for the Propagation of the Gospel. This society withdrew its gifts after the termination of the war. In other respects the conclusion of peace left the Ch. in a depressed condition. Many of the clergy and laity had adhered to the Crown during the struggle, and at its close withdrew themselves to Eng. The peace was soon followed by the confiscation of the landed endowments of the Ch. in Va. The Ch. was poor, and its prospects were not hopeful. Two important measures were necessary—to obtain an episcopate, and to promote a closer union between the chs. in the several States. The first was necessary to the existence, the second to the well-being, of the Ch. A few clergymen from N. Y., N. J., and Pa. met at New Brunswick, N. J., to take measures for reviving an old society for the support of the widows and children of the clergy. They discussed the condition of the Ch. and made arrangements for a larger meeting to be held soon afterward in New York, to which representatives of the laity were to be invited. This meeting did little more than lay down certain gen. principles, and issue a call for a similar meeting to be held the next yr. in Phila. This was the beginning of the Gen. Convention, which has ever since been regarded as the governing body of the Ch. in the U. S. The const. of this body required it to consist of all the bps. and of 4 clergymen and as many laymen from each State. All the bps. were entitled to seats *ex officio*; and as soon as there should be 3 or more they should sit in a separate house. Every act was to receive the approbation of both houses. Authority was given to the Gen. Convention to prescribe the qualifications for ordination and to set forth a Book of Common Prayer. It was also directed that there should be a convention in every State, consisting of clergy and laity. This const. was adopted in the several States. But although it contemplated the presence of bps., there really were none in the U. S. except Bp. Seabury, bp. of Conn. and R. I. The rule of the Ch. requires the presence of at least 3 bps. at every consecration. Application was therefore made in 1786 to the Eng. bps. in behalf of the Rev. William White and the Rev. Samuel Provost, chosen to the episcopate in Pa. and N. Y. After a correspondence between some of the most learned divines in Eng. and the U. S., in which the principle was brought out that "this Ch. does not intend to depart from the Ch. of Eng. in any essential point of doctrine, discipline, or worship," it was agreed to proceed with the consecration of these gentlemen, and they were consecrated bps., on the 4th of Feb. 1789, by the Most Rev. John Moore, abb. of Canterbury, assisted by other bps. The Rev. James Madison obtained consecration in 1790 as bp. of Va. The Ch. has extended into every State and Terr., and its missionaries have penetrated W. Afr., Chi., and Japan. The number of chs. and chapels is estimated at about 2700. There is a gen. theological sem. in the city of New York, and there are divinity schools in Conn., O., Pa., Mass., Wis., and Minn. Several colls. are connected with this Ch. in Conn., N. Y., Wis., and N. J. The Univ. of the S. was begun a few yrs. ago.

The doctrine of the E. Ch. is that of the Ch. of Eng., believed to have been the common faith of Christendom while it continued undivided. The relations of this Ch. to the rest of Christendom were defined by the bps. who met in conference at Lambeth in 1867, to take into consideration the interests of the chs. of the Anglican communion. One of their first acts was to express the deep sorrow with which they viewed "the divided condition of the flock of

Christ throughout the world," and to record their conviction that "unity will be most effectually promoted by maintaining the faith in its purity and integrity, as taught in the Holy Scriptures, held by the primitive Ch., summed up by the creeds, and affirmed by the undisputed gen. councils; and by drawing each of us closer to our common Lord, by giving ourselves to much prayer and intercession, by the cultivation of a spirit of charity and a love of the Lord's appearing." The E. Ch., while it receives the Holy Scriptures as the ultimate rule of faith, does not throw them open to the varying interpretations of every man's private judgment, but explains them by the aid of traditions which it believes to have come down through an unbroken line of teachers from the apostles themselves, by the creeds, and by the definitions of Chr. doctrine made by the gen. councils. As men incline toward authority on the one hand, or individual judgment on the other, they are said to be High Church or Low Church. [From orig. art. in *J.'s Univ. Cyc.*, by REV. B. R. BETTS.]

Episcopus (SIMON), a Dut. divine whose original name was BISSCHOP, b. Jan. 1, 1583. He became chief champion of the Arminians or Remonstrants; was appointed prof. of theol. in the Univ. of Leyden in 1612, but was accused of Socinianism and was banished in 1618. He retired to Fr., returned to Hol. in 1626, and became rector of a coll. in Amsterdam in 1634. His prin. works are the *Confession of the Remonstrants and Institutions Theologice*. D. 1643.

Epistle e-pis'tl [Lat. *epistola*; Gr. *ἐπιστολή*, from *ἐπιστέλλω*, to "send"], literally, a thing sent, hence a letter. The name is now given especially to the 21 canonical E. of the N. T. The writings ascribed to the so called Apostolic Fathers are for the most part epistolary in form. Many E. now considered spurious, are contained in ecclesiastical hist. Among these are some attributed to Paul, one to Christ, and several to the Virgin Mary.

Epistola Obscuro-rum Viro-rum [Lat. for "letters of obscure men"], a collection of satirical letters directed against the R. Cath. Ch. They were pub. in 3 parts—the first at Haguenau (1515), the second at Bâle (1517), and a third at a later date. They were probably written jointly by Ulrich von Hutten, Crotus Rubianus, and Buschius and had a great influence against papal domination.

Epizoa [Gr. *ἐπί*, "on," and *ζῷον*, "animal"], a name given to animals living upon the skin and among the hairs of other animals, as fleas, lice, ticks, mites, etc. Some of these, like the itch-mites, are Acarina—spiders of low grade of development—but many are degraded and specialized forms of insects allied to Diptera and Hemiptera, while the cetaceans have crustacean E. Almost all mammals and birds and many insects are infested by different orders of E. The typical E. live as true parasites upon the blood and secretions of the animal they infest.

Epizootic [Gr. *ἐπί*, "upon," and *ζῷον*, an "animal"], a disease which attacks the lower mammals, or any one species of them. The so called E. diseases appear to attack especially the domesticated animals. Some attack both man and the lower animals. Thus, smallpox affects the horse, cow, and sheep, assuming in each a modified form. Among the more important E. diseases are the rinderpest, the contagious pleuro-pneumonia, and the "foot-and-mouth disease" (all attacking neat cattle); the remarkable influenza which attacked horses and mules, arising in Canada Sept. 30, 1872, and rapidly moving S. and W. over the whole of N. Amer.; the scab, foot-rot, and other diseases of sheep. Analogous are the "reds" and other diseases of the silkworm which have at times threatened the existence of the silk manufacture.

E pluribus Unum [Lat.], "One composed of many," the motto of the U. S., consisting of many States confederated.—Webster. [Lat.], "One of many," the motto of the U. S.; the allusion being to the formation of one federal govt. out of several independent States.—Worcester.

After the Declaration of their independence by the States was announced, July 4, 1776, and before the adjournment of that day's session, it was resolved, "That Dr. Franklin, Mr. J. Adams, and Mr. Jefferson be a committee to prepare a device for a seal for the United States of America." The result of their joint work was the present seal of the U. S., which has not been changed since its first adoption. The 6 sections, or quarters, upon the escutcheon or shield were intended to denote the countries (Eng., Scot., Ire., Fr., Ger., and Hol.) from which the States so united had been, respectively, chiefly peopled. The motto adopted on this seal, and which has ever since been retained, was intended to denote the character of the federal govt. in its formation, as stated by the great Amer. lexicographers, Webster and Worcester, in their above definitions. From the 6 quarters on the shield, with the necessary 7 attending spaces outside of the sections or quarters, arose the original 13 stripes, as they are called, which were transferred to the flag of the U. in 1777. The stars were intended to represent the number of the States, while the origin of the stripes was the quarters or sections of the shield, as stated.

ALEXANDER H. STEPHENS.

Ep'som, a market-town of Eng., 14 m. by R. R. S. W. of Lond. It has a mineral spring containing sulphate of magnesia, which derives from this place the name of E. salt. E. is famous for horse-races, which are held yearly on the Downs, 1½ m. S. of the town. The races last 4 days, one of them called "Derby Day," and are more numerous attended than any others in the kingdom. Pop. 6916.

Ep'som Salt [Lat. *magnesia sulphas* (i. e., "sulphate of magnesia"); Ger. *Schwefelsaure Magnesia*], the magnesium sulphate, a salt, when pure, containing 51.22 per cent. of water of crystallization. It was formerly manufactured from the waters of the mineral spring of Epsom, Eng. It also exists largely in sea-water. In it it is now prepared from a schistose rock, in Eng. from dolomite, in Pa. and Md. from magnesite. This salt is used in med. as a cathartic. In the household it is an excellent addition to starch; mixed with whitewash it gives a fine pearly whiteness to walls.

Equa'tion [Lat. *æqua'tio*, *æqua're*, to "make equal"], in algebra and the calculus, an expression denoting that 2 quantities symbolically expressed are equal. The sign = placed between the 2 quantities equated denotes this relation. Either quantity may be expressed in a single term, or in more terms than one, connected by the sign + or —. The term or terms on the left of the sign of equality constitutes what is called the first member of the E.; the term or terms on the right, the second member. In analysis there occur E. of 2 classes, distinguished as *algebraic* and *transcendental*. Algebraic E. are those in which the quantities employed are subjected to no operations but the operations of common algebra, including addition, subtraction, multiplication, division, and involution to powers or evolution of roots, expressed by constant indices. Transcendental equations are those whereinto relations are introduced to which the ordinary operations of algebra are inadequate, as when the exponents of powers are variable, or when the trigonometrical functions of variable angles enter as terms or factors. Such relations are called transcendental, and give name to the equations in which they occur. The object of algebraic equations is usually to ascertain the value of some unknown quantity through its relations to other quantities which are known. If there is but one unknown quantity, a single E. will suffice for the solution. If there are 2 or more, there must be as many E. expressing relations independent of each other as there are unknown quantities. If the number of independent E. is smaller than the number of unknown quantities, the prob. to which they belong is indeterminate. It can then be made determinate by forming a sufficient number of independent E. with arbitrary conditions. If the number of independent E. is greater than the number of unknown quantities, the prob. to which they are supposed to belong is impossible. In this case some of the conditions which these E. express are incompatible with each other; but if, after eliminating all the unknown quantities from them, we treat the constants which remain as if they were unknown—i. e., make them arbitrary constants—the resolution of the group with respect to these will show what relations they must have to each other, or the conditions which must exist, in order to render the original set of E. determinate. They are therefore called *E. of condition*; which term is generally applicable to all E. which express necessary relations between quantities, without any regard to their absolute value. F. A. P. BARNARD.

Equa'tion of Time, the difference between *apparent* and *mean* solar time. An *apparent* solar day is the interval between 2 successive culminations of the sun over any meridian; a *mean* solar day is the average value of the *apparent* solar day for an entire year. *Apparent* solar days are unequal for 2 reasons: the *first* reason is that the sun's motion in its orbit is not uniform, and the *second* reason is that uniform motion in the orbit would not give uniform motion in the equinoctial. To take account of these 2 causes of inequality, astron. have made use of 2 imaginary or mean suns: the *first* sets out from perigee with the true sun, and revolves uniformly in the plane of the ecliptic, returning to perigee with the true sun; the *second* sets out from the vernal equinox with the first and revolves uniformly in the equinoctial, returning to the equinox with the first mean sun. The motion of the first mean sun takes account of the true sun's irregularity of motion in the ecliptic, and that of the second takes account of the irregularity of motion of the first with respect to the equinoctial. Time as determined by the second mean sun is *mean solar time*; the difference between it and *apparent solar time* is the E. of T. W. G. PECK.

Equa'tor [Lat. from *æquo*, to "make equal"], in geog., a great circle of the earth perpendicular to the axis; in astron., the celestial E. is the great circle of the celestial sphere whose plane coincides with that of the geographical equator.

Equato'rial Telescope, a telescope mounted so as to turn around 2 axes—one parallel to the axis of the earth, and the other parallel to the equator. By means of the latter the telescope may be set to any declination, and by means of the former, around which the telescope is turned by clock-work, the instrument may be made to follow a star or other heavenly body.

Equatorial Current. See CURRENTS, MARINE.
Equestrian Order [Lat. *ordo equest'ris* or *equites*, the plu. of *eques*, a "horseman"], also called **Knights**, the name of a division of the citizens of anc. Rome. They were originally a military organization, and formed the cav. of the Rom. army. Down to 123 a. c. the equites formed simply a division of the army, and were composed of patricians and plebeians, but C. Gracchus in that yr. procured the passage of a law which instituted a new political order called *ordo equest'ris*, from whom all the *judices* (judges) must be selected. The reform of Sulla deprived them of the sole right of being chosen as judges. The equites also enjoyed the privilege of officiating as *publicani* or farmers of the public revenue. According to Cicero, these publicani "comprised the flower of the Rom. chivalry, the ornament of Rome, the firm support of the republic."

Equi'dæ [Lat. *equus*, "horse"], a family of perissodactyl ungulates whose most characteristic feature is the excessive development of the median digit and hoof and the atrophy of the lateral ones, the elongated jaws and molar teeth, and the invaginated incisors. The recent species belong to 2 genera—*Equus* and *Asinus*. A number of species have been described from the tertiary and quaternary deposits of Amer., but none existed in the New World at the time of the advent of the Europeans. (See HORSE.)

Equinoctial. See EQUINOXES.

Equinoct'ial Points, the 2 opposite points of the celestial sphere in which the ecliptic and equator intersect each other. These points do not retain a fixed position in relation to the stars, but retrograde from E. to W. with a slow motion, requiring 25,000 yrs. to accomplish a complete

revolution. This motion is called the "precession of the equinoxes."

Equinoxes [Lat. *æquus*, "equal," and *nox*, "night"], the times at which the sun is in the equinoctial—i. e. the 21st of Mar. and the 23d of Sept.; at the former date the sun crosses the equinoctial from S. to N., and at the latter date it crosses from N. to S. The first of these is called the *vernal*, and the second is called the *autumnal* E. At the E. the days and nights are equal.

Equities. See EQUESTRIAN ORDER.

Equity, *ek-we-te* [Lat. *æquitas*, "equality," "justice," from *æquus*, "just," "even," "equal"]. This word is used to indicate a portion of the mass of Eng. jurisprudence, derived from the decisions of courts and the rules of approved text-writers. It originated in the same gen. way as that branch of jurisprudence technically called "common law." It is, in a sense, common law itself when considered in contrast with statutes. When Eng. jurisprudence had assumed a precise and fixed character, there were 2 sets of tribunals, called respectively courts of common law and courts of E. In some cases the jurisdiction of the 2 courts was concurrent; in others the E. court had exclusive authority, as in the case of trusts. The courts differed in 3 prin. respects: 2 of these were in matters of procedure, while the third distinction was radical and substantial. They differed as to the mode of proof and of trial, and in respect to the nature of the relief granted. The first two distinctions have been largely modified in this country in a considerable number of the States. In these law and E. are administered by a single court and under the same system of pleading, so that there is no distinction between an action at law and a suit in E. Even in these States the difference in relief still continues. When the action is for the recovery of money only, or of specific real or personal property, a writ issues to the sheriff to carry the judgment into effect. In other (or E.) actions, as when a defendant is required to execute or cancel a written instrument, or to refrain from doing an act, the order of the court is directed to him; and if he wilfully disobeys it, he may be punished for contempt of court. This consolidation of law and E. was first attempted in a "code of procedure" adopted in N. Y. in 1848. This has been substantially enacted in a number of other States, and has had much effect upon legal opinion in Eng. Courts of E. have adopted certain maxims which have had a large influence on the development of the system. They are such as these: (1) E. follows the law; (2) He who comes into E. must come with clean hands; (3) He who asks E. must do E.; (4) Where the equities are equal, the legal title must prevail; (5) Equality is E.; (6) E. regards that as done which ought to be done.

The remedies in this court are flexible and readily adapted to the exigencies of the case. The most liberal rules prevail as to parties. Every person can be made a party whose presence is necessary to a complete determination of the matter in controversy. The court has power to prevent apprehended injuries to property by means of an injunction, or to place the property itself in the possession of one of its own officers, termed a receiver, until the rights of the parties are finally established. The tendency of modern times would seem to be to blend the 2 systems of common law and E. jurisprudence into one, when the common law will prevail as modified by the rules of E. T. W. DWIGHT.

Equity of Redemption, the right which the owner of mortgaged property has to redeem it after the condition of the mortgage has been broken. A mortgage is in form a conveyance of property, with a provision that it shall be void on the performance by the maker, within a given time, of a certain condition, usually the payment of a sum of money; and by the common law, if the condition is not performed the conveyance becomes absolute, and the maker of the mortgage, called the mortgagee, loses all right to the property. But the Eng. court of chancery, an equity tribunal, as early as the reign of Charles I. asserted its power to remedy this hardship by compelling the mortgagee to give up the land on payment of the debt with interest. This right in equity to redeem the property after the conveyance has become absolute at law has in modern times come to be regarded as an estate in the land, and can be conveyed or mortgaged or devised by its owner. It passes by descent to his heirs; it is liable for the debts of his creditors, and can be sold on execution against him, and is subject to dower and courtesy. This right to redeem lasts till cut off by foreclosure of the mortgage, which is usually effected by an action in a court of equity. The foreclosure may result in giving a complete title to the mortgagee (called a *strict* foreclosure), or it may result in a sale of the premises and the payment of the debt out of the proceeds, the surplus being returned to the mortgagee or to those who claim under him. The right to redeem from the mortgage extends to all who acquire an interest in the land under the mortgagee after the making of the mortgage; and all such persons must be made parties to a proceeding to foreclose the mortgage, otherwise their right to redeem will not be affected. Formerly, unless restrained by some clause in the mortgage, the mortgagee could at once take possession of the premises, although equity compelled him to account for the rents and profits upon redemption. Now, however, the mortgagee has in gen. the right of possession till the condition is broken, and in some States till foreclosure, except when after default, where the security is inadequate, a receiver is appointed to take charge of the property under the direction of the court.

T. W. DWIGHT.
Equivalents, Chemical. See ELEMENTS, CHEMICAL, and CHEMISTRY.

Equus. See EQUIDE.

Érard, Christian. See CHRISTIAN ERA.

Érard (SÉBASTIEN), an inventor and maker of musical instruments, b. in Strasbourg Apr. 5, 1752, was the son of a

poor cabinet-maker. His first pianoforte was constructed in 1780. He soon became the best pianoforte manufacturer in Europe, and in connection with his brother established a manufactory in Lond. The grand piano, with single and double action, was his invention. He built the great organ for the royal chapel of the Tuileries; was inventor of a double-action harp, and took out patents for many other valuable improvements. D. 1831.

Érasis-tratus [Gr. *Ἐραστρατος*], an eminent Gr. phys. and anatomist, is supposed to have been b. in the island of Ceos. He flourished about 300-260 a. c., and taught anat. and founded a school at Alexandria. He wrote several works, which are not extant.

Eras-mus (DESIDERIUS), Fr. *Didier* or *Desiré Érasme*, a Dut. scholar and philos., b. at Rotterdam Oct. 28, 1465. He was a natural son of Gerard Praet, and was called in his childhood GERHARDUS GERHARDI, which he exchanged for Lat. and Gr. equivalents, each signifying "the well beloved." Having become an orphan about 1478, he was urged by his guardians to enter a monastery. He was induced in 1482 or 1483 to enter the Augustinian convent of Stein, where he distinguished himself as a Lat. scholar. He became in 1492 a priest and sec. to the bp. of Cambray, with whom he remained nearly 5 yrs., and in 1496 went to Paris, where he gained a subsistence by teaching. Between 1498 and 1500 he passed about 2 yrs. in Eng. In 1508 he commenced a tour in It., where he perfected his knowledge of the Gr. lang. He revisited Eng. in 1511, and was appointed prof. of Gr. at Cambridge. In 1511 he pub. *The Praise of Folly*, a satire, in which he exposed the follies and foibles of monks, priests, and others. Having established his reputation as the most eminent scholar of his time, he received invitations from several monarchs, and in 1514 or 1515 visited the court of the archduke Charles (afterward Charles V.), who gave him a pension of 400 florins, and liberty to reside wherever he might prefer. He produced in 1516 a good ed. of the Gr. N. T.—the first ed. ever printed—with a corrected Lat. version and notes. He was on friendly terms with Luther in the first stage of the Ref. But he was too moderate to please the zealous supporters of either side, and dissented from some of the doctrines of Luther, who denounced him as a coward and time-server. He became a resident of Bâle about 1515, and in 1524 was engaged in a controversy with Luther on the subject of Free Will. In 1527 he put forth his famous *Colloquies*, and in 1529 took up his abode at Freiburg, where he remained some yrs. He was condemned as a heretic by the Sorbonne of Paris, but never formally revolted against the pope. He excelled as an ed. of the Gr. and Lat. classics, and his numerous *Epistles* contain valuable materials for lit. hist. (See CHARLES BUTLER, *Life of Erasmus*.) D. at Bâle July 12, 1536.

Eras-tians, a name given to the adherents of the Swiss phys. Erastus on ch. discipline. He opposed the use by Prot. chs. of ecclesiastical censures and punishments, and held that the Ch. ought merely to decide who by soundness of faith were to be regarded as members, but should not take upon herself to punish moral offences by withholding her privileges. During the conflict in the Ch. of Scot., which led to the establishment of the Free Ch., those who maintained that the Ch. had no power to nullify by law the operation of lay patronage were called by their opponents Erastians, but they protested against this use of the word.

Eras-tus (THOMAS), a Swiss phys. and theol., whose proper name was LIEBLER or LIEBER, b. at Baden (according to others, at Angen, near Badenweiler) Sept. 7, 1524. He took the degree of M. D. at Bologna, and wrote several med. treatises; was appointed phys. to Frederick, the elector palatine, and was for many yrs. prof. of med. at Heidelberg. He advocated the Zwinglian views of the Lord's Supper and of ch. discipline, and was charged with Socinianism, but without just ground. In 1580 he obtained a chair of moral philos. at Bâle. His views on ch. discipline excited much controversy. D. Dec. 31, 1583.

Er-ato [Gr. *Ἐρατώ*], the 6th in order of the Nine Muses. She was the muse of the poetry of love, that being the significance of her name.

Eratos-theus [Gr. *Ἐρατοθέης*], a celebrated Gr. astron. and geometer, b. at Cyrene in 276 b. c., was a pupil of Callimachus the poet. He became supt. of the library of Alexandria in the reign of Ptolemy Euergetes, and rendered important services to the sciences of astron. and geog. He wrote numerous works on philos., hist., gram., etc., but only fragments are extant. D. about 196 b. c.

Erb-ium, a rare earth-metal.

Erckmann-Chatrian is the name of two Fr. novelists—Erckmann, b. at Pfalzburg, Alsace, May 20, 1822, Chatrian at Soldatenthal, close by, Dec. 18, 1826—whose works are jointly produced, and whose names, like those of Beaumont and Fletcher, are inseparably united. Among their novels, *The Story of the Peibiscite*, related by one of the 7,500,000 who voted Yes (1872), produced a great sensation; *Histoire d'un Conscrié* de 1813, *L'Invasion*, etc., also attracted much attention. Among their plays, *Le Juif Polonais* and *L'Ami Fritz* were much applauded.

Er-ebus [Gr. *Ἐρεβος*], in classic mythology, the son of Chaos; also the name of a dark and gloomy region through which souls were supposed to pass after death.

Erebus, Mount, and Mount Terror, 2 volcanoes in S. Victoria Land, in lat. 77° S., discovered by J. C. Ross Jan. 27, 1841. Mt. E., 12,400 ft. high, is, as far as is known, the nearest volcano to the S. pole, and when discovered was emitting flame and smoke. Mt. T., 10,900 ft. high, is believed to be an extinct volcano. These mts. were named from the ships in which Ross's expedition sailed.

Erech-the-um [Gr. *Ἐρεχθειον*], a sacred edifice on the Acropolis of Athens, consisting of the 2 temples of Athena Polias and Pandrosus. It was burned by the Pers., rebuilt about 393 b. c., and became the most sacred of all the Athenian sanctuaries. The renewed E. was a most beautiful structure of the Ionic order. It anciently contained a salt-

well made by Poseidon's trident, also the sacred olive tree of Athena; and the olive-wood image of that goddess, which is fabled to have fallen from the sky. The ruins of the E. stand N. of the Parthenon, and are among the most interesting relics of antiquity.

Erechtheus (Gr. *Ἐρεχθεύς*), a hero of anc. Gr. legends, said to be a son of Pandion and father of Cecrops; was king of Athens, and was sometimes called *Erichthonius*.

Erfurt, or **Erfurth** [Lat. *Erphordia* and *Erfortum*], a town of Prus. Sax., on the river Gera and the Thuringian R. R., 15 m. W. of Weimar, 14 m. E. of Gotha. It is defended by 2 citadels, and is important as a military position. It has an old Gothic cathedral with a bell which weighs 275 cwt., a royal acad., a public library of about 50,000 vols., and an edifice formerly occupied by the Univ. of E., founded in 1392 and closed in 1816. Here was the Augustine convent of which Luther was an inmate for several yrs.; it is now used as an orphan asylum. Pop. 1880, 53,254.

Ergot [from the Fr. *ergot*, a "cock's spur"; Late Lat. *ergota*; Ger. *Mutterkorn*], or **Spurred Rye**, a fungus, the compact mycelium of the *Claviceps purpurea* growing frequently in the heads of rye, though found on all grasses and some Cyperaceae. It was long believed to consist of diseased kernels of rye, but microscopical examination shows that it has nothing at all in common with the rye. E. is generally procured from rye after threshing. It is usually shaped somewhat like a cock's spur, and is from $\frac{1}{2}$ inch to $1\frac{1}{2}$ inch long. It is used in med., especially for the purpose of exciting uterine contractions in child-bearing. The contractions induced by E. differ from the natural uterine effort, which is intermittent, with intervals of more or less perfect rest, while E. causes a uniform and constant expulsive effort. In skilled hands it is a remedy of great value.

Eric XIV., king of Swe., b. Dec. 13, 1533, was a son of Gustavus Vasa, whom he succeeded in 1560. He made an overture of marriage to Queen Elizabeth of Eng., but he married a Swe. peasant. He was capricious, momentarily insane, and always addicted to violent paroxysms of anger. In his reign Swe. was involved in a war against Den. Several noblemen were unjustly put to death by his order. A conspiracy was formed against him by his own brothers and other nobles, who deposed him in 1568, and confined him in prison, where he d. Feb. 16, 1577.

Ericsson, eriks-son (JOHN), LL.D., a mechanic and inventor, b. in Swe. July 31, 1803; was appointed at the age of 11 to a cadetship in the engineer corps. In 1826 he visited Eng. to introduce a "flame engine" of his own invention, but though it worked with a wood-fire, it failed when coal was used. He made improvements in steam boilers, and in 1829 produced a locomotive, the "Novelty," which ran 50 m. an hour, winning a prize of £500. He made a steam fire-engine 1832, and a hot-air engine 1833. He also first successfully applied the screw to the propulsion of steam-vessels; but the invention not being well received in Eng., he came in 1839 to New York, and the U. S. screw-steamer Princeton was built under his direction. In 1852 the ship Ericsson, propelled by hot air, was launched. He has also invented a "solar engine," a pyrometer, an alarm barometer, a sea-lead, a hydrostatic gauge, and other ingenious instruments. Mar. 9, 1862, his iron-clad vessel, the Monitor, just built, attacked and repulsed the Confed. iron-clad ram Virginia. E. first successfully employed the armed turret in naval ship-building.

Eric the Red, a reputed discoverer of Amer., was a Nor. who emigrated to Iceland about 982 A. D. He made a voyage to Greenland, and there founded a colony. In 1000 A. D. his son Lief sailed southward, visiting a country called by him Markland (perhaps N. S.), and another called Vinland, which appears to have been S. E. N. Eng.

Erie, city and important R. R. and commercial centre, cap. Erie co., Pa., is the only lake-port of the State. It has the largest land-locked harbor on Lake Erie. The imports are principally grain, lumber, and iron ore, and the exports bituminous and anthracite coal and the merchant and pig iron, engines, and other manufactured products of the port. E. is the market for a rich farming country and has a custom-house and an acad. Pop. 1870, 19,646; 1880, 27,737.

Erie Canal extends from Buffalo to Albany, N. Y., and is 363 m. long. De Witt Clinton was in 1810 appointed a member of a commission to explore and survey a route for the proposed canal from the lakes to the Hudson, and his memorial to the State legislature in 1815 insured the success of the undertaking. The bill for its construction was passed in 1817. In 1825 the canal was completed at a cost of \$7,602,000. Its original width was 40 ft. at the surface, with a depth of 4 ft., but it has been so enlarged that the surface-width is 70 ft., the bottom-width 42 ft., and the depth 7 ft.

Erie, Lake, one of the chain of lakes drained by the St. Lawrence, bounded N. by Canada, S. by O., Pa., and N. Y. It is 290 m. long, 37 m. wide at the broadest part, and has an area of about 10,000 sq. m. The surface is 334 ft. higher than Lake Ontario. The greatest depth yet obtained is 312 ft., the mean depth about 120 ft. Large vessels can pass from Lake E. into Lake Ontario through the Welland Canal. The U. S. fleet, under Com. Perry, gained an important victory, Sept. 10, 1813, over the Brit. fleet on this lake.

Erie Shale, the name given by the O. geologists to the W. extension of the Chemung and Upper Portage rocks of N. Y. The oil-wells of W. Pa. are bored on this foundation, though the petroleum which is found in it emanates from the Huron shale below.

Erigena (i. e. the "Irishman"). (JOHANNES SCOTUS), the boldest thinker of his century. The events of his life are involved in some obscurity. He was probably b. in Ire. between 800-815 A. D., and ed. in the Irish monasteries. Between 840-845 he appears to have gone to Fr., where he was patronized by Charles the Bald. What happened to him after the death of Charles the Bald, in 877, is not clear. According to one account, he went to Eng. about 883, on the

invitation of Alfred the Great, and was murdered by his pupils at Malmesbury in 891. Some, who deny this story, say that Scotus E. has been confounded with an A.-S. monk whom Alfred invited over from Fr. to teach at Ox. E. rebelled against Augustinianism and asserted the supremacy of reason. He translated into Lat. the works (spurious) of Dionysius the Areopagite, and thus planted the seeds of the mediæval mysticism. He wrote against Gottschalk on predestination, against Radbert on transubstantiation, and was condemned as a heretic at Paris in 1209. Of his other works, the most important is *De Divisione Nature*. (See JOHANNES HUBER's *Johannes Scotus Erigena*.)

Erin. See IRELAND.

Erinaceidae, a family of insectivorous mammals, with the molars mostly broad and quadricuspid, the skull broad behind the orbits, and the body covered with more or less hair or spines. There are 2 distinct types—(1) the Erinaceinae, or hedgehogs, with a rudimentary tail and with spines, and (2) the Gymnurae, with a developed tail and no decided spines. (See HEDGEHOG.)

Eriodendron [Gr. *ἔριον*, "wool," and *δένδρον*, a "tree"], a genus of trees of the natural order Sterculiaceae, natives of tropical climates. They have large and beautiful flowers. They are sometimes called wool trees, because the capsules inclose a fibrous woolly or cottony substance, which, however, cannot be spun, but the use of which in paper manufacture has been proposed.

Ermine, er'min, **White Weasel**, or **Stoat** (*Putorius erminea*), a species of weasel, native of the N. parts of Asia, Europe, and Amer. It is about 10 inches long, exclusive of the tail. In the summer the color of the upper parts is a pale reddish brown, and that of the under parts nearly white. In winter the whole of the body is covered with white fur, slightly tinged with yellow; the tip of the tail



Ermine or Stoat.

remains black in all seasons. The fur is closer and finer in winter, and that which is obtained from Siberia, Nor., and other cold countries is one of the most valuable of furs. The E. fur forms the distinctive doubling of the state robes of sovereigns and nobles, as well of their crowns and coronets. It is also worn by Judges in some countries. The E. preys on mice, poultry, eggs, young rabbits, etc. Most of the so called E. fur of commerce is simply white rabbit fur, with spots of black rabbit fur inserted.

Erne, a river of Ire., flows nearly N. W., and expands into 2 lakes, Upper and Lower Lough Erne. After a course of 72 m. it enters Donegal Bay. The Lower Lough is 20 m. long, 7 m. wide, and over 200 ft. deep. The Upper Lough is smaller. Each of them incloses numerous islands. The river and both loughs are deep, and have lines of steamboats, but the river has several cataracts.

Ernest (Ernst), elector of Sax., founder of the line called Ernestine or Ernestinian, b. Mar. 25, 1441; succeeded his father, Frederick II., 1464; annexed Thuringia to his dominions 1482, and did much for the development of the resources of his terts. D. Mar. 22, 1486.

Ernest (Ernst I.), surnamed the Pious, duke of Saxe-Gotha, b. Dec. 24, 1601, was a brother of the famous Bernard of Saxe-Weimar. In the Thirty Years' war he served under Gustavus Adolphus as a col. of horse, and completed the victory of the Swe. army at Lützen, where Gustavus was killed. He was a zealous Prot., and a ruler of great wisdom and activity. D. 1655.

Ernest (Ernst IV.), or **Ernst II.** of Saxe-Coburg-Gotha, duke of Saxe-Coburg, b. at Coburg June 21, 1817. His younger brother, Albert, married Queen Victoria of Eng. He succeeded his father in 1844; composed the operas *Zaire* and *Castilda*. In 1863 he declined the crown of Gr.

Ernest Augustus, king of Hanover, b. Jan. 5, 1771, was a son of George III. of Eng. He was styled the duke of Cumberland before he became king, and was a field-marshal in the Brit. army. On the death of his brother, William IV., in 1837, he inherited the throne of Hanover, which was then separated from G. Brit., because it was not lawful for a woman to reign over Hanover. He was unpopular both in Eng. and Ger. D. Nov. 18, 1851.

Ernesti (JOHANN AUGUST), a Ger. critic, b. at Tennstedt, in Thuringia, Aug. 4, 1707; was ed. at Wittenburg and Leipzig; became prof. of anc. lit. in the Univ. of Leipzig

1742; obtained the chair of rhetoric 1756, to which the chair of theol. was added 1758. He proposed a new system of biblical criticism in his *Institutes of an Interpreter of the A. T.*; wrote other theological works, and pub. an excellent edition of *Cicero*. D. Sept. 11, 1781.

Ernst (OSWALD H.), b. June 27, 1842, grad. at W. Pt. 1864; served as assistant chief engineer of the Army of the Tenn. to the close of the Atlanta campaign, as assistant engineer in construction of fortifications on the Pacific coast 1864-68; commanded a co. of engineer troops at Willett's Pt., N. Y., 1868-71, being detached to serve as astron. with the commission sent by the U. S. govt. to Sp. to observe the solar eclipse of Dec. 1870; was appointed instructor of practical military engineering and military signalling and telegraphy at the U. S. Military Acad. 1871. His prin. publication is a *Manual of Practical Military Engineering*.

Eros [Ἔρως], the Gr. name of the god of Love, corresponding to the Cupido of the Romans. Later poets represent him as a son of Aphrodite (Venus). (See *Cupid*.)

Erpenius, or **Van Erpen** (THOMAS), a Dut. Orientalist, b. at Gorkum Sept. 7, 1584, grad. at Leyden 1608, after which he visited Fr., Eng., It., and Ger. In 1613 he became prof. of Arabic and other Oriental langs. at the Univ. of Leyden; a second chair of Heb. was founded for him in 1619. He printed a number of Arabic works with a press he kept in his own house, and produced in 1613 an *Arabic Grammar*, the first written in Europe. D. Nov. 13, 1624.

Errard (CHARLES), a Fr. painter and arch., b. at Nantes 1606. He was patronized by Louis XIV., for whom he adorned the Louvre, Tuileries, and other places; was one of the 12 artists who founded the Acad. of Painting in Paris 1648, and was the prin. founder of the Fr. Acad. of Art in Rome 1666. D. May 15, 1689.

Ersch (JOHANN SAMUEL), a Ger. bibliographer, b. in Silesia June 23, 1766; became prof. of geog. at Halle 1803. He is called the founder of Ger. bibliography; wrote a *Handbook of Ger. Lit.*, etc. His cap. work is the *Allgemeine Encyclopädie der Wissenschaften und Künste*, which he began conjointly with Gruber, and of which he edited 17 vols., which after his death was continued by Gruber and others. D. Jan. 16, 1828.

Erskine (DAVID STEWART), F. R. S., ELEVENTH EARL OF BUCHAN, and LORD CARDROSS, b. 1742, a brother of Lord Chancellor Erskine, was the author of biographies and antiquarian papers. D. 1829.

Erskine (EBENEZER), a Scot. preacher, founder of the Secession Ch., b. June 22, 1680; preached at Portmoak, in Kinross, from 1703 to 1731; in 1731 he removed to Stirling, where he advocated popular rights in the settlement of ministers, and differed from the majority of the Gen. Assembly in relation to lay patronage; was deposed or suspended 1733. In 1736 E. and his friends formally seceded and organized the Secession Ch. D. June 2, 1754.

Erskine (HENRY), a Scot. lawyer, b. in Edinburgh in 1746, was a brother of Thomas, Lord Erskine, noticed below. He was a Whig in politics, became lord advocate of Scot. in 1782, and again in 1806. During some part of his career he was the most eminent member of the Scot. bar. D. 1817.

Erskine (JOHN), eleventh earl of Mar, a Scot. Jacobite, b. at Alloa in 1675; was appointed sec. for Scot. in 1708. In Sept. 1715 he took arms for the Pretender, and obtained the command of about 12,000 insurgents; was defeated by the duke of Argyle at Dunblane in Nov., and escaped to the Continent. D. May 1732.

Erskine (JOHN), D. D., a Scot. divine, son of the preceding, b. June 2, 1721; ordained minister of Kirkintilloch 1744, and of Culross 1753. In 1758 he was translated to the New Grey Friars' ch., Edinburgh, where he became the leader of the orthodox and popular party; was promoted in 1767 to the Old Grey Friars' ch., where he was a colleague of Dr. Robertson, the leader of the moderate party. He wrote many theological works. D. Jan. 19, 1803.

Erskine (JOHN) of CARNOCK, a Scot. jurist, b. in 1695, son of Col. John Erskine and grandson of Lord Cardross. He became prof. of Scot. law in the Univ. of Edinburgh 1737, and filled that chair till 1765. He wrote *Principles of the Law of Scot.*, and *Insts. of the Law of Scot.* D. 1765.

Erskine (THOMAS), LORD, a Brit. orator and lawyer, b. in Edinburgh Jan. 10, 1750, was the youngest son of Henry David, earl of Buchan. His father could not afford to give him a liberal education; he therefore entered the navy in 1764 as a mdpn., and 4 yrs. later purchased a commission in the army. Renouncing the military profession, he resolved to study law, and was admitted as a student in Lincoln's Inn 1775. It is said that in this part of his career he was very poor, and boasted that he did not know a lord of his own family. He was called to the bar in 1778, and obtained immediate success. One of his first clients was Capt. Baillie, prosecuted for a libel on Lord Sandwich, who was then a cabinet minister. Lord Campbell says that E.'s plea in this case was "the most wonderful forensic effort of which we have any account in our annals." In 1781 he defended Lord George Gordon, who was tried for treason and was acquitted. He was elected in 1783 to Parl., in which his success was not so brilliant as in the forum. In several political trials that occurred during the excitement of the Fr. Revolution he defended the liberty of the press and the friends of reform whom the ministers prosecuted on a charge of constructive treason. On the formation of a Whig ministry by Fox and Grenville, in Feb. 1806, he was appointed lord chancellor, and was raised to the peerage as Baron Erskine of Restormel Castle, but resigned when the Tories came into power early in 1807. He wrote *Armata*, a political romance, and a *View of the Causes and Consequences of the War with Fr.* (See LORD CAMPBELL, *Lives of the Lord Chancellors*.) D. Nov. 17, 1823.

Erskine College, at Due West, Abbeville co., S. C., was organized in 1839, with the Rev. E. E. Pressly (afterward D. D.) for its pres., and belongs to and is under the supervision of the Associated Reformed Synod of the S.

Soon after the breaking out of the war the inst. was suspended. At the close of the war the coll. was reopened, but under unfavorable auspices, the country being demoralized and private and public insts. impoverished.

Erwin (ALEXANDER R.), D. D., a minister of the M. E. Ch. S., b. in La. Jan. 12, 1820. His father was a Bap. minister. He was licensed to preach in 1840, and joined the Tenn. Conference in 1842. He presided over Clarksville Female Acad. and Huntsville Female Coll., and received the degree of D. D. from Nashville Univ. D. Jan. 10, 1890.

Erysipelas [Gr. ερυσίπελας, probably from ερυθρός, "red," and πέλλα, akin to the Lat. *pellis*, "skin"], a disease probably of miasmatic origin. Sometimes associated with a peculiar rose-colored eruption of the skin, whence the name. The inflammation attending this disease is of a peculiar low type which is but little understood. It may terminate favorably by resolution, less favorably by abscess (which is apt to be diffuse—i. e. not limited to a single spot—and is then very dangerous), or the termination may be in gangrene and the death of the patient. The disease is very common in military hospitals, seating itself in wounds, when it proves frequently fatal. Erysipelatous diseases sometimes assume an infectious and almost an epidemic character. Puerperal fever, peritonitis, phlebitis, and a long catalogue of diseases of low type are akin to E. Its infectious character is admitted. The famous old Dreadnought hospital-ship in the Thames became so poisoned by it that she had to be destroyed. The best treatment is a sustaining one. Pure air, a milk diet, and the use of quinia and iron, with stimulants, are in gen. indicated. The sulphites and other disinfectant remedies may be employed. Externally, it is safest to use only the blandest applications—carbolic lotions, lead and opium wash, etc.

E. DARWIN HUDSON, JR.

Erzroom', Erzroum, or Erzurum [i. e. "land of Rome" or Byzantium, so called because it was originally founded under the E. Rom. empire], a fortified town of Armenia on the river Kara-Soo, about 120 m. S. E. of Trebizond. It is about 6000 ft. above the sea. The streets are narrow and filthy; the houses are mostly built of mud, wood, or sun-dried bricks. Its position renders it an important military post, and it has an extensive trade, carried on partly by caravans. In 1859 an earthquake destroyed a considerable portion of the town. Pop. about 60,000.

Esarhad'don [called in the cuneiform inscriptions *Ashur-akh-iddina*], the O. T. name of an Assyrian king, the son and successor of Sennacherib. He appears to have reigned from 680 to about 667 or 660 B. C. His rule extended N. to Armenia, on the W. it included Syria and Cyprus, while on the S. Egypt, and even Ethiopia, were claimed by him. Among the numerous remains of his reign is the S. W. palace of Nimrod.

E'sau ("rough," "hairy"), the elder twin-brother of the patriarch Jacob, and the son of Isaac and Rebekah. He took his name from his hairiness of body. He was the progenitor of the Edomites, who dwelt in Mt. Seir, otherwise called Edom.

Escanaw'ba, or Escanaba, cap. of Delta co., Mich., 360 m. N. of Chicago, on R. R. and the N. end of Green Bay. It has a good harbor, and the prin. business is shipping Lake Superior iron ores. Pop. 1880, 3026; 1894, 4339.

Escheat', a reverting of lands to their original owner (lord of the fee) because of some obstruction in the course of descent, either by failure of heirs or attainder of treason or felony; and the estate itself thus reverting is sometimes called an *escheat*. It was one of the incidents of the feudal system that when the heirs of the person last seized failed, the land reverted to the lord of the fee from whom it was derived. In this country, where the feudal tenure does not exist, the doctrine of E. has a limited application; still, if an owner of land dies without heirs it escheats to the state. Incorporeal rights, such as ways and commons, do not E., but become extinct. The land of a corporation, in case it becomes extinct, reverts to the grantor, and not to the state. The state takes an E. subject to any charges or encumbrances attaching to the land when its title accrued. A proprietor may prevent an E. by conveying or devising his estate. In this country the subject is generally regulated by statute.

Escrow', a deed deposited by a grantor with a third person, to be delivered to the grantee on the happening of a certain condition. Until the condition is fulfilled and the E. delivered, it has no effect as a deed, and the title of the estate remains in the grantor. It takes effect, in gen., as a deed, from the second delivery. Where the ends of justice require it, it may be referred, for its validity, by a fiction of law termed "relation," back to the first delivery.

Escut'rial, or Escor'ial [Sp. *escoria*, "dross,"] applied to places where there are old or exhausted mines; a monastery and palace near Madrid in Sp., built by Philip II., and dedicated to St. Lawrence. It was begun in 1563 and completed in 1584. It is built in the form of the gridiron on which that saint is said to have been broiled alive. The cross-bars of the gridiron are represented by ranges of buildings separated by intervening courts. The main portion is 740 Sp. ft. long and 580 in breadth. The projection which forms the royal palace is 460 ft. in length. The height of the edifice is about 60 ft., and at each angle is a square tower 200 ft. high. The 60 ft. in the centre is very large and rich. The Pantheon beneath this ch. is the place of interment for the royal family. The richest part of this edifice was that which contained the pictures, which formed the best collection in Europe. The Fr. removed many of its best treasures. The most valuable treasures of the E. are the collection of anc. MSS. preserved in the library, especially those of the Ar. writers. In 1872 it was fired by lightning, suffering some damage.

Escutcheon, es-kuch'un, or **The Milk Mirror**, in the Guénon method of selecting milch cows, is the shield-like outline upon the back of the cow's udder and the adjacent parts, formed by the upward growth of the hair. Some

writers call the whole outline the "mirror," and the upper part only the "escutcheon." It is found by careful observation that the size and perfection of these marks afford valuable means of judging of the milking qualities of cows, though much experience is required to make the estimate. (See C. L. FLINT, *Milk Cows and Dairy Farming*.)

Esdrae'lon, in the apocryphal book of Judith, **Esdre'lon** (Gr. *Εσδραήλ*, a corruption of the Heb. *Jesreel*), the most fertile, and historically most important plain in Pal., lying between Tabor and Carmel, and between the hills of Galilee on the N. and those of Samaria on the S. In Script. it is twice called "the valley (plain) of Megiddo." *Jesreel* is properly the S. E. part of it, although this name is sometimes given to the whole. It is triangular in form, the length of its S. E. side being about 15 m., its S. W. about 18 m., and its N. about 12 m. Its surface is slightly undulating. This plain has been the scene of several important battles.

Es'dras, **Books of**, are certain books of the O. T. and of the Apocrypha ascribed to Ezra, whose name is Grecized into *Esdras*. The canonical books of Ezra and Neh. (as they are called in the authorized Eng. version) are denominated in the Vulgate the first and second books of E., while the apocryphal books, now generally known as the first and second of E., are there called the third and fourth of E. The first (apocryphal) book of E. was written in Greek, but at what time cannot be determined. It is not without historical value, and is for the most part a hist. of the restoration of the Jews after the Babylonian captivity. The second apocryphal book of E. is pseudopigraphic, being a record of pretended revelations made to Ezra for the encouragement of the suffering Jews. The original Gr. is lost, but Lat., Ethiopic, and Arabic versions exist. It is canonical in the Abyssinian Ch.

Es'neh, **Esné** (anc. *Lutopolis*), a town of Upper Egypt, on the Nile, about 30 m. above Thebes. Here are the ruins of the anc. city of *Lutopolis*, so called from the worship of the *lutus* fish. Among them is a well preserved portico of a grand temple, with 24 beautiful columns. All the rest of the temple is literally buried, the houses of the modern town standing even upon its roof. In visiting the portico one goes down as into a deep vault. It was cleared of rubbish in 1842. An older temple seems to have been built there by Thothmes III., but the present one dates from times of Tiberius, Vespasian, Trajan, Hadrian, and Antoninus. Pop. 12,000.

Esoc'idae [*Esoc*, an anc. name], a family of haplosum fishes containing the true pikes. The body is elongated, with the back and abdomen nearly straight and parallel;

the head oblong, and produced into a broad, depressed, and flattened snout; the mouth large, and with a deep lateral cleft; the upper jaw formed toward the middle by the intermaxillaries, and at the sides, backward, by the supramaxillaries; teeth are developed on the jaws, vomer, palatine, and hyoid bones; on the jaws they are enlarged and sharp, and on the other bones are aggregated in cardiform bands; the dorsal and anal fins are situated far behind, opposite each other, and higher than long. The family is entirely confined to the N. hemisphere, and is characteristic of the "arctogæan" division of the globe. It is chiefly represented in Amer., where about 10 species are known, while in Europe only a single species—and that also common to the 2 continents—is found. All the members of the family are very voracious, and by the nature of their dentition well adapted for making havoc among their cohabitants of the water. The most notable species of the U. S. are the *Esoc nobilior*, or true mascalonge, the *E. lucius* or *E. estor*, which is the same as the common pike of Europe; and the *E. reticulatus*, or ordinary pickerel of the Middle and E. States. (See MASCALONGE, PIKE, and PICKEREL.)



Esoc lucius.

THEODORE GILL.

Esop. See *ÆSOP*.

Esparte'ro (JOAQUIM BALDOMERO), duke of Vitoria, b. at Granatula, Sp., Feb. 27, 1792, was the son of a cartwright; enlisted in the army 1808; served against the Fr., against Bolivar 1815-25, and against the Carlists 1833-40; became a lieutenant-gen. 1835, a grandee 1838, regent of Sp. 1841; was banished by Narvaez 1843, and became prime minister 1854. Under King Amadeus (1872) he was senior capt.-gen. of the army. D. Jan. 8, 1879.

Esparto (*Stipa* or *Macrochloa tenacis* sarnar), a species of grass growing in Sp., etc., has a very strong fibre, which is used by the Spaniards for making cordage, mats, etc.; is much used in G. Brit. in the manufacture of paper.

Es'py (JAMES P.), a meteorologist, styled the "storm-king," b. in Washington co., Pa., May 9, 1785. He was the author of a theory of storms which excited some controversy, and which he pub. in 1841, in systematic form, under the title *The Philos. of Storms*. Mr. E. entertained a sanguine belief that rains could be brought on at any time by means of great fires, kept up long enough and over a sufficiently large surface to initiate a powerful upward movement, relying on natural causes to maintain the current when once started. He even supposed that it might be possible in this way to maintain the navigation of the upper O. River through the dry season. He therefore petitioned Cong. and the legislature of Pa. to make a sufficient appropriation to enable him to try the experiment, but without success. He received, however, an appointment as meteorological observer under the govt., and while holding this position he made arrangements, in accordance with a suggestion of the Hon. A. H. Stephens of Ga., with the press

and with the various lines of telegraph converging to the capital, to publish daily bulletins of the state of the weather in different and distant localities. These were doubtless the first weather-telegrams ever regularly made public. The system, discontinued during the war, has been since revived and largely extended. It has also been introduced into Eng. and into parts of continental Europe. While enjoying its benefits the world should not forget the meritorious observer with whom it originated. D. Jan. 21, 1860.

F. A. P. BARNARD.

Esquimaux, es'ke-mōz (plu.), a Fr. orthography of the Algonquin *eskimo*, an "eater of raw flesh;" called in their own tongue *Inuit*, "men"; a race inhabiting the Arctic coasts of N. Amer. and its islands, and the coast of Labrador nearly as far S. as the Gulf of St. Lawrence; also found on the extreme N. of the Pacific coast of Alaska, and to some extent in the N. E. part of Asia. They are broad and muscular, but seldom exceed 5½ ft. in height. In color they are of a rather light brown, and in features they approach the Mongolian type. They have remarkable skill in fishing and hunting. Their only domestic animal is the dog, which is used for hunting and for drawing sledges. Their religion is a rude superstition, in which only the vaguest notions of a Supreme Being can be found. In Greenland and on the Labrador coast the Moravian and the Dan. Lutheran missionaries have brought to many of them the knowledge of Christianity. (See C. F. HALL, *Life with the Esquimaux*.)

Ess, van (LEANDER), a Ger. Catholic theolog., b. at Warburg, Westphalia, Feb. 15, 1772. In 1790 he entered a Benedictine monastery; in 1796 became priest, afterward pastor, and in 1813 prof. extraordinary of theol. at Marburg. He aided his cousin, Karl van Ess, in publishing a Ger. translation of the N. T. (1807), and 12 yrs. later, without assistance from his cousin, pub. a translation of the O. T. His ed. of the Vulgate appeared in 1822, and of the Septuagint 1824. His valuable library, of more than 13,000 vols., now belongs to Union Theological Sem. in New York. D. Oct. 13, 1847.

Es'sen, a town of Prus., on the Cologne and Minden R. R., and near the river Ruhr, 27 m. by R. R. N. E. of Düsseldorf. It derives its prosperity chiefly from the rich coal-mines which surround it. In the vicinity is Krupp's extensive manufactory of steel. Pop. 1880, 56,941.

Essen (HANS HENRIK), COUNT of, a Swe. gen., b. in W. Gothland in 1755; was appointed gov. of Stockholm in 1795, and obtained in 1807 the command of an army with which he defended Stralsund against the Fr.; was sent as ambassador to Paris by Charles XIII., who became king in 1809. In 1814 he was raised to the rank of field-marshal and gov.-gen. of Nor. D. July 28, 1824.

Essenes, es-seenz' [Gr. *Ἐσσηνοί*; Lat. *Esse'ni*], or **Essæans** [Gr. *Ἐσσαῖοι*], the latest, and apparently the smallest, of the 3 Jewish parties in existence in the time of Christ. They are not mentioned in the N. T. Their history is obscure. The E. were mystics, and most of them celibates. The greater part of them lived by themselves near the N. W. shore of the Dead Sea, but they were also scattered in various parts of Pal. The first distinct trace of them is about 110 B. C., and they disappear from hist. after the destruction of Jerusalem by the Romans.

Essen'tial Oils [so called because they were formerly supposed to contain the essence or active principle of the plant], called also **Volatile Oils**, a large class of compounds, mostly of vegetable origin, though some are derived from animal sources. They mostly exist already formed in plants. They are in many cases changed by time and exposure into resins, or resolved into several distinct substances. (See TURPENTINE.)

Essequibo, es-seh-kew'bo a river of Brit. Guiana, rises near the S. frontier, flows N. through forests, and enters the Atlantic by an estuary 20 m. wide. It is navigable 60 m. Length, 500 m.

Es'sex, Middlesex co., Conn., on R. R. and the Conn. River, 7 m. from its mouth, and about 17 m. W. of New London. Pop. 1880, 1279.

Essex (ROBERT DEVEREUX), SECOND EARL OF, an Eng. courtier, b. Nov. 10, 1567, was the eldest son of Walter, the first earl of Essex. He served at the battle of Zutphen 1586, and became master of the horse 1587. In 1588 he succeeded the earl of Leicester as the favorite of Queen Elizabeth. He commanded the land forces of the expedition which took Cadiz 1596, and became earl-marshal of Eng. 1597; was appointed lord lieutenant of Ire., and was sent in 1599 to subdue a revolt, but was not successful. Having been removed from office, he provoked the queen by his disrespectful conduct. It is stated that he tried to excite an insurrection in Lond. He was tried for treason, and beheaded Feb. 25, 1601.

Essex (THOMAS CROMWELL), EARL OF. See CROMWELL.

Established Church, a term applied to any ch. organization which is exclusively recognized by the govt. of a country, or which has peculiar privileges under it. Christianity first became the established religion of the Rom. world under Constantine. Charlemagne strengthened the Ch. establishment in the W., and throughout the Middle Ages the unity and authority of the Ch. exercised a great influence. Some of the early Prot. Reformers advocated a separation of Ch. and State, but in every European country where Protestantism prevailed some one of its divisions became the State Ch.

E'staing d', des-tan' (CHARLES HECTOR), COUNT, a Fr. naval officer, b. in Auvergne 1729; served in the land army in India, and was appointed lieutenant-gen. of the naval armies in 1763; commanded a fleet sent in 1778 to fight for the U. S. His fleet was damaged by a storm near Newport in Aug. of that yr. He repaired his ships, and sailed to the W. I., where he captured Grenada 1779. In Sept. of that yr. he attacked the Brit. at Savannah without success. He returned to Fr. in 1780, and was guillotined Apr. 28, 1794.

Estates, The Three, or the **Estates of the Realm** [Fr. *Les États Généraux*], the political name designating the

3 classes of feudal society:—1, the nobles; 2, the clergy; 3, the commons, including the bourgeois or middle class of towns, and the peasantry. One of the exciting causes of the Fr. Revolution was the dispute which arose between the "third estate" (*tiers état*) or bourgeois, and the nobles and clergy, as to whether the third estate had a right to sit, and vote numerically, with the first and second. A convention of the States-General was held (1580-1795) the supreme power in the Dut. republic.

Este, an anc. sovereign family of It., from which the monarchs of G. Brit. are partly descended. Among the first princes of this family was Oberto I., who d. about 927, leaving a son, Oberto II. Albertazzo II., who succeeded Oberto II. about 1030, married a Ger. princess of the house of Guelph or Welf. Their son, Guelph IV., received in 1071 the duchy of Bavaria. He was the ancestor of the houses of Brunswick and Hanover. Obizzo took the title of marquis of Este in 1137, and Azzo VI., marquis of Este, was chosen as their sovereign by the people of Ferrara in 1308. Azzo VII. of Este was the chief of the Guelph faction in the c. war waged against the Ghibellines; d. 1264. His successor, Obizzo II., added to his dominions in 1288 the city of Modena; d. 1293. Ercole (or Hercules) I., who began to reign 1433, was a patron of literary men. His son, Alfonso I., duke of Ferrara and Modena, who reigned from 1505 to 1534, married the notorious Lucretia Borgia. He was succeeded by his son, Ercole II., who married Renée, the daughter of Louis XII. of Fr.; d. 1559. The next duke of Ferrara was Alfonso II., a son of Ercole II. He was a patron of Tasso, whom he afterward imprisoned; d. without issue 1597, when his cousin Cesare became duke of Modena, but lost Ferrara, which was annexed to the Papal States. The dukes who reigned after the death of Alfonso II. were comparatively obscure. Alfonso IV., who became duke of Modena 1658, had a daughter Mary, the second wife of James II. of Eng., and a son, Francis II., who d. without issue 1694. The title was inherited by Rinaldo, who, by his marriage with a daughter of the duke of Brunswick-Lüneburg united the It. and Ger. branches of the family; d. 1737, and was succeeded by his son, Francis III.; d. 1780. Maria Beatrice, a granddaughter of Francis III., was married to Ferdinand, archduke of Aus. They had a son, Francis, who became duke of Modena 1814, and d. 1846, leaving a son, Francis V., the last duke of Modena, who was deposed in 1859.

Estérhazy, an anc. and noble family of Hungary, which has produced many eminent men and which owns large estates.

Esterhazy (NICHOLAS JOSEPH), grandson of Paul, b. Dec. 18, 1714; became a privy councillor and field-marshal-gen. D. Sept. 20, 1790.

Esterhazy de Galantha (NICHOLAS), PRINCE, son of the preceding b. Dec. 12, 1765; was distinguished as a diplomatist, and obtained the rank of field-marshal. He was employed as ambassador to Paris, Lond., and St. Petersburg between 1801 and 1816. D. Nov. 25, 1833.

Esterhazy de Galantha (PAUL), PRINCE, b. Sept. 8, 1635; became a field-marshal in the Aus. army, and was chosen palatine of Hungary 1681. In 1686 he took Buda from the Turks, and in 1687 was created a prince of the empire. D. Mar. 26, 1713.

Esterhazy de Galantha (PAUL ANTONY), PRINCE, b. Mar. 10, 1786, a son of Nicholas, noticed above, was ambassador from Aus. to Lond. 1815-18, and again 1830-38. In Mar. 1848 he became minister of foreign affairs in the liberal ministry of Hungary, but resigned about the time the war broke out. He owned more land than any subject of the Aus. empire. D. May 21, 1866.

Esther, *es'ter* ("star"), the Per. name of **Hadas'sah** ["myrtle"], a Jewish maiden who became the queen of Xerxes, king of Per. (b. c. 486-465).

Esther, Book of, one of the latest of the canonical books of the O. T., consisting of 10 chaps., and relating events which gave rise to the Jewish feast of Purim. The Jews call it emphatically *Megillah*, "the Roll." The whole of it is read in synagogues every yr. at the feast whose origin it explains. The inspiration of the book and its right to a place in the canon have been sharply questioned. Its author is unknown.

Esther, Apocryphal Book of, consists of the 10 canonical chaps. described above, with interpolations here and there, and the addition of 6 chaps. at the end. These additions are found in the Septuagint, and in versions made from it, but not in the Heb. Though considered spurious by all Prot. chs., the Gr., Armenian, and R. Cath. chs. accept these additions as canonical.

Estoppel, a principle of law, whereby one is bound by his previous admission or declaration—not on the ground that it is true, but because to dispute it is regarded as contrary to sound policy or as subversive of the ends of justice. E. is: of record, of deed, and *in pais*.

1. **Estoppel of Record**.—By record is here meant the record of a tribunal of a judicial character. No one is permitted in a legal proceeding to contradict an admission made by him in his pleading. So the judgment of a court of competent jurisdiction is in most instances absolutely unimpeachable.

2. **Estoppel by Deed**.—A party to an instrument under seal is bound by the statements contained in it to those who have acted upon such statements, or as Lord Mansfield puts it, no man is allowed to dispute his own solemn deed. The E. applies to recitals as well as to direct averments.

3. **Estoppel in Pais**.—In the time of Lord Coke this division of the principle was applied only to certain acts relative to the title of real estate which the law regarded as possessing equal solemnity and notoriety with a deed. Since then the principle has been greatly extended, and now presents a twofold aspect. In the first place, it is rigorously applied, from motives of gen. policy, to certain classes of cases. A bailee in gen. cannot dispute the title of his bailor, neither is the indorser or acceptor of negotiable

paper allowed to deny the genuineness of any of the preceding names to the paper. In the second place, it is applied when good conscience requires that one should not be allowed to insist on his strict legal rights. The rule which governs its application here may be thus stated: Where one has made a representation or an admission by his words, his action, or, in cases where it is his duty to speak, by his silence, with the intent or expectation, or reasonable grounds for expectation, that others should rely and act thereon, he shall not be permitted to prove that the representation or admission was untrue, if thereby injury would result to one who has in good faith acted upon it.

T. W. DWIGHT.

Esto'vers, the right of a tenant to take wood from the demised premises for fuel, fences, and gen. agricultural purposes. This right may be claimed by any tenant, whether for life, for yrs., or at will, unless forbidden in his lease. But only a reasonable amount of wood can be taken; the tenant must not destroy the timber, nor do any permanent injury to the inheritance.

Estrades, *d'*, *des'trad'* (GODEFROI), COMTE, a marshal of Fr. b. at Agen 1607. He negotiated the cession of Dunkirk to Fr. in 1662, and rendered important military services in Hol. between 1672 and 1675. D. Feb. 26, 1686.

Estray' [remotely from the Lat. *extrā*, "outside," and *vagor*, *vagari*, to "wander"], in law, is a domestic animal (the owner of which is unknown) found wandering outside the pasture or other inclosure where it belongs. The law of E. varies in the different States of the Union. In some, after the E. has been duly advertised and kept a certain length of time, it is sold to pay the charges for advertising and keeping, any balance going to the town treasury. Cattle running about contrary to local, municipal, or other regulations, or breaking into growing crops and doing damage, can in most places be sent to a public pound, and after a short time sold to pay damages and expenses.

Et'amin [Ar.], the fixed star called γ Draconis. Observations made on this star by James Bradley led him in 1727 to the discovery of the aberration of the fixed stars.

Etching. See ENGRAVING.

Ete'sian Winds [Gr. *ετησια άνεμοι*; *i. e.*, "annual (or periodical) winds," from *ετος*, a "year"], N. and N. E. winds which prevail in summer throughout a great part of Europe and in N. Afr. These winds arise in a great degree from the heat of the Afr. Sahara.

Eth'elbert, king of Kent, ascended the throne in 560, at the age of 8; became the head of the Heptarchy about 590. His wife induced E. to profess Christianity 597. He gave to the A. S. their first written code of laws. D. Feb. 23, 616.

Ethelbert, A.-S. king of Eng., son of Ethelwulf, began to reign over Kent, Essex, and Sussex 852, and obtained also the throne of Wessex on the death of his brother Ethelbald 860. D. 865.

Eth'elred (or **Ethelred I.**, A.-S. king of Eng., succeeded his brother Ethelbert 866. In the first yr. of his reign Eng. was invaded by Danes, who conquered a large part of it. His brother Alfred defeated the Danes in 870. E. was killed in battle at Merton 871, and was succeeded by Alfred the Great.

Ethelred II., surnamed the UNREADY, A.-S. king of Eng., son of Edgar, b. 968. He succeeded his half-brother, Edward the Martyr, 978. In his reign the kingdom was invaded and ravaged by the Danes, who took Lond. in 1014, and E. fled to the court of the duke of Normandy, who was his wife's brother. D. 1016.

Eth'elwulf, A.-S. king of Eng., son of Egbert, whom he succeeded in 836. His kingdom was harassed by several incursions of the Danes, who pillaged Lond. in 851. He defeated these invaders at Okeley in that yr. He married, 856, a daughter of the king of Fr. D. 858.

Ethene. See ETHYLENE.

E'ther Gr. *αιθηρ*; Lat. *ether*, originally applied to the purer upper air; hence any subtle fluid, in organic chem., is a name given to numerous compounds, which are usually very volatile, fragrant, and with a few exceptions, highly inflammable; they are generally derived from alcohols by the action of acids. When the alcohols are simply dehydrated by the action of the acid, "simple E." are produced, which are oxides of the alcohol radicals analogous to metallic oxides. When the acids combine with the alcohol radical, "compound E." are produced, analogous to metallic salts. "Haloid E." are compounds of the alcohol radicals with the halogens, chlorine, bromine, iodine, etc. They are analogous to common salt. Sulphur, selenium, etc., form compounds analogous to the simple or oxygen E. Common E., properly known as ethylic E., commonly and very incorrectly called sulphuric E., is an oxygen E., and is sometimes called ethyl oxide. It is formed by the action of sulphuric acid or some other dehydrating agent upon strong ethylic (common) alcohol. Ethylic E. is a fragrant, colorless, transparent, and highly mobile liquid, with a specific gravity of .730, and a boiling-point of 96° F. It is extremely combustible, and so volatile that when applied to the hand it causes a profound sensation of cold. Though very light in the liquid state, its vapor is more than twice as heavy as air. It is very useful in the chemical laboratory, especially as a solvent of fats and oils. E. is much used in med. and surgery, both as a diffusible stimulant and as an anesthetic. It was probably the first complete anesthetic ever employed. It was introduced by Dr. Morton of Boston, Mass. The other more important E. are "acetic E.," "butyric E." (ethyl butyrate), "pelargonic E." (ethyl pelargonate), "amyl acetate," beside an immense number of other E. and mixtures used in artificial flavoring; "iodic E." (ethyl iodide), used in med.; "nitrous E.," used in making "sweet spirits of nitre."

Ethics. See MORAL PHILOSOPHY, by PRES. NOAH PORTER, S. T. D., LL. D.

Ethiopia, e-the-o'pe-a [Lat. *Æthiopia*; Gr. *Αἰθιοπία*, from *αἰθω*, "I burn," and *ῥωψ*, "face"; Heb. *Cush*], the name

anciently given to that part of Afr. lying S. of Egypt and Libya. The name is of Gr. origin, and was applied by the earliest Gr. writers to all the S. and unknown nations; later it was confined to the region S. of Egypt and Libya, extending to and perhaps beyond the sources of the Nile and its affluents. In this sense it included the modern NUBIA, SENNAAR, KORDOFAN, and ABYSSINIA (which see), and probably also that Libyan desert now known as the E. Soudan. The races which inhabited it were the Ethiopians, a Semitic race, whose descendants are the present Abyssinians and Nubians, black, but with Caucasian features: Ars. from the E., and Libyans from the N. The Gr. historians said that there were also there Pygmies (dwarfs), Troglodytes (cave-dwellers), Blemmyes (hideous men), Macrochii (long-lived men), etc. These statements have been generally considered mythical, but explorers since 1870 claim to have found in the W. part of E. dwarfs, cave-dwellers, races with deformed bodies and rudimentary tails, and a race of evidently remarkable longevity. The region extended from 10° to 25° N. lat., and from 45° to 58° E. lon. The Egyptians had clearer ideas about E. Their E. Proper was the kingdom of Meroë, bounded E. by the river Astaboras (Atbara), S. by the White Nile from its junction with the Blue Nile, W. by the desert of Bahiouda. At the N. it included the island of Meroë in the Nile. Its cap. was Napata. This was a powerful kingdom, holding close relations with Egypt, equally civilized with it, sometimes ruling it, at others ruled by it. Earlier than 1000 B. C. it was one of the most powerful nations of the world, having a sacerdotal monarchy like Egypt. Its kings were warlike, and invaded Assyria, Syria, and Pal., with varying success. In the height of their power (750-550 B. C.) there was an E. dynasty on the throne of Egypt, and many thousands of Egyptians migrated to the E. kingdom. In 530 Cambyses conquered E. In the reign of Augustus Cæsar, Candace, queen of E., made war against the Romans, but was defeated, and paid tribute. A successor of this queen, also named Candace, ruled E. more than 50 yrs. later (Acts viii. 27). Christianity was early introduced into E. and several versions of the Scriptures made there, some of which still exist. (For the later hist. of E. see ABYSSINIA.)

L. P. BROCKETT.

Ethiopic Language and Literature. The name "Ethiopic language" is at present generally applied to the old written lang. of the Abyssinian Ch. The native name is the Geez lang. The Geez were one of the Semitic tribes who emigrated from Ar. to Abyssinia. In the Abyssinian empire, which was gradually Christianized after the 4th century, this Geez became the official and the ch. lang., and continued to maintain itself until the middle of the 13th century, when the Amharic gradually gained the ascendancy. But the clergy and literary men were for centuries compelled to have a knowledge of Geez, and even to the present day the old Geez books continue to be copied. The Geez is a purely Semitic lang., having much in common with the entire Arabic group, but in many words, roots, and even in syntactic forms, it agrees more with the Heb., but also with the Aramaic and the Assyrian. It is written in peculiar characters, from left to right; the words are separated by 2 dots (·), and the vowels are indicated by little lines and hooks attached to the consonants. These characters, with the addition of several new ones, have become the universal alphabet of Abyssinia.

An E. lit. began since the introduction of Christianity into Abyssinia, in the 4th century. It has always retained a predominantly religious character. Its basis was the translation of the Bible, both the O. and N. T., together with semibiblical, apocryphal, and pseudepigraphic books which in the other chs. were rejected or lost. The other lit. consists, for a large part, of translations of Gr. and even Coptic works: Arabic works also were translated. The lit. comprises theological and religious works of every kind, such as collections of old canons, catenæ and homilies, exegetical and dogmatic writings, confessions of faith of the monophysitic teachers, lectionaries for the whole yr.; horologia, liturgies of the mass, and ch.-books for the other sacraments, and for burials, ch. discipline, and ch. law; Acta Sanctorum, monastic rules and monastic writings: in sacred and profane hist. and chronology, the works of Joseph Ben Gorion, George Ben Amid, Abuschaker, and others, and even something relating to philos. and the natural sciences. Among the native productions of the Abyssinians are dogmatic treatises, pseudonymous apocalyptic writings, prayer-books and formulas, meditations, eulogies and biographies of saints, martyrs, monks, and archangels, in prose and verse. More important in their way are the large anc. hymn-books, with hymns and antiphonies for every day in the yr., and containing formulas for the ceremonies in honor of all the saints of the calendar. Beside these there were also large works on native hist., and annals of the several kings, written in a mixture of the Geez and the Amharic. After the extinction of the Geez a beginning of grammatical and lexicographical works was made. Much was also written in this period on med., witchcraft, exorcism, and divination, either in Ethiopic-Amharic or entirely in the Amharic lang. The poetry was almost entirely in the service of the Ch. and of religion. Of the entire lit. very little has been printed beside the Bible. But it is very fully represented in MSS. in all the large libraries of Europe. Since the Abyssinian war the collection of the Brit. Museum has been so increased that it is without doubt the largest in Europe. None of the MSS. brought to Europe in the last century date farther back than the 15th century. [From orig. art. in *J. S. Univ. Cyn.*, by PROF. C. F. A. DILLMANN.]

Ethiops Mineral, the black powder obtained by triturating mercury with sulphur. It is a sulphide of mercury. Ethiops was formerly applied to other black powders.

Ethnology. See the article MAN, by PRES. M. B. ANDERSON, LL.D.

Ethylene, Ethene, Olefant Gas, or Bicarbutted Hydrogen, produced by heating alcohol with

strong sulphuric acid or boric anhydride; also by the dry distillation of many organic bodies, as fats, resins, wood, coal, many salts of organic acids, etc. It is an important constituent of coal gas. It is a colorless gas, having a faint ethereal odor, which is attributed to a slight contamination with ether vapor. Its specific gravity is 0.9784. It burns in the air with a bright white flame which is very luminous. Its compound with chlorine has long been known as "Dutch liquid."

Et'na (Gr. Ἄηνα; Lat. *Ætna*; Sicilian, *Mongibello*), a volcanic mt. in the N. E. part of Sic., adjacent to the sea and near the city of Catania. It is an isolated mass of conical form. It has an altitude of 10,935 ft. above the sea, and its base is about 90 m. in circumference. It appears that the volcanic action of E. was in anc., as it continues to



Et'na.

be in modern times, irregular and intermittent. The city of Catania has repeatedly been nearly ruined by the eruptions and earthquakes. Among the remarkable features of E. is that of its flanks, bristling over with innumerable smaller volcanoes. The height is so great that the lava now scarcely ever rises to the top of the crater, for before that its immense weight breaks through at the sides. The last great eruption was in 1868.

E'ton, a town of Eng., on the Thames, opposite Windsor, 22 m. W. of Lond. It is the site of Eton Coll., one of the most famous educational insts. of Eng., founded and richly endowed in 1440 by Henry VI., but the buildings were not completed until 1523. It is a favorite school for the sons of the nobility and gentry.

Etruria, or Tuscany, a country of anc. It., was called **Tyrrhenia** (Τυρρηνία) by the Grs. It was bounded N. by the Apennines, E. by the Tiber, W. by the Mediterranean or Tyrrhenian Sea. The inhabs. were called Etruscans (*Etrusci*) and Tuscans (*Tusci*) by the classic Lat. writers, but the Grs. always called them Tyrrhenians or Tyrsenians. Their national name in the Etruscan lang. was *Rasena*. Anc. writers state that the govt. was a confederacy of 12 cities or cantons, each of which was independent and had the right of internal self-government. The most important of their deities were Tina or Tina (Jupiter), Capra (Juno), and Minerva. Beside these, and others whose names have been preserved, there were 12 divinities (6 male and 6 female) who were termed collectively *Dii Consentes*, and were counsellors of Tina. Superior to these, and to Tina himself, were the *Dii Involuti*, who were supposed to exercise an irresistible controlling power over the gods. The opinion generally adopted by Rom. writers ascribed to the Etruscans a Lydian origin. Niebuhr maintained that they were a mixture of Pelasgians and Umbrians with a race of N. invaders (*Rasena*), who conquered the same at an unknown date. Our knowledge of the hist. of the Etruscans, even during the period of their greatest power and prosperity, is very imperfect. According to the Rom. traditions, the Tuscans were a powerful nation before the foundation of Rome, 752 B. C. It probably attained its greatest power about 150 yrs. later. The long wars between the Etruscans and the Romans were brought to a close by a victory which the Romans gained 283 B. C. The Etruscans, however, retained long after this event their own lang., customs, religious rites, and nationality. They were admitted to the Rom. franchise in 89 B. C. Anc. writers represent the Etruscans as the most cultivated and refined people of anc. It., and as skilful in ornamental and useful arts, especially in the fabrication of bronze articles and pottery; had made great progress in arch., sculpture, and painting. The Cloaca Maxima at Rome proves that they were acquainted with the true principle of the arch. Of their temples, theatres, and amphitheatres no considerable remains have been preserved. Among the existing monuments of their massive and cyclopean masonry are fragments of walls which defended the cities of Cortona, Fiesole, Clusium, and Volaterræ. Their tombs are in some cases chambers hewn in a cliff or solid rock, and adorned outside with façades of temples, decorated with paintings, and containing vast numbers of vases, tripods, urns, etc.

Etruria, Kingdom of, in It., was founded by Nap. I. Mar. 21, 1801. Louis, duke of Parma (1775-1803), was the first king. His son Charles Louis succeeded him May 27, 1803, but Nap. annexed the kingdom in 1807 to the Fr. empire. Its capital was Florence.

Ettmüller (ERNST MORITZ LUDWIG), a Ger. philologist, b. at Gersdorf Oct. 5, 1802, studied at Leipzig and Jena; became prof. of Ger. at Zurich 1833, and gained distinction by his researches in mediæval Ger. lit. He wrote an epic poem, *Deutsche Stammkönige*, and prepared an *A.-S. Lexicon*. D. Apr. 1877.

Etty (WILLIAM), an Eng. painter, b. at York Mar. 10, 1787, was a pupil of Sir Thomas Lawrence; was admitted as a student into the Royal Acad. 1806, and visited It. 1816. In 1821 he exhibited in the Acad. *Claypatria arriving in Cilicia*. He was elected an academican 1828. Among his works are *Pandora Crowned by the Seasons*, *John of Arc.*, and *The Judgment of Paris*. D. Nov. 30, 1849.

Etymolog'icum Mag'num, a valuable lexicon or vocabulary of the Gr. lang. by an unknown author. It is said to be the oldest extant Gr. lexicon, and it contains many traditions respecting old and uncommon words. It is referred to the 10th century A. D.

Etymology [from the Gr. *ἐτυμολογία*, "literal sense," and *λογος*, a "discourse"] is that branch of philology which traces the hist. of a word and of its grammatical variation from its primitive roots, and which shows the relationship of different langs. by finding the same roots in them. In gram. it is used in a more limited sense, as treating of the various parts of speech, the variations of declension, conjugation, etc. It was not till the beginning of the study of Sans. lit. that E. received philosophical treatment. A philosophic E. seeks the derivation of words by comparison of the vocabularies, the religious faith, the hist., and the lit. of nations ethnologically related, rather than by the comparison of words of any one or two langs.

Eubœa [Gr. *Εὐβοία*; Tur. *Eğriboz* or *Eğriboz*; It. *Negroponte*], formerly called **Negropont**, a Gr. island, the largest in the Ægean Sea, is about 90 m. long; greatest breadth, about 30 m. It is separated from Attica and Boeotia by the narrow channels of Egribo (*Euripus*) and Talanta, and is connected with the mainland by a bridge across the channel at Chalcis. Mt. Delphi, near the middle of the island, is said to be 7266 ft. high. Area, 1574 sq. m. Pop. 1879, 95,136.

Eubulides [Gr. *Εὐβουλίδης*], a Gr. philos. of the Megaric school, flourished about 350 B. C. He was a native of Miletus and an adversary of Aristotle.

Eubulus [Gr. *Εὐβούλος*], an Athenian comic poet, flourished about 375 B. C. He wrote numerous comedies, of which only fragments are extant.

Eucalyptus (plu. **Eucalypti**), a genus of trees of the natural order Myrtaceæ, comprises numerous species, mostly natives of Australia. They have entire leathery leaves, of which one edge is directed toward the sky, so that both surfaces are equally exposed to the light. The *Eucalypti* are called "gum-trees," because they abound in resinous exudations, some of which have medicinal properties. The timber is used for ship-building and other purposes. The *E. gigantea* is said sometimes to attain a height of 480 ft. and a diameter of 27 ft. They are probably the tallest trees on the globe. The bark of several species is used for tanning. Several species of E. have been introduced into Cal. and Europe.

Eucharist, yû'ka-ris't [Gr. *εὐχαριστία*, "the giving of thanks"], a name applied to the sacrament of the Holy Communion, or the feast of the Lord's Supper, in allusion to the blessing and thanksgiving with which the last supper of our Saviour with his disciples began and ended. This solemn festival has been kept in all Chr. chs. from the time of the resurrection, in commemoration of the passion and death of our Lord, and in obedience to his own divine institution. Among the earliest disciples in Judæa, the Lord's Supper seems to have been a regular meal, probably the prin. meal of the day in each family, into which the commemorative breaking of bread and partaking of the cup of blessing were introduced as a part. Subsequently the disciples of many families came together and held a festival in common—a practice in which originated the *ἀγάπη*, or love-feast, in the course of which the brethren saluted each other with a holy kiss. The abuses which grew out of this, and which are severely rebuked by St. Paul in the First Epistle to the Corinthians, led to a separation of the 2 institutions; and the commemorative observance has since been celebrated, with a solemnity in harmony with its character, by itself.

No part of the Chr. practice and doctrine has given rise to larger diversities of opinion or to a more voluminous polemical lit. than the sacrament of the E. These controversies were not known to the Ch. during its first 8 or 9 centuries. It seems entirely just to believe that, during all this early period, the visible elements employed in the celebration, the consecrated bread and wine, were regarded only as symbols and emblems of the body and blood of Christ given for our redemption; inasmuch as the expression of an opinion or doctrine different from this appears to have been first publicly made in the yr. 831 by a monk, subsequently abbot of Corbey in Fr., named Paschasius Radbert, who maintained the 2 following propositions, which he declared to be the true doctrine of the Ch., but which were received with loud and gen. remonstrance—viz. first, that, "after the consecration of the bread and wine in the Lord's Supper, nothing remains but the outward figure, under which the body and blood of Christ are really and locally present"—that is to say, the doctrine more recently known under the name of *transubstantiation*; and secondly, that "the body of Christ thus present in the E. is the same body that was born of the Virgin, that suffered on the cross, and that was raised from the dead." The excitement which followed this announcement was such that the emp. of Ger., Charles II. (I. of Fr., called "the Bald"), directed counter-expositions to be prepared by Johannes Scotus, and Ratramn (otherwise called Bertramn). The work of Scotus, though often cited in subsequent centuries, has perished; that of Ratramn is still extant. Both held that the consecrated bread and wine in the E. are only signs or symbols, and not the veritable body and blood of Christ; but in the work of Ratramn there are some things

said on this point which are ambiguous or obscure, while Scotus, on the other hand, is said to have been perspicuous, distinct, and intelligible. Out of this dispute arose some extraordinary and repulsive secondary controversies, as to the natural consequences of taking into the stomach and digesting the consecrated elements, whatever view be taken of their nature, for which those who desire to understand them must refer to the ecclesiastical histories. (The further hist. of opinions on this subject may be found in *J.'s Univ. Cyc.*)

F. A. P. BARNARD.

Euclid [Gr. *Εὐκλείδης*] of ALEXANDRIA, a celebrated Gr., called the "father of geometry," b. at Alexandria in Egypt, and lived about 300 B. C. The events of his life are mostly unknown. When Ptolemy I. asked him if geom. could not be mastered by an easier process than the ordinary one, he returned the celebrated answer, "There is no royal road to geometry." The most celebrated of his works is his *Elements of Geom.*, which is still extant.

Euclid of MEGARA, an eminent Gr. disciple of Socrates, flourished about 400 B. C. After the death of Socrates (399 B. C.) he founded at Megara a school called the Megaric or Dialectic.

Eudemus [Gr. *Εὐδήμος*] of RHODES, a Gr. philos., lived about 320 B. C., was an ed. of Aristotle's works, and wrote a *Hist. of Geom. and Astron.*

Eudom'eter [from the Gr. *εὖ*, "good," and *μέτρος*, the genitive of *Zeús*, "Jupiter," regarded as the personification of the atmosphere, and *μέτρον*, a "measure"], a graduated tube used in gas analysis.

Eudocia, ù-dô'she-a [Gr. *Εὐδοκία*], sometimes called **Eudoxia**, a beautiful Rom. empress, b. at Athens about 394 A. D. In 421 she was married to the emp. Theodosius II. She was a woman of superior talents and author of several poems. Having offended Theodosius and his sister Pulcheria, she was banished in 449, after which she resided in Pal., and founded several convents in that country. D. 460 or 461.

Eudoxus [Gr. *Εὐδόξος*], a Gr. astron., b. at Cnidus in Caria, flourished about 366 B. C. He was a pupil of Archytas and of Plato. Cicero called him the prince of astrons. Only fragments of his works are saved, except as embodied in the poem of *Aratus*.

Eudyptidæ, a family of pygopodous birds, embracing the loons, characterized by their four-toed, palmate feet and perfect tail. It has been generally called Colymbidæ.

Eufaula, a city and R. R. junc., Barbour co., Ala., on the right bank of the Chattahoochee River, which is navigable to this point for the largest boats at all seasons, 350 m. by river from Appalachicola, and 80 m. E. S. E. from Montgomery. It has a female coll. Pop. 1870, 3185; 1880, 3836.

Eugène, ù-jeen' [Fr. *Eugène*; Ger. *Eugen*], PRINCE, or more fully **François Eugène de Savoy**, b. in Paris Oct. 18, 1663. He was a son of Eugène Maurice, count of Soissons, and Olympia Mancino, a niece of Cardinal Mazarin. Having been offended by Louis XIV. of Fr., he entered the service of the emp. of Aus. in 1683; served in the war against the Turks, and was rapidly promoted. In 1691 he obtained command of the imperial army in Piedmont, where he fought against the Fr. Louis XIV. offered him a marshal's bâton if he would enter the Fr. service. Having been appointed commander of the Aus. army in Hungary, he gained a victory over the Turks at Zenta Sept. 11, 1697. In the war of the Sp. succession, which broke out in 1701, E. first commanded in It., where he was opposed by the Fr. marshal Catinat, and afterward by Villeroi, whom he surprised at Cremona and took prisoner Jan. 1702. He commanded the imperial army which co-operated in Ger. with the Eng. army under Marlborough. These allies defeated the Fr. and Bavarians at Blenheim Aug. 13, 1704. In 1705 he took command of the army in It., and was defeated by the duke of Vendôme at Cassano. He gained a victory over the Fr. duke of Orleans at Turin Sept. 1706, expelled the Fr. from It., and returned to Vienna in 1707. In Flanders E. was associated with Marlborough in the command of the combined armies. They defeated the Fr. at Oudenarde 1708, and claimed the victory at Malplaquet Sept. 11, 1709. In 1712 he was sent to Lond. to urge the Eng. to continue the war and to restore Marlborough to the command. A victory which Marshal Villars gained over E. at Denain in July 1712 induced Aus. to negotiate for peace. He defeated a large Tur. army at Peterwardein Aug. 5, 1716, and took Belgrade from them in 1717. After the end of this war, in 1718, he rendered important services as a statesman. D. Apr. 21, 1736.

Eugene City, cap. of Lane co., Or., on R. R. and the W. bank of Willamette River, here navigable for steamboats, 71 m. S. of Salem. Pop. 1870, 861; 1880, 1117.

Eugénia, a genus of trees and shrubs of the natural order Myrtaceæ, nearly related to the myrtle. It comprises numerous species, which are natives of tropical and sub-tropical countries, and some of them produce fruits remarkable for their pleasant odors. The allspice or pimento of commerce is the unripe, sun-dried berry of the *E. pimenta*, indigenous in the W. I.

Eugénie, or, more fully, **Eugénie Marie de Montijo**, empress of Fr., b. at Granada, Sp., May 5, 1826. Her father was the Sp. count de Montijo, and her mother was Maria Manuela Kirkpatrick, a woman of Scot. extraction. E. was styled the countess of Teba in her youth. She was married to Nap. III. in Jan. 1853, and bore a son in Mar. 1856. As a zealous Catholic she used her influence to promote the power of the pope. After Nap. put himself at the head of the army, about Aug. 1, 1870, she acted as regent until the people of Paris proclaimed a republic, Sept. 4, 1870. She then escaped to Eng.

Eugenius I., chosen pope 654 A. D. as successor of Martin I., who was banished by emp. Constans. D. 658.

Eugenius II., a native of Rome, succeeded Pascal I. as pope 824 A. D. He called a council, which met at Rome in 826 for the reformation of the clergy. D. 827.

Eugenius III., a native of Pisa, was chosen pope in 1145, in place of Lucius II., against whom the Roms. had re-

volted. E., being unable to enforce his authority, retired to Fr. and held a council at Rheims in 1148. He also promoted the second crusade. D. 1153.

Eugenius IV., b. in Venice 1383, was chosen pope in 1431 as the successor of Martin V., who had convoked a council at Bale. This council refused to recognize the supremacy of the pope. E. issued a bull proclaiming that the council must be dissolved, and called another at Ferrara in 1437. The council of Bale in 1438 deposed the pope, and elected as his successor Amadeus of Savoy, who assumed the name of Felix V. The result was a schism in the Ch., for E. continued to act as pope in Rome, and was recognized by several powers. D. Feb. 23, 1447.

Eugu'bian Tables, the name of certain bronze tablets found near Gubbio (the anc. *Iguvium*) in 1444. Five of the inscriptions are in Etruscan and Umbrian characters, the other 2 in Lat. They were pub. by Lepsius in his *Inscriptiones Umbriae et Oscoe*.

Euhemerus, a Gr. philosopher from the third century B. C., was the founder of Euhemerism, or that principle of interpreting the pagan mythology, according to which each myth is supposed to have originated from some simple historical event, a manner of interpretation which was much in favor with the Christian Fathers.

Eu'ler (LEONARD), a geometer, b. at Bale Apr. 15, 1707, was ed. at the univ. of that city; went to Rus., and in 1733 became prof. of math. in the Acad. of St. Petersburg. Having been invited by Frederick the Great, he removed to Berlin in 1741. He improved the integral calculus and the science of mechanics, and wrote many mathematical works, one of which, *Letters to a Girl*, *Princess*, was of a popular character. He became blind about 1767, after which he resided in St. Petersburg. D. Sept. 7, 1783.

Eumenes (Gr. *Εὐμένης*), a favorite officer of Alexander the Great, b. in Thrace about 360 B. C. He had a high command in the army which Alexander conducted against Per. in 334 B. C. On the death of Alexander, E. became gov. of Cappadocia and Pontus. As an ally of Perdiccas he defeated Craterus in the year 321, soon after which Antigonus and Antipater formed a coalition against him. E. was captured and put to death by Antigonus in 317 or 316 B. C.

Eumenides (Gr. *Εὐμένιδες* from *εὖ*, "good," and *αἰνός*, "mind," "disposition"), i. e. the "gracious ones," so called for the sake of propitiating them, or **Erinyes**, the Gr. name of the Furies, whom the Romans called *Furiæ* or *Direæ*. They were supposed to be goddesses who punished crimes and pursued the guilty with burning torches. According to the later tradition there were 3 Furies—namely, Tisiphone, Alecto, and Megera.

Eumol'pus (Gr. *Εὐμόλιος*), in Gr. mythology, was supposed to be a Thracian bard, a son of Neptune, and the founder of the Eleusinian mysteries.

Euna'pius (Gr. *Εὐνάπιος*), a sophist and phys., b. at Sardis, in Lydia, about 348 A. D. He was a Neo-Platonist, an opponent of Christianity, and a partisan of Julian the Apostate. He lived at Athens, and wrote in Gr. *The Lives of Philo*, and *Sophists*. D. about 420.

Euno'mius (Gr. *Εὐνόμιος*), founder of a sect called Eunomians, b. in Cappadocia. He was appointed bp. of Cyzicus in 360 A. D. by Eudoxius, bp. of Antioch, who four years afterward deposed him for heresy. He held extreme Arian doctrines, for which he was several times banished. D. soon after 392 A. D.

Euon'yms (Gr. *εὖ*, "well," "propitious," and *ὄνυμα*, a "name," by euphemism because it is poisonous), a genus of shrubs of the natural order Celastraceæ, natives of Europe and the U. S. The fruit is a capsule, with seeds inclosed in a red aril. The flowers, foliage, and fruit of some of the species are poisonous. The wood of the *E. europæus*, an ornamental shrub, is strong, compact, and yellow, and is applied to various useful purposes. The *E. atropurpureus* (burning bush or wahoo), a native of the U. S., is an ornamental shrub, with crimson fruit drooping on long peduncles. The bark is used as a remedy for dropsy and other diseases, and has active properties. The *E. Americanus*, or strawberry bush, is cultivated for ornament.

Eupato'rium (Gr. *εὐπατόριον*, said to have been named in honor of *Eupator*, a king of Pontus), a genus of plants of the natural order Compositæ, having the florets all tubular and perfect. It comprises many species of perennial herbs, mostly Amer. The *E. perfoliatum*, called boneset and thoroughwort, is a native of the U. S., and is used in med. as a tonic, stimulant, and sudorific. The leaves, as the specific name denotes, are connate-perfoliate—i. e. united at the base around the stem.

Euphor'bia [named in honor of *Euphor'bus*, phys. to Juba, king of Mauritania], a genus of plants of the natural order Euphorbiaceæ, having an acrid, milky juice. Almost 100 species of this genus are natives of the U. S. An acrid drug called euphorbium is obtained from the *E. officinarum* and from other species. Several species bear the popular name of spurge.

Euphorbia'ceæ [from *Euphor'bia*, the typical genus], a large natural order of exogenous plants which abound in tropical Amer., and are found in nearly all parts of the globe. They mostly have an acrid and poisonous milky juice. This order comprises, beside the *Euphor'bia*, the *Ric'nia* (castor oil plant), the *Croton*, which yields croton oil, the *Siphonia*, from which caoutchouc is obtained, the *Buxus sempervirens* (common box), and the *Jatropha Manihot*, the stem of which yields tapioca.

Euphor'blum, an acrid and inodorous gum-resin, is produced by the *Euphorbia officinarum* of S. Afr. and some other species, including *Euphorbia Canariensis* of W. Afr. and *Euphorbia antiquum* of the Levant. It is a violent emetic and purgative, and is sometimes used in the composition of plasters and in veterinary med.

Eupho'rión (*Εὐφώριον*), an Athenian tragic poet, a son of Æschylus, gained prizes with his father's dramas when Sophocles and Euripides were competitors.

Euphorion, an eminent Gr. poet and grammarian, b. at Chalcis in Eubœa, flourished about 250–220 B. C. He became librarian to Antiochus the Great. He wrote epic poems, which were very popular; also several prose works. None of his works are extant.

Euphra'nor (*Εὐφράνωρ*), an eminent Gr. painter and sculptor, b. at Corinth, flourished about 350 B. C., and was a contemporary of Apelles. He excelled both in painting and in sculpture.

Eu'phrasy [Gr. *εὐφρασία*, from *εὐφραίνω*, to "delight,"], or **Eyebright**, a plant of the order Scrophulariaceæ, the *Euphrasia officinalis*, a small annual herb, a native of Asia, Europe, and N. Amer. Milton speaks of its virtues in clearing the eyesight. Some varieties are said to have in their blossoms a spot resembling the eye, and this spot caused, or at least strengthened, the popular faith in its powers.

Euphrates, *û-frâ'tez* (Gr. *Εὐφράτης*; Tur. *El-Frat*), a river of W. Asia, rises in Armenia by 2 branches—the Moorad and Kara-Soo—which unite near lat. 39° N., lon. 39° E. The stream flows first S. W., passes through a defile of Mt. Taurus, and forms the boundary between anc. Syria and Mesopotamia. Near Bir it approaches within 100 m. of the Mediterranean. After crossing the parallel of 36° N. it pursues a gen. S. E. direction, flows through the alluvial plains of Babylonia and Chaldæa, and enters the Per. Gulf at its N. W. extremity. Its total length, says Guyot, is 1750 m., and the area of its drainage 255,000 sq. m. It is navigable 1195 m. Its prin. affluent is the Tigris, which is nearly as large as the E. itself. The width in some places is nearly 600 yards, but below Hillah its vol. and width are reduced by numerous canals cut for irrigation. The name Shatt-el-Arab is given by the natives to that part below the mouth of the Tigris. The melted snows of the mts. of the Taurus and Anti-Taurus cause a periodical inundation of the E. in the spring. In some parts of its course above Someiset the river passes through deep and narrow defiles or gorges between precipices nearly 1500 ft. high, and presents much picturesque scenery. The water is highest in May and June. In anc. times the chief city on its banks was Babylon.

Euphrosyne, *î-fros'e-ne* (Gr. *Εὐφροσύνη*, from *εὖ*, "good," "easy," and *φρον*, "mind," one of the 3 Graces in Gr. mythology, was supposed to be the daughter of Venus, and was a personification of mirth or joy.

Eup'ion [from the Gr. *εὖ*, "good," "very," and *πιον*, "fat," "rich," named in allusion to its oily nature], an oily liquid obtained by destructive distillation of coal, wood, oils, bones, etc. It consists essentially, according to Frankland, of hydride of amyl.

Eu'polis (*Εὐπολίς*), an Athenian comic poet of the Old Comedy, b. about 446 B. C. He was a competitor of Aristophanes, whom, as some critics think, he surpassed in the charms of diction. Horace ranked him with Cratinus and Aristophanes. E. often satirized his eminent contemporaries, including Alcibiades. D. about 410 B. C. His works are lost except small fragments.

Eura'sians [contracted from *Europe* and *Asia*], or **Half-Castes**, is the name given in E. I. to the descendants of Europeans and Indian mothers. They usually receive a European education. The girls generally marry Eng. officers, while the young men enter the govt. offices or serve as clerks. The natives call them "Tschitschi." Their number is estimated at 91,000.

Eure'ka, city, cap. of Humboldt co., Cal., on Humboldt Bay, 7 m. from the ocean and about 225 m. N. N. W. of San Francisco. It has a safe harbor. Redwood lumber is largely shipped from this point. Pop. 1880, 2639.

Eureka, Ill. See APPENDIX.

Eureka, R. R. junc., a city, cap. of Greenwood co., Kan., 110 m. S. S. W. of Topeka, in the centre of a fine grazing-region. Pop. 1880, 1127.

Eureka, on R. R., cap. of Eureka co., Nev., about midway between Salt Lake and San Francisco. The prin. business is mining. It produces much lead and silver ore. Pop. of Eureka dist., 1870, 640; of v., 1880, 4307.

Eureka Springs, Ark. See APPENDIX.

Eurip'ides (Gr. *Εὐριπίδης*), an Athenian dramatist, and the latest of the 3 greatest tragic poets of Gr., b. in the island of Salamis in 480 B. C., or, according to the Arundel Marbles, in 485. According to a tradition, he was b. on the day of the battle of Salamis, Sept. 23, 480. He was the son of an Athenian citizen named Mnesarchus, who sought refuge in Salamis when the Per. army captured Athens. He was a pupil of Anaxagoras, and studied rhetoric under Prodicus. He also enjoyed the intimate friendship of Socrates. As a rival of Sophocles he gained the first prize in several dramatic contests. Like Socrates, he was accused of impiety and unbelief in the gods. About 408 he withdrew from Athens to the court of Archelaus, king of Macedonia. E. composed 75, or, as some say, 92 tragedies, of which 18 are extant; among the best are *Alceste*, *Medea*, and *Orestes*. Aristotle calls him the most tragic of poets. According to a doubtful tradition, he was killed by hounds in 406 B. C., and buried at Pella. His works display great insight into human passions and skill in the analysis of character. Though his plots are censured, he stands pre-eminent among the Gr. tragic poets in the vigorous expression of individual passions and in knowledge of human nature.

Euroc'lydon (Gr. *ευροκλῡδων*, from *ευρος*, the "east wind," and *κλῡδων*, a "billow"), the name of a violent wind of the Mediterranean, mentioned in Acts. The Vulgate renders it *euro-aquilo*, i. e. "N. E. wind." But in some of the best MSS. *ευρακλῡδων*, "E. N. E. wind," is the reading, instead of *ευροκλῡδων*, "N. E. wind." The wind in question is said to be half a point N. of E. N. E. (See SMITH'S *Voyage and Shipwreck of St. Paul*.)

Euro'pa (Gr. *Εὐρώπη*), in classic mythology, a daughter of Agenor, king of Phœnicia, and a sister of Cadmus. According to the poetic legend, she was carried to Crete by Jupiter, who assumed the form of a bull, and she was the mother of Minos and Rhadamanthus.

Europe, *Ůrup* [Lat. *Euro'pa*, so named by the Asiatic Græcs, either from its wide coast or from the Phœnician princess Europa], one of the 4 great continents, and historically the most notable, occupies an area of about 3,823,000 sq. m.; bounded N. by the Arctic Ocean, E. by Asia, S. by Asia, the Black Sea, and the Mediterranean, and W. by the Atlantic. Its greatest breadth is about 3400 m., and its extent from N. to S. 2400 m. at the extreme points. Its terr. has been more carefully mapped out than any other part of the earth's surface. G. Brit. and Ire., although distinct islands, always rank as a part of E., having been separated from the continent at no very remote period. In the N., Iceland and Nova Zembla, and in the Mediterranean, Corsica, Sardinia, Sicily, Malta, Crete, the Ionian and the Balearic Islands, also belong to E. E. is only about $\frac{1}{4}$ as large as either Asia or Amer., and is more populous in proportion to area than any other continent, having about 81 inhabs. to the sq. m. The length of coast-line is about 20,000 m., 8000 of this being on the Atlantic, 3600 on Arctic Ocean, and 7800 on Mediterranean and Black Seas, giving unequalled advantages for commerce. Its 2 great peninsulas, It. and Sp. and Port., form very marked features of its topography.

Geology.—The great Mediterranean basin is the geological feature of S. Europe, having its N. limit at the chains of mts. known as the Cévennes, the Jura, etc. The prevailing rocks are plutonic and metamorphic, of which the Alps are composed, and which are found in Fr., Ger., Scandinavia, etc. In Sp. the Silurian rocks are found. Other palæozoic rocks—the Devonian, carboniferous, and permian—occupy large areas in Rus., the Brit. Islands, etc. Ger., Fr., and Eng. have extensive strata of the secondary formations, and the tertiary are still more widely distributed. Cretaceous rocks abound in Den., Gr., and S. Rus., beside forming a large part of the Paris basin and the basin of the lower Rhine. Mineral wealth abounds. Mines of iron ore, lead, copper, coal, and salt are extensively worked, while for gold and silver E. is mainly dependent upon other countries. E. abounds in mineral springs of great variety and chemical virtue.

Mountains.—The great characteristic groups lie in Switz., Aus., and N. It. In elevation they are surpassed by the mts. of Asia and S. Amer., the highest of all, Mt. Blanc, being only 15,781 ft. The Alps are closely grouped over an area of 75,000 sq. m., and all the other mts. except the Pyrenees, may be ranked as secondary portions of the great Alpine system. The mean height of the Apennines varies from 2600 to 6400 ft. The Pyrenees, running across the isthmus between Fr. and Sp., are about 240 m. long, and average from 3000 to 8000 ft. high; highest point, 11,427 ft. Active volcanoes are now found only in Iceland and in It. The ratio of highlands to lowlands is greater in E. than in most countries; S. W. Europe is a high table-land, while N. E. Europe presents the only plain of great extent.

Rivers.—The prin. rivers are the Danube, Volga, Ural, Dnieper, Don, Neva, Oder, Rhine, Elbe, Vistula, Tagus, Rhone, Seine, Thames, Arno, Po, etc. The Volga drains half a million sq. m. of Rus. terr., and the Danube has a basin estimated at 300,000 sq. m. The flow of some of these is very irregular, and the Danube, the Elbe, the Loire, and others are subject to serious floods. Extensive engineering works to promote navigation and diminish the dangers of floods have been executed. The rivers penetrate the whole continent, fertilizing the soil and lending great natural facilities to commerce. No European river has a great waterfall. The famous Staubbach fall is a mere rill, although the whole descent is 980 ft.

Lakes.—E. abounds in lakes, Lake Ladoga in Rus. being the largest, with 9000 sq. m.; Lake Onega in Rus. has 5000 sq. m. Minor lakes, celebrated for their beauty, are lakes Geneva, Maggiore, Como, Neufchâtel, Constance, Zurich, Lucerne, etc.

Climate.—The numerous small lakes of E. increase the area of evaporation, and tend to make the climate far more moist than that of Amer. or Asia. This is further increased by the Mediterranean, and the large water surface penetrating and hemming in the continent has a powerful tendency to ameliorate the climate; the temperature of any given parallel of lat. in E. is several degrees warmer than the regions in the same lat. in Amer. The whole of E. belongs to the N. temperate zone, except the small portion extending into the N. frigid zone. While no part of the continent touches the tropics, the S. portion is marked by the dryness of the summer peculiar to the sub-tropical zone. The rainfall occurs most largely in the winter in S. It. and Sp.; autumn and spring are the rainy seasons in N. Sp. and It. and in S. Fr. Summer brings a rainy season to Switz., Ger., Aus., Prus., and Swe. The Brit. Islands have their maximum rainfall in winter. Meteorological statistics show the maximum rainfall at Skye and in the W. of Eng., with 101 to 189 inches of annual rainfall, while that of Salamanca in Sp. is only 9 inches, and the average in Swe. and Rus. and parts of Ger. is as low as 15 to 21 inches per annum. W. Europe has heavier rains than E., and the most prevalent wind is the S. W. In S. E. Europe the prevailing winds are from the N. and E., the latter in fall and winter. The snow-line in the mts. varies from 8000 to 13,000 ft. above the sea among the Alps and Pyrenees, while in Nor. the snow-line comes down to the altitude of 2360 ft.

Soil and Productions.—The climate of E. has such variety as to favor the growth of the richest products of the vegetable kingdom. The regions of the Mediterranean, where ages of fertility have produced both vernal and autumnal growths, and the S. of Sp., where almost tropical luxuriance bears fruits every month, contrast strongly with the Arctic regions, with their short period of vegetation. Of the cereal crops, wheat is heavily grown in Rus., Aus., Fr., Eng., Ger., and the countries of the Danube. Barley is an almost universal crop, as are rye and oats in Central and N. Europe. Maize or Indian corn is largely cultivated in the S.; the potato has spread over Central and N. Europe.

Beans, peas, clover, lucerne, sainfoin, hemp, flax, etc. are grown profusely. The cultivation of the vine is of prodigious extent (being profitably grown as far N. as 50°), and forms a vast industry in Fr., It., Aus., and Sp. The olive flourishes in It., Gr., Sp., and Port., growing 2 crops annually. Tobacco is grown all the way from Sic. N. to Swe. The beet is cultivated in Central E. for the manufacture of sugar. Among fruits and nuts, there are the orange, fig, almond, citron, pomegranate, pistachio, apples, pears, cherries, plums, and date-palms. The timber trees, though greatly depleted by centuries of consumption, still furnish forest products for fuel and the arts. N. Europe has a large timber trade. Among the trees are the oak, chestnut, beech, ash, alder, birch, pine, elm, maple, poplar, hemlock, and fir.

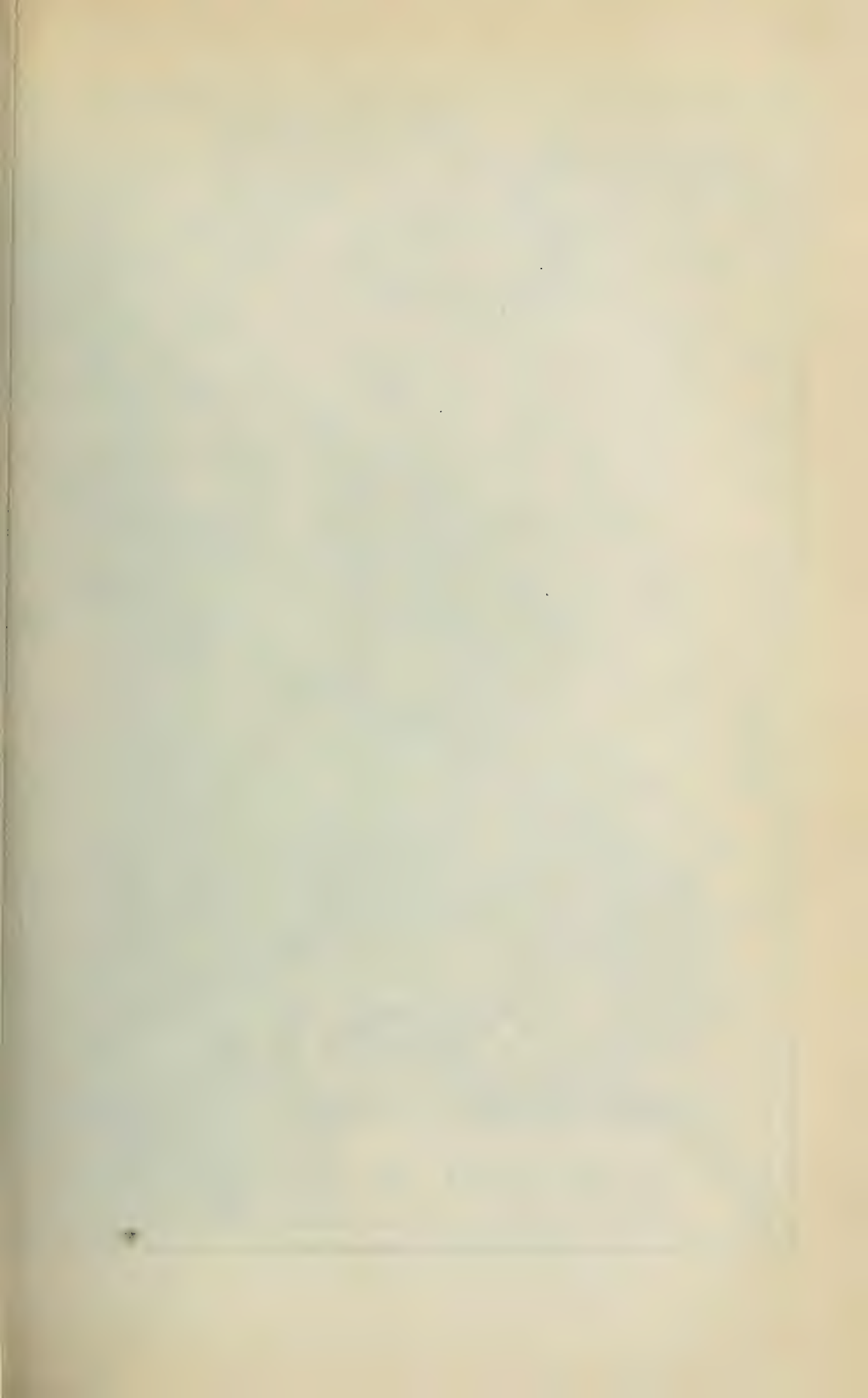
Zoology.—According to Wallace, E. belongs to the palæarctic region. While wild animals are by no means so numerous as on other continents, the domestic animals are reared in large numbers and in great perfection. The larger varieties of Carnivora are few. Among the characteristic animals are the reindeer, bear, wolf, fox, weasel, badger, hedgehog, chamois, hare, rabbit, squirrel, marten, etc. The birds number 247 genera and 531 species, but of these only 2 or 3 are peculiar to this continent. There are the thrush, warbler, magpie, jackdaw, linnet, sparrow, shrike, kingfisher, vulture, quail, eagle, hawk, kite, buzzard, owl, swallow, lark, nightingale, blackbird, etc. The waters, both coastwise and inland, are well stocked with fish, among which the salmon holds a chief place, while the herring, cod, sardine, sprat, perch, tunny, anchovy, etc. abound. Oyster-beds are found all along the Atlantic coast, and their artificial culture is widely extending, though in quality they are inferior to the Amer. oyster. The sponge and the coral fisheries are actively pursued on the Mediterranean. Among reptiles, the tortoise, turtle, chameleon, lizard, adder, viper, frog, and toad are the prin. Insects are not so numerous nor so annoying in E. as in the warmer regions of the globe.

Population.—The inhabs. of E. embrace many composite races, the characteristics of which have been greatly changed and modified in successive ages by migrations, intermarriages, and conquests. Modern archaeologists have found evidence of human inhabs. in E. as early as the pleistocene period. Remains of these races, called the men of the Old Stone Age (and distinguished by some as the cave-dwellers and the inhabs. of the river-beds), are found in Eng., Belg., Fr., Ger., and Switz. At a later but still pre-historic period came the neolithic people, still of the Stone Age. The great Aryan race, still predominant in E., came in at an uncertain period, probably by way of Asia Minor. Writers on ethnology mark out 4 great Aryan detachments—viz. the Græco-Lat. or S., the Celtic or central, the Teutonic or N., and the Slavonic or N. E. Of the Semitic race (mainly Jews), the migration into E. was gradual. Brachelli estimates the 287,000,000 Europeans of Aryan origin to be composed approximately as follows: Ger. peoples (including Gers., Dut., Belgs., Eng., Swedes, Nors. and Danes), 95,000,000; Græco-Lat. peoples (including Fr., Its., Spaniards, Port., Grs., Rumanians, Moldavians, Wallachians, etc.), 96,400,000; Slavonic peoples (including Rus., Poles, Bohemians, Moravians, Wends, Croats, Servians, Bosniaks, Bulgarians, Slavonians, etc.), 82,170,000; Celts, 4,100,000; Semitic peoples, 3,200,000; Lithuanians, 2,800,000; Albanians, 1,300,000; Basques, 700,000; Gypsies, 600,000; Circassians, 400,000; Armenians, 260,000. There remain, beside this overwhelming preponderance of Aryanized pops., only about 4,000,000 Mongolians (Tartars, Turks, and Kalmucks) and 10,500,000 of Uralian peoples (Magyars and Finns).

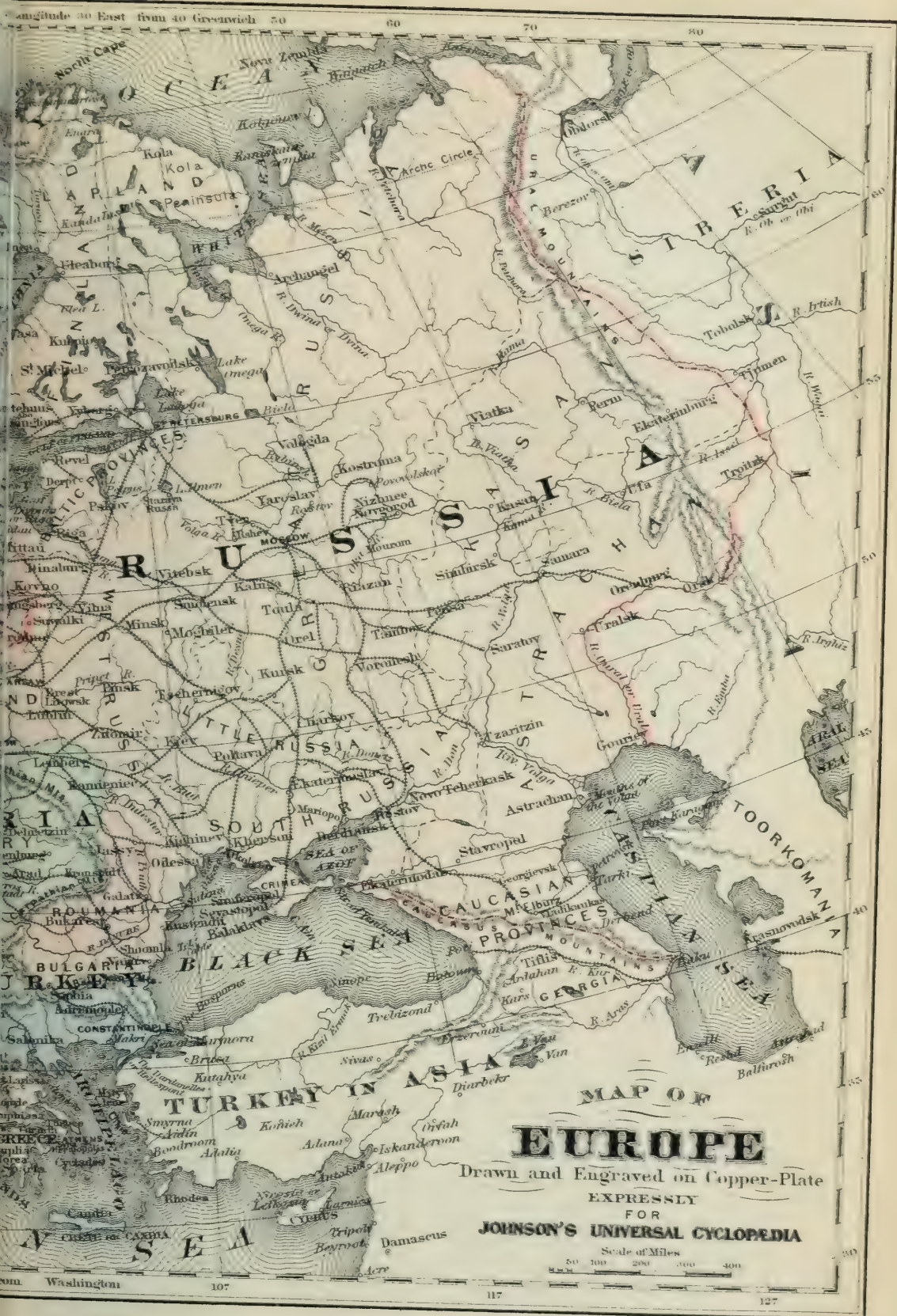
Language.—There are about 60 distinct langs. now spoken in E.; most of these are of the Aryan family, including the Hellenic, Italic, Celtic, Teutonic, Slavonic, and Lettish branches. The Semitic branch includes the Heb., Arabic, etc., and the Tartaric, the Tur., Magyar, Laponic, and many other dialects of limited area. Rapid changes are going on which appear destined to extinguish ultimately many of the minor langs. in favor of those great vehicles of speech, the Eng., Fr., Ger., It., Sp., and Rus.

Political Divisions.—Recent changes in the political map of E. have left its prin. divisions as follows: 4 empires, 11 kingdoms, 4 republics, and 4 principalities. The areas and pop. of these political divisions are as follows:

COUNTRIES.	Government.	Sq. miles.	Population.
Andorra.....	Republic.....	148	12,000
Austria-Hungary.....	Empire.....	240,415	37,741,413
Belgium.....	Kingdom.....	11,369	5,476,668
Denmark.....	.....	14,784	1,969,454
France.....	Republic.....	204,030	36,905,788
Germany.....	Empire.....	208,624	45,194,172
G. Brit. and Ire.....	Kingdom.....	121,571	35,246,633
Greece.....	.....	20,018	1,679,775
Italy.....	.....	114,380	28,209,620
Lichtenstein.....	Principality.....	69	9,124
Monaco.....	.....	6	5,741
Montenegro.....	.....	3,657	286,000
Netherlands.....	Kingdom.....	12,727	3,981,887
Norway.....	.....	122,822	1,806,900
Portugal.....	.....	34,595	4,348,551
Roumania.....	.....	50,159	5,376,000
Russia.....	Empire.....	1,898,019	72,520,000
San Marino.....	Republic.....	24	7,816
Servia.....	Principality.....	18,781	1,669,337
Spain.....	Kingdom.....	193,171	16,333,293
Sweden.....	.....	170,927	4,531,863
Switzerland.....	Republic.....	15,908	2,831,787
Turkey.....	Empire.....	130,935	8,866,500
Total.....		3,577,140	315,010,322









The increase of pop. in E. is very slow, being probably less than 1 per cent. per annum. War and emigration are the prin. causes retarding its growth: G. Brit. and Ire. have lost over 5,000,000 of their pop. since 1815, and Ger. over 2,000,000. The areas of densest pop. are near Lond., Paris, Milan, Naples, and Leipzig. The keeping on foot of great armies and the maintenance of costly navies constitute one of the chronic checks to the prosperity of E. In productions E. (as has been estimated) raises annually less food than its pop. consumes; and for clothing it is dependent upon other countries for all its cotton and for much of its wool and silk, the raw materials. E., however, more than makes up by its labor and skill for all it lacks in materials; its industries are so vast that E. may be called one great workshop, supplying with its manufactures not only its own wants but a large share of the wants of other divisions of the world.

Education.—The condition of E. exhibits a great advance in education during the present century. In every country (even including Tur.) laws exist for maintaining primary schools, and education is compulsory in all the nations except Fr., Rus., Belg., and Tur. Switz. and Prus. hold the highest rank in the universal diffusion of education.

Religion.—Paganism has but little foothold in E., which is pre-eminently Chr. There are 3 grand divisions—the R. Cath. Ch., the Gr. or E. Ch., and the Prot. Ch. Rom. Catholicism has much the largest number of adherents, especially in Aus., Fr., It., Belg., Sp., and Port. The following table approximates the numbers attached to the various religions:

COUNTRIES.	Catholics.	Anglicans.	Other Christians, mostly Protestants.	Jews.	Mohammedans.
Germany.....	14,867,500	3,000	25,690,700	522,200	100
Austria.....	27,084,200	3,052,700	3,871,000	1,375,800	400
France.....	35,088,000	.....	610,800	49,400	31,400
Great Britain.....	5,500,000	.....	25,900,000	40,000	.....
Russia.....	6,742,000	34,000,000	4,137,100	2,277,000	2,000,000
Italy.....	26,772,000	.....	35,000	40,000	.....
Switzerland.....	1,084,400	.....	1,577,000	7,000	.....
Belgium.....	4,880,000	.....	15,000	1,500	.....
Netherlands.....	3,313,000	.....	2,238,000	60,000	.....
Luxembourg.....	207,000	.....	400	600	.....
Denmark.....	1,200	.....	1,800,000	4,000	.....
Sweden.....	500	.....	4,200,000	1,500	.....
Norway.....	850	.....	1,094,000	20	.....
Spain.....	16,500,000	.....	.....	.....	.....
Portugal.....	3,950,000	.....	.....	.....	.....
Greece.....	10,000	1,442,000	.....	.....	.....
Turkey.....	650,000	11,000,000	.....	100,000	4,500,000
Total (approximate).....	145,850,000	69,500,000	71,460,000	4,500,000	6,600,000

History.—The authentic annals of E. commence with the Grs. Gr. founded colonies, but her people were not given to conquest, while the hist. of Rome, which soon supplanted Gr. as a political power, is one of continual aggression and territorial acquisition. Early in the Chr. era Rome had successively conquered Sic., Sp., Gr., and Gaul. In the time of Augustus the Rom. rule covered the whole region now embracing Fr., Belg., Sp., Port., the most of Ger., Switz., It., Aus., Servia, Tur., and Gr. When Constantine established the seat of govt. at Byzantium (now Constantinople) and made Christianity the religion of his empire, his territorial outlines were nearly the same. In A. D. 395 came the division of this great empire into E. and W., the latter embracing much the larger terr. and pop. Gradually the Ger. race became ascendant; the kingdom of the Franks was established, the English occupied Eng., the W. Goths and the Suevi divided Sp. between them, and Gaul (or Fr.) was under the E. Goths and the Burgundians.

Numerous conquests and changes mark the map of the Middle Ages. The papal power of Rome becomes dominant in the politics of many nations; Fr. and Eng. struggle for possessions on the Continent; all E. sends forth a crusade for the recovery of Christ's sepulchre, and the advance of the Ottoman power is vigorously resisted by the nations of W. Europe. The 16th century is marked by the vast extension of the empire of Charles V. over the Netherlands, Sp., Naples, and the Ger. states, leading to wars and rivalries which lasted for generations.

In the 18th century the Ger. empire acquired greatly extended power, while It. was broken up into many petty states; Fr. was strong, and Sp. and G. Brit. were the other leading powers. From 1789-1815 war again broke up the political frontiers through nearly all E., ending in a temporary triumph of absolute govt., followed by many more or less successful revolutions, which gave constitutional or rep. govt. to most of the nations. In 1830 Belg. became a separate constitutional kingdom, Fr. placed Louis Philippe, a constitutional king, on the throne, and the independence of Gr. was secured. In 1848 a revolutionary storm swept over E.; Rome expelled the Pope, and Sic. the Bourbons; Fr. became temporarily a republic, and the king of Prus. was forced to grant a const. and a rep. govt. to the people. A reaction set in, however, which carried back the tide of political reform. In 1855 the Crimean war was fought, Eng. and Fr. maintaining the integrity of Tur. against Rus. Great changes soon followed in It., the separate states of which consolidated under one constitutional king in 1861. Ger. absorbed the provs. of Schleswig-Holstein in 1864, and in 1866 the N. Ger. Confederation was formed; 1870 saw the great Franco-Prus. war, which lasted less than a yr., ending in the firm establishment of the Fr. republic and the crowning of the Prus. king as emp. of the Ger. Confederation. In 1877 Rus. declared war against Tur., and but for the intervention of G. Brit. and other powers would have swept her from the rank of a European nation. Tur. has lost Roumania, which became an independent kingdom, and Servia, which was established as a principality.

What are now known as the great powers of Europe are G. Brit., Fr., Ger., Aus., It., and Rus. To maintain what was called the "balance of power" in E. has cost a long succession of bloody wars, a sacrifice of countless lives, a squandering of vast treasure, and the oppression by taxes and compulsory military service of the masses of the people. The increasing facilities of intercommunication, with the steady growth of intelligence, may yet lead to better methods of settling international differences. Several European congresses evince a tendency to adopt discussion and arbitration instead of war, and some believe in an ultimate confederation of the states of E. for the common benefit and advancement of all.

Eurydice [Gr. *Εὐρυδική*], the wife of Orpheus. According to the poetic legend, Orpheus descended to the infernal regions, and persuaded Pluto to restore her to him on condition that she should walk behind Orpheus, and that he should not look back until they had reached the upper world. But he looked back, and lost her.

Eurypygidæ, a family of birds of very doubtful position in the system, being placed by some authors among the Herodiones, by others among the Alcedorides, near the *Rallidæ*. Their most characteristic features are the very long and broad tail, the feathered lores, short and elevated hallux, and a pair of large uropygial powder-down tracts. It embraces the so called sun bittern, inhabiting S. Amer.

Eusebius, bp. of Emesa, b. near Edessa about 300 A. D. He declined the bishopric of Alexandria, when Athanasius was deposed in 341, but in the same year accepted that of Emesa. He appears to have held the principles called Semi-Arian, and to have been distinguished for his moderation and aversion to controversy. He wrote many eloquent homilies, some of which are extant. D. 359 A. D.

Eusebius [Gr. *Εὐσέβιος*] of NICOMEDIA, an Arian prelate, was a member of the Council of Nice in 325 A. D., having previously become bp. of Nicomedia. He was banished because he defended Arius in this council, but was soon restored to his bishopric. After the death of Arius he was the head of the Arian party, often called Eusebians. In 339 he became patriarch of Constantinople. D. 342 A. D.

Eusebius Pamphilus, bp. of Cæsarea, a theolog. and writer of ecclesiastical hist., b. in Pal. about 260 A. D. He assumed the surname PAMPHILUS in honor of his friend Pamphilus the martyr. He became bp. of Cæsarea 314 or 315 A. D., and took a prominent part in the Council of Nice (325 A. D.). Constantine the Great selected him to open this council by an oration. E. was inclined to moderation and peace, used his influence to reinstate Arius, and was a leader of the Semi-Arians. He was one of the bps. who censured Athanasius at the Council of Tyre (334). He was eminent for learning and talents, and has been styled the "father of ecclesiastical hist." His great work is an *Ecclesiastical Hist.* from the beginning of the Chr. era to 324 A. D.; he also wrote a *Life of Constantine* and many other works which are extant. D. about 340 A. D.

Eustachius [It. *Eustachio* or *Eustachio* BARTHOLOMÆUS], an It. anatomist, b. at San Severino in the March of Ancona; studied med. in Rome; was a prof. at Rome 1562; made important discoveries in anat., among which was the Eustachian tube, and was the first anatomist who illustrated his works with good engravings on copper. D. 1574.

Eustathius, from 324 bp. of Antioch in Syria; was banished in 331 because he would not associate with anti-Nicæans; and Meletius, bp. of Sebaste, was appointed in his place. But his adherents did not recognize Meletius, and formed the party of the Eustathians. D. 360.

Eustathius, bp. of Sebaste in Armenia Minor from 357 to 380 A. D. introduced monachism into Pontus. He was condemned by the synod of Gangra because he rejected marriage. His followers rejected holy ceremonies if performed by married priests, persuaded women to leave their husbands, and are said to have fasted on the Sabbath.

Eustathius, a celebrated Gr. commentator on Homer, was first deacon and then teacher of rhetoric in Constantinople, and after 1155 abp. of Thessalonica, where he d. in 1198. His chief work is a commentary on Homer.

Eustis, Fla. See APPENDIX.

Eustis (ABRAHAM), b. at Boston Mar. 28, 1786, grad. at Harvard 1804; was called to the bar 1807; entered the army as capt. of artil. 1808, served with distinction in the war of 1812-15; received in 1834 a brevet of brig.-gen., and became col. of the 1st Artil. D. June 27, 1843.

Eustis (GEORGE) LL.D., b. at Boston Oct. 30, 1796, grad. at Harvard 1815; was private sec. to his uncle, Gov. William Eustis, when minister at The Hague; removed to New Orleans 1817; admitted to the bar 1822; was for some yrs. chief-justice of the State supreme court. D. Dec. 23, 1858.

Eustis (HENRY LAWRENCE), an officer and engineer, b. at Ft. Independence, Mass., Feb. 1, 1819, studied at Harvard, and grad. at W. Pt. 1842; served as lieu. of engineers in the construction of fortifications, etc., and assistant prof. at the Military Acad. till he resigned (1849) to become prof. of engineering in Lawrence Scientific School of Harvard Univ. In the c. war he was col. of the 10th Mass. Volunteers, serving at Fredericksburg, Gettysburg, Mine Run, the Wilderness, Spottsylvania, Cold Harbor, etc.; became brig.-gen. of volunteers in 1863, but resigned (1864) to resume his professorship at Cambridge. D. Jan. 11, 1885.

Eustis (WILLIAM) M. D., LL.D., b. in Cambridge, Mass., June 10, 1753; served as a surgeon in the war of Independence, after which he practised med. in Boston, and was M. C. 1800-05 and 1820-23. He was sec. of war from 1809-12, and was minister to Hol. 1814; in 1823 was elected gov. of Mass. D. Feb. 6, 1825.

Eutaw Springs, Battle of, was fought in S. C., about 60 m. N. W. of Charleston, Sept. 8, 1781. Gen. Greene, having about 2000 men, attacked a Brit. force under Col. Stuart, who was compelled to retreat, and lost about 620, including prisoners. Greene lost 535, killed, wounded, and missing.

Eutropius, or **Flavius Eutropius**, a Lat. historian who flourished about 350-375 A. D. He wrote an *Epitome of Rom. Hist.* from the foundation of Rome to the time of Valens *Breviarium Rerum Romanarum*.

Eutyches [Gr. Εὐτυχής], an aged superior of a monastery near Constantinople. He was charged with teaching that there is in Christ only one nature—i. e. the divine; was condemned by the Council of Constantinople, 448 A. D., but this decision was reversed by the Council of Ephesus, 449. His doctrines were again condemned by the Council of Chalcedon, 451 A. D., soon after which he died. The Eutycheans were often called *Monophysites*.

Euxine Sea. See **BLACK SEA**.

Evagoras [Gr. Εὐαγόρας], king of Salamis in Cyprus, began to reign in 410 B. C., and as an ally of the Athenians and Egyptians waged a long war against the king of Pers., who invaded Cyprus. He was assassinated 374 B. C.

Evagrius, a Ch. historian, b. about 536, was at first a lawyer, and was appointed city prefect by the emp. Maurice. He continued the Ch. histories of Socrates and Theodoret from 431-594 with great care and impartiality.

Evangelical Alliance. This is a voluntary association of evangelical Chrs. from different chs. and countries for the purpose of promoting religious liberty, Chr. union, and co-operation. It was founded in Lond. 1846, on the following doctrinal basis:

"1. The divine inspiration, authority, and sufficiency of the Holy Scriptures.

"2. The right and duty of private judgment in the interpretation of the Holy Scriptures.

"3. The Unity of the Godhead, and the Trinity of the Persons therein.

"4. The utter depravity of human nature in consequence of the Fall.

"5. The incarnation of the Son of God, his work of atonement for the sins of mankind, and his mediatorial intercession and reign.

"6. The justification of the sinner by faith alone.

"7. The work of the Holy Spirit in the conversion and sanctification of the sinner.

"8. The immortality of the soul, the resurrection of the body, the judgment of the world by our Lord Jesus Christ, with the eternal blessedness of the righteous and the eternal punishment of the wicked.

"9. The divine institution of the Christian ministry, and the obligation and perpetuity of the ordinances of Baptism and the Lord's Supper."

The E. A. soon spread throughout the Prot. world. Branch alliances were formed in G. Brit., the U. S., Ger., Fr., Switz., Swe., and even among the missionaries in Tur. and E. I., in Australia, in Brazil, and in Japan. From time to time gen. conferences are held, composed of Prot. Chrs. from all denominations and countries. The 6th Gen. Conference met in New York 1873, the 7th in Bile 1879. The different branches hold also separate conferences; the Brit. branch every yr., the Amer. every other yr. The Alliance did a noble practical work in defense of religious liberty, wherever assailed, in It., Sp., Tur., Scandinavia, Rus. and Aus. United deputations of various branches effected the release of the Madi family, who were imprisoned for reading the Bible in Florence; of Matamoros, Carrasco, and others, who were imprisoned for the same offense in Madrid during the reign of Queen Isabella, and interceded with more or less success for the persecuted Chrs. in Tur., for the Meths. and Baps. in Swe., and for the oppressed Lutherans in the Baltic provs. of Rus. It is the only Chr. society for the protection of religious liberty. The Gen. Conference of New York is regarded as the most important and interesting religious meeting held on the Amer. continent, and made a deep and lasting impression. PHILIP SCHAFF.

Evangelical Association, popularly known as the **German Methodist Church**, a body of Amer. Chrs., chiefly of Ger. descent, organized about 1800, by the Rev. Jacob Albright, a native of E. Pa. In doctrine and theol. it is Arminian; as to sanctification, Wesleyan; in form of govt. and mode of worship it usually agrees with the M. E. Ch.

Evangelical Church Conference, the name applied to periodical meetings of the Prot. state chs. of Ger. The idea of these meetings originated with King William of Wurtemberg in 1815. The first conference, held at Berlin in 1846, had reps. from almost every Ger. state. At the second conference, held in 1852 at Eisenach, an official central organ was established at Stuttgart. The conferences from 1855 to 1868 were all held at Eisenach.

Evangelical Churches are those bodies of Chrs. which believe in the divinity of Christ, in the necessity of his atonement, and in personal repentance and faith as essential to salvation. "Evangelische Kirche" ("Evangelical Church") is the official title of the Established Ch. of Prus., formed in 1817 by the union of the Lutheran and the Reformed chs. The Lutherans and Reformed (Calvinistic) chs. of Baden, Wurtemberg, and other Ger. states have been similarly united. The "evangelical party" in the Ch. of Eng. professes to attach especial importance to the teachings of the N. T., and is charged with slighting ch. authority and underrating the efficacy of the sacraments.

Evangelical Union, a body of Scotch Independents, called **Morisonians**, from Rev. James Morison, their original leader. In 1843 they left the United Secession Ch. They have been joined by some Congl. chs. of Scot. and Eng. They reject a part of the Calvinistic doctrines.

Evans (Sir DE LACY), D. C. L., a Brit. gen., b. at Moig, Ire., 1787; served at the battles of Baltimore 1814, New Orleans 1815, and Waterloo 1815. He was a Liberal M. P. from 1831 to 1841. In 1835 he was appointed commander of a legion of 10,000 men raised in G. Brit. to fight for the queen of Sp., and defeated the Carlists at several places. In 1846 he was returned to Parl. for Westminster. Having become lieutenant-gen., he commanded a division at the battle of the Alma and at Sebastopol, in Oct. 1854. D. Jan. 9, 1870.

Evans (EDWARD P.), b. at Remsen, N. Y., Dec. 8, 1833, grad. at the Univ. of Mich. 1854; studied at Göttingen, Berlin, and Munich 1858-62; was appointed prof. of modern langs. in the Univ. of Mich. 1862, and visited Europe again in 1870; pub. *Abriß der deutschen Literaturgeschichte*.

Evans (ELLCOTT), LL.D., b. at Batavia, N. Y., June 19, 1819, ed. at Harvard; in 1860 became prof. of law and political economy at Hamilton Coll., N. Y.

Evans (FREDERICK WILLIAM), b. at Leominster, Eng., June 9, 1808, came in 1820 to the U. S.; was apprenticed to a hatter. He studied the works of Owen and Fourier, visited Eng., and after his return went to the Shakers at Mt. Lebanon, N. Y., for the purpose of studying their system, to which he became a convert, and became the presiding elder brother and the leader of the sect in the U. S.

Evans (GEORGE), b. at Hallowell, Me., Jan. 12, 1797, grad. at Bowdoin 1815; called to the bar 1818; was M. C. 1829-41. U. S. Senator 1841-47, and held various other offices in his native State. D. Apr. 5, 1867.

Evans (HUGH DAVY), LL.D., b. at Baltimore, Md., 1792, was a prominent jurist and strong friend of the P. E. Ch. He wrote *Mod. Common-Law Practice and Essays* upon various Ch. questions. D. July 16, 1868.

Evans (JOHN), M. D., geologist, b. at Portsmouth, N. H., Feb. 14, 1812, grad. at the St. Louis Med. Coll.; served on several State and Territorial geological surveys, and discovered remarkable fossil deposits in the Bad Lands of Neb. He afterward made the U. S. geological survey of Or. and Wash. Terr. D. Apr. 13, 1861.

Evans (MARIAN C.). See LEWES (MARIAN E.).

Evans (OLIVER), an Amer. inventor, b. 1755 at Newport, Del. D. Apr. 25, 1819. His most valuable inventions were the automatic flour-mill and the high-pressure steam-engine. Before his time grain and flour were moved in the mill by manual labor. His improvements, which effected a complete revolution in the manufacture of flour, consisted of the elevator, the conveyor, the hopper-boy, the drill, and the descender. By means of this machinery grain was conveyed from a wagon or a boat into the mill, then cleaned, ground, bolted, and delivered into barrels without the intervention of human hands. After great opposition these improvements were introduced into the celebrated Ellicott Mills, near Baltimore, where 325 barrels of flour were daily made. The saving there effected by E.'s contrivances was estimated at more than 50 cents per barrel. He made experiments in which the pressure of steam moved the piston, and in 1781 announced that he could propel boats and wagons by means of steam. In 1786 the State of Pa. gave him the exclusive right to use in that State his flour-mill, but refused to grant the same right to use his steam-wagon. In 1787, however, Md. granted him the right to use both inventions in that State. In order to obtain assistance in building his road-engine, he exhibited his drawings and plans to capitalists and engineers; failing to find one who would join him in the enterprise, he twice sent his plan and specifications to Eng. in the vain hope of convincing foreign engineers of the feasibility of his device. Finally, in 1801 he decided to devote all his earnings from his other inventions, about \$3700, to the construction of a stationary steam-engine on the direct-pressure plan. It was completed and put into operation in the city of Phila., and continued to be used successfully for many yrs. in sawing marble and grinding gypsum. Thus 1801 marks a new era—the introduction of the most important of all engines. Soon after, by order of the board of health of Phila., E. constructed a device for cleaning or dredging docks. It consisted of a small scow or flatboat, with a small steam-engine of 5-horse power and boiler on board to work the dredging machinery. In order to show its adaptability to locomotion, he connected his engine, by means of pulleys and bands, with 4 wooden wheels turning on wooden axles beneath the boat, also with a paddle-wheel behind it. This singular contrivance for moving on land and water he called the "Erector amphibolis." By steam alone it was driven over the highway from his workshop to the Schuylkill River, about 1½ m., where it was launched, and from thence propelled down the Schuylkill to its mouth, and up the Del. River to the city, a distance of 14 or 15 m. This was the first application of the high-pressure principle to locomotion, and the E. engine, with important improvements made since his day, drives all the locomotives and steam-carriages now in use. E. also invented the cylinder boiler, with a cylindrical internal flue, known as the "Cornish boiler." [From orig. art. in *J. of Nat. Hist.*, by SAMUEL D. TILMAN, LL.D.]

Evanson, Cook co., Ill., on R. R., 12 m. N. of Chicago. It is the seat of the N. W. Univ. No intoxicating liquors can legally be sold within 4 m. of the Univ. It is also the seat of Garrett Biblical Inst. Pop. of tp. 1870, 3062; 1880, including part of v. 6703; v. 4400.

Evanson, cap. of Uintah co., Wy. Terr., on R. R. and Bear River, 76 m. E. of Ogden, and half way between Omaha and San Francisco. An abundance of coal is found within 3 m.; iron ore is also found. Pop. 1880, 1277.

Evansville, a city, important R. R. centre, and port of entry, cap. of Vanderburg co., Ind., on the O. River, 185 m. below Louisville and 192 above Cairo. It is S. terminus of Wabash and Erie Canal, and is prin. shipping-point of S. W. Ind. Pop. 1870, 21,830; 1880, 29,280; 1883, about 40,000.

Evansville, Rock co., Wis., on R. R., 22 m. S. by E. of Madison. It has a sem. Pop. 1880, 1068.

Evart, on R. R., Osceola co., Mich., situated in the heart of a great lumber country, about midway between Lake Huron and Lake Mich. Pop. 1880, 1302.

Evarts (JEREMIAH), an Amer. ed., b. in Sunderland, Vt., Feb. 3, 1781, grad. at Yale 1802. Having studied law, he was admitted to the bar in 1806, and became ed. of the *Panoplist*, a religious paper of Boston, about 1810. In 1821 he was chosen corresponding sec. of the board of coms. for foreign missions. D. May 10, 1831.

Evarts (WILLIAM MAXWELL, LL.D.), a lawyer and states-

man, a son of the preceding, b. in Boston, Mass., Feb. 6, 1818, grad. at Yale 1837; studied law, which he practised in the city of New York, where he was admitted to the bar in 1840. He became a Rep. soon after that party was organized. He was the leading counsel employed for the defence of Pres. Johnson in his trial before the Senate in Apr. and May 1868, and was atty.-gen. of the U. S. from July 1868 to Mar. 4, 1869. He was one of 3 lawyers appointed in 1871 to defend the interests of citizens of the U. S. before the tribunal of arbitrators who met at Geneva to settle the "Alabama claims"; appointed sec. of state by Pres. Hayes Mar. 7, 1877, and served during that administration. Elected U. S. senator from N. Y., Jan. 21, 1885.

Eve (PAUL FITZSIMONS), M. D., of near Augusta, Ga., June 27, 1806, grad. at the Univ. of Ga. 1826, and as M. D. at the Univ. of Pa. 1828; studied several yrs. in Europe; was a surgeon in the Polish revolution of 1831; became prof. of surgery in the Med. Coll. of Ga. 1832, in Louisville Univ. 1849, in Nashville Univ. 1850, and in Mo. Med. Coll. 1868. In 1870 he became prof. of operative and clinical surgery in the Univ. of Nashville. He was pres. of the Amer. Med. Association in 1857. He served as a surgeon in the Confed. army. He was editorially connected with professional journalism for many yrs., was the author of numerous monographs upon surgery, etc. D. Nov. 3, 1877.

Everdingen, van (ALBERT), a painter of landscapes, b. in Hol. 1631. His taste was for wild scenery; his pencil was bold, his coloring strong and effective. His etchings are famous. D. 1675.

Everest, Mount [native name *Gaurisankar*], the highest mt. of the earth, is in the E. range of the Himalayas, in N. Nepal, lat. 27° 59' N., lon. 86° 54' E. Height, 29,002 ft.

Everett, Mass. See APPENDIX.

Everett, Pa. See APPENDIX.

Everett (ALEXANDER HILL), LL.D., a scholar and diplomat, b. in Boston, Mass., Mar. 19, 1792, was a brother of Edward Everett; grad. at Harvard, 1806, studied law in the office of John Q. Adams, with whom he went to Rus. as sec. of legation 1809. Having returned home in 1812, he practised law in Boston. He was chargé d'affaires at the Hague 1818-24, and pub. in 1821 an able work, *Europe, or a Gen. Survey of the Prin. Powers*, etc. In 1825 he was appointed minister to Sp. by Pres. Adams. He returned home in 1829, and was ed. of *N. Amer. Review* for about 5 yrs. He was appointed com. to Chi. 1845. D. at Canton, Chi., June 29, 1847.

Everett (CHARLES CARROLL). See APPENDIX.

Everett (EDWARD), LL.D., D. C. L., an orator and statesman, b. in Dorchester, Mass., Apr. 11, 1794, was a son of Rev. Oliver Everett, who d. in 1802. He attended a school in Boston, at which Daniel Webster for a short time supplied the place of his brother, Ezekiel Webster, the regular master. He was twice a "Franklin medal scholar" of the Boston public schools, and for a few months a pupil of Exeter Acad. In 1811 he grad. at Harvard Univ. with the highest honors of his class. In 1812 he was appointed a tutor at Harvard. On Feb. 9, 1814, he was ordained as pastor of the Brattle St. (Unit.) ch. in Boston, where the fascination of his manner and the power and beauty of his sermons made the deepest impression on his hearers. In Mar. 1815 he accepted the Eliot professorship of Gr. lit. at Harvard, and terminated his career as a settled clergyman before he was quite 21 yrs. of age. Proceeding at once to Europe, he studied for 2 yrs. at the Univ. of Göttingen, of which he became Ph. D. in 1817, and then travelled there, making special visits to Athens and Constantinople, returning in 1819. A brilliant course of lectures on anc. Gr. and its arch. inaugurated his accession to the chair, which he held until 1825. His fame as a secular orator may be dated from the delivery of his Phi Beta Kappa oration at Cambridge in August 1824, at which La Fayette was present. Succeeded as it was by his oration at Plymouth on the 23d of Dec. of the same yr., an enthusiastic admiration was kindled and kept alive, which could only be satisfied by calling him into political service, and he was elected M. C. from the Middlesex dist., serving in that capacity from 1825 to 1835. In 1836 he was called home to be gov. of Mass., and was continued in that office by successive annual elections until 1840, when a single vote, out of more than a hundred thousand, defeated his re-election. Going at once, for a second time, to Europe, he established himself in one of the Medicean villas at Florence, and prepared to enter upon his long cherished purpose of writing hist. But hardly a yr. had elapsed before he received a call to proceed without delay to Lond. as minister plenipotentiary of the U. S., and he entered upon that mission in 1841. Returning home in 1845, he was met with an inexorable demand that he should assume the then vacant presidency of the univ. at Cambridge. Accepting the position reluctantly, he gave 3 yrs. to its duties. A brief interval of rest afforded him time to contemplate afresh some larger literary work than had yet engaged him. But the death of Mr. Webster, in Nov. 1852, left a vacancy in the dept. of state at Wash., which he was immediately summoned to fill, and on the expiration of his brief term as sec. of state, by the termination of Pres. Fillmore's administration in 1853, he was elected by the legislature of Mass. a Senator in Congress. He held that place but a single yr., when, owing to ill-health, he retired. In 1860 he accepted a nomination for the vice-presidency of the U. S., but failed of an election, and the last 10 yrs. of his life were thus left undisturbed by political responsibilities. But nothing like private life, as that phrase is commonly understood, awaited his retirement. Calls were soon heard from a hundred sources for the exercise of his personal influence and his oratorical powers in behalf of some charitable institution, or in commemorating some historical event, or in eulogizing some illustrious person, or in patriotic defence of the Union. It was not in his nature to decline such calls. It was during this period he traversed the country and delivered his address on *The Character of Washington*, and paid over about \$60,000 to the treas. of the fund for the purchase of Mt. Vernon.

There have been published in book form *The Mt. Vernon Papers*, his *Biography of Washington*, his *Defense of Christianity*, and his *Orations and Speeches*. His life must be taken as a whole, in order to form any adequate appreciation of its value. Certainly, there have been wiser and profounder statesmen among us, and scholars as learned and accomplished; but we think the annals of our country to the day of his death will be searched in vain for another so ready, prolific, and brilliant a writer and speaker, or for one who has done more both to adorn Amer. lit. and to advocate and advance every public interest and patriotic cause. D. Jan. 15, 1865. *From orig. art. in J. S. Fairbairn's Gen. by Hon. ROBERT C. WINTEROP, LL.D.*

Everett (HORACE), LL.D., b. 1780, grad. at Brown Univ. 1797; settled as a lawyer at Windsor, Vt., became a prominent politician, holding important positions in Vt.; was M. C. 1829-43, and was distinguished as a friend of the Indians. D. Jan. 30, 1851.

Everglades, a marshy region in S. Fla., S. of Lake Okechobee, resembling a shallow lake abounding in low islands, covered with a jungle of pines, palmettoes, vines, and tropical trees, many of which are found only in this State and the W. I. The water between the islands is from 1 to 6 ft. deep, and is covered with tall grass. The E. are 160 m. long and 60 broad. They are elevated several ft. above the sea, which often approaches within ½ m.; their drainage is now in progress.

Evergreen [Lat. *sempervirens*], a term applied to trees and shrubs whose leaves are not deciduous, but persistent, retaining their verdure throughout the winter. E. leaves are mostly thicker and firmer in texture than the leaves of deciduous trees. The greater part of the trees of the natural order Coniferae are E., as the pine and cedar. Among other E. are the holly, orange, ivy, myrtle, box, and laurel. In gen. the duration of the life of leaves is in inverse ratio to the activity of their evaporation. According to W. B. Carpenter, "Trees and shrubs which are spoken of as evergreen do not really retain their leaves for more than a yr.; but they are not cast off until a new crop appears, and the exchange does not take place suddenly, but gradually." "There are some falling leaves," says De Candolle, "as those of firs, which remain 2, 3, or more yrs., but which ought not to be confounded with persistent leaves, although both constitute the permanent foliage of evergreen trees and shrubs."

Everlasting Flowers, the common name of several genera of the order Composite, having flowers which if dried and preserved retain their form and color many yrs. They are often called immortelles.

Eversley (CHARLES SHAW-LEFEVRE), Viscount, D. C. L., b. in Lond. Feb. 22, 1794, ed. at the Univ. of Cambridge, and admitted to the bar. From 1830 to 1857 was an M. P., and for 18 yrs. (1839-57) was speaker of the House of Commons. He became Viscount Eversley in 1857.

Eversmann (EDUARD FRIEDRICH), a Ger. traveller and naturalist, b. in 1794, went to Bokhara with the Rus. embassy in 1820, to the shores of the Caspian in 1825, and afterward to the S. Ural, Caucasasia, and Algeria. In 1828 became prof. of zoology and bot. in the Univ. of Kasan. He pub. several accounts of his travels. D. 1860.

Everts (W. W.), D. D., a Bap. minister, b. in Granville, N. Y., 1815, grad. at Madison Univ. 1839; preached in New York 1839-50, in Louisville 1852-59, when he became a pastor in Chicago. He has written the *Pastor's Handbook*, *Bible Manual*, and other works.

Eviction [Lat. *evictio*, from *e* (ex), "out," and *rinco*, *victum*, to "conquer"], the act of dispossessing one of his lands or tenements, as when a third person evicts a tenant by means of a title superior to that of the landlord, or a vendee by a title superior to that of the vendor. When the grantee of premises is evicted, if the conveyance to him was with a covenant of warranty, he can recover from the grantor the consideration-money, with interest, but not, in gen., the increased value of the premises, even if caused by improvements made by him on them; but the rules on this point differ in different States. If evicted from part of the premises only, he recovers a proportionate part of the consideration.

Evidence Lat. *evidentia*, from *e*, "out," implying "clearness," and *video*, to "see"; in law, is the means of establishing an allegation made in a court of justice. In an action the respective parties make written statements of their cause of action and defence. The matter thus in dispute between them is called an issue. The object of E. is to establish or disprove the propositions alleged. The result of the E. is called proof. E. may be considered under a number of divisions: 1. Its nature and the doctrine of presumptions; 2. The rules that govern in the production and exclusion of testimony; 3. Its effect; 4. The instruments of E., including witnesses, and the mode of making use of them as well as writings.

1. *Its Nature, Etc.*—The object of E. is to establish a fact. It presupposes a disposition in the mind of a listener to believe upon sufficient grounds. Belief on the part of mankind is instinctive, yet this instinct is modified by the results of observation and reflection. When E. is offered in a court of justice, it is assumed to be addressed to minds competent to give it such weight as its quality justifies. It may be either direct or circumstantial. It is said to be direct when it is offered simply to establish the fact which it concerns; it is circumstantial when its object is to lead the mind of the hearer to deduce or infer some other fact from it. In the case of circumstantial E. the minds of the jury or judge, as the case may be, go through a process of reasoning to arrive at the prin. fact in dispute. It must be resorted to with caution, in order that the conclusion arrived at may be sound and logical.

Reference may now be made to the subject of presumptions. These are of 2 kinds—of law and of fact. Presumptions of law are either conclusive or disputable. A conclusive presumption of law takes place when a legal conclusion

is arrived at which no E. is admissible to rebut. When E. can be offered to rebut a presumption of law, it is said to be disputable. A presumption of fact is not a rule of law which can be announced to a jury as binding upon them, but in each case must be found by them as a matter of fact, though the court may direct their attention to the propriety of forming the conclusion.

2. *The Rules which prevail as to the Production of Evidence.*—The leading rules are the following: Rule 1. Certain matters may be judicially taken notice of without proof; Rule 2. E. must correspond with the allegations in the pleadings, and be confined to the points in issue; Rule 3. Only the substance of the issue need be proved; Rule 4. The burden of proof is with him who holds the affirmative; Rule 5. The best E. must be produced of which the nature of the case admits; Rule 6. Hearsay E. is in gen. inadmissible; Rule 7. Testimony should in gen. concern matters of knowledge as distinguished from opinion (though to this rule there are well established exceptions); Rule 8. Certain E., otherwise admissible, is excluded on grounds of public policy; Rule 9. In certain cases, principally by statute law, written E. must be resorted to rather than oral; Rule 10. Oral contemporaneous E. is not admissible to vary the terms of a written instrument. On a trial, with or without a jury, it rests with the judge to determine whether the E. is admissible under these rules. In any case, the opposing party may except, and make his exception the subject of an appeal.

3. *The Effect of Evidence.*—In gen. E. is to be weighed by the jury or judge, as the case may be, and a decision to be rendered in view of all the circumstances of the case. In some instances its effect is governed by technical rules. This remark is particularly applicable to matters embraced under the head of estoppel. The E. in this class of cases is conclusive. It should be added that in some cases the law gives to certain acts the force of *prima facie* E., which, as the phrase implies, is liable to be rebutted. Thus, a promissory note is presumptively made upon a valuable consideration. Statute law frequently declares that a particular transaction shall have this force. The rules of E. are under control of the legislature so long as they do not impair vested rights or violate constitutional law in its letter or spirit.

4. *The Instruments of Evidence.*—These are either witnesses or writings. (1) *Witnesses.*—A witness, when within the jurisdiction of the court, must in gen. attend in person. He can be compelled to attend by a writ termed a subpoena, and in the same way to bring writings which are required. When beyond the jurisdiction, his testimony is taken under a commission issuing from the court in which the case is pending. This matter is in some respects governed by statute, though in some of the courts, as in equity and admiralty, there is an inherent power to issue commissions. The testimony, when taken in the foreign country, is returned to the court, subject to any objections which may properly be taken to it. Certain classes of persons are excluded from testifying. The rules upon this subject are to some extent arbitrary. They have been modified in recent times by statute. Thus, parties to the action were at one time wholly excluded in the courts of common law. They are now by statutes generally admitted. The same remarks may be made as to persons having a pecuniary interest in the event of the litigation. Persons are still incompetent who have a defect of understanding, or who are supposed to be insensible to the obligations of an oath. Thus, persons convicted of an infamous crime are excluded from testifying in the courts of the State where the conviction took place. The tendency of modern law is to allow as wide a range as possible, and to permit objections to witnesses which were formerly grounds of exclusion to be only urged as affecting the value of their testimony. In technical lang. the objection does not go "to the competency, but to the credibility of the witness." The examination of witnesses is governed by rules which are to some extent discretionary, and in other respects absolutely binding.

II. *Writings for the purposes of the law of E. are either public or private. Public writings are either judicial or not judicial. The law provides compulsory modes of producing public writings for the purposes of testimony. Copies are in gen. resorted to, on grounds of public convenience. The officer having the document in custody has, in gen., the power to give a certified copy, which is admissible in E. Copies of judicial records are of 3 varieties: exemplified (a copy either under the great seal of state or under the seal of the court), office (certified by the clerk or other custodian), or sworn. A sworn copy is authenticated by the testimony of a witness who has compared the original with the copy. An act of Cong., authorized by the U. S. const., provides a convenient mode of authenticating a judgment or decree of the courts of record of one State to be used in the courts of another State. Should a record be destroyed, its contents may be proved by oral evidence. A private writing is proved by the production of the writing itself, and its existence established by the testimony of a witness. Where the writing cannot be produced, secondary E. of its contents may be given. In the special case where it is in the possession of the opposite party reasonable notice should be given to him to produce it at the trial. If he fails to produce it, secondary E. may be given as before. When a private writing is executed in the presence of a witness subscribing his name at the request of the maker of it, this witness, called a "subscribing witness," is the proper person to prove it. If he be dead, or for any sufficient reason cannot be produced, his handwriting may be proved, with some E. to identify the party to the action as being the person who executed the instrument. When there is no subscribing witness, the proper course is to call a witness acquainted with the handwriting of the maker of the instrument to testify that in his opinion the instrument or the signature is in the handwriting of the party.*

T. W. DWIGHT.

Evidences of Christianity, The, by the very fact of their existence, place it before the world as at least

claiming to be founded in truth and suited to the reason of man. In distinction from all other systems it possesses a recognized body of proof which has been accumulating for 18 centuries under the most varied criticism.

History of the Christian Evidences.—The hist. of Christianity is but the hist. of its E. Its first conflict was with Judaism. At its very origin the Jewish people stigmatized its author as an impostor, and compelled him by the death of the cross to become the first martyr to its truth. Judaism from that moment declined into a dead tradition. Its next conflict was with Paganism. The decaying religions of Gr. and Rome rallied against it as a common enemy. But its course from city to city was marked with crowds of converts, as well as with persecutions and conflicts. Its next conflict was with Philos. Its advance was met by an infidel wing of the Neo-Platonic school, led by Celsus, Porphyry, and Hierocles, who assailed it as a vulgar imposture, and provoked the bloody persecutions which filled the cities of the empire with Chr. martyrs. Its direct E. for this period are the apologetical writings of Tertullian, Clement, Origen, Eusebius, Cyril, Arnobius, Lactantius, and Augustine. Its next conflict was with Barbarism. In the Dark Ages it subdued the rude religions of the N. While contending with such savage foes it could have no other E. than the Germanic missions and the Chr. schools of the Middle Ages. Its next conflict was with Mohammedanism. The Saracen was invading its domains with the sword; but the Goths whom it had trained into Chr. knights by successive crusades battled for the tomb of the Saviour. Its E. for this epoch were the exploits of Chr. chivalry. Its next conflict was with modern Rationalism. The It. naturalists of the 16th century, who held Aristotelian opinions subversive of revealed religion at the court of Rome, wrought their defeat by their vice. The Eng. deists of the 17th and 18th centuries, who professed natural religion as essential Christianity, were repulsed by Cudworth, Bentley, Berkeley, and Butler. The Fr. atheists of the last century, who assailed Chr. morality with a sensual fatalism, precipitated the terrible Revolution. The Ger. pantheists of the present century were routed by such writers as Neander, Ebrard, and Ullmann. The remaining conflict is to be with modern Heatenism. For the last half century it has been enveloping the globe with a network of missions, which already betokens the triumph of Chr. civilization over heathen barbarism.

Classification of the Christian Evidences.—The most serviceable classification is that by which they are divided as *external* and *internal*. The external E. are such as relate to the fact or existence of Christianity. They distribute themselves into the following groups: 1st, *Prophecies*, fulfilled in the coming of Messiah, etc.; 2d, *Miracles*, wrought by prophets and apostles in attestation of their divine commission; 3d, *Historical Testimonies* to the authenticity and genuineness of the sacred writings. The internal E. are such as appear in Christianity itself: 1st, in its *doctrines*; 2d, in its *precepts*; 3d, in its *examples*; 4th, in its *effects* upon the interests in society. Still further classes of E. are of a mixed nature: 1st, *Experimental E.*, acquired by those who have tested in their own practice the doctrines of the gospel; 2d, *Scientific E.*, collected from the sciences which illustrate the existence of the Deity; 3d, *Philosophical E.*, derived from the view of religion and nature as but consistent parts of one system, having the same Author.

Logic of the Christian Evidences.—Viewed from this point, they take rank as the highest branch of applied logic. Of the 2 schools which have taken opposite grounds, the one would render Christianity reasonable, the other present it as simply credible; the one would claim for it demonstrative E., the other seek only probable E.; the one would dwell upon the internal philosophical proof, the other upon the external historical testimony; the one ends in testing the whole content of revelation by mere reason, while the other destroys all rational conditions of faith.

Progress of the Christian Evidences.—Christianity has lost nothing of the E. which it has been accumulating since the time when first its miracles were wrought and its prophecies spoken. On the contrary, the human sciences since then unfolded are yielding it a new class of E., affording it fresh confirmation, and commending it to the highest intellect and culture of the time. Geography, in the early Ch., repudiated the idea of an inhabited globe as contrary to the Scriptures, but ships now carry the same Scriptures to the antipodes. Astron., during the Middle Ages, described the heavens as huge crystal spheres revolving about our earth, but the very same heavens, as interpreted by Kepler, Newton, and Herschel, still declare the glory of God. Geol. has seemed inconsistent with Genesis, but the story of the earth itself still tells how it was made in 6 days. Anthropology is full of conflicting theories, some of which menace the Scripture doctrine of the first Adam, but he must prejudice the whole question against all precedent who asserts that man was not made in the image of God. [From orig. art. in *J. de Univ. Cyc.*, by PROF. CHARLES W. SHIELDS, D. D.]

Evil Eye, the power of injury which in former ages was ascribed to the look of a malevolent person. The Gr. and Roman classics contain numerous references to this belief, which was also very common in the Middle Ages in Europe. In Mohammedan and uncivilized countries this superstition is still almost universal. It especially prevails in W. Afr. It is perhaps based upon the supposed powers of fascination possessed by serpents, of which much exaggerated stories were told and believed. Charms were much worn to prevent the mischief which it was believed could be done by the E. E., which was considered especially dangerous to young children.

Evolute of a Curve, the locus of the centres of all the osculatory circles that can be drawn to the curve. If normals be drawn at every point of a curve, they will intersect each other so that a curve line drawn tangent to them all will be the E. of the C. The given curve is called an *involute* with respect to the derived curve called the *evolute*.

Evolution, Hypothesis of; also called **The Theory of Development.** According to this, the universe as it exists is the result of "an immense series of changes," dependent upon each other, as successive steps constituting a progress, analogous to the unfolding of the parts of a growing organism.

History.—An old Egyptian cosmological myth was that of a chaotic or mundane egg, from which all things successively emerged, with the belief that repeated creations and destructions of the world have occurred. Thales taught that in the beginning all matter was in a fluid state. Anaxagoras held that all consisted at first of atoms, among which orderly arrangement was produced by a shaping *Nous*. Opposed to this conception was that of Democritus and Epicurus, according to which chance, not intelligence, wrought in infinite time, out of numberless atoms, all existing things. Not far removed from this was the notion of Empedocles, that many monsters were formed by the spontaneous efforts of nature before man appeared. Leibnitz, in modern times, first definitely proposed the opinion that the world was once in fluid condition. De Maillet (d. 1738), Wright of Durham, and Lambert preceded Kant in expanding this thought. But Kant, in his *Theory of the Heavens* (1755), originated the nebular hypothesis. Laplace (1796) elaborated this into a theory of the solar system, while Sir William Herschel (1811) gave it a nearer approach to perfection in its general cosmic relations as a theory of the stellar universe. In biology, Buffon (1749-88) distinctly advocated the transmutation of species, and Wolff (1759-64) first discerned the importance of the transmutations of structure and form which the parts of plants and animals undergo, by means of which, from almost formless seeds or eggs, come their diverse and complex organisms. Goethe (1790) apprehended, independently, the same truth. Owen (1803), Pander (1817), and Von Baer (1819) carried out this idea as an extensive generalization, supported by numberless facts. In like direction have tended the results of inquiries into the ultimate elementary forms and proximate materials of animal and vegetable tissues; Schleiden and Schwann (1838) showing the *cell-form* to be common to both kingdoms in all their classes and orders, and Von Mohl and Max Schultze (1850-61) that a *protoplasmic* material, similar but not identical, is found in them all. In regard to the transmutation of species, Lord Monboddo in 1774 suggested the possible origin of man from the ape; Lamarck (1809) proposed the hypothesis of organic development. One of his leading conceptions was that of the elevation of an animal to a higher range of faculties by the efforts made by it to attain to conditions at first beyond its reach. Dr. Erasmus Darwin (about 1794-95) the grandfather of the established Darwinism, pub. speculative views of similar tenor. Dr. W. C. Wells proposed the application of natural selection to the nat. hist. of man in 1813. W. Herbert in 1822 asserted the probable transmutation of species in plants. Prof. R. E. Grant advocated the same opinion 1826. Geoffroy St.-Hilaire contended against Cuvier in favor of the transmutation of species. Popular interest in this subject was awakened by the publication, in 1844, of the *Vestiges of Creation*. Alexander Humboldt (1844) declared his conviction that species are not immutable. Richard Owen (1850) referred to the struggle for existence as a cause of destruction of types least fitted for the conditions around them, and proposed the theory of the origin of species by "derivation" in a preordained succession. Almost as prominently as any other since 1852 has the name of Herbert Spencer been connected with the theory of development, both in cosmology and biology; with much labor, both of synthesis and analysis, and great adroitness of reasoning and clearness of expression, he wrought out what may be called a philosophy of evolution. Baden Powell of Oxford argued forcibly for the probable continuity of the process of creation throughout time. Alfred R. Wallace and Charles Darwin (1858) separately proposed the hypothesis of the origin of species by spontaneous variation, and the survival of the fittest through natural selection and the struggle for existence. In 1859 appeared Darwin's treatise on the *Origin of Species*. Strenuous opponents as well as advocates of organic E., including the transmutation of species, have not been wanting. Among its ablest defenders are Huxley, Vogt, Fritz Müller, Hæckel, Gegenbaur, Hooker, and Lubbock, in Europe; Cope, Hyatt, Morse, and Marsh, in Amer. A majority of the scientists of the present day are on the side of the gen. theory of evolution. "Scarcely a single competent gen. naturalist," wrote in 1873 Prof. Wyville Thomson of Edinburgh, "fails to accept it, in some form or other."

Is Progress a Fact in Nature?—Cosmologists and naturalists are all agreed upon this. In the lang. of the Duke of Argyll, "It is as certain as any fact of science that creation has had a hist. It is another fact, equally certain, respecting this work, that as it has been pursued in time, so also it has been pursued by method. There is an observed order of facts in the hist. of creation, both in the organic and in the inorganic world." Prof. Leconte asserts 390 coincidences in the solar system which are conformable to the nebular hypothesis. The spectroscopic has contributed much toward the theory of cosmic development, by exhibiting the close correspondence in the material composition of all the worlds. In organic nature on the earth, geol., zoology, embryology, and bot. unite in asserting progress. In the lang. of Prof. Dana, "Life commenced among plants in sea-weeds, and it ended in palms, oaks, elms, the orange, rose, etc. It commenced among animals in Lingulæ, and in crinoids and trilobites, if not earlier in the simple, systemless protozoans; it ended in man. Sea-weeds were followed by ferns and other flowerless plants, and by gymnosperms, the lowest of flowering plants; these finally by the higher flowering species, the palms and angiosperms. Radiates, mollusks, and articulates of the Silurian afterward had fishes associated with them; later, reptiles; later, birds and inferior mammals; later, higher mammals, as beasts of prey and cattle; lastly, man. . . There were higher and lower species creat-

ed through all the ages, but the successive pops. were still, in their gen. range, of higher and higher grade; and thus the progress was ever upward. . . With every new fauna and flora in the passing periods there was a fuller and higher exhibition of the kingdoms of life."

1. The method of progress has been from generalized types to those more special—i. e. with multiplication of organs and functions, or *differentiation*. Comprehensive types of earlier periods have sometimes been called by palæontologists "prophetic" types, containing elements which become distributed among those which succeed them. Examples of these are: *Ichthyosaurus*, combining the types of the fish and the reptile; *Pterodactyl*, *Archæopteryx*, and *Compsognathus*, those of reptile and bird, etc. These are now extinct. Examples of an analogous kind are seen in a few animals of to-day, as *Ornithohynchus*, a duck-billed quadruped; *Lepidosiren*, which combines some of the characters both of the reptile and the fish, etc.

2. *Unity of plan* pervades all organic nature, as exhibited in the *homology* of parts which prevails throughout the animal and vegetable kingdoms.

3. Many *gradations* and *transitional forms* intervene between those great groups into which animals and plants are divided or classified. Such are the Odontornithes (birds with teeth) and Ichthyornithes (fish-like birds). A group of worms receives the name Gephyrea, because of its "bridging over" the gap between Vermes and Echinodermata. *Amphioxus* (lancelet) appears to connect vertebrates with the mollusca. Among fungous plants, especially those discerned by aid of the microscope, distinctions of a permanent kind are difficult to establish, and "there are no species, but only forms, of Algae."

4. A remarkable correspondence prevails among animals and plants in 3 orders of relative succession: a, in geological time; b, in zoological rank; c, in embryological development. What is meant by the above proposition is, that when one animal is known to be, *geologically*, more recent in its appearance on the globe than another somewhat allied to it, it will be found also to rank higher than it in the *zoological* scale, as measured by complication of structure, and greater intelligence; also, the more recent type passes, in its *embryological* development, through successive stages of change, including those of the less recent allied type, whose *adult* condition represents, more or less nearly, an *immature* or embryonic state of the higher and later, more advanced type. A few instances will answer our purpose. Trilobites of the paleozoic era resemble the embryonic state of *Limulus* of to-day. *Labyrinthodon*, of the trias, is like an arrested development of the later saurians. *Anoplotherium* recalls an embryonic stage of ruminants; the extinct dodo has been compared to an incompletely developed duck or goose; the siren manifests a similar relation to the lung-breathing batrachians. In all this succession and parallelism it is important to remember that the human embryo at no time assumes the *exact* or *entire* character of that of any other order of mammals, or that of reptile, bird, or fish. It is only *assimilated* to these lower types, without being identified with them. Yet this assimilation is a fact of very great importance.

5. *Teleology* is the name given to the study of another class of facts—those which display *adaptation* and give evidence of purpose. These are most of all familiar in our own bodies, as the complex formation of the eye as an instrument of vision, with a nerve to convey the impression of light and a brain to perceive it, the hand for prehension, the mouth for speech, the foot for support and locomotion, the stomach for digestion, etc. Natural science furnishes no more beautiful and wonderful instances of such adaptation than those carefully studied and described by Darwin in the formation of many plants, so as to be fertilized by the interposition of insects which visit the flowers for their food.

6. *Modification according to surrounding conditions* occurs both in animals and plants. The earliest consolidation of the surface of the earth made it ready only for the lowest of plants. The animals of primitive periods were all aquatic. The first land-plants and land animals appeared in the Devonian age. The soil of the mesozoic period would not have supported our vegetation. The atmosphere, the oceanic and inland waters, and all other terrene conditions have been different in the succeeding epochs. The mould of the field and forest of our day is the result of an immensely complex series of productions and decompositions going on through all ages since the azoic era. But *modification* by changed conditions, acting upon existing types, appears only within limitations. In organisms of little motility a law may be enunciated—that "extension occurs chiefly in the direction of least resistance, and increase of density in the direction of greatest resistance." Fungi are said by some botanists to be very variable, according to the places and circumstances of their growth. With higher aquatic plants, some individuals of which may have their leaves out of and others in the water, the air-pores or *stomata* are often on the under side in the former case, and on the upper side in the latter. Tendrils of climbing plants cease growing when finding nothing to clasp, but grow thick and strong after taking hold of a support. Shells of oysters are thicker on a wave-washed shore than where the water is always tranquil. Tadpoles develop into frogs in a few weeks when exposed to sunlight; in the dark they may be kept as tadpoles for months. When the queen-bee of a hive is destroyed, the workers will select a neuter larva, and by placing it in a royal cell and feeding it with queen's food, convert it into a queen. M. Baray has observed that frogs in the volcanic island of Guadeloupe go through the tadpole changes in the egg. *Artificial selection* and breeding cause great diversities in animals and plants. Of the latter, witness the double flowers and numberless varieties "created" by the horticulturists, and such changes as those from the wild to the cultivated cabbage, broccoli, and cauliflower. *Acquired instincts* are familiar, yet remarkable; as the fear of man among wild birds and animals, those of a newly-visited

country being always "tame." Hounds of different breeds, pointers, setters, retrievers, require almost no training to fit them for their parts in hunting, yet no such proclivities belong to the dog in the wild state; they are undoubtedly transmitted by inheritance.

7. *Conditions favorable to the support of particular species of plants and animals do not necessitate their existence.* While a few naturalists have advocated the view that the same species may have originated independently in several localities, the weight of evidence seems to be largely in favor of the opinion that *each species has had but one origin*; all "representative" species, such as those nearly identical on the two sides of the Atlantic, being really the same in stock, only more or less modified after divergence and permanent separation in place and circumstances.

8. *Certain types vary, through long periods, very little under any circumstances.* Among domestic species the turkey and peacock are examples of considerable stability. Several "persistent types," through extremely long periods, are well known to geologists. *Lingula*, *Discina*, *Rhyacodonta*, and *Crinia* have continued from the Silurian age to the present time. Some palaeozoic corals are yet building islands or reefs in the ocean. Genera of carboniferous plants, insects, and Arachnida closely resemble some of those of to-day. Hence is to be inferred the propriety of the admission of Darwin: "I believe in no law of necessary development."

9. While progress has been the rule in the great changes of nature through geological time, evidence also exists of the *decline and extinction of types*. Says Dana: "Five hundred species of trilobite lived in the course of the palaeozoic ages; afterward there were none. Nine hundred species of the ammonite group existed in the mesozoic—not all at once, but, as in the case of the trilobites, in a succession of genera and species; the last then disappeared. There have been 450 species of the nautilus tribe in existence; now there are but 2 or 3, and these are peculiar to the present age. Seven hundred species of ganoids have been found fossil; the tribe is now nearly extinct." Alpheus Hyatt understands the fossil Cephalopoda to exhibit the *biography* of a type, closely analogous to that of an individual cephalopod. Opening with the straight *Orthoceras* of the Silurian, it advanced through the coiled and more complex ammonite of the Jurassic, and declined through half-uncoiled forms of the cretaceous, to end in the straight baculite.

10. *Rudimentary parts* furnish one of the strongest arguments in favor of the hypothesis of a genetic connection among all animals. By rudiments are meant organs imperfectly developed, so as to be without functional use. Each of them represents in germ, as it were, in one animal (or plant) that which is perfect and useful in another type. Man has a number of clearly marked rudimentary parts. Such are the 3 small and useless motor muscles of the external ear; the platysma myoides of the neck, homologous with the useful panniculus carnosus of the horse and ox; the little fold or caruncle at the inner margin of the eye, representing the nictitating membrane of birds; the os coccygis at the lower end of the spinal column, in place of the tail of lower animals, and which at one time in the human fetus is longer than the limbs; the vermiform appendix of the large intestine, which in man has no use, but in one marsupial is 3 times the length of its body. The "lanugo" or hairy covering of the human fetus at the fifth month is supposed by Darwin to be a rudimentary appearance of the first hairy covering of other mammals. For the existence of any of those which are certainly rudiments no rational "final cause" has ever been proposed. It is intelligible only upon the supposition of their being relics of a long past descent from a common stock with those species, genera, or larger groups which now present the same organs in perfect development and answering a useful purpose. Their gradual disappearance when their utility has ceased is not strange upon such a view.

Different Theories of Evolution.—It is a popular error that "Darwinism" is a precise synonym of "the theory of development." Several distinct views have been held. Thus, for the origin of diverse species among plants and animals there have been the following hypotheses: 1. Self-elevation by "appetency," or use and effort; 2. Modification by the surrounding conditions of the "medium"; 3. Natural selection, under the struggle for existence, with spontaneous variability, causing the "survival of the fittest"; 4. Derivation by "preordained succession of organic forms," under an "innate tendency" or "internal force"; 5. Evolution by "unconscious intelligence"; 6. Less defined as a distinct hypothesis, but clearly stated, is the view of orderly creation "by law," through the immanent action and direction of Divine Power, working by the purposive collocation and adjustment of natural causes or forces. It may be designated as that of *creative evolution*.

Descent of Man.—Darwin gives the following conclusion in his work on this subject (1871): "The most ancient progenitors in the kingdom of the Vertebrata at which we are able to obtain an obscure glance apparently consisted of a group of marine animals resembling the larvæ of existing ascidians. These animals probably gave rise to a group of fishes as lowly organized as the lancelet; and from these the ganoids, and other fishes like the lepidosiren, must have been developed. From such a fish a very small advance would carry us on to the amphibians. We have seen that birds and reptiles were once intimately connected together; and the Monotremata now, in a slight degree, connect mammals with reptiles. But no one can at present say by what line of descent the 3 higher and related classes—viz. mammals, birds, and reptiles—were derived from either of the 2 lower vertebrate classes—viz. amphibians and fishes. In the class of mammals the steps are not difficult to conceive which led from the anc. Monotremata to the anc. marsupials, and from these to the early progenitors of the placental mammals. We may thus ascend to the Lemnidae; and the interval is not wide from these to the Simiade. The Simiade then

branched off into 2 great stems, the New World and Old World monkeys; and from the latter, at a remote period, man, the wonder and glory of the universe, proceeded."

Sexual selection, urged by Darwin to supplement his theory, falls short of its purpose because it requires considerable intelligence in all the animals which exercise it as a supposed means of advancement in beauty of form, color, etc.

Evolution of Mind and Consciousness.—Some success has been reached in framing a conceivable hypothesis for the transition from the "rudimentary" mental faculties of brutes to those fully developed in the human mind. Consciousness is traced back to a germinal appearance in the higher animals, originated by conflicts between "permanent social instincts and affections" and "more transitory individual instincts and propensities." Yet there is obviously truth in the statement that between the mind of the highest anthropoid apes and that of man there is an "enormous gap." The probable method of E. of instincts in animals, by "accumulated and transmitted experiences," or as "lapsed intelligence," has been well studied of late. Here also we have to stop, at last, at the yet unbridged gap between insensitive, unconscious matter and sensitive, impressible nerve-substance, capable at first of reflex automatic action, and then, higher, of intelligence, impulse, and volition.

We are now prepared to approach a conclusion by attempting an answer to the question whether the facts giving strength to the hypothesis of E. really eliminate the evidence of *design* in nature; and whether, admitting "creation" in any sense, science compels us to remit it altogether to an inconceivably remote origin of the universe. For the following reasons, principally, we must deny absolutely the insufficiency of the proofs of design in nature; and also refuse to admit the elimination of *special creative action* or direct modification of nature from all periods since the first origination of the universe.

1. The nebular hypothesis is null without a creative act to produce the required "inequality of distribution" of cosmic matter in space. Hæckel admits that the hypothesis is weak on at least 2 points—the heat of the gaseous nebular mass, and its rotary motion. Herbert Spencer has committed himself to a self-destructive process of reasoning in his *First Principles*. The "instability of the homogeneous," on which Spencer builds large consequences, might account for chaos, but never for a universe. For *action* and *reaction* there must be heterogeneity, a plurality of factors. The prin. of "uniformity of force" in physics must have been powerless to make any *beginning* whatever. Without designing *will-force* to modify them, natural cosmic forces tend always to *equilibration*, and consequent *dissolution*. The universe must thus become, as it has been said, "its own cemetery." Sir William Thomson asserts that "as energy is being continually lost from the earth by conduction through the upper strata, the whole quantity of plutonic energy must have been greater in past times than in the present." Yet in organic nature there has been a constantly increasing complexity and exaltation of types—integration of matter with accumulation of force, and this under the "struggle for existence" against a steadily increasing resistance. As stated by Prof. Cope, "While the amount of growth-force potential in adult living animals has varied very irregularly throughout the animal kingdom, there being large and small, simple and complex, in every division, it would seem to have accumulated, on the whole, with the rising scale of animal types." Mivart's special hypothesis of an "internal force" is vague and unsatisfactory while detached from the "will-force" of an immanent Creative Power. The "unconscious intelligence" is certainly an *unthinkable* phrase, a "pseudo-idea," when proposed as the designation of an active power in nature. The presumption against organic E., with *true ascent* of types, being in any sense the result of the action of mere cosmic forces, is of the same nature with that against perpetual motion; it contradicts the doctrine of the conservation or persistence of force.

2. *Variation* is necessary to the Darwinian or any other "non-teleological" theory; and no such theory accounts for variation. Darwin requires also almost *infinite* variability of plants and animals; but, so far from infinite, observation shows it to be confined within very narrow limits. The *non-fertility of hybrids* of 2 nearly allied species is a very important indication of the present fixedness of those limitations. Also, species do not pass, in any case, into each other. Palæontology and recent zoology and botany are declared by Agassiz, Barrande, Dawson, Gould, Balfour, and Thomson to establish this. Embryology is regarded by Agassiz as affording concurrent testimony in regard to the essential diversity of types.

3. Were variation infinite, without the *regulation* of directive design, a simple calculation of probabilities shows that a chaotic complication of forms must result, the "struggle for existence" notwithstanding.

4. Infinite time has been proposed as affording a solution of the difficulties of natural selection. But infinite time would not alter the nature of the necessary result of infinite variations, nor would it regulate finite ones. So far from infinite time, not more than 100,000,000 yrs. can have been the duration of the present relation of our planet to the sun—a period too short for the genesis of organic nature merely by spontaneous modification and natural selection.

5. Without design *incipient* structures, which become useful only when completely developed, have no explanation at all. Further items of fact unexplained are—the opposition of the *seces* in plants and animals; the *metamorphoses* of insects; the cessation of the individual life; and the renewal of life-progress by parental reproduction. Moreover, as to the origin of a *new species*, we have the *fact* of individual reproduction exemplified under our knowledge; but what corresponds, in the birth of a *new type*, to the sexual reproduction of a new individual, especially in the case of the *first created type*? Accepting, then, with Herbert Spencer, the evidence found everywhere of the unity of the "insecu-

table universal Power," which is the Cause of nature, there is proof in the multiplicity and adjustment of the manifestations of that Power, that it has the attributes of Intelligence and Will. Every specialization, each true elevation of type involves new force-expenditure. Certain factors have been added in the evolution of nature whose origin is a "mystery" as yet unsolved by science. It is rational and philosophical in the absence of any solution by secondary causation, to refer them to the direct creative action of the First Cause. Such "factors" have been—1, life; 2, animality, as distinct from vegetative life; 3, mind-force, $\psi\chi\eta$; 4, $\pi\upsilon\epsilon\upsilon\mu\alpha$ or spirit, possessed by man alone.

Evolution in Human History.—In the progress of mankind 3 stages are distinguishable—the era of the predominance of physical force, that of intellectual supremacy, and that of moral and spiritual power. It has been often argued whether man was originally savage, and thence self-elevated into civilization, or was at the beginning supernaturally gifted with such knowledge as prepared him for culture. Neither of these alternatives compels our entire assent. Probably man was at first infantile. Hist. shows barbaric degeneration to have been the rule before the Chr. era. There is no instance of any race having initiated its own advancement out of barbarism, while there are many examples of the deterioration of centres of culture into the almost savage state. Always a force from without has begun the elevation of a race. Where hist. has failed to reach such beginnings, tradition follows its clues toward them, and always with the same indication.

We may conclude by a brief statement: "The only idea of creation which is at all conceivable is creation by a process, the steps of which have a succession, which, if known, would be rationally comprehensible." So regarded, E. is the only expression according to which any consistent statement of the facts of nature can be made. But E. is not a force or "law." It is a summary term for the gen. mode of succession of the complex results of all natural forces and laws under the Divine govt. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. H. HARTSHORNE, M. D.]

Evremond, art-mon' (CHARLES DE SAINT-DÉNIS), seigneur de Saint-Evremond, a Fr. courtier and *littérateur*, b. in Normandy Apr. 1, 1613; entered the army about 1629, and became a friend of Turenne and the prince of Condé. Having given offence to Louis XIV. he took refuge in Eng. in 1662; gained the favor of Charles II., who granted him a pension of £300, and he never returned to Fr. He wrote entertaining dramas, essays, and letters. D. Sept. 20, 1708.

Ewald, a'walt (JOHANNES), a Dan. poet, b. in Copenhagen 1743; was a pupil of Klopstock, but treated national subjects both in his lyrics and in his dramas—*Baldur's Death*, *The Fishermen*, etc. He was the author of the national hymn of the Danes, *King Christian*, so admirably translated by Longfellow. D. 1781.

Ewald, von (GEORG HEINRICH AUGUST), a Ger. Orientalist and biblical critic, b. at Göttingen Nov. 16, 1803; became in 1831 prof. of philos. in the Univ. of Göttingen, and obtained the chair of Oriental langs. in 1835. In 1837 he was removed on account of his liberal political opinions; went to Tübingen as prof. in theol. in 1838, but he had to defend himself against both the R. Cath. party and the Hegelians. He was reinstated in his chair at Göttingen in 1848, and was elected a member of the N. Ger. Parl. in 1869. Among his numerous works are a *Heb. Gram.*, *The Poetical Books of the O. T.*, and a *Hist. of the People of Israel*. D. May 5, 1875.

Ewell (BENJAMIN S.), LL.D., an officer and educator, b. in 1810 in D. C., grad. at W. P. in 1832; served as assistant prof. at the Military Acad. till 1836, civil engineer 1836-39, prof. of math. at Hampden-Sidney Coll., Va., 1839-42, and of math. and natural philos. 1842-46; prof. of math. and military science in Washington Coll., Va., 1846-48, prof. of math. and acting pres. of William and Mary Coll., Va., 1848-49; prof. of math. and natural sciences 1849-61; pres. of William and Mary Coll. 1854-61; served in the confed. army as col. 1861-62, and as adjutant-gen. to Gen. Jos. E. Johnston 1862-64. Elected honorary member of Royal Historical Society of G. Brit. 1880. Pres. and prof. of coll. of William and Mary, Va., from 1865.

Ewell (RICHARD STODDARD), a soldier, b. Oct. 1816, in D. C., graduated at West Point 1840; served on the W. frontier 1840-45, in the war with Mex. 1846-48, became capt. of dragoons in 1849, and afterward served in N. M. 1850-61. Resigning May 7, 1861, from the U. S. A., he joined the S. forces in the c. war, serving in the campaigns of 1861-65; was wounded in the Md. campaign; became lieut.-gen. 1863, and succeeded Stonewall Jackson, being in command of 2d corps at Winchester, Gettysburg, the Wilderness, and subsequent operations of the campaign, and was captured Apr. 6, 1865, at Fisher's Creek. D. Jan. 25, 1872.

Ewing (CHARLES), LL.D., b. in Burlington co., N. J., July 8, 1780, grad. at Princeton 1798; was called to the bar 1802, practised at Trenton, and was chief-justice of N. J. 1824-32. D. Aug. 5, 1832.

Ewing (REV. FINIS), b. in Bedford co., Va., July 10, 1773; removed to Tenn., in 1823 married, joined a Presb. ch., and soon afterward removed to Ky. Awakened in 1800 to a religious life, he was licensed to preach, and in 1803 was ordained by the Cumberland Presbytery. His ordination not being recognized by the Ky. synod, and the action of the synod being sustained by the Gen. Assembly, he with 2 others in 1810 formed the germ of the new Cumberland Presb. ch. In 1820 he removed to Mo. D. July 4, 1841.

Ewing (JOHN), D. D., b. in Nottingham, Md., June 22, 1732. He became pastor of the First Presb. ch. of Phila. in 1759, and provost of the Univ. of Pa. 1779. D. Sept. 1802.

Ewing (THOMAS), LL.D., b. in Va. Dec. 28, 1789. In 1792 he removed with his parents to O.; prepared himself for coll. by night-study while employed in the Kanawha salt-works; in 1815 grad. at O. Univ. He was called to the bar in 1816, and was U. S. Senator from O. 1831-37 and 1850-51, U. S. sec. of treas. 1841, and sec. of the interior 1849. He was

the father of Gen. Thomas Ewing and father-in-law of Gen. W. T. Sherman. D. Oct. 26, 1871.

Ewing (THOMAS, JR.), a son of the foregoing, b. at Lancaster, O., Aug. 7, 1829, ed. at Brown Univ.; was private sec. of Pres. Taylor 1849-50; studied law at Cin., removed in 1856 to Leavenworth, Kan., was chief-justice of Kan. 1861-62, col. of Kan. volunteers 1862, served in the c. war, chiefly in Mo. and Ark., becoming brig.-gen. of volunteers 1863 and maj.-gen. by brevet 1864. Since the war he has been a lawyer in Wash., D. C.

Exarch, eks'ark [Gr. $\xi\sigma\alpha\rho\chi\epsilon\varsigma$, a "leader"], was in anc. Gr. the title given to him who conducted the dramatic chorus during the performance, as distinguished from the *coryphæus*, or teacher of the chorus, who was generally the author of the play, and the *choregos*, a title given to some rich citizen who supplied the costs of the outfit of the chorus. Used in the E. Ch. to denote the highest ecclesiastical dignity, and was bestowed on the bps. of Alexandria, Antioch, Ephesus, Casarea, and Constantinople, but was soon exchanged in most places for that of patriarch, though it never was wholly abolished. At present it denotes a chancellor or deputy under the patriarch in the Rus. Gr. Ch.

Ex'archate. The title of exarch was, for some time, applied also to civil dignitaries of the highest rank—to the viceroys who ruled over those border provs. of the Byzantine empire which were most exposed to the danger of being invaded by the barbarians. Thus an E. was established in Afr. in 534, and existed till 698. The most important of these E., however, was that established in It. in the time of Justinian I. by Narses. He destroyed the Gothic empire in 554 and ruled the whole central part of It. as a prov. of the Byzantine empire, under the title of exarch, and with full civil, military, and judicial authority. After his death, in 567, followed Flavius Longinus, and the Rom. E. continued to exist, though with various fortunes, till 752. The exarchs placed *duces* (dukes) at the head of the administration of the different provs., but the dukes of Venice and Naples soon made themselves independent. So did the bp. of Rome, Gregory II., and the dominion of the exarchs, by degrees, dwindled down to a very limited extension, comprising only a few provs. of Central It. around the city of Ravenna, which was their residence. The last exarch was Eutychius. In 752 Astulf, king of the Lombards, conquered Ravenna, but in 755 he had to give most of the possessions of the E. to the see of Rome, compelled to do so by Pepin the Little. The title of exarch was used, however, in W. Europe as a civil and military title till the middle of the 12th century.

Exauvilliez, ek-sô-ve-yâ' (PHILIPPE IRÉNÉE BOISTEL D'), a Fr. author, b. at Amiens Dec. 6, 1786. In 1815 he lost the greater part of his fortune, and went to seek some employment, having failed to secure any, he turned to lit. His essay, *Le Bibliothèque de St. Germain* (1831), gave the first impulse to the establishment of small libraries all over Fr. He translated Walter Scott's novels, from which he blotted out every passage which could be interpreted as telling against the R. Cath. religion, and also all love-passages as far as possible. D. 1858.

Ex'cellency [Lat. *excellen'tia*, from *excello*, to "excel"], a title of honor which was borne by the mediæval Lombard kings, by emps. of the W., and by other it. potentates. It is now given to ambassadors, govts. of Brit. colonies, and the gov. of Mass. The Pres. of the U. S. and the govts. of many of the States have the same title by courtesy.

Excelmans, ek-sel-mon', or **Exelmans** (REMI JOSEPH ISIDORE), BARON, a Fr. marshal, b. at Bar-le-duc Nov. 13, 1775; entered the army 1791, and became aide-de-camp to Murat 1801; served with distinction at Austerlitz 1805, and gained the rank of gen. of brigade for his conduct at Eylau 1807. In the Rus. campaign (1812) he commanded a division. He directed a corps at the battle of Waterloo, after which he passed 4 yrs. in exile; was restored to his title as a peer 1831, and became a marshal of Fr. 1851. D. July 10, 1882.

Excel'sior [the comparative degree of the Lat. *excelsus*, "high," "elevated"] signifies "higher." It is the motto of the State of New York.

Exchange, in a broad sense, is a part of the machinery of society for the transfer of wealth from producers to consumers. More specifically, E. is a transaction in which 2 parties voluntarily transfer to each other the right of property in certain items of wealth which are regarded as equivalents. The diversity of nature's resources, the diversity of human capacities, the wide reach of human desires, and the manifold division of labor necessitate E. Merchants are the special agents of E., and money and credit are its instruments. It encompasses the globe, and affects the comfort of every member of civilized society.

E. has also a technical meaning, applied to the system by which commercial balances are adjusted between different centres of trade. For distant cities of the same country it is called domestic E.; for transactions between different countries, foreign E. The basis of the system is the fact that the greater part of the commerce of the world is a simple E. of commodities. Some device is needed by which the value of goods sent out shall counterbalance the value of goods received in an equitable settlement. A merchant in Chicago has received \$5000 worth of dry goods from New York; a produce dealer in New York has received \$5000 worth of wheat from Chicago; a debt is thus incurred on either side. Each party might pay his debt by forwarding that amount of money; but this would involve much labor and risk. Instead of that, bills of E. are employed. The Chicago man who sent the wheat makes a draft on his consignee for \$5000, and deposits it in his bank; the bank forwards it at once to its correspondent bank in New York. On the basis of that credit in New York the Chicago bank sells the merchant its bill of E. for \$5000, and he sends it to meet his debt in New York. So, through the medium of two bits of paper the wheat has paid for the goods and the goods for the wheat. Hundreds of such transactions are going on daily between the two cities. The sums total of values on

either side are set over against each other, and E. between Chicago and New York is determined accordingly. If the debts of all kinds reciprocally due by the 2 cities be equal, all may be discharged without the intervention of any money, and the price of bills of E. will be at par. If Chicago owes New York more than New York owes Chicago, there will be a brisk demand in Chicago for E. on New York, and bills will be at a premium. If the balance be on the other side, bills will be at a discount. The premium or discount, however, is limited to the expense of transmitting the money, for the debtor will always choose the cheapest way to pay his debt. The illustration is equally good for the relations of foreign E. The agricultural products sent from New York offset the manufactured goods received from Liverpool, and E. between the 2 cities fluctuates according to the balance of values. If one country uses a kind of money that is not acceptable elsewhere, this fact will greatly complicate its E. with other countries. Sometimes E. between 2 countries is equalized by bills drawn on a third country. If the balance of trade in the U. S. is in favor of Eng. but against Fr., we may pay our debts to Eng. by bills of E. on Fr. The circle of foreign E. may thus embrace several different countries, and in gen. bills of E. are made to provide for every kind of indebtedness incurred by the citizens of one country in another, and money needs to be transmitted only occasionally. Since Lond. is the commercial emporium of the world, bills of E. on Lond. command credit everywhere for the settlement of balances of trade. In the U. S. the par of E. on Eng. is set at 94 per cent. premium. This is due to the fact that our first Cong. enacted that the Brit. pound sterling should be reckoned at \$4.44 (Sp. milled dollars), which was then its equivalent; but since then the relative value of gold and silver has changed, the Amer. dollar has been reduced, and now the equivalent of a pound sterling is \$4.86, yet usage keeps the reckoning at the old rate, and the difference is 94 per cent.

The term E. has still another signification, as it designates the place of rendezvous of merchants, bankers, tradesmen, etc. So we have the Royal E. in Lond., the Bourse in Paris, the Merchants' E. in New York, and special gathering-places for the transaction of particular branches of business, as the Stock E., the Corn E., the Cotton E., the Mechanics' E., etc. The term embraces also the associations which meet at these places with well defined rules for the conduct of business. Through abuses connected with these establishments, gambling transactions are sometimes substituted for the legitimate operations of trade. Yet by supervision and regulation they serve an important purpose, and their gen. influence is believed to be favorable to fair and upright dealing.

A. L. CHAPIN.

Exchange, Bill of. See BILL OF EXCHANGE.
Exchequer, Chancellor of the, is the title of the highest finance minister of the Brit. govt. This office is from its nature necessarily intrusted to a commoner. When the prime minister is a member of the House of Commons, he sometimes holds the office of C. of the E.

Exchequer, Court of, in Eng., is one of the supreme courts of common law. It was originally established for the recovery of the king's debts and ordinary revenues of the Crown. It is now a combination of 8 distinct anc. courts. It acquired concurrent jurisdiction with the other 2 superior courts in all personal actions by the fiction of the plaintiff being a debtor to the king—a fiction which is now removed. It has exclusive jurisdiction in cases in which the royal revenue is concerned. The court now consists of 5 judges—viz., the chief baron and 4 barons of exchequer.

Ex'cise, an Eng. term for a tax imposed on specified articles of domestic manufacture, more commonly called in the U. S. an internal-revenue tax. This tax is collected by the sale of stamps to be affixed to the goods before they are thrown upon the market. The amount of the tax is added to the price of the article, and so is paid by consumers. In our country this tax is now levied only on a few articles, the chief of which are spirituous liquors and tobacco.

A. L. CHAPIN.

Excommunication [Lat. *excommunicatio*, from *ex*, "out," and *communio*, *communis*, "to," "partake,"] the act of putting one out from, so that he has no share in, the privileges and protection of the Ch., the formal expulsion of a person from privileges, religious or social, inflicted by ch. authority upon persons accused of misconduct or heresy. In early times, as also in the R. Cath. and in several Prot. chs. at present, there was a lesser and a greater E.; the former a virtual suspension from ch. privileges, the latter a formal expulsion. The greater E. in the Lat. Ch. is less severe than the anathema. E. was not unfrequently employed by the popes in former times as a punishment for refractory monarchs, and even for whole nations, but in later times it has not been so employed.

Execution [Lat. *executio*, from *ex*, "out," and *sequor*, *secutus*, "to follow,"] literally a "following or carrying out" of some design or of a legal sentence, the infliction of the death-penalty by the proper authorities. In the U. S. this act is performed by the county sheriff in the precincts of a jail or prison, and hanging is the only method employed. Military E. are performed by a provost-marshal and his guard, either by shooting or by hanging. Naval E. are generally by hanging at the yard-arm. In W. Europe hanging is the more common method in civil cases, except in Fr., where the guillotine is employed, and in Sp. the garrote takes its place.

Executive Department, The, in the U. S. govt., attends to the execution of the laws of the gen. govt. This dept. is under the direct control of the Pres., who is the principal executive officer. It makes all civil, naval, and military appointments, and manages the army and navy, collects customs and internal revenue, sells public lands, and pays all appropriations authorized by Cong.

Exec'utor [from the Lat. *ex*, "out," and *sequor*, *secutus*, "to follow,"], one to whom a testator commits the execu-

tion of his last will. The will is the source of the executor's title, and the probate (or proof) of the will is merely evidence of it. As a gen. rule, any one capable of making a contract can be an E. By the law of Eng. an infant can act as E. after the age of 17. In many of the U. S. it is provided by statute that no person under 21 is competent to act as E. The chief duties of an E. are to bury the deceased in a manner suitable to the estate which he leaves, to prove the will, make an inventory of his goods, collect the assets, and pay the debts and legacies. An E. has gen. control over the personal estate, and possesses the same property in it as the testator had when living, and the same remedies to recover it. He has no power over the real estate, unless it is given to him by the will, or unless the local law gives it to him when the personal property is insufficient to pay the debts. When he has authority given to him in a will to control the real estate, he is not deemed to act as an E., but either as a trustee or the grantee of a power, according to the nature of the authority conferred upon him. In some States E. are required to give bonds for the faithful discharge of their duties, and in others the probate court has a right to require them to furnish security if there is any doubt of their solvency. (See ADMINISTRATION.)

Exegesis, or Exegetical Theology, is the first and most important part of theological science, and covers the whole field of biblical lit.

I. *Kinds of Exegesis.*—(1) *Philological* or grammatico-historical E. is the basis on which all other interpretation and application must rest. It aims simply at the meaning of the writer according to the recognized laws of lang., and the *usus loquendi* at the time of composition, and according to the historical situation of the writer, irrespective of any doctrinal or sectarian bias. It implies a thorough knowledge of Gr. and Heb., and familiarity with contemporary hist. and lit. (2) *Theological E.* develops the doctrinal and ethical ideas of the writer in organic connection with the whole teaching of the Scriptures and according to the analogy of faith. (3) *Homiletical* or practical E. is the application of the well ascertained results of grammatical and theological interpretation to the wants of the Chr. congregation, and belongs properly to the pulpit.

II. *Branches.*—(1) *Sacred Philology*, the science of the langs. in which the Bible was originally written—viz. the Heb. in the O. T. (with a few sections in the cognate Semitic dialect called Chaldee or E. Aramaic), and the Gr. in the N. T. The latter is not the classical Gr., but the Macedonian or Alexandrian dialect, with a strong Heb. coloring (called the Hellenistic, because spoken by the Hellenists—i. e. Gr. Jews) and the infusion of the spirit of Christianity, which created new words or inspired a deeper meaning into old words.

(2) *Biblical Archaeology or Antiquities*—i. e. a systematic description of the external and internal condition of the nations among which, and the countries in which, the Bible was composed. This includes, again, the geog. and nat. hist. of Pal. and adjacent countries, an account of the domestic habits, social insts., agriculture, arts and sciences, religious rites, and ceremonies of the Hebs.

(3) *Textual Criticism* aims at the approximate restoration of the original text of the Bible as it came from the hands of the inspired authors. The autographs being lost, we are confined to the oldest uncial MSS., which date from the 4th and 5th centuries. Beside, we have partial and secondary sources of the Gr. text in the very numerous Script. quotations of the Chr. Fathers (Origen, Irenæus, Chrysostom, etc.), and the old translations (especially the Syriac, Peshito, and the Lat. Itala and the improved Vulgate of Jerome).

(4) *Historico-Critical Introduction to the Books of the O. and N. T.* is a literary hist. of the Bible, and includes all the introductory information necessary for the proper understanding of its contents, as the question of the genuineness and integrity of the book, the persons addressed, the place and time of composition, the object and aim of the writer.

(5) *Biblical Hermeneutics*—i. e. the science of the principles of interpretation, and the necessary qualifications for an expounder of the Scriptures.

(6) *Biblical Theology of the O. and N. T.* is a summing up of the results of E. in systematic order, and presents a full view of the teaching of the Scriptures, irrespective of the subsequent systems of denominational dogmatics and ethics derived from them. This is a comparatively new topic, but must soon become one of the leading studies in our theological sems.

PHILIP SCHAFF.

Ex'eter [Lat. *Isca* or *Exonia*], a seaport of Eng., on the river Exe, about 10 m. from the sea, and 170 m. W. S. W. of Lond., with which it is connected by R. R. It is the see of a bp., and has a magnificent cathedral, commenced in 1280; it is 408 ft. long, and has 2 Norman towers 145 ft. high. The W. front presents a façade which is one of the most beautiful in Eng. In one of the towers is the Great Tom of E., or Peter's Bell, which weighs 12,500 lbs. Pop. 34,646.

Exeter, one of the caps. of Rockingham co., N. H., on R. R. and the Squamscott River, 50 m. N. of Boston. It contains the co. offices, Phillips Acad., and Robinson's Female Sem. Pop. tp. 1870, 3437; 1880, 3569, including 1526 in v.

Ex'ile, the person, or the condition of a person, who either of choice or by penal sentence leaves his country to escape consequences to liberty, property, or life, involved in living in his own country. It differs from *banishment*, which is in strictness a penalty; from *captivity*, which implies living under an enemy's power in a foreign land. The Grs. at Athens, by ostracism, drove away a popular leader without confiscating his property, and a man who had committed homicide could go into E. retaining his estate. At Rome, under the republic, a citizen tried for crime might go before sentence into E. Verres and Milo thus left Rome, and Cicero was sent into E. by vote of the comitia. *Relegatio* was E. to a certain restricted spot, and *deportatio* E. to an island. E., except in the shape of transportation, or as a condition connected with qualified pardon, is unknown to Eng. law. Political E., not escaping on account

of crime, are now seldom delivered up to a foreign country demanding them.

T. D. WOOLSEY.

Exmouth [EDWARD PELLEW, VISCOUNT, an Eng. admiral, b. at Dover Apr. 19, 1757; served at the battle of Lake Champlain in Oct. 1776, and became a post-capt. in 1782; in 1804 obtained the rank of rear-admiral, and in 1808 that of vice-admiral of the blue; was created Baron Exmouth in 1814, and was raised to the rank of admiral; commanded a fleet which in Aug. 1816, aided by a Dut. fleet, bombarded Algiers, and reduced the dey to submission. He received the title of viscount in 1816. D. Jan. 23, 1833.]

Exodus [Gr. Ἔξοδος, "a going forth"]. The migration, whether by compulsion or otherwise, of any considerable body of people, as of the Moors from Sp. in 1492, of the Huguenots from Fr. after the Revocation of the Edict of Nantes in 1685, or of the Irish to the U. S. since 1847, may be called an E., but the term is commonly applied almost exclusively to the departure of the Israelites from Egypt under the leadership of Moses. How long they had been in Egypt, whether 430 or only 215 yrs., interpreters of the biblical narrative are not agreed. Josephus gives sometimes the larger and sometimes the smaller number of yrs. As to the points of contact between Egyptian and Heb. hist., the time has not yet come for final conclusions. But scholars incline to the opinion that the Israelites entered Egypt under the 12th dynasty and came out under the 19th. They dwelt probably in the Delta. The point at which they crossed the Red Sea is generally supposed to have been not far from where Suez now stands. From this point to Sinai the distance is about 150 m. Their route to Sinai was probably through the Wady Feiran. The miracles by which they were delivered, and which attended them all the way for 40 yrs. through the desert, made a profound impression upon the national character.

R. D. HITCHCOCK.

Exodus, The Book of, was so named by the Alexandrian translators of the O. T. The Hebs. designate it by its opening words, *Elleh Shemoth*, "These are the Words." It has 2 distinct portions, the former narrating the deliverance of the Israelites from Egypt, the latter the giving of the law. Its Mosaic authorship is generally conceded.

Exog'enous Plants, or Ex'ogens [from the Gr. ἔξω, "without," and γένω, "to be born," to "grow"], the first or most highly developed of the 2 primary classes of flowering plants. They are called exogens because their stems grow by successive external additions, and are sometimes termed *dicotyledonous*, because the seed has usually 2 cotyledons. The age of E. trees can often be computed by the concentric rings annually produced. Over 1300 rings or layers have been counted on a stump. All trees of cold or temperate climates, and most trees of tropical regions, are E.

Exorcism [Gr. ἐξορκισμός, from ἐξ, (for ἐν), "out," and ὄρκω, "to adjure" (from ὅρκος, an "oath")], a ceremony designed to expel demons or evil spirits from persons, places, or things. E. of various kinds have been practised from remote antiquity in nearly all nations and races. In the early ages of the Ch. a separate class of exorcists arose who claimed special powers of controlling evil spirits. At present in the Ch. of Rome there is a special order of exorcists. All persons in superior orders must pass through this degree. In the Gr. Ch. a similar order exists. E. is now obsolete in all Prot. denominations, though formerly recognized in several.

Exosmose. See ENDOSMOSE.

Expatriation [from the Lat. ex, "out," and patria, "one's native land"], the voluntary abandonment of one's native country with the intention of becoming a citizen of another state. The right of a person to throw off the obligation of allegiance has been denied by eminent writers and some govts. The true view would seem to be that the power to determine when the allegiance of the citizen may cease belongs to the state of which he is a member, rather than to himself. At the same time, the freedom of intercourse between nations in modern times and the interests of civilization require that the various nations should provide liberal rules by which at proper times the relation of the citizen to the state may cease, and the individual, freed from the ties of burdensome allegiance, may assume another citizenship if he so desire. In this spirit may now be found statutory declarations by leading states on this subject, as well as treaty stipulations. By the act of Cong. of July 27, 1868, § 1, it is recited that the act of E. is a natural and inherent right of all people, and it is enacted that any declaration or instruction or decision of any officer of the govt., which denies, restricts, or questions the right of E. is inconsistent with the fundamental principle of the govt. In Eng., by 33 Vict. ch. 14, § 6, Brit. subjects in gen. cease to be such upon becoming naturalized in a foreign state. The laws of the various States upon this subject are collected under the direction of the U. S. govt. in a publication entitled *Opinions of the Prin. Officers of the Executive Depts., and other papers, relating to Expatriation, Naturalization, and Change of Allegiance.*

T. W. DWIGHT.

Explosives. See CHLORATE, DUALIN, DYNAMITE, GLYCOLINE, GUN-COTTON, GUNPOWDER, LITHOFRACTEUR, NITROGLYCERINE, PICRATES, and SCHLITZ POWDER.

Expo'nent [Lat. ex, "out," or "forth," pono, "to put"], a number written to the right and above a quantity, to indicate how many times that quantity is to be taken as a factor. This was the original idea of an E., but with the progress of science the term E. means any expression written above and to the right of a quantity, no matter what the expression may signify. An exponential equation is an equation in which one or more variables enter as E. All such equations are transcendental—i. e. the relation between constants and variables cannot be expressed by an equation containing a finite number of algebraic terms.

Ex post Fac'to, a legal term introduced from the civil to the common law. Its literal translation is, "by subsequent matter," or "in consequence of something done afterward." An E. P. F. law is one that operates by after-enact-

ments. By the const. of the U. S., neither Cong. nor the State legislatures can pass E. P. F. laws, and the meaning of the term is fully settled by judicial decisions. It refers to criminal and penal statutes only, and not to those which simply affect private property. Chief-Justice Marshall defined an E. P. F. law to be one which rendered an act punishable in a manner in which it was not punishable when it was committed.

Ex'tract of Meat [Lat. *extractum carnis*] is a preparation of beef, and sometimes of mutton, or of both combined, in which the muscular fibre, fat, and gelatine are removed, and the highly nitrogenous elements preserved and condensed into a semi-solid mass. Most of what is sold in Europe and the U. S. comes from Buenos Ayres, where its manufacture was first established under the supervision of the chemist Liebig. E. of M., at the best, imperfectly represents the beef it was made from. Nevertheless, it is useful in preparing soups, and in nourishing those who are sick of low fevers and other like diseases.

Extradition, eks-tra-dish'un [from the Lat. ex, "out," and *trado*, *traditum*, to "convey"], the surrender by one state or nation to another of fugitives from justice. The subject will be considered under 2 gen. divisions: 1, the surrender of fugitives from justice from one State of the U. S. to another; 2, the like surrender as between one nation and another.

1. The U. S. const. provides that "a person charged in any State with treason, felony, or other crime, who shall flee from justice and be found in another State, shall, on demand of the executive authority of the State from which he fled, be delivered up to be removed to the State having jurisdiction of the crime." A like clause is found in the Articles of Confederation. The propriety and necessity of such a provision in the case of States bound so closely together as are those of the Amer. U., and yet exercising independent criminal jurisdiction, will not be questioned. It tends to promote harmony between the States and to repress crime, while it aids in the discharge of a high moral obligation. An act of Cong. of 12th Feb. 1793, ch. 7, § 1, carries the constitutional provision into practical effect by declaring that the demand shall be accompanied by a copy of an indictment found against the alleged fugitive, or by an affidavit made before a magistrate of a State, etc., charging the fugitive with having committed a crime. These documents are to be certified as authentic by the gov. or chief magistrate of the State whence the demand comes. It is thereupon made the duty of the gov. on whom the demand is made to issue his warrant and to cause the fugitive to be arrested and delivered over to the agent of the demanding State.

2. E. as between separate nations belongs to international law. It was at one time supposed that it was the duty of a state under the law of nations to surrender up a fugitive from justice upon demand after the civil magistrate had ascertained the existence of reasonable grounds for subjecting the accused to a criminal trial. Those who maintained this doctrine found much difficulty in drawing the line between the graver crimes to which it was claimed that this rule was applicable and those of a minor character to which it could scarcely be considered that it would extend. (1 Kent's *Commentaries*, 37.) The better opinion now is, that whatever obligation may exist in such a case is an imperfect one, and cannot be insisted upon by the demanding nation unless there be a treaty stipulation. It is quite clear that courts have no power in such cases independent of treaties, and it is a matter of grave doubt whether the executive authority can properly exercise it. So a State of the U. cannot assume to make a surrender of an alleged fugitive to a foreign nation, and an act of a State legislature authorizing it is unconstitutional and void. (*People vs. Curtis*, 50 N. Y. Reports, 321, a. p. 1872.) The U. S. have treaties upon this subject with a large number of foreign nations, including G. Brit., Fr., Aus., the Ger. empire, Nor., Swe., It., Switz., Mex., etc. The treaties are not precisely identical, though of the same gen. scope and character. They all include the more heinous crimes, such as murder and piracy, while some of them embrace robbery, burglary, arson, rape, embezzlement, and fabrication and circulation of counterfeit coin or paper. T. W. DWIGHT.

Extreme' Unction [Lat. *extrema unctio*, the "last anointing"], the 5th of the 7 sacraments of the R. Cath. Ch., consisting of the application, by a priest, of consecrated oil to the eyes, ears, nostrils, etc., of one whose illness is alarming. It is administered after confession and the Eucharist, and is believed to remove the last stains of sin. The Gr. and Coptic chs. recognize unction (not always administered in *extremis*) as a sacrament, and the Jacobites and Armenians have a similar practice.

Eyck, van, vahn ik (HUBERT and JAN), 2 brothers, b. at Maaseyk, Hol.—Hubert in 1366, Jan about 4 yrs. later. They lived and wrought at Ghent as artists together. The brothers are considered the founders of the Flemish school of painting. Jan d. July 9, 1440, Hubert Sept. 18, 1426. The former is often called "John of Bruges."

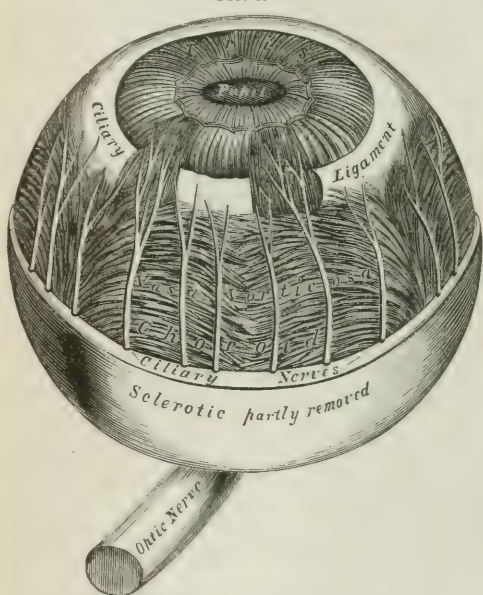
Eye, the organ of vision in animals. E. may be variously developed, and are by no means homologous throughout the animal series, but in the vertebrates, when developed, they are 2 in number, and essentially correspond in all. Among the more notable deviations are the partly double eyes of *Anableps* and the development of the 2 on one side of the head in flat fishes. Supposititious eye-like organs are in addition developed on trunk in certain fishes.

The human E. is placed in a bony cavity called the orbit, and is further protected by the fatty cushion within which it rests, as well as by the brows, eyelids, and eyelashes. Other appendages are the tear-gland and the sac and duct connected with it, the numerous muscles which direct its range, and the nerves and blood-vessels which supply it.

The human E. is a globe, with the segment of a smaller globe planted upon its anterior aspect. Its antero-posterior

diameter is about 1 inch, its transverse one, about $\frac{1}{12}$ of an inch. The larger sphere has about $\frac{5}{8}$ of the whole surface. The E. is invested by 3 coats—first, the sclerotic, a white, tough, fibrous substance, the "white of the eye," visible through the delicate conjunctiva which covers its anterior portion and is reflected over the inside of the lids. The muscles are attached to it, and through a sieve-like "cribriform lamina" it transmits the filaments of the optic nerve with the vessels supplying the retina. The anterior $\frac{1}{6}$ of the E.'s surface is occupied by the transparent cornea. Its posterior surface is lined by a "pavement" epithelium of polygonal cells.

FIG. 1.

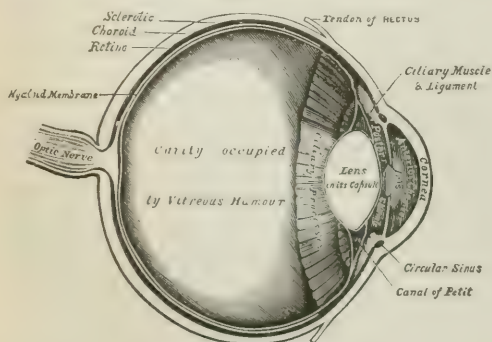


Choroid and Iris.

The second coat of the E. is composed of the choroid tunic, the iris, the ciliary processes, and muscle. The choroid is a vascular, thin, chocolate-colored membrane, lining the sclerotic, and separated from it by the delicate *membrana fusca*. The choroid itself has 3 layers—an *outer*, consisting chiefly of blood-vessels (*vasa vorticosa*) and pigment-cells; a *middle* layer, of fine capillary vessels (Ruyseh's layer); and an *inner* layer, of tessellated, hexagonal cells, laden with pigmentary matter, except in albinos. The ciliary processes are folds or plaits running forward from the edge of the choroid to the suspensory ligament of the crystalline lens. They number about 70. The iris ("rainbow") takes its name from its various colors in different persons. It is the colored curtain which surrounds the pupil, its central opening. It contains both circular and radiating involuntary muscle-fibres—the circular to contract, the radiating to expand the pupil. The circular sinus is a canal (Schlemm's) which runs around the eye outside the ciliary body. The ciliary muscle is a circular band of involuntary muscle-fibre which passes back from the junction of the cornea and sclerotic to the choroid. It is through the action of this muscle on the crystalline lens that the E. is accommodated or adapted to distinct vision at different distances.

The third coat of the E. is the retina. Without is the choroid; within, the vitreous humor. The retina has ten layers. The prin. of those are the *outer*, or Jacob's membrane, consisting of columnar rods and bulbous, hollow

FIG. 2.



Vertical Section of the Eye.

cones filled with fluid; the *granular* layers, consisting of globular particles, lined inwardly by a hyaline substance; the layer of ganglionic cells, and the layer of optic nerve fibres. This latter layer of the retina is an expansion of the optic

nerve. It is separated within from the vitreous humor by the exceedingly delicate *membrana limitans* and by the hyaloid membrane, the former regarded as belonging to the retina, the latter to the vitreous humor.

The contents of the E. are the aqueous humor, the crystalline lens, and the vitreous humor. The aqueous humor consists of about 4 or 5 grains of water, with a very small proportion of common salt and other matters in solution. It occupies the space between the cornea in front and the crystalline lens behind. This space is divided into the anterior and the posterior chambers, which the iris separates from each other. (Fig. 2, Vertical section of the human E.) Behind the aqueous humor comes the crystalline lens, suspended in the capsule, an elastic, transparent membrane which is retained in place by the suspensory ligament. Between this ligament and the hyaloid membrane is the space called the canal of Petit. The lens itself consists, as is seen when it has been boiled or hardened in alcohol, of layers of transparent matter arranged in segments. The vitreous humor occupies $\frac{4}{5}$ of the cavity of the eyeball. Like all the contents proper of the E., it is transparent. It consists of a thin, jelly-like, albuminous fluid. When the aqueous humor has been evacuated by accident or operative interference, it is speedily restored like other serous fluids, but if the vitreous humor is once lost it is never renewed. (See LIGHT AND VISION.)

M. S. BURNETT.

Eye, Diseases of. See AMAUROSIS, GRANULAR LIDS, BLINDNESS, CATARACT, MYOPIA, SQUINTING, OPHTHALMIA, SIGHT, DEFECTS OF, etc.

Eye-Stones (*oculi cancerorum*), 2 semicircular calcareous concretions which are found in the crawfish, in Aug., shortly before the moulting season, in the space between the inner and outer coats of the stomach. They consist of carbonate and phosphate of lime and animal gelatine, and are sometimes used to remove small particles of dirt from the eyes.

Eylau, or Ellau, P'low, often called **Prussian Eylau**, a small town of Prus., on the Pasmur, 22 m. S. of Königsberg. A battle was fought here Feb. 8, 1807, between Nap. and the allied armies of Rus. and Prus., commanded by Gen. Bennigsen. Both sides claimed the victory. The allies lost about 20,000, and retreated from the field, but the Fr. loss was probably the greater. Pop. 3629.

Eylert (RUHELMANN FRIEDRICH), b. at Hamm, Westphalia, Apr. 5, 1770, studied at Halle; became court-preacher at Potsdam in 1806, and in 1817 Prus. supt. and minister of public instruction. He was at first a moderate rationalist, but became orthodox, and was one of the founders of the national Ch. of Prus. and of its liturgy. D. Feb. 3, 1852.

Eymeric (NICHOLAS), an inquisitor, b. at Girona, Sp.; became a Dominican friar in 1334; was appointed by Innocent VI. to be inquisitor-gen. of Aragon 1356, and became chaplain and judge of heresies to Gregory XI. at Avignon 1371. Wrote *Directorium Inquisitorum*. D. Jan. 4, 1399.

Eyre, air (EDWARD JOHN), an Eng. explorer, b. Aug. 1815; emigrated to Australia about 1833, and began in 1840 exploration of the region between S. and W. Australia. In this sterile region he performed a journey of nearly 1000 m. almost alone, and pub. *Discoveries in Central Australia*. In 1862 he became gov. of Jamaica, where he suppressed an insurrection in Oct. 1865. He was removed from office for execution of Gordon by court-martial. An unsuccessful attempt was made to try E. for murder.

Ezekiel, e-ze'-ke-el (i. e. "God will strengthen"), one of the 4 greater prophets of the Heb. Scriptures, the author of a canonical book which bears his name. He was carried away in what is known as the second of the 4 deportations (597 B. C.); was sent to dwell on the river Chebar or Chaboras, a branch of the Euphrates. From that place he exercised his prophetic calling by pronouncing warnings and rebukes against Jerusalem so long as it stood, and also by denouncing woes upon Judah's heathen neighbors for their attitude toward her in her distress. His activity covered a period of 22 yrs., from the 5th to the 27th yr. of the Captivity. The book consists of 2 parts, the former containing predictions delivered before the destruction of Jerusalem in 586 B. C., the latter containing predictions delivered after that event. In his gen. tone E. is independent of Jewish dogmas. He gives fresh and true interpretations and applications of the Mosaic law, which contradict the traditional interpretations.

Ez'ra [Heb. "help;" Gr. *Ἐσδρας*], the name of several persons mentioned in the Bible, the most important of whom was the priest and scribe who came with some 6000 Heb. exiles from Babylon to Jerusalem about the yr. 458 B. C. In no long time, probably, he went back to Babylon, and returned to Jerusalem with Neh. in 445 B. C. His reputed sepulchre is shown at a place on the Tigris, near its junction with the Euphrates.

Ez'ra, The Book of, sometimes called "The First Book of Esdras," following the Vulgate. It narrates the hist. of the Jewish nation on their return to Jerusalem from the Babylonian captivity, and during the period of their reestablishment in the land of their fathers. It is a continuation of the books of Chronicles, and is written partly in Heb. and partly in Chaldee.

F.

F, the sixth letter of our alphabet, is the equivalent of *ph*, and probably of the Gr. *φ*. It is a labio-dental mute, and is strongly aspirated, but is not truly vocalized. F, as we learn from old Lat. writers, differed in power from the Gr. *φ*, and in anc. times was doubtless a strong, rough aspirate, like the Gr. digamma, *Ϝ*, from which it took its form, if not its power. In Sp. *f* takes the place of the Lat. *f* very frequently, while *f* often represents the Gr. *φ*. F is to some extent interchangeable with the dentals *t*, *d*, and *th*, as well as with the labials *p*, *v*, and *wh*, but less so in Eng. than in others.

Fa'am, an archaic plant growing in the Mauritius, in Reunion, and in India—the *Angustura fragrans*, highly prized for its fragrance, and long used there, in the same way as chi tea is used, as a beverage. Many residents in the E. greatly prefer it to tea. It is aromatic, stimulant, and of very agreeable taste. It is used in Fr., and has reputation as an antispasmodic and an expectorant.

Fa'ba [Lat. a "bean"], a genus of leguminous plants to which belongs *F. vulgaris*, or *Vicia F. L.* of unknown, probably Oriental origin, the common bean of Europe, but not the beans ordinarily raised in the U. S., which are of the genus *Phaseolus*.

Faber (FREDERICK WILLIAM), D. D., an Eng. theol. and poet, b. at Durham June 28, 1814, grad. at Ox. in 1836; became vicar of Elton in 1843, went over to the R. Cath. Ch. in 1845, founded the Oratory of the Brotherhood of St. Philip Neri in Lond. in 1849, and in 1854 removed with it to Brompton, where he d. Sept. 26, 1863. He wrote a considerable number of books, both controversial and devotional, in support of the Ch. of his adoption, but will be longest remembered as the author of some exquisitely beautiful hymns, equally admired by all communions. R. D. HITCHCOCK.

Faber (JACOBUS STAPLENSIS), a Fr. theol., b. at Etaples about 1450, and d. in 1536. His translation of the N. T. appeared in 1523, and of the O. T. in 1528.

Faber (TANAQUIL). See LE FEVRE.

Fa'bian, SAINT, was pope 236 A. D., suffering martyrdom under Decius, 250.

Fabius Maximus Verrucosus (QUINTUS), surnamed CUNCTATOR, was consul for the first time 233 B. C., and dictator in 217. Contending against Hannibal the Carthaginian, he adhered so closely to the policy of defensive warfare that his opponent could gain no advantage, and his successes of this sort, long continued, secured for him his surname. Is one of the most illustrious names in Rom. hist.

Fabius Pic'tor (QUINTUS), the earliest Rom. historian, lived at the time of the Second Punic war (which began B. C. 218), though the dates of his birth and death are unknown. The last distinct notice of him is his being sent as an ambassador to Delphi after the battle of Cannæ, B. C. 216. He wrote a hist. or annals of Rome from the early settlement of the city to his own times. His work was written in Gr., but it is supposed there existed also a Lat. translation of it.

Fable means a fictitious story in prose or verse, enacted by animals, without any regard to probability, or even possibility, and illustrative of some moral maxim, which is given in a positive and pointed form after the story, like the fable under an engraving. The prin. fable writers are the Hindoo Pilpay, the Arabic Lokman, the Gr. Æsop (620-564 B. C. ?), the Lat. Phædrus, the Fr. La Fontaine (1621-95), the Eng. Gay (1688-1732), and the Ger. Gellert (1715-69).

Fabre, fabhr (MARIE JOSEPH VICTORIN), Fr. poet and orator, b. at Jaujac July 19, 1785; wrote an *Eulogy on Corneille*, prose, which was crowned by the Fr. Inst.; the *Death of Henry IV.*, poem, and *Literary Hist. of Fr. in the 18th Century*. D. May 29, 1831.

Fabre de l'Aude (JEAN PIERRE), Fr. statesman, b. at Carcassonne Dec. 8, 1755, was deputy to the Council of Five Hundred 1795 and 1797, and com. of finance; in 1807 senator and count of the empire. D. July 6, 1832.

Fabrizio, da (GENTILE), an It. painter of whom little is known; lived between 1360 and 1440, was a contemporary of Fra Angelico. Several of his works are at Urbino and Perugia, but his fame is associated with a picture in the great council-chamber in Venice, which, some say, was thought so remarkable that the republic conferred on him a life pension and the patrician's robe. Specimens of his work are in the chs. Santa Maria Maggiore and St. John Lateran in Rome, and the San Felice, Venice.

Fabricé, von (GEORG FRIEDRICH ALFRED), gen. of cav. and sec. of war in Sax., became widely known as commander of the Ger. army of occupation in Fr. from Mar. 7 to June 19, 1871; b. at Quessoy-sur-Deule May 23, 1818, entered the Sax. service in 1834; became a member of the staff in 1850, was chief of the staff to the Sax. troops in Schleswig-Holstein in 1863-64, and to the crown-prince of Sax. in 1866, during the Bohemian campaign, in which position he distinguished himself, though the latter campaign could boast of no victory. Became sec. of war Oct. 1, 1866, thus assuming the task of reorganizing the Sax. army after the Prus. pattern, in accordance with the present political position of the kingdom—a task which required both military ability and diplomatic talent, and after the war there was in Sax. a great bitterness against Prus. But he fulfilled the task with perfect success, and displayed the same talents as commander-in-chief of the army of occupation in Fr. in 1871; even during the revolution of the Commune in Paris he understood how to maintain his position without incurring any conflict, and he commanded the respect of the Frenchmen at the same time he earned the hearty regard of the Gers.

Fabricius, fah-brit'se-us (JOHANN), Ger. theol., b. at Altorf Feb. 11, 1644; studied theol.; became a disciple of Georg Calixtus; travelled in Ger. and It. from 1670 to 1677, during which period he was for some time a minister to the Ger. Lutheran congregation in Venice; was appointed prof. of theol. at Altorf 1677, and at Helmstedt 1697; King Charles of Sp., afterward emp. Charles VI. of Ger. proposed marriage to the princess Elizabeth Christine of Brunswick, and wished her to embrace the R. Cath. faith. F. pub. a *Gutachten*, urging that it was her duty to renounce her Prot. faith to become queen of Sp. and empress of Ger. The elector of Hanover, afterward George I. of Eng., disliked this *Gutachten*, and in 1709 F. was removed from his chair at the Univ. D. Jan. 29, 1729.

Fabricius (JOHANN ALBRECHT), b. at Leipzig Nov. 11, 1668, was prof. of eloquence and philos. at Hamburg about 1700. Pub. more than 100 learned works, among the most important of which were *Bibliotheca Latina, sive Notitia Scriptorum Veterum Latinorum*, revised and greatly improved by Ernesti; *Bibliotheca Græca*, improved by Harles (1790-1800); *Biblio-*

graphia Antiquaria, Bibliotheca media et infima ætatis, Codex Apocryphus, Nov. Test., and Codex Pseudepigraphus Veteris Test. D. Apr. 30, 1736.

Fabricius (JOHANN CHRISTIAN), b. in Schleswig Jan. 7, 1743; studied nat. hist. under Linnæus, and was appointed prof. of natural science in 1775 at the Univ. of Kiel. Entomology was his favorite study, and his *Systema Entomologica, Philosophia Entomologica, and Supplementum Entomologicæ* are his prin. works. D. 1807.

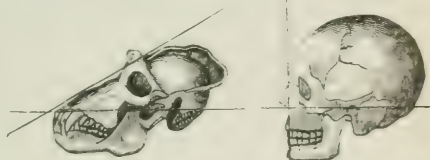
Fabroni, fah-bro'ne, or **Fabbroni** (ANGELO), styled the "Plutarch of modern Italy," b. 1732, was prior of the ch. of San Lorenzo, Florence; wrote *Lives of Italians Eminent for Learning in 17th and 18th centuries*. D. Sept. 1803.

Fabroni, or **Fabbroni** (GIOVANNI VALENTINO MATTHIAS), b. at Florence Feb. 13, 1752; studied natural science, and was appointed director of the phys. cabinet of the grand duke of Tuscany. During the annexation of Tuscany with Fr., he occupied a conspicuous position. He constructed the bridge across the Dora Baltea, and the road across Mont Genève. After the restoration of the house of Lorraine in Tuscany, in 1815, he retired to the chair of natural science at the Univ. of Pisa. D. Dec. 17, 1822.

Fabvier, fah-ve-ä' (CHARLES NICOLAS), BARON, a Fr. soldier, b. at Mousson Dec. 10, 1782, ed. at the Ecole Polytechnique and the military school of Metz; was sent in 1807, as a member of a corps of Fr. officers, to Constantinople and Ispahan to reorganize the Tur. and Per. armies after the Fr. model; returned in 1809 to Europe, fought in Sp. in 1811, and distinguished himself in 1812 at the storming of Moskov. In 1817 he accompanied Marshal Marmont to Lyons, and when the insurrection was put down wrote a pamphlet charging the civil service of the city and dept. with gross abuses. He was arraigned and fined; left the military service, and devoted himself to commercial business. In 1823 he went to Gr. and fought in the war of liberation until 1827. In the revolution of July 1830 he played a conspicuous part; became lieutenant-gen. in the army in 1839 and peer of Fr. in 1845. D. Sept. 15, 1855.

Facciolati, fah-cho-lah'te, or **Facciola'to** (GIACOMO), It. philologist, b. at Torreglia, near Padua, Jan. 4, 1682; was prof. of logic in the Univ. of Padua 1722, pub. an edition of the *Lexicon Septem Linguarum* of Ambrogio Calepino, of the Gr. lexicon of Schrevelius, and of the *Lexicon Ciceronianum* of Nizolius. He began a Lat. lexicon, finished by Forcellini, and d. Aug. 25, 1769.

Fa'cial Angle (the angle formed by the face with a certain other plane), as generally accepted, is the angle subtended by (1) a line coincident with the face, or rather the



Facial Angle, according to Owen.

most projecting parts of the face, and (2) a line drawn from the external opening of the ear to the floor of the nostrils. Such was the idea of Camper, who employed the F. A. as a criterion for the distinction of the races of men and their contradistinction from the lower animals. Others have modified the criterion by taking different lines; thus, the angle subtended by (1) the face, and (2) the plane coincident with the axis of the floor of the skull, was considered by Von Baer to furnish a more trustworthy criterion. By others, still, the angle intersected by (1) the face, or "the most prominent parts of the forehead and upper jaw," and (2) "a line drawn from the occipital condyle along the floor of the nostrils," is accepted as the F. A. Such is the view promulgated by Prof. Owen. These are all inconsiderable modifications of the same idea. If we compare the several races of mankind in their adult stages, it will be found that there are average indexes furnished by the F. A. for each one, and that between the European and negro the differences in this respect are notable; thus, in the former, the F. A. (by Camper's method) is about 80°; in the latter, about 70°; if these are contrasted with the old individuals of some of the apes and monkeys, the differences will be found still greater; e. g. in the adult baboons the angle is about 30°; in the common monkeys it ranges from about 45° to 60°. The contrast in this respect between man and most other animals has led to a very exaggerated idea of the value of the character as an exponent of intelligence. In the young of the different races of mankind the differences of the F. A. are inconsiderable, and the angle in all is more obtuse (instead of being more acute) than in the adult, and especially is the contrast marked between the negro baby and the adult negro. In the young of the apes and monkeys the head is well shaped—i. e. it resembles that of man rather closely in its contour—and the F. A. is proportionately developed, being generally not much if any less than about 70°. The F. A., in brief, is merely the exponent of either (1) the development of the jaws (and to a certain extent of the teeth) in some one or other direction, or (2) the development of the forehead at some one point; e. g. by frontal sinuses or supraorbital ridges. It is a very uncertain and unreliable exponent of the size of the cranial cavity or brain, and the intelligence of any given animal.

THEODORE GILL.

Fa'cial Neuralgia, a disease characterized by more or less paroxysmal pain in parts of the head and face supplied with sensibility by branches of the trigeminal nerve. Any one branch of the trigeminal nerve may be the seat of pain (in brow-ague the supraorbital branch), or all its branch-

es may be involved. The cause of the neuralgia is a morbid state of the nervous centre giving origin to the nerve (the medulla oblongata), and this morbid state may itself be the result of simple malnutrition (anaemia), of blood-poisoning (malaria), or of inherited predisposition. Various other pathological conditions may give rise to pain in the distribution of the trigeminus, irritation of other sensitive nerves (bad teeth), tumors pressing on the nerve, inflammation of the nerve itself.

E. C. SEGUN.

Facial Paralysis, a paralysis of the superficial muscles of the face, due to a loss of the motor property of the nerve supplying them—the 7th or facial nerve. The symptoms are loss of expression on the affected side of the face, a drawing of the mouth and features generally to the opposite (healthy) side, inability to close the eyelids on the palsied side, slight impairment in articulation, owing to palsy of a part of the muscles of the tongue. When both sides of the face are palsied, the face appears like a smooth mask, the mouth (lips) is open, the eyes cannot be closed. The pathological conditions which produce this palsy may be disease of the cerebrum, pons Varoli, or of the medulla oblongata, pressure upon the nerve in the skull or in the canals in the petrous bone, injuries to the nerve in these locations or upon the face, or the sudden impact of cold air upon the face (draught).

E. C. SEGUN.

Factor [Lat. *factor*, a "maker"], one of the quantities which, when multiplied together, produce a given quantity.

Factor, a gen. agent employed in the purchase or sale of merchandise, with power to retain possession of the property in regard to which his authority is exercised, and to control, to a large extent, its management and disposal by proceedings in his own name. By the possession of these peculiar powers a F. is distinguished from a broker, who only conducts negotiations and bargains concerning property of his principal, without having it in his charge, and who properly acts in a rep. character by the use of his principal's name. The term "factor," though the one usually employed in law, is not so common in popular usage as "commission merchant" or "consignee." Compensation by the prin. is generally a certain percentage on the amount of purchases or sales, called factorage or commission. The fundamental duty of a F. is to exercise reasonable care in the performance of the duties with which he is intrusted, and to exhibit such skill and prudence as is required by the nature of the business and a proper consideration for the welfare of his employer. Otherwise, he has no valid claim for his commissions, and for injurious negligence and default may even be subjected to an action by his prin. In the management of the property committed to him he has commonly extensive discretionary power. He may buy and sell, sue and be sued, collect money, give receipts, etc., in the same manner as if he were himself owner of the goods, unless specially restricted by the prin. If any special instructions are given to guide his action, he is bound, as between him and his prin., to follow them strictly, except in some few cases where the necessary protection of his own interests requires that such directions be violated. In the absence of instructions, F. should conform to the usages of the business in which they are engaged. Sometimes, in consideration of an increased commission, a F. guarantees the payment of the price of goods by the purchaser to his prin. He is then said to act under a *del credere* or guaranty commission, and is subject to most of the obligations of a surety. Statutes have been passed in Eng. and some of the Amer. States regulating the rights and duties of F. GEORGE CHASE.

Faed, fad (JOHN), artist, b. in 1820 at Burley Mill, Kirkcudbright, Scot. His father was an engineer and millwright, but the lad showed a taste for painting that made the homely surroundings tributary to it, and at the age of 12 finished a picture so well that his future career was determined. In 1841 he went to Edinburgh for study, and there, in 1850, exhibited pictures which attracted attention from their naturalness and met a ready sale. He painted *Shakespeare and his Friends*, *The Captain's Saturday Night*, *The Soldier's Return*, *Tam O'Shanter*, *Halton Hall of Old John Anderson* and *My Joe, Parting of Gabriel and Evangeline*.

Faed (THOMAS), R. A., younger brother of the above, b. at the same place in 1826. He too had a passion for art, and on the death of his father followed his brother to Edinburgh. At the Acad. of Design there, under the instruction of Sir W. Allan, he soon distinguished himself. His first exhibited piece was in water-colors, *The Old English Baron*. After that he tried oil-painting, like his brother choosing humble themes—*The Players of Dringhts*, *The Shepherd Boys*. In 1849 F. became an associate of the Royal Scot. Acad.; 2 yrs. later the well known picture, *Walter Scott and his Friends at Abbotsford*, made him famous. In 1852 he removed to Lond., and sent his work to the Royal Acad. From yr. to yr. his reputation increased; *The Mitherless Bairn* (1855) was pronounced the picture of the season. His painting *Baith Father and Mither* (1864) was again exhibited at the World's Fair of 1867, along with 2 other canvases by the same hand. Was made member of the Royal Acad. Dec. 1864.

Fagging, a technical term to denote a custom which has become part of the public-school system of Eng. This custom differs in detail in the several schools, but rests in all on the same principle, which is, that the discipline of the school should be left, as far as possible, to the boys themselves, the responsibility for order being thrown on the highest form, known as the 6th form, called also prefects or preceptors. Those who are thus responsible for discipline have also the right of "fagging" the boys in the lower forms, those in the forms immediately under the 6th being exempted. Dr. Arnold defines F. as "the power given by the supreme authorities of the school to the 6th form, to be exercised by them over the lower boys, for the sake of securing a regular govt. among the boys themselves, and avoiding the evils of anarchy; in other words, of the lawless tyranny of brute force." In all the schools the power of F. carries with it certain duties. Beside that of keeping order gener-

ally, the 6th-form boy is the recognized adviser and protector of those fags with whom he comes in immediate contact. Formerly F. included a number of menial functions, such as cleaning boots and candlesticks, and the power of the 6th form was practically unlimited as to hours. All this is now changed. Thus, at Rugby, gen. F. is practically confined to running errands, a 6th-form boy having power to call any fag, at any time, for this purpose. "House-fagging" consists of little beyond carrying up the trays on which their master's breakfast and tea things are set, and perhaps toasting a round of bread or a rasher of bacon. "Study-fagging" still exists at Rugby, where each 6th-form boy has 2 fags specially attached to him, who sweep out his study and put it in order in alternate weeks. The most distinguished masters of public schools, from Dr. Arnold downward, have been singularly unanimous in their approval of the modified system of F. which now exists. The public opinion both of old public-school men and of the boys themselves is also strongly in favor of it as the best means of maintaining the due subordination of ranks, of keeping down "cheek," and preventing bullying. [From orig. art. in *J.'s Univ. Cyc.*, by HON. THOMAS HUGHES, M. P.]

Fagus. See BEECH.

Fahrenheit, far'en-hit (GABRIEL DANIEL), F. R. S., b. in 1690 at Dantzic, Pruss., became a constructor of scientific instruments; resided in Fr., Eng., and afterward in Hol., and was recognized as one of the leading physicists of his time. In 1720 he first introduced the use of mercury in thermometers. He invented the F. scale, also an improved areometer and other valued instruments. D. 1740.

Faidherbe (LOUIS LEON CESAR), Fr. gen., b. June 3, 1848, at Lille, began his career in the colonies. At the outbreak of the war with Ger. he was called to active participation in the war in Dec. 1870, and received the command of the armée du Nord, organized in and around Lille. On Jan. 19, 1871, he was defeated by Gen. von Goeben at St. Quentin. Acknowledged as a very able commander and organizer in war, F. entered into politics during the reorganization of the govt. Joined the party of Gambetta, and accepted the election from his native place. When the govt. of Thiers triumphed, F. retired from public life.

Failly, de (CHARLES ACHILLE), Fr. gen., b. Jan. 21, 1810. After 1828 served partly in Fr., partly in Algeria; in the Crimean war distinguished himself; in the war against Aus. commanded the 3d division of the 4th army corps; after this war, and to 1870, was pres. of the comité consultatif de l'infanterie; in 1867 commanded the expedition whose task was to protect the pope against the attacks of Garibaldi. At the beginning of the war with Ger., F. received the command of the 5th corps, but was very unsuccessful, and was violently attacked by his countrymen.

Fainting (*syncope*), a more or less complete and sudden loss of sensation and of the power of motion, usually attended by feebleness of the circulation and respiration. F. is due to anæmia of the brain, its proximate cause; more remotely it may be caused by loss of blood, by profound emotional disturbance, or by heart disease. In profound and protracted syncope there is danger of death by heart-clot. F. is to be treated by placing the patient on his back in a horizontal position, or with the head and chest slightly depressed below the level of the rest of the body; by admission of fresh air to the patient; and, in prolonged cases, by applying diffusive stimulants—as ammonia, camphor to the nostrils, alcoholic stimulants by the mouth and rectum, and resorting to artificial respiration and the electric battery. F. is seldom fatal, unless in cases of severe disease.

Faioum. See FAYOUM.

Fairbairn (PATRICK), D. D., a Scotch theol., b. at Greenlaw in 1805. After being for some yrs. prof. at Aberdeen, he was in 1856 made prin. and prof. of systematic theol. and N. T. exegesis in the Free Ch. Theological Coll. at Glasgow. D. Aug. 6, 1874. His prin. work is *The Typology of Scripture*.

Fairbairn (ROBERT BRINCKERHOFF), D. D., b. in New York May 27, 1818, grad. at Trinity Coll., Hartford, 1840, and also at the Gen. Theological Sem., New York. Immediately after his ordination as deacon, 1843, became rector of Christ Ch., Troy, N. Y.; from 1853 to 1862 was prin. of the Catskill Acad., as well as rector of Calvary Ch., Cairo, N. Y.; in 1862 appointed prof. of math. and natural philos. in St. Stephen's Coll., Annandale, N. Y., of which inst. he became warden in 1863, and also prof. of moral philos.

Fairbairn (SIR WILLIAM), BART, F. R. S., LL.D., a Brit. civil engineer, b. at Kelsco, Scot., 1789; received his early education at a parish school, and was apprenticed to an engine-wright at a colliery. On the termination of his apprenticeship he visited various places in Eng., Wales, and Ire., working for a brief time in each, in order to acquire a practical knowledge of mechanical engineering. In 1817 began business on his own account at Manchester. In time his attention was directed to the use of iron for ships, and he was the first in Eng. to construct an iron ship. This branch of industry became his prin. business. More than 100 iron ships were constructed by his firm. He made a protracted series of experiments to test the strength of various kinds of iron; also on the resistance of hollow tubes or cylinders to outside pressure, which led to valuable practical results. He co-operated with Robert Stephenson in designing and constructing the great tubular bridge across the Menai Strait; wrote many valuable professional books and papers. Was pres. of the Brit. Association for the Advancement of Science, member of learned societies, and was created a baronet in 1869. D. Aug. 17, 1874.

Fairbanks (ERASTUS), LL.D., an Amer. manufacturer, b. at Brimfield, Mass., Oct. 28, 1792; formed a partnership with his brother for the making of scales in 1825 at St. Johnsbury, Vt.; was member of the Vt. legislature 1836-38, gov. of the State 1852-53 and 1860-61. D. Nov. 20, 1864.

Fairbury, R. R. Junc., Livingston co., Ill., 10 m. S. E. of Pontiac, Ill. It is in a region abounding in coal, limestone, fire-clay, sandstone, and a micaceous quartz which affords

a fine fire-proof building material. Clays of nearly all colors abound. Pop. 1870, 1493; 1880, 2140.

Fairbury, cap. of Jefferson co., Neb., on R. R. and the Little Blue River. It has valuable water-power. Pop. of tp. 1870, 370; 1880, 1251.

Fairchild (JAMES H.), D. D., b. at Stockbridge, Mass., 1817; at 17 entered Oberlin Coll. as freshman, and has been connected with the coll. to the present time. In 1838 was tutor, in 1842 prof. of langs., in 1847 of math., in 1858 of theol., and in 1866 became pres. Has written *Moral Philos.* and pamphlets.

Fairchild (Lucius), b. at Franklin Mills, O., Dec. 27, 1831; served in the war of 1861-65 from the State of Wis., becoming brig.-gen. of volunteers 1863; was sec. of state of Wis. 1864-65, and gov. 1866-71; afterward U. S. consul at Liverpool, and 1880-81 U. S. minister to Sp.

Fairfax (THOMAS), LORD, Eng. gen., b. at Denton, Yorkshire, Jan. 1611; at the outbreak of c. war in 1642 received from Parl. a commission as gen. of cav.; was distinguished at Marston Moor, where he commanded the right wing; in Jan. 1645 became commander-in-chief of the Parliamentary army, with Oliver Cromwell as lieutenant; gained the battle of Naseby June 14, 1645; in June 1646 captured Ox., and Charles I. fled to Scot. F. was then commissioned by Parl. to carry £300,000 to the Scotch army, who agreed to deliver the king to him for that sum. He met the king near Nottingham Feb. 11, 1647. Soon after this he yielded to the genius of Cromwell, and when, in Mar. 1648, he succeeded to his father's titles, continued to fight for him. In 1649 he was made commander of all the forces in Eng. and Ire., but refused to fight the Scots, and resigned his commission in June 1650. In Sept. 1654 he was a member of Cromwell's first Parl., and in Dec. 1659 took part with Monk in the defeat of Lambert; Jan. 1, 1660, was a member of the council of state, and in May chairman of the committee delegated by the House of Commons to prevent the return of Charles II. Wrote *Short Memorials of Thomas, Lord Fairfax*. D. Nov. 12, 1671.

Fairfax (post-office name **Culpeper**), p.-v., cap. of Culpeper co., Va., in Catalpa tp., on R. R., 69 m. S. W. of Wash. It was an important strategic point during the c. war. Pop. 1880, 1613.

Fairfield, R. R. junc., cap. of Wayne co., Ill., 90 m. E. of St. Louis. Pop. 1870, 719; 1880, 1391.

Fairfield, city and R. R. junc., cap. of Jefferson co., Ia., 50 m. W. of Burlington. It is the seat of Parsons Coll. (Presb.) and a female sem. Pop. 1870, 2226; 1880, 3086.

Fairfield, Somerset co., Me., on R. R. and the W. bank of Kennebec River, 21 m. N. of Augusta; has excellent water-power. Pop. tp. 1870, 2998; 1880, 3044.

Fairfield (JOHN), b. at Saco, Me., Jan. 30, 1797; became a lawyer, and reporter of the supreme judicial court 1832; was in Cong. 1835-39, gov. of Maine 1839-40, 1842-43; U. S. Senator 1843-47. D. Dec. 24, 1847.

Fairfield (SUMNER LINCOLN), poet, b. at Warwick, Mass., June 25, 1803, studied at Brown Univ.; became prin. of Newtown Acad., Pa.; wrote *Last Night of Pompeii*, and other poems; edited the *N. Amer. Magazine* 1833-38. D. Mar. 6, 1844.

Fair Haven, Mass. See APPENDIX.

Fair Haven, on R. R., New Haven co., Conn., now the 7th ward of the city of New Haven. It is celebrated for its oyster-trade. Pop. 1870, 3991; 1880, 7556.

Fairhaven, Rutland co., Vt., on R. R., 8 m. N. E. of Whitehall, N. Y. It has great water-power and quarries of slate and marble. Pop. of tp. 1870, 2308; 1880, 2311.

Fairmont, Fillmore co., Neb., 100 m. W. of the Mo. River, on R. R. Pop. 1880, 600.

Fairmont, W. Va. See APPENDIX.

Fair Oaks, a locality in Va., on the Richmond and York River R. R., 7 m. E. of Richmond, where a battle was fought, May 31, 1862, between the U. forces under Gen. McClellan and the Confeds. under Gen. J. E. Johnston. About $\frac{1}{2}$ of the U. army had a few days before been sent across the Chickahominy, the remainder being upon the N. side, the only practicable communication between them being by hastily constructed bridges. Gen. Johnston, about noon of the 31st, made an attack in force upon that portion of the Union army upon the S. side of the river. The first encounter was at a place known as the "Seven Pines," and the U. forces were driven back for some distance, when a new line was formed, and desultory fighting at this point was kept up until after dark. In the meanwhile the noise of the firing was heard across the Chickahominy, and Gen. Sumner with his corps was ordered to cross—a movement attended with some difficulty, on account of the high water which had overflowed the approaches to the bridges. Sumner came in sight of the Confeds. at F. O., under the immediate command of Johnston, a little before sunset. After sharp fighting the Confeds. were forced back. Gen. Johnston was severely wounded, and the command temporarily devolved upon Gen. G. W. Smith, who unsuccessfully renewed the action the next morning, and continued it at points during the day (June 1). As night came on the entire Confed. force fell back to Richmond in great confusion, but without being pursued. The entire U. loss is reported at 5739; the Confed. reports are only partial, but they indicate a loss nearly as great as that of the Union army.

Fairplay, on R. R., cap. of Park co., Col., at the head of S. Park, on the mt.-route between Denver and Santa Fé, 117 m. by R. R. from the former place. It is noted as the supply-point for the Mt. Lincoln mining dist. Its altitude is 9964 ft.—nearly 2 m. above sea-level, and 3500 ft. above Mt. Washington. Mt. Lincoln towers above the plain to a height of over 14,300 ft., and along its sides to within a few yards of the top, often enveloped by clouds, and frequently above them, miners and prospectors are developing or seeking new discoveries. Pop. 1880, 450.

Fairport, Monroe co., N. Y., on R. R., 11 m. E. of Rochester, and on the Erie Canal. Pop. 1880, 1920.

Fairy Rings are imperfectly circular or annular patches in grass-land in which the vegetation is either richer or

more scanty than that around it. They are common in the Brit. Islands and other parts of Europe, where, according to folk-lore, they are caused by the dancing of fairies. It has been shown that they are caused by the growth of mushrooms (*Agaricus*), which spread from the centre outward, and at first check, but afterward by their decay accelerate, the growth of the grass.

Faith [Lat. *fides*; *fidere*, to "trust"] is belief, conviction, assurance, or trust, resting on any sort of evidence whose force is affected by the mental condition of the recipient. An assurance resting on purely objective grounds relies upon the common state of all minds, not on the special condition of any, and involves knowledge. We believe there is a God, but there are temptations to unbelief which have led men to atheism. We know that twice 2 are 4, and it is not possible to tempt us to doubt it. One and the same thing may be an object of F. at one stage of evidence, and of knowledge at another. There may be a subjective difficulty which is invincible to the sort and degree of evidence which is ordinarily sufficient for F., yet is overcome by the evidence which produces knowledge. The mind may pass therefore from unbelief to belief, from belief to knowledge, or from unbelief to knowledge. It may pass from unbelief to belief without addition to evidence, solely by change in itself, but it cannot pass from either to knowledge, except by additions to evidence. The F. of one man may rest on the presumed knowledge of another, and thus be confounded with knowledge itself. The great body of scientific fact is actually the object of knowledge to a few, and is supposed to be a part of the knowledge of the many only because the many have F. in the statements of the few, though they can neither verify them, nor even understand the processes by which they are reached. Knowledge involves intellectual coercion—F. involves freedom. We are not responsible for the fact that under the conditions of knowledge we know, or in defect of them do not know; we are responsible if under the conditions of a well-grounded F. we disbelieve. In theol., the relations of F. to knowledge and the question of precedence have long been agitated. Augustine and his school held that F. precedes understanding; Jacobi confessed that to him the dualism of the two was hopeless; Hegel proposed to relieve the antagonism by absorbing F. into knowledge; Schleiermacher says they are the 2 foci of one ellipse. The Reformers laid stress on F. as a personal assurance of the forgiveness of sins for Christ's sake. This F. justifies not by the merit, or on the ground of the works which follow it, but as the medium, which appropriates Christ and his merit. C. P. KRAUTH.

Faith, Articles of. See FAITH, CONFESSIONS OF.
Faith, Confessions of, official statements of doctrine—symbols in the theological sense. As distinguished from creeds, C. of F. are fuller presentations. Confessions are anc. or modern. In the extent of reception they are (1) oecumenical, catholic, or gen., as accepted by the whole Ch. catholic; (2) particular, as accepted by particular parts of the Ch. Articles of faith are the separate parts of confessions. A confession is an organic body or *corpus* of faith, its parts are members or *articuli*, such as the articles concerning God, sin, Christ, the Ch. C. P. KRAUTH.

Faith, Rule of (Fidei Regula), that to which Faith appeals as its source and guide. Why do I believe this or that? and what am I bound to believe? are questions answered by the R. of F. In the R. Cath. Ch. the R. of F. is the body of revealed truth embraced in Holy Script, and tradition in the sense in which the Ch. holds that truth. In the Prot. chs. the canonical Scripts are regarded as the sole R. of F.—RULE OF FAITH, ANALOGY OF FAITH, have been applied also to the body of saving doctrines, so clearly set forth in the Scripts, as to form a gen. guide in interpreting the more obscure parts. The Apostles' Creed was frequently so styled by the Fathers. The *Regula Fidei* is valid on the assumption that there is absolute unity in all parts of the doctrinal teaching of the Bible. C. P. KRAUTH.

Faithfull (EMILY), b. at Headley rectory, Surrey, Eng., 1835; becoming interested in condition of women, she devoted her time to extending their sphere of labor, establishing in 1860 a printing establishment in which women were employed. Queen Victoria gave this project her approval, and a printing business was formed styled "The Victoria Press." Miss F. has established a publishing-office, with all the appliances of bookseller, stationer, and bookbinder connected. She visited the U. S. several times.

Fa'kir [from an Ar. word signifying "poor"], a class of religious mendicants in India. Some of them are ascetics, who practise surprising mortifications and bodily tortures. They number hundreds of thousands, and perhaps 2,000,000 in India, at the present day.

Fal'ashas, Abyssinian Jews inhabiting the mountainous regions of Samen and the plains along Lake Tzana, and numbering about 250,000. According to F. tradition, their forefathers came to Abyssinia in the days of Solomon; but ethnologists hold that they must have come there some time in the 7th century, while some of the Ger. missionaries believe that the F. came originally from Yemen in the 10th century. Until the beginning of the present century they constituted an independent tribe, but were subjected by the Amharas about 1800, and are now under the rule of the princes of Tigré. Although they possess the whole of the O. T. in the Geez lang., they deviate in many instances from Jewish usages. While they retain sacrifices, it is rather as commemorative ceremonies than as real sacrifices. The most common is the offering for the repose of the dead; but no sacrifice is permitted on the sabbath or on the day of atonement. Polygamy, though tolerated, is discouraged. Slaveholding is suffered, but slave-dealing is strictly forbidden. Slaves are kindly treated, instructed in the laws of Moses, and on conversion are manumitted.

Falckenstein, von EDUARD VONDEL, a Prus. gen. of inf., b. Jan. 5, 1797. At the rising of the Prus. people against Nap. in 1813, he entered as a volunteer into the W.

Prus. grenadier battalion. On Mar. 18, 1848, in the riots in Berlin, he was wounded, but took part in the same yr. in the campaign in Holstein, and in the war of 1866 he commanded against Hanover, Hesse, Nassau, Baden, Würtemberg, and Bavaria, and displayed considerable strategic talent. During the war of 1870 he organized the whole defence of the Baltic and of the N. Sea.

Falcon [Lat. *falco*], a name applied to various accipitrine birds of the family Falconidae, and especially to those of the genus *Falco* and others allied to it. The term *noble falcon* designates the high-flying F., which stoop upon the prey, while those which fly low, chasing the prey, are *ignoble*. The most important of the former are the gyrfalcon, the merlin, the lanner, the peregrine, and the white F., and of the ignoble birds, the hobby, the goshawk (or F. gentle), the sparrowhawk, etc.

Falconer (HUGH), M. A., M. D., F. R. S., b. at Forbes, Scot., Sept. 29, 1808, grad. M. A. at Aberdeen 1826, M. D. at Edinburgh 1829; went to India as a surgeon 1830, became supt. of the botanical garden at Seharanpore 1832, received the Wollaston medal 1837, became F. R. S. 1845, supt. of the botanical garden at Calcutta 1847. D. Jan. 31, 1865.

Falconidae [Lat. *falco*], a family of accipitrine birds, which includes the hawks, buzzards, kites, etc., arranged in 3 sub-families—Falconinae, Buteoninae, and Paudioninae. They have a bill sharp and curved, a feathered head and neck, hallux perfectly incumbent, outer toe not shorter than inner, and the eyes lateral in direction.

Falconry is the art of capturing, rearing, and training falcons for the chase of other birds, and even of small quadrupeds. It appears that the practice of hunting with falcons was introduced into Europe from the E. Marco Polo, speaking of the Tartars, says that their great khan "took with him full ten thousand falconers and good five hundred ger-falcons, with falcons *peregrine* and falcons *sacre* in great abundance; also he had a great number of goshawks for fowling along the waters." Hawking seems to have passed over from the Tartars to the czars of Muscovy. In Europe this pastime is anterior to the Middle Ages. Charlemagne is said to have kept as many falconers as huntsmen. Henry the Fowler received his surname from his passion for this sport. The emp. Frederic II. not only enjoyed hunting with falcons, but wrote a treatise upon it. Another treatise on the subject is attributed to Edward the Confessor of Eng. To Eng. readers the most interesting treatise on this subject is that ascribed to Dame Juliana Berners, forming the first part of the *Boke of St. Albans*, first printed in 1481. We learn from the *Glossary* of Du Cange that the privilege of keeping falcons was, in the Middle Ages, confined to the nobility. This, however, does not seem to have been the case in all countries. The office of grand falconer at the Byzantine court, in that of Eng., and in that of Savoy, was one of the highest dignity. F. and hawking had their special vocabularies, the thorough knowledge and accurate use of which were thought highly important as a test of good-breeding. With E. sovereigns hawking is still in great favor, but it has almost entirely disappeared from Europe. The rare occasions in which the falcon is now employed are rather scenic representations of the old custom than attempts to revive it. The hist. of this pastime is especially interesting, as being almost the only out-door amusement in which women of rank, in the Middle Ages, took an active part, and it has furnished the writer of fiction with many a happy illustration. (See G. E. FREEMAN, *Falconry, its Claims, Hist., and Practice*.) [From orig. art. in *J. s. Univ. Cyc.*, by PROF. ANGELO DE GUBERNATIS.]

Falerii, a city of anc. Etruria, N. of Mt. Soracte and W. of the Tiber. It is believed to have been one of the 12 cities of the Etruscan confederation. It was often at war with Rome, but in 241 B. C. was conquered and destroyed by that power. A new Rom. F. was founded near by, whose ruins are of great interest.

Falerian Wine [so called from *Falerius Ager*, a region of Campania Felix, where it was grown], the most celebrated of the wines of the anc. Roms., was of 3 varieties—a light, a sweet, and a dry. It was very strong, so that it would take fire from a lighted taper. When new it was harsh and unpleasant. The excellent Massic wines came from the same region, and the 2 sorts were often confounded. These regions still produce good wine.

Falle'ri (MARINO), doge of Venice, b. 1274; served the republic in war and on important embassies; and in 1354, when 79 yrs. old, was chosen to the dogate, soon after which the Venetian fleet was lost in a battle with the Genoese. Not long after, at a carnival feast, he was insulted, as he conceived, by a young nobleman, and in revenge determined to destroy the whole body of nobles. His conspiracy was detected, and the doge was beheaded Apr. 17, 1355.

Falkirk, a parliamentary borough of Scot., 24 m. W. N. W. of Edinburgh, on the Edinburgh and Glasgow and Scot. Central R. R. In 1298 William Wallace was defeated here by Edward I., and in 1746 the Highlanders under Prince Charles Edward defeated the royal troops. Pop. 13,170.

Falkland (LUCIUS CARY), VISCOUNT, an Eng. statesman and writer, b. at Burford 1610, ed. at St. John's Coll., Cambridge. At 19 he came into possession of a valuable estate, and a few yrs. after settled at Great Tew, Oxfordshire, where his house became the centre of all the learned of Ox. In 1633, upon the death of his father, he succeeded as viscount, and was made by King Charles gentleman of the royal bedchamber. In 1640 he was chosen member of the Short Parl., and was re-elected to the Long Parl., where he distinguished himself by his independent course. Opposed to what seemed to him the excesses of the popular party, he entered the lists in defence of the king, and became sec. of state. When c. war seemed inevitable he joined the army, and was therefore removed from the Commons and placed on the list with those to whom no mercy was to be accorded. He wrote various treatises, of which is best known the

Discourse of the Infallibility of the Ch. of Rome. Killed at the battle of Newbury, Sept. 30, 1643.

Falkland Islands [Fr. *Malouines*], a cluster in the S. Atlantic, between lat. 51° and 53° S. and lon. 57° and 62° W., consisting of nearly 200 islands and presenting an area of about 13,000 sq. m. Of the 2 largest islands, respectively called E. and W. F., and separated from each other by a narrow sound, the former has an area of 3000 sq. m., the latter of 2000 sq. m.; the rest are small islets. No trees, no fruits, scarcely anything but a few vegetables are raised in the settlement, but the natural grass is extremely luxuriant. The islands were first discovered by Davis in 1592. In 1690 they were visited by Strong, who gave them the name which they now bear. Fr., Sp., and Eng. settlements have been formed on them, but the Eng. have ultimately retained possession. Pt. Stanley, with an excellent harbor, on E. F., is an entirely Eng. settlement. Pop. of colony, 812.

Falköping, a town in Swe., known by the battle of 1389, in which the Dan. queen Margrethe conquered the army of the Swe. king Albrecht, and took him prisoner. This victory led to the famous Union of Calmar, 1397.

Falling Bodies. All material bodies tend downward with more or less force, and the measure of this tendency in each is the weight of that body. The tendency itself is imputed to an influence called *gravitation* inherent in matter universally, and is the resultant of the mutual attractions which take place between all the material particles of the body and those of the earth. When this tendency is adequately resisted, the body is said to be supported, and it remains at rest; when the resistance is withdrawn, the body falls. Observation of bodies falling naturally shows that all do not fall equally fast. A metal bullet descends with great rapidity; shreds of paper flutter downward slowly; some very light substances, like the down of feathers or the winged seeds of plants, seem scarcely to descend at all; and some, relatively lighter still, like bubbles and balloons, even rise. But when we observe that if heavy bodies be immersed in water the differences and seeming anomalies of this kind which occur are much more numerous and more remarkable still, we soon learn to attribute the unequal velocities with which bodies fall in the atmosphere to the buoyant power of the air, and the resistance it opposes to bodies moving through it. If, in order to test the truth of this hypothesis, we make the experiment of dropping from the same support, at the same instant, in a tall receiver exhausted of its air, 2 substances so physically different as a bullet and a bit of thistle-down, we shall find our anticipation confirmed; for the velocity of fall will be the same for both, and the 2 will reach the bottom together. If we would inquire, therefore, the laws which govern the fall of bodies, we must consider bodies as falling *freely*—that is to say, *in vacuo*. The buoyant power of air diminishes the downward tendency and velocity of descent; it is resistance to motion which disturbs the law of fall.

This resistance is proportioned to extent of surface; the weight or urging force is proportioned to density. Bodies of large specific gravity, exposing small surface, are very little interfered with in their fall (at least through the heights to which observation can extend) by atmospheric resistance. But the densest substances, when spread out into thin laminae, such as gold and silver in leaf, fall as irregularly and as slowly as tissue-paper or down.

The law governing the motion of a body falling freely may be abstractly inferred by considering the relation of force to motion. Velocity in a given body is proportional to the force impressed. As gravity is a *constant* force (that is; a force which acts all the time), it imparts every instant to the F. B. a minute addition, always the same in amount, to the velocity which the body had before. Thus, this velocity goes on increasing, and increases equally in equal times—in technical lang. it is uniformly accelerated—and the final velocity is always proportional to the time which has elapsed since the fall began. By experiment it is found that a body, in falling from a state of rest, acquires, in 1 second of time, a velocity which, continued uniformly, would carry it over 32.2 ft. in a second. If, then, we put 32.2 ft. = g , and represent any other time in seconds (whole or fractional) by t , and also represent the final velocity by v , we shall have $v = gt$.

The expression for space s , fallen through in time t , is not so obvious, because the velocity is not uniform. But it may be theoretically shown, and experiment confirms the conclusion, that the space fallen through from rest in a given time is $\frac{1}{2}$ of that through which the final velocity so acquired, if continued uniformly, would carry it in an equal time. This proposition may be stated conversely and generally thus: The velocity acquired by a body in falling from rest during the time t is such as, continued uniform, would carry it in an equal time over twice the space through which it has fallen to acquire that velocity. F. A. P. BARNARD.

Falling of the Womb. See PROLAPSUS UTERI and UTERINE DISEASES.

Falling Stars. See METEORS, by PROF. H. A. NEWTON.

Fall of Man, in theol., the lapse of the first man, and through him the lapse of the human race, from the state of integrity into the state of corruption. The doctrine is placed usually as the systematic link between creation and redemption. The narrative in Gen. iii. is treated throughout the Bible as historical. The myths and legends of paganism have many parallels with the Script. account of the Fall. The tree of knowledge is generally regarded as simply affording the means of testing man, not as having in its fruit any special objective character. The serpent is simply organic and instrumental, the mask of the real tempter, the devil. The sin of the Fall is apostasy from moral fellowship with God, caused by abuse of the freedom of the will, and followed by the loss of the divine image and by liability to temporal and eternal death on the part of Adam and his posterity. Various explanations have been urged as substitutes for the historical sense of the narrative, both in anc. and

modern times. The Ophites regarded the serpent as incarnate Wisdom. Many modern Ger. thinkers consider the Fall as a necessary part of man's development in reason and character. "the happiest event in human hist." Hase calls it "the image of that which occurs in every man." Nietzsche says, "It is true hist., but not actual." (A statement and vindication of the received view will be found in KRAUTH's *Conservative Ref.*, 376-455, and HODGE's *Systematic Theol.*, ii, 123-129.) C. P. KRAUTH.

Fallopius, or Fallopio (GABRIELE), an It. anatomist, b. at Modena in 1528, or, according to Tomassini, in 1490; taught at Ferrara and Pisa, and in 1551 became prof. of anat. and surgery at Padua and director of the botanic gardens. His name is given to the Fallopiian tubes, which he did not first discover, though he first suggested correctly their use.

Fallow Deer [*fallow* means "pale yellow"], the *Cervus dama vulgaris*, now very common in Eng., but introduced there, it is supposed, by the Rom. colonists. In a wild state it only exists in S. Europe.

Fallows (SAMUEL), D. D., b. at Pendleton, near Manchester, Eng., Dec. 13, 1835; removed with his parents to Wis. 1845, grad. at the Univ. of Wis. 1859; became a minister of the M. E. Ch.; entered the army as chaplain 1861, afterward engaged in active military service; became a regent of the Univ. of Wis.; State supt. of public instruction 1870-72; became pres. of Ill. Wesleyan Univ. at Bloomington 1874, rector of St. Paul's Reformed Epis. ch., Chicago, May 1875, ed.-in-chief of the *Appeal*, the organ of Reformed Epis. Ch., Jan. 1876, and bp. July 15, 1876.

Fall River, city and important R. R. centre, Bristol co., Mass., on the R. I. border, on the E. side of Mount Hope Bay, the N. E. arm of Narragansett Bay, and along Taunton River, some 20 m. from the sea and 4½ m. S. of Boston. It is at the head of deep-water navigation. F. R. was first settled in 1659, incorporated as a town in 1803, and became a city in 1854. Pop. 1870, 26,766; 1880, 48,961.

Falls City, cap. of Richardson co., Neb., 9 m. W. of the Mo. River, in the Great Nemaha Valley and on R. R. Pop. 1870, 607; 1880, 1583.

Falls of Montmorency, a waterfall and v. in the prov. of Que., Canada. Here the river Montmorency falls from a precipice 250 ft. high directly into the St. Lawrence, 7 m. below Que.

False Bay is an inlet on the E. side of the mountainous dist. of S. Afr. which terminates in the Cape of Good Hope. As it is sheltered from the N. W. monsoon, to which the harbor of Cape Town is exposed, it receives all trading-vessels from Cape Town for temporary protection, and it is the permanent station of the naval force of the colony.

False Imprisonment, an unlawful deprivation of personal liberty. It is not necessary to constitute this offence that there should be an actual incarceration of the person, or that any actual force should be employed in procuring the wrongful restraint. An unwarrantable detention in a private apartment, or even in a public highway, is sufficient, and there need be no other exercise of power than a mere command or direction to submit to arrest, provided it is accompanied with such a display of authority, or exhibition of means to procure compliance, as naturally leads the person accosted to believe that he is submitting to legal authority, or that he will be forced to yield if he attempts resistance. F. I. often occurs from the unjustifiable exercise of pretended legal authority, as by arresting without process when process is necessary. For instance, a constable or other peace-officer has power to arrest without warrant if he have reasonable ground of suspicion that a felony has been committed and that the person whom he seeks to detain is the offender. In like manner, when a felony has actually been committed, a private individual needs no legal process to justify him in taking into custody the supposed perpetrator, whose guilt is reasonably presumable. Furthermore, any person, whether he be an officer or not, in whose presence a breach of the peace is committed, may detain the peace-doer and deliver him to the proper legal authorities for punishment. But whenever the right of arrest without warrant is exercised, a just occasion must be shown to exist, or the person making the arrest will be guilty of F. I. In all other grades of offence legal process is necessary to justify an arrest, and without it any restraint or detention of a person is unlawful. So an arrest is invalid and wrongful, even if made under color of process, if the process be void from some irregularity or defect, or if the arrest be made on an unlawful occasion, as on Sunday or a legal holiday, upon civil process merely.

The remedies for F. I. are adapted to secure either a restoration of the person confined to liberty, as by writ of habeas corpus, or the punishment of the party who is chargeable with the wrongful confinement, as by a civil action for damages or a criminal indictment. GEORGE CHASE.

False Pretences. See CHEAT, by Prof. T. W. DWIGHT.

Familiar Spirits. The original Heb. word (רוח) plu. רוחות, which is rendered in our Eng. version *familiar spirit* or *spirits*, occurs at least 15 times. The primary meaning of *oboh* is *leathern bottles*, suggesting the idea of inflation by the F. S., with some reference, perhaps, to the tricks of ventriloquism.

Fam'lisms, or Family of Love, an Eng. mystic sect, founded in Hol. by Henry Nicholas, a native of Westphalia, originally an Anabaptist, and transferred to Eng. near the middle of the 16th century. They taught that religion consists wholly in love independently of any form of truth. Through love man could become absolutely absorbed in and identified with God in a subjective sense; that God regards not the outward actions, but only the heart; that to the pure all things are pure, even things forbidden.

Fam'ily [Lat. and Sp. *familia*, from Oscan *famul*, a "slave"]. In the early use of the word the idea of subjection was prominent. With Lat. writers it often denotes the collective body of slaves owned by one master. In a wider sense they made it comprehend all—free persons, slaves, and

objects of property that were subject to the will of the head of the house, in accordance with Rom. law, which gave the head of the family absolute power over children and grandchildren as well as slaves. The Eng. word represents a household including parents, children, and servants living together under one head. It is also extended to embrace the descendants of a common ancestor. The F. is the germ of civilized society. Thus, Plato says, "Whatever is most excellent in the state must begin at the fireside." A. L. CHAPIN.

Fam'ily, in zoology, indicates a group of animals intermediate between the genus and order—e. g. the cat-like animals (Felidae), the dog-like animals (Canidae), etc. The term was originally introduced by Fr. naturalists as the vernacular equivalent of the Lat. *ordo*, and in this sense it is still used by botanists—e. g. by Dr. Asa Gray, who combines certain forms in groups, for which he employs the word *order* as the scientific term, and *family* as the popular; thus, Order 1. *Ranunculaceae* (true-foot family).

Fam'ine [from the Lat. *fames*, "hunger"], a failure of the supply of food for any region, usually caused by drought or other climatic influences, but also liable to be produced by swarms of devouring insects, such as locusts, or by blights and diseases affecting vegetation, like the potato-rot, which produced the terrible famines of Ire. in 1846 and the yrs. which followed. The F. of Egypt have been generally due either to deficiency or excess in the annual floods of the Nile. That of Per. (1871-72) was produced by the great drought of 1870. Long wars have led to F. by breaking up farm-labor and rendering industry impossible. Great pestilences have caused F., while F. has caused epidemics.

Faneuil, fun'el (PETER), merchant of Boston, b. of a Fr. Huguenot family at New Rochelle, N. Y., 1700. In 1740, at a public meeting in Boston, he offered to erect a suitable edifice for a public market-house at his own expense and give it to the town. D. Mar. 3, 1743.

Faneuil Hall, in Boston, Mass., was built by Peter Faneuil in 1742, and given to the town. It was burned in 1761, its walls of brick remaining. It was rebuilt at the expense of the town. It is called the "Cradle of Liberty," because the "Sons of Liberty" held meetings there during the early yrs. of the struggle of the colonies with the mother-country. In 1805 it was made 40 ft. wider and 1 story higher. The hall is now about 80 ft. square.

Fan'no, or Fan'ino (FAVENTINO), one of the earliest martyrs during the reformatory period in It., b. in Faenza; was won over to the Prot. cause by the reading of the Scriptures, and gave himself to proselyting efforts, on account of which he was imprisoned. He was persuaded to recant for the sake of his wife and children; but upon his release he found peace only in the resolve to openly battle for liberty of conscience. He was arrested in 1548 and conducted in chains to Ferrara. Refusing to recant, he was strangled, and his body was burned, Sept. 1550.

Fan'nil (JAMES W.), COLONEL, Tex., b. in N. C., fought in the war for Tex. independence, and was one of 357 prisoners shot at Goliad by order of Santa Anna, Mar. 27, 1836.

Fan'ning (Col. DAVID), b. in Wake co., N. C., about 1756; became the leader of a band of Tories or "loyalists," who during the later yrs. of the war of the Revolution performed in Central N. C. many daring exploits. In 1781 he took the town of Pittsborough, and soon after Hillsborough, then the State cap., carrying off Gov. Burke and his whole suite. He was one of the 3 persons excluded by act of the N. C. legislature from the amnesty proclaimed after the peace; escaped into Fla., traded with the Indians, made his way to N. B., and thence to N. S. He wrote an *Autobiography*. D. 1825.

Fanning (EDMUND), LL. D., b. on Long Island 1737, grad. at Yale 1757, settled in Hillsborough, N. C.; took part against the people in their struggle for independence, raising and commanding the king's Amer. regiment of foot. After the war he was appointed councillor and lieut.-gov. of N. S. and gov. of Prince Edward Island. He was successively major-gen., lieut.-gen., and gen. in the Brit. army. D. Feb. 28, 1818.

Fan'ning-machine, or Fanning-mill, an implement for winnowing grain. Anciently the wind was the agent chiefly employed for separating chaff and dirt from grain. The combination of sieves and fans is a Dut. invention, probably of no great antiquity.

Fan'nius (CAIUS) **Stra'bo**, distinguished as an orator, and one of the earliest Rom. historians who wrote in Lat. His *History* treated of contemporary events, and the 8th book is referred to, though the extent is not known. A few fragments only remain.

Fans, a cannibal race found upon the Gaboon River in equatorial Afr. They eat their own dead, and purchase the dead of other tribes as food, use poisoned arrows and the cross-bow, and are becoming the dominant people, where they first appeared since 1847.

Fan'shawe, or Fanshaw (SIR RICHARD), D. C. L., Eng. diplomatist, b. at Ware 1608, studied at Cambridge; was minister-resident at the court of Sp. At the battle of Worcester, 1651, was taken prisoner and kept captive for yrs. Was privy councillor of Ire. 1661, and ambassador to Port. In 1664 was ambassador to Sp. Translated Guarino's *Pastor Fido*, *The Lusiad* of Camoens, etc. D. June 16, 1666.

Fan'tee, or Fan'ti, a tribe, and the country it inhabits in W. Afr., on the coast of Guinea. The inhabs. belong to the same family as the Ashantees. They built large cities, and began trading and manufacturing. But early in this century they came in contact with the Eng., who built a fort at Cape Coast Castle. Their political organization became weakened under Eng. influence, their civilization faded away, and they became a prey for the Ashantees, who in their turn were conquered by the Eng.

Far'ad (from *Faraday*), the unit of quantity in electrometry. It is the quantity of electricity with which an electro-motive force of 1 volt would flow through the resistance of 1 megohm in 1 second. One F. per second is the Brit. Association's unit of current. A million F. equal 1 megafarad. One F. contains 1,000,000 microfarads. Some elec-

tricians name the common *F. microfarad*, and call the ordinary megafarad by the name of *F.*

Faraday (MICHAEL, D. C. L. F. R. S., b. at Stoke Newington, a suburb of Lond., Sept. 22, 1791. In 1804 became errand-boy to a bookbinder, and in 1805 an apprentice. He read many of the books he bound. He made electrical experiments, and went occasionally to lectures on natural philos. After his apprenticeship he worked for a time as a journeyman bookbinder. And now we come to the hinge of circumstance on which his life turned. Davy was giving his last course of lectures at the Royal Inst. *F.* was taken to hear them; he wrote to Davy, and the reply was kind and favorable. After this he continued to work as a bookbinder, with an exception of some days during which he was writing as an amanuensis for Davy. After a journey on the Continent, and 3 yrs. after his appointment in the Royal Inst., he made his first pub. contribution to science: it was an analysis of some caustic lime from Tuscany. Both skill and insight are revealed by a short paper on sounding flames pub. in 1818. In 1820 a chemical paper opened the long series with which *F.* enriched the *Philosophical Transactions*.

Oersted's discovery in 1820 directed all minds to the interaction of magnetism and electricity, and in 1821 *F.* succeeded in making a magnetic needle rotate around a wire carrying an electric current. In 1823 he liquefied chlorine, and in 1826 he announced the discovery of benzol, which afterward became the basis of our splendid aniline dyes. In 1831 *F.* made his great discovery of magneto-electric induction, opening thereby a vast and novel electrical domain. All our induction coils, our med. machines, and the electric light so far as it has been applied to light-houses, are the direct progeny of this discovery. The desire to refer diverse natural energies to unity of principle is the strongest of the scientific mind, and *F.* illustrated this desire by his attempt to prove experimentally the "identity of electricities." But these researches take rank as mere preliminary disciplines, leading him to the final establishment of the great doctrine of "definite electro-chemical decomposition." His researches in frictional electricity occupied him from 1836 to 1838. Here he enters into the subject of conduction and induction, regarding both from a wholly original point of view. One of his prin. results here is the establishment of the specific inductive capacity of insulators—a subject of supreme importance in connection with submarine cables. In 1825-29, in conjunction with Herschel, he had tried to improve the manufacture of glass for optical purposes; this investigation was a failure, but its first reward was his discovery of the magnetization of light, his second reward that of diamagnetism. To these discoveries succeed his investigations on the magnetism of gases, his papers on atmospheric magnetism, his speculations on the nature of matter and force, and his researches on "lines of magnetic force, their definite character, and their distribution within a magnet and through space"—inquiries marked by profound insight and illustrated with refined experimental skill. Taking him for all in all, it will be conceded that *F.* was the greatest experimental philos. the world has ever seen. D. Aug. 25, 1867. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JOHN TYNDALL, LL.D.]

Faradization, in med., the application to the animal frame of the Faradic or induction electricity. Faradic electricity (named from Faraday, who thoroughly studied this force) is obtained from a variety of apparatuses called batteries—some magneto-electric, composed of a revolving magnet and coils of wires, others of a "cell" (giving a galvanic current) and coils. In cell-batteries the current of the cell never reaches the patient: each current delivered by the battery is distinct (not continuous with any other), and is the result of induction—i. e. the production of electricity in a conductor by its adjacency to another current. The batteries in common use give primary, secondary, or ternary currents (so named because of their derivation from a first, second, or third coil). The coils added to the first are progressively made of finer and longer wire, and yield currents not essentially different, but stronger. We owe to Dr. Duchenne of Paris the best methods for making use of Faradism in therapeutics. It is used for 2 purposes: (a) to produce muscular contractions (passive exercise); (b) to excite the nerves of sensation. The first object may be attained in 2 ways—first, by placing both electrodes (ends of insulated conductors armed with sponge, of various shapes) upon the moistened skin covering the muscles we wish to cause to contract; or, second, by placing one electrode as above and the other over the nerve-trunk which sends branches to that muscle. To excite the nerves of sensation, a portion of skin should be made dry by means of starch-powder, a wire-brush electrode held upon or drawn lightly over this dry skin, while the other sponge electrode is held (wet) on the integument not far away. The current can be made to reach the internal organs (bladder, uterus, etc.) by peculiarly shaped electrodes. The popular use of Faradism by holding both electrodes in hands is worthless. E. C. SEGUIN.

Farallone Islands, a group of 6 small lofty and rocky islands of the Pacific, lying 30 m. W. by S. of the Golden Gate, or entrance to San Francisco Bay, Cal. They are owned by a co., which here collects the eggs of the gull and the murre, a sea-bird of the auk family. The S. E. and largest island has a light-house, with a flashing white light of the first order, 360 ft. above the sea.

Farce is the name of a kind of comedy in which the characters are without psychological truth and the plot without moral importance, the whole being intended for laughter only. It originated in the S. European countries from rustic festivities, in which masks and every other description of disguise were used. There are traces of it in the so called *Fabulae Atellanæ*, far back in the days of the old Rom. republic. In the 16th century it entered the stage, where it kind a brilliant life under the name of *commedia dell' arte*, as a kind of improvised drama.

Farcy. See GLANDERS.

Far-del-bound, a disease of sheep and neat cattle,

known in its milder form as "loss of cud." The animal refuses to chew the cud, is stupid, feverish, has a dry nose, and sometimes grunts as if in pain. The treatment is gentle purgation, as with Epsom salts, followed by liquid food. As a preventive, avoid the use of coarse and overripe hay.

Farrel, fa-rel (GUILLAUME), a Prot. reformer, b. in Dauphiny, Fr., 1489. Being of a noble family, he was intended for the army, but was sent, about 1500, to the Univ. of Paris, where he fell under the influence of Lefèvre d'Étaples, who had dared to declare the Bible the sole guide of the Chr. The Sorbonne condemned these innovations, and Parl. pronounced against them. In 1524 he went to Bâle, Switz., where he was warmly welcomed by Écolampadius and the other reformers, but was obliged to leave in consequence of an angry dispute with Erasmus. He soon made himself conspicuous for his zeal and energy, and in 1532 visited Geneva, then agitated by religious strife. In 1535 the city formally declared itself Prot., and in 1536 *F.* was joined there by Calvin, who took upon himself the charge of the ecclesiastical organization. In 1538 they were expelled from Geneva. For many yrs. *F.* labored in various parts of Switz., finally residing at Neuchâtel. D. Sept. 13, 1565. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. J. H. WORMAN.]

Fargo, R. R. junc., cap. of Cass co., Dak., on the W. bank of the navigable Red River of the North, opposite Morehead, Minn., 254 m. W. of Duluth. It has a U. S. land-office. Pop. 1880, 2669.

Faribault, R. R. junc., cap. of Rice co., Minn., at junc. of Straight and Cannon rivers, 53 m. S. of St. Paul. It contains the State asylum for the deaf, dumb, and blind, an epis. divinity coll., 5 sems., and a public reading-room and library. Pop. 1870, 3045; 1880, 5415.

Farina, fa-rī-na [Lat. "meal"], a name applied to powdered cereal grains, and even powdered pulse (pease, beans, etc.). In a still wider sense it includes the starchy foods prepared from various roots and stalks, such as arrow-root, sago, tapioca. The pollen of flowers, after it has been gathered by bees, is also called *F.*

Farini (CARLO LIGIO), It. statesman and historian, b. at Russi Oct. 22, 1822; studied med. and wrote med. treatises. Proscribed for political offences in 1843, he returned after the amnesty proclaimed by Pope Pius IX. in 1846, and was chosen M. P. for Faenza; then exiled again 1848-49, but was minister of the interior in Piedmont in 1850, and was named dictator of Modena 1859. In the last cabinet of Cavour he was minister of commerce, and was pres. of the cabinet Dec. 1862, holding the position until Mar. 24, 1863. D. Aug. 1, 1866.

Farlow (WILLIAM GILSON). See APPENDIX.

Farm. See AGRICULTURE, by HORACE GREELEY, LL.D.

Farmer (Rev. HUGH), Eng. dissenting clergyman, b. near Shrewsbury in 1714, and from about 1746 pastor of a congregation at Walthamstow, where he d. Feb. 6, 1787. Author of an *Essay on the Demerits of the X. T.*

Farmer (JOHN) a genealogist, b. at Chelmsford, Mass., June 12, 1789, was a founder and the corresponding sec. of the N. H. Historical Society, and compiled several statistical and genealogical works. D. Aug. 13, 1838.

Farmer City, R. R. junc., De Witt co., Ill. It has a large lumber business. Pop. 1870, 537; 1880, 1289.

Farmers' Clubs are associations of agriculturists, generally those of some one community or neighborhood, who meet at stated times for the discussion of questions affecting the interests of agriculture, and more especially for considering the methods of practical farming—the relative values and uses of different fertilizers, the adaptation of special crops to particular soils, the choice of breeds of live-stock, and of varieties of cultivated plants, and the like. Solon Robinson and Hon. Horace Greeley were among the early and influential advocates of *F. C.* They were associated with the *F. C.* of the Amer. Inst. in New York, the discussions of which were for many yrs. printed weekly in the *New York Tribune*, and widely read. Some *F. C.* have libraries and invested funds, and sustain regular courses of lectures in the winter season, and in gen. ladies are admitted. (See GRANGE, by L. P. BROCKETT, M.D.)

Farmers-General, persons to whom, in Fr., the collection of certain taxes was farmed or let out for a given sum paid down. A similar system was employed by Rome in her provinces. Philip the Fair, in the 13th century, introduced it in Fr. In 1720 a regular association was formed, called the *ferme générale*, embracing from 40 to 60 *fermiers généraux*, who accumulated enormous wealth by gross extortion. By bribery and other corrupt arts they managed to resist all attempts at reform until the revolution of 1789, when the system was swept away, and many *F.-G.* were executed.

Farming. See AGRICULTURE, by HORACE GREELEY.

Farming Class. In the U. S. the word *farming* has a meaning quite unlike that given to it in Europe. In Eng. the farmer is a tenant paying rent, generally to some holder of entailed lands. In Fr. the land is divided into farms, none of them of more than 8 acres. In Eng. the farmer has little influence in directing society, for he has no permanent interest in the land. In Fr. his ownership is of so small a possession that the fact that the cultivator is the owner gives him no political importance.

The Amer. Farmer.—Here the cultivator of the soil almost always is the owner, and, except in the vicinity of great cities, less than 50 acres would hardly be called a farm. Thus the Amer. farmer generally possesses the advantages that follow combined occupancy and ownership of landed estates, not too large to be directed by one man, and yet large enough to employ all the energies and ability of an active and enterprising mind. The gen. law of emigration is that the most energetic take the lead, leaving the less enterprising to stay behind. To this energy, that first prompted the movement, in due time is added the self-reliance and quick use of all the powers of body and mind that comes of frontier life. Both men and women received an energy and power of execution unknown in more elegant life. Self-reliance, personal independence, and manhood

proud of its muscular prowess were the result. From this training have come the Amer. farmers of the grain-growing States—a body of industrious, active, and well-informed men, having many millions in their ranks, vast aggregate wealth in lands, and votes sufficient to dictate the policy of the country; generally not so ambitious of office as desirous of having wise laws honestly administered.

Scientific Training.—It would have been strange if such men had not required, as supplementary to the gen. newspaper lit. of the country, a press devoted to their own special wants. The gen. tendencies of our times to accurate and scientific knowledge in regard to the things in which we have the greatest interest have nowhere had more influence than among farmers. The laws of life in animal or vegetable are to the farmer matters of the greatest importance. The chem. of vegetation—how plants grow, and how to make them grow at the least cost—is a matter of vital interest. Scientific books especially devoted to agricultural matters soon followed the agricultural newspaper, and no class of men have more respect for scientific writers than the practical farmers of our country.

Machinery and Labor.—The facilities for acquiring lands have been so great that the sons of farmers, if they intended to follow the vocations of their fathers, have generally themselves become owners soon after arriving at man's estate; thus the labor on farms has commanded very high prices, and the demand has very generally been supplied by persons of foreign birth. Out of this scarcity of men who would work for wages has grown a demand for improved machinery and implements. Who is most benefited by this lessening of the labor necessary to produce food and raw material for clothing the people? The price paid for manual labor on the farm is fully double the price paid for like service 30 yrs. ago. So the first benefit of the improvements in machinery inures to the laborer. The immediate consequences, with people who will work, are better education and more independence and elevation of character.

Future Prospects.—The tendency of the improvements in implements has been in favor of large farms, as it is only a large farm that will justify the outlay of cap. necessary to have a full supply and to keep up with the latest improvements; and the large farm justifies the construction of comfortable houses for the accommodation of families, which find permanent homes and employment. The next generation, with its increased cap. and more cultivated tastes, will devote more means and attention to making the homes of farmers attractive. Carefully cultivated ornamental trees and shrubberies, flowers, and walks will add to the charms of country life, and increase self-respect. [From orig. art. in *J.'s Univ. Cyc.*, by HON. GEORGE GEDDES.]

Farmington, on R. R., cap. of Franklin co., Me., 80 m. N. E. of Portland. It has a State normal school and "The Willows" school for young ladies. There are several quarries yielding superior slate for mantels, billiard-tables, etc. Pop. of tp. 1870, 3251; 1880, 3353.

Farmington, Strafford co., N. H., on R. R., 10 m. S. E. of Alton Bay. Pop. tp. 1870, 2063; 1880, 3044.

Farmville, cap. of Prince Edward co., Va., on R. R. and the Appomattox River, 70 m. S. W. of Richmond and 7 m. N. of Hampden-Sidney Coll. and the Union Theological Sem. It has a female coll. Pop. 1870, 1543; 1880, 2058.

Farne'se (ALEXANDER), duke of Parma and gov. of the Netherlands, b. about 1546, and went with his mother to the Netherlands 1559; married the princess Mary of Port. 1565; distinguished himself at the naval battle of Lepanto 1571; was made gov. of the Low Countries 1578, where he gained important victories; was to have commanded the Sp. Armada had it landed in Eng. 1588. Afterward commanded against Henry IV. of Fr., and was fatally wounded at Coudebec. D. Dec. 3, 1592.

Farnham (ELIZA WOODSON), MRS., b. at Rensselaerville, N. Y., Nov. 17, 1815, went to Illinois in 1835, and in 1836 married Thomas J. Farnham. In 1841 she returned to N. Y., visited prisons and lectured to the women convicts until 1844, when she became matron of the Sing Sing State prison; in 1848 was connected with the Boston Inst. for the Blind; resided in Cal. 1849-56, then returned to N. Y. and organized a society to aid women in emigrating to the W. Wrote *Woman and her Era*, etc. D. Dec. 15, 1864.

Farnham (ROSWELL), b. at Boston, Mass., July 23, 1827, removed in 1840 to Bradford, Vt. Grad. at Vt. Univ. 1849, admitted to bar 1857; State atty. 1859-61, lieut. 1st Vt. regiment 1861, provost-marshal at Newport News, Va., 1861, capt. Bradford Guards 1862, lieut.-col. 12th Vt. regiment; member Vt. senate 1868-69, delegate to Rep. National Convention 1876, and a Presidential elector; trustee Vt. Univ., gov. of Vt. 1880-82.

Farnham (THOMAS JEFFERSON), husband of Eliza W. Farnham, b. in Vt. 1804; in 1839 led a small expedition across the continent to Or. In Cal. in the same yr. he procured the release of a large number of Amer. and Eng. prisoners from the Mex. govt. Wrote *Travels in Cal.*, etc. D. Sept. 1848.

Farns' worth (BENJAMIN FRANKLIN), D. D., b. at Bridge-ton, Me., Dec. 17, 1793, grad. at Dartmouth 1813; was Bap. pastor at Edenton, N. C., prin. of Bridgewater (Mass.) Acad. 1821-23, then of a female high school at Worcester, Mass. He was prof. of theol. at the New Hampton Theological Inst. 1826-33; in 1836 pres. of Georgetown Coll., Ky., subsequently of Louisville Univ. D. June 4, 1851.

Farnsworth (JOHN F.), b. in Eaton, Lower Canada, Mar. 27, 1820, is a lawyer, and has been rep. from Ill. in the 35th, 36th, 38th, 39th, and 40th Congs. In 1861-63 served in the c. war, commanding the 8th Ill. Cav. In 1863-64 he raised the 17th Ill. Volunteers, having been brevetted brig.-gen. in 1862.

Färöe, or **Færö** [Dan. *Färöerne*], a group of islands, 29 in number, of which only 17 are inhabited, in the N. Atlantic, nearly midway between the Shetlands and Iceland. They rise conically to a height of 3000 ft., with

steep and lofty coasts, broken by deep inlets, which often afford safe anchorage, but sometimes cause whirlpools or form currents, making navigation dangerous. In the 9th century the islands were peopled by Nor. settlements, but afterward passed into possession of the Danes. Area, about 500 sq. m. Pop. 1880, 11,221.

Farquhar, far'kar (GEORGE), Irish dramatist, b. at Londonderry 1678, ed. at the Univ. of Dublin, settled in Lond.; wrote *The Beaux' Stratagem* and other comedies. D. Apr. 29, 1707.

Farr (WILLIAM), M. D., F. R. S., D. C. L., Eng. writer and supt. of the statistical dept. of the registrar-gen.'s office, b. at Kenley 1807, was ed. at the Univs. of Paris and Lond. Practising med. in Lond., he edited the *Medical Annual* and the *Brit. Annals of Med.* Has written reports on public health and compiled vital statistics. D. Apr. 14, 1883.

Farragut (DAVID GLASCOW), an admiral, b. at Campbell's Station, E. Tenn., July 5, 1801; entered the navy as mdpn. 1810, serving under Capt. David Porter, who had procured the appointment for him. In 1823 he took part in an action with a band of pirates who had intrenched themselves at Cape Cruz, Cuba; afterward spent a yr. in Tunis with our consul. Mr. Charles Folsom, afterward prof. of Harvard, who directed his studies and gave him that thirst for information which, as his eyes were not strong, kept all his household busy reading to him. His knowledge was varied, and in matters relating to his profession profound, and he was one of the best linguists in the navy. Passing in succession through the grades of lieut. and commander, the war of 1861-65 found him a capt. and living in Norfolk, Va., where every inducement was held out to him to unite his fortunes with the seceding States. But, "intimately connected with the S. as he was by birth, marriage, and residence, he was a son of the republic rather than a citizen of a State;" and so, leaving Norfolk Apr. 19, 1861, he took his family to Hastings on the Hudson, and then hastened to offer his services to the govt.

The capture of New Orleans being resolved upon, F. was chosen to command the fleet destined to effect this purpose, his force consisting of the W. Gulf blockading squadron and Porter's mortar flotilla. On Apr. 30, F. issued a gen. order for battle to his fleet. A great victory was won and New Orleans ours, and in recognition of his services F. received the thanks of Cong. and was made a rear-admiral.

In the summer of 1862 he "ran the Vicksburg batteries up and down the river," and on Mar. 14, 1863, passed through the fearful fire of the forts at Pt. Hudson and opened communication with Flag-officer Porter, who commanded on the Upper Miss. On May 24, in conjunction with the army, he commenced active operations against Pt. Hudson, and when it fell, July 9, he turned over to Porter, who 5 days previously had been made a rear-admiral, the entire control of the W. waters above New Orleans.

He now enjoyed a short respite from his labors, but on Jan. 20 of the following yr. we find him making a reconnaissance of Fts. Morgan and Gaines, and expressing the opinion that "with a single iron-clad and 5000 men he could take Mobile." At length, on the morning of Aug. 5, 1864, with 4 iron-clads and 14 wooden vessels, the rear-admiral filled up the measure of his fame by the victory of Mobile Bay. The fleet was in 2 columns, as at New Orleans, the iron-clads being on the right and a little in advance, with the Tecumseh leading, the wooden vessels, lashed together by twos, forming the port column, with the Brooklyn and Octorara leading. Next astern of the Brooklyn was the Hartford, carrying, as at New Orleans, the flag of the commander-in-chief. At 6 minutes past 7 Ft. Morgan opened, and was replied to by a gun from the Brooklyn, and immediately after the action became gen. Suddenly, however, the Tecumseh reeled, and went down almost instantaneously—sunk by a torpedo—while the Brooklyn, observing a row of suspicious buoys directly under her bows, stopped and backed, thus arresting the advance of the whole fleet. But F., high up in the main rigging, overlooking the whole scene of action, is equal to the emergency. "Go ahead at full speed!" he cries to Drayton, the capt. of the Hartford; and the order being instantly obeyed, the Hartford dashes onward, and the other ships follow. The rest is a tale we all know—how the forts were passed, the gunboats dispersed or captured, and the formidable ram Tennessee forced to strike her colors to the old flag she had so long set at defiance. The fall of Mobile was now reduced to a mere question of time. Ft. Powell was blown up Aug. 6, and a few days thereafter Fts. Gaines and Morgan surrendered.

In Nov. F. returned to his home, and on Dec. 22 he was made a vice-admiral; but it was the common feeling that he should be further honored, and in July 1866 the grade of admiral was created for him. D. Aug. 11, 1870. In 1881 a characteristic bronze statue of him was erected in Madison Square, New York. [From orig. art. in *J.'s Univ. Cyc.*, by COM. FOXHALL A. PARKER.]

Farrar (ELIZA WARE), b. in Flanders, Europe, 1791, was the daughter of Benjamin Rotch of New Bedford, Mass. In 1828 she married Prof. John Farrar of Harvard Univ. Wrote several books for the young and *Recollections of Seventy Yrs.* D. Apr. 22, 1870.

Farrar (FREDERICK WILLIAM), D. D., b. in the Fort. Bombay, Aug. 7, 1831; became canon of Westminster 1876; is also chaplain in ordinary to the queen. His more important theological works are *The Life of Christ* and *The Life and Work of St. Paul*.

Farrar (JOHN), LL.D., a math., b. in Lincoln, Mass., July 1, 1779; prof. of math. at Harvard, and pub. translations of many mathematical works. D. May 8, 1853.

Farrar (JOHN), b. at Alnwick July 29, 1802, ed. near Leeds; became a minister in Aug. 1822, gov. of Abney House Wesleyan Theological Inst. in 1839, and of Headingly Coll. 1868; has been sec. and pres. of the Wesleyan Conference, the latter in 1854 and in 1870. Wrote *Biblical and Theological Dict.* and *Manual of Biblical Geog.*

Farrar (TIMOTHY), LL.D., a judge, b. at Concord, Mass., July 11, 1747, grad. at Harvard 1767; was a major in the Amer. Revolution, and then a justice of the common pleas in N. H. for 40 yrs.; chief-justice 1802. D. Feb. 21, 1849.

Farrar (TIMOTHY), LL.D., son of the preceding, b. at New Ipswich, N. H., Mar. 17, 1788, grad. at Dartmouth 1807; was a law-partner of Daniel Webster 1813-16, judge of the N. H. court of common pleas 1824-33, and v.-p. of the N. Eng. Historical and Genealogical Society 1853-58. Wrote *Review of the Dred Scott Decision*, etc.

Farrriery [remotely from the Lat. *ferrum*, "iron"], the trade of applying iron to the horse's foot. The foot of the horse is wonderfully guarded against injury from without, and equally protected against painful jars from the blows which the feet sustain when travelling upon hard roads. The hoof is a horn-like substance, completely boxing in the delicate tissues, cushions, and bones of the foot. The front part of the crust of each hoof is called the toe, the hindmost parts the heels, and the intermediate parts the quarters. It is about half an inch in thickness at the edge, and in many horses so hard and tough that they hardly need shoeing at all. The sole is a slightly arched dome with a large segment removed, in the place of which the frog is found. At the rearward portions of the sole, divided as they are by the frog, 2 elevated ridges, of a character of horn more resembling the crust, occur. These are called the *bars*, and are really the ends of the crust reflected inward at the heels. The frog is a wedge-shaped body in form like a sharp-pointed V, the point being turned forward. It is of a spongy and elastic kind of horn, placed as a cushion to relieve concussion and to distribute jars so as to break their force. In ordinary shoeing the frog never touches the ground, being cut away and left reduced in size, while the foot is lifted up from the earth by thick-heeled or calked shoes. That a foot so treated becomes diseased is not to be wondered at.

The presence of a shoe prevents the natural wear of the hoof; hence, sooner or later, according to the rapidity of growth of the horn, it must be reset and the horn pared back as nearly as possible to the condition it would have been in if it had not been shod and had worn off evenly and naturally. When a horse is brought to a common blacksmith to be shod, the "clinchers" at the ends of the nails are first cut off; then the shoe is wreathed off with the tongs, a portion of the crust coming off frequently with it. Then the shoe is shaped, heated red hot or nearly so, and a seating burned level by the application of the hot shoe—an operation liable to do serious harm. The paring out of the sole is usually accompanied by the cutting away of the bars entirely. The foot, thus weakened and placed in a most unnatural position, becomes the seat of disease. So far as we are aware, the most rational system of horseshoeing ever proposed is that called the Goodenough system. It is extensively used by street-railroad companies in New York and Brooklyn and elsewhere, and by omnibus, express, and transfer companies. The shoe is applied by cutting out a seating for it, leaving the sole and frog as much exposed as possible, and never applying the knife to either. It is light, has 5 calks or bearings, a lower surface, similar to the edge of the natural foot, is bevelled on both surfaces, the nail-holes are countersunk, and the shoes are applied cold. [From orig. art. in *J. S. Univ. Cyc.*, by M. C. WELP, Ph. B.]

Farrington (WILLIAM GEORGE), D. D., b. in New York Dec. 15, 1832, grad. at Columbia Coll. 1853, and at the Gen. Theological Sem. 1856; was rector of St. John's, Huntington, L. I., until 1858; assistant in Trinity parish, New York, 1858-62; in 1863 organized the parish of Christ Ch., Hackensack, N. J., and continued rector for 7 yrs.; in 1870 accepted a call to St. Barnabas' Ch., Newark, and in 1872 took charge of the ch. of the Holy Innocents, Orange, N. J. Was elected sec. of the diocese of N. J. 1867, and sec. of the Gen. Theological Sem., New York, 1869.

Farthing [from the A.-S., and signifying a "fourth part"], a Brit. coin, the fourth part of a penny. It was coined by the Sax., and again by King John (1210), but the quarter of a penny, cut twice across, also passed for a F. In Edward VI.'s time the coinage of silver F. ceased. An act 9 Henry V. mentions a gold F. Copper F. were first struck in 1665; tin F. appeared in 1684 and 1692; half F. were coined in 1843 and 1852. A F. is worth about half a cent.

Fascination by Serpents. Popular opinion has for a long time attributed to certain serpents a power of so charming weak animals by their eyes and movements of body that they are easily secured as prey. This is not a blind, overpowering force, but one which the doomed animal seems to partly appreciate, but is unwilling to entirely resist. Squirrels, mice, and the weaker birds are the animals which are most often captivated by this power. They are described as running in front of the fascinator by short vibrations of distance or passing round in a circle, gradually shortening the intervals until they are seized by the serpent. Often the animal during the process utters piercing cries, as if aware of its danger, and yet unable to resist. Sometimes a diversion of the animal's attention by a sudden noise, or the interposition of some material obstruction to the vision, breaks the charm and sets the captive free.

Though the whole process is often ridiculed as impossible, yet it seems to bear a striking analogy to the so called mesmeric influence which one human being sometimes has over another, or to the more undefined od or odyllic force. Or perhaps it is the diseased mental or bodily element manifested in a desire often expressed by persons to throw themselves from a tower or precipice; and still further, where the mind or body or both are so diseased that there is a morbid impulse to commit an insane act, or destroy its own self or some other person. EDWARD HITCHCOCK.

Fast [A.-S. *fastan*], to abstain from food from any cause, particularly through religious discipline. When the mind is much excited the claims of the body are less felt. Fasting thus becomes an expression of mental engagement. It is wise that any outward rule intended to enforce special

spiritual duty should impose, as an aid, the outward attendant on the spiritual state. The proper state of mind can be indicated only, but the outward signs of such a state can be exacted; and so F. belong to all religions. Fasting as a religious act is now confined to no land or faith.

Mohammedan and Jewish Fasts.—The Mohammedans keep as an annual F. their 9th month, Ramadan; during every day of this month, from sunrise to sunset, they eat nothing, drink nothing, and give up the solace of their pipe and every other usual indulgence. Their months being lunar, each in the course of 33 yrs. occurs in every season. When the Ramadan happens in summer, the long hot days are exceedingly trying to those who must labor. The Jews from their earliest existence to the present day have observed stated and special F., national and private. Under the Law, as first given, there was but one day imposed on the nation—the great day of the Atonement. In the course of time 4 other days were added in commemoration of sorrowful events in Jewish hist. Beside the public F., there were and are many observed by individuals in consequence of vows, personal cause for affliction, or by way of discipline.

Christian Fasts.—Under the N. T. there is no fast-day appointed by the Lord or by his apostles, nor does the practice rest upon direct command from them. It is even clear that Jesus imposed no special abstinence on his disciples, but it is also clear that he assumed that this exercise would not be neglected by any who desire the rewards given by God. If the apostles gave no rule on the subject, there is no room to doubt as to their practice. It is not so stated in the N. T., but we cannot but believe that from its first recurrence the day of the crucifixion was observed as a day of humiliation. We know that very soon rules were laid down touching this and other seasons of bodily mortification. Wednesday and Friday in every week were kept as such, and early writers who speak of these days of abstinence refer the observance to apostolic usage. The Ch. of Rome and that of Eng. impose as stated F.: (1) Lent; (2) the Ember Days; (3) the Rogation Days; (4) every Friday, as the weekly commemoration of the crucifixion; (5) the vigils on the eves of certain great festivals. The P. E. Ch. in the U. S. follows the Anglican rule, excepting that the vigils are not imposed. A practice so universal as that of fasting must be based on some necessity of man. It is objected that health is frequently injured by religious fasting. It may be so. But, on the other hand, it can admit of no doubt that in an age and country particularly luxurious a stated abstinence from food, a weekly putting aside of self-indulgence, and supporting the body on plainer, less attractive food, would go far toward freeing men from many of the evils that wait on appetite. [From orig. art. in *J. S. Univ. Cyc.*, by REV. WILLIAM F. BRAND.]

Fasti, the court-days or festival-days of the anc. Roms. *Dies nefasti* denoted the opposite, and were esteemed unlucky days. To the *dies fasti* belonged the *dies comitiales*; to the *dies nefasti*, the *dies religiosi*; which were considered days of evil omen. The inst. of these days is ascribed to Numa Pompilius, and belongs, therefore, to the earliest days of Rome. Their order or succession was long known only to the priests, who thus acquired great political power, until Cn. Flavius made it public about 304 B. C. The lists, gradually enlarged and perfected, contained an accurate description of the whole yr. according to its months, with exact specification of the *dies fasti*, *dies comitiales*—festivals and holidays, days appointed for the celebration of public games, etc. Thus they assumed the form of our calendars or almanacs. More important are those which Livy calls "F. consulares," and which, because they were set up on the Capitoline, are also called Capitoli. The F. Capitoli contain lists of the annual consuls, of the censors, dictators, magistri equitum, and also of gens. who celebrated triumphs (*F. triumphales*) and a record of the services for which a triumph had been granted.

Fa'ta Morgana [the *Fairy Morgana*—i. e. castles or palaces of], a remarkable and singularly beautiful effect of mirage, occasionally observable in the Sea of Reggio, Strait of Messina, between Sic. and Calabria. It presents a series of magnificent architectural structures and landscape views, embracing columns, arches, towers, castles, palaces, trees, avenues, and wooded plains, with crowds of moving men and animals, all constantly varying and assuming new aspects, and in certain conditions of the atmosphere becoming resplendent with prismatic colors. There can be no doubt that these images are derived from objects on the shore, their singular forms and transformations being the result of extraordinary refractions in the atmosphere (for the explanation of which see MIRAGE). F. A. P. BARNARD.

Fate [Lat. *fatum*; literally, "something spoken," as a decree, and involving the thought that events come out of an inevitable destiny]. The modern philosophical conception of F. is that of a blind causality undirected and undetermined by any conditions.

Fates, The [Gr. *Moirai*, plu. of *moira*, "one's part, lot, or destiny," Lat. *Parce*], in the Gr. mythology, 3 goddesses who ruled the F. of men, and all things. They are generally named Clotho, who spins the thread of life; Lachesis, who marks off the allotted span; and Atropos—the inflexible—who cuts the thread. Their genealogy, and the whole mythus, are quite variously given in different authors.

Father Lasher, or **Lucky Proach**, the *Aspicotta bubalis*, a marine fish of the European and U. S. coasts, from 6 inches long up to a much larger size. It belongs to the Cottidae or sculpin family. Its head is covered with spines, and it has a repulsive aspect. It can live a long time out of water, and though regarded with aversion and seldom used, it affords a palatable article of food.

Fathers (of the Church), the distinguished earlier laborers in the Chr. Ch. The R. Cath. Ch. distinguishes between Ch. F., Ch. teachers, and Ch. writers. The Ch. teachers are men of acknowledged orthodoxy, authorities for the doctrines of the Ch., while the Ch. writers are of less, or

even doubtful authority. The greatest of the Ch. teachers are also Ch. F. Such were Athanasius, Basil the Great, Gregory of Nazianzen, and Chrysostom in the Oriental Ch.; Jerome, Ambrose, Augustine, and Gregory the Great in the Ch. of the W. Thomas Aquinas and Bonaventura may be named as Ch. teachers who were not F., and Tertullian in his second era and Origen as Ch. writers. The line of Ch. F. is generally regarded by Prot. theol. as terminating with the 6th century; the R. Cath. writers extend it to the 13th. The scientific treatment of the matter contained in the writings of the F. is embraced in Patristics, while their lives and topics related to the externals of their works come under the head of Patrology, but this distinction is not always observed. The F. are of great value in the hist. of biblical interpretation, the hist. of dogmas, creeds, rituals, the const. of the Ch., and indeed in every part of historical theol.; nor is there any part of theol. in which they may not be made highly useful. In the greatest internal struggles of the Ch. the importance of the F. as witnesses or as authorities has been recognized on both sides, as in the Ref., and in our own day in the controversies of the Anglican Ch. Next to the Apostolic F. in value are the Apologists, or Apologetic F.; the Alexandrians, Clement and Origen, Athanasius, Gregory of Nyssen, Chrysostom, Augustine, and Jerome. The greatest laborers in the issue of editions of the F. have been the Benedictines. Next to them have been the Anglican divines. The most recent interest in patristics in G. Brit. has been shown in the issue of translations of the F. In the R. Cath. Ch., among the names illustrious in patristics are Bellarmine, Oudin, Du Pin, Le Nourry, Tillemont, and Hefele; in the Prot. chs. of the Continent, Scultetus, Walch, Danz, Bunsen, Otto; in G. Brit., Cave, Cureton, Routh, and Pusey. Among the editions of the collected writings of the F., the most complete are De la Bigne's, the Lyons *Maxima Bibliotheca*, Cailleau and Guillon.

Fath'om (Gothic *fahan*, to "take"), a measure, originally equal to the distance a man can reach by stretching out both arms. It is now equal to 6 ft., and is used in nautical affairs, as in sounding, measuring cables, etc.

Fat'imites, a family of Ar. caliphs who claimed descent from Fatima, the daughter of Mohammed. They reigned from 909 till 1171, chiefly at Cairo, and at the period of their widest sway ruled all N. Afr., with Syria and Pal. They professed the Shiite doctrines, while the subjects of the Bagdad caliphs were orthodox. After the death of the last F. of this line the sultan Saladin assumed authority.

Fat Lute, a mixture of pipe-clay and linseed oil, worked together. It will stand considerable heat. It is used by chemists and pharmacists to cover joints in apparatus, and especially to prevent the escape of corrosive vapors.

Fats. In the common sense, F. are those unctuous parts of animal and vegetable bodies secreted in the cellular tissues, and separable therefrom by fusion at a moderate temperature. The animal F. do not differ chemically from those of vegetable origin. Both are definite compounds of certain fatty acids, chiefly oleic, stearic, and palmitic acids, with a peculiar base called glycerine, or the sweet principle of F. The F. are, as a rule, nearly insoluble in water, but dissolve readily in ether, which is their proper solvent. They are also soluble in naphtha, benzene, and the oils from coal; in oil of turpentine and other essential oils: bisulphide of carbon, chloroform, fusel oil, etc. They are scarcely at all soluble in cold ordinary alcohol. In absolute alcohol they dissolve much more readily than in weaker alcohol, and especially with the aid of heat. The F. stain paper permanently, and are not volatile by heat, a high degree of heat being required to make them boil. They distil over at a high heat, but not without complete, or nearly complete decomposition, and the evolution of a peculiar pungent, disagreeable odor, irritating the eyes and known as *acroleine*. F. which are fluid at ordinary temperatures are called oils. All the F. burn with a bright flame and little smoke.

Chemically, the F. form part of a very large group of organic bodies (the fatty group), distinguished as containing no nitrogen or its analogues, being hydrocarbons with little or no oxygen. M. Chevreul, in a series of 6 memoirs concluded in 1816 (*Ann. de Ch. et Phys.*), first revealed to us the true const. of the F.—that they are mixtures of several F. of different degrees of fusibility—e. g. oleine, stearine, palmitine—the hard F. being chiefly stearine and palmitine, and the soft F. oleine. The hard F. are beef F., mutton F., human F., chl. tallow, cacao butter, wax, spermaceti, etc.; the soft F., hog's lard, butter, etc., which are greasy at ordinary temperatures; while the liquid F., or oils, are fluid at ordinary temperatures. The researches of Chevreul showed that F. were either saponifiable or non-saponifiable; e. g. if boiled with an alkaline solution, certain F., so called, were unaffected (as spermaceti, wax, paraffine, etc.), while others were broken up and soaps formed, the fatty acids combining with the alkali, while the glycerine was set free; and that this change was accompanied by a gain of weight in the products as compared with the weight of the factors employed; which could be accounted for only by the assumption that hydrogen and oxygen from the water must contribute to form the product. This led him to the conclusion that the saponifiable F. were analogous in const. to compound ethers—i. e. the F. are compounds of fatty acids with glycerine, minus a certain quantity of water, just as ethers are compounds of alcohol with acids, minus a certain quantity of water. (See GLYCERINE, OILS, and SOAP.)

Fatty Degeneration, in pathology, a condition in which the minute structural elements of the tissues of living organisms are gradually replaced by fat-globules. In man this diseased condition has been observed in nearly all the tissues, though some authorities state that the nerves and the red corpuscles of blood are not liable to this change. Fats, though always of organic origin, and often closely associated with living tissues, are never, it is believed, truly organized bodies, and consequently they are not regarded as

ever truly vitalized, any more than are the water and the lime which are found in living organisms. In this view, F. D. is a molecular death, a necrobiosis of the tissues. It has been likened to the change of dead bodies into adipocere. In the great closed glands of the fetus, and in the corpus luteum of the ovary, F. D. is a normal process. In the liver, it is merely an excess of the normal fatty element contained in the acini, which, however, encroaches upon the organized elements of those structures, and becomes a true F. D. It also attacks the muscles, and especially the heart; the bones (in some forms of *mollities*), the brain (yellow softening), the cornea (*arcus senilis*), and the kidney in many cases of so called Bright's disease. The F. D. of the heart is a rather frequent disease, but very difficult to detect, even by the trained diagnostician. When suspected, a quiet life, a nourishing but not too stimulating diet, with the judicious use of tonics and iron, are to be recommended. For the disease there is no cure known.

Faulkner (CHARLES J.), a Congressman, b. in Berkeley co., Virginia, 1805, admitted to the bar 1829. In 1832-33 was elected to the house of delegates, in 1841 to the senate of Va., in 1848 again to the house of delegates; rep. in Cong. 1851-60, when appointed minister to Fr. Returning to the U. S. in 1861, was imprisoned, on suspicion of disloyalty, and exchanged for Hon. Alfred Ely. In 1874 was elected to Cong. from W. Va. D. Nov. 4, 1884.

Fau'na (from *fauu*, a rural divinity in the Lat. mythology), an assemblage of animals inhabiting any given locality.

Fau'nus, a Rom. woodland deity, corresponding to the Gr. Pan. He possessed the power of prophecy, and his oracles were in the groves. A festival, named Faunalia, was celebrated in his honor by the country-people. As a frolicsome wood-deity, with the horns of a goat and the feet of a satyr, he became multiplied by the poets, and the Fauni or Fauns corresponded to the Gr. satyrs.

Faust, fowst (JOHANN), Dr., a Ger. magician, supposed to have been a native of Württemberg, b. about 1480. His hist. is obscured by extravagant fiction. Regarding his existence there is undoubted testimony, and we learn that he spent some time at Wittenberg, at one time enjoying the association of Melanchthon. He seems to have been a learned man who had studied magic and astrology, and travelling about the country performing various feats, came to be regarded as a dealer in the black art. D. about 1538.

Faust, or **Fust** (JOHANN), a goldsmith of Mentz, Ger., who shares with Gutenberg and Schöffer the honor of establishing the art of printing. He was (1450-55) Gutenberg's partner in the new business, but probably did nothing but furnish cap. In 1455 F. prosecuted Gutenberg for money advanced, took the business in his own hands, and associated with himself his son-in-law, Peter Schöffer. They carried on the business successfully until 1462, when at the sack of Mentz the workmen were scattered and the art of printing was no longer a secret. F. still went on with his business, and is thought to have d. of the plague at Paris in 1466. There are extant copies of a number of books printed by F. and his partners, some of them beautifully executed.

Faustina (THE ELDER) **Annia Galeria**, wife of the emp. Antoninus Pius, who at her death caused a temple to be erected to her honor.

Faustina (THE YOUNGER) **Annia**, daughter of the preceding, was married by her father to Marcus Aurelius, her cousin, who had been adopted by Antoninus at the suggestion of Hadrian. She d. A. D. 175, near Mount Taurus in Asia Minor. In memory of her Aurelius established, as Antoninus had done in the case of the elder Faustina, an asylum for female orphans, to which the name "Faustianum" (*Faustianæ*) was given.

Fa'vill (ORAN), b. at Manheim, N. Y., Oct. 13, 1817, grad. at the Wesleyan Univ. 1844; became in 1852 prof. of angel. at McKendree Coll., Ill., in 1853 pres. of O. Wesleyan Female Coll.; removed in 1855 to Ia., where he was a co. judge, lieut.-gov., and pres. and afterward sec. of the State board of education, State sup. of public instruction 1864-66, and pres. of the Ia. Teachers' Association. D. Oct. 3, 1872.

Favori'nus, a philos. and rhetorician in Rome under Trajan and Hadrian, b. at Arlete (now Arles) in the S. of Gaul. Wrote numerous works on a great variety of subjects, all in Gr., and was famed also as an orator. Among his numerous writings 2 are of an historical character, his *Παντοδωτή Ιστορία* and his *Ἀπομνημονεύματα*, from both of which a few fragments are preserved.

Favosi'tes, an extinct genus of corals exceedingly common in the Devonian and carboniferous rocks, of which a large number of species are described. The corallum of F. is compound, and usually forms hemispherical or conical masses, composed of a large number of prismatic columns divided horizontally by transverse septa or "tabulae," usually having the vertical walls pierced by one or several rows of pores. The name is derived from *fauna*, a "honey-comb."

Favre, fabvt (JULES CLAUDE GABRIEL), b. in Lyons, Fr., Mar. 21, 1809; became a lawyer and liberalist of Paris, and in 1848 held positions in the revolutionary ministry; opposed Louis Nap. during his presidency, and more especially after the *coup d'état* of 1851. In 1858 he defended Orsini, the would-be assassin, and in the Corps Législatif opposed the policy of the emp., especially the measures which ended in the Franco-Ger. war; after the fall of Sedan advocated the deposition of the imperial dynasty, and became minister of foreign affairs and v.-p. in the provisional gov. As minister of foreign affairs he took an important part in the negotiations for peace. He was for a time acting minister of the interior, but withdrew in 1871, and devoted himself to law and lit. He was author of *Rome et la République Française* and *Le Grand Échec du 4 Septembre*. D. Jan. 16, 1880.

Favula'ria, a sub-genus of *Sigillaria*, which includes some of the most remarkable trees of the coal-flora. The name was given by Sternberg to those species with trunks fluted and the leaf-scars closely approximated.

Favus [Lat. "honeycomb"], or **Scald Head** (i. e. "scabby head," from *scald*, a "scab"), a disease formerly known as *fungo* and *porrigo*, generally seated on the hairy part of the scalp, but sometimes attacking the roots of the nails and other parts. This disease is caused by a parasitic vegetation. F. is a contagious disease, best prevented by cleanliness, and best cured by carefully removing the hair and applying parasiticide meds., such as have the power of destroying low organisms. Sulphurous and carbolic acids and weak solutions of corrosive sublimate are the best applications. It leads to permanent baldness.

Fawkes, fauks (GUY or GUIDO), Eng. conspirator in the reign of James I., was a R. Cath. In 1605, with Robert Catesby, Thomas Percy, and others, he endeavored to blow up the Eng. House of Parl., with king, Lords and Commons; he hired a vault under the House of Lords and lodged in it 36 barrels of gunpowder, but was arrested on night of Nov. 5, in the vault, and executed at Westminster Jan. 31, 1606.

Fay (JONAS), M. D. b. at Hardwick, Mass., Jan. 17, 1737, was surgeon at the surrender of Ticonderoga, a member of the convention of 1777 which declared Vt. an independent State, and author of the declaration of the fact and their reasons for it to Cong.; sec. of the convention to form the State const. 1777, and one of the council of safety to administer the govt.; member of the State council 1778-85, judge of the supreme court 1782, of probate 1782-87, agent of the State in Cong. 1777, 1779, 1781, and 1782. D. Mar. 6, 1818.

Fay (THEODORE SEDGWICK), author and diplomatist, b. in New York city Feb. 10, 1807, and admitted to the bar in 1828, but soon began contributing to the *New York Mirror*, which he finally edited. *Dreams and Reveries of a Quiet Man* was pub. in 1832. This was succeeded by *Minute Book*, a journal of travel in Europe. *Norman Leslie*, his first novel, was pub. in 1835. Wrote also *The Countess Ida*; *Ulric*; or *The Voices*, poems, and a *Hist. of Switz.*, where he was U. S. minister-resident 1853-61. Prior to this appointment he was U. S. sec. of legation at Berlin 1837-53.

Faye (HERVÉ AUGUSTE ÉTIENNE ALBANS), a Fr. astron., b. Oct. 5, 1814; was prof. of geodesy at l'Ecole Polytechnique from 1848 to 1854; is the author of valuable papers and of several text-books in astron. Nov. 22, 1843, he discovered the comet bearing his name.

Fayette, on R. R., cap. of Howard co., Mo., 12 m. from the Mo. River. It has a coll. and a female sem. Pop. 1870, 815; 1880, 1247.

Fayetteville, on R. R., cap. of Washington co., Ark., in Ozark Mts., in N. W. part of State, 55 m. from Ark. River; has the Ark. Industrial Univ. Pop. 1870, 955; 1880, 1788.

Fayetteville, on R. R., Onondaga co., N. Y., 10 m. E. of Syracuse. The manufacture of hydraulic cement, quicklime, and land-plaster is extensively carried on here. Has a public library. Pop. 1870, 1402; 1880, 1556.

Fayetteville, cap. of Cumberland co., N. C., on R. R. and Cape Fear River, 90 m. from Wilmington. There are a female coll. and a male inst. It has a large trade in rosin, turpentine, and cotton, and is a great horse and mule market. Pop. 1870, 4660; 1880, 3485.

Fayetteville, Tenn. See APPENDIX.

Fayoom, a prov. of Egypt, on the W. side of the Nile, between lat. 29° and 30° N. and lon. 30° and 31° E. Its area, anciently somewhat greater, is now about 750 sq. m., more than 100 of which are occupied by the natural lake Birket el Keroun. It is still the most fertile prov. of Egypt, abounding in figs, grapes, apricots, olives, and other fruits. But its anc. renown was much greater. It contained the Labyrinth and the artificial lake Moeris.

Feast, or Festival [Fr. *fête*; Lat. *festum*, a holy day], a joyful commemoration of a fact or teaching. Most persons are under the influence of times and seasons, and to them the recurrence of a day associated with any important event will revive the feelings which the day brought to them. There has probably never been any community which has not had its festivals, and which has not owed much to the spirit of vigor resulting from them. As their hist. shows, a marked influence on the segregated states of Gr. was produced by their common festivals or games. The most important of these were those celebrated in honor of Jupiter Olympius every 4th yr. at Olympia in Elis. During the month in which the games were held all hostilities ceased throughout Gr., and a religious sanctity protected the territory of Elis. Among the Romans, there were many festivals, private and public; the latter were fixed, or movable, or occasional; these were divided into days of sacrifice and days of banqueting, days of games and days of rest, or *feriae*. Some of the F. of anc. nations were celebrated with great pomp. Herodotus tells us of one at Bubastos in Egypt, that "at this solemnity 700,000 men and women assemble." The sums spent by the later Romans were enormous. A like enthusiasm for the honor of their deities is shown in the E. in our day.

The observance of seasons is in obedience to an instinct with most persons. The believer in revelation recognizes also that it was commanded by God. In Lev. xliii. is given a list of the "feasts of the Lord:" 1. The Sabbath, dividing time into weeks of 7 days. Connected with the weekly sabbath was the sabbatical yr., which returned every 7th yr., and the yr. of Jubilee, which was at the end of 7 times 7 yrs. 2. The Passover, a commemoration of the night when the angel of the Lord slew all the first-born in Egypt, and passed over the houses marked by the blood of the slain lamb. 3. The F. of Weeks, called afterward Pentecost, the anniversary of the delivery of the Law. 4. The F. of Trumpets, said to be in commemoration of the offering of Isaac by Abraham. This F. is on the first day of the 7th month, being the beginning of the civil yr. The first of each month, or new moon, is also kept. 5. The 10th day of the 7th month is the Atonement—a most solemn fast, though now preceded by a banquet. 6. Five days after, and lasting 7 days, is the F. of Tabernacles. These are the "holy convocations" of the Mosaic Law. Other F. were afterward added, the chief of which is the Purim (or lots), celebrated in memory of the

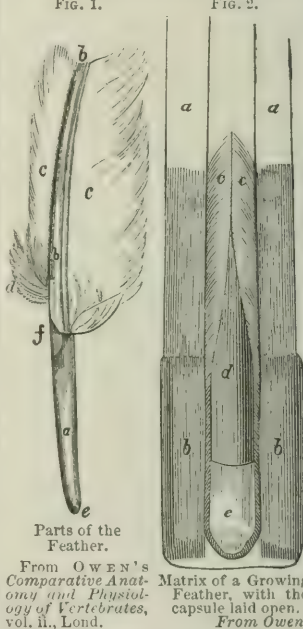
escape from total annihilation plotted against the Jews by Haman, as recorded in the book of Esth.

Under the N. T. there are no festivals enforced as were those commanded to Moses. But from the first, Chrs. observed the Lord's Day and Easter, the weekly and yearly memorials of the fact which confirms the Chr. faith. They also observed Pentecost, in commemoration of the descent of the Spirit and the founding of the Ch. Additions were gradually made to these F., until each prominent event in the life of our Lord had its special day of observance. Some of these are, as near as may be, anniversaries. Some are fixed, recurring always on the same day of the month; others, dependent upon Easter, are movable. The cycle of the festivals of the Chr. Ch. extends throughout the yr., beginning with Advent, and thus every yr. the whole gospel story is, as it were, enacted before our eyes. Beside these F. of the Lord, embracing the whole yr., there are many others commemorating apostles and saints. Every day is a saint's day, many of them being dedicated to more than one saint, and in different chs. to different saints. We have seen in our day repeated the very mode by which many saints' days came to be observed—viz. the yearly assembling of admiring friends at the grave of a holy man on the anniversary of his death or burial for the purpose of religious service. All Chr. bodies who keep stated festivals agree in their observances while differing in respect to the minor F. [From orig. art. in *J.'s Univ. Cyc.*, by REV. WM. F. BRAND.]

Featherfoil, Water-feather, or Water-violet, the *Hottonia inflata* of the U. S. and *Hottonia palustris* of Europe, curious primulaceous plants which grow submerged in water, and thrust up long scapes into the air to produce the blossoms, which in the European species are very beautiful. Other species are known. The name commemorates Peter Hotton, a Dut. botanist who d. in 1709.

Feather-grass (so called from the long feathery awns or beard attached to the seed), a name applied to several long-awned grasses, especially to those of the genus *Stipa*, several of which grow in the U. S. From the hygroscopic twisting and untwisting of these awns the name "weather-grass" is also used.

Feathers are outgrowths of the epidermic system peculiar to birds, of which they form the covering and means of flight.



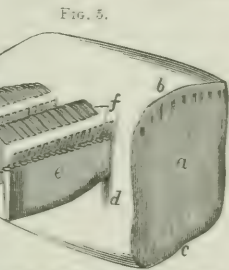
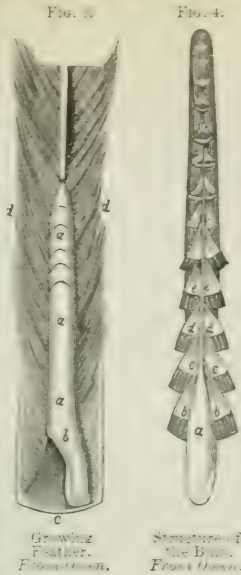
Parts of the Feather.

From OWEN'S Comparative Anat. and Physiol. of Vertebrates, vol. II., Lond.

Matrix of a Growing Feather, with the capsule laid open. From Owen.

hook the barbs one to another (f, f). Each F. is produced by the matrix (Fig. 2), a cylindrical cone-shaped organ attached by filaments to a papilla of the skin, and consisting of a capsule (a, a), a bulb (e), and two intermediate membranes. The capsule is composed of several layers, the outermost of which is of the nature of epiderm. The sides of the capsule corresponding to the outer and inner sides of the inclosed F. are marked each by a white longitudinal line. The capsule infolds a medulla, or bulb, of cylindrical shape and soft fibrous texture, which adheres by its base to the parts beneath, and there receives various blood-vessels and a nerve. The 2 membranes (b, d) lie between the medulla and the capsule. From the external membrane (b) proceed several close-set parallel laminae, which branch obliquely and in an upward direction from both sides of the outer white line of the capsule, curve round the cylinder, and meet at the inner white line on its opposite side. In the narrow spaces between these laminae the matter of the vane (c, c) is deposited and formed into barbs and barbules. The outer white line receives and moulds upon the inner side of the capsule the horny back of the shaft; while on the opposite surface of the internal membrane (d) are formed the pith of the shaft and the horny covering of its inner surface. The inner white line serves as a barrier between the meeting extremities of the barbs. The shaft and barbs (Fig. 3, d) at the apex of the cylinder are the first parts formed. As the medulla increases at its base, these are pushed through the tip of the capsule, the bulb (Fig. 3, a, a, b; Fig. 4, a) sup-

plying the necessary secretions, which are moulded between the 2 membranes until the F. is completed. The membrane inclosing the bulb is connected with a series of membranous cones (Fig. 4, *b, c, d, e*) ranged one upon another along the bulb, and joined by a tube running through its centre. The interspaces of these cones are filled with a pulpy matter, which, as the feather develops, becomes absorbed, leaving the dry conical caps. These are the light pith found inside quills. When the grooves in which the shaft and barbs are moulded are filled with horny matter, and the barbed part of the F. is finished, the horny matter spreads about the medulla and forms the quill. The quill having become firm, the internal bulb dries up: its last remnant is the ligament which passes from the pith through the quill and attaches it to the skin. [From orig. art. in *J. s. Univ. Cyc.*, by JANET TUCKER.]



Diagrammatic Section of the Shaft and Vane, enlarged.
From Owen.

Feather Star, a popular name for crinoids of the family *Comatulidae*, which in their younger stages are fixed by a stem, but in adult life become detached.

Featherstonehaugh

(GEORGE WILLIAM, F. R. S. traveller and author; wrote a *Geological Report of the Elevated Country between the Mo. and Red Rivers, Excursion through the Slave States, and Canoe Voyage to the Minnesota*. He was com. for G. Brit. to settle the N. boundary of the U. S. under the Ashburton treaty, and afterward Brit. consul for Calvados and Seine, Fr. D. Sept. 28, 1866.

Febricula [a diminutive of the Lat. *febris*, "fever", or **Ephemeral Fever**, a short feverish attack, lasting from one day to a week, marked by a rapid pulse, a furred tongue, and often by a very considerable increase of heat and by headache. Persons suffering from F. are said to be "threatened with a fever," and are too often improperly dosed. A warm bath, warm or cold water to drink, as best suits the patient, the use of enemata if called for, and other simple treatment is sufficient, for the disease will pass away of itself if allowed to do so. It is often followed by an eruption or a stage of profuse sweating. There would appear to be no constant factor in the causes of F., which may be associated with a severe cold, a profound emotional disturbance, or with some excess on the patient's part. It is especially common during epidemics of typhoid and typhus fevers.

Febronianism [so called from *Justinus Febronius*, the pseudonym of its founder], a name applied to the views taught by J. N. von Hontheim (1701-90), suffragan bp. of the R. Cath. diocese of Treves. He taught that the primacy of the pope is of human origin, and opposed the Ultramontane view. He had many followers, but in his old age was so annoyed by persecutions that he recanted twice, and finally abandoned his bishopric.

February [so named from *Februus*, an old Etruscan and Rom. divinity, identified in later times with the Pluto of the Grs.], the 2d month of the Gregorian yr., having 28 days, except in leap-ys., when it has 29.

Fecundation. See EMBRYOLOGY, by PROF. J. C. DALTON, M. D.; also FERTILIZATION OF PLANTS.

Federalist, written also **Federalist** [from the Lat. *foedus*, meaning a "league," and akin to *fides*, "faith"].

I. A collection of essays written in favor of the const. of the U. S., and, with the exception of the concluding 9 of the 86 numbers, originally pub. in *The Independent Journal*, between Oct. 27, 1787, and Apr. 2, 1788. Its authors were Alexander Hamilton, James Madison, and John Jay, who addressed themselves over the common signature of "Publius," in a series of letters, "To the People of the State of New York," with the avowed purpose of securing the accession of that State to the const., as proposed by the Federal convention of Sept. 17, 1787. The immediate occasion of the work was the appearance of 2 series of able articles severely criticizing the proposed const. Hamilton resolved to answer the arguments advanced. For this purpose he drew up a syllabus of essays, to be written by himself and associates, which should exhibit the advantages of the U., expose the insufficiency of the subsisting Confederation, with the necessity of a more energetic govt., and advocate the plan under consideration by showing that it was the least objectionable of any feasible scheme. It is beyond reasonable doubt that Jay discussed the foreign relations of the States in the 2d, 3d, 4th, and 5th numbers, and the lodgment with the Senate of the

treaty-making power in the 64th. Concerning the respective shares of Hamilton and Madison in the authorship of several of the other papers there is some question. The point is ably treated by John C. Hamilton and Henry B. Dawson in their respective eds. of the work. In estimating its merits the F. is to be judged as a collection of fugitive pieces intended to vindicate a specific const., rather than as an elaborate treatise on the science of govt. For the end aimed at it was admirably adapted. The basis of the argument well-nigh throughout is utility. The method is mainly empirical, rarely speculative. The style is elevated, yet designedly popular. The whole is replete with more or less familiar illustrations, particularly from hist. If the const. is to be interpreted according to the intention of its framers and the understanding of those who ratified it, an acquaintance with the F. is nearly indispensable. It also affords a valuable view of many of the cardinal differences of the parties which, under various names, have contended in Amer. politics.

II. The name of a political party prominent in the early hist. of the U. S. Various circumstances have been assigned as its origin. But, whatever its proximate cause, its real basis must be sought in divergent connections and interests of long and gradual growth. Upon the accomplishment of the Revolution and relaxation of the motives to the self-denial which alone had made it possible, there were many who believed it necessary to consolidate the country under a gen. national govt. powerful enough to permeate the whole. With these the commercial classes generally sided, as did also the greater number of those distinguished by wealth and social position. On the other hand, the very self-sacrifice so long practised had increased the attachment of the masses for independent local institutions and quickened jealousy of an overshadowing authority. They imputed to the more aristocratic party a design to subvert their liberties, and desired to retain the federal league somewhat modified. Out of this conflict came the const. By one of those freaks of nomenclature not uncommon in religion and politics, those who favored the consolidation of the States into one nation received the name of "Federalists," while the misnomer of "Anti-Federalists" was bestowed upon their opponents. With the administration of Washington the F. came into ascendancy. In 1796 they also succeeded in electing Adams to the presidency, but in 1800 their opponents, who had assumed the name of "Republicans," elected Jefferson, who announced as the new policy "the support of the State govts. in all their rights as the most competent administrations for our domestic concerns, and the surest bulwark against anti-republican tendencies—the preservation of the gen. govt. in its whole constitutional vigor as the sheet-anchor of our peace at home and safety abroad." The power of the F. was irretrievably lost by their action in the Hartford Convention, which was called to protest against alleged neglect of N. Eng. during the war with G. Brit., but which fastened upon them the imputation of condemning the war itself. The party, as such, expired 6 yrs. later on the election of Monroe.

III. The generic name of divers political parties in Sp. opposed to monarchical govt., but favoring very different systems, ranging from socialism to a republic patterned after the U. S. The term *Federalist* has also been used at other periods to designate various prominent partisans, particularly in Sp. and Sp. Amer. [From orig. art. in *J. s. Univ. Cyc.*, by CHARLES F. MACLEAN, LL.D.]

Federalist Party. See PARTIES, POLITICAL, OF U. S.

Federation [from the Lat. *foedus*, a "league"], a union of states under a compact by which the gen. or common govt. is supreme in its own sphere. As distinguished from a confederation, a F. is a composite sovereignty under a supreme govt. formed from attributes of sovereignty relinquished by the constituent states or component parts of the new body politic. It follows, as to domestic economy, that a federal govt. within its proper sphere can act directly upon the individual citizens of the several States. As to international relations, it follows, further, that the supreme central power alone can hold intercourse with foreign govts., which recognize only independent sovereignties. Contrariwise, the several states forming a confederation retain their autonomy and sovereignty, and can maintain all international relations not conflicting with the conditions of the union, while the individual subject is answerable only to his own state govt. The prin. existing examples of this form of govt. are the Amer. republics and the F. of the Swiss cantons. In all of these the superintendence of the foreign relations of the states is vested in gen. cons., which also have more or less direct and controlling relations to the individual subjects. The U. S. of Amer. furnish the most complete and thorough model of a F. [From orig. art. in *J. s. Univ. Cyc.*, by CHARLES F. MACLEAN, LL.D.]

Fee [Sax. *feh*, *feoh*, a "stipend or reward"; L. Lat. *feodum*, *feudum*; Scot. *feu*; Fr. *fiel*], an estate of inheritance—i. e. an interest in land which, on the death of the owner without a will, passes immediately to his heirs. When used without any word of description it has the same gen. extent of meaning as the phrases "fee-simple" and "fee-simple absolute," which indicate more specifically that the estate is to be enjoyed without any qualifications or restrictions limiting the indefinite duration and absoluteness of the tenure, and that it is indefeasible, in contradistinction to the terms "qualified fee," "determinable fee," etc., to be hereafter explained. A F. or F.-simple is the highest estate known to the law. In its creation by deed at common law it is absolutely essential that the word "heir" or "heirs" be employed in connection with the name of the grantee, or the only interest created will be a life estate. The purely arbitrary nature of this requirement has caused its abrogation in certain Amer. States by statute. In wills, moreover, and in estates created under the doctrine of Uses, it has never been obligatory, since in these cases the object of legal interpretation has been to arrive at the true intent of the deviser or grantor, and to effectuate his real purposes without such precise regard to

the forms in which they are couched. When a F. is conveyed to a corporation aggregate the word "heirs" is unnecessary, even in a deed, since it is not properly applicable; if the conveyance be to a corporation sole, the word "successors" should be substituted. The owner of a F. simple has the right of free and unrestricted enjoyment of the property, and an unlimited power to dispose of it at his own pleasure. Even if any lang. be inserted in the conveyance through which he received his title restricting his power of alienation, it is void and may be disregarded. An owner in F. may transfer his entire estate to another, or he may carve out of it any inferior estate, such as a life estate or an estate for yrs., retaining in himself a reversion or creating a remainder in a third person, or he may make any other transfer he may think desirable. His interest may be seized and sold for the payment of his debts, either in his own lifetime or after his death, in exclusion of the claims of his heirs.

Estates in F. inferior to a F. simple are termed "base" or "qualified" or "determinable" F.—i. e. estates of inheritance which are granted with qualifications or restrictions which may cause their defeasance. These assume various forms. Thus, there may be a F. *upon limitation*, as an estate given to A and his heirs until B goes to Boston. So F. may be granted *upon condition*, as an estate to A and his heirs on condition that he builds a market upon the land within 3 yrs. There are also what are styled estates *upon conditional limitation*, as an estate in F. to A until B goes to Boston, when the estate is to pass to C, some third person. There was, moreover, a F. conditional at common law which was afterward modified by statute into a peculiar estate termed a F. *tail*. (See *ENTAIL*.) GEORGE CHASE.

Feejee Islands. See FLI ISLANDS.

Fehm'ic (or **Vehm'ic**) **Court** (Ger. *Fengericht*; Old Ger. *Fehm*, "punishment"), of Ger. They first appear in hist. after the expulsion of Henry the Lion from his estates by the Diet of Wurzburg in 1180. This court was composed of members who were sworn to secrecy. They were presided over by a *Freigraf*, or free count. Their tribunals were either open or secret—the latter being held for the trial of the more serious offences. The irresponsible F. C. came to have a most extensive authority. In the Pact of Westphalia (1371) they were recognized as lawful. In 1438 the emp. Albert II. attempted to suppress them. In 1461 many nobles, prelates, and cities combined to resist their power. In 1495 Maximilian I. gave them a new code, which greatly reduced their authority. In 1568 their last open court was held near Celle in Hanover, but in Westphalia they nominally existed until 1811, holding secret meetings, but were suppressed by Jerome Bonaparte.

Felch (ALPHEUS), b. in Limerick, Me., Sept. 28, 1806, grad. at Bowdoin 1827; became a lawyer of Mich.; in the State legislature 1836-37, bank com. 1838-39, a judge of the State supreme court 1842-43, gov. of Mich. 1846-47, U. S. Senator 1847-53, a com. of Cal. land claims 1855-56. He was a delegate to the Chicago Convention of 1864.

Feldspar, or **Felspar**, a term in mineralogy derived from the Ger. *Feldspath* ("field-spar"), or, according to some, from *fels*, a "rock," and applied to a family of minerals embracing many species, which crystallize in several systems. In chemical composition they all agree in being silicates of alumina, with silicates of other bases, either soda, potash, or lime. By some authors the term is restricted to 1 species, the common potash F. or orthoclase. Popularly, the term is also applied to albite, a soda F., and to labradorite and oligoclase, soda-lime F., etc. F. enter largely into the composition of all granitic and of many metamorphic rocks, and form the chief element of porphyries and volcanic rocks. In their decomposition they are the source of clay. Moonstone and lapis-lazuli are members of this family valued in the arts, and F. is also used as a glaze for porcelain.

Felici'simus, a deacon of Carthage, ordained by the enemies of the bp. Cyprian while he was absent in time of persecution, between Feb. 250 and Apr. 251 A. D. His name is given to a short-lived schism in Carthage. Another Felici'simus was a friend of Cyprian, and the first to suffer in the Decian persecution.

Felicitas, SAINT, a mother and a martyr put to death, with her 7 sons, at Rome under Marcus Aurelius Antoninus (161-180 A. D.). All were arraigned together before the tribunal of Publius the prefect. To the question whether they would sacrifice to idols, they replied by a firm refusal, fearlessly confessing their Chr. faith. The officer informed the emp. of their refusal, and by him they were left to the sentence of the judges, who ordered the sons to be put to death by diverse punishments, but the mother to be beheaded. Another of the same name suffered death for the Chr. faith, in company with St. Perpetua, under Caracalla (211-217 A. D.). The 2, who alike remained firm in their refusal to offer sacrifice as they were required, were first exposed to wild beasts, and after having been torn by them, were put to death.

Felide [*Felis*], a family of Fere, distinguished by the dentition (M. $\frac{1}{1}$, P. M. $\frac{3}{2}$ or $\frac{2}{2}$, C. $\frac{1}{1}$ 1, 1, 6 \times 2 = 28 or 30) and form (cat-like). It contains the cats, lions, tigers, panthers, leopards, lynxes, etc.

Felix [Gr. Φίλιξ], ANTONIUS, a freedman of the emp. CLAUDIUS, whence he was also, according to Suidas, called Claudius, and a brother of the powerful freedman Pallas, through whose influence with the emp. and the empress Agrippina, F. was appointed procurator of Judea in 52 A. D. It was this F. to whom Lysias sent the apostle Paul, and before whom he "reasoned of righteousness, temperance, and judgment to come." In A. D. 60 he was succeeded by Festus.

Felix I., SAINT, succeeded Pope Dionysius Jan. 5, 269 A. D. In persecutions under Aurelian was condemned to die, but expired in prison Dec. 30, 274.—**Felix II.**, POPE, chosen by the Arians in 355, during Liberius's exile, on whose return he was expelled; d. Nov. 22, 365, and was canonized.—**Felix III.**, pope in 483 A. D., a native of Rome and great-grandfather of Gregory the Great. His condemnation of Acetius, patriarch

of Constantinople, accused of heresy in 484, caused the first schism between E. and W. chs.; d. Feb. 24 or 25, 492.—**Felix IV.**, pope 526, appointed by Theodoric, king of the Goths; d. Oct. 530.—**Felix V.**, POPE or ANTIPOPE, was elected by the Council of Bale Nov. 5, 1439, consecrated July 24, 1440, but renounced the pontificate Apr. 9, 1449.—**Felix**, bp. of Urgel, in Catalonia, in the 8th century, promulgated the heresy that Christ, as man, was merely the adopted son of God; was deposed and banished about 800, and d. about 818.

Fell'ah, plu. **Fellahin'** [Ar. "peasant?"], a term designating the laboring class in Egypt. They are mostly Mohammedans, but a few are Copts. Politically and socially, they are in a deplorable condition, and are more numerous than any other body of the Egyptians. They are of mixed Coptic, Ar., and Nubian stock. The name *Fellahin* is also given to laboring classes of other Mohammedan countries.

Fellat'ahs, **Fou'lahs**, or **Fella'ni**, a Mohammedan people of W. Soudan in Afr., remarkable for their enterprise, intelligence, and religious zeal. They have many tribes, several shades of color and varieties of form, probably from the fact that they have blended with various subject-races. They cultivate Mohammedan learning with much enthusiasm.

Fellenberg, von (PHILIPP EMMANUEL), b. in Berne, Switz., June 27, 1771; studied at Colmar and Tübingen, and a visit to Paris just after Robespierre's death convinced him that a better public education was necessary. He opposed the Fr. in their occupation of Switz., for which he was banished, but after his return was employed in important diplomatic, political, and military offices. He founded in 1799 his famous educational and manual-labor establishment at Hofwyl, in which he invested all his large fortune. In 1807 he established a scientific dept., and in 1808 a normal school and an agricultural inst., where scientific agriculture was taught and practised and farming-implements manufactured. Children of all ages, the rich and poor alike, were received. The wife and 9 children of F. assisted him in his work. D. Nov. 21, 1844.

Fellowes (ROBERT), b. in Norfolk, Eng., 1770, grad. at St. Mary's Hall, Ox.; entered the Anglican priesthood, which he afterward abandoned. He was one of the founders of the Lond. Univ. His peculiar views are set forth in his *Religion of the Universe*, D. 1847.

Fellows (Sir CHARLES), b. at Nottingham, Eng., 1799; made four expeditions into Asia Minor; collected the Lycian Marbles, now in the Brit. Museum; was knighted in 1845. Wrote *Journals* of his expeditions, and the *Xanthian Marbles*, etc. D. Nov. 8, 1860.

Fellowship, in the univs. of Ox., Cambridge, Durham, and Dublin, a position held by the fellows (*socii*) of a particular coll. They were originally poor students (chiefly of divinity) who received the income of the F. as a means of support, but when they obtained a sufficient benefice, or became owners of property beyond a certain amount, or by marriage signified their abandonment of the Ch., they lost the F. The fellows of certain Amer. colls. are simply trustees who manage the business-affairs of their coll.

Felony. See WHITLOW, by E. DARWIN HUDSON, M. D. **Felony**. Under the Eng. common law all grades of criminal offences have, from an early period, been divided into 2 great classes, felonies and misdemeanors. The commission of offences of greater criminality was attended with a forfeiture of the wrong-doer's lands, goods, or both, and all crimes thus punished were included under the comprehensive designation *felony*. Death was in a large number of instances superadded to forfeiture, but was not a distinguishing characteristic of this grade of offence. In the Eng. law at the present day forfeiture as a gen. punishment for crime has been abolished, but crimes classed as F. before this change in the law are still so designated, unless an act of Parl. has changed the grade of particular offences. In the U. S., where the nature and punishment of crimes are generally determined by statutory provisions, there is no universally recognized meaning given to the word "felony." Some States employ it to designate crimes involving a certain kind of penalty, but making the penalty of a different character from that by which its meaning was originally determined. Thus, in N. Y. any offence punishable by death or by imprisonment in a State prison is a F. In a few States the use of the term is entirely discarded, and if it be employed at all in legal proceedings, it is without definiteness and precision of meaning.

Felspar. See **FELDSPAR**. **Felt** [kindred to Gr. *πλος*, "felt?"], a stuff composed of wool, fur, or hair, of which the fibres are so entangled and interlaced that they cannot readily be separated. It has long been known in the East, and the nomads of the desert largely occupy tents of F. Waste wool is largely employed for felting. It is first deprived of its oil, then carded and placed in a machine, where it is kept wet with hot water and subjected to a process of beating, by which the fibres are made to move upon each other until the interlocking of their serrations and the curling of the fibre itself unite the whole into a compact sheet of F. The *fulling* of cloth is but a partial felting of wool already woven.

Felt (REV. JOSEPH BARLOW), LL.D., b. at Salem, Mass., Dec. 22, 1789, grad. at Dartmouth 1813; was pastor at Sharon and at Hamilton, Mass., 1821-34. In 1846 he completed the classification and binding of the archives of the State of Mass. He was pres. of the N. Eng. Historical and Genealogical Society 1850-53, and held other offices in kindred insts. Wrote *Ecclesiastical Hist. of N. Eng.* D. Sept. 8, 1869.

Fel'ton (CORNELIUS CONWAY), LL.D., a scholar and author, b. at W. Newbury, Mass., Nov. 6, 1807, grad. at Harvard 1827; taught in Northampton, Mass., and at Geneseo, N. Y.; in 1829 was Lat. tutor at Harvard, in 1830 Gr. tutor. In 1832 he became Eliot prof. of Gr. there, and was inaugurated its pres. 1860. Among his literary works are *Homer with Eng. Notes*, eds. of several Gr. dramatists, translations of Menzel's *Ger. Lit.* and Guyot's *Earth and Man*, a *Life of Gen. Eaton*,

and *Familiar Letters from Europe*. He assisted Longfellow in preparing the *Poets and Poetry of Europe*, and contributed to periodicals; was a member of the Mass. board of education, regent of the Smithsonian Inst., and member of the Amer. Acad. of Arts and Sciences. D. Feb. 26, 1862.

Felton (WILLIAM H.), b. in Oelethorpe co., Ga., June 19, 1823, grad. at the State Univ. in 1842, and at the Med. Coll. in Augusta in 1844; did not practise his profession, but settled in Cass co., engaging in farming and planting, and devoting much interest to the affairs of the M. E. Ch. F. was elected to the State legislature in 1851 on the famous Ga. platform; opposed the policy of secession in 1861, but went with his State when she adopted that cause; was M. C. 1874, and re-elected in 1876.

ALEXANDER H. STEPHENS.

Fences, Law of. At common law, land-owners were under no obligation to build and maintain F. between their premises and those of adjacent owners. Trespasses by cattle and other animals were to be prevented, not by means of F., but by a duty imposed upon each owner of animals to keep them within the precincts of his own estate, and to take precautions against their entering upon a neighbor's premises. If cattle should escape and do injury to another's land, their owner would be liable in an action for damages. The obligation to build F. might, however, be assumed by contract or imposed by prescription, as if a land-owner should keep up F. upon his property for 20 yrs. to the benefit of his neighbor. At the present day the matter of fence-building is generally regulated to some extent by statute, both in Eng. and in this country. The duties imposed upon R. R. companies to maintain F. along the line of their routes are particularly minute and exacting.

Fencing [formerly called "the fence," a contraction of *defence*]. Combat with the sword is as old as the hist. of the human race. The Rom. soldier was a carefully instructed swordsman, but aided by the shield. F., the art of handling the small-sword with skill in attack and to the greatest advantage, relying upon it as a means of defence, came into use after armor and the shield ceased to be worn. It was in Italy during the religious wars of Charles V., under a condition of society which rendered life particularly insecure, that the small-sword or rapier was adopted and habitually worn by military and state officers, and generally by all men whose position in society or whose occupation permitted it. Then and there its skillful use was found essential, and F. at that period and long subsequently was considered a necessary art. The Its. were the instructors of the art, first in Sp. and afterward in Fr., where, during the last century, F. was brought to the highest perfection.

The small-sword, when once it came into use, was adopted as the fairest weapon for duelling; and though to the custom of wearing it may be charged the disposition to indulge in violence, many desperate encounters in which innocent persons sometimes suffered, and the loss of valuable lives, it must be said that the practice of duelling, which had previously been so conducted that every unfair advantage was taken and allowed, and with a revolting display of ferocious passions, was greatly humanized by the refinement introduced by the rules and art of F. Skill with the sword is practically of advantage to those upon whom falls the duty of the national defence, to enable them to use loyally the weapon they alone are required to wear. But as the sword is no longer generally worn, and is not, among Eng.-speaking peoples, used in duelling, adroitness in its use may no longer be feared as likely to create a fondness for contention; and F. may be and is now resorted to as an enjoyable and healthful recreation and as a certain means of physical development. As an exercise it is void of danger, gives no occasion for rudeness, calls for no over-exertion, yet brings into active and graceful play every muscle of the body, and demands the eager and unremitting attention of every faculty.

A distinguished Fr. authority on the art of F. declares that a swordsman, on crossing blades with an antagonist and before closing in combat, must take in at a glance the intellectual and phys. powers of his adversary, so as to judge of the employment he will likely make of them, and decide by the first few movements of his weapon if he is a man of nerve or one that may be intimidated or confused; observe on the instant if his guard is faulty, and what advantage may be taken of it; discover by feints his natural parry, and by his attitude and aspect whether his *forte* is the attack or defence; if he will probably rush in, trusting all to strength and audacity; and of whose attack signal advantage may be taken if anticipated, or contend warily with the skill of one accustomed to F., and must therefore be attacked with caution. This, so true in mortal combat, must be borne in mind by fencers to secure the best advantages from the use of foils as an exercise. [From *orig. art. in J. C. Univ. Cyp.*, by Col. J. C. FELTON.]

Fénelon (FRANÇOIS SALIGNAC DE LA MOTTE, F. abp. and author, b. at the château de Fénelon Aug. 6, 1651; went to the Univ. of Cahors in 1663, and then to the Coll. of Plessis; thence to the Sem. of Sulpice, and received holy orders about 1675. In 1678 was superior of the order of Nouvelles Catholiques, for the instruction of new converts. In 1686, after the Revocation of the Edict of Nantes, was sent by Louis XIV. to Poitou to convert Prots. Was preceptor to the duke of Burgundy in 1689, tutor to the Duke of Anjou in 1690, and to the duke of Berri in 1693. In the same yr. he became a member of the Fr. Acad. Was appointed abp. of Cambrai 1695, and became the friend and defender of Mme. Guyon. Bossuet denounced him as a heretic in 1697, and in 1699 F., having in vain appealed to the pope, signed his renunciation of Mme. Guyon's doctrines. The writings of F. are numerous; his most noted work is *Les Aventures de Télémaque*. D. Jan. 7, 1715.

Fenestella, a genus of fossil bryozoans, of which many species have been obtained from the palaeozoic rocks. They usually have the form of a calcareous network, of which the meshes are often quadrangular, resembling little windows,

whence the name. The threads of the network are poriferous. The corallum of F. often grows in a broad, ribbon-like frond, wound round and radiating from a central axis.

Fenestella, a Lat. historian who flourished under Augustus and Tiberius, since, according to the statement of Jerome, he d. A. D. 21. Nothing further is known positively of his life. Wrote a work entitled *Annales*, which supplied to Plutarch materials for some of the statements in his *Lives* of distinguished Romans. Only fragments remain.

Fénian, a name first applied in the early hist. of Scot. and Ire. to a tribe of warriors noted for their prowess. Finn MacCumhail was their most famous chief. According to Irish annals, he d. about 235 A. D. So great was his renown that these Gaelic warriors were henceforth called Feinne, Fiana, or Fenians. Their deeds form the theme of many poems and legendary tales in Celtic lit., and are also commemorated by various names in Scotch and Irish topography. In early Irish hist., they are represented as an established militia, whose duty it was "to defend the country against foreign or domestic enemies, to support the right and succession of their kings, and to be ready, upon the shortest notice, for any surprise or emergency of state." With the rise of monasticism the anc. order disappeared, but Finn and his F., and especially his two sons, Gergus and Oisín (the Scot. Ossian), long remained to the Gaelic imagination what Arthur and his knights were to the Cymric.

In 1859 the name was applied to an organization of Irishmen that was formed in Amer. and G. Brit. to secure the independence of Ire. The organization was constituted on republican principles, having its social, dist., and State circles, and its cong., in which was vested the supreme legislative authority and the choice of the chief executive officer. The first F. cong. met in Chicago in 1863; the order, however, did not attract much attention until its second cong., in Cin. in 1865. It then became very popular among the Irish; 80,000, it was said, belonging to it in the U. S. In 1866 several attempts were made by the F. in this country to invade the Brit. provs., but all, except 2, were frustrated by the U. S. authorities. The 2 companies of F. who succeeded in crossing the Canadian frontier were speedily driven back, and most of those who returned were taken prisoners by U. S. authorities and sent on parole to their homes. During the following yr. there was a number of F. riots in G. Brit., but all were soon quelled, and some of the rioters executed. From that period the F. excitement rapidly subsided. Divisions occurred in the organization, the masses lost confidence in their leaders, and many of the wrongs of Ire. which they sought to redress were abolished by legislation.

L. CLARK SEELYE.

Fen'nee, Cer'do, or Zerda, *Megalotis cerdo*, a small fox-like animal of N. and Central Afr., of the family of Canidae or dogs, the only representative of a very peculiar genus named *Megalotis*, so called from its large ears. Its habits resemble those of the true foxes. Its fur is highly prized by the Afrs.

Fen'nel [Lat. *feniculum*, dim. of *fœnum*, "hay," from its finely divided leaves], a genus (*Feniculum*) of umbelliferous herbs, closely allied to *Anethum*, the dill genus. The common F., sweet F., and *Feniculum officinale* of Europe (the first cultivated in the U. S. also) are raised extensively for their seeds, a pleasant, warm aromatic. Among the popular superstitions there is a belief that he who sows F.-seed sows sorrow. "Small F." is the *Nigella salvia* of Europe and Asia, the "love-in-a-mist" of our gardens, a small herb sometimes used in cookery and med.

Fen'ner (ARTHUR), b. at Providence, R. I., in 1745. He was for a long time clerk of the superior court of R. I., and afterward gov. 1789-1805. D. Oct. 15, 1805.

Fenner (JAMES), LL.D., son of the preceding, b. at Providence, R. I., 1771, grad. at Brown Univ. 1789; was U. S. Senator 1805-07, gov. of R. I. 1807-11, also 1824-31 and 1844-45. D. Apr. 17, 1846.

Fen'ton (Fentonville P. O.), Genesee co., Mich., about 50 m. N. W. of Detroit, on R. R. It has a Bap. sem. and an Epis. high school. Pop. 1870, 2553; 1880, 2152.

Fenton (REYBEN E.), legislator, b. at Carroll, N. Y., July 11, 1819, ed. at Pleasant Hill and Fredonia acads.; studied law, and became a merchant. He was rep. in Cong. from Dec. 1857 to Mar. 1865, gov. of N. Y. from 1865 to 1869, and then U. S. Senator from N. Y., being elected in 1869.

Fentonville, Mich. See FENTON.

Fen'ugreek [Lat. *fœnum Græcum*, "Greek hay," because it is used in the Levant and in Asia as a forage-plant], a name given to the *Trigonella fœnum Græcum* and other species of the genus, leguminous annual herbs of Asia and Europe, resembling clover. The above species is cultivated in Fr. and Ger. for its seeds, which are ground into an oily, mucilaginous meal, much used in farriery as a vehicle for drugs. They were once valued in med., but are now only employed in poultices, etc.

Fen'wick (BENEDICT J.), b. in St. Mary's co., Md., Sept. 3, 1782; joined the Jesuits; pres. of Georgetown Coll., D. C.; in 1825 became R. Cath. bp. of Boston. D. Aug. 11, 1846.

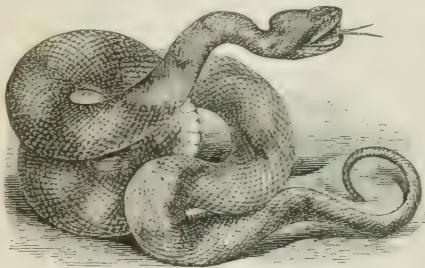
Fenwick (EDWARD), D. D., first R. Cath. bp. of Cin., b. in Md. 1768; became bp. in 1822. D. Oct. 6, 1832.

Feoff'ment, a mode of conveyance of landed property, formerly in use in the Eng. law, by which land or other corporeal hereditaments were transferred by one person called a *feoffor* to another called a *feoffee*. An actual delivery of the land was made by a peculiar ceremony known as *livery of seisin*—i. e. a delivery of the possession of the land by taking the feoffee upon or near it and directly investing him with the ownership and occupation. When the parties entered upon the land the livery was said to be *in deed*, and in the presence of witnesses the feoffor handed to the feoffee a clod or turf or a twig or bough as a symbol of actual investiture, at the same time uttering certain words of transfer. When the delivery was made in sight only of the land, the livery was said to be *in law*; and in order to make the transfer effectual the feoffee had to make an actual

entry during the feoffor's life. Conveyance by F. was for a long period in Eng. hist. the only ordinary method of transfer of land in possession. It has been entirely superseded by more convenient methods. The mode of conveyance now in use is by deed.

Feræ Naturæ [Lat. "of a wild nature"], a legal term used to designate such animals as are naturally of a wild disposition, as bears, foxes, deer, pigeons, wild-geese, etc. Property in domestic animals is absolute, or indefeasible, while in animals F. N. it is only qualified—i. e. the right of property only continues to exist as long as the animals are reclaimed from their savage or wild condition, and ceases when they return to it. When animals are of such a kind that if once restored to their freedom they would never return of themselves to their owner, his ownership of them can continue only so long as he keeps them confined. Wild beasts in a menagerie would be of this character. But if animals naturally wild have become so tamed that if suffered to escape or roam at large they have a habit or disposition of returning (*animus revertendi*), a qualified property in them continues so long as this habit is found to have a controlling influence. But if they stray and remain absent, it is lawful for any stranger to take them as his own property. The owner of such animals will in some instances be liable for their acts. A distinction is to be taken between animals that are not and those that are naturally inclined to do mischief. In cases of the first class the owner is not in general responsible for injuries done by his animals, unless he is shown to have special knowledge of some vicious propensity. This knowledge is technically called *scienter*, and must be alleged in an action, and proved. This proof would not be necessary if the animals were trespassing on the land of another. The owner in that case is liable for acts done in the course of the trespass. When the animal belongs to the second class, and is naturally inclined to do mischief, no proof of knowledge is requisite, as the owner is presumed to have knowledge of its vicious propensities.

Fer de Lance [Fr. "lance-head"], *Craspedolephalus lanceolatus*, a much dreaded venomous serpent of the family



Fer de Lance.

Crotalidæ, of the W. I. and S. Amer., especially abundant in St. Lucia and Martinique. It is from 5 to 8 ft. long. It gives no warning of its attack.

Ferdinand the Just, king of Aragon, was co-regent of Castile and Leon near the close of 1406; became king 1412; defeated and imprisoned the count of Urgel 1413. D. Apr. 2, 1416.

Ferdinand I., emp. of Aus., eldest son of Francis I., emp. of Ger., b. Apr. 19, 1793; took the throne Mar. 2, 1835, but was under the direction of Prince Metternich, his prime minister. On Dec. 2, 1848, he abdicated in favor of Francis Joseph, the present emp., after having repeatedly fled from Vienna during the revolutionary agitations of that yr. D. June 29, 1875.

Ferdinand I., king of Bohemia and Hungary and emp. of the Roms., b. at Alcalá, Sp., Mar. 10, 1503, was made king of Bohemia Feb. 24, 1527, of Hungary Oct. 28, 1527, and of the Roms. Jan. 15, 1531. Took the title of emp. when his brother, Charles V., abdicated, near the end of Sept. 1556. Recognized as emp. by the electors at Frankfort Mar. 12, 1558, was forbidden to take the title by Pope Paul IV. In 1562 he sent ambassadors to the Council of Trent. D. July 25, 1564.

Ferdinand II., king of Bohemia and Hungary and emp. of the Roms., b. July 9, 1578, was crowned king of Bohemia July 29, 1617. The Bohemian states deposed him Aug. 19, 1619, and offered the crown to Frederick, elector-palatine. Had been crowned king of Hungary July 1, 1618, and was elected Rom. emp. Aug. 28, 1619. Frederick was defeated by F.'s army at Prague, Nov. 8, 1620, and in 1623 the Bavarian duke received the Palatinate. In 1624 the imperial gen., Wallenstein, defeated the armies of another Prot. league which had been formed against F., with the king of Denmark at its head. Dec. 1625 and Nov. 1627 F. resigned the crowns of Hungary and Bohemia to his son, Ferdinand III. In 1630-32 Gustavus Adolphus of Swe., with Fr. and Venice, invaded Ger., and gained important successes, although at the battle of Lützen, Nov. 1632, the Swe. monarch was slain. Chancellor Oxenstiern directing the league after the death of Gustavus Adolphus, F. was more fortunate, made peace with some of the allies, and procured the election of his son Ferdinand as king of the Roms. D. Feb. 15, 1637.

Ferdinand III., king of Bohemia and Hungary and emp. of the Roms., b. July 20, 1608, and became king of Hungary and Bohemia Dec. 8, 1625, and Nov. 25, 1627. Gained the battle of Nördlingen, in the contest of his father (Ferdinand II.) against the Swedes and their allies, Sept. 6, 1634; was made king of the Roms. Dec. 22, 1636, and became emp. in 1637. In 1648 he signed the peace of Westphalia, guaranteeing religious liberty. D. Apr. 2, 1657.

Ferdinand I. (THE GREAT), king of Castile and Leon, married Doña Sancha of Leon, and was named king of Castile in 1033, succeeding to throne in 1035, crowned king of Leon June 22, 1038. Invaded Port. 1044 and 1045. In 1046-49 he warred against the Moors. On Sept. 3, 1054, he defeated Garcia III., king of Navarre, near Burgos; in 1063 conquered Mohammed ben Abad, dividing his kingdom between his 3 sons in 1064. Forced the kings of Saragossa and Toledo to become his tributaries in 1065. D. Dec. 27, 1065.

Ferdinand III., THE SAINT, king of Castile and Leon, son of Alfonso IX., king of Leon, and Berengaria, queen of Castile, succeeding in Castile, on his mother's abdication, Aug. 31, 1217, and in Leon in 1230; he conquered the kingdom of Baeza, took Cordova and Seville, and made the kings of Granada and Murcia his tributaries. D. May 30, 1252, and was canonized 1671.

Ferdinand V., king of Castile and Aragon, THE CATHOLIC, b. at Sos, Sp., Mar. 10, 1452, married Isabella of Castile Oct. 18, 1469. Sp. was divided into the kingdoms of Castile, Aragon, Navarre, and Granada, the last held by the Moors. On the death of Isabella's brother, Henry IV., F. was proclaimed king, with her as queen, Dec. 13, 1474. In Jan. 1479 F. succeeded his father, John II., in Aragon. In 1480 he established the Inquisition at Seville, and subsequently permitted its establishment in Aragon. Began his wars with the Moors for the possession of Granada 1482, and on Jan. 6, 1492, with Isabella he entered Granada in triumph. The same yr. he issued an edict for the expulsion of all Jews from his dominions. This yr. also Isabella furnished to Christopher Columbus 2 vessels in his fleet of 3, with which he discovered San Salvador. In 1493 F. reacquired Roussillon and Cerdagne from Charles VIII. of Fr. In 1497 he promoted the expedition of Amerigo Vespucci. By 1500 the Sp. conquest of Naples was complete; by 1501 every Moor had been expelled from the kingdom or was compelled to be baptized. In Oct. 1511 he joined the "Holy League" against Fr.; and Jean d'Albret, king of Navarre, having leagued himself with the Fr. monarch, F. invaded his dominions, drove him from the throne, and in 1512 subjugated that kingdom, thus finally uniting Aragon, Castile, Granada, and Navarre under one sway. D. Jan. 23, 1516.

Ferdinand I., king of Naples, b. in 1425, was legitimized by Pope Eugene IV., and crowned king in June 1458. In a short time his subjects invited John of Anjou to take the throne, but F. defeated him at Troia Aug. 18, 1462, and became master of the kingdom in 1463. In 1486 the barons of Naples revolted. F. having made peace with them on Aug. 11, treacherously arrested and massacred them Aug. 13. For this he was excommunicated by Pope Innocent VIII., June 29, 1489, but made peace with the pope in May 1492. D. Jan. 25, 1494.

Ferdinand IV., king of Naples, and I. of the Two Sics., b. at Naples Jan. 12, 1751, and succeeded, on the accession of his father, Don Carlos, to the throne of Sp. Oct. 5, 1759. In 1767 he expelled the Jesuits; in 1792 joined the first coalition against Fr., but in 1796 purchased peace. In Nov. 1798, a secret alliance having been formed against Fr., the Neapolitan army marched to Rome, but was defeated by the Fr. The king and queen fled to Sic., but during the same yr. were restored to power by the successes of the allies. Mar. 28, 1801, F. made peace with Fr., but in Sept. 1805 joined a third coalition against her. In the end of that yr. he was deprived of Naples by Nap., and retired to Sic. under Eng. protection. In Jan. 1812 he resigned his authority in favor of his son Francis, but on Nap.'s fall he was restored. In Dec. 1816 or 1817 he took the title of king of the Two Sics., but in the latter part of his reign (1820-21) was threatened with a fresh revolt of his subjects, annulled their const., and entered Naples, supported by the Aus. army, May 15, 1821. D. Jan. 3, 1825.

Ferdinand I., king of Port., b. at Coimbra Feb. 27, 1340, succeeded to the throne Jan. 18, 1367. In 1369 claimed Castile, but was defeated by Henry II., and compelled to make peace in 1371. The war being renewed, a like issue ensued in 1373. Again warred with Castile, assisted by Edmund, duke of Cambridge, in 1381. D. Oct. 20, 1383.

Ferdinand VI., king of Sp. (THE WISE), b. at Madrid Sept. 23, 1713, or Apr. 10, 1712, and succeeded his father, Philip V., Aug. 10, 1746. Acceded to the treaty of Aix-la-Chapelle June 28, 1748. D. Aug. 10, 1759.

Ferdinand VII., king of Sp., b. at St. Ildefonso Oct. 13, 1784; proclaimed prince of Asturias and heir to the crown 1790. On the abdication of his father (Mar. 19, 1808) he succeeded to the kingdom, but was compelled to resign May 1, and was shut up in the château of Valençay. In Mar. 1814 was liberated, and in May annulled the Sp. const. and dissolved the Cortes. The Fr. having invaded Sp. Apr. 1823, F. was declared incapable by the Cortes, and a regency was appointed on June 11, but he was restored on Sept. 28. D. Sept. 27, 1833.

Ferdinand II., of the Two Sics. (KING BOMBA), b. Jan. 12, 1810, succeeded his father, Francis I., in 1830. The hist. of his reign is a catalogue of conspiracies, rebellions, executions. His reckless bombardment of Messina, Sept. 2-7, 1848, won him his shameful title. D. May 22, 1859.

Fergus Falls, on R. R., cap. of Otter Tail co., Minn., 176 m. N. W. of Minneapolis, on Otter Tail River, in a lumber region. It has fine water-power. Pop. 1880, 1635.

Ferguson (ADAM), LL.D., b. at Logierait, Scot., June 20, 1723; studied at St. Andrew's, read divinity in Edinburgh, was ordained in 1745; became Gaelic chaplain in 42d regiment; prof. of natural philos. at Edinburgh 1759-64, prof. of moral philos. 1764-84; was one of the coms. sent in 1778 to the U. S. to effect a peace. Wrote *Hist. of Civil Society, Moral and Political Science*, etc. D. Feb. 22, 1816.

Ferguson (JAMES), F. R. S., astron. and mechanician, b. in Banffshire, Scot., 1710. His mechanical genius was developed at a very early age by investigation into the wheel and axle and the construction of a wooden clock and watch which were good timekeepers. He spent several yrs. in

Edinburgh, and in 1743 went to Lond.; in 1748 commenced lecturing upon astron. and mech.; elected a F. R. S. 1763; member of the Amer. Philosophical Society 1770. Wrote *Assessment Expedition and Lectures on Subjects in Medicine, Hygiene, Pneumatics, Optics, etc.* D. Nov. 16, 1776.

Ferguson (JAMES), PROF., b. in Perthshire, Scot., Aug. 31, 1765; arrived in New York 1800; was assistant civil engineer on the Erie Canal 1817-19, assistant surveyor on the boundary commission under the treaty of Ghent 1819-22, astronomical surveyor on the same commission 1822-27, civil engineer for Pa. 1827-32, first assistant of the U. S. Coast Survey 1833-47, and assistant astron. of the U. S. Naval Observatory 1847-67. He discovered several asteroids, for which he was awarded the astronomical prize medal by the Acad. of Sciences of Fr. in 1854 and in 1860. D. Sept. 26, 1867.

Ferguson (Sir WILLIAM), BART., F. R. S., b. at Prestonpans, Scot., Mar. 20, 1808, studied in the Royal Coll. of Surgeons at Edinburgh; became a licentiate of that inst. 1828, a fellow of the corporation 1829, and began to lecture on the principles and practice of surgery 1831. In 1836 he was assistant surgeon to the Royal Infirmary, and in 1839 a F. R. S. of Edinburgh. He settled in Lond. in 1840, having been appointed prof. of surgery in King's Coll. and surgeon to King's Coll. Hospital; was chosen pres. of the Royal Coll. of Surgeons 1870, having been made a bart. 1865. Author of *System of Practical Surgery* and the inventor of numerous surgical instruments. D. Feb. 11, 1877.

Fergusson (JAMES), D. C. L., F. R. S., arch., b. at Ayr, Scot., in 1808, journeyed through the E.; prepared illustrated works on *Hindoo Arch.*, and wrote *Illustrations of the Rockcut Temples of India, The Palaces of Nineveh and Persepolis Restored*; was arch. of the Nineveh Court in the Crystal Palace at Sydenham; Apr. 17, 1871, he received the gold medal of the Royal Inst. of Brit. Arch.

Fergusson (Right Hon. Sir JAMES), BART., b. at Edinburgh Mar. 18, 1832, succeeded to the title on his father's death 1849; was ed. at Rugby school, after which he entered the Grenadier Guards, in which he became capt. 1854; retired from the army 1855, represented the co. of Ayr in Parl. 1854-57 and 1859-68, under sec. for India 1866-67, under sec. for the home dept. July 1867-Aug. 1868, gov. of S. Australia 1868-72, gov. of New Zealand 1873.

Feria [Lat. plu. of *feria*; probably (through *fesiv*) connected with *festus*], in anc. Rome, were those holidays whereon business could not lawfully be done, and when slaves might rest from their labors. These festivals were of many kinds. Marcus Antoninus fixed them at 135 in the yr., though before his time they had been much more frequent. The way they were kept varied extremely, but in gen. there was a religious element in their observance. A *feria* in the Ord. of the R. Cath. Ch. is a week-day having no feast.

Ferland (JEAN BAPTISTE ANTOINE), L'ARBRE, b. at Montreal, Canada, Dec. 25, 1805, admitted to orders in the R. Cath. Ch. 1823. Was priest and prof. in Canada for several yrs.; then superior of the Coll. of Nicolet 1847, afterward prof. at Laval Univ. 1855. Wrote several works on Canadian hist. D. Jan. 8, 1864.

Fermat, de (PIERRE), Fr. math., b. at Toulouse 1601. Fr. savants claim for him a great part of the honor of the discovery of the differential calculus. La Place thought F. ought to share with Pascal in the fame of the invention of the calculus of probabilities. He was a councillor of the Parl. of Toulouse, and is known as the first to propose 2 celebrated theorems called by his name. D. Jan. 12, 1665.

Fermentation [Fr. *fermentation*; Ger. *Gährung*], a spontaneous change or decomposition which takes place in most vegetable and animal substances when exposed at ordinary temperatures to air and moisture. When the process is accompanied by the liberation of foetid gases, as in the decomposition of urine, blood, or flesh, it is termed *putrefaction*. When it occurs with free access of air, and without excess of water, it is termed *decay* or *evemacais*, as when a fallen tree moulders into brown putrefied humus. The term *fermentation* is limited in common lang. to the process as conducted for the production of inoffensive and useful products, as when grape-juice and malt-wort are fermented into wine and beer. While these processes differ widely in their products, they are all similar in their gen. character. The substances most liable to undergo putrefaction are compounds rich in nitrogen, such as albumen, fibrine, caseine, gluten, gelatine, etc. These bodies require only the presence of water, and access of air for a short time, to bring them into a state of putrefactive F., which is very offensive, owing to the liberation of sulphuretted hydrogen, ammonia, and a variety of volatile bodies, whose exact nature has not been definitely determined. These bodies, which ferment spontaneously, are composed of carbon, hydrogen, nitrogen, oxygen, and sulphur. Many non-nitrogenous substances, consisting of carbon, hydrogen, and oxygen only, which are incapable of fermenting or putrefying spontaneously, readily undergo this change when brought in contact with albuminous or gelatinous compounds, either in a fresh state or in a condition of incipient putrefaction. These latter bodies, which are capable of exciting F., are called *ferments*, and bodies which are made to ferment by them are said to be *fermentable*. One of the most active of all ferments is yeast, a plant which develops in liquids undergoing vinous or alcoholic F. Bodies composed wholly of carbon and hydrogen do not appear to be capable of undergoing F. under any circumstances. Bodies may be brought into different states of F. by the same ferment, according to the particular stage of decomposition which it may have attained. Thus, in the raising of bread by the aid of leaven, vinous F. may occur, with the production of alcohol and carbon-dioxide gas, which makes the bread light and porous, or lacticus F. may occur, with the formation of lactic acid, which makes the bread sour and heavy. Temperature influences both the development and the character of F. It cannot occur at a temperature much below 40° F., nor much above 140°.

F. is generally indicated by a sensible internal motion, the

development of heat, and the liberation of bubbles of gas; and when it occurs in a clear liquid, always results in turbidity and the formation of a scum and a sediment. During the process complex organic bodies are resolved into simpler organic bodies, as when milk-sugar is changed to lactic acid; or into simpler organic bodies and inorganic compounds, as when glucose is changed to alcohol and carbon-dioxide; or the decomposition may result in the liberation of elementary bodies, as hydrogen and nitrogen. The elements of water are often assimilated during F., and enter into the composition of the new bodies. The process is always complex, and while it often results in the formation of some well characterized predominating product, as alcohol, acetic acid, lactic acid, butyric acid, etc., there is always produced a variety of bodies in smaller quantities the exact nature of which has not been fully determined, although many of these secondary bodies have been identified. Fermenting substances generally have a tendency to abstract oxygen from the air and other bodies. When F. occurs with free access of air, it is accompanied by oxidation (*evemacais*) on the surface. Putrefying bodies reduce ferrous sulphate to sulphide of iron by withdrawing oxygen.

F. has long been resorted to in raising bread with leaven or yeast, in preparing alcoholic beverages, and in preparing certain vegetables, as sour beans and sauer-kraut. It is the process, too, by which all vegetable and animal substances ultimately undergo destruction, and finally return to the inorganic world in the form of carbon-dioxide, water, ammonia, nitrogen, etc., to become again the food of plants, and under the influence of the solar rays again to generate complex organic bodies. It is the process by which milk and vegetables sour, meats putrefy, and fats become rancid, and by which timber and textile fabrics decay. It is, moreover, intimately associated with the development of contagious diseases, and its study leads to the discovery of methods for preserving food and timber and for preventing the occurrence and spread of many diseases. There is an endless variety of processes to which the term F. may be applied with more or less propriety; the following are a few of the most important: (1) Vinous, alcoholic, or panary F.; (2) acetous; (3) lactic; (4) butyrous; (5) mucous or viscous; (6) putrefactive; (7) saccharous; (8) glucosic; (9) pectous; (10) gallow; (11) amygdaloid; (12) sinapous; (13) urinous; and (14) peptous. (See FERMENTATION, in *J. S. Univ. Cyc.*) C. F. CHANDLER.

Fern (FANNY). See FARTON.

Fernandina, fer-nan-dee'-nah, on R. R., city, port of entry, and cap. of Nassau co., Fla., on Amelia Island, between Nassau and Prince William sounds, and separated from the mainland by a channel called Amelia River, which affords a safe and spacious anchorage. The entrance is protected by Ft. Clinch. Pop. 1870, 1722; 1880, 2562.

Ferns [Lat. *filices*; Fr. *ougères*; Ger. *Farnkräuter*], the name of a large family of flowerless plants which forms the largest natural order of the class Acrogens, the other orders of this class being Equisetaceæ, Lycopodiaceæ, Marsiliaceæ, Salviniæ, and Isoëtæ. They are characterized by having a woody root-stock, which is creeping, or afterward erect, and even developed into an arboreous trunk, and bears along the sides or at the end long leaves (*fronds*), which are either simple and entire, or variously lobed or decomposed, often presenting most elegant feathery patterns. In respect to size, F. vary from the smallest *Hymenophyllum*, consisting of a few little leaves not half an inch long, growing from a thread-like, creeping stem, up to the gigantic tree-F. of the tropics, which have an erect trunk sometimes 50 or 60 ft. high, bearing at the top a magnificent crown of feather-branched fronds, often 8 to 10, or even 15 to 20 ft. long, and gracefully curving outward on every side. The whole number of known F. cannot be exactly stated. A moderate estimate, however, places the number of well-known species at 2500, and with a fair allowance for little known and undiscovered species all the F. of the world probably do not exceed 3000 species. In regions of extreme cold F. are scanty in number and small in size; in the warmer temperate regions they are larger and more numerous, and in the torrid zone, especially in its more humid districts, they become very abundant and reach their grandest proportions.

Many systems of classification for the F. have been proposed, the earliest ones being based principally upon the shape of the frond. Linnæus recognized 12 genera, based on the position and grouping of the sporangia. In 1836 Presl took the ground that differences in the arrangement of the veins of the frond should be considered of generic importance. Accordingly he adopted or proposed 112 genera, which Fée increased to 212. Later writers have rejected as untenable many of these genera, and from the studies of Mettenius, Hooker, and other systematists there now seem to be satisfactorily established 8 well-marked tribes, with about 30 genera, mainly distinguished by the nature of the sporangium and of the elastic ring in the tribes where that exists.

The economical uses of F. are few. The Hawaiian species of *Cibotium* have the young fronds enveloped in a dense woolly covering, which is extensively used to stuff pillows and cushions. In New Zealand the root-stocks of *Pteris aquilina* are used for food. The ashes of the same species, the common brake, are used for making lye by the Eng. peasantry. The root-stocks of *Aspidium filix-mas* have long been used in med. as an anthelmintic, and *Aspidium athamanticum* in S. Afr. is used in the same way. (For a good gen. essay on F. see BERKELEY's *Introduction to Cryptogamic Bot.*, and for the study of genera and species, the writings of HOOKER, METTENIUS, FÉE, BAKER, etc. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. DANIEL C. EVERTON].)

Fero'nia, an It. goddess. She has been variously regarded as goddess of the earth, of the inferior world, of commerce, and of liberty. The chief seat of her worship was the town of Feronia, at the foot of Mt. Soracte.

Feroze Shah, Canal of, a canal of India, serving

chiefly for irrigation, was begun in 1356 by Feroze Shah, king of Delhi, but was not finished until some 250 yrs. later. It flows from the W. side of the Jumna more than 100 m. above Delhi, and with its branches is 240 m. long. It rejoins the Jumna at Delhi. The Brit. have cleaned the canal and also constructed a similar one on the E. side. These canals are of importance to the agriculture of that region.

Ferrara, fer-rah'rah, a city of N. It. While this region belonged to the house of Este, F. was the ducal residence and a city of great importance. Under the papal rule it went into decay. Still, many of its monuments—as the cathedral, the ducal palace, etc.—are of great interest. It is an abb.'s sec. Pop. 1881, 75,513.

Ferrara, Council of, in continuation of the Council of Bâle, which was transferred to Ferrara by Eugenius IV. Jan. 8, 1438, and thence to Florence Jan. 1439 on account of the plague. It was soon joined by the Byzantine emp. John Palæologus, with 700 followers, including the patriarchs of the Gr. Ch., the emp. hoping, by obtaining a union of the E. and Lat. chs., to gain the aid of the W. against the Turks. The council discussed principally the points of difference between the E. and W. chs.

Ferra'ri (GAUDENZIO), an It. painter, b. at Valdugia 1484. Studied in Rome under Raphael, whom he assisted in some of his works. His style of painting was impressive and grand. He studied the highest models, and entered into competition with the highest eminences—with no less a master than Titian. His best works are in Milan. D. in 1550.

Ferrari (GIUSEPPE), b. in Milan in 1811; studied law at Pavia, but devoted himself subsequently to lit.; was appointed prof. in 1840 at Rochefort, and afterward at Strasbourg; returned in 1859 to It., where he was successively made prof. in Turin, Milan, and Florence. His most remarkable works are *Filosofia della Rivoluzione*, *Histoire des Révolutions d'Italie*, and *Corso di Lezioni sugli Scrittori Politici Italiani*. D. July 2, 1876.

Fer'ret, the *Putorius furo*, a carnivorous mammal of the weasel family, so closely allied to the European polecat (*Putorius fœtidus*) that many regard it as merely a delicate albino variety of the latter. It breeds freely with the polecat, has red eyes, a white or yellowish fur, and is so tender that the winters of Eng. are too severe for it, unless well housed. It is half domesticated in Europe, but is probably of Afr. origin. It is much used in hunting rabbits and rats, but often has to be muzzled, or it will suck its victim's blood and leave the body in the burrow. It is fierce and treacherous, sometimes severely biting its master's hand.

Ferri'cyanides, a class of chemical compounds formed by the action of oxidizing agents upon ferrocyanides, from which an atom of the metal is extracted. The most important of these salts are the potassio-ferrous F. (soluble prussian blue) and Turnbull's blue (ferrous F.). Potassium F. is a delicate test for ferrous salts, and is invaluable in the laboratory.

Fer'rier (JAMES FREDERICK), a Scot. philos., b. in Edinburgh 1808; became prof. of hist. at Edinburgh Univ. 1842, and of moral philos. and political economy at St. Andrew's in 1845. Wrote *Institutes of Metaphysics*, and edited works of John Wilson, his father-in-law. D. June 11, 1864.

Fer'ries, Law Concerning. A ferry, according to the legal definition of the term, is a franchise or privilege created by governmental grant or by prescription, which authorizes the transportation of passengers and goods across streams and other bodies of water, giving a right to demand compensation by way of toll in return. In Eng. the grant is by the king's license; in the U. S., by statutory enactments in the several States. The right may, however, be derived from the supreme power indirectly through authority delegated to courts, commissioners, or municipalities to create such franchises. Without a grant, no one, not even the owner of both sides of a stream, is authorized in maintaining a public ferry. Ferry-proprietors are common carriers, invested with the same rights and subject to the same duties as other carriers. They must afford accommodation to the entire public, must exercise the same high degree of care as is obligatory upon all who engage in the business of transportation, and are responsible for damage to property wholly intrusted to them unless it be attributable to the act of God or the public enemy. This responsibility may, however, be modified by lawful agreement with the owner. And as passengers usually retain possession of their baggage or other property, while crossing a ferry, the ferry company's liability, therefore, is in consequence modified. Safe means of access to the ferry-boats must be provided, and every reasonable precaution taken to prevent injury. Even though property be under the care of an owner or driver during the transit, the ferry company will be liable for any negligence causing injury to it, unless the owner himself occasion the disaster by his own wrongful act or default.

GEORGE CHASE.

Fer'ris (ISAAC), D. D., LL.D., b. in New York Oct. 9, 1798, grad. at Columbia Coll. 1816; studied theol., and was licensed to preach 1820; held Reformed Dut. pastorates at New Brunswick, N. J., 1821-24; at Albany, N. Y., 1824-36; in the Market st. ch., New York, 1836-53; chancellor of the Univ. of New York City 1852-70, also prof. of moral science and Chr. evidences 1853-70, and acting prof. of constitutional and international law 1855-69. Was prominent in Sunday-school and mission work. Wrote *Home Made Happy*, *Memorial of Dr. Bethune*, etc. D. June 16, 1873.

Fer'ro, the smallest of the Canary Islands, in lat. 27° 45' N. and lon. 18° 7' W., with an area of 100 sq. m. and a pop. of 4387. As it is the most westerly isle of the archipelago, it was by anc. geographers considered the most westerly point of the world, and they drew through it the first meridian. Ger. geographers still adhere to this manner of reckoning lon., while the Eng. have adopted the meridian of Greenwich as the first meridian, but that of F. is the conventional line between the hemispheres.

Ferrocyanides, a class of chemical compounds formed

by uniting ferrous cyanide with some other cyanide. Thus, ferrous cyanide added to potassium cyanide gives F. of potassium (yellow prussiate of potash), an extremely valuable chemical reagent; useful also in pharmacy, and especially in dyeing and calico-printing. Refuse animal matters, iron-filings, and commercial potash are melted together, and the mass is poured into hot water, filtered, evaporated, and repeatedly crystallized; but several other processes have been invented. Ferric F. is commercial prussian blue.

Fer'rotype, a photograph taken on japanned sheet iron by collodion process. (See PHOTOGRAPHY.)

Ferry, fâ-fer' (JULES), Fr. advocate, journalist, and politician, b. at St. Dié, in the Vosges, Apr. 5, 1832; joined Paris bar 1851, and became connected with the *Gazette des Tribunaux*; obtained notoriety in 1868 by his attacks on Baron Haussmann's administration of the city of Paris; in 1869 was returned to the Corps Législatif, and in Sept. 1870 became a member of the govt. of the National Defence; minister of public instruction and fine arts 1879-80 and 1882; pres. of Council, 1880-81; prime minister and minister of public instruction, 1883.

Ferry (ORRIS SANFORD), U. S. Senator, b. in Bethel, Conn., Aug. 15, 1823, grad. at Yale 1844, admitted to the bar 1846; in 1849 judge of probate, State senator 1855 and 1856; in 1856-59 State atty. for Fairfield co.; M. C. 1859, col. and brig.-gen. of volunteers during the c. war; U. S. Senator 1867-73, and re-elected for a second term. D. Nov. 21, 1875.

Ferry (PAUL), a Fr. prot. divine, b. at Metz Feb. 24, 1591; was destined for the ministry, and ed. at the Huguenot sem. in Montauban. In 1612 took holy orders, and returned to his native place to become pastor of a congregation which he served until his death. He was distinguished for his eloquence and unbounded religious toleration, being surnamed THE PACIFACTOR. D. July 28, 1669.

Ferry (THOMAS W.), b. at Mackinaw, Mich., June 1, 1827; entered early upon a business life; sent to the State legislature in 1850, to the State senate in 1856; long an active member of the State Rep. committee; M. C. 1864-71, U. S. Senator 1871-83; chosen pres. *pro tem.* of the Senate, and became acting V. P. of the U. S. on the death of Henry Wilson, Nov. 22, 1875.

Ferry (WILLIAM M.), father of U. S. Senator T. W. Ferry, b. in Granby, Mass., Sept. 8, 1796, grad. at Union Coll. 1817; was a Presb. missionary at Mackinaw 1821-32, conducting a school for white and Indian children. His health failing, he purchased land near Lake Mich., founded a settlement which became the city of Grand Haven, engaged in the lumber manufacture, and became wealthy. D. Dec. 30, 1867.

Fertilization of Plants, the process by which the contents of 2 sexual cells are blended to form the starting-point in a new development. In flowering as well as flowerless plants the mechanism of reproduction is so complicated that some knowledge of vegetable physiology is necessary to its comprehension.

Fertilizers [Lat. *fertilis*, "productive," from *fero*, to "produce"]. The name *fertilizer* is applied to substances which enrich the soil with nutriment of plants. Agriculturists distinguish usually between home-made and artificial mineral or commercial F. The former consist mainly of the various refuse matters, animal and vegetable, incidental to the particular farm operations carried on. The latter include a large number of articles which are obtained elsewhere than from the farm. Lime, salt, saltpetre, oyster-shells, gypsum, and ground bones are among the more prominent commercial fertilizing substances.

Stable manure, ashes of plants, and various other means, as fallow and rotation of crops, irrigation, and drainage, etc., had been employed for ages in the interest of a successful fertilization of cultivated lands, yet no satisfactory explanation regarding their respective action was offered until quite recently. Without any knowledge of the nature of the previously mentioned important physiological processes peculiar to animal and vegetable life, not even an approximately correct appreciation could be entertained regarding the mutual dependency of plants and animals in the economy of farming. One of the most important services which the experimental sciences have rendered of late to practical agriculture consists in the elucidation of the fact that it is essential to a successful cultivation of the various crops to restore without delay to the soil those of its constituents which the crops have abstracted.

In comparing the ash-constituents of different plants it was noticed soon that certain mineral elements were present in a more or less conspicuous proportion in every plant. The gen. occurrence of these substances led ultimately to the quite natural assumption that their presence might be necessary for the performance of some physiological process of vegetable life. We have learned since that of all the substances which enter into the composition of plants, only potassium, calcium, magnesium, iron, sulphuric acid, phosphoric acid, and carbonic acid, beside some nitrogenous compounds, as ammonia or nitric acid, and water, are indispensable for their growth. To store the farm-lands with the largest possible amount of available essential mineral constituents of plants in particular has thus become the most important point of consideration in practical agriculture.

The selection of a F. is for economical reasons always made with reference to the nature and the amount of available plant-food in the soil under cultivation, and to the special requirements of the crops to be raised. Most of our home-made F. are of a compound nature, while the commercial or artificial F. supply usually but one or two articles. Stable manure, although the most complex of home-made F., cannot be considered a complete one as long as farmers sell a part of their produce. The commercial F. furnish excellent means to correct the composition of the stable manure obtained under any system of agricultural industry, and to make it a complete F. for the crops under cultivation. Bones, mineral phosphates, and superphosphates—the latter frequently mixed with nitrogenous animal matter, as

fish, blood, meat, etc., or ammonia compounds—have been for yrs. the main portion of commercial F. Phosphoric acid, lime, sulphuric acid, and nitrogen have thus for yrs. past been duly represented in the market, while potassa and magnesia were less attended to until of later yrs. Many of the artificial F. have acquired also an additional value on account of their special character, and thus their special action on the quality of various important crops for industrial purposes, as tobacco, sugar-beets, etc. [*Fromorig. art. in J. S. Unit. Ag.*, by PROF. CHARLES A. GOESSMANN, Phil. D.]

Fesch (JOSEPH, CARDINAL, a half-brother of the mother of the first Nap., b. at Ajaccio Jan. 3, 1763, was a com. attached to the Fr. army of It. 1795-99, abp. of Lyons Apr. 1802, ambassador to Rome and cardinal 1803, grand almoner and senator 1805, pres. of the Council of Paris 1811; exiled to Lyons for opposing Nap. 1811-14. D. May 13, 1839.

Festuca, a name applied to the numerous species of grass of the genus *Festuca*, which abound in most temperate regions of the globe. The sheep's F. and the field F. (*Festuca ovina* and *elatior*) are excellent pasture and forage grasses. Peru has the *Festuca quadridentata*, which is reputed poisonous to stock, perhaps from the growth of ergot in place of its seeds. The European F. are more numerous and important than the Amer. The celebrated tussock-grass of the Falkland Islands is a F.—*Festuca flabellata*.

Fessenden (FRANCIS, b. at Portland, Me., Mar. 18, 1839, grad. at Bowdoin 1858; studied law; was appointed cap. 19th U. S. Inf. May 14, 1861; wounded at Shiloh; col. of the 25th Me. Volunteers Oct. 1862 to Jan. 1863; in command of brigade in the battle of Chantilly, Va.; col. of the 30th Me. Volunteers in the battle of Sabine Cross-roads; commanded a brigade in battles of Pleasant Hill and Monett's Bluff, La., and lost a leg; brig.-gen. of volunteers May 1864; brevet maj.-gen. of volunteers, and brevet major, lieut.-col., col., and brig. and maj.-gen. U. S. A.; lieut.-col. 28th U. S. Inf.; retired Nov. 1, 1866.

Fessenden (SAMUEL), LL.D., b. at Fryeburg, Me., July 16, 1784, grad. at Dartmouth 1806; admitted to the bar in 1809, he practised at New Gloucester, Me.; was a member of the Mass. gen. court 1814-16, and of the senate 1818-19; removed to Portland, Me., in 1822, and was its rep. in the legislature 1825-26, also grand-master of the grand lodge of Masons in Me. He was the father of Hon. W. P. Fessenden. D. Mar. 13, 1869.

Fessenden (SAMUEL C.), a Congressman, b. in New Gloucester, Me., Mar. 7, 1815, grad. at Bowdoin 1834, and at the Bangor Theol. Sem. 1837. In 1838 became pastor of the Second Congl. ch. at Thomaston (now Rockland), Me. In 1856 he left that place and established the *Maine Evangelist*. In 1858 studied law, soon became judge of the municipal court, and was elected a rep. in the 37th Cong. In 1861 was appointed a member of the board of examiners of the U. S. Patent Office. D. Apr. 18, 1882.

Fessenden (T. A. D.) Congressman, b. at Portland, Me., Jan. 23, 1826, grad. at Bowdoin 1845; was aide-de-camp to the gov. of Me. 1858, and in 1860 a member of the legislature. In 1862 was chosen M. C. D. Sept. 28, 1868.

Fessenden (THOMAS GREEN), poet and agricultural writer, b. at Walpole, N. H., Apr. 22, 1771, grad. at Dartmouth 1796; studied law, but turned his attention to lit. In 1804 settled in Boston, publishing there, in 1806, *Democracy Unveiled*, a political poem, etc. Afterward edited the *Weekly Inspector* at New York. In 1812 practised law at Bellows Falls, Vt., removing to Brattleboro' in 1815, where he pub. *The Reporter*. From 1816 to 1822 he edited *The Intelligencer* at Bellows Falls, Vt. From that time until his death he pub. *The N. Eng. Farmer* at Boston, and edited *The Horticultural Register*. D. Nov. 11, 1837.

Fessenden (WILLIAM PITT), LL.D., statesman, b. at Bos-cawen, N. H., Oct. 16, 1806, grad. at Bowdoin 1823, admitted to the bar 1827; began the practice of his profession at Bridgeton, Me., removing 2 yrs. later to Portland, Me. Chosen to the State legislature in 1832, although the youngest member of that body, he attained distinction as a legislator and debater; was returned to the legislature in 1840, and in 1841-43 represented his dist. in Cong., where he made a brilliant record. During the yr. 1843 he received the Whig vote for U. S. Senator, but was defeated; was returned to the State legislature in 1845 and 1846, and again in 1853, when he was elected to the U. S. Senate as a Whig, though the legislature was Dem. Taking his seat Feb. 1854, he was placed upon the finance committee. Re-elected in 1859, he was made chairman of the finance committee, and throughout the c. war rendered valuable service by aiding the sec. of the treas. to maintain the national credit. In 1864, on the retirement of Mr. Chase from the secretaryship of the treas., he accepted that portfolio, and discharged the duties of the office during a most critical period of the nation's finances until Mar. 1865, when he resigned and resumed his seat in the Senate, to which he had been re-elected. On the conclusion of the impeachment trial of Pres. Johnson he cast his vote for acquittal. As a politician he began his career as an ardent Whig. He was one of the founders of the Rep. party, in which he became a recognized leader. As a lawyer he ranked among the first in his State, and in the supreme court of the U. S. made himself a national reputation. D. Sept. 8, 1869.

Fessler (IGNAZ AURELIUS), b. at Czörendorf, in Hungary, July 1756; was at first a Capuchin, but in 1791 became a Prot.; 1785-87 prof. of Oriental langs. at Lemberg, and in 1809 received the same chair at St. Petersburg, and afterward was a prominent Lutheran official in Rus. Wrote a *Hist. of Hungary* and an *Autobiography*. D. Dec. 15, 1839.

Festus. See FEAST, by REV. W. F. BRAND.

Festus (Gr. Φῆστος), (PORCIUS), procurator of Judæa, succeeded Antonius Felix about A. D. 60, while Nero was emp. On his arrival in his prov. he found the apostle Paul a prisoner, examined his case, refused to gratify the vindictive feelings of the Jews against him, and would have set him at liberty, but as the apostle had appealed to Cæsar (i. e. Nero), he sent him to Rome to lay his case before the

emp. D. about 2 yrs. after his appointment, and was succeeded by Albinus.

Festus (SEXTUS POMPEIUS), a Lat. grammarian and lexicographer of uncertain date, but after Martial (A. D. 100), from whom he quotes, and before Charisius and Macrobius (400 A. D.), who quote from him. No particulars of his life have come down to us apart from his connection with the great work of Flaccus Verrius, *De Significatu Verborum*. F. prepared an abridgment of this work, which he arranged under the letters of the alphabet into 20 books, following the order and authority of Flaccus, introducing additional matter from his other writings, but rejecting certain points, which he intended to treat of in *Præcursor Verborum cum exemplis*. This abridgment, *De Significatione Verborum*, caused no doubt the loss of the original work of Flaccus.

Fetials, or **Fetiales** [Lat. *fetiales*; etymology uncertain], a body of anc. Rom. priests who had charge of certain international affairs, acting as heralds in the announcement of war, and presiding over the solemnities attending the return of peace. They were chosen for life, and were called *patres patrati*. Their rites and regulations constituted a code known as the *Jus fetiale*.

Fetich [root in the Lat. *fatium*, but derived from the Port. *feitico*, meaning a "charm," "witchcraft," "magic"], a name given by the Port. discoverers to the objects worshipped by the degraded tribes of Senegal and Congo. A F. is not an idol, and is not properly a symbol, but is looked upon as the actual and visible dwelling-place of a preternatural power. It may be thus some fixed object of nature, as some lofty mt., a grove, or a tree; it may be an animal, as a snake, a snail, a crocodile, and often a sheep or a goat; or it may be any object on which the whim or the fancy has fixed, as the beak of a bird, the fin of a fish, the hoof of a quadruped, a stone, a block, a feather, a stick, a nail, or almost anything else that can be named. One thing will do about as well as another for a F., provided the worshipper can believe that his god resides therein; and this he is easily led to do in reference to anything which pleases or is useful to him. A F. is often worn about the person or hung up in the hut as a talisman, and is employed in the most disgusting rites of superstition and witchcraft. Fetichism shows the religious instinct in its lowest forms. J. H. SEELYE.

Fetid Gums, in pharmacy and med., are certain gummresins which are the concrete natural juices of umbelliferous plants. They have a strong, unpleasant odor, whence the name. Assafoetida, armoniacæ, galbanum, and saganapenum are the best known.

Fétis (FRANÇOIS JOSEPH), Belg. writer on music and biographer, b. at Mons Mar. 25, 1784; studied at the Conservatory of Paris 1800, was organist and prof. of singing at Douai 1813, director of the conservatory at Brussels 1833, member of the Acad. of Belg. 1845, musical executor of Meyerbeer, producing his *Africaine* 1864; officer of the Legion of Honor 1864, grand officer of the Order of Leopold 1869. Founded and edited the *Revue Musicale*; wrote *Universal Biography of Musicians* and *General Hist. of Music*. D. Mar. 27, 1871.

Feudal Sys.tem. The word *feudum*, from which *feudal* is derived, came into use in the 9th century, and displaced the earlier term *beneficium*, which denoted property given for use on certain conditions, the ownership of which did not pass over with the usufruct. *Feudum* is distinguished from *allodium*, or freehold property, as that which was held on condition of performing a service to the proper owner. The F. S. was that political form in which there was a chain or series of persons holding land, one from another, on condition of performing certain services, beginning with the serfs and lowest freemen, and ascending through *milites* or knights to the *arriere-vassals*, and thence to the immediate vassals of the *suzerain* or superior. Every successive member in the chain, from the *milites* or knights upward, was bound to his immediate superior, held land from him, took the oath of allegiance to him, and became his man or *liege-man*. The suzerains thus had no direct connection save with the great vassals, although they might retain some lands of their own. The effect of this separation of powers from the sovereign and their distribution among smaller fief-holders or vassals was a great disintegration which obstructed all national existence and unity for centuries.

As for the origin of the system, we may say that it cannot be accounted for by the Rom. military colonies on the borders toward Ger., nor by the relation of the *comites* or companions to the chief, which was not of a political nature. Under the first race of kings the Rom. usages were chiefly followed. The *comes* or count was both a civil and military ruler, without hereditary jurisdiction at first. He might own lands in the co., or might receive grants of them for life or on some other tenure from the king. It was under the second race of Frank kings that certain insts. grew up—new in some respects, but resembling older Germanic ones. These were *commendation* and *vassalage*, *beneficia* and the *beneficiary system*, *immunity* or *exemption*.

1. *Beneficia* (see above) at the beginning were grants of land in use, given by any one, as by the king or any layman or corporation ecclesiastical, and enjoyed by any one, as by the king, or a female, or a corporation, held for a short term of yrs. and revocable, which were called *precaria*. *Beneficia* terminated at first with the *grantor's* life, or the *grantee's*, but under the grandsons of Charlemagne had something more of the hereditary character. A sort of acknowledgment of the hereditary principle was made in the W. Franks' kingdom in 877 A. D. by Charles the Bald, but the principle was not then absolutely fixed. On a renewal of a grant money was sometimes demanded, which may have given rise to the subsequent *finer* or *relief*. The beneficiary acknowledged his obligation, in a declaration of readiness to comply with the benefactor's wishes. At this point the reception of benefices explains the origin of

2. *Vassality* or *commendation*, which was not a political but a *personal* tie. The latter word denotes a putting of one's

self under the protection of a superior, which was at first for various reasons; and various persons, lay or ecclesiastical, commended themselves to the king, to his great officers, etc. The person so commended was called a *vassus* or *vassallus* (our vassal), and was also called the *homo* (the man) of another, whence *homage*. The person receiving another into protection was called a *senior* (seignior) or *dominus*. The relation was confirmed by an oath and by putting the folded hands in the hands of the senior. The oath was taken in all the stages of vassalage, to the nearest superior; thus there was among inferior vassals no practical fidelity to the head of the state, or rather *there was no state*. *Beneficia* and vassalage had no necessary connection, but in time holders of benefices and but few others were vassals.

3. *Immunity* (*emunity*) or *exemption* was a third constituent element of the F. S.; one which developed itself somewhat later than the others, but was of them all the most politically important. The first shape in which immunity appears was relief from burdens on the land, and the first holders of benefices enjoying this right were ecclesiastical foundations. Only the king could grant this right at first, but afterward the high vassals acquired power to bestow it. Under Pepin and the next kings immunity appears in the form of excluding public officers from entering the lands of foundations, in order to levy peace-money, demand quarters, take securities, or hold judicial proceedings. The convent-land had this privilege first; or at least the oldest documents belong to them, although many charters of convent-land immunity are forged. This privilege, if granted to all secular holders of fiefs, would amount to a transfer of the king's direct public power, and this was naturally united with the small fief-holders' joining together by degrees under a larger vassal for common protection. Thus exemption from authority outside, as far as justice, police, and military headship were concerned, prevailed, and broke up kingdoms into all but fragments, denationalizing a large part of Europe.

These 3 causes, working together, produced the F. S. Public property distributed by kings or other holders of it created great proprietors, who finally became hereditary occupants of it. Vassalage joined these proprietors with one another—whether they were lay or ecclesiastical—and immunity conferred what we regard as state or public powers on the suzerain's vassals, and on their vassals also. The movements of feudalism were not all everywhere the same, but one land moved faster than others. In some lands, as Fr., there was little allodial property, so that the statement *Nulle terre sans seigneur* was nearly true in Fr., while in parts of N. Ger. there was a great amount of it. The fiefs again became hereditary at an early day in Fr. In Ger. the right of succession was silently acknowledged by the emp. Henry II. (1024-24) to the great vassals; but Conrad II. (1024-39) brought it about that the *arrière vassals* should have the same right against their *seigniors*, and effected a similar change in It., so far as his jurisdiction extended. The original non-hereditary nature of the fiefs was indicated by the fine called *relief*, which the heir of the last holder paid to the suzerain or the seignior on entering into possession, and by the *rachat* or sum paid for the right of selling the fief. In Fr. for some time most fiefs could not go to females, on the principle that they could not defend the land. In Fr. the fiefs were to a considerable extent indivisible; in Ger. the gen. rule was to divide them up among the male children of the fief-holder. If an unmarried daughter succeeded her father, she was under the superior's guardianship, and could not marry without his consent.

Our limits allow us to notice very briefly some important points connected with feudalism: 1. The ecclesiastical feudatories played a large part in some countries. The kings and these peaceful ch. nobles were natural allies against the unruly barons; but as the prince-bps. had a double relation, as members of the feudal kingdom and as dignitaries of the Ch., there might grow up a conflict of secular and religious authority. Some of the great struggles of the Middle Ages grew out of this source. 2. The complexity of the system was increased by the fact that every privilege could take the form of a fief. Thus great offices at court and that of count palatine, or king's assistant in administering justice, became hereditary. 3. The prin. duties of vassals were (a) service in war for a definite time (as 40 days), and with a certain fixed number of *milites* or horsemen and others. Such vassals were especially called *homines ligii* (*liegemen*, from *ligo*, Lat. to "obligate") if they were bound to serve through a war. Ordinary *homage* implied simply fidelity and neutrality. (b) *Justitia* was the obligation to appear at the lord's courts, where the gen. rule was trial by their peers for all classes of feudatories down to milites or knights. (c) Aids or *auxilia*, due by usage, as in Fr. and Eng., for redeeming the suzerain from captivity, for helping him at his daughter's or eldest daughter's marriage, and on behalf of his son when he became a knight.

Why did the F. S. fall? The causes were mainly 3: better law supplanting feudal law, derived at first from Rom. law at its revived study in It.; the cities under charters, which the great seigniors found it for their interest to grant. These masses of men hated the oppressive barons, and were the natural friends of the kings. The third cause was the new modes of warfare—cross-bow men, guns, cannon, and gunpowder, mercenary troops opposed to unwieldy mail-clad horsemen. Crécy (1346), Agincourt (1415), Granson, Morat (1476), were fields won by yeomen and peasants against the chivalry of the times. But underlying all these causes were the spread of knowledge by travel, by the rise of liberal professions, the revival of art, the wealth of citizens, a closer communication of minds in different lands, and other causes pertaining to the mediæval revival.

The F. S. had in it immense evils: it destroyed unity and cut up society, rested on serfdom, encouraged the lawlessness of the strong, prevented the spread of knowledge. But it had its good side—the sentiments of honor and fidel-

ity, courage and personal independence, and a respect for woman unknown to former civilizations. Trial by peers and taxation by the tax-payers' consent were among its important principles of a political kind. T. D. WOOLSEY.

Feuerbach, foh'-bakh (LUDWIG ANDREAS), the rep. of modern atheism in its earliest Ger. form, b. at Landshut, Silesia, July 28, 1804; went in 1822 to Heidelberg to study theol., but removed in 1824 to Berlin, where, under Hegel's auspices, he devoted himself exclusively to the study of philos. In 1828 he gave a course of lectures at the Univ. of Erlangen, and in 1844 another at the Univ. of Heidelberg. Meanwhile he developed a great activity in lit. and wrote, beside numerous minor essays in periodicals, *Thoughts on Death and Immortality*, *Hist. of Modern Philos.* from Bacon to Spinoza, *Das Wesen des Christenthums*, his chief works, etc. After 1844 he retired to a small v. in Franconia, where he lived, very poor and mostly occupied by practical employments, till his death, Sept. 12, 1872.

Feuillans [from *Feuillans*, near Toulouse], a name applied to certain congregations of reformed Cistercian monks and nuns. Jean de la Barrière, abbot of Feuillans, began the reform in 1567. It was approved by the pope in 1586 and 1587. Their first house in Paris was instituted in 1588. Their severe rule was mitigated in 1595. The congregation was divided in 1630 into that of Notre Dame de Feuillans and the reformed Bernardines (the latter Italian). Nuns were admitted to receive the rule of the F. in 1588. The nuns were first organized as a congregation in 1583 by Marguerite de Polastron. The F. were one of the numerous remote branches of the Benedictine order.

Feuillel, fuh-yä' (OCTAVE), Fr. litterateur, b. at St. Lô Aug. 11, 1812, ed. at the Coll. of Louis-le-Grand at Paris; entered upon his literary career in 1844 under the name of DESIRÉ HAZARD; has been a contributor to periodicals, and has written novels, dramas, and farces. Among his works are *La Nuit Terrible* and *Roman d'un Jeune Homme Pauvre*. In 1862 he was elected to fill the chair in the Fr. Acad. left vacant by the death of Eugène Scribe.

Fever [Lat. *febris*, allied to *ferveo*, to "glow," to "be hot"]. In distinction from other diseases, which, however grave or extended, are confined to certain organs, F. may be said to be a perversion of all the physiological functions. F. occurs in a great variety of forms and different degrees. The early symptoms are a sensation of gen. *malaise*, bodily and mental languor, headache, pains in the back and limbs, loss of appetite, accelerated pulse, and *chill*; after a certain length of time a sensation of *heat*, not merely felt by the patient himself, but also by others. The skin feels hot and dry, the pulse remains quick, but is fuller, the respiration is hurried and irregular, the gen. restlessness becomes very great, the thirst intense, the appetite is wholly lost, the tongue is coated with a whitish film, the mucous membrane of the mouth and throat is dry, the urine is scanty, of a deeper color but clear, and of a greater specific gravity. After this stage of dry heat there is profuse *sweating*, the dryness of the mouth and the thirst diminish, the respiration becomes deeper, more regular, and less frequent, the pulse soft. One symptom is never wanting in F. which can be measured with mathematical exactitude, which always keeps in true relation to the degree of the fever: it is the *increase of the temperature of the body as determined by the thermometer*. It varies from 98.5° F. (normal temperature of the body) to 108° F., or a little more (37.5° to 42° C.). There is no more certain and trustworthy guide to a correct judgment of the dangers threatening health and life from F. than the thermometer, and it is now universally adopted by the med. profession for diagnosis and prognosis in F.

F. are *idiopathic* (primary) and *symptomatic* (secondary). Idiopathic F. are also called *essential F.* All zymotic F. be they contagious or miasmatic, belong to this class. Symptomatic F. require a local disease as a preceding condition. Such are inflammatory, catarrhal, rheumatic, hectic F.; also all F. named after the organs whose diseased condition causes them—brain, lung, gastric, enteric F. Contagious and infectious F. are the result of peculiar substances which get into the circulation either from the air we breathe or in food and drink. Secondary F. are generated in a similar manner, the local diseases producing some substance which, absorbed, contaminates the blood in such a way that F. must follow. (The more important varieties of F. are described, with their treatment, under their alphabetical heads.) [From orig. art. in *J.'s Univ. Cyc.*, by E. KRACKOWIZER, M. D.]

Fever and Ague. See INTERMITTENT FEVER.

Fever Bush, the *Lindera Benzoin*, a shrub of the order Lauraceæ, common in the N. States. Decoctions of its bark and leaves have been used for aromatic and stimulant drinks in low fevers. Its berries afford a poor substitute for allspice. It is also called spice bush and benjamin tree.

Feverfew (i. e. "febrifuge"), the *Pyrethrum Parthenium*, a large perennial herb of the order Compositæ, resembling chamomile, and a native of Europe. It was formerly much used as a tonic and febrifuge, and forms the chief element of Persian insect powder.

Fewerwort, Wild Ipecac, Horse Gentian, or Tinker's Weed, a perennial herb of the U. S., the *Triosteum perfoliatum* of the order Caprifoliaceæ. Its root is used as a cathartic and emetic. A smaller species, *Triosteum angustifolium*, grows in the S. States.

Few (IGNATIUS A.), D. D., LL.D., b. in Augusta, Ga., Apr. 11, 1789, ed. at Princeton and New York, and studied law in Augusta; was col. during the war of 1812, and at its close resumed legal practice. He was at this time tainted with infidelity, but, becoming a Ch., he shortly after (1828) entered the ministry of the M. E. Ch. He was the founder and first pres. of Emory Coll., Oxford, Ga.; was distinguished in the highest councils of the Ch., and was an able defender of the S. in the Gen. Conference of 1844, when measures were adopted which led to the organization of the M. E. Ch. S. D. Nov. 28, 1845.

Few (WILLIAM), b. in Baltimore co., Md., June 8, 1748, removed in 1758 to Orange co., N. C., and to Ga. in 1776; was chosen to the State convention to form a const., as also to the assembly, and made one of the council; served as col. in the war of the Revolution; in 1778 became surveyor-gen., and also presiding judge of the Richmond co. court. From 1780 to 1783 was delegate to the old Cong., and also in 1786; a member of the national constitutional convention in 1787, and of those of the State of Ga. in 1796 and 1798; U. S. Senator from Ga. 1793-93, and then 3 yrs. on the bench. He removed to New York in 1799, and was in the State legislature, com. of loans, and mayor of the city. D. July 16, 1823.

Fez, Fes, or Fas, cap. of Morocco, numbers 150,000 inhabs., and is situated in lat. 34° 6' 3" N. and lon. 5° 1' 11" W., in a valley on the N. W. slope of the Atlas, surrounded by mts. on all sides except toward the S. Two rivers run through the city, changing their names whenever they change their course. F. consists of Old F. and New F., and these 2 parts of the city are 2 kilometres distant from each other, connected with 1 street only, which is densely set with houses. Old F. lies to the N., and its E. part rises with the slope; New F. lies to the S., wholly in the valley. The above-mentioned rivers unite between the 2 parts of the city, and run then through Old F., dividing it into an E. and a smaller W. part, which are connected with each other by 6 stone bridges. Both Old F. and New F. are surrounded with walls built of a mixture of clay, lime, and cement; only the gates are framed with stone. At each 350 metres rises a quadrangular tower constructed to hold cannon. F. makes a gloomy impression, as the streets are very narrow, the public squares very small, and the houses 2 or 3 stories high, without presenting any windows to the street. Pavement does not exist, whence an immense dust in the summer and deep mud in the winter. The interiors of the houses are often very handsome, the yards being paved with marble and the walls and ceilings of the rooms covered with light colors. The palace of the sultan of Morocco comprises the whole S. W. part of New F. This gigantic palace consists of many large yards provided with arcades and surrounded with buildings. Among the remarkable buildings are also the mosques of Karubin and El Mulei Edris. The former is of immense dimensions, and rests on about 800 columns. F. has 11 mosques of importance, beside a great number of smaller ones. The city has a considerable trade with Marseilles, Gibraltar, Cadiz, and Lisbon. Raw and manufactured silk, cotton, cloth, paper, arms, tea, sugar, and spices are imported from Europe. Tanning, weaving, and pottery are the prin. manufactures of the country, and form the exports. The inhabs. are a mixed race of Arabs and Berbers, ugly, very uncleanly, and fanatical in religion. [From orig. art. in *J's Univ. Cyc.*, by CAPT. A. NIEMANN.]

Fezzan' [the anc. *Phasiania*], a kingdom of N. Afr., bounded N. by Tripoli, and on the other sides by the Sahara. The N. part is covered with bare hills of sandstone, without rivers, and almost without vegetation. The S. part is level, often consisting of dry sand. Only $\frac{1}{10}$ of the soil is cultivable. The inhabs., whose number is estimated at about 50,000, are a mixed race of Berbers, Turicks, Arabs, and negroes. They are governed by a sultan, who pays a tribute to the viceroy or *vady* of Tripoli. Moorzook is the cap, and the rendezvous for the caravans coming from Cairo, Tripoli, and Timbuctoo.

Fibre [Lat. *fibra*, a "filament"]. Man has for ages availed himself of the filamentous character of various parts of plants to make clothing, domestic utensils, parts of instruments of the chase, and shelter for himself and his possessions. The animal kingdom has also been laid under contribution from the earliest times, and even the mineral kingdom contributes, in the substance known as asbestos, a F.—in the gen. sense of the word—which has various uses in the arts. The minute characteristics of the principal vegetable F., and the points on which their value depends, are most conveniently studied by grouping them under 1 subject. Anatomically considered, vegetable F. may be referred to 3 different sources—viz. (1) plant-hairs, (2) fibro-vascular bundles, or (3) the separate constituents of the latter. (1) The important plant-hairs employed for textile purposes are the long, single cells which are attached to the seeds of certain species of *Gossypium* (cotton). (2) Fibro-vascular bundles are obtained from the stems of endogenous plants, and consist chiefly of long bast-cells, with an admixture of spiral ducts (e.g. *Manilla* hemp). (3) The prin. elements of fibro-vascular bundles of exogens—viz. bast-cells and woody tissue—are used separately as F. for spinning or for paper-making (e.g. flax and poplar-wood). These structures are cells of different shapes, sizes, and thickness of wall. [From orig. art. in *J's Univ. Cyc.*, by PROF. E. M. SCHAEFFER, M. D.]

Ficherelli, or Ficarella (FELICE), b. at San Gimignano, Tuscany, about 1605; studied painting under Empoli, and became the friend and imitator of Cristofano Allori. He was an admirable copyist of Perugino and Andrea del Sarto, and his original works, now become rare and valued, are very delicately executed, excelling especially in the heads, which are very pleasing. His style is simple and natural. D. in 1660.

Fichet, fe-shā' (GUILLAUME), b. at Anunay, near Paris, Fr., early in the 15th century; was in 1467 rector of the Univ. of Paris, teaching at the same time rhetoric, theol., and philos. He was employed by Louis XI. in making peace with the duke of Burgundy, and was the patron by whose influence the first printing-press was brought from Ger. and set up in the Sorbonne at Paris. Among the first books printed in Fr. were his *Rhetoricorum Libri tres* and *Epistola*, in Parisianum Sorbona. He afterward held office at the papal court of Sixtus IV. The date of his death is unknown.

Fichte, fik'teh (IMMANUEL HERMANN), son of the great Fichte, b. at Jena July 18, 1797, ed. at Berlin, where he studied philology. He was early attracted to philos., however, especially by the ideas of his father, and made a comprehensive study of his hist. He spent the earlier part of his

life as a teacher, but in 1836 he was appointed prof. of philos. at the Univ. of Bonn, and from 1842 to 1855 occupied the same office at the Univ. of Tübingen. The most important of his works are *System der Ethik*, *Anthropologie neubegründet auf naturwissenschaftlichen Weg*, and *Psychologie als Lehr- und bewussten Geiste des Menschen*. He has also written on politics, *Grundzüge zur Entwicklung der künftigen deutschen Reichsverfassung*, and on theol., *Die speculative Theologie*. He taught that the world was created by God; became a convert to Spiritualism. D. Aug. 13, 1879.

Fichte (JOHANN GOTTLIEB), the second of the 4 greatest philos. of Ger., b. at Rammenau, Upper Lusatia, May 19, 1762. He was of Swe. descent, and his father was a ribbon-weaver. He studied theol. at Jena and Leipsic, and in 1790 began the study of the Kantian critiques. On a visit to Kant he presented as his letter of introduction the MS. of a *Critique of all Revelation*, a work composed in 5 days. He married a niece of the poet Klöpstock, and in 1794 he was called to the chair of philos. in Jena, to succeed Reinhold, and there elaborated the great central work of his system, in which he attempted to demonstrate the basis of the Kantian system by an *Analysis of Consciousness*. His *Science of Knowledge* (*Wissenschaftslehre*) appeared in 1794. Being dismissed from his professorship at Jena, he went to Berlin (1799), and there pub. several eloquent popular expositions of his system, the most prominent of which are the *Destination of Man* (1800), *The Sun-clear Report to the Public upon the True Nature of the Latest Philos.*—an Attempt to Force the Reader to an Understanding of it (1801), *The Way to the Blessed Life* (1806). An outline of the philos. of hist. appears in his *Characteristics of the Present Age* (1806). In his *Addresses to the Ger. Nation* he took a bold, patriotic stand against Nap. (1808). He became rector of the Univ. of Berlin upon its establishment, and exerted a powerful influence upon its const. D. Jan. 27, 1814.

F.'s complete works were collected and edited in 8 vols. by his son in 1845-46. Eng. translations have been made as follows: *The Life of Fichte* and his popular writings, including *The Nature of the Scholar*, *The Vocation of the Scholar*, *The Destination of Man*, *Characteristics of the Present Age*, *Way towards the Blessed Life*, *Outlines of the Doctrine of Knowledge*, were pub. in Lond., translated by William Smith. *The Destination of Man* was also translated by Mrs. Percy Sinnett (Lond.), and a portion of it by one of the contributors to *Hedge's Ger. Prose Writers* (New York). *The Science of Knowledge* (ed. of 1794) and *Science of Rights* were translated by A. E. Kroeger (Phila.). In the *Journal of Speculative Philos.* (St. Louis) have appeared (a) *The Introduction to the Science of Knowledge* (ed. of 1794), (b) *Criticism of Philosophical Systems*, (c) *Sun-clear Statement*, (d) *New Exposition of the Science of Knowledge*, (e) *Facts of Consciousness*. (See KANT, SCHELLING, HEGEL, and PHILOS., HIST. OF.) WILLIAM T. HARRIS.

Ficino, fe-chee'no (MARSILIO), [Lat. *Ficinus*], the reviver of Platonic philos. in It., b. in Florence Oct. 19, 1433, and d. at Careggi Oct. 1, 1489; selected and carefully edited by Cosimo de' Medici with a view to place him at the head of a proposed acad. (founded in 1460) for the cultivation and dissemination of Platonic philos. He translated into Lat. the entire works of Plato (1484) and Plotinus (1492), accompanying them with a more or less complete commentary. Beside these he made translations of many of the works of Proclus, Iamblichus, Porphyry, Dionysius Areopagita, Hermes Trismegistus, Alcinous, Speusippus, and Xenocrates.

Fiction, in law, in its ordinary meaning, is an assumption that a thing is true which is either not true, or which is as probably false as true. Mr. Best, an author on *Presumptions*, distinguishes it from a presumption, a mere rule of law established for the purpose of reaching a certain conclusion, though it may be arbitrary, which is based on public convenience or on the difficulty of arriving at the exact truth. Thus, the rule that a child under 7 yrs. of age cannot commit a felonious crime is a conclusive presumption rather than a F. Some writers—as e.g. Mr. Maine (see his work on *Ancient Law*)—use the word "fiction" in a broader sense, to signify any assumption which conceals, or affects to conceal, the fact that a rule of law has undergone alteration, its letter remaining unchanged while its operation is being modified. From this point of view F. is a powerful agency in the improvement of law. By means of it new views more adapted to the age are introduced under color of observance of anc. forms. Attempts have been made by various writers to classify F., but without much practical success. They are said to be limited by 3 prin. rules: 1. The F. must have the semblance of truth: that which is impossible is not to be feigned. 2. It shall not be allowed to work an injury. 3. It is only to be resorted to to accomplish the end for which it was introduced. To that extent it cannot be contradicted; beyond that it may be impugned. "The law," says Gould, J., in *Lord Raymond's Reports*, 516, 517, "does not love that rights should be destroyed, but, on the contrary, for the supporting of them invents notions and fictions." When they are urged to an intent and purpose not within their reason and policy, a party injuriously affected by them may show the truth. T. W. DWIGHT.

Ficus [Lat., a "fig"]. The genus *Ficus* belongs to the Artocarpaceæ, or bread-fruit family, in which it is associated with the bread-fruit of the Pacific, the jack of the Indian Archipelago, the mulberry, the Osage orange of our own country, and the notorious upset tree of Java. The common fig tree (*F. carica*) is the most valued representative of this genus; it is a deciduous tree, attaining to a height of from 15 to 30 ft., and often living to a great age. The fig itself is a multiple fruit formed from monœcious flowers aggregated together in the interior of a hollow fleshy receptacle. Figs are highly prized in the fresh state, but they are more generally esteemed in the dried condition, in which state they form an important article of commerce from the Mediterranean, and especially from Tur. They are dried in the sun, and containing a large amount of grape-sugar, this in the process of drying serves to preserve them. Many trees of the family yield a remarkable milky

juice, which, inspissated, forms the caoutchouc of commerce. The original India-rubber plant, or *F. elastica*, of Java, is one of these. The celebrated banyan tree (*F. Indica*) of India yields the well known resin gum-lac. Several *Fici* have poisonous qualities. One of the most remarkable species is the peepul or bo tree. E. C. H. DAX.

Fides [Lat. "faith"], in the religious system of anc. Rome, was the personification of good faith, represented as a venerable matron crowned with laurel or olive, and carrying corn and fruits. *F. Publica* had a temple on the Capitoline, built by Numa.

Field (CYRUS WEST), LL.D., a son of Rev. David D. Field, D. D., b. at Stockbridge, Mass., Nov. 30, 1819, became a clerk in New York, and was soon the head of a prosperous mercantile business. In 1854 he obtained from the legislature of Newfoundland the exclusive right for 50 yrs. of landing telegraph cables from Europe and Amer. on that island; formed a company for that purpose, and in 2 yrs. the lines were finished from New York across Newfoundland. In 1856 he went to Lond. and organized the Atlantic Telegraph Co., the U. S. and Brit. govts. furnishing ships for the enterprise. The first 2 attempts failed, and the third cable, though laid (1858), worked only for a short time. The war prevented the renewal of the enterprise until 1865, when, after 1200 m. had been laid, the cable parted, and was lost for the time. In 1866 a cable was successfully laid, and the cable of 1865 was picked up in mid-ocean and completed. He has subsequently been engaged in large enterprises, among which is the construction of elevated R. Rs. in the streets of New York. In 1881, shortly after the shooting of Pres. Garfield, he originated a subscription for the benefit of the family, which after the death of the Pres. amounted to more than \$350,000.

Field (DAVID DUDLEY), D. D., a clergyman, b. at East Guilford, Conn., May 20, 1781, grad. at Yale 1802; was settled at Haddam, Conn., 1804-18, at Stockbridge, Mass., 1819-37, then at the same ch. as before in Haddam 1837-51, when he returned to Stockbridge. Wrote *Hist. of Middlesex Co., Conn.*, and *Hist. of Berkshire Co., Mass.* D. Apr. 15, 1867.

Field (DAVID DUDLEY), LL.D., jurist, eldest son of preceding, b. at Haddam, Conn., Feb. 13, 1805, entered Williams Coll. 1821, studied law, and was admitted to the bar 1828; settled in New York, and soon made his way into the front rank of his profession. But finding the practice of the law complicated, dilatory, and expensive, he began to study how it could be revised and improved. In 1839 he pub. his first essay on the subject, and in 1847 was appointed by the legislature of N. Y. one of a commission to reform the practice of the State. Upon this work he was engaged for 2 yrs., and the result was contained in 2 codes of procedure, the one civil and the other criminal. The civil code was in great part adopted by the State of N. Y., and has since been adopted by 23 States and Terrs. Subsequently he was placed by the State of N. Y. at the head of a new commission to undertake a complete codification of the whole body of the law. This was a work of yrs., but in due time the commission reported a civil code, a penal code, and a political code. These 5 codes covered the whole province of Amer. law, both common and statute, and were designed to supersede the unwritten or common law. In this work Mr. F. was engaged nearly a quarter of a century, carrying it on at the same time with a large professional practice. In 1867 he brought before the Brit. Association for Social Science a proposition to frame an international code. This led to the preparation by him of what was really a complete work on international law, though entitled *Draft Outlines of an International Code*, one feature of which was the principle of arbitration to settle disputes between nations.

Field (FREDERICK), Eng. clergyman, b. about 1800, ed. at Trinity Coll., Cambridge, graduating in 1823. He has edited the Gr. text of St. Chrysostom's *Homilies on St. Matthew*, *Interpretation of the Pauline Epistles*, and the Septuagint version of the O. T. according to the Alexandrian Codex. In 1842 he was presented to the rectory of Reepham, Norfolk; resigned in 1863, and has since edited Origen's *Hexapla*.

Field (HENRY MARTYN), D. D., a son of Rev. David D. Field, D. D., b. at Stockbridge, Mass., Apr. 3, 1822, grad. at Williams Coll. 1838. Took charge of a ch. in St. Louis (1842-47); resigned and went to Europe. In 1851 was settled at W. Springfield, Mass., in 1854 became ed. of *N. Y. Evangelist*, and in 1875-76 made a tour around the world. Wrote *From Egypt to Japan*; made a second visit to the E. in 1882, and wrote *On the Desert* (1883) and *Among the Holy Hills* (1884).

Field (KATE), b. in St. Louis, Mo., ed. in Mass. and in Europe, where she enjoyed the friendship of Walter Savage Landor in his later yrs. at Florence; was European correspondent for several journals; contributed to periodicals, delivered lectures, and in 1874 appeared on the stage.

Field (MAUNSELL BRADHURST), a lawyer, b. in New York Mar. 26, 1822, grad. at Yale 1841, admitted to the bar 1847; in 1854 acted as sec. to the Amer. legation in Fr., and subsequently became attached to the Sp. legation. In 1855 was appointed pres. of the Amer. coms. to the Universal Exposition at Paris; deputy sub-treasurer of the U. S. in New York 1861, and subsequently assistant sec. of the treas. at Wash., which office he resigned in 1865, and was appointed a collector of internal revenue, which office he held 4 yrs. In 1869 he resigned and resumed the practice of law in New York; appointed judge of the civil court 1873. Wrote a vol. of *Personal Recollections*. D. Jan. 24, 1875.

Field (RICHARD STOCKTON), LL.D., a judge, b. at Whitehall, N. J., Dec. 31, 1803, grad. at the College of N. J. 1821; was prof. in the N. J. Law School 1847-55; for a long time atty.-gen. of N. J.; U. S. Senator in 1862-63, in place of J. R. Thompson, deceased, and then judge of the dist. court of the U. S. for N. J. D. May 25, 1870.

Field (STEPHEN JOHNSON), a judge of the supreme court of the U. S., a son of Rev. David D. Field, D. D., b. at Had-

dam, Conn., Nov. 4, 1816, grad. at Williams Coll. 1837; studied law with his brother in New York; went to Cal. in 1849; in Jan. 1850 was elected first alcalde of Marysville; in Oct. was elected to the legislature; in 1857 was elected judge of the supreme court of the State, and in 1859 became chief justice; in 1863 was appointed associate justice of the supreme court of the U. S. In 1873 he was appointed by the gov. one of a commission to examine the codes of the State, and to prepare amendments to the same. In 1880 he was prominently before the National Democratic Convention as a candidate for the Presidency.

Fieldfare, or **Gray Thrush** (*Arreosophsus pilaris*), an oscine bird of Europe. It is brownish above, with the head and wings gray; below yellowish, with black spots.

Field-glass, a form of magnifying apparatus which is essentially a telescope of low power. It may have a single tube like the spy-glass, or two like an opera glass.

Fielding (HENRY), an Eng. dramatist and novelist, b. at Sharpsham Park, near Glastonbury, Apr. 22, 1707. Being destined for the law, he was sent at 18 to the Univ. of Leyden, where he remained 2 yrs., when his father became unable to support him, and he returned to Eng. He wrote a comedy, *Love in Several Masques*, which appeared in 1728, and was favorably received; this was followed within 9 yrs. by 23 other pieces, of which only 1 was decidedly successful. In 1735 he married, succeeded to a small estate, which he spent, and again had recourse to lit., with some success. In 1740 he was called to the bar; in 1742 appeared his first novel, *The Adventures of Joseph Andrews*, which was regarded as the best work of Eng. fiction that had appeared. This was followed by other productions, among which is the far from pleasant *Hist. of Jonathan Wild*. After starting 2 political journals, he was in 1748 appointed justice of the peace for Middlesex and Westminster, the duties of the office being performed with great ability. In 1749 appeared his greatest work, the *Hist. of Tom Jones*, and in 1751 *Amelia*, his last novel. Subsequently he wrote several law reports. In June 1754 he went to Lisbon for his health, and d. there, Oct. 8, 1754.

Fielding (Rev. J. H.), b. in Coleraine, Ire., Feb. 28, 1796, came to the U. S. in his 18th yr.; in 1819 was licensed to preach; in 1826 became prof. of math. in Madison Coll., Pa., where he remained 5 yrs.; then spent 2 yrs. in the chair of math. in Augusta Coll., Ky.; in 1835 accepted the presidency of St. Charles Coll., Mo., and discharged the duties of that office with signal success. D. Oct. 14, 1844.

Field Mice, a name applied to those mice which live out of doors and do not frequent houses, but given especially to the *Arvicoline*, of which there are many species in the U. S. and Europe. These mice are in some yrs. extremely destructive to crops and trees.

Fields (JAMES THOMAS), A. M., author and pub., b. at Portsmouth, N. H., Dec. 31, 1817; read an anniversary poem before the Boston Mercantile Library Association in his 18th yr., and in 1848 another poem, *The Post of Honor*, before the same society. He was a member of the publishing firm of Ticknor, Reed & Fields, Ticknor & Fields, and Fields, Osgood & Co. for 25 yrs. up to Jan. 1871, and edited the *Atlantic Monthly* from 1862 to 1870. He printed for private distribution several vols. of *Poems*, delivered public lectures, and wrote *Yesterdays with Authors*. D. Apr. 24, 1881.

Field-works. See FORTIFICATIONS.

Fiesole, fe-á-so-la, da (FRA GIOVANNI), an It. painter, commonly called ANGELICO, and sometimes IL BEATO, from the character of his art. Was b. at Vicchio, among the Apennines, in the prov. of Mugello, in 1387. Of his youth nothing is known. At the age of 20 he entered the religious order of St. Dominic, and then changed his original name (Guido) for that of Giovanni, a name of sanctity in the order. His first yrs. were passed in the convent at Foligno, not far from Perugia and Assisi, famous places both of art and piety. The plague drove him to Cortona about 1413, where he stayed 4 or 5 yrs. Then he returned to Fiesole, his spiritual birthplace and the home of his best yrs. Here and in Florence his greatest work was done. The last 10 yrs. of his life (1445-55) were spent by the pope's desire in Rome, where he d. Feb. 18, 1455. Was buried in the ch. of Santa Maria sopra Minerva, where his monument, with its quaint epitaph and the effigy of the painter in his monastic habit, is still to be seen.

The works of Fra Angelico are numerous, most of them small panel-pictures executed for convents. Traces of them are in every place where he lived. The chs., chapels, and convents of Florence were enriched by his masterpieces, the best of which are now in the Acad. of Fine Arts there. His paintings were in great demand, for in his prime he was regarded as the most famous artist in It. The best preserved of Angelico's work is in the convent of San Marco at Florence. Fra Angelico founded no school, imitation of him being impossible. His disciples fell away from his purity into love of external form and decoration. He left no peer, and was followed by no successor; his works stand alone. The best *Life of Fra Angelico* is by E. CARTIER, translated from the Fr. and pub. in Lond. O. B. FROTHINGHAM.

Fifth-Monarchy Men, a small religious sect in Eng. during Cromwell's protectorate and the first part of the reign of Charles II. They professed to believe that the time was near at hand when, to the 4 great monarchies of Daniel's prophetic vision, was to succeed the fifth, which was to break in pieces all others and to "stand forever."

Fig [Fr. *figue*; Lat. *ficus*], the fruit of *Ficus carica*, L., a deciduous tree of the bread-fruit family, a native of Asia from Syria to the Caucasus and Koordistan. In the Scriptures the fig tree is often mentioned, along with the vine, as a symbol of peace and plenty. Although unknown in Gr. during the Homeric age, it was common in the time of Plato; it was early introduced into It., and thence into Sp. and Gaul. Charlemagne ordered its cultivation in Central Europe, and it is now cultivated in most warm temperate climates. F. can be well ripened, and can be raised for

preservation in the dried state, only where the summer and autumn are warm and dry. In the Atlantic U. S. the main obstacle to their cultivation is the cold of winter, which frequently destroys unprotected trees even in Fla. On the Pacific coast they find a more congenial climate. The F. tree bears 2 crops in a season—an earlier one from the axils of leaves of the preceding growth; a later and longer continued one from the axils of the leaves of the season. The F. is popularly said to fruit without flowering. This comes from the nature of this particular fruit. It is a hollow, pear-shaped receptacle, nearly closed or barely pervious at the broad apex, lined throughout the interior with innumerable small flowers, male and female. The so called seeds are the ripened achenia (*i. e.* seed-like fruits) of the latter: the luscious pulp mainly belongs to the ripened and softened receptacle or hollow flower-stalk. In ripening, the acrid milky sap characteristic of the family is replaced by saccharine matter, chiefly grape-sugar. Smyrna is the prin. mart whence dried F. are exported to N. Europe and Amer. Dried F. are said by the dealers to be *natural* when not compressed in the packing, but retaining their original shape, or *pulled* when after drying they are made supple by kneading, and packed by pressure in drums or boxes. *Eleme* F. are those of superior quality, so called from a Tur. word meaning "hand-picked." ASA GRAY.

Fighting-Fish, the *Betta pugnax*, a little fresh-water fish of Siam, etc., of the family Anabantidae. Two of these fishes placed in the same vessel of water will attack each other with the utmost fury.

Figuer, fe-ge-a' (GUILLAUME LOUIS), Fr. chemist and scientific writer, b. at Montpellier Feb. 15, 1819; became M. D. 1841, prof. in the school of pharmacy at Montpellier 1846, then scientific ed. of *La Presse* at Paris. Has written largely in scientific journals, and prepared several popular scientific works.

Figure, Grammatical and Rhetorical, a distinction of great importance in the logical construction of figurative lang.—a subject on which there is an extraordinary amount of confused thinking. The grammatical F. rests upon a *real* relation of the subject and predicate. "My Milton is in 4 vols." involves a F. or form of speech departing from strict literalness; but it is a grammatical F., for the relation on which it rests is real, objective, and undeniable; it is, according to the letter, the gram., and hence has been styled the grammatical. Milton is literally the author of the works contained in the vols. The 2 great grammatical F. are metonymy and synecdoche. They may be at home in the plainest and most commonplace prose—in the lang. of a will or of an advertisement. The rhetorical F. rests upon an ideal or an idealized relation between the subject and predicate. The mind makes it, and can unmake it; it can exist to one mind, and be denied by another; it may be conceded by the mind at one time and in one state, and denied at another time. "Milton is an eagle" involves a metaphor, which is the chief rhetorical F. The relation is ideal; it may be denied; or the mind may allow it at one time and deny it at another. Some of the most confused and persistent logomachies have arisen from failing to observe this distinction. C. P. KRAUTH.

Figures, Numerals. See NUMERALS.

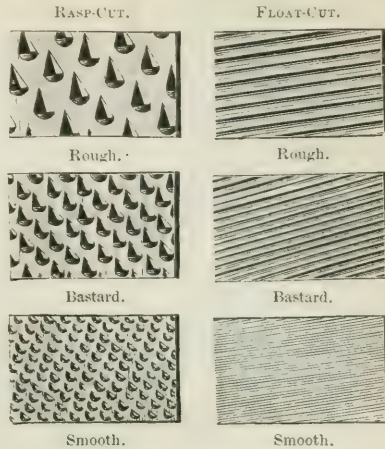
Figwort (*Scrophularia*), a flowering plant of the order Scrophulariaceae, common in many parts of N. Amer. and Europe. It was formerly prized in med. for the cure of scrofula and other diseases, but is now not much used.

Fiji, Fidji, or Viti Islands, a group in S. Pacific, between lat. 15° 30' and 20° 30' S., and lon. 177° E. and 178° W., numbering about 200 islands, of which about 80 are inhabited. They were discovered in 1643 by the Dut. navigator Tasman, but not fully explored until 1840, when they were visited by the Amer. navigator Wilkes. The 2 largest islands are Viti Levu, having an area of 90 m. by 50, and an estimated pop. of 50,000; and Vanua Levu, with about 30,000; the others are small. The F. I. are of volcanic origin; earthquakes are common and hurricanes periodical. The soil is exceedingly fertile, and the moist and hot climate, the temperature ranging from 69° to 120°, calls forth a most luxuriant vegetation, consisting of bread-fruit trees, bananas, cocoa-nuts, sugar-canes, and tea-plants; cotton grows wild. The inhabs. were a most fierce and savage race, middle-sized, strong-limbed, short-necked, with a complexion between copper-color and black. They live in tribes, each tribe being governed by its own chief, who rules absolutely. Lately, however, the efforts of Chr. missionaries have been followed with success, and in 1861 the king and chiefs of Viti Levu formally offered the island to G. Brit., which offer was accepted in 1874, when the Brit. flag was first hoisted on F. soil. The pop. of the islands is 128,511, some of the smaller islands being exceedingly populous. It was formerly true to call the islanders cannibals, but it is not true now. This was the case when the Wesleyan missionaries went there in 1835, but now more than half the whole native pop. regularly attend ch. on the Sabbath. There are 22,223 ch.-members, 663 native preachers of the gospel, and 1524 day schools, attended by 57,067 children; the barbarities, crimes, and vices of their former state have within a few yrs. greatly lessened.

Filbert [etymology doubtful; believed to be *full-beard*; Ger. *Bartnuss*, "beard-nut"], the nut of the hazel. The name is not often applied to the Amer. wild hazel-nuts; and in commerce the round varieties of European hazel-nuts are called cob-nuts, the name *filbert* strictly belonging to the elongated sorts. F. are chiefly the product of *Corylus Avellana*, the common hazel of Europe and Asia, which is extensively cultivated.

File [Fr. *lime*; Ger. *Feile*]. A F. is a tool consisting of a bar of steel, the size and shape of which are determined by the use for which it is intended. Its surfaces are covered with sharp cutting edges or teeth, the direction, number, and size of which depend upon the effect to be produced. The cutting edges or teeth are usually made by the

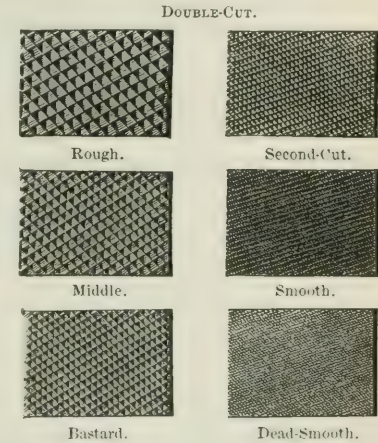
edge of a cold-chisel. Where the surface has isolated sharp teeth separated by comparatively wide spaces the F. is called a *rasp*. The teeth of the rasp are made with a punch having a pyramidal point. The forms given to F., as well as their shapes and sizes, are almost numberless. Those which have cutting edges extending unbroken from side to side are called "floats" or "single-cut" F. Those which



have 2 sets of such edges, crossing each other at an angle, are called "double-cut."

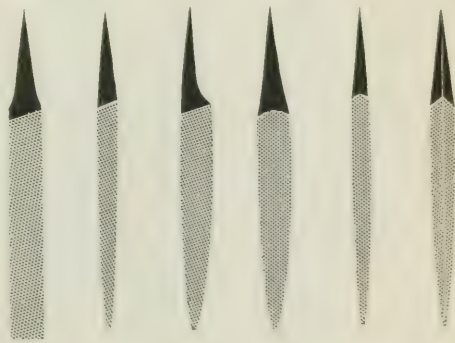
The coarseness or fineness of the F. is known by the trade-terms: 1, rough; 2, middle-cut; 3, bastard; 4, second-cut; 5, smooth; 6, superfine or dead-smooth.

Watchmakers' F. are often exceedingly delicate, meas-



uring less than an inch in length, and having a thickness not greatly exceeding that of a coarse bristle. Mechs. and machinists require F. from 6 to 18 inches in length, and for special purposes double these sizes. The shape of the cross-section of the F. is usually either that of a square, a parallelogram, a circle, an oval, a triangle, or a combination of straight lines and arcs of circles. Each kind has a special technical name—usually more than one. We give only the

FIG. 1. FIG. 2. FIG. 3. FIG. 4. FIG. 5. FIG. 6.



most distinctive names. Fig. 1 represents the "parallel hand F." Fig. 2 represents the "square" F., which is often, as is the case with all other forms of section, made with parallel sides. Fig. 3 is the "knife" F. Fig. 4 exhibits the "half-round" F., the section of which, as seen, is not a com-

plete semicircle. Fig. 5 is the "round" F. If of small size it is called, when tapering, a "rat-tail" F. Fig. 6 is the triangular F., often called a "three-square" F. Fig. 7 resembles Fig. 1, but is thinner. Fig. 8 is the "cross" or "double half-round" F., the two sides usually having different curvatures. Fig. 9 is the "slitting" F., having 2 knife edges. "Equalling" F. are flat and thin. They are always uniform in thickness, and usually in width. "Kifflers" or "bent" F. are shown in Fig. 10, and have usually curved surfaces. They are used by sculptors and by makers of ornamental castings. They are double-cut, single-cut, or rasp-cut, and of various degrees of fineness, as required for different kinds of work. The common kinds of F. are frequently bent for convenience in working upon curved surfaces.

The tapering end of the F. outside the shoulder, and upon which the handle is driven, is called the "tang" or shank. The handle is usually driven upon the tang. It sometimes happens that the F.-handle interferes with the use of the F. In such cases the

FIG. 10.



tang is bent or a "holder" is used, as seen in Figs. 11 and 12.

F. are usually made of the best material and are forged into shape in a similar manner to all small work in steel, the smith taking care not to work the metal at a higher than a blood-red heat. Peculiar shapes are produced in dies or formers. The blanks are very thoroughly annealed after having been forged, and are next ground into the exact shape demanded and sent to the F.-cutter.

F.-cutting is usually performed by hand. The tools of the F.-cutter consist of peculiarly shaped hammers and chisels, an anvil, and packing pieces of lead or pewter. The

FIG. 12.



hammers weigh from 1 to 5 or 6 lbs. In striking a blow the hammer is pulled toward the workman as it descends, the mass taking a direction approximating to that of the inclination of the chisel, which is short and light, nearly a triangle in form, with a broad, straight edge, and is held between the finger and thumb of the left hand. The F.-blank is placed upon the anvil, where it is held by a strap passing over each end and tightened by the workman. As each blow is struck the workman moves the blank slightly to bring the chisel over the proper place for the next cut, the strap being loosened at the instant to allow the movement to take place. The surface of the F. being "single cut," a second set of cuts is usually made at a large angle with the first. The blank is then turned over, and the opposite side and the edges are next cut. When a surface already cut is placed downward, a strip of lead or pewter is placed beneath it, to prevent injury of the teeth by contact with the hard surface of the anvil. By constant practice the workman becomes very expert, and the rapidity and accuracy of his work are quite wonderful. After cutting, the F. are next hardened, although those made for use on wood are frequently left unhardened. In all cases the gen. shape of the F. is determined previous to the operation of hardening. The tang is next softened by immersion in molten lead; the F. is then scrubbed thoroughly, washed in lime-water, carefully dried and oiled, and is then ready for the market.

F.-cutting machinery was probably first proposed nearly 2 centuries ago. The prob. has engaged the ingenuity of able mechs. in all countries for many yrs. Among these machines is that of Bernot of Paris, which has been used with some success in Fr. and Belg., and has since 1860 been introduced into G. Brit. and the U. S. The Nicholson File Co. of Providence, R. I., was organized in 1865, and is claimed to have built machines which do satisfactory work. Very small clock and watch makers' F. have been made by machinery for many yrs., but the difficulties met with in the attempt to make larger F. have seemed almost insurmountable. It has seemed impossible to obtain machinery having the delicacy of touch of the practised hand of the F.-cutter, which varies its action, the position of the chisel, and the force and direction of each blow according to circumstances. The Bernot and the Nicholson machines seem to have been the most successful yet invented. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. R. H. THURSTON, C. E.]

See BATHING.

File-buster (Sp. *filibustero*, from *filibote*, a "flyboat," a fast-sailing vessel, first used, it is thought, on the river Vly in the Netherlands), a name formerly applied to buccaners and other pirates. In 1849 and 1851 the name was applied by the Cubans to Narciso Lopez and his followers, and it became a common name in the U. S. for adventurers who fitted up expeditions against the Sp. Amer. states.

Filicaja, da (VICENZO), an It. poet, b. at Florence Dec. 30, 1642. Even in youth his ardent temperament was controlled by a clear judgment and high principles, and he

returned to Florence, after his student-life at Pisa, with the character of an accomplished scholar and an earnest, upright man. He occupied every leisure hour with poetry, and when at the age of 31 he was made senator by the grand duke, he was already known in It. as a poet of distinguished genius. His reputation became European after the appearance of his noble *Canzone* addressed to John Sobieski on occasion of the raising of the siege of Vienna in 1683. His sonnets are models of purity of style, of vigor, and of sublimity of thought. He held positions of high trust, and his life was in noble accord with the lofty sentiments of his poems. D. Sept. 24, 1707.

Filioque (Lat.). The Council of Nice (325 A. D.) affirmed the consubstantiality of the Son with the Father, and simply declared its belief "in the Holy Spirit." The Council at Constantinople (381 A. D.) affirmed, in effect, the consubstantiality of the Spirit with both the Father and the Son, and taught the procession of the Spirit "from the Father." It was not affirmed that the Spirit proceeds from the Father only, but this is certainly the suggestion of the Creed, and it became at last the established doctrine of the Gr. Ch. In the Lat. Ch., the double procession of the Spirit appears never to have been denied. In Augustine's treatise on the Trinity, written between 400 and 416 A. D., it is clearly taught that the Spirit proceeds from both the Father and the Son. And so firmly did this become the established doctrine in the W., that at the third Synod of Toledo in Sp. (589 A. D.) the clause *filioque* was added to the Niceno-Constantinopolitan Confession, and the doctrinal basis was laid for the schism which permanently separated the chs. of the E. and the W.

R. D. HITCHCOCK.

Fillmore (MILLARD), D. C. L., 13th Pres. of the U. S., b. of N. Eng. parentage in Summer Hill, Cayuga co., N. Y., Jan. 7, 1800. Worked in youth upon his father's farm, and at 15 was apprenticed as a wool-carder and cloth-dresser. Undertook, when 19 yrs. of age, the study of law, teaching school a portion of the time. In 1822 removed to Buffalo, was admitted to the bar 1823, and opened a law-office in E. Aurora, N. Y.; commenced practice in the State supreme court in 1827, and in 1830 removed to Buffalo. Was sent to the N. Y. assembly 1829-32; was in Cong. 1833-35 and 1837-41, where he favored Mr. J. Q. Adams's views upon slavery, and in other public questions acting mainly with the Whigs. While chairman of the committee of ways and means he took the leading part in drawing up the tariff of 1842. In 1844 was the Whig candidate for gov. of N. Y.; in 1847 was chosen comptroller of the State, and resigned in 1849; in 1848 was chosen V.-P. of the U. S., and on the death of Pres. Taylor, July 9, 1850, Mr. F. became Pres. The great events of his administration were the passage of the Compromise Acts of 1850 and the Japan expedition of 1852. Mr. F. was in Europe 1855-56, and in the latter yr. was the candidate of the Amer. party for the Presidency. He did not again enter public life. D. Mar. 8, 1874.

Final Causes, causes which are not also effects. All other causes are, on one side, caused; they come forth as well as go forth. F. C. do not come forth. The phys. sciences, as such, have nothing to do with F. C. When they exhaust phys. causes, they exhaust all with which they have to deal, for phys. science is the science of second causes. They assume the simples and forces as existent, and the question, *How* these simples and forces came to exist? is not for them. In this sphere the objection of Bacon and Descartes to the investigation of F. C. is well founded. It was too often an indolent or ignorant evasion of the real work of science. But as it is no part of the distinctive work of phys. science to determine F. C. it is equally remote from its prov. to assert that there are not F. C. The whole doctrine of F. C. has been denied by materialism. Uriel shows that the argument of materialism at this point rests upon a confounding of "the notion of causality with the mental law of causality," and that the law of causality "does not affirm that whatever exists must have a cause, but only that all that happens, all that comes into being, must have a cause."

Finance [*It. finanza*; Fr. *finance*]. The word primarily signified revenue arising from fines; hence it came to be a comprehensive term for the revenue of a king or state, and taking a wider range it now embraces the medium of exchange, the science of the medium of exchange and liquidation in commerce. F. has been more briefly defined as the science of money. The common use of the word is in the plural, *finances*. It is so applied, indiscriminately, to the affairs of individuals, companies, and governments. In the singular, *finance*, which is the generic form, the word applies not only to experimental phenomena, but also to the principles of administration in connection with the gen. economy of the country—the assessment of values, the apportionment of taxes, the negotiation of loans, the husbandry of resources, the liquidation of debt, the policy of commercial intercourse with foreign countries, and, at large, with all the employments and interests of human life. In a scientific view, F. must be regarded as the main pillar of social organization. Practically, it governs the valuation of property, and thus it comes home to every individual.

Every govt. has an officer with the title *minister of finance*, or its equivalent, to whom is intrusted the direction of its treas. affairs. In Eng. he is commonly styled *cancellor of the exchequer*; in the U. S., *secretary of the treasury*. The sec. of the treas. is required to "prepare plans for the improvement and management of the revenue and the support of public credit"; to report to each session of Cong., on its assembling, the receipts and disbursements of the fiscal yr. past, and estimates thereof for the yr. ensuing; to superintend the collection of the revenues; to grant all the warrants for moneys to be paid in pursuance of appropriations by law; to execute necessary services in the sale of the public lands, and "to make report and give information to either branch of the legislature, in person or in writing, respecting all matters referred to him." [From orig. art. in *J.'s Univ. Cyc.*, by J. S. GIBBONS.]

Fin-back, a name given to the whales of the family Balanopteridae, on account of their prominent dorsal fin. The F.-B. whales have not been much sought for by whalers, generally on account of their fierce disposition, and from the fact that their oil is not abundant, while their baleen is often scanty and poor.

Finch [Ger. *Fink*], a name given to various birds, especially to certain European and Amer. birds of the family Fringillidae, and more particularly to those of the sub-family Fringillinae. The Amer. F. are mostly of the genera *Carpodacus*, *Chrysomitris*, *Peiplo*, *Spinus*, *Basileus*, *Chondestes*, *Zonotrichia*, etc. They feed on seeds and insects, are generally bright, active birds, and some are good songsters.

Finding, in law. The finder of lost property upon land who takes it into his possession becomes invested with a special property therein, which is superior to the claims of all persons except that of the true owner. He is under no legal obligation to take into his custody any articles he may thus discover, but if he does, it is his duty to preserve the property intact, and in as excellent condition as its nature and state at the time of finding will permit, in anticipation of the owner's appearing to reassert his title. He thus becomes a bailee of the property. He may defend his possession and interest by bringing action against any third person who injures the property, or asserts dominion over it, or interferes with his immediate ownership. If the absolute owner ever appears, restoration must be made to him, and the finder will be entitled to no reward if none had been previously offered. But if a specific reward had been promised, of which the finder had knowledge, he would be authorized in demanding it, and would have a lien upon the property until such charges were satisfied. If at the time of making the discovery the finder knew, or had means of readily ascertaining, to whom the property belonged, it would be his duty to return to the owner whatever he had thus acquired; and if he failed to do this his retention of the goods would constitute larceny. But in cases where knowledge of ownership could not be acquired no larceny could be committed. If the former owner can never be discovered or never asserts any claim to the property, it vests absolutely in the finder. The place where the finding occurred is immaterial as regards his rights.

The finder of a chose in action, as a check or lottery-ticket, cannot enforce payment of it if the party liable under it has notice that the applicant is not the real owner. If in such a case payment was made, the proper owner would not be debarred from a subsequent recovery. If, however, the finder transferred the instrument for value to a *bona fide* holder, who was ignorant of his defective title, it would, if negotiable, be good in the latter's hands, according to general principles governing commercial paper. GEORGE CHASE.

Findlay, R. R. junr., cap. of Hancock Co., O., 46 m. S. of Toledo. Pop. 1870, 3315; 1880, 4633.

Findlay (JAMES), b. in Franklin Co., Pa., about 1775, went to Cincinnati, O., in 1793; was in the legislative council for that Terr. in 1798, and became a prominent Dem. leader, filling various civil offices until 1824. As col. of the 2d O. volunteers in 1812 served under Gen. Hull at Detroit. Mich. Was in 1826-33 M. C. from O. D. Dec. 28, 1835.

Findlay (WILLIAM), b. at Mercersburg, Pa., June 30, 1768; was a prominent Dem. State legislator; State treas. 1807-17, gov. of Pa. 1817-20, U. S. Senator 1821-27, treas. of the U. S. mint, Phila., 1827-41. D. Nov. 12, 1846.

Findley (WILLIAM), politician, b. in Ire. about 1750, came to Pa. while young; served in the war of the Revolution; at its close became a member of the legislature, then of the State constitutional convention, and was M. C. 1791-99 and 1803-17. He wrote a *Review of the Funding System* in 1794, etc. D. Apr. 5, 1821.

Fine Arts is a gen. term applied to certain methods of embodying the beautiful in human productions. To the degree in which any work of man is produced according to the laws of taste only, is it a work of fine art. Even among the works of poetry, music, painting, sculpture, and arch., many do not serve æsthetic purposes solely, but form a transition from the fine to the useful, or, as they often are called, the mechanical or industrial arts, in whose productions usefulness is the primary quality, beauty only a secondary. Sometimes several arts are combined in the same work, as arch., sculpture, and painting in a monumental edifice; poetry, dramatic action, and scenic painting in a theatrical representation; and these, together with instrumental and vocal music, in an operatic representation. The *multi-plying arts*, such as engraving, chromo-lithography, and photography, are those by which, through the aid of mechanical and chemical means, many repetitions can be quickly and cheaply produced, which shall contain most or all of the prominent features of a work of art. [From orig. art. in *J. S. Unit. Cyc.*, by PROF. G. F. COMFORT.]

Fin'gal's Cave, on the island of Staffa, off the W. coast of Scot. Two ranges of basaltic rocks are supported upon a lava-like mass beneath, and the unequal hardness of the materials permitted carving out, by the waves, of one of the most picturesque pieces of natural architecture.

Fin'ing, or **Clarification**, the process of clearing turbid liquors, generally used in connection with wines and malt liquors.

Filtering.—For F. small quantities of many liquors the process of filtration is the simplest. A funnel lined with porous filter-paper is the most convenient apparatus, though filters are made of a great variety of porous substances, such as cotton, flannel, earthenware, sand, charcoal, etc. *Isinglass*, or gelatine, is most frequently employed for beer and ale. "Brewers' finings" are made by softening the gelatine in 4 times its weight of cold water or sour beer. As the gelatine swells, more water or sour beer is added. Coffee is often clarified by the addition of a piece of the skin of salted codfish, which furnishes gelatine which is coagulated by the tannic acid present. *Lime* in the water used is supposed to aid materially in the clarification of beer

by combining with the acids of the malt. *Albumen* is coagulated either by heat or by alcohol. It is used in large quantities by sugar-refiners, who clarify or "defecate" their solutions of raw sugar with bullock's blood. Heat alone clarifies many vegetable and animal juices by coagulating the albumen which they naturally contain. *Vegetable acids* clarify many expressed juices. *Alum* is specially serviceable in clarifying waters which are rendered turbid by fine mud, a pinch of alum thrown into a barrel of water being sufficient to render it clear and limpid after a few hours' standing. *Acetate of lead* has been used for clarifying liquors, but it is a very dangerous agent, on account of its poisonous character. *Plaster of Paris*, *clay*, *sand*, and *muri* are often effective in clarifying turbid solutions, such as cider, etc. *Soluble salts*, as a solution of sal-ammoniac, often cause the separation of finely-divided precipitates, which remain long in suspension in pure water. C. F. CHANDLER.

Finland [Fin. *Suomesmaa*, the "land of lakes"] is a grand duchy of Rus., lying between lat. 59° and 70° N. and lon. 21° and 33° E., and bounded by Rus., Nor., Swe., and the Gulfs of Bothnia and Finland. Its area is about 135,000 sq. m., $\frac{1}{2}$ of which is occupied by lakes and marshes, while a large part of the rest is covered with dense forests of fir and pine. While F. was united to Swe. it exported yearly a great quantity of rye and barley; indeed, it was called the "granary of Sweden." But since its annexation to Rus. it seems to have given up agriculture and taken to cattle-breeding, for which the country in many places is eminently adapted. The most valuable exports are, however, the products of its forests, as timber, pitch, potash, tar, and rosin. Reindeer, wolves, elks, beavers, various kinds of game, and, among fishes, salmon, trout, and herring, abound. The climate is rigorous. The pop. numbers 2,081,612, and consists of Finns, interspersed with Laplanders, Swedes, and Rus. The Finns are a branch of the Ugric race kindred to the Laplanders and the Magyars of Hungary, but different both from the Swedes and the Rus. They are tall, strongly built, and well proportioned, but the shape of their faces is nearer the square than the oval. In olden times they formed an independent empire, but in the 12th century they were conquered and converted to Christianity by the Swedes. During the union with Swe. the Swe. lang. and civilization took deep root among the Finns, and when in 1809 Rus. conquered and secured the country, she was met with great opposition and aversion by the people. She has governed the country with great prudence, however, granted the Finns many privileges, and her attempts at eliminating the Swe. elements by supporting and developing the original Finnish foundation have been successful. The most important towns are Helsingfors, Abo, Sveaborg, and Viborg. The state ch. is Lutheran. The gov't. is nearly independent of the rest of the Rus. empire, and is administered in accordance with the Finnish const. of 1772.

The Finnish lang. is a branch of the Turanian family, nearest allied to that of the Magyars, and spoken in the N. W. part of European Rus., in F., and the adjacent dists. by over 2,000,000 people, in 3 different dialects—the E. Finnish or Karelian, which is the oldest, most primitive, and least developed; the S. Finnish, spoken in the dists. around Abo and Helsingfors, from which the written lang. of the Finnish lit. has been developed; and the W. Finnish, which extends along the Bothnian Gulf into Swe. and Nor. Kindred dialects are spoken by the Lapps along the Arctic Ocean, by the Wotes, S. of the Gulf of Finland, and by the Tschudis in the govts. of Olonetz and Novgorod.

During the union with Swe. it was almost forgotten by the ed. classes, and for literary purposes it was hardly used at all. There existed a translation of the Bible, commenced in 1548 by Michael Agricola, bp. of Abo, but not finished until 1642. There also existed some religious and moral tracts; but even in these few literary monuments the lang. was not pure. As soon, however, as F. became a Rus. possession a great change took place: it is the official lang. of the country, used in the ch., the court, the school, the theatre, and by the ed. circles of society. About 20 periodicals are issued in it, among which are several newspapers of good standing and a couple of magazines of merit. The first literary effort which attracted attention was the *Kalevala*, "the land of Kaleva," pub. by Lönnrot in 1835, and consisting of a number of *runo* or popular songs which had lived, by oral tradition, in this people since the pagan period. With the support of the Finnish literary society in Helsingfors he gave a new and complete edition in 1849, containing 50 *runo*, consisting of 22,800 verses. *Kalevala* was translated into Swe. by Castrén in 1844 and Collin in 1865, into Fr. by Leonzon le Duc in 1845, into Ger. by Schiefner in 1852, and everywhere it charmed with the perfect epic objectivity of its descriptions, and with the splendid views it revealed of a new mythology, a new popular character, a new sense of beauty. In 1840 Lönnrot pub. *Kantelela*, a collection of ballads and lyrical pieces, and in 1842 *Suomen kansan sanadaskija*, a collection of 707 popular proverbs. From 1854 to 1862 Eero Salmelainen pub. a collection of Finnish popular tales in prose. CLEMENS PETERSEN.

Finland, Gulf of, an arm of the Baltic, situated between lat. 59° and 61° N. and lon. 22° and 30° E. At its E. end is St. Petersburg.

Fin'lay (GEORGE), LL.D., of Scotch parentage, b. near Faversham, Eng., Dec. 21, 1799. In 1823, before the death of Lord Byron, he joined the Grs. in their struggle for independence, and afterward settled in Athens, where he d., Jan. 26, 1875. His *Hist. of Gr.* from B. C. 146 to A. D. 1864 is a standard work.

Finley JAMES BRADLEY, D. in N. C. July 1, 1781; removed to O. 1801, joined the Meth. ministry 1809, took charge of the Wyandott Indian mission in Upper Sandusky 1814, where he spent 6 yrs. For 45 yrs. was one of the most successful Meth. itinerants of the N. W. Wrote an *Autobiography*, *Sketches of W. Methodism*, etc. D. Sept. 8, 1850.

Finley ROBERT, D. D., Presb. clergyman, b. at Princeton.

ton, N. J., 1772, grad. at the Coll. of N. J. 1787; was tutor there 1793-95, trustee 1807-17, and pastor of the ch. at Baskingridge, N. J., 1795-1817. Originated the colonization of emancipated blacks from the U. S. in Afr., helping to organize the Amer. Colonization Society. Became in 1817 pres. of Franklin Coll., Athens, Ga. D. Oct. 3, 1817.

Finley (ROBERT W.), Meth. clergyman, b. in Bucks co., Pa., June 9, 1750; studied at Princeton, N. J., and in 1774 entered the Presb. ministry. In 1788 emigrated to Ky. and opened a theological school. In 1811 became an itinerant in the Meth. Ch., and labored as such until 80 yrs. of age. D. Dec. 8, 1840.

Finley (SAMUEL), D. D., Presb. clergyman and pres. of the Coll. of N. J., b. at Armagh, Ire., 1715; arrived in Phila. 1734, was licensed to preach 1740, and ordained at New Brunswick, N. J., 1742. He preached itinerants to preach in the parishes of settled ministers without their consent, and in Sept. 1743 was seized and carried beyond the colonial limits as a vagrant. From 1744 to 1761 was pastor and teacher of an acad. at Nottingham, Md. In 1761 was chosen pres. of the Coll. of N. J. Wrote *Sermons*, and edited those of Pres. Davies. D. July 17, 1766.

Finney (CHARLES G.), a revivalist, b. at Warren, Conn., Aug. 29, 1792, studied law in Jefferson co., N. Y., but was ordained as a minister in 1822. In 1835 became a prof. at Oberlin Coll., O., and its pres. in 1852, holding that office until 1866. In 1848-51 preached in Eng. Wrote *Lectures on Revivals*, *Sermons on Important Subjects*, *Lectures on Systematic Theol.*, etc. D. Aug. 16, 1875.

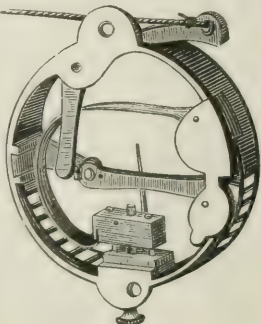
Fjord, fe-ord' [Scandinavian], a narrow inlet of the sea or a bay penetrating deeply into the land and bounded by high and precipitous sides. The coasts of Nor., of Iceland, and Greenland, of Chili, and around Cape Horn, and again of N. W. Amer. and of parts of New Zealand, afford examples of F. The water in F. is often of great depth, and extends for many m. into the heart of a mt.-range.

Fir, the Eng. name for all coniferous trees of the old genus *Abies* (and in Eng., indeed, even the native pine is called *Scotch fir*, but incorrectly); but there is a prevailing tendency to restrict the name to the group represented by the silver F. of Europe, the balsam F. of Atlantic N. Amer., and their like—i. e. to those species which bear lateral and erect cones, the scales of which at maturity fall away with the seeds. Most of these yield F. balsam. The numerous species of the other main division properly take the name of *spruce*. F. timber generally is light, soft, and white; that of some species is excellent for masts and spars, but not otherwise of high value.

Firdousi, or **Firdusi**, surnamed **ABOOL KASIM YAKSOOR**, Per. poet, b. near Toos, Khorassan, about 940 A. D. The surname is thought to have been given because his father was a gardener. His great poem, *Shah-Namah*, or *Shah-Namah* ("Book of Kings"), has about 56,000 distichs. D. 1020 or 1022. D.

Fire. See FLAME, by PROF. E. W. HILGARD, PH. D.
Fire-Alarms are classified as fire-alarm telegraphs, automatic electric fire-detectors, and mechanical fire-detectors. In the first a system of signal-boxes is connected by electric circuits with a central station, and thence with a series of alarm-bells on a second circuit. By giving a signal at one of the boxes the place of the fire is telegraphed to the central station, and from the latter to the signal-bells at the local stations, to direct the engines to the place where needed. Although simple in principle, the details of the system are somewhat complex. Different substances or mechanical devices change their volume or position with change of temperature; and if we imagine one of these substituted for human fingers to break or close an electric circuit connected with alarm mechanism, we have an idea of the essential principle of a self-acting electric fire-detector. Mechanical detectors depend for their action upon agencies altogether mechanical; such, for example, as the burning of a string to set the annunciating appliances in motion.

The earliest record of an electric F.-A. appears to be the Eng. patent of N. Rutter (1847), in which the mercurial column of a thermometer closes the circuit when the temperature is high enough to be dangerous. A galvanometer, alarm-bell apparatus, and electro-magnetic coil are included in the circuit. In 1852 John Hunter suggested applying fusible or combustible conductors to render electric telegraphs self-communicating in case of fires. In the same yr. Price patented a thermometric circuit-actuating device, the principle of which has been and still is in practical use. In 1857 Greenhow patented a valuable modification, in which, instead of setting the alarm in action by completing the circuit, the same effect is produced by breaking it. In 1865 Charles Dion patented in Fr. F.-A. in which the thermo-actuating device consisted of an inverted cone, with a small orifice at the top, fixed to one end of a balanced lever. On the occurrence of a fire, the heated air rising through the perforated cone tilts the lever and puts the apparatus into operation. In the electric apparatus the tilting of the lever trips a detent, which sets free a wheel actuated by a spring or weight. The periphery of this wheel carries a series of teeth which, acting upon a key similar to that of the Morse telegraph, transmits the alarm to a fire-station at a distance. A local



Dion's Fire-Alarm.

alarm is at the same time produced, apprising the inmates of their danger. The patents of John H. Guest of Brooklyn, N. Y., 1873, display features of importance, the gist of his improvements lying in the use of thermometric devices that under ordinary conditions themselves form a portion of the circuit, so that elevation of temperature will break the circuit and transmit the alarm; the same also occurring when the circuit is broken by accident. But one line-wire is required for any number of rooms in a building, and the signal-boxes of the ordinary alarm telegraph are retained. In automatic electric alarms a thermometric device for breaking or closing the circuit is essential. The mercurial thermometer of Rutter does not appear to have met with favor. As regards sensitiveness, the funnel and balance lever of Dion is claimed to excel any other device.

Although mechanical F.-A., strictly so termed, cannot compete for cities, villages, or even for large buildings, with those employing an electric circuit, they may be found useful under circumstances where batteries would be troublesome or the regulation of the mechanism difficult. Joseph Smith patented in Eng. in 1802 a F.-A. set in motion by the burning of a string. Still another device employed the rupture of a brass wire softened by mercury brought into contact with it by expansion to start a train of wheels, and thus ring a bell. In what is known as Tunncliffe's invention a small cylinder of gunpowder is furnished with a fuse igniting at 200° F., the device being hung to the ceiling of the room and the explosion sounding the alarm. In 1852 F. F. Herman combined with an alarm a gun-cotton cord connecting with the wick of a lamp, to light the latter when the alarm is started. In 1853 Henry L. Brown patented a contrivance which is thus described: "The detent lever of a wound-up alarm-bell mechanism is connected with the arm of an inflated bellows or air-chamber, which is in air-tight communication with a tube of fusible metal running through the rooms to be protected. On the melting of the closed tube by a fire at any point, the escape of air collapses the air-chamber and the alarm is sounded." In Dion's mechanical application of his funnel thermometric device the balanced lever was made hollow, and a sphere of some heavy substance was placed therein above or near the point. On the tilting of the lever by the upward movement of the funnel the ball rolled out against the detent of a bell-sounding device, and thence into the mouth of an inclined tube that conducted it to a receiver in the office of the hotel, for which class of buildings the apparatus was more especially designed, the balls being marked with the numbers of the rooms. The importance of automatic F.-A. apparatus is far from being adequately appreciated. Contrivances operating on similar principles can be successfully applied to many other purposes. [From orig. art. in *J's Unit. Cyc.* by PROF. JAMES A. WHITNEY, LL.B.]

Fire-Armor. Appliances known by this name are equally fitted for use in burning buildings to facilitate escape or the management of fire-extinguishing apparatus; in mines filled with choke or fire-damp, or in occupations that involve exposure to undue heat or noxious gases. They are of 2 kinds, in one of which the wearer breathes from a supply of compressed air carried in a suitable reservoir fastened upon the person; the other, in which the air is filtered through a moistened porous material interposed between the respiratory organs and the atmosphere. The idea of F.-A. was naturally derived from that of submarine armor, and the first apparatus of the kind was adapted for either use. The U. S. patent of W. H. James, granted in 1828, describes a diving-dress which the inventor stated could be employed "in mines and other places filled with deleterious gases, wherein it may be used with perfect safety and very great advantage." In this a circular air-receiver, formed of a coil of metal pipe, was placed around the waist of the wearer under the arms and extending down to the hips, being held in place by straps. Air was forced into this from above. It was calculated that an apparatus within a manageable compass could be made to hold air enough to last 1 hour, but to do this a pressure of 15 atmospheres, or about 225 lbs. to the square inch, was required. The simpler apparatus of M. Galibert has an air-receiver of India-rubber cloth, from which the air passes by a tube to the mouth of the wearer, the expired air passing out through a valvular device attached to the nostrils.

That class of F.-A. in which the air is filtered on the way to the lungs appears to have been primarily derived from the "aspirator" used by surgeons in making dissections, etc., and comprising a wire-cloth shell filled with powdered charcoal, and held over the mouth and nose by a strap buckled around the head.



Croft's Eye and Lung Protector.

The invention brought out by George A. Croft of New York in 1873-74 differs in many respects from the F.-A. previously devised, although the principle of filtering the air on its way to the lungs is retained. It is termed an "eye and lung protector," and is held over the face by an elastic band passing about the head. A duplex shell, formed of thin steel covered with India-rubber, fits over the eyes, the external edges of the rubber being flexible, and so shaped as to fit tight around the eyes to exclude dust, smoke, etc. from the eyes, while the eye-holes provided in the shell have

flexible lips, with a groove between, which receive plates of transparent mica, a tight joint being formed between the mica and the rubber. To protect the respiratory organs, the duplex shell is provided with a curtain of porous cloth, which, being gathered in at the bottom by means of a string around the neck of the wearer, forms a semi-elastic bag over the lower portion of the face. In this is placed a wet sponge of suitable size and shape, held by the bag against the mouth and nostrils. The wearer breathes through the moist sponge, which eliminates from the air passing through it the dust, noxious gases, foul odors, etc., with which it may be impregnated, and also cools the air during such passage. The entire device weighs but a few ounces, and may be fitted in place for use in a few seconds. Its utility has been abundantly demonstrated. Crofutt's invention has been adopted in the West; for example, by the fire depts. of Va. City, Gold Hill, Los Angeles, Placerville, etc. [From orig. art. in *J. S. Univ. Cyc.*, by Prof. J. A. WHITNEY, LL.D.]

Firearms, arms loading with powder and ball; all arms which expel their charge by the combustion of powder, whether cannon, such as guns, howitzers, mortars, or small-arms, such as muskets, rifles, pistols, fowling-pieces. (See ARTILLERY: SMALL ARMS.)

Fire-Brick, a name given to brick made from very refractory clay, and used for the lining of furnaces, stoves, grates, etc. F.-B. are usually made from FIRE-CLAY (which see), but other materials are used in their manufacture; as, e. g., the "Dinas brick," the F.-B. most esteemed in Wales, is made of pulverized quartzose rock cemented with a little lime. In Amer. the best F.-B. are made from the "Amboy clay" (a cretaceous clay found in N. J.) and from the fire-clays of the coal-measures of Pa., O., Ill., and Mo. In the manufacture of F.-B. both plastic and non-plastic clays are employed. In the use of a plastic clay like that of N. J., this is first burned in a kiln, losing its plasticity by the process, and becoming what is known as "cement." This is then coarsely ground, mixed with from $\frac{1}{4}$ to $\frac{1}{10}$ of plastic clay, moulded and burned. The Mt. Savage F.-B. are made at Mt. Savage, Md., from 2 varieties of carboniferous fire-clay; one of which is non-plastic, in its natural state has the properties of the "cement" before mentioned, and is treated in the same way. The Mt. Savage brick are of great excellence, and are extensively used throughout the U. S. At Mineral Point, Tuscarawas co., O., a non-plastic clay is found similar in appearance and properties to that used at Mt. Savage. It is here manufactured in the same way, and the brick made from it are scarcely inferior to those before mentioned. In all factories of F.-B. the refuse of the kilns is ground over and cemented with a little fresh plastic clay, and in this way brick are manufactured which have great power to resist fire. From their mode of manufacture the most refractory F.-B. are necessarily tender, and have little power to resist mechanical strain or violence. They are therefore employed only for the central portions of furnaces, where they are exposed to the greatest heat. Higher up in the blast furnace and near the doors of puddling furnaces, brick of greater strength and less resistance to fire are used. These are made in large part of plastic clay, to which more or less sand is added. In the various parts of the different kinds of furnaces used in smelting operations brick of different shapes and qualities are required. Hence, at all factories may be seen bricks of various forms and sizes, and those in which the materials are differently mixed. As all iron furnaces frequently require to be lined with F.-B. the impression generally prevails that they are rapidly destroyed by the action of the heat. This, however, is not true, as the best F.-B. are infusible by ordinary means. The rapid destruction of F.-B. which takes place in a furnace is for the most part due to the union of the iron with the silica of the brick, forming a fusible slag; in this way the brick are eaten or dissolved away. In the selection of clay for F.-B. it is important that it should contain as little iron, lime, soda, potash, etc. as possible, as these readily combine with the silica, forming a fusible silicate. The price of the best F.-B. in the U. S. varies from \$35 to \$60 per 1000 at the kiln, and these are made at comparatively few localities. Cheaper brick, and those of somewhat inferior quality, and yet adapted to most purposes for which F.-B. are used, are or may be manufactured at a thousand different localities; wherever, indeed, a reasonably good fire-clay can be obtained.

Fire-Clay, the name specifically applied to the beds of clay which underlie most of the coal-seams in the carboniferous strata. They are so called because as a class they are very resistant to the action of fire. These clay-beds are fine sediments which, accumulated at the bottom of shallow pools of water, subsequently filled up by growing vegetation. The roots of aquatic plants penetrating this clay have generally abstracted its potash, soda, lime, iron, etc., and have removed such a percentage of silica as to leave it with a larger relative quantity of alumina than it had before being subjected to their action. Thus, they have taken from it its more fusible ingredients, and have imparted to it the peculiar property it possesses of remaining unchanged at a high heat. Clays very like our F.-C. are now found underlying many beds of peat, and we may in such circumstances see the formation of F.-C. going on.

In the U. S. we have 2 varieties of F.-C.—the one non-plastic, and specially adapted to the manufacture of fire-brick; and the other plastic, and used also for fire-brick, and for pottery, glass-pots, etc. In the first class are the clays of Mt. Savage, Md., Mineral Point and New Lisbon, O., and from these large quantities of superior fire-brick are made. The second class includes most of the F.-C. of the coal-measures. These differ much among themselves as regards purity and excellence, but they are very largely employed for the manufacture of stoneware and second quality fire-brick. In next column are analyses of some of the best and best known F.-C., Nos. 2 and 3 being non-plastic, 4 and 5 plastic clays.

ANALYSES OF FIRE-CLAYS.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Water.....	17.34	12.74	11.70	5.34	5.45
Silica.....	45.25	50.45	49.20	59.95	70.70
Alumina.....	28.77	35.90	37.80	33.85	21.70
Oxide of iron.....	7.72	1.50			
Lime.....	0.47	0.13	0.40	2.05	0.40
Magnesia.....		0.20	0.10	0.55	0.37
Potash.....					

No. 1 is from Stourbridge, Eng.; 2, Mt. Savage, Md.; 3, Mineral Point, O.; 4, Port Washington, O.; 5, Springfield, O.

J. S. NEWBERRY.

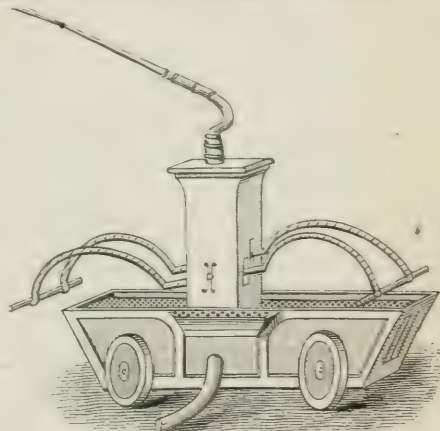
Fire-Damp, Methane, Marsh-Gas, of Light Carburetted Hydrogen, is a dangerous gas often disengaged in coal-mines from the fresh-cut surface of the coal, and from apertures or "blowers," which emit for a great length of time a copious stream or jet of gas, probably existing in a state of compression pent up in the coal. With 7 or 8 times its volume of atmospheric air this gas becomes highly explosive, and accidents constantly occur in coal-mines, owing to the incautious introduction of a naked flame into such mixtures accumulated in the workings. To meet the dangers of this gas Sir H. Davy devised his safety-lamp.

Fire-Eater, a term the invention of which is ascribed to Col. Howell Rose of Coosa co., Ala., who in the S. Rights Convention at Montgomery co., Ala., in 1851, applied this epithet to the avowed Disunionists of that body. The term was afterward applied in political parlance to extremists among the S. Rights men, whether Disunionists or not.

Fire-Engines, apparatus used for projecting water upon or into burning buildings. Their utility depends upon the fact that fire may be extinguished either by reducing the temperature of the combustible below the point at which ignition occurs, or by preventing access of air to the flame. The application of water induces both of these conditions. Hand-syringes were, after buckets, the first devices used for casting water upon fires; and although a F.-E. comprising 2 pumps furnished with valves, and worked by levers or brakes, was invented in Egypt in the 2d century before Christ, the "squirter" or syringe seems to have been in use for the same purpose during many hundred yrs.

The first portable engine appears to have been invented in Ger., and is stated to have been successfully used previous to 1615. There are known to have been used in Augsburg in 1618 huge syringes mounted upon wheels. F.-E. were introduced into Paris in the yr. 1699 by a projector named Duperrier. They were provided with an air-vessel. In 1657 John Hautch of Nuremberg made an apparatus which, worked by 28 men, threw an inch stream 80 ft. high; it was placed upon runners and drawn by 2 horses.

Little improvement was made until about 1734, when the F.-E. became an important and efficient machine. According to one plan, the engine threw 2 jets at once; in another treadles were applied to supplement the hand-levers. One



NEWSHAM'S FIRE-ENGINE.
From a Dictionary of Arts and Sciences, 1794.

manufacturer, Newsham, claimed that his engine had thrown a stream 165 ft. in height. He was the first to arrange the brakes at the sides instead of at the ends of the machine, although some of his engines were made on the latter plan as late as 1750 or thereabout. The first manual engine used in New York was made by Newsham. Floating F.-E. worked by manual power were first employed on the Thames. The exact date is not known, but they were certainly in use in 1793. In 1834 an Eng. writer stated that the "ne plus ultra of fire-extinguishing machinery would be a steam floating F.-E. of about 30 horse-power." Manual power, however, was employed in working floating F.-E. for several yrs. later. The first one operated by steam was that designed for the use of the E. I. Docks in 1850, in which a pump was fitted upon a propeller and geared with the engine; it threw 600 gals. of water per minute 30 ft. above the roofs of the highest buildings on the docks.

The earliest steam F.-E. for use on land was made in Lond. by Braithwaite and Ericsson in 1829, but after 1832 they met with no favor in Eng. during 30 yrs. They were used in subduing several large fires, but were popularly objected to

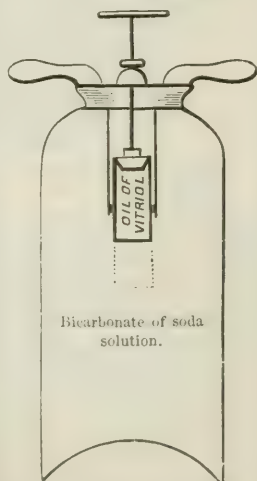
as throwing *too much* water. In 1840 an Eng. steam F.-E. was introduced in New York, but it was not until 1860 that the Lond. establishment used a land steam-engine in extinguishing a fire. As to the superiority of the steam over the manual F.-E., careful Eng. experiments have shown that, taking as a standard a given height and volume of water thrown, the expense of the latter is £9 sterling, and of the former 2s. 6d. But this is not the main consideration, for hand-engines are of little use when the height of the burning building is over 60 ft., whereas a good steam F.-E. will play with effect upon the roof of a building 150 ft. high.

In the U. S. the use of F.-E. dates back to 1731, when it was resolved by the common council of New York to import 2 of Newsham's engines, which were received the following yr. Five yrs. later the common council ordered that £10 be advanced to one Turk to enable him to finish the first F.-E. built in this country. Steam F.-E. are now universally used in all of the larger cities. Amer. steam F.-E. possess a demonstrated superiority over those of foreign make, due to the high speed at which they are worked, which in its turn is dependent upon the fact that in many important respects they are proportioned in close imitation of railway locomotive-engines. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.D.]

Fire-Escapes. The common F.-E. is simply a system of fixed iron ladders attached to a building to permit descent from the upper windows; ordinarily, a platform or balcony is provided to each story, and the ladders are extended from one to another, either in a vertical or inclined position. Many persons provide a long rope attached at one end to a bar, which latter may, on emergency, be fixed across a window with the rope pendent, to permit sliding down. As it is difficult in descending the rope to grasp it securely enough to prevent a too rapid descent, several plans have been brought forward, in which a mechanical clutch is provided to grip the rope. Such appliances have operated successfully in experiments where the experimenter was cool and clear-headed, but have seldom been of much use in the confusion of actual danger. As the value of land increases in cities, the buildings are made higher, and this materially increases the difficulty of escape in case of fire. It also enhances the obstacles in the way of constructing an entirely practicable fire-escape.

Apart from fixed ladders attached to the building, and the sectional ladders of the hook-and-ladder companies, F.-E. may be classified as follows: 1st, those whereby the inmates of a burning building may slide down a rope grasped by the hands or by a gripping device; 2d, those embracing extensible ladders carried upon a suitable carriage and provided with winches for elevating; 3d, those in which a chute is employed, through which persons may slide to the ground; 4th, those in which a platform is raised and lowered by a system of "lazy-tongs"; and 5th, those in which a platform or basket is suspended from a rope or chain worked by a winch from the ground. The numerous F.-E. that have been projected and experimentally tried have hitherto done little to prevent loss of life, but it is to be supposed that in course of time some one or more will be sufficiently perfected to meet all the conditions of success. But perfect security can never be obtained until in the construction of buildings the contingencies of fires and the necessity of escape therefrom are kept especially in view. If a fire-proof well 2 ft. square extending from the attic to the ground floor, and opening to the street, was provided in each dwelling, and furnished with mechanism for lifting or lowering persons, many losses of life would be avoided. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.D.]

Fire-Extinguishers. This term designates a large class of apparatus in which water is surcharged with some other body antagonistic to flame. Ordinarily, the water is charged with carbonic acid, but other substances have been used. A F.-E., commonly so termed, is of cylindrical form, and having a short hose and nozzle, whereby a small but forcible jet may be thrown in any direction. In some varieties there are provided within the cylinder, filled with water, 2 vessels or receptacles, one containing a bicarbonate, the other a strong acid; as, for example, oil of vitriol. When the apparatus is to be used the contents of the 2 receptacles are thrown into the water, and the chemical reaction sets free the carbonic acid, which, being confined and consequently under pressure, is absorbed by or dissolved in the water. On opening a suitable valve in the hose or outlet the pressure of the confined gas forces out the liquid in a strong jet, which carries with it a very considerable portion of the carbonic acid gas contained therein. This non-combustible gas, being thus brought in intimate contact with the flame, excludes the atmospheric air, and in a very high degree assists the action of the water in its extinguishment. These portable fire-engines occupy little space, and have been found very useful for subduing small fires, and thus preventing larger ones. Many modifications have been introduced, most of them relating merely to details of construction.



Babcock's Fire-Extinguisher. Among these is the Babcock

extinguisher, which is filled with a solution of bicarbonate of soda, and has in its upper part a vessel of acid suspended by lateral pivots to a stirrup depending from the top of the apparatus. The stopper of this vessel is worked by a rod through the top of the extinguisher. By withdrawing the stopper the vessel tilts over, and mingles the acid with the solution, thereby discharging the carbonic acid from the latter.

The transition from a F.-E. small enough to be carried on the back to one sufficiently large to require wheels was easy and natural, and under the name of chemical fire-engines these latter have been put in practice with a certain measure of success. Such apparatus, however, are of comparatively limited utility, the steam fire-engine alone being sufficient to cope under all conditions with fires that have passed that incipient stage in which they may be readily subdued by the small extinguishers carried by the operator. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.D.]

Fire-fly, the name of nocturnally luminous Coleoptera, of the families Lampyridæ, including the glowworms and Elateridæ. The phosphorescent substance is thought to be a gaseous product of the nature of phosphuretted hydrogen. The purpose of the phosphorescence is supposed to be the attraction of the sexes. The F. of Central and S. Amer. are chiefly Elateridæ of the genus *Pyrophorus*. They generally give a very intense light, which comes from 2 spots on the prothorax. Our common "lightning-bugs" are of numerous species, all Lampyridæ. *Photuris Pennsylvanica* is the most common. In this both sexes are winged, while in the *Lampyris* the females are apterous. (See GLOWWORM.)

Fire Insurance. See INSURANCE.

Fireproof Buildings. Absolute security from fire is alone obtained by constructing buildings of material that is not only in itself incombustible, but which will not be decomposed by an extreme degree of external heat, and by the utter absence of storage of quickly combustible merchandise. The necessity of these conditions is shown by the rapidity with which structures only partially of wood are consumed, and also by the wholesale destruction of great iron, marble, and granite buildings, and by the tumbling down of solid walls because of the expansion of iron beams in so called F. B. filled with saltpetre, oils, and other highly inflammable substances. As a material for building, hard-burned brick has been found to have the greatest fire-resisting properties; the evil results of the expansion of iron girders have been measurably overcome by supporting them on roller bearings, which relieve the walls of their thrust. But a defect in many brick walls exists in the mortar, which frequently crumbles from heat. The quality of the mortar used is of even more importance than that of the brick. The covering of walls with a fire-resisting cement has been suggested, but this would be open to the same drawbacks as stone and cast iron—viz. splitting and cracking when heated and subjected to the contact of cold water.

To secure as far as possible immunity from the worst results of fire, the building should be constructed with special reference to the class of merchandise it is designed to hold. The storage of petroleum, rosin, turpentine, etc. would be best in underground receptacles covered only by a light structure. In warehouses the nearest approach to perfect fireproofing is found in the employment of brick walls, and concrete floors and ceilings supported by girders having their weight uniformly distributed upon the walls. In New York floors of corrugated iron and cement have long been in use, but the objection to iron is so great that some arches, have recommended wood strongly pugged with cement as preferable.

The construction of perfectly fireproof stairs is a greater problem than that presented by walls or ceilings; and for these well pugged wooden beams have been recommended as preferable to iron as supports for the brick-work, which should always be used instead of stone. But it must be remembered that in this use of wood everything depends upon the character of the pugging, and the cement used in this country is inferior to that which has shown the utility of the system abroad. The isolation of the stories from each other is important, but seldom provided for.

For dwellings in which economy dictates to a greater or less extent the use of wood, the Paris system is preferable, provided a plaster or cement equal to the Fr. is used for pugging. The central idea is to secure the strength of wood on end, and to utilize the resistance of plaster to the direct action of fire. The framing is battened with oak battens nailed several inches apart. Rubble, burnt clay, stone chips, or brickbats freshly broken are laid into the space between the 2 series of vertical battens, and plaster of Paris is then applied to each side, filling up the interspaces and leaving smooth cement surfaces. The wood is thus firmly imbedded in stone and plaster. The floor-timbers are laid in the usual manner, with battens nailed on their lower sides covering about half the area. Underneath is provided a temporary platform reaching nearly to the battens. Plaster of Paris is then worked in below and around the battens, the platform being allowed to remain until the plaster has set. In this manner the ceiling of the room below is formed. Above, upon the timbers, are laid transverse billets or battens of wood, that receive an upper layer of plaster, which constitutes the floor. The inner or partition walls are made in the same manner as the outer ones just described, even when these latter are replaced by bricks. The stairways are of wood, but are placed between walls of brick or in some cases of stone, in others of wood filled in and pugged, and are filled in with solid rubble and plaster, which practically secures immunity in case of fire. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.D.]

Fireproofing. Alum, borax, sulphate of iron, soluble glass, sulphate of ammonia, phosphate of ammonia, and tungstate of soda are the substances most advocated hitherto for F. by impregnation. Cloth fabrics should be immersed

or soaked; wood should have the solution forced through its pores; and with paper the solution should be worked into the pulp during manufacture. The first 4 are better suited for timber than for fabrics. Soluble glass may be used for surface-impregnation of the same material, but experience has shown it to be a treacherous substance, liable to effloresce; and theoretically, at least, its free alkali tends to the deterioration of any organic substances with which it may be brought into contact. Sulphate of ammonia does not appear to have ever been thoroughly tested. The phosphate of the same base is efficacious as a fireproof, but leaves the fabric harsh to the touch. The tungstate of soda, therefore, should be used in preference to the others for light articles of apparel, curtains, upholstery, etc. As combustion depends upon access of air, light wood-work may be measurably protected by fire-resisting paints. One of the oldest is composed of 3 parts wood-ashes ground with 1 part of boiled linseed oil, and applied with a brush when fresh. Another is made by mingling lime and ashes with skimmed milk. A Ger. recipe for fireproof coating is 3 successive applications of a hot solution of 3 parts alum and 1 part copperas, and then of a solution of copperas brought to the consistency of paint by admixture of pipe-clay. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.D.]

Fireproof Safes. The idea of rendering the contents of an iron strong-box secure against fire by lining it with a fire-resisting medium originated with James Conner, a type-founder of New York, between the yrs. 1829 and 1832. This safe was filled in with plaster of Paris. He does not appear to have appreciated the importance of his invention, for the safe was allowed to pass into disuse, and seems to have been nearly or quite forgotten, even by the inventor, until in the yr. 1843 it was reinvented by Fitzgerald; and the U. S. courts decided that as the former had abandoned his invention without giving a knowledge of it to the public, the latter must be adjudged the legal patentee. From this date the manufacture of F. S. received a lasting impetus. Numerous new compounds were devised for filling, the advocates of each claiming for it a constructed superiority over all others as a fire-resistant. The construction of F. S. has of late yrs. formed a very important branch of manufacture, and many improvements have been made which in the aggregate have much increased their utility. But the essential features remain the same, so that these fireproof receptacles may still be classified as (1) those having a filling of some simply non-conducting material, like clay or concrete; (2) those fitted with plaster capable of giving off water by calcination, though only in moderate quantities; (3) those in which alum or other salt yielding a large percentage of water by decomposition is mingled with the plaster; (4) the steam-safes, in which vessels either of glass or metal and filled with water are arranged between the inner and outer walls to give off steam when subjected to a high heat. The first-named class is of doubtful utility; the second of measurable value under many conditions; the third and fourth are the best as yet devised, although their efficiency in any case depends wholly upon the judgment and care displayed in their manufacture.

Many inventions relating to F. S. have been developed in the U. S. during the past few yrs. Among these (1869) was the use, external to an alum or similar filling, of cans containing steam or vapor producing substance placed between such filling and the outer casing of the safe; also, the construction of safes with a water-supply from an elevated head. No safe is absolutely fireproof, although several manufacturers make them capable of withstanding an exceedingly high temperature. Wherever possible, a safe should be imbedded in brick-work, which experience has shown to be one of the most effective of all protections against the injurious transmission of heat. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.D.]

Fire-ship, a vessel which is laden with combustibles, fired, and sent into the midst of an enemy's ships for the purpose of setting them on fire. This anc. device can never be of much effect when employed against a well managed steam-marine.

Fireworks. See PYROTECHNY.

Fire-workshippers. See GUEBRES and PARSEEM.

Firk'owitsch (ABRAHAM), a Jewish archaeologist, b. at Lutzk, in the Crimea, in 1796. His study of MSS. had instilled in him a love for anc. Jewish authors, particularly Karaites. His opportunity to urge the matter successfully came in 1825, when the Karaites of Eupatoria established a printing-press. He finally became the prin. guide of the Crimean Karaites not only in the reproduction of anc. MSS., but also in the selection of modern works worth printing. Unsatisfied by the meagre supply in the Crimea, he visited various regions, and finally brought together and deposited in the imperial library at St. Petersburg no less than 1500 MSS. D. 1874.

Fir'man (Pers. *fermân*, "a command"), in Oriental countries the certificate or written mandates of a sovereign or govt. It is especially applied to the passports issued to travellers in Turkish countries.

Firmicus Maternus (JULIUS), a writer on math. and astrology, b. in Sic., and flourished in the time of Constantine. He followed at first the profession of an advocate. He wrote in Lat. a work entitled *Matheseos libri VIII.* (A. D. 354), which treated of astrological subjects, such as nativities, the influence of the stars on human life, etc., more than of math. The work is still extant. *De errore profanarum religionum*, ascribed to Julius Firmicus Maternus, is more probably by another writer of the same name. It is a vigorous defence of the Chr. religion against the errors of paganism.

First-born [Heb. *bekorâh bekôr*; Gr. *πρωτοτοκος*; Lat. *primogenitus*]. Before the establishment of the Heb. theocracy the rights of primogeniture were recognized, but they were sometimes transferred from the eldest to a younger son, as from Esau to Jacob, and from Reuben to Joseph. After the Mosaic economy was established such a transfer

was forbidden. The birthright consisted in a double portion of the inheritance—i. e. the eldest son received twice as much of the patrimony as any one of the younger sons. It is nowhere said in the Bible that the birthright embraced the family priesthood and govt. To commemorate the destruction of the F.-B. of the Egyptians, God required that the F.-B. males of the Hebs. should be consecrated to him; also the firstlings of their cattle and the first-fruits of their ground. After the Exodus their F.-B. sons, numbering 22,273, were substituted by 22,000 Levites, and the 273 surplus were redeemed at 5 shekels a head. The tribe of Levi thus became the priestly tribe for the nation. The F.-B. son seems to have had authority over the family from the earliest times.

The term F.-B. is used metaphorically for the first, or chief, or pre-eminent. In the N. T., *protokolos* occurs 9 times; thrice it is used literally. Christ is styled "first-born among many brethren," as he is "the Son of God" in a peculiar sense. He is called "first-born of every creature" or of all creation. He is called "first-born from the dead" and "first-begotten of the dead," because he was "the first" raised from the dead to die no more, and so is "become the first-fruits of them that slept." He is called "the first-begotten," as he was destined to occupy the highest position of honor in the universe. The righteous are spoken of as "a society of first-borns, registered in heaven," expressing their pre-eminent dignity and prerogatives. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. T. O. SUMMERS, LL.D.]

First-Fruits [Heb. *reshith*; Gr. *ἀπαρχαί*; Lat. *primitiæ*]. The offering of the F.-F. of the season, with religious ceremony, was practised by the anc. Egyptians, Grs., and Roms., as well as by the Hebs. The form in which it is first expressly commanded by Moses (Ex. xxiii. 29) implies a custom already existing. Specific directions bringing out the religious significance of the act, are contained in Deut. xxvi. 1-11. Of every kind of produce of the earth, as it ripened, a basketful was to be presented by each Israelite, some in their natural, and others, as wine and oil, in their prepared state. But whatever was offered must be the produce of the Holy Land. Beyond Pal. it might be converted into money, and thus sent to the Temple. (See SPENCER, *De Legibus Hebræorum Ritualibus*, iii. p. 1.)

Fir-wool, a fibre prepared in Ger. from the leaves of *Pinus sylvestris*, and made into cloth and wadding, for the treatment of rheumatism and skin diseases. F.-W. oil is made from these leaves. F.-W. extract is prepared from the leaves, and used in med.

Fisch (GEORGES), D. D., a Fr. Prot. clergyman, b. in Switz. July 6, 1814, ed. in the acad. at Lausanne. After entering the ministry he preached for nearly 5 yrs. to a Ger.-speaking congregation at Vevay, and then emigrated to Fr. and joined the Fr. Evangelical Ch. Became in 1846 the successor of Adolphe Monod at Lyons. In 1855 removed to Paris, and became pastor of the ch. Taithout, the colleague of his brother-in-law, Edmond de Pressensé.

Fish, in a popular sense, the vertebrate inhabs. of the waters; in a scientific sense, *liferiferos vertebrates*, with a skull provided with membrane or dermal bones; in other words, the shoulder-girdle forms a lyriform or furcula-shaped apparatus, like a bird's wish-bone, the scapular bones and their adjuncts of the 2 sides being connected below at the median line: an air-bladder (sometimes lung-like) is, as a rule, developed, and either connects with the oesophagus by a single duct (as in Ganoids and most soft-finned F.), or is entirely closed (as in the spine-finned F.); the skull is highly developed, and is provided with membrane bones, or with dermal shields which are homologous with them; the shoulder-girdle is formed, in great part, by large furcula-like bones, which bound the region behind the head, and which, beside meeting at the median line, are generally connected, by means of intervening bones, with the skull; these external scapular bones are also membrane or dermal bones, and are not developed in the Selachians; to the internal surfaces of these bones are attached smaller ones or cartilages (homologous with the shoulder-girdles of sharks), which support the pectoral fins. The gills and branchial apparatus are contained entirely within the cephalic cavity, in front of the scapular arch, and consist of 5 arches, the hindmost of which are, however, generally modified into pharyngeal bones; the gills are free at their distal margins. Such are the characters which are common to all true F. There is, however, much variation in other respects among the numerous constituents of the class, which can only be briefly alluded to.

In the typical F., known as TELOSTEIS, the skeleton is ossified (whence the name); the optic nerves cross (deccussate) each other; the heart has only 2 opposite valves; the outer elements of the scapular arch (proscapula) are simple, the inner elements mostly ossified, and usually 3 or 2 in number; the pectoral member destitute of any representatives of the arm, and connected with the scapular arch by several (generally 4) narrow bones (actinosts). To this great division belong by far the largest number of species and those most familiar to most persons: they are grouped in a number of orders named PEDICULATES, PLECTOGNATHI, LOPHOBRANCHIATES, HEMIBRANCHIATES, TELEOSTHEALS, SCYTHOPHORES, NEMATOGNATHI, APODES, and OPISTHOMES.

In the remaining F., united by most recent naturalists under the name of GANOIDS, the skeleton is variable in its composition; the optic nerves do not cross, but are united by a commissure; the heart has a thickened bulbus arteriosus, provided with several rows of valves (but with those of each row sometimes united into a ridge, as in the Lepidosirens); the elements of the outer portions of the scapular arch (proscapula) are in some double, in others united; the inner scapular element is cartilaginous and simple; the pectoral member is provided with 2 basilar elements (bounding the insertion of the pectoral fin on each of its sides), or with a single pedicle corresponding with the humerus. The F. combined under this last division, although not now numerous in species, exhibit extreme differences when compared with each other, and have been even considered and

with a very great degree of propriety) as constituting several sub-classes. These are as follows: (1) The group of *HYOGANOIDS* contains the orders *CYCLOGANOIDS* (represented in the U. S. by the bowfins or Amids) and *RHOMBOGANOIDS* (represented by the alligator-gars or *Lepidosteids*). (2) The group of *BRACHIOGANOIDS* is represented in the present age of the earth by a single order (*CROSSOPTERYGIANS*), with 2 genera (*Polypterus* and *Calamochthys*), but was in anc. times rich in species. (3) The group of *DIPNOANS* is represented at present by 3 very distinct genera—viz. *Lepidosiren* in S. Amer., *Protopterus* in Afr., and *Ceratodus* in Australia, but formerly the members of the group were among the prim. representatives of the class, and in the triassic period of Europe *Ceratodus* was represented by several typical species of that genus. (4) The last group (*CHONDROGANOIDS*) contains the sturgeons (constituting the order *CHONDROSTEI*) and the "shovel-noses" or "paddle-fishes" of N. Amer. and E. Asia (constituting the order *SELACHOSTOMI*).

While the 4 groups just enumerated are the only great primary types of ganoid F. that have members in the waters of the present epoch of the earth, in anc. times there were some very strange and peculiar forms which are not referable to any of those divisions, but which appear to stand isolated and afar from all others, and thus necessitate still another primary group. The types alluded to flourished among the first known F., and in the Silurian and Devonian epochs. So strange are some of these in their appearance that remains of them have been referred to the Crustaceans. Such are the forms which have been called Cephalaspids. Others ("Placoganoidea") are almost equally aberrant in appearance, and their relations would not be suspected from their external characters; but the dental armature and scapular arches of a species discovered by Prof. Newberry in O. have convinced the writer that they were closely allied to the order Sirenoidei, and with them formed the super-order Dipnoi. The vomerine and palatine dental plates were contiguous, and seem to be homologous with the palatine plates of the Sirenoidei.

Chronological History.—No representatives of the class of F. have been found in the lowest fossiliferous rocks, and it is only when we reach the uppermost Silurian that we find evidences of their existence in fossil bones or teeth. The most anc. known F. belonged to types entirely distinct from any that are in existence at the present time. As already mentioned in the remarks on the primary groups of F., the Cephalaspids and Placoganooids, first of known F., heralded the advent of the class, and these were the predominant species apparently in the Devonian epoch; from somewhat later formations have been obtained the remains of representatives of orders still existing, but in very small numbers; such were especially the Dipnoans, which were then represented by numerous genera and species; coeval with these were various Selachians or sharks; coeval of the true F. existing during the mesozoic epoch, earlier than the cretaceous, have been referred to the great group of Ganoids, but it is probable that some have been erroneously identified, and that they belonged to the sub-class of Teleosts. No universally recognized species of that group, however, have been found in deposits lower than the cretaceous; in that epoch they began to culminate, and in time became the greatly prominent forms; and in the present epoch almost all the species (excluding the Selachians) belong to this great group; and, so far as numbers go, all of the living Ganoids might disappear, and yet the loss would scarcely be apparent in the sum-total of the class. Of about 9000 existing species of F. or Teleostomes, less than 100 do not belong to the Teleosts, and that number alone represents the various primary groups of the ganoid F., and yet, great as is the number of the Teleostomes, and small as is that of the Ganoids, the latter exhibit much greater differences in contrast with each other than do all the Teleosts among themselves. Such is the character of the difference between the animals of the present and the distant past periods of the earth's hist.; and it is fortunate for the fulness of our knowledge of that hist. that, although with few lineal heirs left, most of the anc. types are still represented by some examples.

THEODORE GILL.

Fish (HAMILTON), LL.D., b. in New York Aug. 3, 1808, grad. at Columbia Coll. 1828; was admitted to the bar 1830, in 1837 chosen to the State legislature; served in Cong. 1843-45, was lieut.-gov. of N. Y. 1847-49, gov. 1849-51, and U. S. Senator 1851-57. Was in 1862 one of the U. S. coms. to visit soldiers confined in Confed. prisons, and rendered valuable service in negotiating for the exchange of prisoners. In 1869 was appointed sec. of state in the cabinet of Pres. Grant. He suggested the Joint High Commission between the U. S. and G. Brit., which met in 1871 to settle the difficulties between them, including the Alabama claims; pres. of the order of the Cincinnati 1872.

Fish (HENRY CLAY), D. D., Bap. clergyman, b. at Halifax, Vt., Jan. 27, 1820, grad. at Union Theological Sem. 1845. From 1845 to 1850 was pastor of the Bap. ch. at Somerville, N. J., and afterward of the First Bap. ch. at Newark, N. J. Wrote *Primitive Pity Revived, Hist. and Repository of Pulpit Eloquence*, etc., D. Oct. 2, 1877.

Fish-Culture. The propagation of fish has in recent times received an immense impulse from the discovery of a method of artificial impregnation of the ova. The main fact upon which the economical importance of modern F.-C. rests is that by artificial means fish can be indefinitely increased in quantity with a very slight corresponding increase of cost, because: (1) The possible yearly increase of fish is very great, the ratio of increase varying from 100 to 1 in a yearling trout to perhaps 1,000,000 to 1 in a full grown sturgeon. (2) This increase can be almost entirely saved at a comparatively insignificant expense by artificial impregnation and hatching. (3) The food of fish after they are hatched is not a source of expense to man.

The honor of the discovery of the artificial impregnation of the eggs is generally conceded to G. L. Jacobi, a Prus.

officer, whose experiments were pub. in 1763. But they led to no important practical results, and the art seems to have remained forgotten for nearly a hundred yrs., when it was rediscovered and again practised by Joseph Rémy, a fisherman of the Vosges Mts. His experiments eventually led to the establishment of the extensive fish-breeding works at Hünningen in 1851, formerly the property of the Fr. govt., but now in possession of the Ger. emp. This was the first practical effort at F.-C. on a large scale that was based on the artificial impregnation of the eggs.

The principle of the artificial impregnation is substantially the same with all the varieties of fish that have been experimented with. It consists in mixing the eggs of the female fish with the milt of the male in some convenient receptacle immediately after the eggs and milt leave the fish. The subsequent treatment of the eggs after impregnation is quite various with different kinds of fishes; and in order to fully illustrate these differences we give a brief description of the treatment of the eggs of the salmon (*Salmo salar*), the shad (*Alosa præstabilis*), the glass-eyed pike (*Luciopeca*), and the yellow perch (*Perca flavescens*). These are representative fish, the salmon representing the class of fish depositing their eggs separate like shot, and spawning in cold water; the shad representing the fish which have similar eggs, but spawn in warm water; the glass-eyed pike representing the fishes whose eggs come separate from the fish like shot, but which stick inseparably together upon entering the water; and the yellow perch representing the fish which deposit their eggs in a gelatinous mass, like frog-spawn.

(1) *Salmon*.—The parent fish are usually confined in some inclosure where they can be conveniently caught, and a female with ripe eggs having been found, the eggs are stripped from the fish into a dry pan or pail. As soon as they are taken the milt of the male is also stripped into the same pan. The eggs and milt are then thoroughly mixed by stirring, and left to stand 2 or 3 minutes. Sufficient water is then poured into the pan to stand to the depth of 1 or 2 inches over the eggs. They will now stick together for some time, and must be left quiet till they separate of themselves, which is about half an hour. After the eggs are separated they are thoroughly washed from the superfluous milt, and when perfectly clean are placed in the hatching apparatus, where they are left until they hatch. The time varies from 35 to 70 days, according to the temperature of the water. After the young salmon are hatched they are usually artificially reared for a time before being placed in the natural waters intended for their final destination. They are retained in this way sometimes 3 or 6 months, and sometimes a yr., at the end of which they are turned loose and their artificial life is at an end. The same gen. treatment of the eggs is usually adopted with brook trout, salmon trout, char, graylings, white-fish, and other Salmonidae.

(2) *Shad*.—The eggs are generally taken from the parent fish as they are drawn up in the seine. Shad eggs are usually taken in water instead of in a dry pan, the eggs impregnating as well in water as without. The eggs after being taken are treated at first in the same way that salmon eggs are, but after they are washed they are placed in a box with a wire-netting bottom. The water always being warm in shad rivers at the spawning season, these eggs hatch in a few days. The young shad are not kept long in confinement, but are soon turned loose.

(3) *Glass-eyed Pike*.—The eggs are taken on plates of glass or something similar, care being taken to deposit only one layer on each plate. The eggs which have been taken on the glass plate adhere to it very strongly, and may be placed in any favorable spot under running water. As but little is now known about the habits and requirements of the very young fish, it is thought the best way after hatching them is to place them as soon as possible in the waters which they are intended to stock.

(4) *Yellow Perch*.—The eggs, which come out in gelatinous folds, are the easiest to hatch of all fish-eggs. It is only necessary to impregnate them in the usual way, and to keep them in moderately clean safe water having a slight circulation.

The methods by which modern F.-C. is now practised are: (1) The fish are operated upon at their own river, and when the eggs are hatched the young fry are replaced in the river for the purpose of increasing the stock. (2) The young fish when hatched, or in some cases the eggs when sufficiently matured, are transported from the place of their nativity to other waters which it is thought desirable to stock with them. (3) The fish are bred and raised at private establishments, which are supported by the sale of the spawn, young fry, and mature fish. (4) Fish of different varieties, naturally bred, are caught and transported alive to waters which are destitute of these varieties.

F.-C. is without doubt destined to be one of the great practical arts of the present civilization. Vast as were the resources of the land before they had been reached by agriculture, they did not surpass the vast unreached resources of the sea. A single spawning-ground of the herring contains, without doubt, a hundred thousand million eggs; yet this is an insignificant fraction of the whole amount of fish-eggs in the sea. These vast life-producing powers of the sea are now just where the productive powers of the land were before agriculture, with its skill and inventions made them fruitful. A no less brilliant future awaits the art of aquaculture. (See NORRIS, *Amer. Fish-Culture*; SETH GREEN, *Trout-Culture*; KLIPPART, *Fish-Culture*, and various State, U. S., and Canadian Reports.) [From orig. art. in *J. S. Univ. Soc.*, by LIVINGSTON STONE.]

Fisher, the largest of the martens, is the *Mustela Pennanti*, a carnivorous quadruped of the family Mustelidae, found in Canada and the U. S. arboreal in its habits, and receiving its name, as it is said, from its fondness for fish; which, however, it probably does not capture, but which it often steals from the traps of fur-collectors, who use fish as a bait for the pine-marten. The F. is not often trapped,

being very skilful in escaping this fate. It is some 3 ft. long, inclusive of the tail. In color it is chiefly black, often with gray or brown tints toward the head. It is a fierce nocturnal animal, living chiefly upon birds and small quadrupeds. Its fur in winter is good, and is used chiefly in Europe. The black tail was once a favorite ornament to the caps of the Polish Jews, and brought a high price, but this fashion has gone by.

Fisher (ALVAN), a painter of landscapes and portraits, b. in Needham, Mass., Aug. 9, 1792; studied under Penniman, an ornamental painter. His native talent overcame the more serious disadvantages of so cramped an education. In 1824 he took his position as an artist; in 1825 visited Europe and pursued his studies in Paris; returned to Boston, and d. Feb. 14, 1863. Was a pleasing painter, without remarkable force or brilliancy. His portrait of Dr. Spurzheim, taken immediately after his death and finished from recollection, was admired.

O. B. FROTHINGHAM.

Fisher (CHARLES), D. C. L. b. in York co., N. B., grad. at King's Coll., N. B.; studied law, was admitted to the bar, and elected to the provincial Parl. 1837. In 1848-57 was a member of the executive council; in 1852 a com. to codify the provincial statutes; from 1854 to May 1856 was atty.-gen., again in 1856-61, and again 1866; advocated the union of all the provs. of Brit. Amer., and in 1867 was a member of the conference of the reps. of Brit. N. Amer. in Lond. by which the terms of the union were arranged; was a judge of the supreme court of N. B. from 1868 to his death, Dec. 8, 1880.

Fisher (GEORGE JACKSON), M. D., b. in Westchester co., N. Y., Nov. 27, 1825, grad. in med. at the med. dept. of the New York Univ. 1849; phys. and surgeon of the N. Y. State prison at Sing Sing in 1853-54; pres. of the N. Y. Acad. of Med. 1857; member of many learned associations, and pres. of the Med. Society of the State of N. Y. 1874. Has written *Diploteratology, an Essay on Compound Human Monsters*, etc.

Fisher (GEORGE P.), b. in Milford, Del., Oct. 13, 1817, grad. at Dickinson Coll. 1838, was admitted to the bar 1841. In 1843-44 was in the Del. house of reps., in 1846 sec. of state for Del., in 1850 appointed a com. to settle claims against Brazil; atty.-gen. of Del. 1855-60, and M. C. 1861-63. Pres. Lincoln appointed him a judge in supreme court of D. C. In 1874 he came dist.-atty. of D. C.

Fisher (GEORGE PARK), D. D., b. in Wrentham, Mass., Aug. 10, 1827, grad. at Brown Univ. in 1847, and at Andover in 1851. Became prof. of divinity in Yale Coll. in 1854, and in 1861 was transferred to the chair of ecclesiastical hist. Since 1866 has been one of the eds. of the *New Englander*. Author of several important historical and critical works, among which is *Hist. of the Ref.*

Fisher (JOHN), bp. of Rochester, b. at Beverley, Eng., about 1459, took M. A. at Cambridge Univ. 1491; in 1501 became chancellor of univ., and in 1504 bp. of Rochester. In 1505 was master of Queen's Coll. Cambridge, and on Shrove Sunday, 1527, burned Tyndale's Bibles at Paul's Cross. In 1530 he opposed the divorce of Henry VIII. from Catharine of Aragon; was imprisoned in the Tower of Lond. in 1534, and, receiving the cardinal's hat from Pope Paul III. May 1535, was convicted for denying the royal supremacy, and executed June 22, 1535.

Fisher (JOHN DIX), M. D., Amer. instructor of the blind, b. in 1799, grad. at Brown Univ. 1820; assisted in the organization and management of Perkins Inst. for the Blind at Boston; was visiting phys. to Mass. Gen. Hospital. Wrote *Description of the Smallpox and Varioloid*. D. Mar. 3, 1850.

Fisheries. The right to fish in open seas, or along coasts and in waters beyond the jurisdiction of an organized state, is free to all; but the sea for a marine league, and the right to cure fish on coasts, are under the control of the sovereign of the terr.

In the treaty of 1783 G. Brit. conceded to the U. S. the right of fishing where they had it when they were Eng. colonies, and also gave them the liberty to catch and to dry and cure fish in certain other places. The treaty of Ghent, 1815 (see GHENT), said nothing of the right of F., and afterward the Brit. govt. denied any such right, on the ground that war dissolves the provisions of ordinary treaties. A convention at Lond. in 1818 granted to fishermen from the U. S. a right to fish on certain coasts of Newfoundland, the Magdalen Islands, and Labrador; and to dry and cure, along the S. and W. coasts of Newfoundland, only while they were unsettled; and afterward only by consent of proprietors, as before. These grants were made perpetual.

In 1854 the Reciprocity treaty provided, among other things, the new privilege of fishing in the waters and along the coasts of Canada, N. B., N. S., Prince Edward Island, etc., and of drying and curing also; and a reciprocal right was conceded to Brit. fishermen along the coasts of the U. S. to the 36th degree of lat. This treaty being for 10 yrs. was given up by the U. S. in 1866, and only the convention of 1818 remained, until, by the treaty of Wash. in 1871, the F. were placed substantially as they were under the Reciprocity treaty. The rights of the Brit. fishermen were extended along the coasts of the U. S. to 39°. There were other privileges on both sides, which were to be specially estimated in money, in order to equalize the advantages on both sides. A convention at Halifax in 1877 awarded to G. Brit. \$5,500,000 to compensate for the superior advantages of the U. S.

THEODORE D. WOOLSEY.

Fisheries, Statistics of. See APPENDIX.

Fisherman's Ring (*annulus piscatorius*), a seal-ring worn by the pope, who with it seals certain briefs, which are said to be "given under the fisherman's ring." It bears a figure representing St. Peter fishing, and is borne by the popes as St. Peter's successors. It has been employed since the 13th century.

Fishersville, Merrimack co., N. H., constituting the 1st ward of the city of Concord, on R. H. and the Merrimack River. It has an acad. Pop. 1870, 1499; 1880, 1521.

Fishery, Law of. The rules of the Eng. common law regulating the subject of fisheries are of a twofold variety, since navigable waters—by which is meant, in legal usage, those in which the tide ebbs and flows—are distinguished, as regards the right to fish, from those which are not navigable. In streams above the reach of the tidal flow the soil to the centre of the river-bed belongs to the riparian proprietors upon the opposite banks, and each of them possesses an exclusive right of fishery in that half of the stream over which his independent ownership exists. If the land upon both sides is vested in the same person, his fishing privilege pertains to the whole width of the river as far as the boundaries of his property along the course of the river may extend. But this exclusive right must be exercised so as not to interfere with the public convenience in passing along the stream in boats or rafts, and no dams or other obstructions can be made which would prevent the free passage of the fish, unless such privilege be given by statute. In navigable or tide waters, on the contrary, the soil is vested in the sovereign, and the right of fishery is common to the entire public. A special or exclusive privilege can only be created by legislative grant or by prescription, which must be clearly proved. This is very unusual.

The doctrines of the Eng. law concerning fisheries have been generally adopted in the U. S. In some few States, however, the common right of the public to take fish has been extended to streams ordinarily considered private, being above the flow of the tide. The regulation of fisheries by statutory provisions is very gen., particularly in recent yrs. In the prosecution of the cod, mackerel, and other fisheries along the coast of Newfoundland and the other Brit. possessions, much hostility has been created in times past between Brit. and Amer. fishermen on account of the practices of the latter in fishing unlawfully in bays and inlets, and in drying and curing their fish upon Brit. shores. In order to remedy these difficulties, various treaties have from time to time been negotiated between the U. S. and G. Brit. granting certain privileges reciprocally to the inhabs. of either country.

GEORGE CHASE.

Fish-glue, a species of isinglass suitable for making cements, etc., prepared from the offal of the fisheries.

Fish-Hawk, the common Amer. name of the *Pandion haliaetus*, a cosmopolitan bird of the family Falconidae. It subsists upon fish, and takes its prey by plunging.

Fishing Frog. See ANGLER.

Fishkill on the Hudson, or Fishkill Landing, R. R. junc., Dutchess co., on the Hudson River, 58 m. from New York. Pop. 1870, 2992; 1880, 2503.

Fish-Louse, a name applied to numerous parasites (generally entomostracous crustaceans) which infest fishes and whales. Some of them are very degraded forms.

Fish Oil, the oil of the menhaden or mossbunker (*Alosa menhaden*) and of other fishes, which are caught in large quantities for their oil on the Atlantic coast of the U. S. The refuse is dried and sold as "fish guano." The oil is used in dressing leather and adulterating oils.

Fish-skin, in mechanical arts. See SHAGREEN.

Fisk (JAMES), b. 1762, was a lawyer, represented Vt. in the U. S. Cong. 1805-9 and 1811-15; was judge of the supreme court of Vt. 1815-16. U. S. Senator 1817-18; afterward for 8 yrs. collector of customs in the dist. of Vt. D. Dec. 1, 1844.

Fisk (REV. WILBUR), D. D., b. in Brattleboro', Vt., Aug. 31, 1792, grad. at Brown Univ. in 1815. In 1818 was licensed as a local preacher in the M. E. Ch.; in 1825 chosen first prin. of the Wilbraham Acad., Mass., removing thither in 1826; in 1830 chosen first pres. of the Wesleyan Univ., Middletown, Conn., where he d. Feb. 22, 1839. Wrote *Calvinistic Controversy and Travels in Europe*. (See his *Life*, by REV. JOSEPH HOLDICH, D. D.)

Fiske (JOHN), M. A., LL.B., b. in Hartford, Conn., Mar. 30, 1842, grad. at Harvard 1863. Author of *Tobacco and Alcohols, Myths and Mythmakers, The Unseen World*, etc. Lecturer on philos. 1869-71, instructor in hist. 1870; member of Amer. Oriental Society 1867.

Fiske (REV. NATHAN WELBY), b. in Weston, Mass., Apr. 17, 1798; grad. at Dartmouth in 1817, and was prof. in Amherst Coll. (first of Gr. and Lat., and then of intellectual and moral philos.) from 1824 to 1847. His chief literary work was a translation (with large additions) of Eschenburg's *Classical Manual*, first pub. in 1836. D. in Jerusalem May 27, 1847, and was buried on Mt. Zion. He was the father of Mrs. Helen Hunt, known to the public as "H. H."

Fiske (REV. PLINY), b. in Shelburne, Mass., June 24, 1792, grad. at Middlebury Coll. in 1814, and at Andover Theological Sem. in 1818. In 1819 went as missionary to the E., and d. at Beyrout Oct. 23, 1825. (See his *Life*, by ALVAN BOND, and SPRAGUE'S *Annals*, ii. 622.)

Fiske (REV. SAMUEL), b. in Shelburne, Mass., July 23, 1828, grad. at Amherst in 1848; was in Andover Theological Sem. from 1850 to '52, tutor at Amherst from 1852 to 1855, then travelled a yr. in Europe and the E.; was settled over the Congl. ch. in Madison, Conn., in 1857; entered the Federal army as a private in the 14th Conn. regiment 1862; became capt., distinguished himself in several battles, and fell at the head of his co. on the second day of the battle of the Wilderness, May 6, 1864, dying in the hospital at Fredericksburg May 22. Wrote under the name of "Mr. Dunn Browne."

Fistula [Lat. a "pipe"], a term used in pathology to designate an abnormal canal, usually of small length and diameter, leading from one organ to another, or from some cavity of the body to the external world. The two most prominent characteristics of a F. are the constant discharge from it of a thin purulent fluid, with which the secretions of the organ affected are mixed, and the obstinacy with which it resists the healing process.

F. is caused (1) by wounds which penetrate passages, or those which follow a long and deviating course through many tissues; (2) by ulceration and the sloughing process; (3) by abscess. The last is the most frequent cause. The passage of a bullet through any region of the body some-

times leaves a canal which fails to unite: and whenever a necrosis of bone occurs there are usually one or more tracks following a winding course from it to the outside of the body. These passages are often called fistulae, but the more appropriate name for them is *sinus*. F. in ano commonly occurs in persons of an enfeebled constitution. Where it results from abscess it is more frequently the chronic than acute form which gives rise to it. At the present time some surgeons refuse to operate on a F. in ano in a patient having phthisis.

The cure of F. depends upon producing union of its walls through the agency of healthy granulation-cells. This may be brought about by stimulating applications, as the injection of nitrate of silver, corrosive sublimate, etc. in solution, or the application of the red-hot iron. Where the walls are old and indurated, it is necessary to dissect them out and remove them altogether, bringing the lips of the wound together by sutures. [From orig. art. in *J's Univ. Cyc.*, by G. H. WYNKOOP, M. D.]

Fistula, in horses, is the farrier's name for a deep-seated chronic abscess, usually situated upon the withers, and discharging pus through fistulous pipes or sinuses. When seated upon the top of the head it is called poll-evil.

Fit. See CONVULSION, APOPLEXY, and EPILEPSY.

Fitch. See VETCH.

Fitch, the commercial name of European polecat (*Putorius fetidus*). The fur, though inferior in quality to that of martens and sables, is handsome.

Fitch (BENJAMIN). See APPENDIX.

Fitch (EBENEZER), D. D., b. at Norwich, Conn., Sept. 26, 1756, grad. at Yale 1777; was tutor there 1780-83 and 1786-91, prin. of the Williamstown (Mass.) school until its erection as a coll., then its pres. 1793-1815. Having been ordained as a minister in 1795, he was subsequently pastor of the Presb. ch. in Bloomfield, N. Y., 1815-1827. D. Mar. 21, 1833.

Fitch (ELEAZAR THOMPSON), D. D., b. at New Haven, Conn., Jan. 1, 1791, grad. at Yale 1810; was Livingston prof. of divinity in the theological dept. of Yale Coll. 1817-52; author of theological reviews, etc. D. Jan. 31, 1871.

Fitch (JABEZ W.). See APPENDIX.

Fitch (JAMES), b. at Bocking, Eng., Dec. 24, 1622, came to N. Eng. when 16; studied 7 yrs. under Hooker and Stone, and was pastor at Saybrook, Conn., 1646-60, and then at Norwich, where he was the first settled minister; preached to Mohegan Indians in their own lang. D. Nov. 10, 1702.

Fitch (JOHN), b. in Windsor, Conn., Jan. 21, 1743. After an apprenticeship at clock-making he established a brass-foundry. In his 26th yr. he established himself at Trenton, N. J., as a silversmith. During the early part of the Revolution he had large contracts for the repair of arms, but when the Brit. army entered Trenton his shop and its contents were burned. Having accumulated about \$4000 in continental money, he procured an appointment as deputy surveyor for Va., having sold his paper money for \$100 in silver. After suffering many hardships, he reached the place of destination and commenced his surveys. In 1781 he returned the owner of 1600 acres in the valley of Salt River, and spent some time in Phila. In 1782 he raised a party of 10 emigrants, and again started for the W. At the mouth of the Muskingum the party were attacked by Indians; two were murdered, and the others were carried into captivity. After travelling with different tribes more than 1200 m., he was purchased by a Brit. officer at Detroit, became a prisoner of war, and was released at Montreal.

The thought of propelling vessels by steam originated with him in 1784, and in Aug. 1785 he petitioned Cong. for aid in constructing his boat. The records of the Amer. Philosophical Society of Phila. show that "a model, accompanied by a drawing and description of a machine for working a boat against a stream by means of a steam-engine, was laid before the society by John Fitch on Sept. 27, 1785." With the pecuniary assistance of several gentlemen, F. immediately undertook to build a steamboat. On May 1, 1787, his steamboat, *The Perseverance*, was put in motion on the Del. River, and made 3 m. per hour. Various improvements were soon added, and the vessel was successfully tested in the fall of 1788; it moved in dead water at the rate of 8 m. an hour, or 1 m. in 7½ minutes. With 30 passengers it left Phila. and, moving against the current of the Del., reached Burlington, a distance of 20 m., in 3 hours and 10 minutes. The steamboat was run for some time as a packet to Burlington, but after several mishaps it was burned. F. was sent to Fr. under the auspices of Consul Aaron Vail, but finding all the machinists engaged on govt. work, Mr. Vail furnished F. with means to return to his native country. He crossed the Brit. Channel, and during his stay in Lond., in 1793, he wrote a pamphlet entitled *An Explanation for Keeping a Ship's Traverse at Sea by the Columbian Ready Reckoner*. He remained in Lond. until his funds were exhausted, then secured a passage on a homeward-bound vessel, and landed at Boston in 1794 in a state of destitution. From that time to 1796 he resided at Sharon, Conn. In the *Documentary Hist. of New York*, vol. ii. p. 585, will be found an account of experiments subsequently made by F. in propelling a small boat by steam on the Collect Pond, formerly existing in the lower part of New York city. This boat had side wheels, and a screw propeller at the stern. In 1797 F. went to Ky. to get possession of lands he had purchased while surveying there. D. July 2, 1798. SAMUEL D. TILLMAN.

Fitch (THOMAS), gov. of Conn. from 1754 to 1766, b. in Conn. 1699, grad. at Yale 1721; practised law, and filled the offices of counsellor, judge of the supreme court, chief-justice (1750-54), lieutenant-gov., and gov. In 1766 was driven into retirement for having taken the oath of office prescribed in the Stamp Act. D. July 18, 1774.

Fitchburg, city and R. R. centre, one of the caps. of Worcester co., Mass., on a branch of the Nashua River. Pop. 1870, 11,260; 1880, 12,420.

Fitz (HENRY), telescope-maker, b. in Newburyport, Mass., 1808; was a printer and then a locksmith, but in 1835

made a reflecting telescope, and in 1844 invented a method of perfecting object-glasses for refracting telescopes. He finally made an instrument of 16-inch aperture, his telescopes having come to notice through the fair of the Amer. Inst. at New York in 1845. His instruments were so delicate that the change in the form of the object-glass by expansion, caused by passing the finger over it in a frosty night, could be detected. D. Nov. 6, 1863.

Fitzgerald (RT. HON. JOHN DAVID), P. C., Q. C., LL.D., b. in Dublin in 1816, ed. at Trinity Coll., Dublin; called to the bar in 1838, and became a Q. C. in 1847. In 1855-56 was solicitor-gen. of Ire., and in 1856-58 and 1859-60 atty.-gen. In the House of Commons from Ennis July 1852 to Feb. 1860, and was then made a judge of court of queen's bench in Ire. Privy councillor in 1856.

Fitzgerald (PERCY HETHERINGTON), M. A., F. S. A., b. at Fane Valley, Ire., 1834, ed. at Stonyhurst Coll. and Trinity Coll., Dublin; came to the Irish bar, and was for a time a crown prosecutor on the N. E. circuit. Wrote a *Life of Sterne* and *Life of Garrick*.

Fitzgerald (WILLIAM), D. D., Anglican bp. of Killaloe, Kilfenora, Clonfert, and Kilmacduagh, Ire., b. in Ire. Dec. 3, 1814, ed. at Trinity Coll., Dublin, where he had B. A. in 1837, and of which he became a fellow. In 1840 he wrote in opposition to *The Tracts for the Times*. In 1848 was appointed prof. of moral philos. in Trinity Coll., and in 1853 prof. of ecclesiastical hist. Was consecrated to the see of Cork 1857, and transferred to his present see 1862.

Fitzgerald (SIR WILLIAM ROBERT SEYMOUR VESEY), D. C. L., G. C. S. I., b. 1818, grad. at Oriel Coll., Ox., 1837, and had M. A. in 1844, and D. C. L. in 1863. In Jan. 1839 was called to the bar at Lincoln's Inn, and gained a seat in Parl. for the borough of Horsham 1848, being re-elected in 1854. Was under-sec. for foreign affairs 1859, and was made gov. of Bombay 1866, being made a privy councillor Dec. 28, and sailing for India Feb. 1867. The same yr. he was nominated grand cross of the order of Star of India.

Fitzpatrick (BENJAMIN), U. S. Senator, b. in Greene co., Ga., June 30, 1802, emigrated to the valley of the Ala. River, near Montgomery, Ala., 1815; studied law, and began to practise in 1821; was gov. of Ala. 1841-45. In 1852 he was appointed U. S. Senator from Ala., and then elected to the same position for the term ending in 1861; left the Senate in Feb. 1861, and took an active part in the Confed. cause. Was often pres. *pro tem.* of the U. S. Senate, pres. of the Ala. constitutional convention 1865, and a delegate to the Phila. Union national convention 1866. D. Nov. 25, 1869.

Fitzpatrick (JOHN BERNARD), D. D., b. in Boston Nov. 1, 1812, ed. at Boston, at the Coll. of Montreal, and the Sulpician Sem., Paris. In 1840 was ordained a R. Cath. priest; in 1844 was consecrated coadjutor-bp. of Boston, *cum jure successionis*, and in 1846 succeeded Bp. Fenwick in the bishopric. D. Feb. 13, 1866.

Fitzroy (ROBERT), Eng. vice-admiral, b. July 5, 1805, entered the Brit. navy 1819; was lieut. 1824; took part in a govt. expedition to the coast of S. Amer. in 1828 and 1831. In 1841 was M. P. for Durham, and gov. of New Zealand 1843-46. In 1854 became supt. of the meteorological dept. of the board of trade, rear-admiral in 1857, and in 1862 established a system of "storm-warnings." Was made vice-admiral 1863. With Capt. King he wrote *Narrative of the Surveying Voyages of H. M. S. Adventure and Beagle, and a Barometer Manual and Weather-Book*. D. Apr. 30, 1865.

Fiume, an Austrian seaport on the Adriatic, carries on a very important export trade from Hungary and a flourishing shipbuilding industry. Pop. 20,981.

Five Forks, a locality in Va., about 15 m. S. W. of Petersburg, where was fought, Apr. 1, 1865, the last important battle of the c. war, Gen. Sheridan being in immediate command of the U. force here engaged. The "Forks" are formed by the junction of several roads, making an important strategic point in the operations around Petersburg. It had been several times strongly menaced, and Gen. Lee now held it with about 15,000 men. Sheridan had somewhat more than 21,000. The action began at daylight, but it was past noon when the Confeds. were forced back into their intrenchments, from which they were driven out by a simultaneous attack upon every side. The U. loss was about 1000; the Confeds., beside their killed and wounded, lost more than 5000 prisoners.

Five Points Mission. Long before 1850 the Five Points in New York had come to be regarded as the plague-spot of Amer. In May 1850 Rev. Lewis M. Pease of the M. E. Ch. was appointed a missionary to this field. He secured a room in the very heart of the F. P. The next step was to gain an influence over the children. While yet unknown to them he engaged with a number of boys in a game of marbles first, and then in a wholesome lunch. During the next few days he was frequently accosted by, "Say, mister, ain't you goin' ter have a Sunday-school? And you'll have cake too, won't you?" When the time came for the school there was no lack of children. The great secret of success was found to lie in attending first to the phys. well-being of the children. At this time every house in this vicinity was a den of infamy, and to lead their inmates to a better life was the work of the missionary. The great first want was honest industry and proper home-influences. With much difficulty these were provided. The owners as well as the keepers of disreputable houses were indicted, and their trade broken up. House after house was secured by the missionary until 8 were joined for the purposes of a Home. Thousands of garments were given out to be manufactured by the poor. Employment and a home provided, the next step was a day-school. Two yrs. before this the ch. of the Ascension (Epis.) of New York had contributed means for a day-school on the F. P. The fund here found a channel for its appropriation, but with the understanding that the school should not be denominational. Sept. 1850 was the date of its commencement. For 15 yrs. this school derived its entire support from the ch. of the Ascension. The work in its di-

rectly religious aspects was denominational, and sustained by the M. E. Ch., but in its educational, industrial, and home features it was catholic, deriving its supplies from the gen. public. At the close of the first yr. it was deemed best to leave Mr. Pease to the temporal, and have another missionary appointed to attend to the strictly spiritual interests. Rev. John Luckey was thus appointed, in May 1851. During this and the succeeding yr. the notorious "Old Brewery" was purchased, and a house erected on its site by the Ladies' Mission, while Mr. Pease retained the old ground. The House of Industry was incorporated in Mar. 1854. It has provided for more than 2000 of the once wretched denizens of this region. [From orig. art. in *J.'s Univ. Cyc.*, by REV. L. M. PEASE.]

Fixed Air, a name given by Dr. Black to carbonic acid. That this gas was liberated in the burning of lime was known to Van Helmont, who called it *gas sylvestre*, but Dr. Black's name is more common. F. A. is carbon dioxide; carbonic acid is formed by combining this with water.

Fixed Oils, those oils which are not volatile without decomposition, in contradistinction to the volatile or essential oils, which evaporate at ordinary temperatures.

Fixed Stars. See STARS.

Fixture [Lat. *figo*, supine *fixum*, to "fix"], an article or structure which, in itself personal property, has been made an annexation or become accessory to real estate. Annexations of this nature, when made under certain conditions and circumstances, still continue to be considered removable, as personal property, while in a different class of cases they are regarded as constituting a part of the realty merely as a result of the change that has been effected in their situation and relations.

The question to be determined in every instance is, Has an addition to land become itself real property? It was formerly a well established legal principle that such a result was consequent upon every case of attachment, and the rule was stated in a concise Lat. maxim (*quicquid plantatur solo, solo cedit*)—whatever is affixed to the soil belongs to the soil—i. e. becomes a part of it, but the exceptions which have been established have become so numerous that the formerly received doctrine, though still applicable as a gen. principle relating to F., can no longer be regarded as of much practical value. In the elucidation of the subject the primary inquiry must be whether there has been a true annexation in the legal meaning of the term. This annexation may either be *actual*, as where there is some real substantial attachment to land or buildings, or it may be merely *constructive*, as in cases where, though there is apparently no connection, and the articles are easily portable or removable, they are yet properly considered as appurtenant to certain real property and indispensable to its integrity. Thus, machinery attached to buildings, furnaces, mirrors fastened to walls, etc., would be illustrations of actual F., while door-keys, window-blinds, or bells temporarily detached, fences that have been removed, but are to be replaced, etc., would constitute *constructive F.*

After the subject of annexation has been considered, another leading inquiry is the presumable intention with which the erections or additions were made, and by the establishment of what principles the requirements of a wise and judicious public policy would best be promoted. In examining into the intent with which F. were erected, the actual purpose is not so much in question as the reasonably and justly *presumable* intention which the law can gather from all the attendant circumstances and the relations of the parties concerned to have been the guiding motive. When, for instance, a person sells land with certain additions upon it of the equivocal nature of F., and which the purchaser may naturally have presumed to pass with the grant, and to have been intended for the permanent improvement of the property, the law will not permit the vendor to claim that his actual intent, though secretly indulged, was to consider the articles as personalty and remove them for his own use. The dictates of public policy also support the same rule, since otherwise fraud could be readily committed, and free transfers of property would be hampered by suspicion and uncertainty. Again, when additions for purposes of trade are made upon leased property by a tenant for yrs. it is necessarily presumable that he does not intend that they shall be permanent attachments, but that he only purposes their maintenance during the time of his tenancy. Considerations of public policy also support this conclusion, since the establishment of a prohibition upon tenants to erect F. which they could remove when their interests expired would materially interfere with the leasing of property and with commercial enterprise and progress. In all cases, however, in which specific contracts are made, or persons have a clear understanding of the terms upon which their interests are created, no opportunity for presumption can exist, and if the agreements be legal public policy can interpose no obstacle. The parties may determine upon what stipulations they will.

On these grounds has been made a division of the parties in regard to whom questions concerning F. most generally arise into 2 great classes: (a) One class consists of those interested in property on which F. have been erected by one having a *permanent* interest therein; (b) the second class is where the F. were annexed by one having only a *limited* interest in the land. Under the first class questions arise (1) between heir and executor of one adding F. to land; (2) between mortgagee and mortgagee of property on which F. had been erected by the former; (3) between vendor and vendee of land with F. thereon; (4) between vendor and contractor to buy land under similar circumstances. Under the second class questions occur (1) between landlord and tenant where the latter erects F. after the commencement of his lease; and (2) between tenant for life and remainderman or reversioner. When the interests of all those varieties of parties grouped under the first class are concerned, the presumption is quite rigid that attachments to the land

constitute a part of it, and consequently are governed by all the rules appertaining to real estate. F., therefore, which the law would presume to have been attached for permanent continuance will pass to heirs rather than to executors, will be conveyed under a deed or mortgage of the property to the vendee or mortgagee, or will be included within the contract of one who agrees to purchase the land. But a large number of annexations may, even in this class of instances, be considered as personal property, for those additions, as has been stated, are alone treated as realty in regard to which the legal presumption is that they were added for the *permanent improvement and habitual enjoyment* of the premises. In order to determine whether such a presumption can justly be entertained, regard is had to a variety of tests, as, for instance, to the nature of the annexation, whether bulky and unwieldy, or light and easily removable; to the adaptability of the attachment to the proper and natural use of the building in which it is placed, or of the land with which it is connected; and to many diverse considerations which must evidently depend upon the circumstances of each particular case.

One test of considerable importance and frequent application is to consider the manner in which the F. is joined to or connected with the property to which it is attached—whether it can be removed without injury to the premises, or whether its fastenings can be readily detached. This criterion is only valuable, however, as indicative of an intention to have the articles remain permanent attachments to the land. Thus, machinery attached to a building by means of rods passing through joists and there secured by nuts has been held to be real estate, while looms merely fastened to the floor by screws have been considered personalty. In regard to such objects as stoves, boilers, kettles, and various articles of machinery of moderate size, the cases have exhibited much discrepancy. Buildings erected upon wooden blocks merely are generally considered chattels. The rolling-stock of R. Rs. is by some courts considered real, by others personal property, in perplexing variety. As between mortgagee and mortgagee, it has been held in New York to be personal property.

In regard to the rights of those persons forming the second class above mentioned—viz. landlord and tenant, and tenant for life and remainderman—the law concerning F. is very different. Both the question of presumed intent and the dictates of public policy, as has been seen, lead to conclusions essentially diverse from those which have been stated as applying to other cases. But the doctrine of presumed intention is not carried so far as to permit a tenant to erect anything he may choose upon his landlord's premises, with the privilege of removing it when his tenancy is ended. The tenant, therefore, may only take away additions he has made when they belong to one of these special classes: (1) He may remove all F. which he has erected for purposes of trade or manufacture. This rule is established to promote business enterprise. Thus, brewing vessels, cider-mills, closets, shop-counters, engines, presses, etc., may all be rightfully removed. The removal must be made by the tenant so as not to injure the landlord's premises. (2) In the U. S. the gen. rule is established that F. annexed for agricultural purposes may be removed. In Eng. a contrary rule was maintained at common law, but some exceptions have been established by statute. Nursery trees would be an illustration of agricultural F. (3) Articles erected for domestic use and convenience and the necessary enjoyment of the premises are, in gen., removable. This privilege would not probably extend to objects of mere ornament. In any case it is necessary that the tenant should exercise his right of removal before the expiration of his interest and his yielding up possession, as otherwise he will be deemed to have abandoned the F. to his landlord. But the executor of a tenant for life, as the necessity of the case demands, has a reasonable time after the tenant's death to take away the F.

The rights of landlord and tenant may be variously modified by mutual agreement. They may contract to consider certain articles chattels which would otherwise become real estate according to gen. rules, and *vice versa*. It is quite common to find a provision in leases that the F. at the end of the term shall be taken by the landlord at a valuation made in a specified manner; as, e. g., by appraisers selected by the parties. By such an agreement, matters which, legally speaking, would be real estate may be made to appertain so far to the tenant as to entitle him to compensation.

GEORGE CHASE.

Flac'cus (CAIUS VALERIUS), an epic poet who flourished in the reign of Vespasian. He d. in the reign of Domitian, probably about A. D. 89. He was the author of a poem entitled *Argonautica*, on the expedition of the Argonauts, in imitation of the poem of Apollonius of Rhodes, which extended to 8 books, but was left unfinished.

Flaccus (VERRICUS), a freedman by birth, distinguished as a grammarian and teacher at Rome under Augustus. He was so successful in his method of instruction that the emp. placed his own grandsons under his charge. He was the author of several works, historical, antiquarian, and grammatical, the most important of which, and the one the loss of which is most deplored, was entitled *De Significatu Verborum*. (See FESTUS.)

Flac'cius, Flach, or Vlach Francowitz (MATTHIAS), one of the greatest Lutheran scholars and polemics of the second generation of the era of the Ref., b. Mar. 21, 1520, at Albona, in Venetian Illyria (hence *Illyricus*). He desired to become a monk, but was dissuaded by Lupetinus, provincial of the Minorites, who put into his hands some of Luther's writings and counselled him to study theol. in Ger. He went to Bale 1539, became private teacher at Tübingen 1540, went to Wittenberg 1541. He became one of the most earnest defenders of Luther's faith. He received the chair of Heb. 1544; in 1545 he married; 1547 the Schmalkald war compelled him to leave Wittenberg. In Magdeburg he be-

gan (1557) his immortal ch. hist., the *Magdeburg Centuries*, in which he was the main worker, though he had a body of able collaborators. The *Catalogus testium Veritatis* (1556) was meant to trace in a long line of witnesses the evangelical protest of the ages against the errors of Rome. In the same interest he pub. the *Missa Latina* (1557). In 1561 he was dismissed from the Univ. of Jena for his resistance of the encroachments of the state on the liberties of the Ch. His whole after-life was one of wandering and suffering, amid which he finished his other great works, the *Clavis Scripturæ Sacre* (1567) and his *Glossa on the N. T.* D. Mar. 11, 1575. (See *Life*, by PRÆGER.) C. P. KRAUTH.

Flag, the name of various long-leaved aquatic plants, such as sweet-F. (see ACORUS CALAMUS), blue-F. (see IRIS), and cat-tail F. (see CAT-TAIL). The fixed sea-weeds are often called F.

Flag, See ENSIGN.

Flagellants [Lat. *flagellum*, a "whip," "scourge"], a name given to companies of persons in the Middle Ages who marched and sang and scourged themselves in public places for their own and others' sins. During the 13th, 14th, and 15th centuries the F. became a sort of intermittent order of fanatics, frequently reappearing here and there in times of extraordinary declension or distress. In spite of all their extravagances, their existence served as a sort of protest against the blind ritualism of the age. (See FÜRSTEMANN'S *Die christlichen Geisselgesellschaften*.)

Flagg (AZENIAH C.), b. in Clinton co., N. Y., 1790; served in a N. Y. regiment in the war of 1812, participating in several engagements; in 1823-24 represented Clinton co., N. Y., in the State legislature, and was sec. of N. Y. State 1826-33. In 1834 he was appointed State comptroller, held the office for 5 yrs., and was reappointed 1842-46. He contributed for yrs. to the Albany *Argus*, opposed the U. S. Bank, and was a founder of the Barnburner (afterward the Free-Soil) party. He was elected comptroller of New York City in 1852 and in 1855. In 1859 he became blind. D. Nov. 25, 1873.

Flagg (EDMUND), a journalist and author, born at Wiscasset, Me., Nov. 24, 1815, grad. at Bowdoin 1835; taught at Louisville, Ky., was admitted to the bar 1837, practised at Vicksburg, Miss., 1844-45; conducted the St. Louis (Mo.) *Evening Gazette*, and was reporter of the co. courts. In 1848-50 was sec. to the U. S. minister at Berlin, in 1850-51 consul at Venice. In 1854 became chief clerk of a commercial bureau in the state dept. at Wash. Wrote *The Far West*, dramas, poems, etc.

Flagg (GEORGE WHITING), painter, b. in New Haven, Conn., June 26, 1816, a nephew of Washington Allston, with whom he studied, and from whom he derived his most earnest impulses toward excellence in his profession. Was considered in his youth a prodigy, and great expectations were cherished of him. His boyhood was passed in Charleston, S. C., his youth in Boston, his early manhood in Lond. In Lond. he painted portraits mainly, though his taste for composition pictures occasionally showed itself. His resemblance in style to artists of the Venetian school is due probably to association with Allston.

Flagg (JARED BRADLEY), D. D., brother of George, b. in New Haven June 16, 1820; began drawing at the age of 13; studied with his brother and uncle; devoted himself mainly to portrait-painting; went in 1849 to New York, and exhibited in the National Acad. his *Angelo and Isabella*, which secured his election as an academician. In 1854 Mr. F. engaged in the study of theol., and took deacon's orders in the P. E. Ch. After living in Brooklyn, L. I., for some yrs. as rector of Grace ch., he removed to New Haven, and thence to New York. His clerical duties have not put a stop wholly to his career as an artist. He has painted many portraits, some ideal pieces, and has been active in the establishment of the art-gallery at Yale Coll.

Flag officer, one who commands a fleet or squadron, and is thereby entitled to hoist a flag at the mast-head of the vessel (called the flagship) in which he sails, as the token of his authority. F. O., in our navy as well as those of other naval powers, are divided into the grades of admiral, vice-admiral, rear-admiral, and commodore. Their stations in time of action or of tactical exercise depend somewhat upon the size of the fleet. They should ordinarily, however, be found near the centres of their commands. They direct the fleet or squadron under their command, as to their diplomatic as well as to their naval relations.

Flagstone, stone cut or split in thin layers, and used for walks, floors, etc. In all cities and towns the consumption of stone for this purpose is large; and since the best quality of flagging is comparatively rare, it becomes an article of very considerable value, and one which in its production and transportation gives employment to several millions of dollars of cap. Good flagging is strong and smooth, without being slippery; hence, a stone which will furnish it must be readily worked into slabs of from 2 to 4 inches in thickness, with an area of from 10 to 100 or even more square ft., and one on which a uniform surface can be readily produced. By far the greater part of flagging used is composed of stone which splits readily into slabs of the proper thickness, and of which the natural surfaces are so smooth as to require little dressing. The rock which best fulfils these requirements is generally a laminated sandstone, but mica-slate, marble, and granite are frequently used for the walks of our cities. Some of our limestones cleave readily and afford a handsome flagging, but when worn smooth in wet weather they become slippery, and from this cause dangerous. The same objection holds against granite. This material is frequently wrought into slabs of large size, which are so laid as to stretch entirely across the sidewalk in front of business buildings; but, while very strong and durable, and forming a convenient roof to vaults below, they are rough and uncomfortable to the feet when new, and are dangerously smooth when worn. The perfection of flagging is found in a strong, fine-

grained sandstone laid in accurately joined flags of considerable size, of which the surfaces have been sawed or rubbed. Even when wet the grain of such a stone holds the foot firmly and makes walking easy and pleasant. Marble flagging has, from its crystalline, granular texture, the same excellence with sandstone, but it is much more expensive. Some varieties of mica-slate afford good flagging, like that in front of the Capitol at Wash., which is clean, bright, and silvery in appearance and pleasant to the feet; but it wears unevenly, and is apt to crimp at the edges. One of the best varieties of flagging known in the world is that most generally used in New York, and popularly known as the *bluestone*. This is a fine-grained, somewhat metamorphosed sandstone, derived from the Hamilton group, and chiefly quarried on the Hudson at Rondout. It lies in strata from $\frac{1}{4}$ inch to 6 inches in thickness, which cleave readily, work with accuracy, and are very strong. A belt of this formation stretches across from the Hudson to the line of the Erie R. R. near Port Jervis; much good stone coming to market from the last mentioned district. Slabs of any required dimensions can be furnished at the Rondout quarries, and in several instances they have been laid in New York 12 by 15 ft. in area. The natural surface of these flags is so smooth that they usually require but little dressing. Where more perfect finish is desired they are crenelled, sawed, or rubbed. When so treated this stone affords an unsurpassed walk. J. S. NEWBERRY.

Flamboyant. See APPENDIX.

Flame [Lat. *flamma*], a mass of visibly glowing gas; ordinarily, of a gas in process of combustion with air or oxygen. But flame may accompany the combination of any gaseous bodies, provided the action be sufficiently intense to produce luminosity; or it may even result from the intense heating of a gas whose nature is not thereby changed.

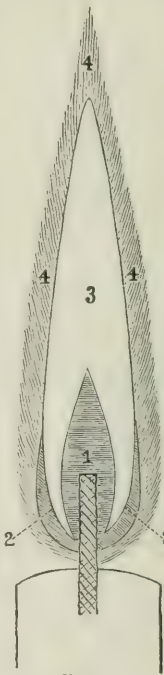
Structure of a regular Hydrocarbon Flame.—In a candle-flame we readily distinguish 4 distinct portions: 1. Immediately surrounding the wick there is a dark space of conical shape (No. 1) filled with the combustible gases formed

by the first action of the heat on the fuel, together with those flowing in through the base of the F. The temperature in this dark space is quite low. 2. Surrounding the base of the dark cone and the lower portion of the luminous part is a cup-shaped zone (No. 2), of a blue tint, faintly luminous, but sharply defined. It results from the sudden and complete combustion of the gases of the dark cone, with a full supply of air striking them from without. 3. Above the dark cone lies the luminous portion of the F. (No. 3), when it exists at all, its extent depending (other things being equal) upon the relative amount of carbon present in the fuel. In a wax, tallow, or coal-gas F. it forms a slender, rounded cone with hollow base; while in that of alcohol it appears as a thin inverted cup-shaped zone. Its prominent characteristic is the separation of highly heated and therefore luminous carbon, out of its combinations with hydrogen, by the intense heat of No. 4, the exterior zone of final and complete combustion. The latter, a faintly luminous halo, surrounds the F. on all sides, and is its hottest portion.

Luminosity of Flames.—The luminosity of flames varies from the faintly luminous flames of hydrogen, carbonic oxide, or sulphur, to the intense brilliancy of the "Bude light," in which coal gas is burned with pure oxygen. Under ordinary circumstances, useful luminosity is dependent upon the presence in the F. of a sufficient (yet not excessive) amount of a highly heated solid, usually carbon. But when illuminating gas is, previous to combustion, mixed with air or oxygen sufficient for the complete combustion of all its ingredients, the separation of carbon, and consequent luminosity, will be suppressed, while the temperature is greatly increased. Feeble luminosity may also be caused by an inadequate amount of carbon in the fuel, or by an excessive supply of carbon, or fuel.

The temperature of flames depends primarily upon the nature of the fuel, upon the rapidity and completeness of combustion, and upon the amount of inert gas mixed with the active ingredients. The hottest F. is that of pure hydrogen burning with half its bulk of pure oxygen. When, in a mixture of combustible gas or vapor with air or oxygen, either of the two is present in great excess over the proportion required for complete combustion, the mixture will either not burn at all, or will burn with a quiet F. But if neither be in great excess, a F. will instantly fire the entire mass, and an explosion ensues.

The color of flames depends essentially upon the substances that are vaporized within them. Thus common salt produces a yellow tint; copper, green and blue; lime, orange red; strontium, crimson; potassium, violet, etc. The appearance of F. is sometimes presented by dense masses of small particles, either themselves red hot or strongly illuminated from an outside source. Such is doubtless the nature of the immense sheets of "flame" often reported as issuing from volcanoes during eruptions, which are in reality but jets and clouds of volcanic ashes and smoke lighted up by the fiery masses in the crater. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. E. W. HILGARD, Ph. D.]



Flame.

Flamin'go (*Phenicopterus*), a herodionine genus of birds, constituting the family Phenicopteridae, remarkable



Flamingo.

for the length of their necks and legs, webbed feet, and deflected lamellar bills. *Phenicopterus ruber* is met with on the Fla. keys.

Flamin'ian Way [Lat. *Via Flaminia*], the prin. N. road which led from anc. Rome. It was laid out from the Flaminian gate of Rome to Ariminum by C. Flaminius the Elder in 220 B. C., during his censorship, and with its subsequent extensions and branches finally reached nearly all the large towns of N. It. Its remains are still visible.

Flamin'ius (*Tryps Quinctus*), a Rom. gen., b. about 230 B. C., became questor 199 and consul 198; invaded Epirus, which he subjugated; gained in 197 the battle of Cynoscephalæ over Philip, the last king of Macedon; proclaimed 196 the independence of Gr.; overthrew Nabis in the Peloponnese 195; triumphed 194; was ambassador to Gr. 192-190; censor 189; envoy to Prusias of Bithynia 183, designing to arrest Hannibal, who was an exile there. D. about 174 B. C.—His brother, **LUCIUS QUINTIUS FLAMINIUS**, was an able gen. and admiral, notorious for vice and cruelty.

Flamin'ius (*CAIUS*), a Rom. of plebeian birth, became tribune 232 B. C., and carried an agrarian law; was praetor in 227; as consul in 223 defeated the Insubrian Gauls and triumphed, but was deprived of his office by the senate; was magister equitum to M. Minucius Rufus 221, but both had to resign on account of the squeaking of a mouse, an evil omen; was one of the censors in 220, and constructed the Flaminian Way and the Flaminian Circus; again consul in 217; marched against Hannibal; was defeated and slain in battle at Lake Thrasymene, June 23, 217 B. C.—His son, **CAIUS FLAMINIUS**, was an able gen., consul in 187 B. C.

Flamma'rión (*CAMILLE*), a Fr. astron., b. Feb. 25, 1842; wrote many popular works on astron.

Flam'steed (*JOHN*), the first astron. royal, b. Aug. 19, 1646; was appointed astron. royal in 1675; spent the remainder of his life at Greenwich. His great work was *Historia Coelestis Britannice*, the first trustworthy catalogue of the fixed stars. D. Dec. 31, 1719.

Flan'ders, formerly the name of the terr. comprising the 2 provs. of Belg., E. and W. F., the S. portion of the prov. of Zealand, in the Netherlands, and 2 depts. of Fr. In the latter part of the 9th century this terr. was given by the Fr. king Charles the Bald as a fief to his son-in-law, Baldwin, count of *Vlaenderen*, who gave the country its name. On the marriage of Marguerite of F. to Philip the Bold of Burgundy (1384), F. became united to Burgundy, and a century later (1477), on the death of Charles the Bold, it passed to the house of Hapsburg by the marriage of Mary of Burgundy to the archduke Maximilian. On the abdication of Charles V., in 1556, F. and Burgundy came into the possession of the Sp. line of the house of Hapsburg, but the terr. of F. was soon diminished, a N. portion of it being transferred to the States-General by the Peace of Westphalia (1648), and a S. portion being conquered by Louis XIV., and secured to him by the Peace of Utrecht (1713). The remainder of F. fell again (1714) to the Aus. line of the house of Hapsburg, but in 1794 it was incorporated with the Fr. republic, and afterward with the empire, until the Cong. of Vienna (1814) conferred the terr. on the kingdom of the Netherlands, to which it remained united till the formation of the kingdom of Belg. in 1831, of which kingdom it forms 2 provs.—E. and W. F.

Flanders (*BENJAMIN FRANKLIN*), b. at Bristol, N. H., Jan. 26, 1816, grad. at Dartmouth Coll. 1842; went to New Orleans in Jan. 1843; studied law and taught there; edited *The Tropic*; held some municipal and public positions; was forced to flee to the N. States in Jan. 1862, for Unionism; returned to New Orleans when it was captured by the U. forces; was city treasurer in 1862, and M. C. from La. 1863-67; then military gov. of the State 1867-68.

Flaton'ia, Tex. See APPENDIX.

Fla'vel (*JOHN*), an Eng. nonconformist clergyman, b. about 1627; was ed. at Oxford, and became rector of Dartmouth in 1656, but was ejected for nonconformity in 1662, and afterward preached in private houses. His best known work is *Methods of Grace*. D. June 29, 1691.

Flavia'nus, patriarch of Antioch, b. about 309 A. D., in early life was a lay monk, and, according to Theodoret, he, with Diodorus, his associate, first introduced the re-

sponsive singing of the Psalter. In 381 A. D. he was chosen bp. of Antioch, but was not fully acknowledged by all factions until 390. In 387 he interceded with Theodosius the Great for the seditious people of Antioch. He strongly opposed Arianism, and d. in 404 A. D.—Another Flavianus was bp. of Antioch 498-512, when he was deposed and banished to Petra, where he d. in 518 A. D. He is commemorated as a confessor by the R. Cath. Ch. July 4.

Flavia'nus, SAINT, became bp. of Constantinople 446 A. D., and was from the first opposed by Theodosius II., who favored the Eutychnian heresy. F. called a synod which deposed and excommunicated Eutyches (448), but in 449 the emp. convened a council at Ephesus, presided over by Dioscurus, bp. of Alexandria, the enemy of F., who was deposed and ordered to be banished, but was set upon and so beaten that he d. 449 A. D.

Fla'vine, a preparation of quercitron bark.

Fla'vius, the name of many eminent Roms., mostly of the gens Flavia; but many of the Flavii who figure in hist. were undoubtedly not of this gens.—CNEIUS F., curule ædile in 303 B. C., was the son of a freedman and sec. to Appius Claudius Cæcus. His publication of the *Jus Flavianum*, embracing secret rules of judicial procedure, made him popular with the common people.—Vespasian, Constantine the Great, and other Rom. emps. were called Flavians.

Flax (*Linum usitatissimum*) is known throughout the civilized world. The genus *Linum* contains several species, of which this is the only one of especial value or of commercial importance. The plant is an annual, growing from 1 to 3 ft. high. The leaves are alternate upon the straight, slender stem and branches. The flowers are blue, about an inch in diameter. The petals drop within a few hours after the flowers open, and the seed-heads, called *bolls*, form rapidly, becoming finally nearly globular, and containing a flat, oval seed of a reddish-brown color, very smooth and glossy. The valuable portions of the plant are the fibrous coating of the stalk, and the seed.

The *fibre*—when freed from all else, so far as possible, is nearly pure bast fibre, of a light grayish-brown color, inclining to green, exceedingly tough, adapted to spinning and weaving, capable of being bleached to snowy whiteness and of taking a variety of colors in dyeing, which it holds faster than cotton. The ultimate filaments are hollow, thick-walled, and thus nearly solid cylindrical cells, which are terminated by exceedingly attenuated points, varying in thickness from $\frac{1}{650}$ to $\frac{1}{500}$ of an inch. When the fibre is separated from the bark and wood of the stalk it appears in market in 2 prin. forms—viz. "dressed F." and "tow."

The *seed* consists of the embryo or kernel and its outer coverings, principally its reddish-brown shell, which is very mucilaginous, yielding a thick, glairy gum, becoming quite viscid when cold. The kernel is rich in a valuable oil (linseed oil), which possesses the property of "drying" or hardening on exposure to the air to a remarkable degree.

Flax Culture.—F. is a plant of rapid growth, for, being sown in Apr. or May and harvested early in Aug., it is less than 3 months in possession of the ground. Good wheat-soils are especially favorable to F. Heavy clays, coarse gravels, light sands, and peaty soils are not so. Moderately stiff soils should be ploughed in autumn, light ones early in the spring. When the ground is warm in spring the seed should be sown—say from the 15th of Apr. to the 1st of May in the Middle States. It is very important that the sowing should be even, for otherwise the tendency to branch is great, and those plants which are least crowded will grow coarser and larger, ripen their seed unevenly, and cause the crop of lint to be of unequal fineness. It should be harrowed in evenly with a light harrow. The F. should get the start of the weeds, and when it is about 3 or 4 inches high it should be carefully examined, and if necessary weeded at once.

Pulling.—F. is ready to pull when it changes color decidedly after blooming, becoming of a yellowish or golden-brown color, $\frac{3}{4}$ of the bolls being plump and beginning to turn brown, and the leaves having shrivelled and dried upon the lower half of the yellow stalks. Pulling should take place a little earlier if lint be the prin. object, but a little later if the seed pays best. If the fibre is an important object, the F. should be pulled, but otherwise it may be mowed, cutting close as possible to the ground.

Threshing.—After drying and standing in stacks, or not, as the case may be, the seed may be threshed off by a flail or by beating the heads of the sheaves against a block of wood which easily removes the bolls. On a large scale the seed is most easily removed by holding the bundles spread out, fan-shaped, upon the cylinder of a threshing-machine, the "concave" being taken off.

Retting (*rotting*).—This is conducted either under water, or upon the grass, where the F. is exposed to the action of the dew and sunshine. In "water-retting" the F. is subjected in the bundles to the action of soft water in pools called "dams." It requires some experience to know exactly when to remove the F., for a few hours may make a considerable difference in the amount of fibre realized. When sufficiently rotted, the F. bundles are lifted from the water, opened, and spread upon the grass until perfectly dry. Then they are re-bundled and housed.

Breaking.—This is accomplished by machines called F.-breaks, which are variously constructed, but all accomplish the same end—viz. the breaking up of the stalks without doing violence to the fibre.

Scutching or *swingeing* is performed both by simple hand-appliances and by machinery. The essential implements are the scutching-block and the scutching-knife. The scutching-knife is made of hard wood, 9 or 10 inches broad and very thin. With this the "hand" of F. is struck sharp blows. Thus, the fibre is freed from most of its adhering impurities. In this condition the lint and the tow remain together.

Hatcheling or *heckeling* consists in drawing the hands of F.-fibre through combs of long iron teeth set filling a circle or a square. The ends accomplished by this process are, the

subdividing of the fibres into their finest filaments, the separation and removal of all broken or short fibres (the tow), and the laying of the lint parallel and untangled. The operation requires considerable skill, and upon it depends to a great extent the value of the result. [From orig. art. in *J's Univ. Cyc.*, by M. C. WELD, Ph. B.]

Flax, New Zealand, the *Phormium tenax*, a large perennial, lilaceous plant, native of New Zealand, grown for its fibre, which is used as a substitute for hemp. The fibre is obtained from the leaves, which are 2 to 6 ft. long and 1 to 3 inches broad.

Flax'man (JOHN), b. in York, Eng., July 6, 1755. He was the second son of a modeller in plaster, who took up his residence in Lond. He was a feeble child, and for a long time moved about with the help of crutches. He early amused himself with drawing, and displayed no little genius. At 15 he entered the Royal Acad. as a student; in 1770 he exhibited a figure of Neptune in wax, and during the next 5 yrs. he sent 10 pieces to the Acad. In 1787 he went to It., where he remained 7 yrs., and produced the series of outline illustrations for Homer, Eschylus, and Dante, executed several works in marble, and studied closely the remains of anc. sculpture in Rome. Having returned to Eng., he was in 1797 elected an associate, and in 1800 a member of the Royal Acad. He now produced in rapid succession many of his best works—the monument in memory of the Baring family, the Lushington monument, the monument to the countess Spencer, to Mrs. Tighe, the poetess, with others to the memory of the Tarborough family, to Mr. Edward Balme, and to the Rev. Mr. Clewe. Among the statues made by F. were those of Sir Joshua Reynolds, of Sir John Moore, of Pitt, of Joseph Warton, of George Stevens, of the rajah of Tanjore, of the missionary Schwartz, of Lord Cornwallis, and of Warren Hastings. In 1810 the Royal Acad. created a professorship of sculpture, and requested F. to fill the chair. He gave in all 10 lectures: 1, Eng. sculpture; 2, Egyptian sculpture; 3, Gr. sculpture; 4, Science; 5, Beauty; 6, Composition; 7, Style; 8, Drapery; 9, Anc. art; 10, Modern art. Beside his lectures he produced some minor writings. In his 66th yr. he finished the celebrated *Shield of Achilles*, one of the most beautiful and characteristic of his productions. In his later days he executed the statues of *Psyche*, the *Pastoral Apollo*, *Michael Angelo*, and *Raphael*, with those of Kemble and Robert Burns. (See his *Life*, by ALLAN CUNNINGHAM.) D. Dec. 7, 1826. CLARENCE COOK.

Flea, the common name of the Pulicidae, wingless insects related to the Diptera. They grievously infest the higher animals, the common *F. (Pulex irritans)* attacking man as well as beast, while other species attach themselves to the dog, cat, mole, and various other mammals and birds. The *Sarcopsylla penetrans*, or chigoe, is another *F.* which seriously troubles man. Most of the *F.* are distinguished by great powers of leaping.



Flea.

Flea-bane [so called from their insecticide powers], a name given to various herbs of the order Compositae, especially to those of the genus *Erigeron*. The destructive powers of various composite plants upon insects appear to reach their maximum in *Pyrethrum carneum* and *roseum* of Asia and Europe.

Flea-wort Seed (*Semen psyllidis*), the seeds of *Plantago psyllium*, a kind of plantain of Europe and Barbary. The seeds are mucilaginous, like flax-seed, and are sometimes used for the same purposes in med.

Fleet Marriage. The Fleet prison in Lond. was long a famous resort for clandestine marriages. F. M. are first mentioned in 1613, and in 1754 were forbidden by statute. The officers were clergymen in prison for debt. The most famous F. M. was that of Henry Fox, afterward Lord Holland, to Georgina Caroline Lennox, daughter of the duke of Richmond.

Flem'ing (JOHN), Scotch clergyman and naturalist, b. 1785; appointed to the chair of natural philos. at King's Coll. Aberdeen, 1832; resigned in 1843, having identified himself with the Free Ch. coll., and became prof. of natural science in the Free Ch. Coll. of Edinburgh 1845. Wrote *Hist. of Brit. Animals*. D. Nov. 18, 1857.

Flem'ington, R. R. junc., cap. of Hunterdon co., N. J., 50 m. from New York. Pop. 1870, 1412; 1880, 1751.

Flem'ish Language and Literature. With the exception of some slight differences in pronunciation and orthography, the Flemish (or Vlaemisch) lang. is identical with the Dut. The difference is a difference of name only, and the true name is "Flemish" or "Vlaemish"; "Dutch" or "Hollandish" did not come into common use until a comparatively late period. Now, F. designates the Dut. lang. as far as it is spoken by the inhabs. of the Belg. provs. of E. Flanders, Antwerp, Limburg, W. Flanders, and Brabant; and the most interesting feature in its present hist. is the contest which takes place within the boundaries of the Belg. kingdom between this branch of the Germanic tongue and the Walloon, a Fr. dialect spoken by the inhabs. of the other Belg. provs., Liege, Hainaut, Namur, and Luxembourg. The division is nearly equal, the F. having a numerical superiority of half a million, and the Walloons having politically and socially the advantage of their compatriots. In 1869 there were reported 180,000 F.-speaking people in Fr. In 1860, 76 political newspapers and 31 weekly and monthly periodicals of miscellaneous character were issued in the F. lang.; and the *Nederdutchsch Tijdschrift*, commenced in 1862 by Emmanuel Hiel, is the most spirited and elegant periodical in Belg., and a competent rival of Fr. publications of the same kind. CLEMENS PETERSEN.

Flesh-Fly, the common name of various Muscidae, of which the best known is the *Sarcophaga carnaria*, the common F.-F. They deposit their already hatched larvæ upon fresh meat and decaying animal matter.

Flesh Juice. See MEAT EXTRACT.

Fletcher (ANDREW), of Saltoun, Scotch publicist, b. at Saltoun 1653; opposed the royal court in the Scot. Parl. in 1681, and was forced to retire to Hol. Returned to Eng. 1683, took part with the duke of Monmouth 1685, served in Hungary against the Turks 1686; returned to Eng. with William of Orange 1688, brought forward the bill of security in the Scotch Parl. May 1703, opposed the union 1706. His *Political Works* were pub. D. 1716.

Fletcher (BENJAMIN), a soldier of fortune who was gov. of the prov. of N. Y. (1691-98), succeeding Slaughter and preceding the earl of Bellomont. He was a dissolute man, and in New York attempted to establish the Ch. of Eng. in opposition to the wishes of the people. Was also (1698-95) gov. of Pa. by the illegal commission of William and Mary.

Fletcher (JAMES COOLEY), clergyman and traveller, b. at Indianapolis, Ind., 1823, grad. at Brown Univ. 1846; studied theol. at Princeton, N. J., then at Paris, Fr., and in Geneva, Switz. Went in 1851 to Rio de Janeiro, as chaplain missionary of the Amer. and Foreign Chr. Union and the Amer. Seamen's Friend Society. Here he was also sec. of the U. S. legation. Returning to the U. S. in 1854, he again visited Brazil in 1855, 62-65, and travelled extensively. Having returned to the U. S., he issued his *Brazil and the Brazilians*, in connection with Rev. D. P. Kidder, D. D. In 1869 was appointed U. S. consul to Oporto, Port.

Fletcher (JOHN), Eng. dramatist, b. 1576, ed. at Cambridge, and became the friend of Francis Beaumont, in conjunction with whom he wrote many dramas; also wrote, separately, *Rule a Wife and Have a Wife* and other comedies. D. 1625.

Fletcher (JOHN WILLIAM), originally *de la Fléchière*, b. at Nyon, Switz., Sept. 12, 1729; studied at Geneva, served in the Port. and Dut. armies, visited Eng., and became a minister of the Established Ch. in 1757, being vicar of Madeley. Wrote in defence of the doctrines of Wesley, and was one of the founders of Methodism; wrote much, his chief work being *Checks to Antinomianism*. D. Aug. 14, 1785.

Fletcher (PHINEAS), Eng. poet, b. about 1584, entered Cambridge Univ. 1600, and was rector of Hilgay, Norfolk, in 1621. Wrote many poems, *The Purple Island* being the chief. D. about 1660. He was a cousin of Fletcher the dramatist, and brother of Giles Fletcher (1588-1623), author of the poem *Christ's Victory and Triumph*.

Fletcher (RICHARD), LL.D., b. at Cavendish, Vt., Jan. 8, 1788, grad. at Dartmouth Coll. 1806; studied law with Daniel Webster, was admitted to the bar in 1809; settled at Salisbury until 1825, when he removed to Boston, Mass. Was member of the Mass. legislature, M. C. 1837-39, judge of the Mass. supreme court 1848-53. D. June 21, 1869.

Fletcher (WILLIAM A.), jurist, b. in Mass., settled in Mich. about 1820; practised law at Detroit, was atty.-gen. of the Terr., in 1835 chief-justice of the supreme court of the State; retired from the bench in 1842, and resumed his practice. The *Revised Statutes of Mich.* were pub. by him in 1838. D. 1855.

Fleur de Lis [Fr. for "flower of the lily"], often Anglicized into **Flower de Luce**, the flower of the *Fris sambucina*, a plant native in the S. of Europe. This flower is famous as the emblem of the Fr. kings.

Fleury, fuhr-re' (CLAUDE), ABBÉ, Fr. ecclesiastic and historian, b. at Paris Dec. 6, 1640, was advocate to the Parl. of Paris 1658-67, and tutor to the princes Conti in 1672; in 1689-1707 sub-preceptor with Fénelon to the dukes of Burgundy, Anjou, and Berry. Was prior of Argenteuil in 1707, confessor to Louis XV. 1716-22. Wrote a voluminous *Ecclesiastical Hist.* D. July 14, 1723.

Fleury (ÉMILE FÉLIX), Fr. gen., b. in Paris Dec. 23, 1815; entered the army 1837; served 11 campaigns in Algeria; was sub-lieut. 1840, capt. in 1844, major in July 1848, and on his return to Fr. a gen. of brigade Mar. 13, 1856, and gen. of division Aug. 13, 1863; became officer of the Legion of Honor in 1849, grand officer Aug. 13, 1859. Was summoned to the Fr. senate by decree Mar. 15, 1865, was chief enquiry to Nap. III. Dec. 1865; in 1866 was sent on a mission to King Victor Emmanuel, and in 1869 became Fr. ambassador at St. Petersburg. In Sept. 1870 resigned. D. Dec. 11, 1884.

Fleury, de (ANDRÉ HERCULE), CARDINAL, b. at Lodève, Fr., June 22, 1653, studied at the Jesuit Coll., Paris; was made bp. of Fréjus 1698; in 1715 became preceptor to Louis XV., in 1721 admitted to the Acad., in 1726 assumed the position of prime minister of Fr., and was made a cardinal. D. Jan. 29, 1743.

Flex'ible Sand'stone, sometimes called **Itacol'umite**, a metamorphic silicious rock found in the S. Alleghanies, and especially in Brazil. It occurs in thin layers, which are to a certain degree flexible, but are not elastic. Such sheets may be bent forward and backward hundreds of times without breaking. The cause of this peculiar property of itacolomite has been much discussed. Prof. Wetherell of Phila., after a careful microscopic examination of the granules of quartz which compose this rock, announced that he had discovered that they are elongated and interlocked, each particle working in a kind of joint. This has been denied by later observers, but the weight of authority favors its acceptance. J. S. NEWBERRY.

Flied'ner (REV. THEODOR), D. D., a distinguished Ger. philan., and founder of the Prot. inst. of Deaconesses at Kaiserswerth on the Rhine, b. June 21, 1800, d. Oct. 4, 1864. He established a number of similar insts. in Ger., in the Orient, and one in Pittsburg, Pa. The deaconesses are trained nurses of the sick and wounded, and teachers of orphan children. They are an evangelical counterpart of the Catholic Sisters of Charity, but assume no vows, and are at liberty to leave the work and to marry after serving 5 yrs. They have proved very useful in war as well as in peace.

Flinch (ALFRED), b. in Copenhagen, Den., Mar. 7, 1840, ed. at Hammerich's Coll., and studied at the Univ. of Copenhagen; travelled through Gr., Egypt, Pal., and Asia Minor; lived several yrs. in Paris, Vienna, and other caps.; wrote

Remembrances from the Orient, several tragedies (*Kroisos*, *The Last King of Lydia*, etc.), and is an authority as a translator of French (Molière) and of Italian (Boccaccio). Came to U. S. Dec. 1879.

Flint, a variety of quartz, massive, dull-colored, and dark, with translucent edges, found especially in nodules in chalk-beds, and on microscopic examination found to consist largely of the fossil frustules of diatoms, the spiculae of sponges, and the like. In pre-historic times it was extensively used as the material for knives, arrow-heads, and other weapons. F. is employed in making some kinds of glass, and ground F. is an ingredient of porcelain-ware. In the U. S. the hornstones of the paleozoic limestone strata have been shown to be of precisely similar origin to the true cretaceous F.

Flint, R. R. centre, city, and cap. of Genesee co., Mich., 60 m. N. W. of Detroit. The Mich. Inst. for the Deaf, the Dumb, and the Blind is located here. Lumber is largely manufactured. Pop. 1870, 5386; 1880, 8400; 1884, 9035.

Flint (ABEL), D. D., b. at Windham, Conn., Aug. 6, 1765, grad. at Yale Coll. 1785; was tutor at Brown Univ. 1786-90, and was ordained minister of the Second Congl. ch., Hartford, Conn., 1791. Pub. *Geom. and Trigonometry, with a Treatise on Surveying*, D. Mar. 7, 1825.

Flint (AUSTIN), M. D., LL.D., author, prof., etc., b. in Petersham, Mass., Oct. 30, 1812, grad. in med. dept. of Harvard Univ. 1833; was one of the founders of Buffalo Med. Coll., and prof. of int. from 1847 to 1853. In 1844 was called to the Rush Med. Coll. in Chicago. Occupied for 4 yrs. the chair of theory and practice in the med. dept. of the Univ. of Louisville, and for 3 winters (1858-61) was prof. of clinical med. in the New Orleans School of Med. He removed to New York in 1859, was made one of the attending phys. to Bellevue Hospital, and appointed to the chair of principles and practice of med. and clinical med. in the Bellevue Hospital Med. Coll., a position he now holds. He is the author of several standard works in the profession, among which is *Principles and Practice of Med.*

Flint (AUSTIN, JR.), M. D., son of the preceding, b. at Northampton, Mass., Mar. 28, 1836, studied med. at the Univ. of Louisville, Ky., and grad. 1857 at the Jefferson Med. Coll., Phila.; was ed. of the *Buffalo Med. Journal*, and prof. of physiology and microscopical anat. in the Univ. of Buffalo 1858-59; became prof. of physiology in the New York Med. Coll. 1859, and in New Orleans Med. School 1860, and in 1861 became prof. of physiology and microscopical anat. in Bellevue Hospital; has held the chair of physiology in L. I. Coll. Hospital, and was appointed surgeon-gen. of the State of N. Y. Wrote *The Physiology of Man*, etc.

Flint (CHARLES LEWIS), b. at Middleton, Mass., May 8, 1824, grad. at Harvard Univ. in 1849; studied law, but in 1852 became sec. of the State Board of Agriculture of Mass.; pub. *Milch Cows and Dairy Farming and Agriculture of Mass.*, etc.

Flint (ROBERT). See APPENDIX.

Flint (TIMOTHY), b. at Reading, Mass., July 11, 1780, grad. at Harvard Univ. in 1800; was a Congl. minister at Lunenburg, Mass., from 1802 to 1814. In Sept. 1815 went as missionary to the Miss. Valley, and was afterward farmer and teacher at Cin., O., and in La.; subsequently became an ed. and writer for periodicals. D. Aug. 16, 1840.

Flint Glass, one of the varieties of glass which contain a large percentage of lead. Powdered flint was formerly used in the manufacture, whence the name. F. G. is used largely in the manufacture of achromatic lenses, and grades inferior to the very finest are used in making bottles and other glass goods, either blown or moulded.

Flint Implements, a name used to designate the tools made of stone, chiefly of flint, used by savages who have no knowledge of metals. If we assume that man's original condition was a savage one (which is by no means universally conceded to be true), it is probable that his clothing and utensils have been the result of a long series of discoveries and inventions, which have been the means of a series of advancing steps toward civilization. It is certain that very early races, like modern savages, fabricated their implements from stone, and chiefly from flint, and that at a later stage bronze, and at a still later stage iron utensils were employed. The period during which any people have employed stone implements only may be termed the *stone age*. The pre-historic Stone Age has been subdivided into, first, the time when only the rough flints or flakes of stone were used, or the *Paleolithic*; and, second, the time when the edges of the knives were sharpened and the surfaces polished, or the *Neolithic*.

The more common F. I. are known as *celts*, from the Welsh *cellt*, a "flint." They are the more common hatchets, adzes, or chisels of stone, and are of 3 sorts: 1st, those which have been simply chipped out in a more or less careful manner; 2d, those which, after being fashioned by chipping, have been ground at the edges; and 3d, those which have been smoothed over the whole surface. The implements are hatchets, adzes, chisels, gouges, picks, perforated axes, hammers, mining-tools, pestles, grindstones, whetstones, saws, scrapers, awls, drills, knives, daggers, lance or spear heads, javelins, arrow-heads, flaking-tools, sling-stones, balls, slick-stones, sinkers, weights, disks, cups, spindle-whorls, and personal ornaments. The presence of manufactured celts is sufficient evidence of the existence of man in the absence of his bones. As the flints have been found in connection with the remains of extinct animals, some have supposed that in paleolithic times man was contemporary with the woolly elephant and rhinoceros, cave lion, cave bear, cave hyæna, hippopotamus, and others. In the neolithic period the animals were chiefly those of existing races, the ones just mentioned having disappeared. C. H. HITCHCOCK.

Floating Islands are either artificial or natural. To the former class belong the *chinampas* of the Mex. lakes, formed by placing the mud upon floats or rafts of wicker-work covered with reeds. Natural F. I. are found in many lakes. They frequently consist of considerable pieces of

marsh turf held together by willow roots and the like, and torn from their muddy beds by inundations or swift currents. In 1874 islands or natural rafts from the Miss. were observed floating out to sea, bearing a freight of living animals, birds, and reptiles. Similar floats have been seen over 100 m. from the mouth of the Ganges in time of flood. Doubtless both plants and animals have had their habitats widely extended in this way.

Flodden Field, the last point of the Cheviots, where King James IV. of Scot., with an army of over 30,000, was defeated and slain, Sept. 9, 1513, by the Eng.

Flood (RT. HON. HENRY), an Irish orator, b. 1732, was ed. at Dublin and Ox.; entered the Irish Parl. in 1759, was sworn of the privy council for G. Brit. as well as for Ire. in 1775, was vice-treas. of Ire. 1775-81, and entered the Brit. Parl. in 1783. His speeches are noteworthy for their fine style and logical method. Author of some poems and a vol. of *Speeches*, D. Dec. 2, 1791.

Flood-plain, a plateau which borders many streams above their gen. water-level, but which is covered by their periodical or occasional floods. The F.-P. is swept by and often covered with deposits from the turbid waters of freshets. Thus, it is built up to and maintained at a nearly uniform height. When left beyond the reach of the stream by cutting down of its bed, the F.-P. becomes a terrace.

Floor-cloth is composed of canvas, both sides being painted with one or more coats, and afterward printed on one side with designs in colors. The compounds linoleum, kamptulicon, and the like are substitutes for common F.-C., and are made by patented processes. India-rubber is an ingredient of some of these.

Flo'ra was early worshipped among the Roms. as the goddess of flowers and of spring, and was identified with the Gr. Chloris. A temple was vowed to her by Tattius, and a flamen appointed to serve at her altar. Her temple was situated near the Circus Maximus, and an annual festival was held in her honor between the 28th of Apr. and the 3d of May, when every licentious extravagance was indulged in by the populace. She was represented bearing the cornucopia filled with flowers. A late tradition says that she was a wealthy courtesan who bequeathed her riches to the city on condition that she should be worshipped.

In bot. the term *flora* is applied to the collective vegetation of a country or dist., and has been extended in its significance so as to include the fossil forms of plant-life found in any geological formation. The name is to bot. what *fauna* is to zoology. It is applied also to a work which enumerates and describes the plants of any particular country. A *flora* would include only such plants as were indigenous to the region, or such adventitious ones as had become completely naturalized. The author sometimes endeavors to present his F. in such a way that it may be not merely a list of plants of the specified region, but an indication also of their geographical distribution, habits, and utility. In writing the name of such a work the term *flora* is followed by an adjective expressing the country included, as *F. Americana*, *F. Japonica*, etc. W. W. BAILEY.

Flora, R. R. junc., Clay co., Ill., 94 m. E. of St. Louis, Mo. Pop. 1870, 1339; 1880, 1494.

Floréal (the "flowery"), the 8th month in the republican calendar of Fr., which from Nov. 24, 1793, to Sept. 9, 1805, was used in place of the Gregorian. F. began Apr. 19-22, and ended May 18-21.

Florence [It. *Firenze*, with the epithet *La Bella*], a city of It., in lat. 43° 46' 36" N. and lon. 11° 15' 30" E., in the valley of the Arno, mostly on the N. bank. Great and splendid even in former times, it made great progress in size and beauty, as the cap. of the new kingdom, from 1865 to July 1, 1871. The inner part of the city has been made brighter by the construction of new and wider streets, and new and beautiful palaces are added to the great number of old and celebrated monuments. The Arno, dammed up to 100 paces breadth, is provided with quays, called *Lungarno*, and 6 bridges connect the different parts of the city with each other. Among the public squares the most remarkable is the Piazza della Signoria, which is very rich in works of art. One of the most interesting palaces is the Palazzo Vecchio, or Palazzo della Signoria. The Palazzo Pitti, built by Brunelleschi, is one of the most magnificent palaces which exists. It contains the Galleria Pitti, the finest collection of pictures in the world. Remarkable among the ecclesiastical buildings is the cathedral, 555 ft. long, 340 ft. broad. The baptistery of San Giovanni, belonging to the cathedral, and the 3 doors of bronze, by Ghiberti, are very interesting. The ch. of Santa Croce, commenced in 1294 by Arnolfo di Cambio, 371 ft. long and 113 broad, contains the tombs of Michael Angelo, Alfieri, and Machiavelli, and a monument of Dante. A most interesting building is the Loggia dei Lanzi, a hall commenced in 1376. Between the Loggia dei Lanzi and the Palazzo Vecchio is situated the Palazzo degli Uffizi, containing the world-famous collections of statuary (the group of Niobe and the Medicean Venus), of cameos, pictures (*Venus* by Titian, the *Holy Family* by Michael Angelo), and crayons.

F., originally a Rom. colony in Etruria, was a flourishing city at the time of Christ. In the beginning of the 12th century it threw off the authority of the Ger. emps. and established a republic, which had an oligarchical character, but although it was convulsed by the c. wars between the Guelphs and the Ghibellines, the city still increased in power. In 1222 F. conquered Pisa, and gained great commercial advantages, and it soon ruled over the whole of Tuscany. The authority of the nobility began to decrease: the citizens acquired ascendancy, and in 1378 the democracy gained a decided victory. Salvestro de Medici, a plain citizen, becoming gonfaloniere. It was, however, Giovanni de Medici, the banker of the pope and a man of immense wealth, who founded the house. At his death in 1428 he left 2 sons, Cosimo and Lorenzo, from the latter of whom the dukes of the 16th century descended. By the victory of

Alessandro di Medici (Aug. 12, 1530) the republic was finally overthrown, and (July 29, 1531) Alessandro was declared duke of F. After the death of the last Medicean grand duke of Tuscany, whose cap. F. was, fell to Francis, duke of Lorraine, later an emp. of Ger. In 1801 Tuscany became a part of the kingdom of Etruria. In 1808 it came under the sway of Fr. In 1814 the grand duke Ferdinand III. took possession of the country, but in 1859 Ferdinand IV. had to abdicate, and May 22, 1860, Tuscany became part of the kingdom of It. with F. as cap., till 1871, when Rome became cap. of It. Pop. 1881, 169,001. [From orig. art. in *J. s. Univ. Cyclopedia*, by CAPT. A. NIEMANN.]

Florence, cap. of Lauderdale co., Ala., on R. R. and at the head of navigation on the N. bank of the Tenn. River. It contains the State normal school and a female coll. Pop. 1870, 3,003; 1880, 1359.

Florence, city and R. R. junc., Marion co., Kan., on Cottonwood River. Pop. 1880, 954.

Florence, Hampshire co., Mass., on R. R., 3 m. N. W. from Northampton. Pop. 1880, 2566.

Florence, S. C. See APPENDIX.

Florence, Wis. See APPENDIX.

Florence (THOMAS B.), b. in Phila. Jan. 26, 1812; pub. and edited a newspaper there for several yrs.; was for 9 yrs. sec. of the board of controllers of public schools in Phila., and was a rep. from Pa. in Cong. from 1850 to 1859. Established the *National Democratic Review*, edited the *Constitutional Union* in Wash., D. C. D. July 3, 1875.

Florence, Council of (1439-42 A. D.). This was not a separate council, but, along with that of Ferrara, only the continuation of the Council of Bale, which was opened Dec. 14, 1431. On Jan. 8, 1438, it was transferred to Ferrara, and in Jan. 1439 to Florence, where its sessions continued at intervals until 1442. But its interest culminated in the summer of 1439, when the reunion of the Gr. and Lat. chs. was thought to have been accomplished. Four points were under discussion: 1, the Filioque of the Lat. Creed; 2, the use of unleavened bread in the Eucharist; 3, purgatory; 4, the papal supremacy. The first 3 points were settled by compromise; the 4th by the submission of the Grs. But the impulse to this settlement was imperial, the Grs. desiring Occidental assistance in beating back the Turks. The "reconciliation" had no roots in the hearts of the people, and in 1443 the Council was denounced by the E. patriarchs. Meanwhile, the remnant of the council summoned by Eugenius IV. continued to sit at Bale; in 1440 elected an antipope (Felix V.), who resigned in 1449; removed to Lausanne July 24, 1448, and dissolved Apr. 25, 1449. (See *Mansi's Councils*, vol. xxix.; *HARDUIN's Councils*, vols. vii. and ix.; and *HEFELE's Conciliengeschichte*, vol. vii. part 2.)

Florentine Academy, (*Accademia Fiorentina*), a learned association of Florence, was founded in 1540. With it the *Accademia della Crusca* was finally united.

Florentine Work, or **Pietra Du'ra** [It. for "hard stone"], a beautiful kind of ornamental work composed of black (or less frequently white) marble inlaid with brilliantly colored stones. Florence is the most famous seat of this art, but the Rus. excel the Italians.

Florentinus, the name of several men eminent in hist. and in letters. Among them are FLORENCE (Florentinus) of WORCESTER, a monk, d. in 1118; author of a Lat. chronicle, the first written in Eng. after the Norman Conquest.—FLORENCE RADENIUS, b. at Leerdam in the Low Countries in 1350, was ed. at Prague; succeeded Gerhard Groot as director of the Brethren of the Common Life; d. 1400. Another FLORENTIUS (*François Florent*) was a Burgundian jurist, d. Oct. 29, 1650; author of *Dissertations* on the canon law and *Disputations* regarding consanguineous marriages.

Florian, SAINT, patron saint of Poland, a Rom. soldier, b. in Noricum of Chr. parentage, and drowned in Aus. during the Diocletian persecution, on account of his confession of the Chr. faith. He was buried where now stands the Augustinian abbey of St. Florian, 3 m. S. W. of Enns, but his relics were translated to Rome, whence in 1183 they were taken to Cracow. He is commemorated on Mar. 4.

Florian, de (JEAN PIERRE CLARIS), b. at the Château de Florian, in Gard, Fr., Mar. 6, 1755; entered the service of the duke of Penthièvre; was patronized by Voltaire, and attained fame as a writer of fables, romances, comedies, and pastoral poems. His *Fables* and the translation of *Don Quixote* are his best works. D. Sept. 13, 1794.

Floriculture [Lat. *flos, floris*, a "flower," and *cultura*, "attention"], the cultivation of flowers, whether pursued for profit or for enjoyment. Not only for the supply called for by the flower-markets of all large cities, but to satisfy the demand for artificial perfumes, has F. become an industrial pursuit. Thus, rose-culture in India, Per., Tur., and Fr., and in the latter country the production of violets, jessamine, orange-flowers, tuberoses, heliotropes, jonquils, etc., are conducted on a large scale. In anc. Athens as well as in aboriginal Mex.—the one the most refined of cities, the other a scarcely more than barbarian town—there were famous flower-markets. Even among the rudest savages the love of flowers is not unknown. India, Japan, and especially Chi., have done much for the development of garden-flowers, which are indeed almost as much the product of art as of nature. But, though often monstrosities to the eye of the botanist, hardly any objects in the world are more beautiful or more replete with fine aesthetic and moral influences than garden-flowers. Parlor and green-house F., the Wardian case, and the flower-border each require special skill, to be acquired by experience and the study of works specially devoted to the subject. In the U. S., F. is carried on in the vicinity of all considerable towns to some extent, but the flower-markets of New York and New Orleans have long been the most celebrated. The cultivation of flowers for market is an important industry near New York. The New York flower-markets receive ample supplies, principally from N. J., and the number of kinds of flowers supplied, even in the coldest months, is very great.

Florida, flor'e-da (Sp. flo-ree'dah), the most S. State of



the U. S., lying between 24° 30' and 31° N. lat. and 79° 48' and 87° 38' W. lon. It forms the E. barrier between the Gulf of Mex. and the Atlantic; bounded N. by Ga. and Ala., E. by Atlantic Ocean, S. by Gulf of Mex. and Strait of Fla., and W. by Gulf of Mex. and Perdido River Area.

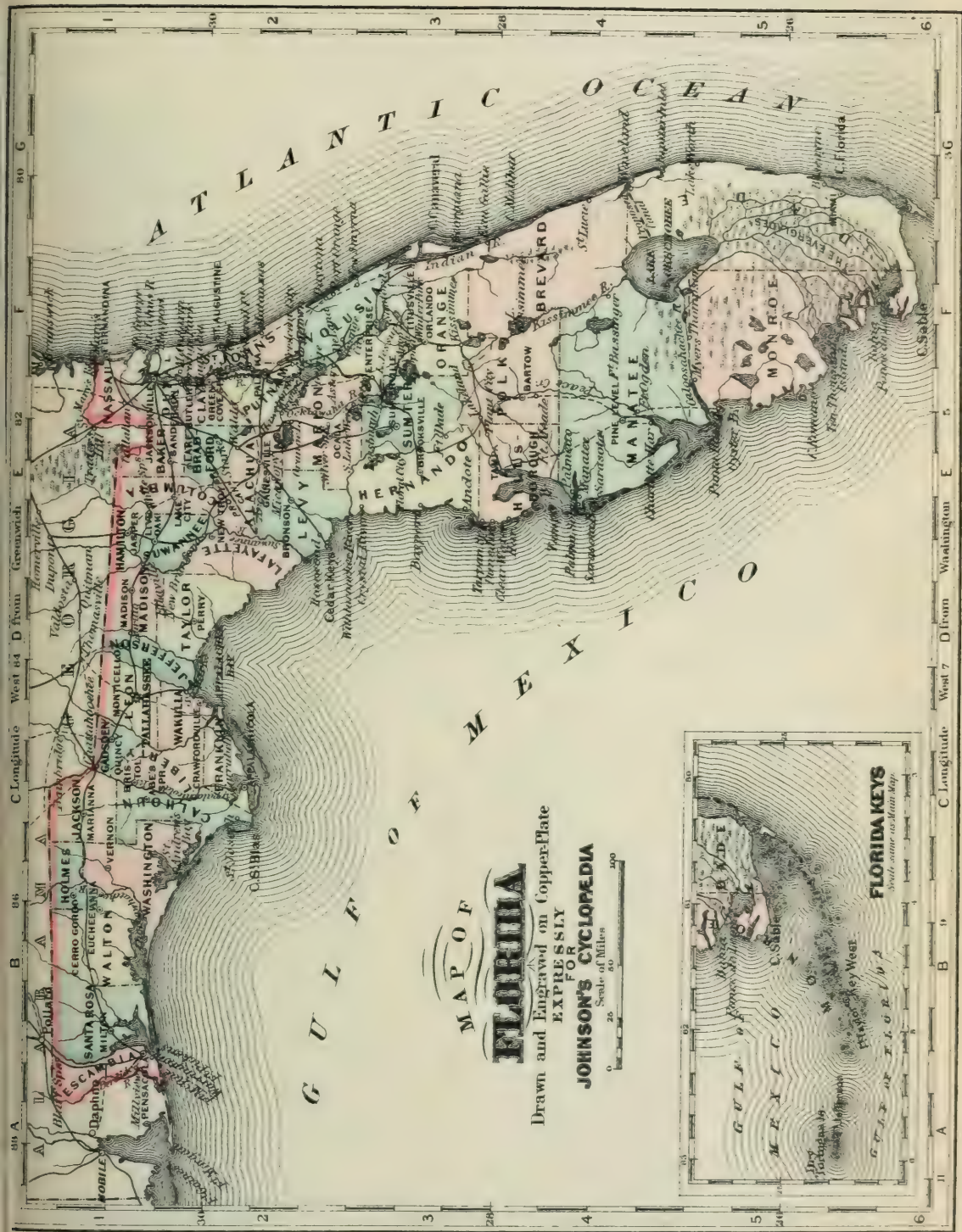
58,680 sq. m. or 37,555,200 acres. Of this area, 2,841,600 acres is a water surface, and 4 times that amount is often submerged. The peninsular portion of F. is about 375 m. long, with an average breadth of 90 m.

Topography, Etc.—F. has a coast-line of more than 1150 m., with many fine bays, harbors, and estuaries. The best of these harbors are on the Atlantic coast—St. Augustine, Fernandina, Port Orange, and Jacksonville on the St. John's River; on the S., Key West, and on the Gulf coast, Oyster Bay, Caloosahatchie River, Charlotte Bay, Tampa Bay, Cedar Keys, Deadman's Bay, St. Mark's, Apalachee Bay, Apalachicola, Pensacola, Escambia, Perdido, etc. The surface of the S. half is very level, the islands and hummocks rising but a few feet above the sea; in the central and N. portion there is no elevation 200 ft. above the sea, the central watershed being a low ridge running from N. to S. From the Apalachicola to the Suwannee there are some hills, but nothing like a mt. The prin. rivers are the Perdido, Escambia, Apalachicola, St. Mark's, Suwannee, Withlacoochee, Peace Creek, and Caloosahatchie, with their affluents, on the Gulf side; the St. Mary's and the St. John's with its large affluent, the Ocklawaha, on the Atlantic side; and the Kissimee, which discharges into Lake Okeechobee. Indian River, so called, is not a river, but a long, narrow sound with 2 or 3 inlets, extending nearly 100 m. along the coast, and separated from the Atlantic by sand-bars. Lakes are very numerous: Okeechobee, area, 650 sq. m.; Ahapopka, Istokpoga, Orange, Kissimee, Cypress, Lake George, Lamona, Washington, Tohopekaliga, Alligator, Dunn's, Harris, Griffin, Trati-Apopka, Jessup, Monroe, Santa Fé, Maitland, etc., are the largest. The Everglades, a delta-like expansion, nearly 90 m. in length and 30 to 50 in width, having an area of 3600 sq. m., forms the marshy outlet of Lake Okeechobee, and in a wet season resembles an immense lake studded with numerous islands. S. of the peninsula, but belonging to it, is a series of islands, sand-banks, reefs, and keys, extending for 220 m., terminating in a group known as the Dry Tortugas or Turtle Islands. Many of these keys or *cayes* are not inhabited. Key Largo is the longest, and Key West, on which is the city and naval station of that name, is the most important. The Dry Tortugas have been used as a military prison. S. of these keys, with a navigable channel between, is a long, narrow coral reef, known as Florida Reef, and constituting the left bank of the Gulf Stream.

Climate.—Though extending over 6 degrees of lat., the climate of F. is very uniform. The extreme range in N. F. is from 90° (very rarely 95° or 96°) to 26° F.; in Central and S. F., from 90° to 43° F. The rainfall exhibits greater variations. On the Atlantic coast and at Key West it averages nearly 50 inches; at Punta Rassa, at the mouth of the Caloosahatchie, about 32 inches; at St. Mark's, on Apalachee Bay, N. W. F., 75 to 77 inches. It does not continue long at a time, and there are about 250 clear days in the yr.

Minerals.—There is some iron ore, a little coal (lignite), peat, corals, silicified shells, ochre, amethyst, topaz, agate, carnelian, chalcodony, and calcareous limestone. The *coquina*, a shell conglomerate, furnishes good building-stone.

Soil and Vegetation.—The swamp lands when reclaimed, and the hummocks and islands on them when they are not, are very fertile. Next to these come the low hummocks and savannahs or bottom lands; these are fertile, with a clay subsoil, and under suitable cultivation will yield large crops of cotton, sugar-cane, grains, and fruits. The high hummocks have a gray soil, very productive at first, but soon running out unless fertilized. Next come first-class pine, oak, and hickory lands; these are sandy, but contain a good deal of lime. Not only the pine and hard-wood trees, but the orange grow well on these lands; but neither on these nor the second class of pine lands will grain, root crops, or garden vegetables succeed well. The third class of pine lands is very barren, and the pines on it are scrubby; but it is said that the Sisal hemp and the Mex. hemp or agave grow well on these lands. Some of the poorer lands furnish tolerable pasturage. The pine grows on all soils. There are several choice species, as the yellow, the pitch, and the white pine. The other forest trees are the live oak and other evergreen oaks, the swamp cypress, hickory, magnolia, the great dogwood, bay laurel, satinwood, lignum-vite, mahogany, palmettos, Jamaica kino, mangrove, machinee, torch-wood, etc. F. is especially famous for her trees of the *Citrus* family; the orange, shaddock, lemon, lime, citron, and pomegranate all grow wild



here, and when well cultivated are finer than those produced elsewhere; and there are also large numbers of lemons, limes, and citrons in groves. Above the 28th parallel the orange is liable to be injured by frosts; below that there is seldom any danger. Figs, olives, Eng. walnuts, and It. chestnuts thrive in F. Sugar and rice can be successfully grown on the low and swamp lands; Indian corn and the cereals flourish generally, except on the poorer pine lands, and the sugar-cane succeeds well.

Animals.—The forests and swamps of S. and central F. abound in wild animals—the black and possibly the Mex. bear, the cougar or panther and several smaller felines, wolves, gray and black, black and gray foxes, raccoons, opossums, the fish-otter, cotton-tail deer, and all the smaller game; alligators and manatees are found in most of the rivers, the last named only in the Everglades; turtles and fish abound. The birds are of all kinds. The *farm animals* in 1880 were 2,636 horses, 9,000 mules and asses, 467,370 cattle, 56,681 sheep, and 287,051 swine.

Agricultural Products.—3,174,234 bushels of Indian corn, 468,112 bushels of oats, 1273 hogheads of sugar, 1,029,868 gallons of molasses, 1,204,677 lbs. of rice, 54,997 bales of cotton, 1,687,613 bushels of sweet potatoes, 20,221 bushels of Irish potatoes, 21,182 lbs. of tobacco. Value of orchard products, \$758,295.

Industries.—The production of pine and other lumber and of live oak timber for ship-building is a large business; the production of naval stores, turpentine, tar, rosin, and pitch, and the distilling of the turpentine employ many hands. Carpentering and building and the making of boxes for the orange crop, the manufacture of cigars, the flouring trade, the sponge and coral fisheries and the fisheries of S. F., the evaporation of sea-salt, and the production of cotton-seed oil are the other prin. industries.

Railways.—The railway system of F. includes 2 lines across the peninsula and several N. and S. lines. At the close of 1880 there were 554 m. in operation.

Banks, Etc.—There are 2 national banks in F.; cap., \$100,000; U. S. bonds deposited, \$80,000; outstanding circulation, \$70,000; also 8 private bankers and 1 savings bank; cap. of all, \$83,830; deposits, \$287,280. No insurance cos.

Finances.—The assessed valuation of F. in 1880 was \$30,998,309, of which \$18,885,151 was real estate, and \$12,053,158 personal. By census of 1880, the debt of F. was as follows: State, \$1,134,880; co., \$435,993; city and town, \$1,055,636; total, \$2,626,509.

Churches and Education.—The number of chs. is about 550; of ch. edifices, 503; membership, above 50,000; adherent pop., nearly 250,000. The denominations are, in the order of numbers, Meths., Baps., Presbs., Catholics, Epis., and minor denominations. There were, in 1880, 1135 public schools, with 1151 teachers, and 31,477 pupils in average attendance; there were only 880 school-houses.

Population.—1870, 187,748; 1880, 269,493 (white, 142,605; colored, 126,888, including 18 Chi. and 180 Indians).

Principal Towns.—Key West, pop. 9890; Jacksonville, 7650; Pensacola, 6845; Tallahassee (cap.), 2494; Fernandina, 2562; St. Augustine (oldest town in U. S.), 2293.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Alachua.....	2-E	17,328	16,462	Gainesville.....	.....
Baker.....	1-E	1,325	2,303	Sanderson.....	988
Bradford.....	2-E	3,671	6,112	Lake Butler.....	1,511
Brevard.....	4-F	1,216	1,478	Titusville.....	.....
Calhoun.....	2-C	908	1,580	Abe's Spring.....	607
Clay.....	2-E	2,098	2,838	Green Cove Sp.....	.....
Columbia.....	1-E	7,335	9,589	Lake City.....	1,379
Dade.....	5-F	85	257	Miami.....	7,650
Duval.....	1-E	11,921	12,431	Jacksonville.....	7,650
Escambia.....	1-A	7,817	12,156	Pensacola.....	6,845
Franklin.....	2-C	1,256	1,791	Appalachicola.....	1,336
Gadsden.....	1-C	9,802	12,169	Quincy.....	639
Hamilton.....	1-E	5,749	6,790	Jasper.....	341
Hernando.....	3-E	2,935	4,248	Brookville.....	.....
Hillsborough.....	1-E	5,216	6,814	Tampa.....	720
Holmes.....	1-B	1,572	2,170	Cerro Gordo.....	.....
Jackson.....	1-C	9,528	14,372	Marianna.....	586
Jefferson.....	1-D	12,398	16,065	Monticello.....	.....
Lafayette.....	2-E	1,783	2,441	New Troy.....	.....
Leon.....	1-C	15,266	19,062	Tallahassee.....	2,494
Levy.....	2-E	2,051	3,767	Bronson.....	381
Liberty.....	2-C	1,010	1,362	Bristol.....	.....
Madison.....	1-D	11,121	14,798	Madison.....	756
Manatee.....	4-E	1,931	3,544	Pine Level.....	673
Marion.....	2-E	10,904	13,045	Ocala.....	806
Monroe.....	5-F	5,657	10,940	Key West.....	9,890
Nassau.....	1-E	4,247	6,635	Fernandina.....	2,562
Orange.....	3-F	2,195	6,618	Orlando.....	.....
Palm.....	4-E	3,169	3,181	Bartow.....	.....
Panama.....	2-F	3,221	6,261	Palatka.....	1,616
Santa Rosa.....	1-A	3,312	6,645	Milton.....	1,058
St. John's.....	2-F	2,618	4,535	St. Augustine.....	2,293
Sumter.....	3-E	2,962	4,886	Sunterville.....	271
Sebastian.....	1-E	3,536	7,161	Live Oak.....	458
Taylor.....	2-D	1,453	2,279	Perry.....	.....
Volusia.....	3-F	1,723	3,294	Enterprise.....	224
Wakulla.....	2-C	2,066	2,726	Crawfordville.....	84
Walton.....	1-B	3,041	4,201	Euchebe Anna.....	78
Washington.....	1-B	2,202	4,089	Vernon.....	1,330
Total.....		187,748	269,493		

* Reference for location of county. See map of Florida.

History.—F. was probably discovered before 1500; first visited and named by Ponce de Leon in 1512, who searched for the "fountain of perpetual youth and health;" visited by him again, in quest of gold, in 1516; in 1520, 1523, and 1524, Vasquez and De Garay, Sp. adventurers, and Verazzano, a Florentine, landed, but could not effect settlements on it. Narvaez obtained a grant of the peninsula in 1526, and in 1528 landed at Apalachee Bay with 440 men; these mostly perished, partly by shipwreck, partly by the Indians. Fernando de Soto explored it very thoroughly in 1539, but planted no colony; the Sp. claimed the terr. In 1563-64 Admiral de Coligny sent a company of Huguenots, under Laudonniere, to a point on the coast below St. Augustine, and there es-

tablished a colony; the Sp. freebooter, Pedro Menendez, in 1565, murdered nearly all, and hanged them on trees, with an inscription saying that they were killed, "not as Frenchmen, but as heretics and enemies of God;" he left a Sp. garrison there, and then proceeded to the present site of St. Augustine, and founded there the first permanent settlement in F.; his murders were avenged, a yr. or two later, by Dominique de Gourgues, a Fr. adventurer, who seized the garrison which Menendez had left, hanged them on the same trees which they had used for the Huguenots, with an inscription that they were "hung, not because they were Spaniards, but because they were traitors, cutthroats, and murderers." St. Augustine grew and prospered; it was captured in 1586 by Drake, but soon restored, and became for the next century an important Sp. post. In 1682 the Fr. adventurer La Salle planted colonies in what was then W. F., but is now La. or Miss.; in 1696 the Fr. settled at Pensacola. In the Fr. and Sp. wars of the 18th century St. Augustine became a rendezvous of freebooters; in 1763 F. was ceded to G. Brit. by Sp., but it was ceded back in 1783, and remained in possession of Sp. till 1819, except that portion W. of the Perdido River, which was secured to the U. S. by the treaty with Fr. in 1803. In 1812 Pensacola and Ft. St. Mark were occupied by the Brit., and were captured by Gen. Jackson, but subsequently restored to Sp. In 1819 negotiations with Sp. were entered into for the cession of F., and by the good offices of Fr. were concluded, and the sovereignty formally transferred, in July 1821. F. Terr. was organized in 1822; immigration commenced immediately, but the Seminole Indians occupied the best lands and resisted the emigrants; after yrs. of private conflict, open war with the Seminoles commenced in 1835, and continued 7 yrs. The Seminoles were not numerous, but their positions were impenetrable and the climate deadly, and it was impossible to dislodge them; after enormous expense and the sacrifice of many lives they were prevailed upon in 1842 to migrate to the Ind. Terr.; a few, however, remained in the Everglades. After the removal of the Indians the Terr. grew in pop., and in 1845 was admitted to the U. It was a slave State from the first, and passed its ordinance of secession on Jan. 10, 1861. The battle of Olustee, in Feb. 1864, was the only considerable action within its boundaries. It was one of the first States to return to the U., framing a new const. in Oct. 1865; it was not readmitted, however, till June 1868.

Governors of Florida.

TERRITORIAL.	Madison S. Perry.....	1857-61
Andrew Jackson.....	1821-22 John Milton.....	1861-65
William P. Duval.....	1822-34 Wm. Marvin. <i>Provis'l.</i>	1865-66
John H. Eaton.....	1834-36 David S. Walker.....	1866-68
Richard K. Call.....	1836-39 Harrison Reed.	1868-Dec. 31, '72
Robert R. Reid.....	1839-41 O. B. Hart. Jan. 1873-Mar. '74	
Richard K. Call.....	1841-44 M. L. Stearns.....	1874-77
John Branch.....	1844-45 George F. Drew.....	1877-81
	Wm. D. Bloxham.....	1881-85
	E. A. Perry.....	1885-89
STATE.		
William D. Moseley..	1845-49	
Thomas Brown.....	1849-53	
James E. Broome.....	1853-57	

L. P. BROCKETT.

Florida Keys, a group of small islands lying off the extremity of Fla. They are based upon a coral reef of great extent and of much danger to mariners. The extreme W. group of keys is the Dry Tortugas. Beside these, the W. coast is lined with keys or islets. The soil of some is productive of tropical fruits, etc.; others are barren. Some are ridges of silicious sand, but most are masses of broken coral, shells, etc. Some are dunes of sand, held in place by a creeping vine. Sugar-loaf Key covers some 50 sq. m., inclusive of its lagoons. Salt Key and others have lakes of intensely salt water. Key West, or Thompson's Island, contains the city of Key West. The islands are healthful except during epidemics of yellow fever. They are the resort of innumerable birds, and abound in rare mollusks and fishes. The sponge-fishery is an important industry.

Florin [It. *florino*, either from *Florence*, where it was first coined, or from the figure of a lily which it bore], a Florentine coin first struck in gold in 1254. Gold and silver coins called F., and of various values, have since been coined in many countries. At present the Eng. 2-shilling silver piece, first coined in 1849, bears the official name of F. It is worth 48.6 cents of our money.

Florinus, a Rom. presbyter and heresiarch in the latter half of the 2d century, who was deposed by Eleutherius. His heresy was a form of Gnosticism, essentially the same with that taught by Valentinus.

Florus, a Rom. historian, of the circumstances of whose life very little is known, and whose full name is a matter of dispute. The researches of Otto Jahn and Halm, based upon a thorough examination of the best existing codex, give the name as Julius Florus. From this author we have a concise and highly rhetorically written hist. of the Rom. people from King Romulus to Augustus Cæsar. In the earlier eds. the work was entitled *Epitome Rerum Romanarum*, and was divided arbitrarily into 4 books. But Jahn and Halm give the title *Epitome de Tito Livio Bellorum omnium Annorum DCC. libri duo*.

Florus (DREPANIUS), a Gallo-Rom. divine of the 9th century, a deacon at Lyons, the opponent of Gottschalk and Scotus Erigena; against the latter he wrote *Liber de Predestinatione*; author also of extant Lat. hymns and other works. D. about 890.

Floss Silk is silk which has been broken in the reeling. It is pressed, carded, and spun into soft coarse yarn, which is made into shawls and other fabrics, either alone or mixed with cotton or wool.

Flo'tow, von FRIEDRICH FERDINAND ADOLPH, a Ger. composer, b. at Tentendorf, in Mecklenburg-Schwerin, Apr. 27, 1812. A passion for music diverted him from the diplomatic career his parents had marked out; went to Paris and

took lessons in composition from Reicha. His first operas, produced when he was scarcely 18, were rejected by the theatrical managers. But he persevered, and in 1838 obtained great success by his *Le Naufrage de la Méduse*, which was performed 54 times in a single season at the theatre of the Renaissance. From that time his operas followed in easy succession: *Le Forestier*, *L'esclavage de Camoëns*, *Alessandro Stradella*, *L'am en peine*, *Albin*, *Martha*, *Zilda*. The last 3, written in Ger., are favorites on the Ger. stage with the lovers of light opera. *Martha* is popular everywhere, and is better known in Amer. than any other of all F.'s works. F., after living several yrs. in Paris and a short time in his native place, took up his abode in Schwerin, where he was supt. of the court theatre. In 1864 was made corresponding member of the Fr. Inst. D. Jan. 1883. O. B. FROTHINGHAM.

Flounder, a name vaguely given to various Pleuronectidae. The common F. of the E. cities is *Pseudo-pluronectes Americanus*, and has a small mouth. The same name is also given to another common species, the *Chenopsetta ocellaris*, with a large mouth.

Flour [a word kindred to *flower*; i. e. the "flower" or choicest part of the wheat]. When dry wheat is crushed, the product is a powder mixed with scales, known as whole meal. The process of sifting or bolting separates the whole meal into 2 portions, known as F. and bran. The latter consists of the outer woody portion of the grain, with adhering portions of the interior; and F. is the name given to the remainder. With refinements in the art of making bread, etc., came a demand for finer F. New modes of milling were introduced, and the product was separated into more numerous grades.

The grain of wheat has the form of an irregular oblong spheroid. If this grain be moistened and rubbed with a dry rough cloth, there will be detached from the surface 2 outer coats, composed of woody fibre. Within there is a thin coat, also composed of woody fibre. This is succeeded by another coat of exceeding tenuity, like the others chiefly composed of woody fibre. Within these is the nutritious portion of the grain. There is first a framework of cells, filled with a class of nitrogenous bodies of albuminous character and certain mineral salts, of which the chief is the phosphate of potassa: the whole, with the cell framework, being known as the gluten coat. At the germ end of the berry are certain organic forms, constituting the embryo of the grain. The whole of the remaining interior is occupied by a framework of coarse, open cellular tissue, filled with starch grains, containing albuminoid or nitrogenous constituents. The phosphatic and nitrogenous constituents and the starch are indispensable as elements of food, the starch constituting about 70 per cent. of the whole grain. The nitrogenous constituents or the albuminoid bodies constitute from 12 to 18 per cent., and the phosphatic salts about 2 per cent., the rest being mainly woody fibre.

On this structural peculiarity of the grain rests the foundation of a philosophical system of milling. The larger the percentage of the interior of the berry in F., the less must be its nutritive value; and correspondingly, the larger the percentage of the gluten coat in F., the greater its nutritive value; and in bran, the smaller the percentage of adhering gluten the more nearly worthless as an article of food the bran would be. It is very rare that any considerable quantity of wheat is to be found absolutely free from foreign ingredients; it is rarer still to find wheat grains uniformly filled out and without shrivelled or blasted kernels. Wheat is sometimes plump, the starch of the interior being mealy. It is sometimes slightly shrunken, hard and brittle from the surface to the centre. It is sometimes shrivelled, as if its growth had been arrested.

Purification of Commercial Wheat.—Two principles underlie most of the devices for separating the light grains from the heavy, and the foreign seeds, grains, and other impurities from the wheat. The one is the process of sifting; the other, that of exposing a thin cascade of falling grain to a current of air. To these a third has been added, that of centrifugal force, taking advantage of unequal specific gravity and unequal extent of surface. By these processes it is now practicable to obtain good wheat from a sample of spring wheat of which not more than $\frac{1}{2}$ is fit for making F., by the complete separation of every foreign matter from the sound, serviceable wheat grains.

Milling.—The trituration of wheat is now almost universally accomplished between millstones. These are 2 short cylinders of hard stone placed one over the other, having the 2 horizontal surfaces between them peculiarly grooved to fulfil the office which they are expected to perform. To understand this office we must notice a property of gluten.

Gluten.—If a handful of F. be moistened with water and fashioned into dough, and then kneaded in a slender stream of falling water, the starch will gradually be separated from the dough, and there will remain at length pure gluten. On drying, this body will become quite hard and somewhat brittle. On subjecting it to moderate heat after it has been thoroughly dried at common temperatures, it will be found to lose weight. It will have parted with water of hydration. On withdrawing the heat the gluten will reabsorb this water of hydration from the air and recover its original weight. In the same manner the gluten of the F. subjected to heat will part with its water of hydration, and this escape of water will be accompanied more or less with the rupture of the cells in which the gluten is encased. The openings through which the moisture has escaped will permit the air to enter, and with it, more or less the germs of microscopic vegetation, which, taking root in the gluten, produce the well known effect described in the term *mould*.

It is desirable that, in the process of grinding, the wheaten meal should be subjected to as little friction with the millstones as may be, or within its narrow limits, successively to interrupt the process and allow the materials to cool. The surfaces of the millstones present a series of grooves, oblique in some instances and curvilinear in others. Great in-

genuity has been displayed in the conformation and arrangement of the grooves. Among the best results that have been attained in this direction are those of the Istvan steam-mills at Debreczin in Hungary, in which with a stone 54 inches in diameter, the width in grinding surface from the periphery inward is only 9 inches. This gave nearly 80 per cent. of F., with 20 per cent. of bran and 3 per cent. of waste.

Walz Muhl of Hungary.—As one of the results of the study of the nature of the grain, a process of milling has been perfected in which the millstones are replaced by pairs of small horizontal steel rollers, the surfaces of part of which are traversed by small, sharp grooves, parallel to the axis of the rollers. These pairs of rollers are arranged in sets of 3, one above the other, with considerable intervals between, so that the heat produced by the slight crushing will be counteracted as the product passes through the air on its way from one pair of rollers to the next. These pairs of rollers are adjusted so that the crushing effect of any one pair is slight, and as many as 6 or 7 sets, making from 18 to 21 pairs of rollers, are necessary to produce the various grades of F. At intervals the products of the several sets of pairs of rollers are subjected to processes involving bolts and currents of air to separate the F.-dust and the bran produced.

Low Milling.—In this country the prevailing process is that of low milling. The first step, after the removal of the foreign seeds and shrunken berries and dirt, is to pass the wheat through a smut-machine, which, beside removing any smut or dust, largely removes the outer coat of the berry, together with the brush of vegetable hairs at one end, and more or less of the germ at the opposite end. It is then ground, and the product passed through the bolting cylinders or sieves, which separate the F. from the middlings and coarser bran. The middlings are then discharged upon a slightly inclined sieve, the meshes of which are sufficiently large to let the whole product pass through, but the bran is kept above by a current of air sweeping upward through the sieve. These fine grits or "groats," are in some mills separately ground, and sold by themselves as an extra quality of F. In most they are conducted back to be mixed with fresh wheat, incorporated with the gen. product, and separated with the fine F. in the next bolting.

Judging Flour.—The excellence of F. may be judged in some degree by its shade of color, and by the elasticity and tenacity of the dough which it yields when mixed with a small quantity of water and kneaded. To this may be added the odor which the dough in thin layer yields when submitted for a brief time to a sharp baking temperature of about 400° F.

Composition of Flour.—It has been convenient to treat of the composition of wheat as including the outer envelope, bran; the inner envelope, the gluten coat; and the mass of the interior, the starch and associated albuminoids. Proximate phys. analysis and detailed chemical analysis have shown a much greater variety than would be indicated by these 3. The outer coats contain, beside the woody fibre and cellular tissue of their structure, various inorganic substances, including silica. The gluten coat contains, beside the framework of cellular tissue, various nitrogenous substances, the chief of which is gluten. Beside these there are contained bibasic phosphates, of potassa—the most abundant—then magnesia next; lime, soda, iron, in combination with which the nitrogenous bodies above mentioned seem more or less to play the part of bases; and in addition to these, oil and sugar. The interior, beside the open cellular tissue and starch-granules, contains albuminoid bodies, kindred with those of the gluten coat, and in some grains in larger proportion, and a small percentage of phosphates. The embryo contains, beside its organic texture, the nitrogenous and phosphatic constituents found in the gluten coat.

Bread-Making.—When starch and gluten are mingled together and mixed with an adequate quantity of water, the changes which the nitrogenous bodies experience are transferred to the starch, and that is also converted into new substances. At a temperature of from 70° to 80° F. the starch is converted first into a kind of dextrine, then into grape-sugar, and then this grape-sugar into alcohol and carbonic acid; at a more elevated temperature butyric acid, succinic acid, hydrogen, with carbonic acid and other volatile products, are produced. In bread-making advantage has been taken of this susceptibility to fermentation to give to the moistened F. or dough, and ultimately to the loaf, the quality of porosity or cellular structure. There are 2 prin. modes of effecting fermentation—one by the introduction of the purified yeast-plant (known as press-yeast), and the other by the incorporation with fresh F. and water of a portion of the fermenting dough of a previous batch, which is of course filled with yeast-germs. This yeast-plant, if skillfully manipulated, yields only the products of vinous fermentation, but where neglected and allowed to become old and to undergo spontaneous decay, or where impure from the presence of germs of putrefactive fermentation, the bread produced takes on the offensive qualities of the yeast, and instead of being grateful to the palate and uniformly porous, may be offensive to the taste and smell, and heavy or sodden, or partially filled with bubbles of irregular and greatly unequal size, producing on the one hand great cavities, and on the other heavy streaks in the bread.

Unfermented Bread.—Effort was made long since to convert F. into porous bread without the aid of fermentation. As the porosity was due solely to the spontaneous evolution of the gas from every point in the interior of the dough, it was evident that it need not be produced from fermentation. It would only be necessary to mix a finely powdered alkaline carbonate with the F., and then make the F. into dough by incorporating with it acidulated water. The acid of the acidulated water, combining with the alkali, would set the carbonic acid free, which, taking on the gaseous form in every part of the loaf, would make it porous. This principle was illustrated early in the use of sour milk as the acidulated solution. In place of the sour milk, hydrochloric

acid was employed, and when carbonate of soda was used yielding common salt in the bread.

Self-raising Flour.—It was obvious that if an acid which has a solid form, but readily soluble in water, were pulverized and mixed with bicarbonate of soda in proper proportions to yield a neutral compound of the acid and alkali, there would be practicable yeast-powder. The substance chosen for this purpose was tartaric acid, or its compound with potassa, cream-tartar. This, mingled with bicarbonate of soda in proper proportions, is incorporated with the F., and the mixture constitutes what has been called a *self-raising flour*. In place of the tartaric acid, which yields no nutritive value to the F., there has been introduced the use of acid phosphate of lime in the form of powder, with a view to restoring the phosphates lost with the bran in the ordinary process of bolting. [From orig. art. in *J. s. Univ. Cyc.*, by Prof. E. N. Horsford, M. D.]

Flour Manufacture, New Process of. A large proportion of the most valuable part of the wheat, is in the old flouring process, carried off as "middlings," chiefly used for feeding stock and for distilling. A plan for preventing this waste, introduced from Paris in 1872 by Mr. Lacroix of Faribault, Minn., and subsequently much improved by Mr. George C. Smith and others, has been successfully employed in the N. W. The grinding is done at a relatively low speed of the stones, and the F. is consequently coarser or "higher" than ordinary. Bolting-cloths are employed, a strong blast of air passes up continuously through the bolt for the prevention of clogging, and the upper side of the bolt is acted upon by a system of brushes. There are several processes, but in all the principle is essentially the same, excepting that in some of the best no brushes are employed. The following results have been accomplished: (1) the amount of F. yielded by a bushel of wheat is increased more than 8 per cent.; (2) the quality of the F. is better than that previously made; (3) spring wheat, the sort most abundantly produced, is becoming the highest in value, since the new processes are failures when applied to winter wheat.

Flourens, Jean- (MARIE JEAN PIERRE), b. at Maureilhan, Fr., Apr. 15, 1794, became M. D. 1813; admitted to the Acad. of Sciences 1828, prof. of comparative anat. 1832, perpetual sec. of the Acad. of Sciences 1833, and member of the Fr. Acad. 1840. He was made a peer of Fr. 1846, and grand officer of the Legion of Honor 1859; wrote a *Course of Comparative Physiology*. D. Dec. 6, 1867.

Flower [Lat. *flor*, *floris*; Fr. *fleur*]. The organs of fructification of a phænogamous plant, with the envelopes or peculiar leaves which inclose or surround them, constitute the F. Yet some F. are destitute of all envelopes or leaves, and the F. most prized for ornament, such as full "double" roses or camellias, consist wholly of leaves. The latter are botanically monstrosities, and incapable of performing their office of propagation. A complete F. consists of its essential organs of 2 kinds, male and female; the latter in the centre, surrounded by the former, and these surrounded by 2 floral envelopes, the leaves of the blossom as they are sometimes called. The outer envelope is the *calyx* or F.-cup (and this is the meaning of the word, the same as "chalice"), for the leaves which compose it are often consolidated more or less into a cup. These calyx-leaves when separate are named *sepals*. The calyx is more commonly green and leaf-like, but by no means always so. The inner floral envelope, whether in form of a cup or of separate leaves, is the *corolla*, and its separate leaves or pieces are called *petals*. The corolla is usually the attractive part of a F., the texture delicate, and the color some other than that of the herbage.

The organs next within the corolla are the *stamens*, the male or fertilizing organs. The essential part of a stamen is the *anther*, a case usually of 2 cells or compartments containing *pollen*, a powdery substance consisting of minute grains. The anther is commonly borne on a stalk-like support, the *filament*. In the centre are the female or seed-bearing organs, one or more—the *pistils*. A pistil consists of 2 essential parts—viz. the *ovary* (in Lat. *ovarium*), which contains *ovules*, destined to become seeds; this is surmounted by a *stigma*, which is a knob, line, or other surface receptive of the pollen, which falls upon or is in some way conveyed to it, and which serves to fertilize the ovules, so that an embryo is formed and they become seeds. (See *PHYSIOLOGY, VEGETABLE*.) In most F. the stigma is elevated above the ovary upon a column often resembling the filament of a stamen; this is called the *style*.

A name sometimes employed to denote the envelopes of a F. taken together is the *perianth*. A technical name for the stamens of a F., taken together, is *androeium*; for the pistils, taken together, *gynaeium*. The axis of the F., the apex of the F.-stalk out of which all the organs grow, is the *receptacle* or *torus*. The idea of the F., morphologically, is that the receptacle is axis or stem, and that the sepals, petals, stamens, and pistils respectively answer to leaves, more or less transformed and adapted to special functions. (For details, see *BOTANY*.)

ASA GRAY.

Flower (WILLIAM HENRY), F. R. S., Eng. surgeon, b. at Stratford-on-Avon Nov. 30, 1831, ed. at University Coll., Lond., and at Middlesex Hospital; entered the army as assistant surgeon in Apr. 1854, served in the Crimean war, was assistant surgeon and demonstrator of anat. at the Middlesex Hospital, and in 1861 conservator of the museum of the Royal Coll. of Surgeons; since 1869 he has been Hunterian prof. of comparative anat. and physiology. Wrote *An Introduction to the Osteology of the Mammalia*.

Flowers, Artificial. Flowers and leaves of painted linen have been found in tombs at Thebes, and the Egyptians also invented F. of horn shavings stained in various colors. During the Middle Ages they were much used, being generally made of paper, satin, silk, metal, and wax. But in 1728 Seguin began the manufacture in Paris, employing parchment for the F. and bristles of the wild-boar for the stems. From this time the manufacture increased in Fr. It is only of late that Eng. F.-making has rivalled the Fr.

manufacture. The prin. tools used by artificial florists are *stamps*, by means of which leaves and petals are cut out very rapidly. *Goffering-irons* of different kinds, the commonest being a ball of polished iron, fastened to a handle, are used to hollow the petals. *Moulds* called *veiners* are employed to vein the leaves. *Burnishers* of glass or agate give the petals the polished appearance of real F. Many other tools exist, but of late years their use has greatly diminished. The florist's fingers are found better than any mechanical appliance. The best F. are painted by hand.

Flowers, Colors of. Although the coloring principles contained in many of the most important vegetable dyestuffs have been isolated and their composition and chemical relations clearly established, and some of them have been produced artificially, the C. of F. have, with few exceptions, thus far resisted all attempts at isolation. The C. of F. often change spontaneously during the life of the F. The F. of *Myosotis sivecolor* open with a yellow tint, but soon change to blue. *Cheiranthus mutabilis* opens yellow, then changes to orange, red, and finally to purple. Garden phlox is blue in the early morning and pink in the middle of the day. *Hibiscus variabilis*, which is white in the morning, is pink at noon and bright red toward night. The petals of the purple or violet dahlia are reddened by acids, the purple being restored by alkalis, but changed to green by an excess of alkali; a red rose is bleached by sulphurous acid, but the color is restored by dilute sulphuric acid. Many flowers contain more than one coloring-matter. The petals of the safflower yield a yellow color to water and a red principle to alkalis. The orange-colored *Tropaeolum majus* yield a purple coloring-matter to boiling water, becoming yellow; boiling alcohol then extracts a purple substance. The blue and red pigments of F. are generally soluble in water, while the yellow matters are often resinous, and dissolve only in alcohol and ether. They are generally very fugitive, and consequently of little value in dyeing. The term *cyanin* is applied now to the blue coloring-matter of F. It is a blue amorphous body, soluble in water and in alcohol. It is decolorized by reducing agents, as sulphurous acid, but regains its color when exposed to the air. It is colored red by acids, green by alkalis. These reactions render cyanin useful for the preparation of test-papers. Some red F., as varieties of the aloe, contain a red principle sparingly soluble in water, but readily soluble in alcohol, which is not changed by acids or alkalis.

C. F. CHANDLER.

Floy (JAMES), D. D., b. in New York Aug. 20, 1806; studied in Columbia Coll., and afterward in Lond.; became a preacher in the M. E. Ch. in 1833; preached in New York, Brooklyn, New Haven, etc.; wrote and edited several works, and served on the "committee on versions" of the Amer. Bible Society. D. Oct. 14, 1863.

Floyd (JOHN), b. in Beaufort, S. C., Oct. 3, 1769, moved to Ga. 1791; was brig.-gen. of the Ga. militia Aug. 1813 to Mar. 1814; commanded in 2 battles against the Indians; was often in the State legislature, M. C. in 1827-29, and maj.-gen. of the State militia. D. June 24, 1839.

Floyd (JOHN), b. in Jefferson co., Va., was many yrs. in the Va. legislature; was M. C. from that State from 1817 to 1829, and gov. of Va. 1830-34. D. Aug. 16, 1837.

Floyd (JOHN BUCHANAN), b. in Va. 1805, grad. at S. C. Coll. 1826; studied and practised law; M. C. from Va. 1847-49, gov. of Va. 1850-53. He was made sec. of war by Pres. Buchanan Mar. 1857; used his power in dispersing the U. S. A. to distant parts of the country, and in transferring arms and ammunition to S. arsenals. On the secession of S. C. he became a sympathizer with the secession movement, and upon the Pres. refusing to withdraw the U. S. forces from Charleston harbor, resigned his office. Was indicted as being privy to the withdrawal of bonds from the dept. of the interior, but was never brought to trial. Was appointed brig.-gen. in the Confed. army, and commanded in 1861 in W. Va.; was subsequently transferred to Ky., and at Ft. Donelson commanded a brigade, being senior officer, but abdicated his command and withdrew the night previous to the surrender. D. Aug. 26, 1863.

Floyd (Gen. WILLIAM), b. in Suffolk co., L. I., Dec. 17, 1734, was in the Continental Cong. 1774-83, and signed the Dec. of Ind.; was again in Cong. 1789-91; was a presidential elector 1800, 1804, 1820, and was a prominent State legislator. He served actively in the Revolution. D. Aug. 4, 1821.

Fludd (ROBERT), M. D. (*Robertus de Fluctibus*), "the Searcher," an Eng. alchemist, b. at Bearstead, Kent, 1574; entered St. John's Coll., Ox., 1591, studied 5 yrs. on the Continent, took his med. degree at Ox. 1605. He was a famous phys. and the author of numerous obscure Lat. works, theological, philosophical, and mathematical. His doctrine was a refined dualism. D. Sept. 8, 1637.

Fluents and Fluxions [Lat. *fluo*, to "flow"]. In the Newtonian analysis, a *fluent* is the same as a function in the modern calculus, and the *fluxion* is the same as its differential. The conception of F. and F. was based on the idea of motion. According to this view a curve is supposed to be generated by a point moving uniformly in the direction of a given line, and at the same time having a transverse motion which varies according to a fixed law: the part of the curve which has been generated up to a given time is the *fluent*, and the part generated in the succeeding instant of time is the *fluxion*. (For a fuller article on F. and F., see *J. s. Univ. Cyc.*)

W. G. PECK.

Flue, von der (NIKOLAUS), SAINT, b. at the estate of Fluehli, Unterwalden, Switz., Mar. 21, 1417; became a distinguished soldier, and for 19 yrs. was state councillor and judge. In 1467 he left his children and went to live among the Alps, a hermit, bareheaded and barefooted; and we are told that for 20 yrs. he ate only the eucharistic bread. In 1477 he began to preach in his little chapel, and in 1481 he visited the Diet at Stanz and prevented the breaking up of the confederation. D. Mar. 21, 1487, canonized 1669.

Flügel (GUSTAV LEBRECHT), Ger. Orientalist, b. at Bautzen Feb. 18, 1802, ed. at Leipsic, became the pupil in 1827 of

Von Hammer at Vienna. The *Arabic Anthology of Thālibī* (fugitive poetry), pub. in 1825, led to his appointment on a scientific mission by the Aus. govt.; for 3 yrs. he travelled in Hungary, Styria, parts of Ger., and in Fr. Became prof. in the Coll. of Meissen in 1832; resigned 1850. In 1835-54 his Lat. translation of *The Encyclopædic and Biographic Dict. of Hadschi Chalfa*, with commentary, was pub. at the expense of the Lond. Oriental Society. He wrote several works, and edited Ar., Tur., and Per. MSS. D. July 5, 1870.

Flügel (JOHANN GOTTFRIED), b. at Barby on the Elbe, 15 m. from Magdeburg, Nov. 23, 1788. In 1838 was appointed U. S. consul at Leipsic. Is best known by his *Complete Eng.-Ger. and Ger.-Eng. Dict.*, in last ed. of which he was assisted by his son, Dr. Felix Flügel. D. June 24, 1855.

Fluid [Lat. *fluidus*, from *fluere*, to "flow"], a body whose particles move over each other without sensible resistance, yielding to the slightest pressure. Such bodies under the influence of natural forces assume forms of static equilibrium. Such forms will be changed by the action of any new force, but will be immediately restored when the disturbing force is withdrawn. F. are of 2 classes, liquid and æriform. The property which distinctively characterizes æriform F. or gases is that they are perfectly elastic; whence it follows that, temperature remaining constant, their vol. is always inversely as the pressure to which they are subjected. This law is subject to a practical qualification, in regard to which see GAS. With diminished pressure, therefore, they tend to expand indefinitely; but as expansion is accompanied by depression of temperature, the process may be naturally arrested by the condensation of the body to the liquid state. This is what happens with the æriform bodies called *vapors*, which differ from permanent gases only in being condensable at temperatures naturally occurring. Liquids are but slightly reduced in bulk by pressure—to common observation not at all. A liquid introduced into a vessel having a capacity greater than its bulk occupies but a part of the vessel; whereas the smallest portion of any permanent gas fills the containing vessel entirely, however large it may be. Liquids are sometimes called non-elastic fluids, and sometimes *dense fluids*. The terms are convenient, but neither of them is severely correct. When elastic F. are spoken of, æriform bodies are always intended. Some writers have been disposed to restrict the term *liquid* to such dense fluids as have the property of *wetting* the solid bodies immersed in them. Water, alcohol, and oil are examples of this kind; mercury is an example of the other. But such distinctions will not hold universally. Water will not wet a charred cork; mercury will readily wet gold or silver or lead or zinc, though it will not wet platinum, iron, glass, stone, wood, nor organic or mineral substances generally. F. A. P. BARNARD.

Fluidity, the condition of matter in which its molecules glide upon each other without sensible resistance from cohesion. Though the term *fluid* is applied to bodies both liquid and gaseous, the word *fluidity* in its ordinary sense is understood of liquids only. Brande distinguishes the state of F. as one in which bodies are capable of forming *drops*.

Fluke-Worm, a name applied to various Trematoda. The disease called "rot" in sheep is caused by the presence of flukes in the biliary passages.

Flume, The, in the Franconia Mts., and in the town of Lincoln, Grafton co., N. H., is a cleft between 2 walls of rock through which flows a small stream. This stream, just below, falls over 600 ft. down The Cascade. It is one of the finest resorts of the White Mt. region.

Fluohydric (or Hydrofluoric) Acid. The aqueous acid is produced by the action of sulphuric acid on metallic fluorides, fluor spar or cryolite being generally employed, the operation being conducted in leaden or platinum vessels, as the acid rapidly corrodes glass and porcelain. The acid distils over, on the application of heat, as a gas holding a certain proportion of water; it is condensed in a small quantity of cold water placed in the receiver, and must be preserved in bottles of lead, platinum, or gutta-percha. The concentrated aqueous acid is a colorless liquid, sp. gr. 1.06; on dilution its density increases to 1.15. The strong solution gives off fumes which are very caustic and irritating, and the liquid itself is extremely corrosive. On the skin it produces painful ulcers, difficult to heal. It dissolves metals readily, with the liberation of hydrogen—even copper, silver, and the elements silicon, boron, zirconium, titanium, and tantalum, but not gold. Ignited silicon and titanium require for their solution a mixture of hydrofluoric and nitric acids. Silica and the silicates (glass, porcelain, etc.) are energetically attacked by this acid. Silica dissolves to a clear solution with elevation of temperature, forming hydrofluosilicic acid. With silicates it forms silicofluorides. Placed upon glass, heat is evolved, fumes are given off, and a roughened spot is produced. This action upon glass distinguishes it from all other acids.

Uses.—The aqueous acid is extensively used for etching glass, designs being produced by first tracing them in a coating of wax or varnish previously applied to the surface. Lines etched by the vapor of the acid are opaque; by the liquid, transparent. For etching with vapor a leaden box is employed containing a mixture of fluor spar and sulphuric acid. The waxed plate is placed over it, waxed side down, and a gentle heat is applied to the bottom of the box. The acid is very useful in the laboratory for decomposing silicates for analysis. (See FLUORINE.) C. F. CHANDLER.

Fluorescine. See PHTHALEIN.

Fluorine, a non-metallic element belonging to the group of halogens which includes chlorine, bromine, and iodine. It occurs abundantly in fluor spar, which is a fluoride of calcium; in cryolite (fluoride of aluminium and sodium), topaz, mica, amphibole, chondrodite, tourmaline, apatite, and numerous other minerals. It is very generally diffused, occurring in all rocks in small quantities. It is also found in almost all waters in minute quantities; in plants, especially in grasses and Equisetaceæ; and in ani-

mals in the bones, teeth, brain (*Horsford*), blood, urine, milk, etc. The name fluorine is derived from fluor spar, from *fluo*, to "flow," because this mineral has long been used as a flux. From the nature of the compounds of F. it is supposed to be a gas, to possess color like chlorine, atomic weight 19, equivalence 1, molecular weight 38, molecular vol. 2, density 19 (H = 1), 1.31 (air = 1). One litre weighs 1.7 grammes.

Compounds of F. with hydrogen, boron, silicon, sulphur, phosphorus, and nearly all the metals have been described, but none are known with oxygen, chlorine, bromine, or iodine. Solid fluorides have no metallic lustre; most of them fuse readily; when dry they are not decomposed by heat, though many of them are volatile without decomposition. The fluorides of hydrogen, ammonium, tin, and silver are readily, the fluorides of sodium, potassium, and iron sparingly soluble in water; most of the other fluorides are insoluble in water. Some fluorides are gases. F. manifests a strong tendency to form double fluorides, some of which, containing hydrogen, possess acid properties. (See FLUOHYDRIC ACID.) C. F. CHANDLER.

Fluorotype, a photograph taken upon paper treated with a compound containing fluoride of sodium or some other equivalent fluoride. This process was brought forward by Mr. Robert Hunt in 1844. (See PHOTOGRAPHY.)

Fluor Spar, Fluor, or **Fluorite** (from *fluo*, "I flow," in allusion to its use as a flux in metallurgical operations), a mineral composed of fluoride of calcium. It crystallizes in the monometric system (in cubes, octahedra, etc.), and has a perfect octahedral cleavage. Its hardness is 5, and its specific gravity 3.18. It occurs frequently very perfectly crystallized, and of beautiful and bright colors; pulverized, it becomes below a red heat brilliantly phosphorescent. It is sometimes carved into ornaments, and is used in the arts as a source of hydrofluoric acid for etching, and, as above stated, as a flux. EDWARD C. H. DAY.

Fluosilicic (Hydrofluosilicic or Silicofluoric) Acid. This acid is formed by the action of water on the fluoride of silicon. According to J. Lawrence Smith, Du Motay and others have simplified the manufacture of this acid to a degree which will extend its use to many important industries. A mixture of fluor spar, alumina, silica, and carbon is made into bricks and melted in a blast furnace. Fluoride of silicon is evolved, and a fusible slag is from time to time drawn from the furnace. The gas is conducted through a series of 5 wooden chambers, containing inclined shelves of glass which are moistened by a spray of water. Silica is deposited at the bottom of the chambers, and the acid solution passes from chamber to chamber, and may thus be concentrated to between 5° and 10° B. (1.034 to 1.070), equivalent to from 4 to 8½ per cent. of acid. The acid thus prepared costs about 4 times the price of its equivalent quantity of sulphuric acid. Hydrofluosilicic acid is a sour, fuming liquid, which can be evaporated in platinum vessels without leaving a residue. It does not attack glass except when evaporated in it, when fluoride of silicon is first given off, leaving hydrofluoric acid, which corrodes the glass. Chloride of barium gives a crystalline precipitate, in solutions of the acid; chloride of potassium, a transparent gelatinous precipitate. When ammonia is added to the acid, even with the greatest care, a portion of the acid is decomposed, with the precipitation of silica, while the rest is changed to the ammonium salt. A similar decomposition occurs whenever the acid is neutralized by a base. In the laboratory the acid may be used as a test for barium and potassium. In the arts it is suggested as an agent for removing potassa from sugar and syrups in sugar-refining, especially when beet-sugar is employed, which contains much potassa, which interferes with the operations of refining. It may also be used for making chloric acid from chlorate of potassa. It is proposed to make it the agent for preparing useful salts from the chloride of potassium, found at Stassfurt. The acid, being added to a solution of this salt, precipitates silicofluoride of potassium, setting free hydrochloric acid. This salt can be used as a substitute for borax, and in place of carbonate of potassa in making flint glass. It is sold in Fr. at 10 cents a pound. It can be converted into caustic potassa by first heating in retorts, when fluoride of silicon is driven off, to be again converted into hydrofluosilicic acid, and fluoride of potassium remains behind. This salt is readily decomposed by lime or carbonate of lime, forming caustic or carbonate of potassium and fluoride of calcium, to be used again. Thus the acid becomes a mere agent, to be used again and again to extract potassa from native chloride. C. F. CHANDLER.

Flushing, R. R. Junc., Queens co., N. Y., on the N. shore of L. I. at the head of Flushing Bay, 7 m. from New York. It has several insts. of learning. Gardening, the nursery business, and fruit-raising are leading pursuits. Pop. 1870, 6233; 1880, 6683 (estimated).

Flux [Lat. *fluo*, to "flow"], a substance or mixture used to promote the fusion of bodies. Limestone is the usual F. for ores of iron in the blast furnace; it unites with the alumina and silica of the ore, forming a fusible slag. To flux-silica and silicates, alkaline or basic F. are selected, as carbonate of soda or potassa, litharge, lime, or carbonate of lime; fluor spar is very effective. For lime, alumina, oxide of iron, etc., acid F. are selected, as borax, silica, glass, etc. Nitre and litharge are both oxidizing agents and F., while cyanide of potassium is a reducing agent as well as a F.; it frees metals, such as lead, from sulphur and from oxygen. White F. is a mixture of carbonate, nitrite, and nitrate of potassa, prepared by projecting a mixture of equal parts of nitre and argol or crude cream of tartar into a hot crucible in successive small portions. It is an oxidizing F. Black F. is prepared of the same materials and in the same manner as white F., but the quantity of argol employed is double that of the nitre. C. F. CHANDLER.

Fluxions. See FLUENTS AND FLUXIONS.

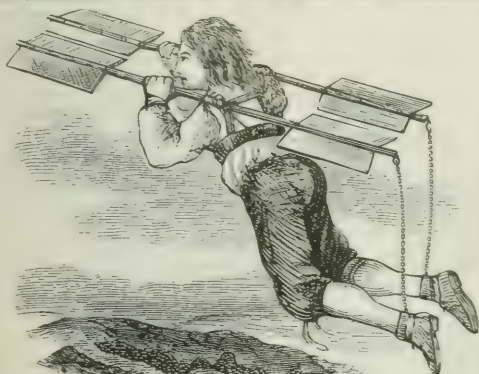
Fly, a name applied to many insects, mostly Diptera, of

the families Muscidae and Diptera. The common house-Fly, *Musca domestica* is universally prevalent. F., though often a serious annoyance, are extremely useful as scavengers and preventers of disease.

Fly-Catchers, a name applied at first to birds of the genus *Muscivora*, now given to a large number of Amer. birds, none of which are of that genus, and which have the habit of lying in wait until insects come near them, when they dart upon them with wonderful quickness.

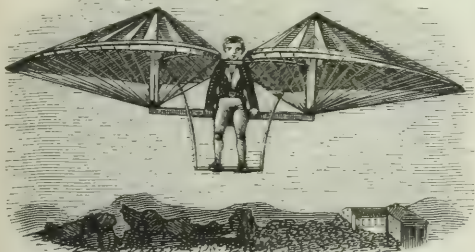
Flying, the motion of a living animal through the air when propelled by its own wings. In vertebrates it is effected by various expansions from the anterior members; most birds and all the bats possess, and the pterodactyl reptiles once possessed, the power of flight. It is probable that flying fishes also have a limited power of true flight, the pectoral fins serving as wings. Most insects also have the power of F., but their wings are not homologous with those of vertebrates.

Flying, Artificial. This term is applied to aërostation by dynamical agencies, either with or without balloons to provide ascensive power. The first requisite of a flying-machine is that it shall overcome the force of gravity; the second, that in moving more or less horizontally it shall overcome the resistance of the atmosphere, and be capable of guidance as to the direction of its flight. The first authentic



Besnier's Flying-Machine.

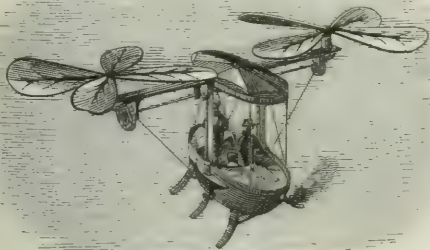
account of a flying-machine that operated at all is that of one Besnier, a locksmith of Sablé, Fr. His apparatus comprised 4 rectangular wings arranged in pairs at opposite ends of 2 rods passing over the shoulders, the rear extremities of the rods being connected by cords to the ankles of the wearer, to enable the legs to assist the arms in giving a vibratory movement to the rods, and consequently to the wings. This was in the latter part of the 17th century. About a century



Jacob Degen's Flying-Machine.

and a quarter later one Jacob Degen, a prisoner at Vienna, constructed an apparatus having 2 umbrella-like wings of large area worked by manual power. With this machine he rose to a height of 50 ft., as measured by a cord attached to prevent escape and held by the jailer.

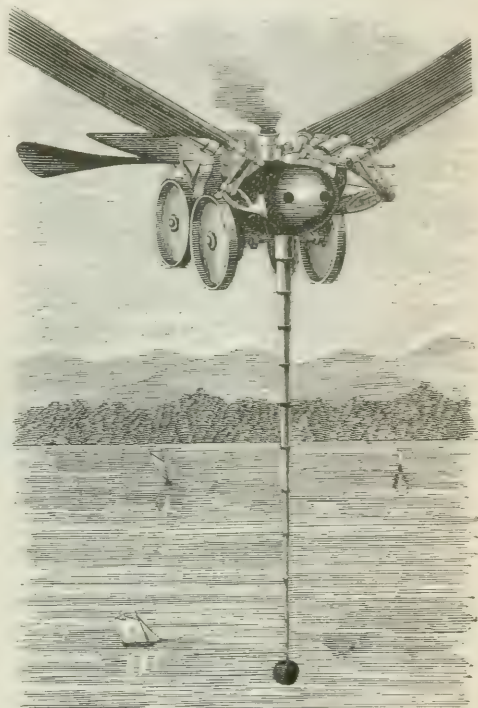
In 1815 Messrs. Pauly and Egg secured the first Brit. patent for an aerial machine. In this a balloon of fish- or bird-like form was to have "wings or fins" and a "tail," which were to be of silk stretched upon whalebone strips



"Two-Propeller" Flying-Machine.

fastened to operating staves. In 1840 Moses Poole suggested propellers for moving "vessels floating in the air." Two yrs. later William Henson brought forward a scheme for A. F., which attracted much attention. The apparatus was

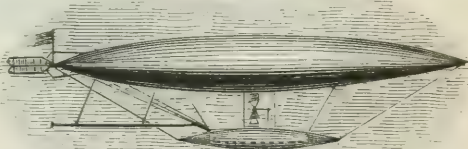
to carry "letters, goods, and passengers." It comprised a horizontal plane composed of wire and hollow wooden bars, arranged on the principle of a trussed girder and covered with silk. This plane was furnished with propellers driven by a steam-engine. A tail capable of being brought to any desired angle to the horizontal was arranged "so that when the power acts to propel the machine, by inclining the tail upward the resistance offered by the air will cause the machine to rise, and when the tail is reversed the machine is propelled downward, and passes through a plane more or less inclined to the horizon as the inclination of the tail is greater or less." The machine was to be guided laterally by a vertical rudder. Five yrs. later 2 propellers, arranged to work in opposite directions at the front and stern of an aerial carriage, were proposed by Von Hecke. In 1869 Mr.



Kaufmann's Bird-Machine.

Joseph F. Kaufmann, an engineer of Glasgow, projected a bird-machine worked by steam-power, with wings giving 120 strokes per minute, and a pendent weight designed to keep the machine in equilibrio when elevated in the air. Lateral guidance was to be had by means of a flat rudder answering to the tail of a bird.

The first projector of flying-machines of any note in the U. S. was Rufus Porter. His apparatus comprised a cigar-



Rufus Porter's Aëroport.

shaped balloon, with a car or saloon suspended underneath, the car carrying the motive-power for propelling the whole. The balloon was 22 ft. in length and 4 ft. in diameter. It was made of fine oiled silk stretched upon an internal skeleton or frame consisting of 12 rods $\frac{3}{4}$ of an inch in thickness, and joined at their ends to form the pointed extremities of the balloon. The saloon, 3 ft. below the balloon, was suspended therefrom by cords, and was 7 ft. long, 10 inches in diameter, furnished with a row of miniature windows in



Marriot's Avitor.

each side, and, except that it was square in its cross-section, conformed on a smaller scale to the shape of the balloon. The machine was provided with a pair of screw-propellers,

and, with "a four-leaved rudder;" in other words, one having its cross-section thus, \pm . This model rapidly made the circuit of the hall in which it was tested; it was publicly tried in the Merchants' Exchange in New York city, and made the circuit of the rotunda 11 times. The inventor built what would have been a full working machine had it ever been completed. But it failed, because it was impossible to prevent the leakage of the hydrogen to an extent that wholly destroyed the lifting power of the balloon.

In 1869 Porter's cigar balloon, with certain additions, was revived at Shell Mound Lake, Cal., by Mr. Frederick Marriot, who termed it the "Avitor." The balloon had a length of 37 ft. and a diameter of 8, and, like that of Porter, tapered to points at the ends. It was surrounded by a longitudinal frame of wooden strips firmly wired together, the frame being attached in position by bands and straps. This frame was provided at its forward half with 2 laterally projecting wings, and at the rear was furnished with the 4-leaved rudder, and at the sides by 2 propellers operated by a small steam-engine. This apparatus worked well in a still atmosphere, but failed in brisk winds.

The available data on A-F are scant. The Brit. patent-office has pub. in pamphlet form brief extracts of Eng. patents, prior to 1866, relating to aeronautics. The Lond. mechanical journals reported with considerable fulness the proceedings of the Aeronautical Society during its existence, and the U. S. patent-office reports will be found to show some curious devices. (See M. GUITURE LAMBERT, *De la locomotion mécanique dans l'air et dans l'eau.*) [From orig. art. in *J's Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.B.]

Flying-Draco, a name of small, inoffensive E. I. lizards of the genus *Draco* (*D. fimbriatus*, *volans*, etc.), remarkable for an expansion of the skin on each side, which sustains the animal like a parachute.

Flying Fish, a term applied to various fishes that are enabled, by means of very enlarged and elongated pectoral fins, to support themselves for a brief time in the air, but more especially to the *Exocoetinae*. These constitute a sub-family of the family *Exocoetidae*, characterized by their short jaws, elongated pectorals with all the rays connected, and enlarged lower lobe of the caudal fin. Nearly 50 species are known: they are chiefly inhabs. of the tropical seas, but a few visit the temperate ones. They are said to have flown nearly $\frac{1}{4}$ m.

Flying Fox, a name sometimes given to the *Galeopithecus*, but more frequently applied to the fox-bats, or bats of the family *Pteropodidae*.

Flying Phalanx, a name given to marsupials of Australasia, somewhat resembling the flying squirrels in appearance and habits. The species are rather numerous. The largest, the *Petaurus flaviventris*, is 20 inches long, and its tail measures 18 inches; the smallest, *Acrobates pygmaeus*, is 2 inches long, and its tail is of the same length. One of the most beautiful of these creatures is the *Petaurus ariel*.

Flying-Robin, a name applied to species of *Dactylopterus*, or *Triglidae*, remarkable for the great development of the pectoral fins. They have 2 spines behind the head, detached from the first dorsal fin, the foremost of which is much elongated. The *D. volitans* occurs on coast of U. S.

Flying Squid, a name given to Cephalopodes of genus *Ommastrephes*.

Flying Squirrel, a name for Sciuridae, of the genera *Pteromys* and *Sciuropterus*, characterized by a hairy expansion of the skin between the fore and hind limbs.

Fo, the Chi. Booddha, often confounded with **Fo-Hi** (Fuh-hi), with whom, however, he has nothing in common. The name is derived from *Buddha*, of which word it is a very corrupt form.

Fo'cus [Lat. a "fire-place"], a point at which rays of light meet, after deviation by a lens or mirror. In conic sections, a F. is a point on the prin. axis through which the double ordinate is equal to the parameter. The ellipse and the hyperbola have each 2 foci, but the parabola has only 1—i. e. at a finite distance. Rays of light proceeding from one F. of a conic section, after being reflected at the curve, have directions that pass through the other F.; this principle holds true for the parabola, if we regard it as having a second F. at an infinite distance. In a lens or mirror the point through which the rays pass before deviation is called a *radiant*, and the point through which they pass after deviation is the *focus*; these points are reciprocal—i. e. if the F. is made the radiant, the radiant becomes the F.

Fog. A fog has properly been defined as a cloud at the surface of the earth. It is produced by the condensation of the vapor of the atmosphere into liquid particles of extreme minuteness. The suspension of the cloud is due to the extreme fineness of the globules, and also perhaps slightly in the daytime to the higher temperature of the air which surrounds them. The rising of a F. from the surface of the earth is evidently due to the latter cause, when the source of vapor is cut off. A F. is produced when a gentle current of warm air surcharged with moisture passes over a colder

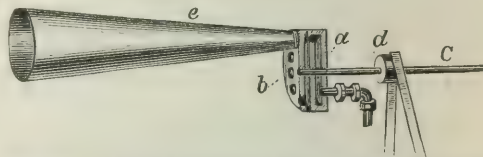
surface. A F., however, is not produced in absolutely still air even when resting on a colder surface. In order to this effect it is necessary that 2 strata of air be mingled with each other, one of which, being the colder, precipitates on itself, as it were, the particles of invisible vapor of the other. This fact is illustrated by dew, in which atmospheric vapor is condensed into water without producing F.

The E. coast of the U. S. is especially subject to F., the cause of which will be readily seen when we consider the relative position of the currents on the W. side of the Atlantic Ocean. First, a cold polar current coming out of Baffin's Bay is thrown by the revolution of the earth laterally against the coast of N. Amer. from Labrador to Cape Hatteras, where it passes under the Gulf Stream. Contiguous to but outside of this current, and moving in an opposite direction, is the great Gulf Stream, an immense body of warm water, which throughout its whole course across the Atlantic heats and saturates with vapor the air immediately over it. Now, it must be evident that whenever the wind is in such a direction as to blow this warm and saturated air across the cold surface of the polar current, mingling the heated and moist air with the colder stratum, a F. must be the result. F. are also produced on the W. coast of N. Amer. when the wind from the exterior ocean passes across the coast current which comes from the N. The production of F. is in this case more complex, since the coast current is in fact the E. portion of the great Gulf Stream of the Pacific. The N. part of this current is warmer than the surrounding ocean, while in its S. portion its temperature is less than that of the water through which it is passing. On the same principle F. are produced in other parts of the world; and their existence may be inferred from the relative position of the cold and warm currents of the ocean. [From orig. art. in *J's Univ. Cyc.*, by PROF. JOSEPH HENRY, LL.D.]

Fogg (GEORGE GILMAN, LL.D., ed. and Senator, b. at Meredith, N. H., May 26, 1813, grad. at Dartmouth Coll. 1839; practised law at Gilmanton, N. H., in 1842, and was in the State legislature in 1846. From 1846 to 1861 edited the *Independent Democrat* at Concord, N. H.; in 1846 was sec. of state of N. H.; from 1861 to 1865 U. S. minister to Switz., and in 1866-67 U. S. Senator. D. Oct. 12, 1881.

Fog-Signals. In various parts of the world, and especially on the coast of the U. S., F.-S. are indispensable aids to navigation. Along the E. coast of the U. S. fogs prevail almost continuously at certain periods of the yr.; and as the shore is exceedingly precipitous, the sounding-line cannot be used with any certainty, and therefore F.-S. must be resorted to. For the production of sound for this purpose bells, gongs, whistles, trumpets, and sirens have been used by the light-house board of the U. S. Bells, even of a large size, give too feeble a sound to be distinguishable across the breakers at a sufficient distance in opposition to the wind; they are only used when a signal is required to give warning of danger at a short distance at intermediate positions. They are rung by a weight wound up at intervals, the descent of which is regulated by the vibration of a pendulum with clock escapement. Gongs in reality give an impulse of too feeble a character to be heard under all circumstances at a distance.

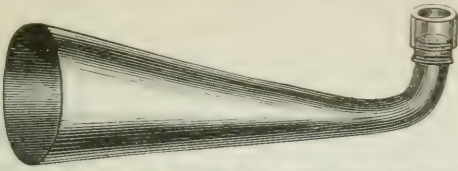
The mechanisms which have been found to produce sound of the greatest penetrating power are those which depend upon the principle of resonance, such as the organ-pipe, the trumpet, and the whistle, in which the air itself becomes the sounding body, as well as the medium of conduction of the sound. Of this character is the ordinary locomotive whistle, in which the vibration is produced by a thin sheet of air striking against the edge of a resounding cavity called the bell. The next powerful instrument used is that called the reed or Daboll trumpet, actuated by air condensed in a reservoir by means of an Ericsson calorific (or heated-air) engine. In this instrument the trumpet itself is the resounding cavity, and the reed by its vibration produces the requisite motion of the air. In order to the best effect, sound from these 2 parts must be in unison, and for this purpose means should be provided for gradually increasing or diminishing the length of the trumpet. With a given stiffness of the reed the pressure of the air in the reservoir cannot exceed a given intensity, since beyond this the reed cannot recoil, and the orifice remains closed. A pressure of from 10 to 15 lbs. per square inch is the maximum employed.



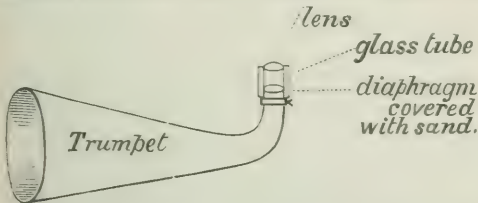
Explanation.—a, steam drum, with 1 hole on front face; b, revolving plate, perforated with 8 holes and supported on the shaft c; d, a pulley, to which rapid motion is given by a band and driving-wheel; e, resonator or trumpet.

Another instrument, and the most powerful of all yet employed, is the siren trumpet. The part of this which gives the impulse to the air producing the sound consists of a flat drum, or, in other words, of a hollow cylinder with a short axis, one head of which is perforated with an orifice, which admits the steam from a pipe connected with a locomotive-boiler. The other head of the drum is perforated with 8 holes, before which, and almost in contact with this head, is a revolving disk also perforated with 8 holes. At each revolution of the disk 8 holes are alternately opened and shut, allowing egress to as many impulses of steam, which in turn produce a violent agitation of the air, giving rise to a most powerful sound, reinforced by the resonance of a trumpet of suitable length. The disk is made to revolve at the required velocity by a small engine attached to the boiler,

the motion being transmitted by a band over pulleys of proper size. The sound from this instrument can be distinctly heard in still air in dense fog from 20 to 30 m. To test the



penetrating power of sounds an instrument has been employed, consisting of a horn, of which the mouth is about 9 inches in diameter and the axis about 4 ft. in length. The smaller part of this horn is gradually bent at right angles, so that when the mouth is held vertically the opening at the



smaller end is horizontal. Across this smaller end is strewn a delicate membrane on which fine sand is strewn. When the instrument is held in the hand horizontally, and the mouth is directed toward a sounding instrument, the sand, protected from the wind by a cylinder of glass, is observed to be agitated. The instrument is then carried off from the source of sound until the sand ceases to be moved. The measured distance at which the agitation ceases is taken as the relative penetrating power of the sound under examination as compared with the standard instrument, such as a reed horn or a bell.

In experimenting with sounds of such powerful magnitude as those produced by the instruments we have described, certain peculiarities are observed which escape detection in ordinary acoustic investigations with sounds of inferior power. The first to which we call attention is that of the great divergence of powerful sounds. It is well known that there is a striking analogy between the reflection of sound and that of light—that sound, like light, may be concentrated and directed in parallel lines by concave reflection; but this appears to be true only to a limited extent, and perhaps for more feeble sounds, since we have found that although the sonorous ray from a parabolic reflector, in the focus of which a powerful steam-whistle is sounded, is more powerful in the direction of the axis of the reflector than in any other at a comparatively short distance—for example, a mile or so—yet when the distance is increased to 4 or 5 m. the effect of the reflector is almost entirely lost, and the sound in the line of the axis may be heard apparently with the same intensity behind as before the reflector. Another set of phenomena are those which result from the effect of the wind. It is a fact of daily observation that sounds are heard farther with the wind than against it. To understand this, let us recall the fact that a beam of sound consists of a series of waves the length of the crests of which is at right angles to the direction of the sound. Now, although the wind may have very little effect upon the absolute velocity of these waves, it may materially affect their relative position, and consequently the direction of the sound. To render this plain, let us suppose the beam of sound to be represented by a series of parallel rods which in still air are perpendicular to the horizon. Let us next suppose a wind blowing against the sound; the stratum of this wind next the earth will be the most retarded, on account of friction and other resistance; the one next above less retarded; and so on toward the upper stratum, which will have the greatest velocity. The effect of a moving river of air of this character will be to cause the perpendicular rods representing the waves of sound to lean, as it were, backward, and the sound itself to take a direction upward, passing far above the ear of an auditor placed on the surface of the earth at a distance to the windward of the origin of the sound. An opposite effect will be produced by a wind in the direction of the sound; the upper part of the rods or waves will be inclined downward, and the sound, which in still air would pass above the ear of the observer, would in this case be thrown down upon it.

That a sudden change in the condition of the air by its saturation with moisture will have some effect in the propagation of feeble sounds, is evident from both experiment and analogy; but this cause is entirely insufficient to produce the effects we have described, since they are exhibited without any apparent change in the hygrometrical condition of the atmosphere. Beside this, the fact that they depend upon the direction of the sound with reference to the wind is conclusive evidence that they are the result of the latter. [From orig. art. in *J's Univ. Cyc.*, by PROF. JOSEPH HENRY, LL.D.]

FO-HI (*Fuh-hi*), a half-mythical character in Chi. hist., b. in Shen-Si, became emp., or rather king, and reigned a. c. 2952. He introduced social order, music, writing, and marriage, and established a kind of mystic religion, which superseded to a great extent the anc. star-worship. He was the reputed author of the *Yih-King*, the most venerable of the Chi. classics still extant, but written mostly in a character now unreadable, although its teachings are known from commentaries. Since F.-H. and his family were said to have

been miraculously saved from a flood, some have considered him the Chi. Noah, but the flood was not improbably an overflowing of the Hoang-Ho.

Foil [Lat. *folium*, "leaf"], thin sheets of metal (gold-foil, tin-foil, etc.) thicker than the leaf-metal of commerce. Gold-F. is obtained by beating. It is chiefly used by dentists. Tin-F. is obtained by rolling the metal or by shaving a thin layer from a block of tin in a machine, which cuts off the F., rolls and stretches it at the same time. Pure tin-F. is of great use in chem. and the arts. F. of copper and other metals are used for the backing of gems by the lapidary.

Fo'ley (JOHN HENRY), R. A., sculptor, b. in Dublin May 24, 1818. When F. was 13 yrs. old he entered as a student in the Dublin Royal Society; in 1834 went to Lond., and entered the Royal Acad. as a student. He exhibited in 1839 his *Death of Abel and Innocence; Ian and Barchan*, which was purchased by the earl of Ellesmere, made him a European reputation. In 1856 F. produced his bronze equestrian portrait-statue of Lord Hardinge for Calcutta. This is counted his finest work. He made the statue of the prince-consort for the national memorial in Hyde Park at the personal request of the queen, and also the group of *Asia* for the same monument. F.'s latest work was a statue in bronze of the Confed. gen. Stonewall Jackson, a commission from the State of S. C. D. Aug. 27, 1874.

Folger, fol'jer (CHARLES J.), LL.D., b. in Mass. Apr. 16, 1818, grad. at Hobart Coll., Geneva, N. Y., 1836; admitted to the bar 1839; judge of Ontario court of common pleas 1844, and also master and examiner in chancery; co. judge 1851-55, N. Y. State Senator 1861-69, assistant U. S. treas. at New York 1869; elected associate judge of N. Y. court of appeals 1871, chief-judge Nov. 2, 1880; U. S. sec. of treas. 1881-84. Nominated by Republican convention Sept. 20, 1882, for gov. of N. Y., but was not elected. D. Sept. 4, 1884.

Folkes (MARTIN), LL.D., F. R. S., b. at Westminster, Eng., Oct. 29, 1690, studied at Saumur and Clare Hall, Cambridge; became in 1741 pres. of the Royal Society; pub. valuable papers on antiquities, astron., etc. D. June 28, 1754.

Folk-lore, a word recently introduced into the Eng. from the Ger. to indicate the knowledge which has been gained from a scientific study of popular traditions and tales. The Brothers Grimm in their *Kinder und Hausmärchen* may be said to have inaugurated the study, and since the publication of that work many others have been collecting in all parts of the world the stories which have been orally transmitted from generation to generation. These stories have been taken from the lips of unlettered men and women among different nations all over the earth. The tales thus gathered have been carefully compared with each other, analyzed, and traced back to their oldest forms. Many new and important facts have been discovered in these old wives' fables concerning the literary character of our ancestors, their household utensils, habits of life, sports, worship, moral qualities, superstitions, and ideas of another world. The study has also been of great service to the ethnologist, the historian, and the philologist, in showing popular affinities, giving information about early migrations, and unfolding more clearly the meaning of words.

The Gers. have done more than any others in developing this new science. (See *Kinder und Hausmärchen*, by the BROTHERS GRIMM; *Deutsche Mythologie*, by JACOB GRIMM; *Die Herabkunft des Feuers und des Göttertrunks*, by ADALF KERN; *Norddeutsche Sagen, Märchen, und Gebräuche*, by KERN and SCHWARTZ; CAMPBELL'S *Tales of the W. Highlands*; DASENT'S *Popular Tales from the Norse*, etc.) From orig. art. in *J's Univ. Cyc.*, by PIES, L. C. SEELEY.

Follen (CHARLES THEODORE CHRISTIAN), PH. D., LL.D., a writer, reformer, and liberal preacher, b. at Romrod, in Hesse-Darmstadt, Sept. 4, 1796, was ed. at Giessen, where there were many schools of learning, preparatory to the univ. Sharing the Ger. enthusiasm of 1814, the youth joined the army that resisted Nap. The campaign ended, he returned to Giessen to pursue his studies, and soon became known as a leader among the ardent patriots as well as the diligent students of the univ. For a short time (1836-37) he was pastor of the First Unit. ch. in New York, following Rev. Wm. Ware. His freedom of speech about slavery cut short his ministry there, and in 1839 he accepted a call to E. Lexington, Mass., where he had hardly established himself when he was lost in the steamer Lexington, which was burned on L. I. Sound Jan. 13, 1840. O. B. FROTHINGHAM.

Follen (ELIZA LEE), wife of Dr. Follen, daughter of Samuel Cabot, b. in Boston Aug. 15, 1787. She, like her husband, whom she married in 1828, was an earnest abolitionist from first to last, and a diligent writer. Her writings are mainly of a religious character, and are intended for the moral instruction of the young. Her little books for children are deservedly popular for their purity and practical wisdom. Her *selections from Emerson, Wordsworth, Homer, Mænead Life*, exerted wholesome influence in their time. The memoir of her husband was from her pen. *The Child's Friend* was under her editorship from 1843 to 1850. D. Jan. 26, 1860.

Fol'let (DAVID LYMAN), a lawyer, b. July 17, 1836, at Sherburne, N. Y., ed. at Cazenovia Sem.; admitted to the bar in 1858, and settled at Norwich. In 1867 was appointed assessor of internal revenue, in 1874 elected justice of the supreme court of N. Y. State.

Fol'som (GEORGE), LL.D., b. in Kennebunk, Me., May 23, 1802, grad. at Harvard in 1822, and studied law. In 1837 removed to New York and became librarian of the New York Historical Society. He was a member of the N. Y. State senate 1844-48, *chargé d'affaires* to the Netherlands 1850-54; was pres. of Amer. Ethnological Society, and produced several historical monographs. D. Mar. 27, 1869.

Folsom (JOSEPH L.), b. in N. H. in 1816; graduate of the U. S. Military Acad., and brevet second lieut. of inf. July 1, 1840; served in Cal. during the war with Mex. He was identified with the early history and development of San Francisco. Folsom City, on the Amer. River, near where gold was discovered, is named in his honor. D. July 19, 1885.

Folsom (NATHANIEL), b. at Exeter, N. H., 1726; commanded a company at Ft. Edward 1755, and a regiment of militia before the Revolution; as brig.-gen. of the N. H. forces served in the siege of Boston until July 1775; was a member of the Continental Cong. 1774-75 and 1777-80; councillor in 1778, and pres. of the convention which framed the const. of N. H. in 1783. D. May 26, 1790.

Folsom (NATHANIEL SMITH), b. at Portsmouth, N. H., Mar. 12, 1806, grad. at Dartmouth 1828 and at Andover Theological Sem. in 1831; was missionary in Ga. 1831-32; prof. in Lane Sem. and in Western Reserve Coll. 1833-36; pastor of the Congl. ch. at Franchestown, N. H., 1836-38, of a ch. at Providence, R. I., 1838-40, of a Unit. ch. at Haverhill, Mass., 1840-47; edited the *Chr. Register* 1847-49, and was prof. of lit. and biblical interpretation at Meadville Coll., Pa., 1849-61. Author of an address on temperance and an *Interpretation of the Prophecies of Daniel*.

Folwell (WILLIAM WATTS), b. Feb. 14, 1833, at Romulus, Seneca co., N. Y., grad. at Hobart Coll. 1857; became adjunct prof. of math. in Hobart Coll.; in 1860 and 1861 studied philology in Berlin; in Jan. 1862 was commissioned first lieut. in the U. S. Engineers, and attained the rank of major of engineers and the brevet rank of lieut.-col. U. S. volunteers; became in 1869 prof. of math. in Kenyon Coll., Gambier, O., and in same yr. pres. of Univ. of Minn.

Fonda, N. Y. See APPENDIX.

Fond du Lac, city and R. R. centre, cap. of Fond du Lac co., Wis., on Lake Winnebago, at the mouth of Fond du Lac River, 148 m. from Chicago and 65 from Green Bay. Water is supplied from about 1000 artesian wells, the mineral properties of which have rendered the place famous. Pop. 1870, 12,764; 1880, 13,004.

Fonseca, da (PEDRO), D. D., "the Portuguese Aristotle," b. at Costizada in 1528; became a Jesuit in 1548; held professorships at Coimbra and Evora; resided at Rome 1572-79; wrote commentaries on Aristotle, *Institutiones Dialecticæ*, and a treatise on foreknowledge and free-will. D. Nov. 4, 1599.

Fontainebleau, a town of Fr., 35 m. S. E. of Paris. Its palace, built in the 12th century and enlarged and embellished in each succeeding century, is one of the most magnificent buildings in Fr. The forest which surrounds it, and which is wholly laid out as a landscape-garden, comprises 64 sq. m. Pop. 12,483.

Fontana (DOMENICO), an It. arch. and engineer, b. 1543, is chiefly remembered for the transportation of the Egyptian obelisk to the square of St. Peter's, Rome, in 1586. It had been brought to Rome in Caligula's time. He finished the cupola of St. Peter's basilica, completed palace of Monte Cavallo, and planned the Vatican Library. D. 1607.

Fontenelle, de (BERNARD DE BOVIER), Fr. author, b. at Rouen Feb. 11, 1657; admitted to the Fr. Acad. 1691, and to the Acad. of Sciences 1697, of which he was perpetual sec. from 1699 to 1741. He prepared eulogies on about 70 members of the Fr. Acad. of Sciences; wrote *Dialogues of the Dead*, a *Hist. of Oracles*, and other works. D. Jan. 9, 1757.

Fontenoy, a v. of Belgium. Here was fought, May 11, 1745, a battle between the Fr. under Marshal Saxe and the allied Eng., Dut., and Aus. under the duke of Cumberland, in which the Fr. won a great victory.

Fontevault, fon-teh-vro', a town of Fr., in the dept. of Maine-et-Loire. In its ch. are the tombs of Henry II. and Richard I. of Eng. This ch., now a prison, is nearly all that remains of the anc. abbey of F., once the mother-house of the monastic order of F., founded 1100, and broken up at the first Revolution.

Foo-Chow, popularly called **Hok-Chin**, cap. of the Chi. prov. of Fo-Kien, the residence of the viceroy of Fo-Kien and Che-Kiang, the seat of several high civil and political authorities, stands on the river Min, 35 m. from its mouth. Pop. 600,000. The town is beautifully situated on both banks of the river, which rise in terraces and are connected by stone bridges; it has an excellent harbor, and is surrounded with an old wall 30 ft. high, 12 ft. thick, and surmounted with high towers. Its gen. aspect is most striking; the broad river is entirely covered with floating houses and innumerable junks, and stretches through the valley like a boisterous market-street, while on both sides the town rises like an amphitheatre. The town itself is dirty, and makes a poor impression on account of its miserable buildings, though its streets are lined with shops crowded with goods and stirring with traffic. The most remarkable institution of F.-C. is its arsenal, a perfectly modern establishment. But its greatest importance is derived from its tea-trade, and from the circumstance of its being open to foreign commerce. [From orig. art. in *J.'s Univ. Cyc.*, by CAPT. AUGUST NIEMANN.]

Food, a substance which supports the functions and powers of the body—one by which the body may live, act, and grow. With want of F. there is a natural subsidence of vital action, accompanied by craving for F. and appetite or relish for it, while after F. has been eaten the action of the heart, lungs, and other organs is increased, heat is generated, appetite is arrested, and a sense of satisfaction is felt, while a glow of warmth pervades the whole body. Hence F. must be identical with the elements of our bodies, or be capable of transformation into them. It must also be adapted to the needs of the infant as well as those of man at all ages and in various conditions of season, climate, modes of life, and exertion. Its nature must be such that it can be digested within the usual period, lest the body starve while F. is within it; but this is commonly assisted by the process of cooking, which by softening the F. shortens the term subsequently required for digestion.

I. SOLID FOODS.—A. *Mineral Food*.—The bones, nearly every soft tissue, and the blood require mineral matters combined with acids, and F. supply them in about the following proportion: Common salt, or chloride of sodium, is found in water and in many animal and vegetable substances, but it is usual to eat from $\frac{1}{4}$ to $\frac{1}{2}$ an ounce daily with our

F. Potash is supplied by lemons, oranges, grapes, pine-apples, strawberries, mulberries, tamarinds, apples, and nearly all fruits, as well as by potatoes, cauliflowers, cabbages, cucumbers, artichokes, asparagus, rhubarb, and nearly all garden vegetables. Sulphur is contained in albumen (as the white of eggs), fibrine, and caseine in proportions of $\frac{3}{4}$ to 7 parts in 1000. Iron enters into the composition of most vegetable F., as potatoes, carrots, cucumbers, peas, cabbages, and mustard, and into many animal substances, as milk and flesh. Alumina exists in carrots, and silica, or flint, in potatoes, wheat, rice, and numerous vegetable structures. Phosphorus, when combined with a base, as lime, magnesia, soda, potash, etc., is found in nearly all vegetable and animal F.

B. Vegetable Foods.—The lowest classes of vegetables which supply man with F. are the lichens, fungi, mosses, and sea-weeds. Mushrooms (*Fungi*) constitute a large class of vegetables, many of which have most attractive colors, and not a few very repellent odors. There is great difference of opinion as to their edible qualities, some asserting that nearly every kind may be eaten, while others allow but one or two kinds, and particularly the common edible mushroom of small size.

Succulent Vegetables.—This very large class of F. is eaten chiefly for their juices and starch, and are prized according to the abundance of those elements and their flavor. The potato (*Solanum tuberosum*) occupies the first place in temperate climates, on account of the large quantity of starch and potash which it contains, and its agreeable flavor. It is a native of N. and S. Amer., but has become acclimatized in all except very hot and very cold climates. The fruit of the bread-tree (*Artocarpus incisa*) and of the plantain (*Musa paradisiaca*) may be regarded either as culinary vegetables or fruits, but from the quantity of nutritive material which they afford they belong rather to the former. The carrot (*Daucus carota*), parsnip (*Pastinaca*), beet (*Beta vulgaris*), turnip (*Brassica*), vegetable marrow, and pumpkin (*Cucurbita*) occupy a position between potatoes and ordinary green vegetables, since they contain a larger quantity of starch and sugar, and are therefore more nutritious than the latter. All the well known succulent vegetables, as spinach, turnip-tops, cabbage (*Brassica*), broccoli, cauliflower, sea-kale, tomatoes, nettles, lettuce, dandelion, endive, chicory, may be regarded as nearly alike in nutritive value, while they vary extremely in flavor, and are chiefly valuable for their fresh juices. They should be well cooked, for if eaten in large quantity they do not readily digest. Fruits are more like succulent vegetables than any other productions in the composition of their juices and their uses in the animal economy. It is needless to cite them by name, since they are well and widely known, and it would be impossible to refer to more than a very small proportion of them. No products are so universal and none so agreeable. All agree in having a larger proportion of sugar and vegetable acid than occurs in ordinary vegetables, and flavors of infinite variety and delicacy.

Seeds.—The most highly nitrogenized seeds are peas, beans, lentils, and numerous other products of pod-bearing plants, called pulses, or dahls and grain in India, and frijoles in Mex. While potatoes contain about 2 per cent. of nitrogenous matter, peas have 23 and lentils 25 per cent., and are the most highly nitrogenized natural foods known to mankind. They are also rich in starch, for peas contain 55 per cent. of that substance. Whole nations are largely indebted to these F. for their highest nourishment, and it seems as if the nitrogenous vegetable F. were more suitable to the body in hot climates than meat. The seeds which supply our staple vegetable F. occupy a position between these and peas, and have a close similarity in their nutritive qualities—viz. wheat, maize, and oats, which possess 11 to 12 per cent. of nitrogenous and 75 to 80 per cent. of carbonaceous matter. They differ in flavor, so that both maize and oats are said to be rough, while wheat has a softer and perhaps sweeter flavor; and although wheat has the preference, wherever it is grown each kind of corn has its advocates. Regarded simply as nutritive F., one may be substituted for the other, but in practice they are not interchangeable. Bread which is made from wheat may have all or any part of the husk or bran of the grain in it. If there be much, it is called brown bread, and as the flinty covering of the bran is indigestible, it is very apt to cause purging, and is the rich rather than the poor man's F. White flour has lost the nitrogen of the bran, but it is more digestible, and therefore more useful, and probably the most nutritious kind is that known as seconds or households. Fourteen lbs. of fine white flour should make 19½ to 20 lbs. of bread. Passover cakes are made from the finest and purest flour. Oatmeal is never met with entirely devoid of the hard and indigestible skin, to which also it owes its high percentage of nitrogen; but when the whole grain has been decorticated it is known as groats. Maize is the only grain under consideration which is eaten whole in its unripe condition and when full of milky juices. The nutritive qualities of all these grains vary with climate and season, so that moderately hot and dry climates and seasons produce the best wheat, and the highlands better oats than the lowlands. Rye and barley, although inferior grains, are largely eaten by the poorer inhab. of N. and Central Europe. Their proportion of nitrogenous matter is only from 7 to 8 per cent., and therefore but little exceeding that of rice and millet, while the carbonaceous is 78 to 80 per cent.

Nuts.—There are numerous seeds which are regarded as fruits from their agreeable flavor and unfitness to be eaten as standard articles of F., such as the cocoa-nut (*Cocos nucifera*), Brazil-nut (*Bertholletia excelsa*), earth-nut (*Arachis hypogæa*), walnut (*Juglans*), chestnut (*Castanea*), and almonds (*Amygdalus communis* and *amara*), constituting a very large class, and found in almost every part of the world except the extreme N. and S. They are rich in albuminous, saccharine, and fatty elements, and supply a much larger quantity of nutriment than our ordinary cereals.

Starchy Foods.—F. which are composed almost exclusively of starch are artificial, for they must be prepared by man from natural F. Such are sago, tapioca, arrow-root, cassava meal, and manioc. None are absolutely destitute of nitrogen, but the quantity is so small that it may be practically discarded in our calculations.

Sugar is found in almost every kind of vegetable F., but particularly in fruits, where it is called fruit or grape sugar; in the sugar-cane (*Saccharum officinarum*) and Chi. sugar-grass (*Sorghum saccharatum*), where it is known as cane-sugar; and in milk, as milk-sugar. The largest source for the sugar-market is doubtless the sugar-cane, and the next beet-root (*Beta vulgaris*), but a considerable quantity is obtained in N. Amer. from the sugar-maple (*Acer saccharinum*). In India much is extracted from the juices of various palm trees, and particularly of the wild date and the *Arenga saccharifera*. The juice is expressed from the whole substance of the cane and beet-root by great pressure, while the tree of the sugar-maple is tapped and the male flower of the palm is cut off for the exudation of the juice.

Honey is not the product of the bee, as many believe, but is simply collected by that useful insect from flowers, and has a flavor varying with its source. Some of the finest is obtained from N. Hymettus in Gr., while that procured from certain plants, as the azaleas, is said to be poisonous.

Manna as ordinarily obtained is derived from the juices of the manna ash, growing in S. Europe. It is also found as a deposit upon the trees and ground under certain conditions of weather and climate, when it is in grains as small as a coriander-seed, and if not carefully picked will be mixed with other substances. It is called *mannite*.

C. Animal Foods.—All kinds of flesh have their essential properties in common, and for ordinary dietetic purposes are interchangeable; but as lean corresponds with lean and fat with fat, the true distinction is the proportion of one to the other: thus, there is the largest proportion of fat in the pig, and a greater in sheep than oxen as ordinarily fed and when ready for the butcher. The flesh of all animals consists of bundles of extremely fine tubes which contain the meat juices. The better the breed and feeding, the richer are the juices in flavor and fat, while the older the animal, the tougher are the fibres or tubes and the tissue which connects them. Beef has always been regarded as the kind of flesh which gives the best nutriment to the eater, while mutton and poultry are softer in texture and more delicate in flavor. The flesh of wild animals approaches to beef in nutritious qualities, but it is almost always harder, and requires a degree of decomposition to separate its fibres. Pork and veal have always been regarded as less digestible than beef, but this depends upon the quality and age of the animals. The juices of flesh are obtained when making beef-tea and Liebig's extract of meat.

The flesh of fish contains more phosphorus, and differs little from that of animals in chemical composition, but much in texture and flavor, and the nearest approach is found in salmon and sturgeon. The proportion of fat and oil to flesh is in some kinds greater than that of quadrupeds. On the whole, fish is excellent F., but not equal to flesh, nor sufficient to maintain full health and strength. The roe of fish is a luxury, and contains both albuminous and fatty matters, and when obtained from the sturgeon and some other fish, and prepared, is called *caviare*. Oysters are delicacies rather than necessary F., while lobsters and similar shell-fish are too indigestible to be eaten by some persons with impunity.

Eggs consist chiefly of albumen, but the yolk contains oil, and there are also sulphur and other elements which have a certain nutritive value. They are not fitted to supplant flesh, but rank next to fish. Gelatine is a very valuable F., notwithstanding the erroneous inferences which have long been made from the report of the Fr. gelatine commission, and in composition is practically identical with albumen. Caseine is obtained principally from milk, but exists largely in peas and almonds, and has the same nutritive character as albumen and gelatine.

Offal.—The offal of animals are the head, feet, liver, lungs, and heart, while the blood and bowels may be added to the list for dietetic purposes. The heart consists of muscular fibre or flesh, having, however, a firmer texture, is not so easily masticated, and is much inferior to other flesh as F. The lungs and liver consist largely of albuminous, and the head and feet of gelatinous matter, and while not equal to flesh are very good F., and might be eaten by the poor more largely than at present with advantage. Tripe is prepared chiefly from the stomach of the ox, and contains much fat as well as albuminous and gelatinous substances. Its flavor is delicate, and it is quickly digested. Blood is less valuable as a F. than any of the foregoing, but as it contains all the elements under discussion, beside iron and other valuable mineral matters, it should be eaten.

Fats.—The richest hydro-carbonaceous F. is fat. It is customary to reckon fat as equal to $\frac{2}{3}$ times its weight of starch. All fats have nearly the same composition when freed from water and the tissues in which they are contained, so that one may be substituted for another; but they differ in flavor and the temperature at which they liquefy. So also oils remaining liquid at ordinary temperatures may be eaten instead of solid fats. There are no animal oils which are avowedly used as F. in temperate climates, but in the far N. whale oil or seal oil is taken either with or without the solid mass which constitutes the blubber. Lard oils and other animal oils are used largely to adulterate vegetable oils, and fish oils are used as meds.

Condiments.—Condiments are rather adjuncts to F. or appetizers than F., although vegetable substances used therein are nutritious.

II. FLUID FOODS.—Milk is the type of nutritious fluids, since it contains all the elements of nitrogenous and carbonaceous F. in a fluid form. It is therefore adapted to every condition of man, but particularly to such as require

the immediate use of F., as in infancy and when there is not time for prolonged digestion. It contains caseine and albumen as its chief nitrogenous elements, and sugar and fat as its carbonaceous, beside salts of the most valuable kinds. The proportion of each varies in different animals and with age, food, and climate, while certain special flavors, as hircine acid in goat's milk, mark each kind. The salts in milk are small in quantity. Human milk is the standard of comparison for the F. of infants, and varies in quality with health, food, production, and anxiety, but a mixture of $\frac{2}{3}$ of ordinary cow's milk with $\frac{1}{3}$ of water and $\frac{1}{2}$ an ounce of milk-sugar or cane-sugar in a pint, is a tolerable approximation. For adults the milk of the cow, goat, and sheep is preferable. Skimmed milk has lost nearly all its fat or butter. Buttermilk differs little from skimmed milk. Whey is much less valuable; it has lost both fat and cheese.

Tea, Coffee, Cocoa, Chocolate.—These substances, from which so large a proportion of our beverages are made, have elements in common by which a sort of unity is given to the whole—viz. the chemically identical compounds called *theine* in tea and *cafféine* in coffee: while the *theobromine* of cacao and chocolate, though by no means of the same composition, is believed to have analogous effects upon the animal economy. The quantity is too small to be regarded simply as a nutrient, but it is believed to exert a peculiar action on the nervous system.

Alcohols.—Ordinary or ethylic alcohol is the product of the fermentation of saccharine substances, whether they be malt, grain, potato, beet-root, sugar, or molasses, and comes over, mixed with other compounds, in distillation. The portions which distil early in the process are the finest and purest, and are used for the manufacture of the finest essences and spirits, while the later are mixed with an increasing quantity of fusel oil, until at length they are fit only for the manufacture of varnish. Alcohol is an artificial and not a natural product, and in the process referred to is mixed with a proportion of water, but it is possible by a further process to remove the water, when the remaining fluid is called absolute alcohol. It is never sold in this form for use as F., but is mixed with water, and when about equal quantities of water and absolute alcohol are added together, *proof spirit* is produced. It is denied by many that alcohol is a F., since they say it is not decomposed and transformed, but leaves the body in the same or an analogous condition to that in which it entered; while others dispute the inference, because the alcohol administered in any one experiment has in no case been all recovered in the excretions. Alcohol remains in the tissues for a period of 1 or 2 days, and as the aim should be to rid the body of it, those forms are the best which increase some diminishing action, as that of the lungs or kidneys. Rum is the least hurtful of spirits—a quality which is owing probably to the eliminating action of sugar. Wines, when the product of the grape only, obtain the alcohol which they possess from the fermentation of the sugar in the juice of the grape, and if the fermentation be complete no sugar remains.

The salts in wine are very valuable as F., as, for example, the tartrates and malates of potash, which give a tartness to natural wines, and are deposited with age, or more rapidly when gypsum is added, which sets free the vegetable acids. The chief advantage of such wines, when comparatively new, lies in these salts, but when older in the essential oils and ethers. Fortified wines (and therefore adulterated) are those to which alcohol is added which was not produced from the grapes under manipulation, and which are commonly of inferior quality. Such are port, sherry, and madeira, which are rather weak ardent spirits or liquors than wines. [From *orig. art. in J.'s Univ. Cyc.*, by EDWARD SMITH, M. D., F. R. S.]

Foolahs. See FELLATAHS.

Fool, Licensed, or Court Jester, called also **Clown**, a personage found in the courts of kings and nobles of mediæval Europe, whose employment was to amuse the household. The custom originated in the E., and was not unknown in anc. Gr. and in the Rom. empire. Court F. were sometimes persons of weak intellect or dwarfs, but were often men of sharp wit, and even of learning and talents. F. enjoyed large license in the exercise of their profession, but were made the victims of all sorts of practical jokes. A fool's cap and bells, a bauble (consisting of a stick with a bladder at the end), a coat of motley or of calfskin, and an ass's ears were the usual badges of this office, but the jesters of the better class were not always thus decorated. The names of a large number of Fr. and Ger. jesters and F. have been preserved, some of them apparently men of refinement and wit, and others of all the grades of stupidity, even to idiocy.

Fools, Festival of [Lat. *Festum Stultorum* or *Festum Fatuorum*], a mediæval Chr. merry-making, of fantastic and childish character, which fell especially upon Holy Innocents' Day (Dec. 28), but had more or less to do with the whole period between Christmas and Epiphany (Jan. 6). Exercises were held in the prin. ch. edifice of the place; a mock pope, abp., or bp. was chosen, and all the most sacred rites of Christianity were travestied. The wild license which reigned resembled that of the old Rom. *Saturnalia*. The leading performers were of the lower clerical orders, especially the subdeacons; hence another name for the festival, *Festum Hypodiaconorum*, with some reference to St. Stephen, who is commemorated on the 26th of Dec. The aim professed was to interest young and ignorant people in the story of the Advent, but profaneness soon got the better of piety in the matter. This festival, which is first mentioned by the Parisian Ritualist, John Beleth, in the latter half of the 12th century, originated apparently in Fr., and was more popular there than anywhere else, though observed also in Sp., in Ger., and in Eng. In spite of repeated condemnations by prelates and councils, it survived the Prot. Ref., one instance of its observance being reported as late even as 1644.

R. D. HITCHCOCK.

Fools' Parsley (the *Ethusa cynapium*), a poisonous umbelliferous plant, so called because it somewhat resembles in appearance the smooth-leaved varieties of parsley, so that people who have gathered it for parsley have been poisoned by it. It is a native of Europe, naturalized in the U. S. It may be distinguished by its acrid taste and fetid smell. It is an acro-narcotic, causing numbness, faintness, and dimness of vision.

Foot-see, or Fu'si-ya-ma, the highest mt. of Japan, on the island of Nippon, stands completely isolated, and rises 14,170 ft. above the sea. According to Japanese historians, this mt. emerged in 1 night in the yr. 285 B. C., and a corresponding depression formed the lake of Mitsuo at the same time. Although it has had no great eruptions since 1760, it is still an active volcano.

Foot, the name of the unit of linear measure in common use in the U. S. and in Eng. All the nations of Europe and their colonies or dependencies employ, or have employed, a unit of length having in each lang. a name of the same significance as *foot* in Eng. This identity of name indicates similarity of origin, which was therefore unquestionably the length of the human foot. No two peoples, however, have agreed in the value assigned to their F.-measures. No two provs., and hardly any two considerable towns even, have had the same F. Nor have any of these measures corresponded very nearly with the presumed prototype; nearly every one of them being greater; and many of them much greater, than the average length of the foot of an adult man. In the vol. of *Investigations in the Military and Anthropological Statistics of Amer. Soldiers*, by Dr. B. A. Gould, pub. in 1869 among the memoirs of the U. S. Sanitary Commission, are given measurements of nearly 16,000 individual men, volunteers for the army, of various races and nationalities, 11,000 being white and the rest colored. The mean length of the foot was found for no nationality to exceed $10\frac{2}{3}$ /₁₀₀ inches, and for none to fall short of $9\frac{9}{10}$ /₁₀₀; the mean value for the total being $10\frac{8}{10}$ /₁₀₀, or about $\frac{1}{20}$ of an inch above 10 inches. It is probable that the F.-measures in use in the later centuries have been in gen. entirely arbitrary. The account commonly given of the adjustment of the Brit. standard yard in the yr. 1101 from the arm of the king, Henry I., is probably a true one; and the Brit. F. is simply $\frac{1}{3}$ of the Brit. yard. But it was doubtless otherwise in the earlier ages. The anc. Grs. first used this measure, and their Olympic F. was said to have been determined by the length of the foot of Hercules. This, according to the best authorities, was about equivalent to $12\frac{1}{4}$ /₁₀₀ Eng. inches. But there were among them other F.-measures materially differing from this. Thus, the Macedonian F. was $14\frac{1}{2}$ /₁₀₀ inches; the Pythian, $9\frac{7}{10}$ /₁₀₀ inches; and the Sicilian, $8\frac{7}{10}$ /₁₀₀ inches. In more recent times the diversity has been almost endless. In It. the F. was, not long ago, $11\frac{9}{10}$ /₁₀₀ inches in Rome, $13\frac{8}{10}$ /₁₀₀ in Milan, and $23\frac{2}{10}$ /₁₀₀ inches in Lucca. In Fr. it was $9\frac{7}{10}$ /₁₀₀ inches in Avignon, $9\frac{9}{10}$ /₁₀₀ inches in Aix-en-Provence, $10\frac{7}{10}$ /₁₀₀ inches in Rouen, $14\frac{9}{10}$ /₁₀₀ inches in Bordeaux, while the *ped-du-roi* of Paris was $12\frac{9}{10}$ /₁₀₀ inches. In Switz, it was $10\frac{2}{10}$ /₁₀₀ inches in Neufchâtel, $11\frac{3}{10}$ /₁₀₀ inches in Rostock, $11\frac{9}{10}$ /₁₀₀ inches in Bale, and $12\frac{1}{10}$ /₁₀₀ inches in Geneva. In the Sp. peninsula it was $10\frac{1}{10}$ /₁₀₀ inches in Aragon and $10\frac{8}{10}$ /₁₀₀ in Castile. In Ger. it was $9\frac{3}{10}$ /₁₀₀ in Wesel, $10\frac{8}{10}$ /₁₀₀ inches in Bavaria, $10\frac{9}{10}$ /₁₀₀ inches in Heidelberg, $11\frac{4}{10}$ /₁₀₀ inches in Göttingen, and $13\frac{1}{10}$ /₁₀₀ in Carlsruhe. And in the Netherlands it was $10\frac{8}{10}$ /₁₀₀ inches in Brussels and $11\frac{2}{10}$ /₁₀₀ in Liege. Alexander's *Dict. of Weights and Measures* (Baltimore, 1850) gives more than 100 F.-measures, all differing from each other. Dours-thier's *Dictionnaire Universel des Poids et Mesures, Anciens et Modernes* (Brussels, 1840), makes the number more nearly 1000. The confusion resulting from this great diversity was intolerable. The inconvenience caused by it in business transactions prepared the public mind of Europe early in this century to receive with favor the new system of metrology called the metric, introduced first into Fr. at the close of the last. The F. has therefore ceased to be the legal unit of length in all the countries of Europe except G. Brit., Rus., Tur., and the Scandinavian peninsula, and the metre has taken its place. The Rus. unit of length, the *sagene*, was fixed by Peter the Great after his sojourn in Eng. in 1698, at exactly 7 Brit. ft. The F. of the U. S. is identical with that of G. Brit., from which it is copied. In both countries the legal standard is properly the yard of 36 inches. The copy of the Brit. standard, by which the U. S. standards were till recently adjusted, is a brass bar prepared by the celebrated Troughton of Lond. to the order of Prof. F. R. Hassler, the first chief of the U. S. Coast Survey, and supt. of the bureau of weights and measures at Wash. It is 82 inches in length, and the 36 inches between the 27th and the 63d divisions were taken as the prototype yard of the U. S. A few yrs. since, however, a copy of the Brit. prototype, officially certified, has been substituted for the Troughton bar, and the standards furnished the several States are now carefully adjusted by this.

F. A. P. BARNARD.

Foot (SOLOMON), lawyer and U. S. Senator, b. at Cornwall, Vt., Nov. 19, 1802, grad. at Middlebury Coll. 1826; was prin. of Castleton Sem. 1826 and 1828, tutor in Vt. Univ. in 1827, prof. of nat. phil. in the Acad. of Med. at Castleton 1828-31; was admitted to the bar 1831, and settled at Rutland, Vt. In 1833, 1836-38, and 1847 was in the Vt. legislature, and speaker of its house for his last 3 terms. Was M. C. 1843-47, and U. S. Senator from 1850 to his death, and was for some yrs. pres. *pro tem.* of the U. S. Senate. D. Mar. 28, 1866.

Foo'ta (or Fu'ta) To'ro, a terr. of W. Afr., between lat. 15° and 16° 25' N., consists mostly of low, flat, hot, but very fertile and not unhealthy plains. It is inhabited by about 800,000 Mohammedan negroes, who have built large cities, established a kind of theocratic govt., and started several branches of manufacturing industry.

Foo'ta Ja'l'lon, a wild and mountainous region of Senegambia, the highest of that portion of W. Afr. in which the rivers Senegal, Gambia, and Grande have their sources. The elevation of the country may not average much above 2000

ft., but some peaks are said to be occasionally covered with snow during the rainy season. The mts. are rugged and abrupt. Timbo, the cap., is in lat. 10° 25' N. and lon. 10° 40' W.

Footte (ANDREW HULL), an Amer. admiral, b. at New Haven, Conn., May 4, 1808, entered the navy as mdpn. 1822; became lieut. 1830, commander 1852, capt. 1861. In the fall of 1861 he was appointed to the command of the W. flotilla, then in course of construction for the purpose of opening the navigation of the Miss. River. On Feb. 6, 1862, he took Ft. Henry after an obstinate fight; on the 14th of the same month engaged Ft. Donelson, for 1½ hours, with 4 iron-clads and 2 wooden gunboats; on the 7th of Apr., after many a hard-fought action, received the surrender of Island No. 10, considered by the Confeds., next to Vicksburg, their most important stronghold on the Miss. He had received a severe wound at Ft. Donelson, which from neglect had become so serious as to endanger his life, and was forced to resign his command and return to his home. On June 16, 1862, he received the thanks of Cong. and was made a rear-admiral, and on the 22d of that month was appointed chief of the bureau of equipment and recruiting. On June 4, 1863, he was ordered to relieve Rear-admiral Dupont off Charleston, but on his way to his command was taken ill at New York, where he d. June 26, 1863. (See his *Life*, by HOPPIN.)

Footte (HENRY STUART), b. in Va. Sept. 20, 1800, grad. at Washington Coll., Va., 1819; was licensed to practice law in 1822; removed to Tuscumbia, Ala., in 1824; edited a Dem. paper, and in 1826 established himself at Jackson, Miss. Was presidential elector in 1844, and in 1847 was elected U. S. Senator, which position he held until 1852; was elected gov. of Miss. over Jefferson Davis in that yr. In 1854 removed to Cal.; in 1858 settled at Vicksburg, Miss., and at the S. convention at Knoxville, Tenn., in May 1859, spoke against disunion; was a member, however, of the Confed. Cong. Wrote a *Hist. of the Secession Struggle*. D. May 19, 1880.

Footte (JOSEPH IVES), D. D., b. at Watertown, Conn., Nov. 17, 1796, grad. at Union Coll. 1821 and at Andover Theological Sem. 1824. From 1826 to 1832 was Congl. pastor at W. Brookfield, Mass., then in Salina, N. Y., 1833-35, in Cortland, N. Y., 1835-37, and in 1839 entered upon a Presb. pastorate in Knoxville, Tenn. In 1840 was appointed pres. of Washington Coll., Tenn. D. Apr. 21, 1840.

Footte (SAMUEL), Eng. actor and dramatist, b. at Truro in 1720; studied at Worcester Coll., Ox. (whence he was expelled), and at the Middle Temple, but indulged in gaming and other excesses until his fortune was expended; in 1744 he made his appearance as Othello at the Haymarket, but his success was small until he began to play in pieces written by himself; his best characters were ludicrous imitations of living public men. From 1747 to 1767 he conducted the Little Haymarket Theatre without license, no one daring to enforce the law against him for fear of his mimicry. He wrote many plays of small literary merit. D. Oct. 21, 1777.

Footte (SAMUEL AUGUSTUS), LL.D., U. S. Senator, b. at Cheshire, Conn., Nov. 8, 1780, grad. at Yale 1797, and practised law in Cheshire; was M. C. 1819, 1823, and 1833; speaker of the Conn. assembly 1825-26, and U. S. Senator from 1827 to 1833. In 1834 was gov. of Conn., and in 1844 presidential elector. D. Sept. 16, 1846.

Footte (WILLIAM HENRY), D. D., b. at Colchester, Conn., Dec. 20, 1794, grad. at Yale 1816; taught in Va., studied in Princeton Theological Sem.; was licensed by the presbytery of Winchester 1819; preached in Va.; was agent of the central board of missions, also for Hampden-Sidney Coll., and Confed. chaplain at Petersburg during its siege. Wrote *Sketches of the Presb. Ch. in Va. and N. C.* D. Nov. 28, 1869.

Foot-Rot, a disease of sheep which is rare in the U. S. Sometimes, when sheep from rocky pastures are taken to the Eng. fen-country to fatten, the hoof grows too rapidly for its new conditions, and when it has become long it may become cracked and broken, or in part separated from the fleshy part of the foot. Sand and grass may lodge on the raw surface, and lead to active inflammation. The cure is in removal of the foreign matter, clipping of the hoof, and the application of stimulants and caustics, with removal to a dry pasture. (See FOUL IN THE FOOT.)

Forage, food or fodder, food for animals. The word is also used as a verb, when it means to collect supplies generally for both man and beast, from an enemy by force, from friends by impressment, but giving to friends receipts, to be paid ultimately. The daily ration of F. in the U. S. A. is for each horse 14 lbs. of hay and 12 lbs. of grain, either oats, corn, or barley. For a mule the daily ration is 14 lbs. of hay and 9 lbs. of grain. The blades of Indian corn are used for F. in absence of hay. The consumption of F. in a large and active army is enormous. Its weight, owing to the number of animals employed in military operations, is about $\frac{1}{2}$ times as great as that of the subsistence supplies for the same army. There were issued from the depot of Wash. during the war of 1861-65, 4,500,000 bushels of corn, 29,000,000 bushels of oats, and 490,000 tons of hay. Partial reports of the quartermaster-gen. show issues of F. during the war as follows:

22,816,271 bushels of corn, costing.....	\$29,879,314
78,663,799 bushels of oats.....	76,362,028
1,518,921 tons of hay, costing.....	48,595,872

Total.....\$154,837,212

The weight of these supplies in lbs. was—Corn.....	1,277,711,176
Oats.....	2,517,341,568
Hay.....	3,037,242,000

making a total of 6,832,194,744 lbs.—numbers, like infinity, difficult to realize, but interesting as showing the magnitude of the operations necessary to provide and distribute these few items of the expenses of war. M. C. MEIGS.

Foraminifera (Lat. *foramen*, an "aperture," and *fero*, to "bear"), an order of Protozoa, usually characterized by the possession of a shell pierced by numerous minute orifices, through which filaments (*pseudo-podia*) are protruded. The shell is generally composed of carbonate of lime, but it may

consist of particles of sand cemented together, or may be chitinous. The animal may be simple, or may repeat itself indefinitely by budding. The shell is filled with organic matter called *sarcodæ*, and a layer of sarcodæ often exists on its outside. The pseudo-podia reach the exterior by perforations in the walls of the shell or by its mouth. The F. may be divided into 2 groups, according as their walls are or are not perforated by foramina. In those with calcareous shells, in which the walls are not perforated, the substance of the shell is porcellaneous and opaque white. In those in which the shells are calcareous and perforate, they are vitreous. The arenaceous shells may or may not be perforated, their texture in either case remaining the same. The F. are also classified by the forms of the shells. A few of them remain through life as simple cells—e. g. *Orbulina*. More generally, however, the shell becomes many-celled by the budding of the sarcodæ. In this case the walls between the cells are perforate, and the sarcodæ in all is so connected as to have a common vitality. The multiplication of the cells in the F. takes place in several different ways, and hence the resulting aggregate form is very unlike in the different genera and species. Some form elegant discoid spirals (as *Robulina* and *Rotalia*), and this form is called nautiloid; sometimes the added cells compose a constricted or beaded tube, as in *Nodosaria*. In some cases also the shell is much flattened and disk-like (e. g. *Ninnulites*); sometimes it is fusiform by lateral elongation, as in *Fusulina*. Most of the F. are microscopic, but in a few cases the shell attains a diameter of an inch or more.

In a geological point of view, the F. are of great interest, as they are found in all the formations, from the oldest to the newest, and they frequently make up the chief part of great rock-masses. For example, the chalk is mainly composed of the calcareous shells of F., so small that perhaps half a million are contained in a cubic inch. So also the limestones of the carboniferous age are sometimes largely composed of *Fusulina*, and the Eocene limestones of *Nannulites*.

J. S. NEWBERRY.

Forbes (CHARLES STUART), Eng. naval officer, b. 1829, entered the navy 1841; served in the first Chi. war, and in New Zealand 1844-45; promoted during the Rus. war, having been with the first expedition sent out to find Sir John Franklin. He took the gunboat *Algerine* to Chi. in 1857, and in Apr. 1858 was made commander. In 1860 was an amateur in the Garibaldian campaign, and wrote *The Campaign of Garibaldi in the Two Sicilies*. In 1870 he became a cap., and went upon the reserved list.

Forbes (EDWARD), F. R. S., Eng. naturalist, b. in the Isle of Man Feb. 12, 1815, began the study of med. at Edinburgh 1830; founded the Botanical Society of Edinburgh 1836; visited Paris and the Mediterranean 1837; was naturalist of the expedition to Lycia 1841, prof. of bot. at King's Coll., Lond., 1842, F. L. S. 1843, assistant sec. to the Zoological Society 1844, F. R. S. 1845, prof. of nat. hist. at the School of Mines and pres. of the Geological Society 1852, prof. of nat. hist. at Edinburgh 1853. Wrote upon zoological, botanical, and literary subjects. D. Nov. 18, 1854.

Forbes (JAMES DAVID), D. C. L., F. R. S., Brit. philos., b. near Edinburgh Apr. 20, 1809; was prof. of natural philos. in the Univ. of Edinburgh 1833; made discoveries in the laws of glacial motion, light, and heat; received the Rumford medal and that of the Royal Society of Lond. In 1860 became prin. of the United Colls. in the Univ. of St. Andrew's. Wrote *Travels in the Alps and in Nor.* D. Dec. 31, 1868.

Forbes (JOHN), b. in Scot. 1710, became lieutenant in the Scotch Greys in 1745. After service in the Ger. war, was made brig.-gen. in Amer.; Nov. 25, 1758, taking possession of Fort Duquesne, Pa., he named it Pittsburg in compliment to the Eng. prime minister. D. Mar. 11, 1759.

Forbes (Sir JOHN), F. R. S., Eng. phys., b. in Scot. Oct. 18, 1787, entered Marischal Coll. 1805, and was in the Eng. navy as assistant surgeon 1807; was made M. D. in Edinburgh 1817, and settled in Lond. 1840; became phys. extraordinary to the prince consort the same yr., and soon after to Queen Victoria; knighted 1853. Wrote *Nature and Art in the Cure of Disease* and other med. works. D. Nov. 13, 1861.

Forbes (JOHN MURRAY), D. D., of Columbia Coll., New York, S. T. D. by Vatican decree of Pope Pius IX.; b. May 5, 1807, grad. at Columbia Coll. 1827, and at the Gen. Theological Sem. of the P. E. Ch. 1830; became assistant prof. of anc. langs. in Trinity Coll., Hartford, and in 1834 rector of St. Luke's ch., New York. In 1849, in company with Drs. Newman, Manning, and others, he entered the Ch. of Rome, and became shortly after pastor of St. Ann's R. Cath. ch., New York. In 1859 Dr. F. returned to the P. E. Ch.; was restored to the exercise of his ministry in that body, and in 1869 was appointed dean and permanent executive officer of the Gen. Theological Sem. of the P. E. Ch. in the U. S.—an office held by him until the year 1872.

Forbid'den Fruit, a name given in different countries to fruits which, according to tradition, represent the fruit of which Adam and Eve ate at the time of man's fall. One is a sort of thick-skinned orange (*Citrus Aurantium*, var. *Paradisii*), which bears marks which are likened to tooth-marks. The pulp is very sour, but the skin is soft and pleasant to the taste. Another kind is a small shaddock (*Citrus decumanus*). Still another is the poisonous fruit of *Tabernaemontana dichotoma* of Ceylon. This fruit appears as if bitten.

Forcade-Laroquette, for-cahd' lah-ro-ke't', de (JEAN LOUIS VICTOR ADOLPHE), LL.D., b. at Paris 1820, a half-brother of Marshal St.-Arnaud; became an advocate 1841, received the doctorate 1846; became master of requests 1852, director-gen. of forests 1857, director-gen. of customs-revenues and indirect contributions, and councillor of state, minister of finance 1860-61; v.-p. of the council of state 1863, minister of agriculture, public works, and commerce 1867, minister of the interior 1868.

Force (PETER), an historian and journalist, b. at Passaic Falls, N. J., Nov. 26, 1790; came to New York, where he was a printer till 1815, when he moved to Wash., where in 1820

he commenced the publication of *The National Calendar*, which he continued annually until 1836. He also pub. (1823-30) *The National Journal*, which was during Pres. J. Q. Adams's administration the official organ. He undertook in 1833 the preparation of a documentary hist. of the Amer. colonies, to which he devoted 30 yrs., during which time 9 folio vols. were pub., entitled *Amer. Archives*. While thus engaged he accumulated a valuable library relating to early Amer. hist., which was purchased by the U. S. in 1867, and added to the Congressional Library. From 1836 to 1840 he was mayor of Wash., and subsequently was pres. of the National Inst. for the Promotion of Science. He also pub. several vols. of historical tracts relating to the Amer. colonies. D. Jan. 23, 1868.

Forcellini, for-chel-lee'ne (EGIDIO), a distinguished Lat. lexicographer, b. at Fener, near Feltre, in Venetian terr., Aug. 25, 1688. Having entered the sem. of Padua, he by his marked abilities and devotion attracted the notice of Faccioliati, then director, who soon engaged his aid in carrying out his own designs for improving the Lat. dict. then in use. Under the direction of Faccioliati F. began the revision of the book called *Calepinus* (see FACCIOIATI). Faccioliati meantime had conceived the plan of a complete dict. of the Lat. lang., which should comprise all the words of existing authors, as well as those found in inscriptions and on medals, but the execution devolved entirely upon F. He began the work at the end of 1718 and completed it in 1753; 2 yrs. were given to revision and 8 yrs. to the transcription, which was finished in 1761. F. d. at Padua Apr. 4, 1768, 1 yr. before Faccioliati and 3 yrs. before the publication of the work that had occupied nearly 40 yrs. of his life.

Forchhammer, fork'ham-mer (JOHAN GEORG), b. in Schleswig July 26, 1794; was the associate of Oersted, and long held the chair of geol. at Copenhagen; author of works on the *Geol. Den., of Scandinavia*, and a *Manual of Chem.* D. Dec. 13, 1865.

Forchhammer (PETER WILHELM), distinguished as a traveller and archaeologist, b. in 1803; studied at the Univ. of Kiel; spent 3 yrs. in explorations and study in Gr. On his return to Ger. he pub. the results of his investigations, and then revisited Gr. in 1839. Was appointed prof. extraordinary at Kiel in 1836, and founded, in conjunction with Jahn, the archaeological museum. Wrote *Hellenika, Topography of Athens, Description of the Plain of Troy, Halkyonia, The Cyclopean Walls*, and other works on the topography and archaeology of Gr.

Ford (GABRIEL H.), b. at Morristown, N. J., 1764, grad. at the Coll. of N. J. 1784; was admitted to bar 1789, presiding judge of court of common pleas for E. dist. of the State and justice of supreme court 1820-40. D. Aug. 27, 1849.

Ford (JOHN), Eng. dramatist, b. at Ilslington 1586; entered the Middle Temple 1602, and appears to have followed the legal profession, but as early as his 18th yr. pub. *Fame's Memorial*, a tribute to the memory of Charles Blount, Lord Mountjoy and earl of Devonshire; then wrote several plays not now extant, and finally produced about 16 others, most of them performed between 1628 and 1639. D. about 1640.

Ford (LEWIS DE SAUSSURE), M. D., LL.D., prof. in the Med. Coll. of Ga., b. at Washington's head-quarters in Morristown, N. J., Dec. 1801; took his degree in med. from the Coll. of Phys. and Surgeons of New York city 1822; removed to S. Ga. 1822, and to Augusta 1827, where he assisted in organizing the Med. Coll. of Ga. 1832—an inst. in which he has held ever since the professorship either of chem. or practice of med. He received the honorary degree of LL.D. from the Univ. of Ga. 1868.

Ford (SEABURY), lawyer and politician, b. at Pomfret, Conn., Oct. 15, 1801, grad. at Yale 1825; practised law at Burton, O.; was often member and once speaker of each branch of the O. legislature; gov. of O. 1848-50, and maj.-gen. of militia. D. May 8, 1855.

Ford (THOMAS) was taken by his parents to Ill. in 1804; practised law; was judge of the supreme court, and governor of Illinois 1842-46. Wrote *Hist. of Illinois from 1818 to 1847*. D. Jan. 1851.

Foreign Attachment. See ATTACHMENT and GARNISHMENT.

Foreknowledge is God's absolute knowledge or OMNISCIENCE (which see) from eternity—His knowledge conceived of, as in advance of, before, the thing known. All human knowledge is, strictly speaking, simultaneous with the object it contemplates, or, in a looser sense, may be subsequent to it. In the doctrine of PREDESTINATION (which see) F. is regarded in its relation to the salvation of men. It is admitted by all thorough theologians that the F. of God is *dialectically* distinct from His foreordination or eternal purpose, but as to the question whether or how an absolute (that is, an infallible) F. (which is conceded by both sides) can be consistent with a conditional foreordination, they answer differently. It is also admitted on both sides that there is no interval of time between the F. and the foreordination of God: both are alike eternal. The question is, Which is properly put first in the system, in the order of nature and of logic? Out of the different answers to these questions have arisen, in large part, the conflicts between ARMINIANISM (which see) and CALVINISM (which see). The Calvinists make the F. subsequent to and dependent on the foreordination; the Arminians in some cases invert the relation, and make the purpose or ordination of God dependent upon what He foreknows. In the one system the 2 are distinct, but not separable; in the other they are separable as well as distinct. C. P. KRAUTH.

Foreordina'tion, ordination or decree in advance, the eternal appointment of all ends, and of all men to those ends, by God. When predestination, as some of the Fathers and of the Calvinistic divines have used the term, covers all the acts of God's will, it is synonymous with F. When predestination is confined, as it is in Script. usage, to the purpose of God in regard to salvation, F. is related to predestination as a whole to a part. (See FOREKNOWLEDGE.)

Forest Culture. See ARBORICULTURE.

Forest-Fly, a name given to insects of the family Hippoboscidae which have well developed wings. All are parasitic. The larvæ are hatched in the oviduct, and turn to pupæ just after birth. The *Hippobosca equina* is a European horse-fly. Others infest sheep, deer, birds, and bats in U. S.

Foresti (E. FELICI), LL.D., lt. patriot and scholar, b. near Ferrara about 1733; practised law at Ferrara; was prator of Crespino 1816; arrested Jan. 7, 1819, as one of the Carbonari, and imprisoned at Spielberg until Aug. 1836; was prof. of It. in Columbia Coll., New York. Appointed in 1858 as U. S. consul at Genoa. Wrote *Twenty Years in the Dungeons of Aus.* D. Sept. 14, 1858.

Forestry. See APPENDIX.

Forey, FO-RĀ' (ELIE FRÉDÉRIC), marshal of Fr., b. in Paris Jan. 10, 1804, admitted to St.-Cyr 1822, where he became instructor; served mainly in Algeria, where he rose to the rank of col.; returning to Fr., became a gen. in 1848; took an active part in the *coup d'état* of Dec. 1851, and was made gen. of division and commander of the Legion of Honor. For a time he had command of the siege force before Sevastopol. In 1857 was nominated to the 1st division of the army of Paris; during the It. war in 1859 gained the battle of Montebello, and distinguished himself at Magenta and Solferino. He commanded the Fr. expedition against Mex., stormed Puebla, and was made marshal; received command in Fr. of the second *corps d'armée* Dec. 24, 1863. In 1867 commanded the camp of Châlons. D. June 20, 1872.

Forfeiture [Low Lat. *forisfactura*, from *foris*, "without," and *facio*, to "make"], a loss of property to the state or an individual as a penalty for the commission of some offence. F. is either civil or criminal. In civil F. the property passes into the possession of some individual who has been injured by the violation of his rights through some neglect or transgression of duty on the part of the property-owner. There are several classes of cases in which this penalty might be incurred at common law, and in some of them it is still retained. One very important case of civil F. is that which occurs when the breach of the condition in a grant has been committed. The grantor may re-enter upon the premises and recover them as his own property. Criminal F., under the Eng. law, was the gen. penalty inflicted for acts of felony and treason, the offender's lands, chattels, or both, being confiscated by the crown. But F. as a gen. punishment for crime is now abolished.

In the U. S., F. as a gen. mode of punishment for crimes, has never existed. There is a provision in the const. that "no attainder of treason shall work corruption of blood or forfeiture, except during the life of the person attainted." This limited authority to declare F. for treason was never exercised until after the breaking out of the c. war in 1861. A previous law of Cong., passed in 1790, had expressly waived the right to impose such a punishment by providing that "no conviction or judgment for any capital or other offence shall work corruption of blood or any forfeiture of estate." The crisis of the c. war was thought to demand more stringent measures, and in 1862 an act was passed providing for the confiscation of the property of certain classes of persons, but containing the restriction that no punishment or proceedings should be construed to work a F. of the real estate of the offender longer than his natural life.

There are certain specific classes of offences in regard to which particular statutes have been enacted by Cong. exacting the F. of property employed as a means of committing the wrongful act or used in an unlawful transaction; but F. in such cases applies only to the particular property designated, and not generally to chattels or lands, as in the other instances which have been mentioned. Thus, laws have been passed from time to time providing that smuggling or importation of goods under fraudulent invoices shall cause a F. either of the entire invoice or of the property wrongfully imported. Acts of piracy entail a F. of the piratical craft and its appurtenances. The same was formerly true of vessels engaged in the slave-trade. The const. of many of the States of the U., or the laws which they have enacted, contain substantially the same provisions, prohibiting the gen. F. of a criminal's property, as the laws enacted by Cong.

GEORGE CHASE.

Forgery, fôrj-er-e, the wrongful making or alteration of a writing with intent to deceive and defraud by its fictitious appearance of genuineness. The essential criminality of the offence lies in its tendency to prejudice the rights and interests of innocent third persons, by giving to an instrument an apparent legal efficacy which it would not otherwise have possessed. The writing must be of such a nature that, whether fictitiously fabricated as a whole or only in part, its use and circulation would be calculated to occasion pecuniary loss, or some infringement upon or injury to legal privileges, or the creation of a liability to which the person injuriously affected ought not to be subjected. The instrument must be legally capable of effecting a fraud. Hence, if its only tendency would be to injure some person's feelings, violate his confidence, or convey false information, without otherwise affecting his interests, no F. would be committed. But whenever the writing might be made the foundation of a legal liability, as if one should wrongfully make or alter a note or a bill of exchange, or wherever it might cause a wrongful disposition of property or occasion the loss of a situation of pecuniary benefit—in these and similar cases the unwarrantable falsification is sufficient to constitute the offence of F. Not only, therefore, instruments which are manifestly of a pecuniary nature, by directly entitling their possessor to the receipt of money, may be forged, but a letter of recommendation to a servant or a schoolmaster by which he might obtain a lucrative position, or a representation as to the financial credit and standing of a merchant by reason of which those trusting him might be deceived, would come within the same category. The same is true of instruments which unwarrantably prejudice any legal right by effecting a fraud, as a deposition to be

used on the trial of a cause in court or a copy of a writing to be used in evidence. If a writing be invalid on its face, it cannot be the subject of F., since its power to prove deceptive would be nullified by its own contents.

The degree of fabrication or alteration of an instrument need be only sufficient to render a fraudulent deception possible. Consequently, not only need the entire contents not be fictitious, but a very slight change, either by insertion, alteration, erasure, or other material modification of the terms of any writing, which would be effectual in giving it a seeming validity or varying its tenor, would be enough to constitute F. This may consist either in the addition of a false signature to a true instrument or a real signature to a false one, in the insertion of paragraphs or clauses or the change of words, or even of letters, if the legal effect of the instrument be thereby altered. Appending the signature of a fictitious person or of one no longer living to an instrument is as fraudulent an alteration as imitating the name of a person still living and generally known. A printed or engraved document, as a railroad ticket or pass, may be forged, as well as one that is in writing.

As in other criminal offences, an evil intent is a necessary element in the offence of F. But this principle does not require that there should have been a definite purpose to injure a particular person, but only that the instrument forged shall be intended to be used as if it were genuine. Consequently, if the wrong-doer in using the fictitious paper faithfully designs to take such subsequent measures as shall avert all possibility of injury, he is nevertheless guilty of the crime. But if a person, believing himself with good reason duly authorized to act as agent in the use of another's signature, does employ it, and has in fact no justification, he is not chargeable with F., because his wrongful act was induced by no fraudulent purpose.

It is not necessary that any actual injury should result from the offence. It is sufficient, at common law, that the writing has such a deceptive character that if once put into circulation it will, according to natural and reasonable anticipation, entrap and mislead those to whose hands it comes, to the injury of their lawful interests. Whether the person whose writing is imitated or whose name is assumed be immediately affected by the F., or loss is occasioned to third persons, is entirely immaterial. The offence is complete without regard to the persons affected.

Beside F. prejudicial to the rights of individuals, there exist, both at common law and by statute, varieties of this offence more immediately affecting the public. Of this nature are false and fraudulent alterations of any matter of record or of any authentic matter of a public nature, as a parish register, etc. In the U. S., Cong. and the State legislatures severally have enacted special laws against F. The offence of uttering forged instruments—i. e. of attempting to effect a fraudulent deceit by making actual use of them—was not a necessary ingredient in the crime of F. at common law, but was specifically provided for by statutory regulations. In some of the Amer. States uttering has been made an essential element in this offence, while in others it is still considered a distinct crime.

GEORGE CHASE.

Forget-me-Not [Ger. *Vergissmännchen*], the *Myosotis palustris* of Europe, a plant of the borage family, prized by people of many nations as the emblem of constancy. Many other species of the genus are known, chiefly European. The U. S. have a number of F.-M.-N., mostly common to the 2 hemispheres. They generally have brilliant blue flowers. Mouse-ear and scorpion-grass are popular names for it.

Forging, the reduction of iron or steel at a high temperature to any desired shape by means of blows of the hammer. Some kinds of work are still forged by hand, but most F. is done by the steam-hammer, though some work is finished by hand. The rolling-mill has also to some extent superseded the forge.

Forked Beard, *Phycis furcatus*, a European fish of the cod family, so called from their forked jugular ventral fins. The *Phycis chause* and *tentis* of the U. S. are closely related, but are misnamed hake.

Formation, a convenient but not accurately limited term in geol. Properly speaking, it refers to a stratum or series of strata which have a certain unity; as the "Clinton F.," which is equivalent to the "Clinton group," a subdivision of the Silurian system; the "Hamilton F.," an important subdivision of the Devonian. It is also as often applied to an entire system, as the "Silurian F.," the "Carboniferous F.," etc. The theory in the coinage of the word was that it should designate certain strata which were formed by one gen., common cause, even though that cause might vary in the nature and in the intensity of its action, and which, though differing in their lithological character and fossils, had still some things in common which served to bind them together.

J. S. NEWBERRY.

Formes (KARL JEAN), a famous basso singer, b. at Mühlheim, in the grand duchy of Baden, Aug. 7, 1818. The possession of a voice of singular depth, compass, and purity, capable of great expression, was the occasion of his forsaking the ecclesiastical calling he had already entered on, and betaking himself to the stage. Driven from Vienna on account of his revolutionary opinions, he repaired to La-bliche. In 1857 F. came to the U. S. to renew his triumphs on the lyric stage and in oratorio. He liked the Amer. people, insts., and ideas, reappeared season after season in New York, and, as it was said, purposed at one time making this country his home. In later yrs. his voice gave way, but being gifted with uncommon dramatic power, he attempted drama in Lond. In this he failed. Beside being a great artist, one of the greatest of this generation, a singer of equal power in comedy and tragedy, as grand in Elijah as he was droll in Leporello, Karl F. is a man of unusual intelligence and breadth of humanity—a man of mind. His best remembered parts are Marcel, Leporello, Bertram, Figaro, Sarastro, Plunkett.

O. B. FROTHINGHAM.

Formic Acid, the simplest member of the fatty series of acids, derives its name from the ant (*formica*) from which it was first prepared. It occurs in the juice of the stinging nettle and in other plants; in the ant, especially the red ant, and is projected by it as a means of defence; in some caterpillars; in human blood, urine, flesh-juice, and perspiration; in some waters. It is formed by a great variety of chemical reactions. The concentrated acid is a thin, transparent, colorless liquid, sp. gr. 1.22, boiling at about 212° F. It fumes in the air, and is very corrosive, a single drop placed on the skin causing intolerable pain and producing a painful ulcer. It (or its salts) reduces the oxides and many of the salts of mercury, silver, and gold, forming metallic precipitates.

Formication, Lat. *formica*, an "ant"; a morbid sensation felt in the skin, so called from its resemblance to the feeling produced by the crawling of ants. F. is a part of the complex sensation called numbness—that which is experienced when after compression of the nerves of the leg the "foot is asleep." In addition to indicating irritation of a nerve by pressure, etc., F. is the result of any kind of irritation of those parts of the nervous centres which are connected with sensitive nerves. Hence, this morbid sensation is often a symptom, and an early symptom, of cerebral or spinal disease. Numbness is often confounded with anæsthesia (loss of sensibility), but this is an error, since numbness almost always coincides with the preservation of sensibility.

Formic Ethers, formates of the alcohol radicals, as ethylic formate.

Formosa (Port. "beautiful"). [Chi. *Tai-Wan*, "terrace"], an island in the Chi. Sea, 90 m. off the coast of the Chi. prov. of Fo-Kien, to which it belongs. Its length is 237 m., average breadth 70 m. It is intersected from N. to S. by a range of high volcanic mts. The E. part is inhabited by the aborigines, the W. by Chi. settlements, which comprise about 500,000 inhabs. The cap., Tai-Wan, was opened to foreign commerce in 1858. F. is called the granary of Fo-Kien. The Chi. settlers are described as an enterprising and progressive people; about the aborigines little is known. F. in 1874 was invaded by the Japanese, who punished a native tribe for the murder of Japanese sailors, and for some months occupied a part of it; but finally Chi. paid the expenses of the invasion, and the Japanese evacuated the island.

Formosus, bp. of Porto, became pope in 891. His election caused much controversy during and after his pontificate, since the canons at that time forbade a transfer of bps. from one see to another; and Pope Stephen VI. had his body dug up and cast into the Tiber as an intruder, but John IX. reversed this action as far as possible. D. May 23, 896.

Formula, Chemical. See CHEMISTRY.

Forney (JOHN WEISS), politician and journalist, b. at Lancaster, Pa., Sept. 30, 1817; apprenticed in the office of the Lancaster *Journal* in 1833, and in 1837 was ed. and joint-proprietor of the Lancaster *Intelligencer*; in 1840 he united the 2 papers. In 1845, in Phila., and thereafter, he edited the *Pennsylvanian*. In 1851-53 was clerk of the U. S. House of Reps., editing the *Wash. Union*; Aug. 1, 1857, began the *Press*, Dem. daily newspaper, at Phila., supporting Stephen A. Douglas and opposing the administration of President Buchanan. Was after that clerk of the 36th Cong. At the opening of the c. war he took strong ground for the vigorous prosecution of the contest, and afterward acted with the Rep. party. From 1861 to 1868 was sec. of the U. S. Senate. Also started during this time the *Wash. Chronicle*. He travelled in Europe in 1868, and pub. his letters to the *Press* and *Chronicle* as *Letters from Europe*. D. Dec. 9, 1881.

Forrest (EDWIN), an actor, b. in Phila., Mar. 9, 1806; d. there Dec. 12, 1872. His first appearance on the public stage was at the Walnut Street Theatre, in the rôle of Douglas, on Nov. 27, 1820. A long and enterprising professional tour in the W. cities, during which he undertook characters in Shakspeare, gave him experience and reputation, so that, after filling engagements in Albany and Phila., he presented himself before the New York public at the Park Theatre in the character of Othello. This was in 1826. His success was signal. At the Bowery he was a special favorite. There and at the Park he played long engagements, but, not satisfied with local fame, visited all the prin. cities of the U. S. His chief characters were Othello, Macbeth, Hamlet, Richard III., varied by parts like Metamora and Spartacus, which his fine physique and immense energy made effective and kept popular. In 1835 Mr. F. made a professional visit to Eng. and the Continent.

Mr. F. was enriched by his profession. He built a stone castle on the Hudson, and later a residence in Phila., where he had a splendid library, especially rich in Shakspearean lit. His library, with its best treasures, was destroyed by fire Jan. 15, 1873.

Forrest (FRENCH), naval officer, b. in Md. in 1796, became mdpn. 1811; distinguished himself in Perry's victory on Lake Erie, became lieut. 1817, capt. 1844; was adjutant-gen. of the land and naval force in the Mex. war; followed the State of Va. when she seceded from the U., and was acting assistant sec. of the Confed. navy. D. Dec. 22, 1866.

Forrest (NATHAN BEDFORD), b. in Bedford co., Tenn., July 13, 1821. His father emigrated to Miss., where he d. 1837, leaving his family in straitened circumstances. The son entered into business of various kinds, becoming, in 1852, a real estate broker and slave-dealer at Memphis, Tenn. In 1859 purchased large plantations in Miss., and acquired great wealth. When the c. war broke out he entered the Tenn. mounted rifles as a private, but soon raised a regiment of cav., of which he was chosen lieut.-col. He was present at the siege of Ft. Donelson, but made his escape with his regiment before the surrender. He took part in the battle of Pittsburg Landing, where he was wounded; commanded the cav. at Chattanooga; was made brig.-gen. July 1862; was in many engagements, including the battle of Chickamauga; made maj.-gen. Dec. 1863, and placed in

command of a cav. dept. He was created lieut.-gen. Feb. 1866, but surrendered May 9, 1865. After the war he was pres. of Selma, Marion, and Memphis R. R. D. Oct. 29, 1877.

Forrest (URIAH), b. in St. Mary's co., Md., 1756; was lieut.-col. in the Md. line, and was so wounded at Germantown that he never fully recovered. Was auditor of Md., member of the old Cong. 1786-87, often in both branches of the legislature of Md.; maj.-gen. of militia, M. C. 1793-95, and then clerk of the circuit court of D. C. D. July 1805.

Forrest City, Ark. See APPENDIX.

Forrester (ALFRED HENRY), ("Alfred Crowquill"), Eng. artist and comic writer, b. in Lond. in 1805, ed. at Islington; was a notary in the Royal Exchange, but retired about 1839. Began contributing to periodicals at the age of 16, and afterward drew, modelled, and engraved on steel and wood to illustrate his own writings. He exhibited large pen-and-ink drawings at the Royal Acad., and gained some repute as a designer and modeller. D. May 26, 1872.

Forshey (COL. CALEB GOLDSMITH), A. M., b. in Somerset co., Pa., July 18, 1812, ed. at Kenyon Coll., O., and at W. Pt.; was prof. of math. and civil engineering at Jefferson Coll., Miss., 1836-38; engaged for many yrs. in engineering works in Miss., La., and Tex.; was in charge of the U. S. survey of the Miss. delta 1851-53; chief engineer of the Galveston, Houston, and Henderson R. R. 1853-55; planned the bridge across Galveston W. Bay; founded the Tex. Military Inst. 1855, conducted it until 1861, when, though opposed to secession, he took service in the Confed. army as lieut.-col. of engineers; served on the James River, and afterward as chief engineer on the staff of Gen. Magruder; planned the defences of the Tex. frontier and the operations for the recapture of Galveston and the Tex. coast. After the war was engaged in R. R. construction in Tex. 1865-71, on the improvements at the mouth of the Miss., and in the U. S. engineer service on the Red River and in Galveston Bay 1874-75. He was one of the founders of the New Orleans Acad. of Sciences 1853, and was its first v.-p.; contributed largely to scientific periodicals, and his book, *The Plaquemine of the Miss. River* is considered high authority. He was one of the associate eds. of *J.'s Univ. Cyc.* D. 1881.

Förster (ERNST JOACHIM), a Ger. painter and writer on the hist. of art, b. in Münchengosensstadt Apr. 8, 1800. His early studies were in theol., philos., and philology in the univs. of Berlin and Jena, but at the age of 23 he devoted himself to painting, under the teaching of Cornelius, one of the founders of the school of which Kaulbach was the most distinguished pupil. F.'s hand is seen in frescoes in the Aula at Rome, in the Glyptothek and Arcade at Munich, and in the chapel of San Giorgio at Padua, whose frescoes he restored. But his chief labor has been literary. He has written a *Hist. of two Arts*, a *Hist. of P. Art*, *Studies Relating to the Hist. of Modern Art*, *Lectures on Painting*, *Monuments of Ger. Arch., Sculpture, and Painting*, and guide-books to Munich, It., and Ger. of great merit. He has written also a life of Jean Paul Richter. F. was the discoverer of several anc. pictures in It., notably of the old frescoes of Avanzo in Padua, which he restored.

Forster (JOHANN GEORG ADAM), b. near Dantzic Nov. 27, 1754, accompanied his father around the world 1772-75; was prof. of nat. hist. at Wilna 1784, and librarian to the elector of Mentz 1788; envoy to Paris 1792. He made a translation of the *Sakuntala* into Ger., was the tutor of Humboldt, and one of the fathers of modern Ger. lit. D. Jan. 11, 1794.

Forster (JOHN), Eng. author, b. at Newcastle Apr. 2, 1812, was ed. for the bar, but devoted himself to lit., contributing to the *London Examiner*, of which he was ed. for 10 yrs.; to the *Edinburgh and Quarterly Reviews*, the *Foreign Quarterly Review*, of which he was ed., in 1855 was sec. to the lunacy commission, and in 1861 became a com. in lunacy. Wrote *Statesmen of the Commonwealth of Eng.*, *Life of Oliver Goldsmith*, and *Life of Charles Dickens*. D. Feb. 1, 1876.

Forster (WILLIAM), Eng. philan., b. at Tottenham, near Lond. 1784; became a minister of the Society of Friends in 1803; married Anna, sister of Thomas Fowell Buxton, in 1816; in 1838 settled as a preacher near Norwich, Eng.; in 1846 travelled in Ire. to relieve the distresses caused by famine. Commissioned in 1849, by the Lond. Yearly Meeting, to present an address on slavery and the slave-trade to rulers in Christendom, he had interviews with European monarchs, and in 1853 with the Pres. of the U. S. and several S. State govts. D. 1854.

Forster (RT. HON. WILLIAM EDWARD), an Eng. statesman, son of the preceding, b. at Bradpole, Dorset, July 11, 1818, ed. at Friends' School, Tottenham, and is a worsted manufacturer at Bradford. Was returned to the House of Commons 1861 for Bradford, and has been in Parl. since then. Was under-sec. for the colonies from Nov. 1865 until July 1866, and v.-p. of the committee of council on education in 1868. He had much to do with passing through the House of Commons the Education Bill in 1870 and the Ballot Bill in 1871. In 1874 he visited the U. S. He was appointed, Apr. 28, 1880, chief sec. for Ire.

Forsyth, for-sith', cap. of Monroe co., Ga., on R. R. 25 m. N. W. of Macon. It is the site of Monroe Female Coll. Pop. 1880, 1105.

Forsyth (JOHN), b. at Fredericksburg, Va., Oct. 22, 1780, grad. at Princeton 1799; studied law; was atty.-gen. of Ga. in 1808, M. C. 1813-18 and 1829-27, U. S. senator 1828-29 and 1829-37, gov. of Ga. 1827-29, U. S. minister to Sp. 1829-23, U. S. sec. of state 1835-41. D. Oct. 21, 1841.

Forsyth (JOHN), a son of Hon. John Forsyth (1780-1841), well known for many yrs. as ed. of the *Mobile (Ala.) Register*, was b. at Augusta, Ga., Oct. 30, 1812; took the first honor at Princeton in the graduating class of 1832; was an officer in the Mex. war, in which he served with distinction, and was U. S. minister to Mex. from 1856 to 1858. He was a Douglas elector in Ala. in 1860, and was one of the 3 Confed. coms. to visit Pres. Lincoln in Mar. 1861. During the war between the States he was on the staff of Gen. Bragg, and was the author of that officer's address to the people of Ky. in 1862. He held

ous ages of mankind. Thus, among the wild tribes of the infant world, armed with clubs and weapons of stone, a wooden barricade or a bank of earth surmounted by a hedge was an efficient defensive work. The introduction of cutting tools of metal rendered these an easy prey to the attack, and a wall of masonry became necessary. The next improvement was to build towers projecting from the face of the wall, and providing a fire parallel to it. It is doubtful when the ditch was introduced, but it was probably at an early date. During the Middle Ages the art of F., like the other arts and sciences, rather retrograded than improved. The invention of gunpowder caused a radical change in all the methods previously employed. The high walls had to be very much lowered, the towers expanded into bastions; outworks were thrown up in front of them. Its being in advance of the rest of Europe in all the arts, it was with them that the first great changes originated, though the first modern writer was the celebrated Ger. painter, sculptor, and arch., Albert Dürer (1527). The second great name in the modern art is that of Daniel Speckle, also a Ger., b. in 1536 at Strasburg, which city he fortified. The first prominent Fr. writer was Errard de Bar-le-Duc, whose book is dated 1547. His work was followed by that of De Ville in 1629. Following Errard and De Ville, the next master was the count de Pagan, whose work is dated 1645. Vauban was b. in 1633. He displayed extraordinary talent in adapting his works to the site, and he brought the bastioned system to a high degree of perfection. Coehorn was a contemporary of Vauban's, and adapted the system in a peculiar manner to the low lands of Hol. Vauban was followed by Cormontaigne, b. in 1696, who made improvements, leaving the system substantially as it is to-day. The bastioned system was considered the only proper manner of fortifying until the latter part of 18th century, when Montalembert, a Fr. gen. of cav., produced his bold and original work. This "most intrepid of writers on 'fortification,'" as he has been styled, abandoned the bastioned trace, developing the ideas produced 250 yrs. before by Dürer. He advocated the tenailled system. It is upon the ideas of Dürer and Montalembert that the modern polygonal system is based. [From orig. art. in *J.'s Univ. Cyc.*, by CAPT. O. H. ERNST.]

Fort Jackson, a bastioned and casemated brick work, on the Miss. River, 75 m. below New Orleans, which, in conjunction with Ft. St. Philip, defends New Orleans against naval attack by the river. The forcing of the passage of these works and their capture by Farragut constitutes the first great naval exploit of that commander.

Fort La Fayette, a battery erected on Hendrick's Reef in the Narrows, New York Bay, under the guns of Ft. Hamilton. During the c. war it was used as a govt. prison for civilian offenders. It has since been partly burned.

Fort Leavenworth, Kan. SEE APPENDIX.

Fort Madison, city and R. R. junc., cap. of Lee co., Ia., on the Miss. River, 23 m. below Burlington. It is opposite Niota, Ill., with which it is connected by ferries. It is the site of a ft. built in 1808, and captured by the Indians in 1818, and is the seat of one of the State penitentiaries; has an acad. Pop. 1870, 4011; 1880, 4672.

Fort Monroe, a fortification located on Old Point Comfort, Va., for the defence of Hampton Roads and the water-approach to Norfolk and the Gosport navy-yard. It stands on the N. side of the channel, Ft. Wool (formerly Ft. Calhoun) being on the S. side, about 1 m. distant. F. M. might properly be called a fortress or fortified place, as it incloses a large area, and contains within it a number of detached buildings, such as officers' quarters, offices, barracks for soldiers, storehouses, a portion of the workshops of an arsenal, the artil. school of the service, a chapel, etc. It was commenced in 1817, and was originally designed to mount 371 guns in casemates and *en barbette*, inclusive of mortars, field-pieces, and flanking howitzers. In plan it is an irregular hexagon, on 2 sides of which, comprising the 3 channel fronts, the armament is arranged in 2 tiers, one in casemates and one in *barbette*. On the other 4 sides, each being one front, the ramparts are solid, with the exception of some of the flanks, which are casemated. The work is bastioned, although unaccompanied by the usual outworks of the regular bastioned system. It is surrounded by a tide-water ditch, 8 ft. deep at high water, exterior to which there is a casemated battery on the channel front to the left of the casemates of the main work, and a quadrilateral redoubt on the N. side, commanding the approach down the peninsula. This redoubt, like the main work, is surrounded by a wet ditch. The scarp-wall of the main work rises to the height of 17 ft. above high water. The entire ft. covers an area of 80 acres, and the distance around it, exterior to the ditches of main work and redoubt, is $1\frac{1}{10}$ m. In its construction there has been expended \$2,818,000. When certain modifications now in progress or approved are completed it will mount 118 guns and 18 flank howitzers in casemates, and 51 heavy guns of modern calibres *en barbette*. Inasmuch as the exceptional magnitude of F. M., as compared with our other works of coast and channel defence, has been the subject of frequent, and sometimes of severe and perhaps not unjust criticism, it may be said, in explanation, that this work was designed under the inspiration of Gen. Simon Bernard, a foreign engineer of eminence called into our service soon after the close of the war of 1812-14, with all the exaggerated ideas of warfare which the close proximity of belligerent nations in Europe had produced and rendered orthodox. But the more moderate opinions of our own military engineers, moulded solely upon local circumstances and the necessities of our own country, so far prevailed as to restrict the introduction of a foreign system to the single case of F. M. We have no other work at all like it in any essential particular, and the error in this instance relates solely to magnitude, not to strength.

Q. A. GILLMORE.

Fort Morgan, an inclosed casemated and bastioned pentagon of brick, with exterior batteries, located on the

W. end of Mobile Point, Ala., at the entrance to anchorage in Mobile Bay; commenced 1819 on the site of old Ft. Bowyer. An historic interest attaches to the latter work as having borne an important part in the war of 1812-15. On Sept. 15, 1814, the Brit. made a combined naval and military attack upon the ft., and were repulsed, losing one ship and 232 men; they, however, captured the ft. Jan. 11, 1815. F. M. was captured by Farragut Aug. 22, 1864.

Fort Moultrie, on Sullivan's Island, entrance to Charleston harbor, S. C. A rude work of palmetto logs and earth, mounting 26 guns, was unsuccessfully attacked in 1776 by the Brit. fleet of 9 vessels (270 guns) and thenceforth bore the commander's name, Col. William Moultrie. It was subsequently rebuilt in masonry with an imperfectly bastioned trace. It was abandoned, Dec. 26, 1860, by Major Anderson, and in consort with batteries on Morris Island fired the first guns of the c. war, Jan. 9, 1861. Since the war it has been modified to adapt it to receive modern heavy guns, protected by earthen traverses and parados.

Fort Pickens, an inclosed casemated and bastioned pentagonal brick work, on Santa Rosa Island, Pensacola harbor, Fla., which harbor and the U. S. navy-yard at Warrington it is intended to defend. In Jan. 1861 the navy-yard and works on the mainland, including Ft. McRee, fell into Confed. hands, and desultory operations were carried on between the 2 shores, exhibiting at one time the spectacle of 2 fts., Pickens and McRee, cannonading each other.

Fort Plain, Montgomery co., N. Y., on R. R., the Mohawk River, and the Erie Canal, 56 m. W. of Albany. It has a sem. Pop. 1870, 1756; 1880, 2443.

Fort Pulaski, on Cockspur Island, Ga., for the defence of the approach to the city of Savannah, commenced in 1823. At the beginning of the c. war the work was finished in all essential particulars, but had never been garrisoned or armed. Upon the secession of the State of Ga., her military at once took possession of Fts. P. and Jackson. On Nov. 29, 1861, the writer made a military reconnaissance of F. P., and pronounced "the reduction of that work practicable by batteries of mortars and rifled guns established on Big Tybee Island." On Feb. 21, 1862, the first vessel with ordnance and ordnance stores for the siege arrived in Tybee Roads. Mortars of 8½ tons weight, and columbiads but a trifle lighter, were moved in the dead of night over a narrow causeway bordered by swamps on either side, and liable at any moment to be overturned and buried in the mud, which was about 12 ft. deep. Two hundred and fifty men were barely sufficient to move a single piece on sling-carts. The positions selected for the 5 most advanced batteries were artificially screened from view from the ft. by a gradual change, made little by little every night, in the condition and appearance of the brushwood and bushes in front of them. The batteries opened fire on Apr. 10, and the ft. was surrendered at 2 p. m. the next day. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. Q. A. GILLMORE.]

Fortress Monroe. SEE FORT MONROE.

Fort St. Philip, nearly opposite Ft. Jackson, on the Miss. River. The old river front, with low brick scarp and wet ditch, was built by the Spaniards. After 1841 it underwent extensive repairs and modifications. Falling into the hands of the Confeds. in 1861, it was, with Ft. Jackson, recaptured by Farragut's fleet Apr. 1862.

Fort Scott, city and R. R. centre, cap. of Bourbon co., Kan., 380 m. W. of St. Louis and 98 m. S. of Kansas City, Mo., on Marmaton River. Coal is found in the vicinity, also hydraulic cement and mineral paints, umbers, yellow ochres, Sp. brown, Indian red, etc. Pop. 1870, 4174; 1880, 5372.

Fort Smith, a city, one of the caps. of Sebastian co., Ark., at confluence of Ark. and Poteau rivers, on R. R. and the Ind. Terr. border, 150 m. W. of Little Rock. It is the head of navigation. Pop. 1870, 2227; 1880, 3099.

Fort Snelling, on R. R., an old U. S. military post in Hennepin co., Minn., at the junction of the Minn. and Miss. rivers, opposite Mendota, and 2 m. below the Minnehaha Falls. It was founded in 1820, and is the oldest settlement in what is now Minn. Pop. 1880, 352.

Fort Sumter, Charleston, S. C., upon a shoal at the S. side of the inner harbor, 3¼ m. from the city, was begun in 1829, and was designed to mount 136 guns arranged in 3 tiers. It never received its entire armament, as none of the embrasures of the 2d tier were finished when the c. war broke out. When S. C. seceded, Dec. 20, 1860, the entire U. S. force in Charleston harbor consisted of 75 enlisted men, under the command of Major Robert Anderson, by whom they were transferred, during the night of Dec. 26, from Ft. Moultrie to F. S.; whereupon the authorities of S. C. seized the other fts. in the harbor, and demanded the surrender of F. S.; this being refused, fire was opened, Apr. 12, upon the ft., which capitulated the next day. The Confeds., upon getting possession of F. S., at once proceeded to augment its offensive and defensive strength, and held undisturbed possession for 2 yrs. On Apr. 7, 1863, a gallant attack was made upon the ft. by a naval force of 9 iron-clads, carrying 23 guns, under command of Rear-Admiral S. F. Dupont. The combat lasted 1 hour and 40 minutes, when the fleet withdrew, at 4 p. m., with the intention of renewing the engagement the next morning. The monitors had received so much injury, however, that the project was abandoned. F. S. was subsequently bombarded, its batteries destroyed, and the walls upon 2 of its faces demolished, from batteries established by the U. land forces on Morris Island. The first fire from the breaching batteries opened Aug. 17, 1863. At 12 p. m. on the night of Sept. 8 the ft. was assaulted by a naval column of 500 men in small boats, which was repulsed with heavy loss. The F. S. garrison, subsequently built additional shelters, galleries, and quarters within and under the ruins, and kept possession till the final evacuation of Charleston and all its defences, Feb. 18, 1865. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. Q. A. GILLMORE.]

Fortuna [Gr. Τύχη], the goddess of good-luck, worshipped at many places of It., Gr., and Asia Minor, but es-

pecially honored at Rome, where she had several temples and bore many surnames.

Fortunate Islands (*Fortunata Insulae*, Μακάρον νήσοι), an anc. name for a group of islands of the ocean stream, supposed to be the Canary Islands, and perhaps including the Azores, Madeira, and the Cape Verde group.

Fortunatius (ATILIUS), a Rom. grammarian, author of a treatise on metres, and especially on the metres employed by Horace.

Fortunatus, the hero of an old romance. F. receives an inexhaustible purse and a wishing-cap, which finally proves the ruin of him and his sons. The prin. European langs. have the tale in various forms. Its authorship is not known, but some of its materials are very old.

Fortunatus (VENANTIUS HONORIUS CLEMENTIANUS), bishop of Poitiers 597 A. D., a Latin poet of the transition period, wrote on a great variety of subjects; owes his reputation mainly to three or four beautiful Latin hymns. He was born in N. It. about 530 A. D., and received his education at Ravenna. About 564 he left It. for Fr., where he spent the rest of his life. He took orders, became a presbyter, and almoner and chaplain of Queen Radagunde. His works are very numerous in prose and verse, consisting of lives of distinguished men, bps., confessors, and others; explanation of the Lord's Prayer and of the Creed; an epic poem in 4 books on the life of St. Martin, chiefly copied from the narrative of Sulpicius Severus; and nearly 300 poems, collected in 11 books, on a great variety of subjects and in different metres. D. about 600 A. D.

Fortuny (MARIANO), a Sp. artist, b. Reus, Catalonia, June 11, 1839. F. was one of the leaders in the circle of artists who have made themselves famous under the title of the Fr.-Sp. school. His training began in the Acad. of Barcelona. In 1856 he gained the acad. prize, which entitled him to live and study in Rome for a certain number of yrs. at the expense of the state. In 1859 he joined his compatriot, Gen. Prim, count of Reus, in his expedition to Morocco, and in Afr. he was taken captive by the charm of that splendid barbarism, in which Regnault, too, found such delight as made him forget It., and he returned to Europe with a world of studies, which were afterward, whether as studies or as pictures, to make him fame and fortune. On his return from Morocco to Rome, where he finally fixed his home, he visited Paris, where he was strongly attracted by the pictures of Meissonier, and the influence of that master is marked in his works, in spite of the wide difference in the techniques of the two men. A Ger. critic not unhappily calls F. "a link between Goya and Meissonier." The reputation of F. dates from the yr. 1866, when he went to Paris. The names of his best known pictures are *A Spanish Marriage*, *The Serpent-Tamer*, *The Amateur of Prints*, *A Fandasia at Morocco*, *The Sword-Sharpener*, *The Academician of Arcadia*. He acquired a great reputation as an etcher, and many of his most remarkable works in this kind have been reproduced by the heliogravure process. F. composed and painted with extreme care. He thus produced comparatively little. *The Spanish Marriage* was sold by him for 75,000 francs. D. Nov. 21, 1874. CLARENCE COOK.

Fort Wagner. See MORRIS ISLAND.

Fort Wayne, city and important R. R. centre, cap. of Allen co., Ind., at the confluence of the St. Mary's and St. Joseph rivers (which form the Maumee), 94 m. from Lake Erie. The city contains 2 colls. and 1 acad. The Wabash and Erie Canal passes through the city. Pop. 1870, 17,718; 1880, 26,880; 1889, about 32,500.

Fort William Henry, a fortress near the head of Lake George, N. Y., erected in 1755 by the Brit. forces under Sir William Johnson. It became an important strategic point in the last Fr. war in the colonies, and was captured by the Fr. and Indians in 1757. It was in the tp. of Caldwell, Warren co., N. Y. Its site is occupied by a hotel, Ft. George, $\frac{1}{2}$ m. to the E., was built in 1759 by Gen. Amherst.

Fort Worth, city and R. R. centre, cap. of Tarrant co., Tex., is 1108 ft. above the sea and 109 above Trinity River, on the S. bank of which it is situated. Pop. 1880, 6663.

Forum [etymologically connected with *forare* and the Gr. *φόρος*, and so originally a "passage-way"] was an open space in the Rom. camp of early times, close to the pratorium, or gen's tent. The term was usually applied to an open place in Rome, like the Gr. *ἀγορά*, for the assembly of the citizens for business, for legal transactions, for the administration of justice, and for the sale and purchase of goods. With the growth of the city the necessities of the people required more than a single F., and convenience separated them into those devoted to public affairs (*fora civilia*) and those which were more strictly markets or bazaars (*fora venalia*). The Rom. F. differed in shape from the *ἀγορά* of the Grs., for while the latter was usually square, the former was oblong, the length exceeding the width by $\frac{1}{2}$, according to Vitruvius. The most celebrated and the most important of the *fora civilia* was the F. Romanum, sometimes called Magnum, and from its pre-eminence simply F. This was situated in the valley between the Capitoline and Palatine hills, and with it is associated very much of the interest of the public and private life of early Rome. (For a description of the buildings in and around the F., see ROME.) A new F. was erected at great expense by Julius Caesar, which was called from him F. Julium, and was dedicated B. C. 45 after the battle of Pharsalus. Augustus constructed still another, which received from him the name F. Augusti. These 3 are sometimes distinguished as the *tria fora*. Still other fora were erected by the later emps.; among these may be named F. Nervæ, begun by Domitian and completed by Nerva; and the most magnificent of all, the F. Trajani, or Ulpium, immediately adjoining the F. Julium and F. Augusti, and having connected with it the Basilica Ulpia and the famous Columna Trajani, still standing. The second class of fora was devoted to market transactions, and they derive their names from the articles sold in them—e. g. *F. olitorium*, the vegetable market; *F. pisci-*

arium, the fish market; *F. boarium* (cattle), *F. suarium* (swine), etc. H. DRISLER.

For'ward (WALTER), a lawyer, b. in Conn. in 1786, removed to Pittsburg, Pa., in 1803, and studied law, commencing its practice in 1806; was M. C. from Pa. 1822-25. He was active in the convention of 1837 to revise the const. of Pa.; in Mar. 1841 was appointed first comptroller of the U. S. treas.; was sec. of the U. S. treas. 1841-43, in 1849-52 U. S. *chargé-d'affaires* to Den., and then presiding judge of the dist. court of Allegheny co., Pa. D. Nov. 24, 1852.

Fos'carl (FRANCESCO), doge of Venice 1423-57, b. 1372; warred with the duke of Milan, and the Venetians obtained possession of Crema, Bergamo, and Brescia, but F. was deposed by the Council of Ten Oct. 23, 1457, and d. Nov. 1, 1457. His sufferings and those of his son are the subject of Byron's *Two Foscari*.

Foss (ARCHIBALD CAMPBELL), a Meth. divine, b. at Phillips-town, Putnam co., N. Y., Mar. 6, 1830, grad. at Wesleyan Univ. in 1852, and at once joined the New York Conference of the M. E. Ch.; served several important chs., and in 1858 became associate pastor with Dr. John McClintock at St. Paul's, New York city. In 1860-62 was prof. of Lat. and Heb. in his alma mater; from 1863 to 1866 was presiding elder of the Poughkeepsie dist. D. Mar. 30, 1870.

Foss (CYRUS DAVID), D. D., LL. D., b. at Kingston, N. Y., Jan. 17, 1834, grad. at Wesleyan Univ. in 1854; taught math. in Amenia Sem., N. Y. 1854-55, and was its prin. 1856; entered the Meth. Epis. ministry, and has held important pastorates, chiefly in New York and Brooklyn, 1859-74; became pres. of Wesleyan Univ., Middletown, Conn., 1875; elected bp. in M. E. Ch. May 12, 1880.

Fossil [Lat. *fodius*, *fossim*, to "dig"]. A F. is the body or any known part or trace of an animal or plant buried by natural causes in the earth. The moulds of shells, the impressions left by the feet of animals in walking, implements of stone or metal and other works of human art which have been accumulated naturally into rubbish-heaps, are thus strictly F. Perhaps the marks of rain, wind, waves, and shrinkage through heat should be included. Early writers believed F. the result of certain laws of nature, and never animated; others suggested they might be relics of the Noachian deluge; but it is now generally conceded that they indicate the nature of the life of numerous successive periods in the earth's hist. from the *Eozoic*, or the dawn of life, to the latest vessel sunk in the chalky depths of the ocean. A few F. have been preserved entire, like the elephants and rhinoceroses found encased in frozen mud and sand in Siberia. The relics are usually *petrified*, or rendered stony through the infiltration of mineral matter. The organic particles are slowly replaced, through chemical forces, by mineral atoms, but arranged in the same manner, so that the characteristic structure of the plant or animal is preserved. Microscopic sections show unmistakably the peculiar internal features of the pine, oak, or palm, though the substance is changed to flint. F. indicate the former existence of organic races now entirely extinct; that, as a whole, each successive period contained more highly organized structures than its predecessor; that tropical forms once flourished in the polar regions; that each epoch was characterized by peculiar groups. Hence, formations are identified in new countries by means of F. C. H. HIRSCHOEK.

Fossil Botany. The study of F. B. presents peculiar difficulties to the paleontologist, from the fragmentary character of most plant-remains, and from the incomplete preservation of their perishable tissues. Of many extinct species of trees, in which the individuals may have been 100 ft. in height, the only traces yet obtained are perhaps a few leaves, of which the outlines and the nervation are imperfectly preserved. All botanists know how variable the leaves of trees are; and since they often find difficulty in discriminating between genera and species when entire individuals are before them, it is not surprising that they have little faith in the deductions made from a few variable and incomplete organs. No doubt the inherent difficulties of the subject have favored hasty generalization, have, in fact, led fossil botanists into many errors, and should inspire a proper caution; yet many thousands of fossil plants have been discovered, and the preservation of some of them is so complete that they afford material for legitimate and important deductions in regard to the hist. of plant-life on the globe. The usual classification of plants is as follows:

- | | |
|-------------|---------------------------------------|
| | Exogens—Oak, Rose, etc. |
| PHÆNOGAMS. | Endogens—Palms, Lilies, Grasses, etc. |
| | Gymnogens—Cycads and Conifers. |
| | Acrogens—Ferns, Lycopods, Equiseta. |
| CRYPTOGAMS. | Anogens—Mosses and Liverworts. |
| | Thallogens—Algae, Fungi, and Lichens. |
| | Protophytes—Diatoms and Desmids. |

On comparing the plants of the groups given in this table they will be found to form a series of which the members increase in complexity of structure from the Proto-phytes to the Angiosperms, and, as in the animal kingdom, the simplest forms are reckoned to be lowest, the most complex highest, in the scale. In the life-hist. of plants, as in that of animals, we also find that the lower forms appear first, their remains being found in all the oldest fossiliferous formations, the higher groups coming in successively in the later geological ages, and the present flora, like the present fauna, being the most highly organized of all. In further comparing the records from which we attempt to make up the past hist. of animals and plants, it should be remembered—1st. That plants have power to assimilate inorganic substances—a power which animals do not possess. Hence, the animal kingdom is dependent on the vegetable for its support, and in fact rests upon it as a base. Plants must therefore have preceded animals on the globe, or at least must have appeared simultaneously with them. 2d. The sea is the mother of continents, and, with the exception of a few fresh-water deposits, all our fossiliferous strata are sediments deposited from the sea. Hence, aquatic

species of animals and plants are far more likely to be preserved than those which do not inhabit the water, and the specimens we have obtained of extinct faunas and floras give but a partial view of the life of each period, from the fact that the aquatic species are much more fully represented than the terrestrial. 3d. In all the later geological ages the flora has been mostly terrestrial, while the fauna has been more largely aquatic. Animals have also, more generally than plants, some hard and imperishable organs, and hence the extinct faunas are more complete than the floras. 4th. The remains of the marine fauna of the globe which are exposed to our inspection are contained in sediments laid down by the sea in successive invasions of the land; and these invasions were followed by periods of retirement—periods of immense duration—during which no record was made except in the depths of the sea-basins, or in other countries where submergence took place at the same time. Hence, for any one country the records of marine life constitute a series of chapters separated from each other by long blank intervals. The genetic relations of the different extinct marine faunas are, therefore, necessarily obscure, and will perhaps never be fully determined, since we have not access to those portions of the record which form the connecting links in the chain of being. On the other hand, the succession of land-plants on any continent may have been unbroken; at least its continuity has been greater than that of the marine fauna accessible to us. As a consequence, we may expect that, though having its peculiar imperfections, to which reference has been made, the record of plant-life contained in the shore-deposits and old lake-beds of our continents, when carefully studied, will throw important light on the great questions of evolution and the origin of species. Extreme care will be necessary, however, in prosecuting this study, to gather as much and as complete material as possible, and to read from it only such lessons as it may clearly and unmistakably teach. The progress of science has been much retarded by hasty generalization from collections of imperfectly preserved fragments of plants. From their lower position in the scale, plants are less distinct with life than animals, and their organs or fragments of organs are much less significant than the better preserved and more characteristic portions of animal structures from which so much has been learned.

The most important facts in regard to the hist. of plant-life on the globe, brought to light by the study of fossil plants, are briefly as follows:

1. The beginnings of plant-life are not known, but the oldest rocks, as the Laurentian of Canada, contain large quantities of graphite, which is generally conceded to have been derived from vegetable tissue.

2. Of the plants found fossil in the different geological formations, the oldest are simplest in their structure and lowest in the scale, while in the later formations higher and still higher forms come in, and vegetation approaches more and more closely to that of the present day. The earliest known fossil plants are contained in the Lower Silurian rocks, and consist of sea-weeds. The impressions called *Eophyton* in the Cambrian of the Old World, and supposed to be the remains of land-plants, are now considered as either the trails of floating objects or the remains of sea-weeds. The fern-like figure discovered in the Lower Silurian slates of Angers, Fr., and named *Eopteris Moricrei* by Count Saporta, has proved to be dendritic crystallizations of pyrites infiltrated into the cleavage planes of the slate. The so called land plants found in the Lower Silurian rocks of Cin., O., require careful re-examination before they can be accepted as such.

3. Unmistakable land-plants occur sparingly in the Upper Silurian, and abundantly in the Devonian. They belong to the acrogens and gymnosperms, and are ferns, lycopods, equiset, conifers, and cycads. This vegetation is further expanded and culminates in the Carboniferous.

4. In the Mesozoic rocks the cycads and conifers are abundant, and give character to the vegetation.

5. In the Cretaceous the angiosperms and palms appear in large numbers, seemingly with abruptness, but the pioneers of these groups will probably be found at a lower horizon.

6. In the Tertiary rocks the angiosperms predominate, and the first living species appear, while the grasses make their advent in company with the great mammalian fauna, of which so large a part depended on them for subsistence.

7. The Tertiary flora of N. Amer. was certainly richer in arborescent forms than that of the present day, the forests including a larger number of species, and those of greater average dimensions. The most splendid trees of our living forest, such as the gigantic sequoias of Cal., the tulip tree, the magnolias, the sweet gum, the deciduous cypress, and the planes, are surviving members of the Tertiary forests, in which they were associated with many allied species equally imposing that are now extinct.

8. The herbaceous plants of former times were so perishable that few are preserved, and we have a very imperfect view of the herbaceous flora of any age but our own.

9. Flowers of plants serving chiefly to attract insects have been proportioned in number and size to the insect fauna; and we are taught by the great number of flowerless plants preserved in the older formations, with the rarity of phænogams before the Cretaceous, that the vegetation of earlier ages was sombre in aspect and less attractive than that of the present day, and that insects were few.

10. The plants which contribute most to the subsistence of man—the cereals, edible fruits, etc.—are of modern date, had no existence before the Tertiary, and are more abundant now than ever before.

11. The well marked progress of plant-life from the simple to the complex brought out by the study of F. B. affords support to a theory of evolution, but the exception to the gen. rule—viz. the late appearance of fungi, lichens, mosses, and hepatics, the absence of connecting links to show the transmutation of the earlier into the later forms, and the

absence of evidence as to the method in which the progress was effected—leaves Darwin's theory of the survival of the fittest and modification by descent to be established from other proofs.

J. S. NEWBERRY.

Fossil Fishes. Like most other aquatic animals, fishes at death are often buried in the sediments which accumulate at the bottom of the water in which they live. Here their remains are almost beyond the reach of change, and are indefinitely preserved. Hence, like mollusks, radiates, and crustaceans, fishes are frequently found in the stratified rocks, which are consolidated sediments that in former ages accumulated at the bottom of salt or fresh water. Already many hundred species of F. F. have been obtained from the strata of the different geological formations, and they constitute an exceedingly interesting and important element in the life-hist. of the globe. The study of F. F. has only recently been taken up, our knowledge of them is yet very imperfect, and every yr. sees some important additions made to it. The conclusions deduced from it are therefore liable to be considerably modified by future discovery. The knowledge we have gained on this subject may be briefly summarized as follows:

1st. Fishes constitute the lowest group of vertebrate animals, and they are the first of vertebrates to make their appearance in geological hist.

2d. The earliest traces of fishes are found in the Upper Silurian rocks of the Old World, and, according to our present knowledge, in the Devonian strata of Amer.

3d. The oldest fishes known were of small size and few in number as compared with the associated forms of life. They belong to 2 groups—viz. the Elasmobranchs (sharks, etc.) and the Cephalaspids or buckler-headed fishes, a group long since extinct.

4th. The seas of the Devonian age were well stocked with fishes, some of which attained a size scarcely inferior to the largest now living. They belonged to the sub-classes of the Elasmobranchs, Placoderms, and Ganoids. In consequence of the abundance of fishes found in the Devonian rocks, this chapter in the life-hist. of the globe has been called the *Age of Fishes*.

5th. In the Carboniferous age fishes were numerous and varied in structure, but they were no longer the monarchs of the animal world, as the sceptre here passes from them to the amphibians, into which they pass by insensible gradations. In the open seas of the Carboniferous age sharks existed in large number and attained great size, the great Placoderms and Ganoids of the Devonian age, to which the Elasmobranchs had been subordinate, having mostly disappeared. In the rivers, lakes, and bays of the Carboniferous continents numerous Ganoids, large and small, existed.

6th. In the Trias the fishes were altogether subordinated to the amphibians, but from the nature of the Triassic deposits we have a very imperfect view of the fish-life of the period. The rivers, lakes, and bays were, as we know, inhabited by shoals of small Ganoids, for we find their remains in the lagoon and estuary deposits of Richmond, Va., New Jersey, the Conn. valley, etc.

7th. The fishes of the Jurassic were sharks and Ganoids, and were very numerous. The sharks were mostly Cestractoids, allied to the Pt. Jackson shark; the Ganoids had rhomboidal scales, and tails but slightly vertebrate.

8th. The Cretaceous age is marked in the hist. of fishes by the appearance of the great sub-class of the Teleosts, or true bony fishes, such as the salmon, pike, etc. They constitute the majority of the fishes of the present day, and are generally placed at the summit of the class of fishes. In these we find the vertebral column bony throughout, and tail equally lobed.

9th. In the Tertiary age the Teleosts gradually superseded the Ganoids, while the sharks attained dimensions unknown before or since, the largest having attained a length of 50 to 60 ft., with cutting teeth as large as a man's hand.

10th. In the present age the Teleosts have almost entirely replaced the Ganoids, and have become the prevailing type of fish-life. The Ganoids, if we exclude from them the Dipnoi, are now reduced to 7 genera—viz. *Acipenser*, *Lepidosteus*, *Amia*, *Scaphiorhynchus*, *Polyodon*, *Calamichthys*, and *Polypterus*; of these, the first is common to all parts of the N. hemisphere, the succeeding 4 are exclusively N. Amer., while the last 2 are Afr. If we accept Dr. Gunther's classification, and unite Dipnoi with Ganoids, we must add 3 more to the list of living genera—viz. *Protopterus*, *Lepidosiren*, and *Ceratodus*—the 3 species which represent these inhabit, one S. Amer., one Afr., and one Australia. J. S. NEWBERRY.

Fossil Footprints, or Ich-nites, the impressions left by the feet of animals in mud, which afterward became hardened into stone. In Amer. are the crustacean impressions of Canada of the Cambrian age; reptilian tracks in the Pa. Carboniferous; crustacea and worms in the Clinton group in N. Y., and others. The best known are 153 species of Ich-nites described in the Mass. geological reports. The most notable are those in the Conn. Valley, which have been grouped (but without sufficient reason) as follows: 1 marsupial; 17 thick-toed birds; 17 narrow-toed birds (?); 21 ornithic reptiles, the *Dinosaur* of Eng. writers, and the *Heteropods*; 25 reptiles and amphibia; 17 batrachians; 6 chelonians; 2 fish; 24 insects; 21 larval and lower articulata, and at least 2 mollusca. This classification is, however, merely speculative. In the Hitchcock Ich-nological Museum at Amherst, Mass., are over 20,000 ich-nites. It was founded by Pres. E. Hitchcock, and belongs to Amherst Coll. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. C. H. Hitchcock.]

Fossil Forests. Petrified forests are frequently referred to in the notes of travellers taken in different countries, but it is more than doubtful whether any of the collections of petrified tree-trunks really deserve the name applied to them, as they generally, perhaps universally, consist of trees which have been buried in earth or rock, then silicified, and subsequently exposed by the washing away of the material which once surrounded them. The most cele-

brated of the F. F. of which we have any record are those of Egypt near Cairo, of Nubia, of Silesia, and of the island of Antigua in the W. I. Other accumulations of silicified wood are known to occur in the interior of Chili, in New Zealand, and in Abyssinia. It is also true that in the interior of our own continent, in Or., Nev., and Ari., as great and remarkable collections of silicified tree-trunks exist as any found in other parts of the world. On the banks of the Little Col., in Ari., for example, not less than 1000 cords of silicified wood may be seen piled up in one locality. Here we find trunks, of all sizes up to 6 ft. in diameter, most perfectly and beautifully preserved. Sometimes they are simply replaced by white silica, which shows the woody structure as distinctly as it could have been seen in the living tree; in other cases the trunks are now masses of solid jasper, looking like huge sticks of red sealing-wax; in other cases still, the wood is opalized or agatized, or filled with chalcedony or crystallized quartz, stained with the most brilliant colors. It is probable that thermal waters have had much to do with the silicification of the tree-trunks in the localities where they are found in great numbers. In our own country we know that volcanic phenomena have been displayed on a grand scale throughout all the region where fossil wood is most abundant, and it is also a dist. in which thermal springs carrying large quantities of silica are still numerous, and are now displaying their petrifying powers. J. S. NEWBERRY.

Fossil Fruits. See FOSSIL BOTANY.

Foster (ABIEL), b. at Andover, Mass., Aug. 8, 1735, grad. at Harvard in 1756; was pastor of a Congl. ch., Canterbury, N. H., 1761-79; was sent in 1780, and often afterward, to the legislature; M. C. 1783-84, 1789-91, and 1795-1803. In 1784 became a judge, and afterward chief-justice, of the common pleas court of N. H. D. Feb. 6, 1806.

Foster (CHARLES), b. in Seneca tp., Seneca co., O., Apr. 12, 1828, ed. in the common schools and acad. of Norway, O.; engaged early in life with remarkable success in extensive business, to which he devoted himself till 42 yrs. of age, contributing greatly to the growth of Fostoria, O., where his prin. interests were located, and where he now (1882) resides; elected to Cong. from the 9th O. dist. in 1870, 1872, 1874, and 1876, each time as a Rep. in a Dem. dist., and was only defeated in 1878 by a change in the boundary of the dist. While in Cong. he occupied prominent positions upon the committees of ways and means and of appropriations, and was repeatedly selected for important special services. He was gov. of O. 1880-84.

Foster (DWIGHT), b. at Brookfield, Mass., Dec. 7, 1757, grad. at R. I. Coll. in 1774; became a lawyer at Brookfield; was a prominent legislator of Mass., and judge, afterward chief-justice, of the court of common pleas; M. C. 1793-99, and U. S. Senator 1800-03. D. Apr. 29, 1823. Was a son of Judge Jedediah Foster (1726-79).

Foster (GEORGE WHITEFIELD), b. at Swanton, Vt., May 9, 1794; studied law, and was admitted to the bar, attaining prominence in his profession, and for 20 yrs. held a prominent place in the affairs of his State; was State's attorney, com. of the Vt. Central R. R., and repeatedly chosen to the legislature and State senate; though without political ambition, he had been selected for nomination to the U. S. Senate just previous to his death. D. Oct. 12, 1848.

Foster (JEDEDIAH), a judge, b. at Andover, Mass., Oct. 10, 1726, grad. at Harvard Univ. 1744; practised law at Brookfield, Mass.; was in the Worcester co. convention Aug. 1774, and delegate to the Provincial Cong. 1774-75; he was negatived as a councillor by the Eng. gen. Gage in 1774, but re-elected in 1775; was judge of the superior court in 1776, then judge of probate, and a justice of the court of common pleas of Worcester co., Mass.; was a member of convention which formed const. of Mass. D. Oct. 17, 1779.

Foster (JOHN), Eng. essayist and moralist, b. at Halifax Sept. 17, 1770. He was a weaver in his youth, ed. at Bristol Coll. (Bap.); preached to Bap. congregations at Chichester (1797), at Downend, near Bristol, and at Frome. In 1817 resigned the ministerial office and devoted himself thenceforth to lit., having begun to write for the *Eclectic Review* in 1806. Wrote *Essays in a Series of Letters to a Friend and The Evils of Popular Ignorance*. D. Oct. 15, 1843.

Foster (JOHN GRAY), b. in Whitefield, Coos co., N. H., May 27, 1823, grad. at W. Pt. July 1, 1846, and entered the U. S. A. as second lieut. of engineers; served in the war with Mex. 1847-48; was assistant prof. of engineering at W. Pt. 1855-57; engineer in construction of Fts. Sumter and Moultrie, S. C., and works in N. C. 1857-61. On the outbreak of the c. war he was chief engineer of the fortifications in Charleston harbor (rank of capt.), being at Ft. Sumter during its bombardment and at its surrender; appointed brig.-gen. of volunteers Oct. 1861, and commanded brigade on Gen. Burnside's expedition to N. C., and maj.-gen. July 1862, and assigned to command of dept. of N. C. (18th army corps); conducted various expeditions, and engaged in the battle of Kinston, siege of Washington, attack on Newberne, N. C., etc.; raised to command of dept. of Va. and N. C. July 1863, and that of the army and dept. of O. Dec. 1863; dept. of the S. May 1864, and of Fla. 1865; mustered out of volunteer service Sept. 1866. Returning to duty with his corps, he was placed in charge of works for the preservation and improvement of Boston harbor, and construction of defences of Portsmouth harbor, N. H. His submarine engineering operations in removing rocks from the channel of entrance to Boston harbor were conducted with much ability and professional skill. For services during the c. war he received all the brevet from major to that of maj.-gen. U. S. A. Author of *Notes on Submarine Blasting in Boston Harbor*; also article *BLASTING IN J.'s Univ. Cyc.* D. Sept. 2, 1874.

Foster (COL. JOHN WELLS), LL.D., b. at Brimfield, Mass., in 1815; studied at Wesleyan Univ., Middletown, Conn., and in 1836 removed to Zanesville, O., where he became a lawyer. He assisted in the O. geological survey of 1837, and wrote a report of his labors; went in 1845 to the copper-regions of Lake Superior, and with Prof. J. D. Whitney made a survey

of that region. Removed to Mass., and then (1858) to Chicago. Wrote *The Miss. Valley and Pre-historic Races of the U. S.*, and was pres. of the Association for the Advancement of Science. D. June 27, 1873.

Foster (LA FAYETTE SABINE), LL.D., b. Nov. 22, 1806, in Franklin, Conn., was the son of Capt. Daniel Foster; grad. at Brown Univ. 1828, and was admitted to the bar in 1831. Repeatedly elected to the Gen. Assembly of Conn. from Norwich, he was speaker of the house of reps. in 1847, 1848, and 1854; mayor of Norwich in 1851 and in 1852. In 1854 was elected U. S. Senator for 6 yrs., and at the close of that term was re-elected for 6 yrs. longer. When Mr. Johnson, the V.-P., became Pres. by the death of Mr. Lincoln, on Apr. 14, 1865, Mr. F. became acting V.-P. of the U. S., and held that position for 2 yrs. In 1871 was elected by the legislature a judge of the supreme court of errors and the superior court of Conn. D. Sept. 19, 1880.

Foster (NATHANIEL GREENE), a lawyer of Ga., b. in Greene co. in that State, Aug. 25, 1809, grad. at the State Univ. in 1830; admitted to the bar in 1831; commanded a co. in the Seminole war in 1836; was then solicitor-gen. of Ockmulgee circuit, 5 yrs. member of the State senate, and M. C. 1857-59. His residence was Madison, Ga. He became a Bap. minister. D. 1871.

Foster (RANDOLPH S.), D. D., b. at Williamsburg, O., Feb. 22, 1820; studied at Augusta Coll., Ky., and in 1837 entered the Meth. Epis. ministry; held important stations in the W. States; was transferred in 1850 to the N. Y. Conference; chosen in 1856 pres. of N. W. Univ.; in 1858 became a prof. in Drew Theological Sem., and in 1872 was elected a bp. in his Ch. Residence, Cin., O. Author of *Objections to Calvinism*, also of *Theism*.

Foster (STEPHEN), b. at Andover, Mass., Feb. 15, 1798, grad. at Dartmouth Coll. 1821, and at Andover (Mass.) Theological Sem. 1824; ordained in Oct. 1824, he was minister at Greenville and Knoxville, Tenn.; then prof. of Lat. and Gr., and afterward pres. of the Coll. of E. Tenn. at Knoxville. D. June 11, 1855.

Foster (THOMAS F.), a lawyer and politician of Ga., b. in Greensborough, Ga., Nov. 23, 1790, grad. at the State Univ. in 1812; studied law at Litchfield, Conn., and was admitted to the bar in his native town in 1816, where he continued to reside until his death in 1847. He was for many yrs. a distinguished member of the State legislature, and was M. C. 1829-35 and 1841-43.

Fostoria, R. R. junc., Seneca co., O., 13 m. W. of Tiffin. Pop. 1870, 1733; 1880, 3569.

Foucault, foo-ko' (JEAN BERNARD LÉON), Fr. natural philos., b. at Paris Sept. 18, 1819; in 1844 invented an apparatus by which electric light is used in optical experiments, microscopic researches, etc. He demonstrated the earth's rotary motion on its axis by the pendulum and gyroscope in 1851, was physicist to the Imperial Observatory (1854), and a member of the Fr. Inst. In 1855 obtained the Copley medal of the Royal Society for measuring the velocity of light. D. Feb. 13, 1868.

Fouché, foo-shā' (JOSEPH), b. at La Martinière, near Nantes, May 29, 1763; studied theol., but did not take holy orders. After living for some yrs. as a teacher of philos., he became an advocate, married, founded a republican club in Nantes, and was elected a member of the National Convention in 1792. As such, he voted for the death and immediate execution of Louis XVI., and followed Collet d'Herbois to Lyons. On his return he was chosen pres. of the Jacobin Club, but after the execution of Robespierre (July 28, 1794), he gave up his career as a furious revolutionist. He was nevertheless driven out of the Convention as a terrorist Aug. 9, 1795, and even for some time held in arrest. After being restored to liberty by the gen. amnesty of Oct. 26, 1796, he was sent as ambassador, first to the Cisalpine Republic, and then to Hol., whence he was called to Paris, and made minister of police July 31, 1799. In this position he was of great service to Nap., and though he was several times dismissed, he was made duke of Otranto and received a large pension. Nap. seems to have feared him. He tried to keep him away from Fr. even when he was compelled to use him. In 1813 he made him gov. of Illyria, and sent him to it to watch Murat. Nevertheless, F. became minister of police on Nap.'s return from Elba, and he played a very conspicuous part in all the proceedings which led to the final abdication of the emp., the formation of a provisional govt., and the re-establishment of the Bourbons. He remained in office under Louis XVIII., but his position between the liberal and the ultra-reactionary party was untenable. On Sept. 19, 1815, he went to Dresden as ambassador. The law of Jan. 16, 1816, however, which exiled all who had voted for the death of Louis XVI. affected also him, and deprived him of his office. During the remainder of his life he resided in Linz, and in Trieste, where he d. Dec. 25, 1820. CLEMENS PETERSEN.

Fould, foo (ACHILLE), Fr. statesman, b. at Paris Nov. 17, 1800. Prince-Pres. Louis Nap. made him minister of finance Oct. 31, 1849, but he retired Oct. 1851, filling the position, however, for a 2d period, from Dec. 2, 1851, to Jan. 25, 1852; was senator, minister of state, and of the house of the emp. in 1852; then a third time finance minister, Nov. 12, 1861, to Jan. 1, 1867. He was of Heb. stock. D. Oct. 5, 1867.

Foul in the Foot, a contagious disease of sheep, characterized by ulcers and granulations between the toes. Caustic and stimulant applications, such as oil of turpentine, with tarry applications, are generally curative. The cause and nature of this disease are not well understood.

Foundation [Lat. *fundatio*; Fr. *fondation*], that upon which the main structure rests. The body of the foundation consists of the main part of those masses of masonry or timbers of which it is formed. The bed of the foundation is the prepared surface on which the F. rests. When the F. is made upon rock the surface should be properly prepared. The rock should be tested as to its soundness and its supporting power, and if it is to be exposed to the elements the effect of such action should be determined. If it is sound, it

should be so dressed that its surface will be normal to the line of pressure. As the pressure in most cases is vertical, the surfaces should generally be horizontal. Where it costs too much to reduce the whole to a single horizontal surface, it may be cut into steps. If the rock is unsound, being loose or porous, the upper part should be removed until suitable rock is reached. If the rock is very porous, it may be filled with cement to form the bed of the F. Large cavities may be arched if necessary. When the F. is composed of masonry it is desirable to have the bed horizontal over the whole surface; and if the soil is yielding, it must be confined so as not to spread laterally (Fig. 1).

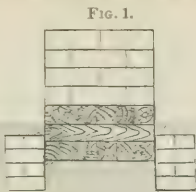


Fig. 1.

When a heavy structure rests upon isolated pillars or columns, and the soil beneath is compressible, the bases of the columns may be connected by inverted arches, as shown in Fig. 2, so as to distribute the pressure over the whole surface, and prevent the soil from rising between the piers. The use of wooden piles is one of the most common elements in the preparation of the F. in marshy soils. A grillage is often combined with the use of piles. The piles may be as long as they can cut; and may be driven farther by placing other piles on the tops of them and the driving continued. The second piece is called a punch. Formerly iron shoes (Fig. 3) were placed on the lower end of the piles to assist in penetrating the soil, but experiment has shown that this is a needless expense, as they will drive quite as well if simply sharpened, and in many cases they can be driven nearly as easily if the end is square. The larger surfaces sink more in proportion to their area than smaller ones. This is probably because the lateral surface is less in proportion. The friction on the lateral surfaces is an important element.

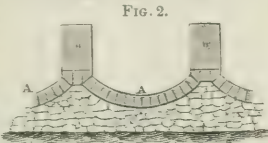


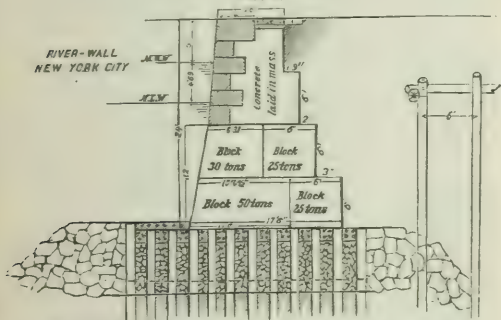
Fig. 2.

Fig. 3.



The system of water-fronts and piers which has been adopted for New York city is intended to be permanent. (Fig. 4.) Where rock cannot be reached, piles are driven as close to each other as possible, and sawed off at a

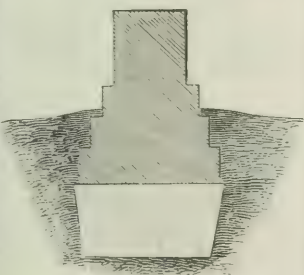
Fig. 4.



Foundations of water-fronts on North River, New York.

uniform level, about 15 ft. below low water. A grillage is made upon these, and the masonry built upon it. The lower part of the masonry is made of large blocks of cement (artificial stone), composed at first, by vol. of 1 part of Portland cement, 2 of sand, and 5 of stone (Bergen trap). Afterward they were composed of 1 part of cement, 2½ of sand, and 6 of broken stone. The upper part of the wall is faced with granite, backed with concrete. The piles are protected in many cases, both on the land and water sides, by masses of rubble stone. Where a firm substratum cannot be reached screw-piles have been used with good success.

Fig. 5.

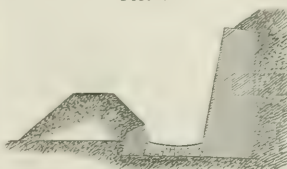


The blades are made broad, so as to give a large area for support, and the end of the pile is pointed to aid the penetration. They are forced into the soil by turning them like an auger. Piles having a disk attached to their lower ends for the purpose of giving greater supporting area have been successfully used in India. The towers of the suspension bridge over the O. at Cin. are 242 ft. high above the bed of the F., and the bed of the F. on the Cin. side is 12 ft. below low water. The F. was made upon a bed of compact gravel, although limestone rock was only 12 ft. deeper. Upon the gravel was laid a timber platform 110 ft. long by 75 ft. wide, composed of 12 courses next to the river, and

stepped off on the land side to 8 courses. The timber was composed of pine, oak, maple, hickory, burrwood, elm, beech. The length of the logs varied from 25 to 40 ft. They were flattened on 2 sides, so as to make a uniform thickness of 12 inches, the other sides being left rough. The courses crossed at right angles, and each stick was secured by rag-bolts 1 inch in diameter. All the spaces between the timbers were filled with clean gravel and broken stone. The pressure upon the timber F. for the loaded bridge is, according to computation, less than 55 lbs. per square inch.

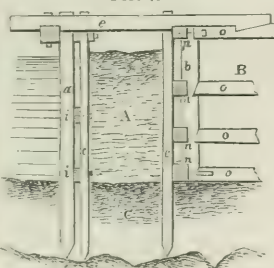
In some cases sand answers a good purpose in forming the bed of the F. It readily adjusts itself to the inequalities of surface and of pressure, and causes the pressure to be uniform over the whole surface. If there is unequal settling, the sand easily adjusts itself to the new bed. It should be confined laterally, and should be moistened before the masonry is placed upon it. Yielding soils may be prevented from rising to such an extent as to damage the structure by loading the soil for some distance outside of the F. It is nearly equivalent to making a very broad F. The soil may be covered with a grillage and loaded with soil or masonry, or an inverted arch may be used, as in Fig. 6. In making foundations under water a coffer-dam is often used for excluding the water during

Fig. 6.



the progress of the work. To construct it a row of piles is first driven, and their tops are connected so as to prevent them from spreading from the inward pressure, and braced

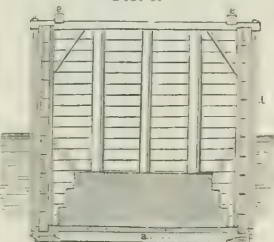
Fig. 7.



Section of coffer-dam: a, main exterior piles; b, strong square beams, corresponding to a, on which the wales n, n, are notched and bolted; c, sheeting-piles; d, cross-pieces; e, horizontal shores buttressing opposite sides of dam; A, puddling; B, interior space; C, mud, etc.

to prevent their being crowded inward by the pressure of the water from the outside. Other piles or planks, called sheeting-piles, are driven firmly into the soil as close to each other as possible, and their upper ends secured to the frame of piles previously formed. Another row of sheeting-piles is then formed, so as to leave a space of from 5 to 15 or 20 ft. between them, depending upon the depth of the water and the quality of the puddling material. The space between the 2 rows of sheeting-piles is then filled with clay, or a mixture of clay and sand, put down in layers and thoroughly puddled. One of the most serious difficulties to be contended with is the leakage underneath the dam. It may not be possible in loose soils to stop this entirely, but in all cases the main piles, and especially the sheeting-piles, should be driven to a firm soil, and all the loose soil should be removed before the puddling is put in. When the water is deep, in order to give additional security a row of piles may be placed entirely outside the dam, and the space filled in with puddling.

Fig. 8.



Cross-Section and Interior View of a Caisson.

A caisson, or water-tight box is sometimes used. Where a coffer-dam cannot be constructed, and it is considered safe to have a timber bed rest directly on the soil in the bed of the stream, it may properly be used. The bottom of the caisson should be composed of strong timbers, which should be sufficiently numerous to support the structure which is to be placed upon it. If the soil is yielding, it may be best to make the whole bottom of planks, forming a grillage. The last courses must be water-tight. The sides are so constructed that they may be easily removed after the F. is completed, but when the box is completed it should be nearly or quite water-tight. It is floated to the place where the F. is to be made, and the masonry is begun on the inside, and built up in the same manner as if on a solid bottom. When the caisson is sufficiently loaded by the masonry, it will sink to the bottom. If it does not rest evenly on the bottom, it may be desirable to raise it again and remove the obstructions underneath. To facilitate this process, it is advisable to have some side-gates, so as to let water in and cause it to settle before it is fully loaded; in which case the gates may afterward be closed and the water pumped out, and the box again floated. After the F. is carried above the surface of the water the sides may be removed. The F. of the Victoria tubular bridge in the St. Lawrence River at Montreal furnish an example in which both coffer-dams and caissons were used in making a F. for a pier. The stream is quite rapid and deep, and the bottom was covered with large boulders, so that it appeared quite difficult to secure a good bed for the F. A caisson, was brought to the proper place and sunk and

securely anchored. At the corners were strong posts. Holes were made through them, and the holes continued by drilling into the rock, and a strong 2-inch iron bar put in it. A coffer dam was used in making the foundation. On E. Bengal R. R., where it crosses the Goral River, piers were constructed of 2 cylinders, forming 2 large piers, which were 37 ft. 6 inches apart. The first cylinder was sunk 80 ft. below low water, or 40 ft. into the bed of the river; but as the scour was very deep the others were sunk 98 ft. below low water. The earth within the cylinder was raised by a flow of water. C is a tube reaching down to the earth, B the level of the water in the stream, and A the height of the water in the cylinder. The depth of E below A was a head for producing the flow. The earth was stirred by a rotating tool E. A novel but successful process, called "pneumatic," has been largely used of late yrs. for sinking large cylinders and inverted caissons in deep water. There are 2 gen. methods—viz. the "vacuum" and the "plenum." The vacuum process consists in exhausting the air from the cylinder, thus using the pressure of the atmosphere upon the top to force it down. Exhausting the air causes the water to flow into the cylinder past the lower edge, thus loosening the soil and causing the cylinder to sink rapidly. By reversing the process the pressure the water may be forced out, and then by suddenly relieving the pressure the pile will sink again. The plenum process consists in forcing air into the cylinder or vessel, so as to exclude the water, and forcing the pile down by a load which is placed upon it. A cage or air-lock, as hereafter described, is connected with the main vessel in a suitable way, and so constructed that men may pass through it into the main vessel. This process enables the workmen to remove any obstructions. It also enables the engineer to have complete control of the sinking. The gen. principles involved in the plenum process are shown in Fig. 10. A A is a large iron cylinder which is represented as already sunk some depth into the earth. BB is a tube through which the compressed air passes into the cylinder. E is an air-lock, or small compartment, which has 2 doors, both opening inward. When the cylinder A A is filled with compressed air, it will keep the door F closed, and a free passage may be had through the door C. If F is opened and C closed, the pressure of the air inside will keep the latter closed, and a free passage may be had through the former. The main object of filling the lower part of the cylinder with compressed air is to force the water out, and keep it out, so that men may work inside the cylinder. To do this it is only necessary to make the pressure of the compressed air per square inch equal to that of the water outside. When this is done the upward pressure of the air may prevent the pile from sinking, and it will be necessary to place a load upon it to force it down. In many cases, as will appear hereafter, permanent masonry is built upon the column while it is being sunk. To enter the tube, the lower door F of the air-lock is closed, while the lower part of the cylinder is filled with compressed air, and by means of a stop-cock or other suitable device the compressed air from the upper part is permitted to flow out; and when the internal air is reduced to the atmospheric pressure, the door C is easily opened and the workmen may pass in. After they have passed in the door is closed, and by opening another stop-cock the air is allowed to flow from the lower part of the cylinder A into the space E; and as soon as equilibrium is restored, the door F is easily opened, and workmen may then pass freely into the lower part and proceed with their work. The excavated material may be raised in any suitable way into the upper chamber E, and then by closing the door F and opening the outer passage C, it may be discharged. When the pneumatic cylinder cannot be extended down to

Fig. 9.

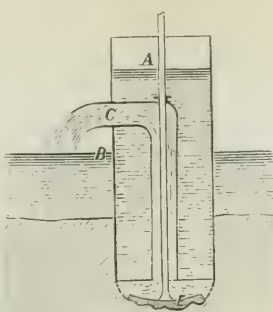
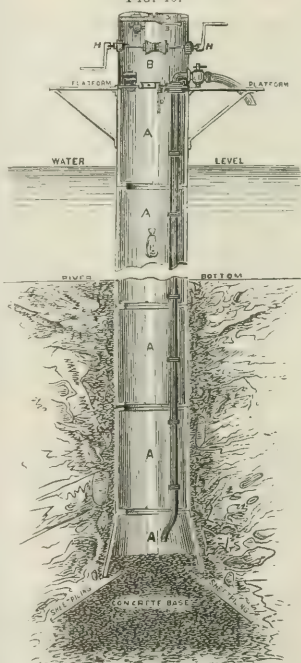


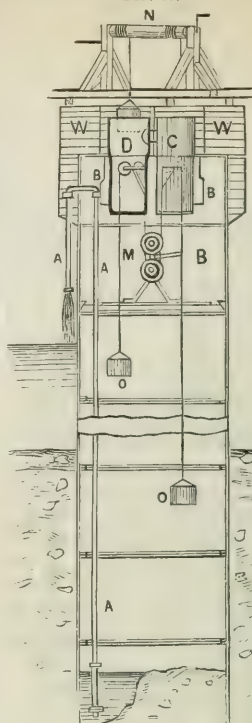
Fig. 10.



rock, or even to unyielding soil, its supporting power may be greatly increased by enlarging the foundation at its base. This is done by removing the soil from under the edge of the cylinder and filling the space with concrete.

It has been ascertained that concrete will harden very slowly under great pressure, and it has been questioned whether it will ever become very hard. The hardening has been greatly facilitated in such cases by using a porous brick in a dry state, instead of stone, as was done at Szegedin, Hungary. In some cases in Europe double airlocks have been used, such as at the Szegedin bridge over the river Theiss, Hungary (Fig. 11), for the purpose of saving time. In this bridge each pier was composed of 2 piles or columns filled with beton, and each supports one track of the R. R. The soil was alluvial, in alternate layers of sand and compact clay for an indefinite depth. The piles were sunk about 30 ft. below the surface of the bed, or 40 ft. below the surface at low water. Twelve piles were driven into the bottom of the columns to the depth of 20 ft. below the bottom. To provide against a scour, sheeting-piles were driven about 2 ft. from the pier and completely around it, and the space filled with concrete; and in addition a large quantity of stones was put outside the piles, extending outward about 10 ft. from the piles. The concrete for this structure was mixed by mechanical means. A wooden cylinder about 4 ft. in diameter, which was firmly hooped on the outside and lined with sheet iron on the inside, was supported on an axis which was inclined $\frac{1}{15}$ th to the horizon, and made to revolve by means of a belt from a steam-engine, making from 15 to 20 revolutions per minute. The cylinder was fed through a hopper at the upper end, and its contents discharged at the lower end thoroughly mixed. The centre pier of Saltash Railway, Eng., was sunk to a greater depth by the plenum process than any pier which had been previously sunk by this method. The two river-spans are each 455 ft. The centre pier (see Fig. 12) carries $\frac{1}{2}$ of each of these spans. It consists of a column or circular pillar of solid masonry 35 ft. in diameter, and 96 ft. high from the rock on which it rests to above high water. Upon this are placed 4 octagonal columns of cast iron 10 ft. in diameter, carried up to a height of 100 ft. above high-water mark. The pressure on the bottom of the pier is about 10 tons per square ft., including the load upon the bridge. The character of the bed of the stream and the slope of the rocky bottom were determined by means of 175 borings made through a cylinder which was 6 ft. in diameter and 85 ft. long. The cylinder was used

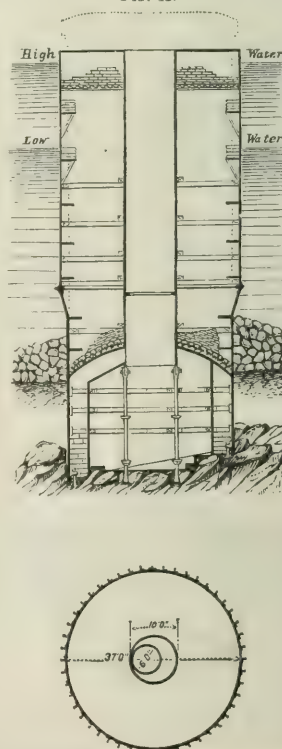
Fig. 11.



LONGITUDINAL SECTION OF PILE A, bell or working-chamber B, and airlocks C, D, used on the bridge at Szegedin over the river Theiss, Hungary: A, water discharge-pipe; B, equilibrium tubes of air-lock; C, elevation of air-lock; D, longitudinal section of air-lock; E, hoisting-gear for air-lock; F, counterpoise to compressed air.

wooden cylinder about 4 ft. in diameter, which was firmly

Fig. 12.



was 6 ft. in diameter and 85 ft. long. The cylinder was used

on account of the great velocity of the stream and the rise and fall due to the tides. It was slung between 2 gun-brigs, and when in the desired place it was sunk a few feet into the mud, and kept in position while the borings were made. In this way it was found that the surface of the rock where the pier was to be established was very irregular, but had a gen. slope, as is shown in Fig. 12. A wrought-iron cylinder of boiler plates, 37 ft. in diameter and 90 ft. in length and open at the bottom, was constructed on the shore, floated to the place where the pier was to be made, and sunk through the mud to the rock. It was with some difficulty that the cylinder was brought to a full bearing and to an upright position. Within the large cylinder was a 10-ft. cylinder, placed concentrically with the former, and the 2 thoroughly connected by means of tie-rods; and within this was a 6-ft. cylinder. The lower end of the cylinder was provided with an annular space about 4 ft. wide and divided into 13 air-tight compartments which were connected with the 6-ft. air-cylinder extending through and to the top of the 10-ft. cylinder. The lower compartments were covered with a dome-like partition at about the height of the mud. It was supposed that the mud would prevent the inflow of water, but it was found necessary to resort to air-pressure to keep it out. The water and mud were first removed from the air-space, and a ring of granite ashlars masonry 4 ft. thick and about 7 ft. high was put in place.

In attempting to pump out the water and mud from beneath the dome, it became evident that there was a leak of such magnitude that it was necessary to use air-pressure again. The rock was finally reached, and dressed to a level surface. Before the air-pressure was applied, about 750 tons of ballast was put upon the cylinder to prevent its floating, part of which was placed above the dome, and a part on the upper deck, as shown in the figure; and to add to the security in case there was a sudden inflow of water, the cylinder was anchored vertically to the rock by means of tie-rods and lewis bolts. The masonry was then built up to the springing line of the dome, after which the dome was cut away, as well as the lower part of the 10-ft. cylinder, and the masonry was carried upward, having a diameter about 2 ft. less than that of the upper part of the cylinder. When the masonry reached the height of the surface of the water, the upper section of the cylinder was unbolted from the lower, and the upper portion was removed, leaving the lower portion undisturbed.

Pneumatic Caissons.—The essential difference between the pneumatic pile and a pneumatic caisson is one of degree rather than one of quality, the latter being sufficiently large to envelop the entire masonry of the pier. In ordinary cases the pier is sunk to the required depth before it is filled with concrete or masonry, but in the caisson the masonry is built upward while the whole pier is being sunk downward, the masonry thus forming the load for forcing the caisson into the soil. The gen. arrangement of the parts is shown in Fig. 13. The lower portion, A, is a large compartment in which the laborers excavate the earth. The outside wall is strong enough to resist the inward pressure of the water and soil. Its lower edge is made comparatively thin, so as to force itself more easily into the soil. The roof is sufficiently strong to support all the masonry which will be put upon it. The air-bells C C contain double air-locks, as before explained. D D are cylindrical passages to form a communication between the air-bells and the lower compartment. The workmen pass up and down the passages D D.

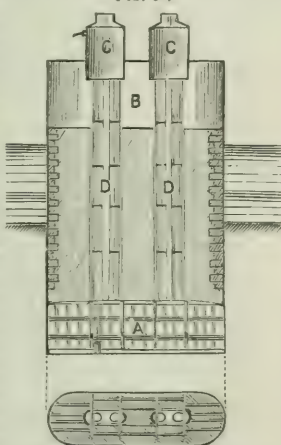
Tay Bridge.—This Eng. bridge, built in 1873, has 89 spans, and is 10,330 ft. from shore to shore. The piers finally used were composed of 2 columns, so joined at the bottom as to form 1 large compartment under the whole pier. At first, single columns were used, and sunk separately, but their bases were so narrow that several overturned while being sunk; but no such difficulty was found after their bases were joined. The base of the lower chamber is made of wrought iron, and is 22 ft. 7 inches long, 10 ft. 6 inches wide, and 3 ft. high. It is surmounted by a conical cast-iron frame 5 ft. high, and forming a flange 2 ft. 6 inches wide, upon which the masonry was built. The body of the cylinders is made of cast iron, $\frac{3}{4}$ of an inch thick, 9 ft. 6 inches in diameter, and in sections about 4 ft. long. These were surmounted with air-locks which had supplementary locks for discharging the material. One set of air-locks was made to answer for all the piers by removing them from one to the other as needed. A space of about 2 inches was left between the masonry and the inside of the cylinder, which was afterward filled with concrete. A cylindrical space of about 4 ft. diameter was left inside, through which the workmen passed from the lower chamber, and through which also the excavated material was raised. After the pier was sunk to a permanent position, the lower chamber was filled with concrete, in the proportion of 1 of sand to 3 of broken stone. Concrete was run in, so as to thoroughly fill all the space about the flanges carrying the masonry, after which the cylindrical passage was filled. The piers were first built up 15 ft. high near

the shore, and the pontoons, which carried a set of girders, floated over them at high tide; and as the tide lowered the girders were left hanging upon brackets which were attached to the piers, and the pontoons were floated away. The piers were then built upward to such a height that the top would be above water when the piers rested upon the bottom. The girders were then connected by the wrought-iron lowering chains to the wrought-iron links near the bottom. The pontoons were then floated under the girders at low tide, and as the tide raised the whole were floated and towed to their permanent position. The pontoons were then anchored, and the piers were gradually lowered by means of hydraulic rams which were placed on the girders. These rams had a stroke of 12 inches. As the lowering proceeded, links which were about 4 ft. long were added. The lowering took place during ebb tide, and as it sunk into the bottom it was carefully watched to see if it retained its vertical position. If it did not, the hydraulic pumps were set to work to bring it into the proper position. As it moved downward it was steadied by chains attached to the last pier which was finished, and extended to the one being sunk, and also by means of two hydraulic telescopic legs.

St. Louis Bridge.—The shifting character of the bed of the Miss. River, and the great depth of the scour, make the establishment of permanent foundations in it very difficult. The rock underlying the river opposite St. Louis dips to the eastward, the depth at the W. abutment being only 13 ft. below extreme low water, while at the E. abutment it is 94 ft., and 136 ft. below high-water mark. There are 2 piers in the body of the stream, which are essentially alike, except that the easterly one is deeper than the other. They were built in a large caisson in which was one large air-compartment in the base, where the workmen excavated the material. This compartment was 9 ft. high, the sides being of $\frac{3}{4}$ -inch plate iron for the larger, and $\frac{5}{8}$ -inch for the smaller pier. Two massive timber beams or piles were built up from the sand for supporting the roof of the chamber. The roof was composed of $\frac{1}{2}$ -inch plate iron. Over this, and running transversely to the timber beams, are 13 iron girders, which are riveted to the roof. The masonry rests upon the girders. The bottom was excavated as evenly as possible all over, so that the timber beams and sides of the caisson would sink evenly. There were openings through the wooden beams, so that communication could be had with all parts of the chamber. The support given by the timbers, the buoyant force of the air, and the friction upon the sides were the only means relied upon to sustain the pier during its gradual descent to the rock. The air-locks were located in the roof of the air-chamber, and communication was had with them through brick wells, thus avoiding the necessity of adding new joints under the locks as the sinking advanced. The sand was forced out by means of a sand-pump placed at the lower end of the tube. The sand-pumps were designed especially for this work by the engineer, Capt. Eads, and were operated by means of a stream of water which was forced through them in the well known way. The E. abutment differs in several of its details from the piers. It is especially noted as being the deepest foundation ever constructed by the pneumatic process. When it touched the rocky bottom it was 110 ft. below the upper surface of the water in the river. The main shaft had 2 air-locks at its lower end, each 8 ft. in diameter, having about 4 times the capacity of those used in the piers. There were also 2 other shafts and air-locks, which were used for additional security. Every precaution was taken to secure the safety of the workmen. Telegraphic communication was established between the top of the masonry in the pier and the large compartment at the base. Previous experience had raised a doubt in the minds of many whether workmen could endure a pressure of over $3\frac{1}{2}$ atmospheres above that of the ordinary atmospheric pressure; but it was found that by making frequent changes, not keeping them in the compressed air for more than 1 hour at a time, they suffered but little inconvenience. But several who remained in several hours under a much less pressure were paralyzed, and a few died from the effects of the confinement.

In all the preceding cases to which we have referred the walls of the caisson which inclosed the masonry were extended upward so as to exclude the water, but in the E. pier and E. abutment they were extended upward only 12 or 15 ft. above the roof of the air-chamber. The sides of the roof of the chamber having been made practically water-tight, it was only necessary to make the shafts water-tight to exclude water from the chamber. This was done by lining them with white pine pieces, which were arranged like the staves of a cask, and were 10 inches thick at the lower end, and gradually diminished to 3 inches at the top. Candles and oil lamps burned much more rapidly in the compressed air than usual, and it was very difficult to extinguish them. It was found, also, that if the clothes of the workmen caught fire, it was difficult to extinguish them, although they were of woollen material. It was therefore thought advisable to inclose the lamps in a very strong glass case or vessel which communicated freely with the external air, and then admit compressed air into the vessel through an air-cock, so that the supply could be limited. A cock in the tube leading to the external air enabled them to prevent the escape of the air while changing a lamp or supplying oil. After the E. pier reached the rock the air-chamber was filled with concrete. In the E. abutment all depressions in the rock were filled with concrete, so as to make an even bearing surface, and it was continued up, so as to prevent the possibility of water ever washing under it; and then the entire space was filled with wet sand nearly up to the roof, and the remaining space was rammed full of concrete. This greatly cheapened the process of filling, and it was supposed to be as good as if it were all concrete. (See *Notes on Foundations*, by GEN. DELAFIELD, U. S. A., and MAHAN'S (*U. Eng.*) [From orig. art. in *J. S. Univ. (Cyc.)*, by PROF. DE VOLSOLN WOOD.]

FIG. 13.



Found'er (*Laminitis*), an inflammation primarily attacking the laminae of the horse's foot. This disease may follow overdriving, exposure to cold when perspiring, overfeeding, or giving food or drink too soon after hard work; long continued driving on pavements or on frozen ground and bad shoeing are fruitful causes. The disease resembles rheumatism in many respects. Like that, its acute form is attended by great fever and pain. A foundered horse can be detected by his mincing gait, by his resting his fore foot upon the toe, by a hot or contracted hoof, and by delicate signs recognized by practised observers.

Found'ling Hospitals, insts. for the reception and support of infants and children that have been abandoned by their parents or guardians. Such insts. are maintained by govt. appropriations or by private or sectarian associations. Children found abandoned are known as foundlings, and the cause of their desertion is in most cases illegitimate birth, though not a few are born in wedlock and are abandoned by parents unable to provide for them. The necessity of providing for such children, and restraining infanticide, long since led to the establishment of F. insts. by most civilized nations. As early as the 6th century a species of F. H. existed at Treves, where a marble basin was located in front of the cathedral, in which parents could deposit children they wished to abandon, the care of such foundlings being given by the bp. to members of the ch. One was established at Milan in 787 by an arch-priest named Datheus, for the object of preventing infanticide. The children received at this inst. were nurtured by hired nurses until the age of 7, when they were discharged as free-born. The Hôtel Dieu of Lyons, founded in 1523, was one of the first F. H. in Fr. where foundlings were not only received, but educated. In Paris in 1563 a F. H. was established by the Ch., and managed by an association of priests. In this children received a careful education, many of the boys being trained for the priesthood. The refusal of this inst. to receive illegitimate children necessarily left those unfortunates to become the victims of misery. Recognizing the necessity of providing for abandoned infants, St. Vincent de Paul, by his eloquent pleadings, collected funds sufficient to establish a new F. H. in 1640, which during his lifetime was managed by a committee of ladies. In 1670 this hospital was converted into a public one by Louis XIV., and subsequently it was enlarged, and received annually about 2000 foundlings, who were chiefly from the provs. After 1789 the Fr. republic assumed the charge of foundlings, and in 1793 the terrorists declared them all to be *enfants de la patrie*. An imperial decree in 1811 continued the arrangement by which F. H. had become govt. institutions, and the foundlings children of the state. It further ordered the establishment of such hospitals in each arrondissement of Fr., the children to be suckled and weaned in the insts., and kept in them until 6 yrs. of age, when they were to be intrusted to respectable persons, who received a stipend for their support and education. This stipend is yearly reduced until the children attain the age of 12, when the able-bodied boys are placed at the disposal of the minister of the marine, while delicate ones are provided with suitable work. All foundlings are the property of the state, and if not taken into public service at the age of 12 are apprenticed. It was not many yrs. before the facilities for the disposal of children afforded by the law produced a great increase in the number of foundlings in Fr. Prior to 1811 the reception of foundlings was public, but by the decree of that yr. each hospital was provided with a turning-box in which the child could secretly be deposited. After 1834 most of the hospitals had suppressed the turning-boxes, from a conviction that the great increase in the number of foundlings since 1811 was due to their use. In 1852, however, M. Ulysse Ladet wrote a series of papers advocating their restoration, but was opposed on the ground that they encouraged parents to abandon their offspring. On the other hand, the statistics of infanticide are decidedly favorable to the turning-boxes. The question of the public or secret reception of abandoned children, and consequently of the use or suppression of turning-boxes, is one that must be decided by considerations aside from infanticide, and is now receiving careful attention.

The F. H. in Vienna and Lower Aus. receive infants on the following conditions: Declaration of the community to which the infant or mother belongs, of her religion, and proof of its illegitimacy in case it is to be received permanently. Admission is free to infants born in hospitals. Admission is granted to illegitimate children on payment of a stipend by the relatives or townships of the mothers. The infant's maternity is known only to the authorities, and such information is given on presentation of the certificate given the child's mother on its admission. The insts. provide for the children until their 10th yr., after which its support must be assumed by its native village or town. While in charge of the inst. the children are raised either within or outside the buildings; in both cases they are universally well-nursed. The management of the insts. where they are as follows: The govs. meet once a week to receive petitions for the admission of children. A child can only be received upon personal application of the mother, who is obliged to state the circumstances requiring her to abandon her child, and to give her name, residence, age, date of child's birth, sex, father's name and occupation. Shortly after admission the infants are sent into the country, where they remain until their 5th yr., when they are returned to the inst., where they are educated. At the age of 15 the girls are apprenticed out as domestic servants until the age of 20. The boys are apprenticed at the age of 14 as mechanics until they attain the age of 21 yrs. In both cases those to whom they are apprenticed are held to a strict accountability for their phys. and moral well-being. After the termination of the period of apprenticeship the inst. ceases to exercise any control over the foundlings. At the present day in Eng. the boarding-out system for foundlings is being extensively tried, and meeting with great approval. The

advantages claimed for this method are that the children are removed from pauperizing tendencies, and are put upon an equal footing with other children. It is claimed that foundlings thus brought up have in most instances become good men and women. In Scot. the boarding-out system has been widely adopted, and from its marked success has won universal approval. In the U. S. the care of foundlings in insts. is the universal system, and most of the larger cities have their F. H., either under control of and supported by private and sectarian associations, or the State govt. The city of New York has a large F. H. on Randall's Island, capable of receiving 1200 infants yearly. It is under municipal control. Within a few yrs. the large F. H. of the Sisters of Charity has been established in New York city from money received from the State and other sources. It is wholly under control of the R. Cath. sisterhood, and is most admirably managed. Boarding out the infants to responsible women is largely practised by this inst., and with good results. At both insts. the infants are secretly received, no questions being asked of those bringing the infants to the hospitals. The opinion of those who have given the subject their careful attention is adverse to large asylums for infants, and statistics show that in them the mortality is larger than among the poorest people. [From orig. art. in *J.'s Univ. Cyc.*, by E. F. DAWSON, M. D.]

Fourier, foo-re-a' (FRANÇOIS MARIE CHARLES), the founder of the social system called Fourierism, b. Apr. 7, 1772, in Besançon, and ed. in the coll. of his native city. When he was 18 yrs. old his father put him into the office of a merchant in Lyons. Having been discharged from the military service in 1795 on account of ill-health, he returned to his commercial pursuits, residing in Marseilles till 1825, in Lyons till 1832, and then in Paris, where he d. Oct. 10, 1837. He lived very retired, held always inferior positions, and had only miserable salaries. In his few leisure hours he wrote his books, and with his scanty spare money he pub. them. His first book, *Théorie des quatre mouvements et des destinées générales*, was pub. in 1808; his second and most important, *Traité de l'association domestique agricole*, in 1822; and a sort of compendium of both, *Nouveau monde industriel et sociétaire*, in 1829; but they found only very few readers. It was not till 1831, when the social schemes of St. Simon and of Robert Owen were much discussed, that F. attracted any attention for his own ideas by his savage attacks on these 2 reformers, *Pieges et Charlatanisme des Deux Sectes Saint-Simon et Owen, promettants l'Association et Progrès*. From that time several talented disciples gathered around him—Mme. Clarisse Vigoreaux, Victor Considerant, Cantagrel, Hennequin, and Mennier. A monthly paper, *La Phalange*, was issued, and later on even a weekly, *La démocratie pacifique*. In Eng. and the U. S. Fourierism found warm adherents in Hugh Doherty and Albert Brisbane, and practical experiments were made both in Fr. and Amer. They failed, however, and the whole idea seems to have lost its hold on the public interest. CLEMENS PETERSEN.

Fourier (PIERRE), known as THE BLESSED PETER FOURIER, b. at Mirecourt, in Lorraine, Nov. 30, 1565, became a Premonstratensian monk, and in 1595 parish priest of Martincourt, where he founded the congregation of Notre Dame or "Ladies of the Congregation," and soon after instituted a reform in the Premonstratensian order. D. Dec. 9, 1640, and was beatified 1730.

Fournet, foo-nā' (VICTOR), b. at Paris May 15, 1801, ed. at the Fr. School of Mines; grad. doctor of science, and rendered great services to dynamical geol., metallurgy, and mineralogy; demonstrated *Fournet's law*, establishing the exact order of the metals as regards their "sulphurability;" was an industrious meteorologist and observer of phys. phenomena; wrote many scientific papers. D. Jan. 8, 1869.

Fowl [Ger. *Vogel*, a "bird"], in its original meaning as a synonym of *bird*, is antiquated and nearly obsolete, except as a name for domesticated gallinaceous birds—i. e. the common domestic F., peacock, guinea-F., turkey, etc. The domestic F. is of undoubted Asiatic origin. It was well known to Grs., Roms., Etruscans, and, as Cæsar says, to the anc. Britons also. There are innumerable breeds and varieties, among which may be mentioned the Dorking, the game-F., the black Sp., the tall Chi. breeds, the Polish, the Crèveœur, the Houdan, the little Bantam, the Leghorn, etc. They are valued for the great number and excellence of their eggs, and for their flesh, which is excelled by that of no domestic bird except the turkey. The various breeds differ much in respect to color, disposition, hardness, size, and fattening and laying qualities.

Fowler, Ind. See APPENDIX.

Fowler (CHARLES H.), D. D., LL.D., Meth. clergyman, b. in Upper Canada in 1837; came with his parents to the U. S. in 1840, grad. at Genesee Coll., N. Y., in 1859, and studied at Garrett Biblical Inst., Evanston, Ill. In 1861 he entered the Meth. ministry, preaching in Chicago, Ill., until 1872, when he was chosen pres. of the M. E. N. W. Univ. at Evanston, Ill. Ed. of *Chr. Advocate*, New York, 1876-80.

Fowler (JOSEPH SMITH), b. at Steubenville, O., Aug. 31, 1822, grad. at Franklin Coll. 1843, and was 4 yrs. a mathematical prof. there; studied law in Ky., but removed to Tenn.; resided in Springfield, Ill., 1861-69, on account of the proclamation of Jefferson Davis; in 1863 comptroller of Tenn. under the governorship of Andrew Johnson; U. S. Senator from Tenn. 1869-71.

Fowler (LORENZO NILES), b. in Cohocton, Steuben co., N. Y., June 23, 1811, was for many yrs. the business-partner of his brother, O. S. Fowler, and is the author of several books upon subjects of the same class with those treated of by his brother. He has also lectured extensively in the U. S., Canada, and Gr. Brit.

Fowler (ORIN), b. at Lebanon, Conn., July 29, 1791, grad. at Yale 1815; entered the Congl. ministry, became a missionary in the W., settled in 1819 as pastor at Plainfield, Conn.; was 20 yrs. a minister of Fall River, Mass.; often in the State legislature; M. C. 1848-52; distinguished as a temper-

ance and anti-slavery orator; author of a treatise on *Baytown and Historical Sketch of Fall River*. D. Sept. 3, 1852.

Fowler (ORSON SQUIRE), b. at Cohocton, Steuben co., N. Y., Oct. 11, 1849, grad. in 1834 at Amherst Coll., and with his brother, L. N. Fowler, became widely known as a lecturer, and as writer, ed., and pub. of books and periodicals upon phrenology, health, self-culture, education, and social reform; retired in 1863 from his business in New York, and removed to Boston, Mass., still continuing to write and lecture; is the author of numerous well known works upon the subjects indicated above.

Fowler (SAMUEL), M. D., b. near Newburg, N. Y., Oct. 30, 1799, studied med. at Penn. Med. Coll. of Phila.; was licensed in 1800, and began to practise at Hamburg, N. J.; after a few yrs. removed to Franklin, N. J.; represented his co. in the upper branch of the State legislature, and afterward his State in the 24th and 25th Congs. As a mineralogist and geologist he was regarded by men of science as among the first in the country; contributed to *Silliman's Journal of Science*, *An Account of some New and Extraordinary Minerals discovered in Warwick, Orange co., N. Y.*; *An Account of the Supplies and other Minerals in Newton tp., Sussex co., N. J.*; and to Gordon's *Gazetteer and Hist. of N. J.* an article on *The Franklinite, Red Oxide of Zinc, and other Minerals, found in the Valley at the foot of the Hamburg Mts.* The rare mineral fowlerite was discovered by and named for him, and the iron and zinc ore franklinite is supposed to have been so called by him. He once owned the extensive zinc-mines of N. J. A. GUYOT.

Fowler (WILLIAM CHANCEY), LL.D., b. in Clinton, Conn., Sept. 1, 1793, grad. at Yale in 1816; was tutor 1819-23, pastor of the Congl. ch. at Greenfield, Mass., 1825-27, prof. of chem. and nat. hist. in Middlebury Coll., Vt., 1827-38, prof. of rhetoric and oratory in Amherst Coll. 1838-43; a son-in-law of Noah Webster, and ed. of the Univ. ed. of Webster's *Diet.*; author of 2 Eng. grams. D. Jan. 15, 1881.

Fowler's Solution [named from Dr. Thomas Fowler of Stafford, Eng. (1736-1801), its inventor], a solution of arsenite of potash in water, flavored and colored with compound tincture of lavender. Each fluidrachm contains the equivalent of half a grain of arsenious acid. It is a powerful tonic, and should be used only under the eye of a competent physician.

Fowlerville, Mich. See APPENDIX.

Fowling, the taking of wild fowl either as a sport or as a means of livelihood. The term in the ordinary use is limited to the hunting of wild ducks, geese, and other waterfowl, and perhaps the shore-birds, such as the rail and plover. F. is an important industry, chiefly in cold latitudes. In the Orkneys and other smaller Brit. islands, as in Labrador, birds are pursued not only for their flesh and eggs but for their feathers. This kind of fowling is a very arduous.

Fowl Meadow Grass, the *Poa serotina* of the U. S., Canada, and Europe, growing in wet lands. The *Glyceria nerrata* of the N. States is called by the same name.

Fox (Ger. *Fuchs*), the common name of Canidae distinguished by a slender muzzle, vertical pupil, and an elongated bushy tail. The typical genus (*Vulpes*) is common to the entire N. hemisphere and Afr. The most familiar species is the red F. Another genus (*Crocyon*) is distinguished by several very important anatomical characters and is peculiar to N. Amer. It embraces the gray F.

Fox (Sir CHARLES), Eng. C. E., b. at Derby in 1810, was designed by friends to follow the med. profession, but studied engineering and was first employed by Ericsson. He drew the plans for the building for the Great Exhibition in Hyde Park in 1851, spending 18 hours per day in their execution for 7 weeks, and being knighted for the work. He constructed the Sydenham Crystal Palace and many extensive railway and engineering works. D. June 17, 1874.

Fox (Rt. Hon. CHARLES JAMES), the second son of Henry, Lord Holland, by Georgiana Carolina, daughter of the duke of Richmond, a descendant of Charles II., b. in Lond. Jan. 24, 1749, ed. at Eton and at Hertford Coll., Ox. In 1768 he took a seat in Parl. for Midhurst; in 1773 became a lord of the treas., whence he was dismissed in 1774 by Lord North on account of his independent spirit. From this time he stood by the side of Burke and the Liberals, and assailed with most brilliant and effective eloquence the administration of Lord North, foretelling the eventual defeat of the Brit. arms in N. Amer. In 1780 he was chosen to represent Westminster in Parl.; in 1782 was sec. of state for foreign affairs under the marquis of Rockingham, and in 1783 was sec. of state in the Portland ministry. In 1783 he introduced his India bill for the relief of the inhabs. of Brit. India, but the E. I. Co., the king, and the House of Lords combined to defeat him, and he resigned. Entering Parl. for a Scot. burgh, he now became the prime leader of the Liberal party, joined heartily in the prosecution of Warren Hastings, opposed with all his powers the policy of Pitt and his interference in continental affairs, supported Wilberforce in his efforts for the abolition of the slave-trade, and hailed from the first the Fr. Revolution as the harbinger of a new era of freedom. Between Nap. and Mr. F. there was a mutual respect, which amounted almost to a personal friendship. In 1806 he entered ministry as sec. for foreign affairs, and in a personal note addressed to Nap. offered peace, but did not live to see it effected. Mr. F. was brought up by his father to a loose way of private life. An inveterate gambler, a hard drinker, the greatest spendthrift of his day, he was still a man of most generous and noble impulses and of kindly and genial disposition. To the consummate excellence of his oratory Burke, Mackintosh, Parr, Franklin, and all the best critics of his time bear the amplest testimony. His political views were always liberal and progressive, always far in advance of his time. His incomplete *Hist. of the Reign of James II.* was pub. in 1808. D. Sept. 13, 1806.

Fox (CHARLES JAMES), b. at Antrim, N. H., Oct. 11, 1811, grad. at Dartmouth 1831; was law-partner with Hon. Daniel Abbot of Nashua, N. H., in 1834, member of the N. H. legis-

lature in 1837, co. solicitor 1835-44, member of a commission to revise the N. H. statutes in 1841-42; went to Egypt in 1843, and to the W. I. in 1844; compiled, with Rev. Samuel Osgood, D. D., *The N. H. Book of Prose and Poetry*; wrote the *Hist. of Dunstable and the Town Officer*. D. Feb. 17, 1846.

Fox (GEORGE), founder of the Society of Friends, b. at Drayton-in-the-Clay (now Fenny Drayton), Leicestershire, July 1624, was the son of pious Christopher Fox, weaver, called among his neighbors "righteous Christer." His parents were both members of the Ch. of Eng. F. was early bound apprentice to a shoemaker and glazier, but in 1643 abandoned this occupation, and in 1647-48 began itinerant preaching. For this he was repeatedly arrested and imprisoned from 1649 to 1666, but submitted as one ready to lay down his life for his faith. In 1652 he formed congregations in Lancashire; in 1671 visited Amer. At Barbadoes, on this journey, he drew up a paper setting forth the belief of the Friends as to the fundamental doctrines of Christianity. In Mar. 1673 he embarked for Eng. He was soon imprisoned again, remained in confinement a yr., and was freed through the influence of Sir Matthew Hale. In 1677 and 1681 he visited the Friends in Hol., and established monthly, quarterly, and yearly meetings there. He returned to Eng., where he continued his public addresses to within a few days of his death. Wrote *Collections of many Select and Chr. Epistles, Letters, and Testimonies, and Gospel Truths promulgated in a Collection of Doctrinal books, containing Principles Essential to Christianity and Salvation held among the people called Quakers.* (Consult SEWELL's *Hist. of the Quakers* and JANNEY's *Life of Fox*.) D. Jan. 13, 1691.

Fox (GUSTAVUS V.), b. at Saugus, Mass., June 13, 1821; mdpn. U. S. N. 1838, and served for 19 yrs. on different stations, in the Coast Survey, in command of mail-steamer, and in the war with Mex.; in 1856 became agent of the Bay State Woolen Mills at Lawrence, Mass. In Feb. 1861 was sent for by Gen. Scott, in reference to throwing supplies and troops into Ft. Sumter, but Pres. Buchanan refused to allow the expedition. Subsequently Mr. Lincoln approved the plan, sending F. to Ft. Sumter to communicate with Major Anderson, and on his return directed him to carry out his plan, which was, however, thwarted by the withdrawal of the Powhatan. The expedition could only proceed to Charleston harbor. Communication with Wash. being cut off, he then applied to William H. Aspinwall and W. B. Astor, who fitted out a steamer, of which he was appointed an acting capt., and in which he sailed for Chesapeake Bay. Mr. Lincoln now conferred upon Capt. F. the appointment of assistant sec. of the navy, which position he held till the close of the war. Soon afterward Cong. created an additional assistant sec. of the navy to enable the gov. to send Capt. F. to Rus. to present to the emp. Alexander II. the congratulations of the Amer. Cong. on his escape from menaced assassination. Regardless of self, he had declined to ask an admiral's commission, accepting the Rus. mission as his sole reward, and on his return resumed the charge of extensive woollen manufactories in Lowell. More recently he became a member of a business house in Boston. D. Oct. 29, 1883.

Fox (JOHN), b. at Boston, Lincolnshire, Eng., in 1517; entered Brasenose Coll., Ox., in 1533, chosen a fellow of Magdalen Coll. 1543; became a Prot., and in 1545 was deprived as a heretic; was tutor to the children of Sir Thomas Lucy, and later to those of the earl of Surrey; was ordained deacon by Ridley 1550, became a prebendary of Sarum 1563; author of the *Acts and Monuments*, well known as Fox's *Book of Martyrs*. D. Apr. 18, 1587.

Fox (WILLIAM JOHNSON), b. near Wrentham, Eng., in 1786; was sent to Homerton Coll. to be ed. for the Chr. ministry among the Independents. But he became a preacher of Unitarianism, till, departing still farther from the accepted belief, he separated from all denominations and became a rationalist preacher in S. Chapel, Finsbury, Lond. Here he attracted attention by the speculative boldness of his views, his innovations on the ordinary customs of worship, and the secular tone of his discourses. His interest in politics made him a leader among the Liberals. No abler speaker addressed the meetings of the Anti-Corn-Law League; no abler writer took up the pen for the most extreme measures of the "party of progress." His *Letters of a Norwich Weaver Boy*, which were printed in the newspapers, did powerful service; his *Lectures to the Working-Classes* were widely read. In 1847 he was elected to Parl. from Oldham, was defeated in 1852, and re-elected the same yr. to fill a vacancy caused by death. At the gen. election in 1857 he was again defeated. Three vols. of sermons show what he was as a pulpit-orator; a book on *The Religious Ideas* shows the cast of his philosophic thought. D. June 3, 1864. O. B. FROTHINGHAM.

Foxboro', on R. R., Norfolk co., Mass., 21 m. S. W. of Boston. Pop. of tp. 1870, 3067; 1880, 2950.

Foxhound, a variety of the dog, bred principally in G. Brit. and Ire., and adapted to the national sport of fox-hunting. The F. is a cross of the bloodhound, whence it derives its keen power of scent; the greyhound, which gives its speed, and the bulldog, which has conferred upon its descendant its own courage and persistency. At present, however, the breed of F. is regarded as well established, requiring no further cross with either of the original stocks. This is about 2 ft. high.

Fox-Hunting, one of the national sports of Eng. The fox is followed by a pack of from 40 to 120 dogs, and by a large number of gentlemen and ladies on horseback. The party are under the charge of a master, the hounds being in the care of a huntsman and "whippers-in" or whips. The members of the hunt leap their horses over fences, gates, and hedgerows, and feel at liberty to rush through grain-fields and other growing crops. The fox is not shot, but when caught by the dogs the huntsman cuts off his brush (tail, pads, feet), and mask (face), which are given as trophies to those who may be "in at the death." The flesh is cut up and given to the dogs.

Fox Islands, Pacific Ocean. See ALEUTIAN ISLANDS.

Fox River rises in Wis., flows S. and S. W., approaches within 1½ m. of the Wis. River, with which it is connected at Portage City by a canal. It flows then by a circuitous N. and N. E. course to Green Bay, Wis., into which it falls at the town of that name. The improvement of this river is being carried on by the U. S. govt. as the connecting link between the Atlantic and the great system of internal navigation furnished by the Miss. and its tributaries.

Fox Shark, or **Thresher**, *Alopius vulpes*, a shark of the Atlantic and Mediterranean, 12 to 18 ft. long, with a tail about as long as the body. It swims round schools of herrings, etc., splashing the water and crowding them in order to more readily capture them. It is also said to attack the whale with its tail, and is therefore called thresher, but this has been discredited.

Fractions [Lat. *frango*, to "break"]. If an integral unit is divided into any number of equal parts, each part is called a *fractional unit*; a fractional unit or a collection of fractional units is called a *F*. Every *F*. consists of 2 parts—a *denominator*, which shows the number of equal parts into which the integral unit is divided, and the *numerator*, which shows how many of these are taken. In common *F*. both parts are written; in decimal *F*. the numerator alone is written, the denominator being indicated by means of the decimal point. For a more full article, see *J.'s Univ. Cyc.*

W. G. PECK.

Fracture, frakt'yur [Lat. *fractura*, from *frango*, *fractum*, to "break"]. In surgery, the term *F*. is used to indicate a rupture or solution of continuity, occurring in osseous tissue, or in rare cases in cartilaginous tissue partly ossified. By *simple F*. is meant one in which no wound exists admitting air to the seat of *F*. A *compound F*. is one in which such a wound does exist. A *complicated F*. is one in which some other serious injury is inflicted, at or near the site of the *F*. or in which, from the situation of the rupture, the healing process cannot progress as favorably as is usual; as when a large blood-vessel or nerve-trunk is torn by the broken bone, or when the *F*. extends into a joint-cavity. A *comminuted F*. is one in which the bone is broken into several small pieces at the point of rupture, and is rarely produced, except by direct violence, as by a blow or crushing force.

Causes of Fracture.—These may be *direct violence*, *indirect violence*, where the bone is bent, *muscular force*, and *brittleness* of the bones, called "fragilitas ossium." The signs of *F*. are *pain*, *swelling*, and *tenderness* at the point of *F*. *change in shape* of the limb, *false point of motion*, and *crepitation*. *F*. generally unite by the deposition of bony material between and around the broken ends of the bone. A few days after the *F*. the bone, its periosteum (membrane surrounding the bone), and the neighboring tissues pour out a quantity of plastic material around and between the broken ends, which gradually hardens, and at the end of the 4th week consolidates the fragments. The union of *compound F*. is entirely different. It is a process requiring several months, or sometimes yrs., and is attended with a greatly increased amount of danger from exhaustion through long continued suppuration and absorption of purulent material. The difference in the mode of union seems to be due to the irritation produced by the air, or something conveyed by the air to the wound.

The *treatment of F*. consists essentially in restoring the fragments to their original position, and holding them there by splints or some form of rigid apparatus which shall not cause discomfort or injury to the patient. Splints are made of wood, sheet-iron, tin, zinc, gutta-percha, felt, sole leather, starch, soluble glass, or plaster of Paris. [From *orig. art. in J.'s Univ. Cyc.*, by PROF. SAMUEL ST. JOHN, M. D.]

Framingham, on R. R., Middlesex co., Mass., 23 m. W. of Boston. The tp. has 3 thriving villages—*F*. South *F*. and Saxonville, also the oldest normal school in N. Amer., and a soldiers' memorial library building, with a valuable town library. Pop. tp. 1870, 4968; 1880, 6235.

Franc, the unit of account in the monetary system of Fr., adopted under the republic in 1795; also the silver coin representing the same unit. In the gen. reform of Fr. metrology which took place in the yr. above mentioned, the following were the governing principles: 1st, to derive the units of measure, weight, and value, mediately or immediately, from the linear unit called the metre, which is the base on which the whole system rests; 2d, to derive the higher and lower denominations in each series from the corresponding unit by decimal multiplication and division. The unit of capacity was derived immediately from the basic unit of length; the unit of weight from the unit of capacity; and the unit of value, the *franc*, from the unit of weight. (See *Metric System*.) The *F*. is divided into 10 *decimes* and 100 *centimes*; the denomination *decime* has fallen into disuse. The copper coins which represent this value are stamped "ten centimes." The coinage in silver consists of single *F*., pieces of 5 and 2 *F*. and of 50 and 20 centimes. The gold coins are pieces of 5 *F*., 10 *F*., and 20 *F*.; the latter commonly, but not legally, called *napoleons*. The copper coins are of 10 centimes, 5 centimes, and a very pretty but rather useless little piece of 1 centime. The 1-centime pieces are hardly seen except at the post-offices.

The weight of the silver *F*. is 5 grammes = $\frac{77}{100}$ grains Troy. It is composed of an alloy consisting of 9 parts by weight of silver and 1 part base metal (copper). Twenty silver *F*. therefore weigh 100 grammes; and as the Fr. law makes both the gold and the standard silver coins equally legal tenders for all sums, and fixes arbitrarily the relative value of the 2 metals for equal weights in the ratio of 1 to 15½, it follows that 20 *F*. in gold weigh $\frac{6452}{1000}$ grammes, very nearly; and this is the weight of the gold *napoleon*. The name *franc* did not originate with the monetary system of 1795. It has been in use since the 14th century, and applied to coins of very different values, both gold and silver, at different times. The legal monetary unit in Fr. before the introduction of the *F*. was the *livre Tournois* (of Tours); slightly less in value than the coin by which it was superseded, 81 livres being equal to 80 *F*. F. A. P. BARNARD.

France, I. *F*. extends in W. Europe over a space of 12° 20' lon., in lat. 42° 20' to 51° 5' N. It is bounded N. by the Ger. Ocean, the Strait of Calais, and the Eng. Channel; W. by the Atlantic Ocean; S. by the Pyrenees; S. E. by the Mediterranean, and E. by the Alps, the Lake of Geneva, the ridges of the Jura Mts., and the ridge of the Vosges. S. of the Donon, the prin. peak of the Lower Vosges, it ceases to depend upon natural lines, following an arbitrary one, which, passing between Nancy and Metz, proceeds to Longwy, and reaches the N. Sea. Thus, *F*. touches Sp. on the S., It. on the S. E., Switz., the Ger. Empire, Luxembourg, and Belg. on the E., and the Netherlands on the N. Its area is 528,572 square kilometres (204,028 sq. m.), Corsica included. Annexed to *F*. are Corsica and Algeria, which latter comprises a large terr. S. of the Mediterranean. The colonies of *F*. are not numerous; the *Fr*. have no talent for colonization.

II. **PHYSICAL GEOGRAPHY**.—1. *The Surface*.—The surface of *F*. presents a plane, gently inclined from S. W. to N. W.—i. e. from the Alps and the Pyrenees to the Atlantic Ocean. To the E. the valley of the Rhone cuts this plane, and on its W. side rise the Cévennes, from which the waters of the 3 great basins of *F*. flow in an almost parallel direction. The *Vosges* stretch from N. to S. for a length of 260 kilometres. Their summits are rounded, their sides clad with forests of beech and fir. The S. part of the *Vosges* is the highest; its average elevation is 1000 metres; the N. part rises hardly more than 600. The *Vosges* are separated from the Jura Mts. by a considerable depression, the pass at Belfort, which forms one of the prin. thoroughfares by which to pass the frontier of *F*. The *Jura Mts.* are principally composed of limestone. Less rude and not so richly wooded as the *Vosges*, they have more plastic grandeur. Instead of the rounded summits, we meet here long, parallel ridges, the gen. direction of which is a curve concentric with the gen. curve of the Alps. The *Jura* group rises from *F*. toward Switz.; its highest peak is the Crêt de la Neige (1723 metres), its length from the Rhone to the Rhine is 300 kilometres (124 m.). The *Fr*. part of the *Alps* has a length of about 450 kilometres, and consists of: (1) The Pennine Alps, from St. Gothard to Mont Blanc; (2) the Graian Alps, containing the Little St. Bernard and terminating at the road of Mt. Cenis; (3) the Cottian Alps to Mt. Viso (3810 metres); and (4) the Maritime Alps, terminating at Col di Tenda. Toward It. the slopes of the Alps are abrupt; in *F*. they project long arms toward the Rhone—viz. the Alps of Valais, of Savoy, of Dauphiné, and of Provence. The *Pyrenees* are inferior to the Alps. The main body, composed of granite, schist, and limestone, extends, from W. to E., over a length of 217 m., and with a breadth of 60 m. in the centre. The highest peak in the chain, Maladetta, rises 3404 metres. This chain is continued by the *Cévennes*, which extend over a length of 295 m., and are divided into the S., the central, and the N. *Cévennes*. To the N. they are continued by the *Côte d'Or*, the plateau of Langres, and the Faucilles Mts., which communicate with the *Vosges*, and N. of which extend the plateaus of Lorraine, L'Argonne, and the Ardennes. The *Côte d'Or* produces the finest wine in *F*.; its average height is 500 metres. To the W. of *Côte d'Or* is found a small granitic group, which is called *Morvan*. Still more westerly, and N. of the Loire, stretches the immense plain of the Beauce, the granary of *F*. Between the Beauce and Finistère are the heights of Perche and Maine, from which a double granitic range traverses Bretagne from E. to W. N. of Maine are the fertile hills of Lower Normandy, and finally the peninsula of Cotentin, terminating in Cape de la Hague and the high hills which inclose the naval port of Cherbourg. Between the Loire and the Garonne are the remarkable summits of the central group which in remote ages separated the gulf of the Seine from that of the Garonne. This group comprises very different chains: the granitic mass of the Margeride, the mts. of Auvergne (Puy de Sancy, 1886 metres), the mts. of Lower Auvergne, and toward the N. the chain of the Puys, a curious line of old, extinct volcanoes, the most remarkable of which is Puy de Dôme. With the mts. of Lower Auvergne connect the granitic mts. of Limousin. Corsica is traversed from N. to S. by a chain of high mts., whose most elevated summit is Monte Rotondo.

2. *Hydrography*.—The running waters form in *F*. 7 prin. basins—viz. those of the Seine, Loire, Garonne, Rhine, Maas, Scheldt, and Rhone. In the first 3 basins the water runs toward the N. W. in the next 3 it runs northward, and in the basin of the Rhone it runs southward. *F*. possesses more than 200 streams which are fit for navigation or flotation of craft. The prin. rivers in the basin of the Seine are the Seine, which waters Paris, Rouen, and Havre, and its affluents—to the right, the Aube, Marne, and Oise; to the left, the Yonne and the Eure. In the basin of the Loire flow the Loire, which passes by Nevers, Orléans, Blois, Tours, Nantes, and St. Nazaire, and its affluents—from the right, the Maine; from the left, the Allier, Cher, Indre, and Vienne. In the basin of the Garonne we find the Garonne, which, after its junction with its prin. affluent, the Dordogne, forms the beautiful river Gironde, on whose borders stands Bordeaux. Its prin. tributaries, the Tarn, Lot, and Dordogne, join it on the right side. To this basin belong those of the Charente and the Adour. In the basin of the Scheldt, the Scheldt and its affluent, the Scarpe; in the basin of the Maas, the Maas, which receives from the left the Sambre. In the basin of the Rhine, the Rhine; its prin. affluent, the Moselle, waters Metz, and receives the Meurthe, which passes through Nancy. In the basin of the Rhone, the Rhone, which waters Lyons; it receives from the right the Saône, which is greatly increased by the waters of the Doubs. It then proceeds toward the Mediterranean, where it forms its vast marshy delta. S. of Lyons its prin. affluents are the Isère, Drôme, and Durance. The coast of the N. Sea is low. Along the Eng. Channel the coast of Normandy is bordered by cliffs; then comes a line of low and very dangerous rocks, after which the sandy and marshy estuary of Carentan touches the peninsula of Cotentin. In the angle formed

by this peninsula and the N. coast of Finistère lies the bay of Mt. St. Michel, remarkable for the exceptional height of its tides (15 metres). The whole N. coast of Finistère is strewn with dangerous reefs extending to the extremity of Bretagne. Here the coast suddenly retreats and forms the vast roadstead at the head of which stands the naval port of Brest. From Brest to L'Orient, which also is a naval port, the coast is lower, but still hilly. The peninsula of Quiberon is remarkable. Then comes the mouth of the Loire, and between the Loire and the Charente a succession of dunes and extensive marshes. Farther S. the ocean receives the Gironde, which is deep and broad, like an arm of the sea. From the Gironde to Sp. the coast is traced as a straight line bordered by vast dunes. Along the Mediterranean the W. coast is low, and conceals a series of marshes. At Marseilles the coast rises, and from here to the It. frontier it presents a line of headlands and bays. The W. coast of Corsica is steep and abrupt, the E. low and marshy.

3. *The climate of F.* is generally temperate and mild; its mean temperature is 55° F.

III. *AGRICULTURE.*—F. presents 4 agricultural belts—that of the olive, that of the maize, that of the vine, and that of the apple tree. The cultivation of cereals is very important. Wheat is produced, especially in the N. E.; spelt, rye, and barley in the same regions, but on poorer soil; oats in N. W., maize in S. E. and S. W., millet in W., rice in the S., and buckwheat in Bretagne and Normandy. The olive of S. F. gives the best table-oil, and tobacco is cultivated under control of the govt. But one of the most important resources of F. is the vine, the production of which falls into 7 groups—Burgundy, Bordelais, Champagne, Rhone, Charente, the central and the S. part of the country. Charente produces by the distillation of its wines the most excellent brandies. There are in F. 8,500,000 hectares of forest; it possesses of live-stock a very large number of horses, asses and mules, horned cattle, sheep, goats, and swine; its annual production of honey and wax amounts to 24,000,000 francs, and the fisheries are very important. Martens, foxes, otters, and other beasts and birds yield furs and feathers of great value, and the silkworms furnished, before the prevalence of disease among them, 25,000 tons of cocoons.

IV. *INDUSTRY.*—1. *Mining Industry.*—F. produces granite (Cotentin, Bretagne); among the volcanic products, basalt of Auvergne and porphyry of Corsica; the vicinity of Bayonne gives feldspar and asphaltum, and slate-quarries are found in that of Angers. Different kinds of freestone abound, and the country is rich in marbles for building purposes. Chalk is found at Rouen, Meudon, etc., and of silicious materials F. produces excellent millstones, the sandstone of Pontainebleau with which Paris is paved, plaster from the vicinity of Paris, and cement from Boulogne and other places. Of clay there is a common and a finer sort, and also porcelain clay is found; the country produces both rock-salt and sea-salt, and of mineral and thermal springs there are 4 groups. F. is poor in metals, with the exception of iron; there is found argentiferous lead, copper, zinc, nickel, tin, and gold—in the sand of the Rhone, always in small quantities. But in the last half century the consumption of coal and that of pig iron has increased, the former tenfold, the latter a hundredfold. The collieries number 590, and are distributed in 4 groups—that of the N., of the E., of the W., and of the centre; in this the mines are numerous and often very rich, and the great basin of the Loire yields $\frac{1}{4}$ of the whole. Iron ore is not often found in F. in veins, but more frequently in beds, and oftenest as alluvial or bog ore. The iron-mines number about 240, and the manufacture of pig iron and steel is increasing.

2. *Manufacturing Industry.*—All kinds of industry are united in Paris, and hydraulic motors, steam-engines, agricultural machines, spinning, weaving, and sewing machines, machine-tools, metallic wares, and arms are manufactured in that city. At Herault and Charentes alcohol is made from wine, and chemicals are manufactured in Paris and other cities. Oils are made from olives, from nuts, from flax-seed, and from rape-seed. Chandlery products, soaps, toilet soaps, hair-dressing articles, and glue are made in Paris, Lyons, Marseilles, Lille, etc. At Corbeil milling is carried on extensively; especially in Paris, but also in Marseilles, Lyons, and Clermont-Ferrand, the so called *pâtes d'Italie* are made. Of preserved food may be mentioned the sardines of Bretagne and the pastries of Toulouse. In Paris confectionery is made, liquors are distilled, chocolate manufactured; other cities prepare vinegar, mustard, drugs; the manufacture of beet-root sugar is carried on especially in the N. W., raw sugar from the colonies refined at Marseilles and Havre, and cheese-making much developed all over the country. Cotton stuffs are manufactured in the valleys of Lorraine, in Normandy, in Amiens, and in Lyonnais. Of textile plants, hemp and flax are indigenous in F. The linen manufactures (for veils, laces, spinning, plain stuffs, damasks, etc.) are principally located in the N. part of the country; the manufacture of wool is carried on in 7 regions, but the silks are principally manufactured in the valley of the Rhone, the region of the silkworm. Paris is the prin. centre of the *modes*, and hats, gloves and boots come especially from this city. For jewelry no place, perhaps in the world, can rival Paris, which also manufactures watches, though this industry has another very important centre in Besançon, where the mounting of the pieces manufactured in the Jura Mts. is done. Perfumery is made in Paris and Provence.

V. *COMMERCE.*—1. *Means of Communication.*—The roads of F. are divided into 3 classes—national roads, departmental roads, and parochial roads. The water-roads comprise the navigable courses of the rivers and the canals. The first Fr. R. R. was constructed in 1828; horses were used on this road until 1832, when the first locomotive was employed. The real system of railways was commenced in 1847, and the total length of all the railways open for traffic in 1882 was 26,373 kilometres (16,415 Eng. m.). They are almost entirely

in the hands of 6 great cos. The traffic on the Fr. railways amounts to 100,000,000 passengers, the receipts to 700,000,000 francs. The traffic conveying merchandise on the water-roads is about $\frac{1}{2}$ of that on the railways. The steam navigation in the basin of the Seine is equal to that in all the other basins together. The post and telegraph follow the great roads of communication. Both are regulated by the state. The traffic on the sea is not prosperous. The number of vessels has remained stationary for about 30 yrs., though their tonnage has been doubled. The commercial fleet is 15,600 vessels, of about 1,000,000 tons burden.

2. *Money and Measures.*—The great Revolution of 1789 gave F. the metrical system, so admirably founded in reason, and now adopted by the greatest part of continental Europe. The basis is the metre—that is to say, the $\frac{1}{10,000,000}$ th part of the quadrant of the meridian passing through Paris, and the scale is arranged in accordance with the decimal system. The Fr. money basis is the franc.

3. *Interior Commerce.*—The interior commerce of F. circulates annually more than 29 milliards. The increased facilities for communication have served to increase the interior commerce; thus, the number of letters has increased five-fold since 1830.

4. *Foreign Commerce.*—The gen. commerce of F., with the exception of that of the precious metals, comprises more than 8 milliards, of which 4 are for importation and more than 4 for exportation; half a century ago it did not exceed 1 milliard. It takes place mostly by sea. That of the precious metals exceeds generally 1 milliard, of which 700,000,000 are for importation. F. imports all kinds of articles from all parts of the world, but the importation of manufactured articles forms only $\frac{1}{14}$ of the whole; its exports consist chiefly of manufactured articles.

VI. *THE POPULATION OF F.* Dec. 31, 1881, was composed of 37,672,048, the excess of females over males, as well as the increase of pop. within the last century and a half, being comparatively less than in any other state of W. Europe. Like that of most other European countries, the pop. is agglomerating ever more in towns; but though the rural pop. is declining, more than $\frac{1}{2}$ of the total pop. still depends on agriculture as a means of living. The length of life has increased in F. in a very remarkable degree: the average life-time, which was 28 yrs. in 1789, is now 37 yrs. In ethnological respects the Fr. nation is a very mixed race. The first occupants of the soil did not form a homogeneous mass. They consisted of 3 nations—Kymric Celts, tall and blonde, in the N. E.; true Celts, small and short, in the centre and W.; Basques, in the S.; and beside these 3 races there was perhaps a fourth aboriginal race, from which the inhabs. of Central F. may have inherited certain traits, and of which memorials are found in the caves and in the megalithic monuments. This original stock, composed of 4 partially unknown elements, received manifold influences from the successive conquering races. The Romans ascended along the Rhone, and descended along the Garonne; the Visigoths settled in the basin of the Garonne; the Normans at the mouths of the rivers and in Normandy; the Arabs in Roussillon, Lower Languedoc, and Provence. Later on came the Eng. into the S. W., and the Spaniards into Flandre and Franche-Comté. And to these influences must be added that of more recent immigrations. Thus, the Fr. nation is not, properly speaking, a race, though the Gallic element is predominant.

VII. *CONSTITUTION AND ADMINISTRATION.*—1. *Administrative Divisions.*—In 1876 F. comprised 36 old provs., forming 87 depts., 362 arrondissements, 2865 cantons, and about 36,000 communes.

2. *Army and Navy.*—The law of 1872 enacts universal liability to arms. The Fr. army consists of (1) volunteers or enlisted men, and (2) young men 20 yrs. of age and fit for military service, whom the laws of recruiting summon annually to form what is called "the contingent." The enforcement of this law will give, in time of war, an army of 2,685,000 men. The whole of F. is divided into 18 military regions, subdivided into dists. The Fr. fleet consisted in 1881 of 498 vessels, of which 385 have steam-power (59 iron-clads). The maritime terr. of F. is divided into 5 maritime arrondissements; the caps. of these 5 arrondissements are the 5 military ports, Cherbourg, Brest, L'Orient, Rochefort, and Toulon.

3. *Finances.*—The budget of the state is prepared by the ministers, presented by the pres. of the republic, and discussed, article by article, by the National Assembly 1 yr. in advance. After the close of the inspection which the budget has thus undergone, the accounts are examined and verified by the court of accounts. The expenses of the state exceed 2,000,000,000 francs. The total public debt of F. amounted, on Jan. 1, 1879, to a cap. of about 18 milliards.

4. *Justice.*—Justice is administered in F. in the name of the chief of the state. There are 3 different jurisdictions: (1) the civil jurisdiction, which takes cognizance of all personal or real relations of the citizens, and is exercised by justices of the peace. Above them are the civil tribunals, or "tribunals of first instance." In the manufacturing and commercial cities there are 216 tribunals of commerce. Above the civil tribunals and the tribunals of commerce there are 26 courts of appeal. (2) The criminal jurisdiction. The simple misdemeanors come before the tribunals of police. The maires and justices of peace exercise this jurisdiction. Offences are brought before the tribunals of correction, and grave crimes, which lead to infamy and severe punishment, are brought before the courts of assize, of which there is one in each dept. They are composed of 3 magistrate-judges and a jury. From the verdict of the court of assize there is no appeal. Beside the magistrature which judges there is a magistrature which administers—that is to say, performs the office of public prosecution. The public prosecutor interferes only exceptionally in civil cases. In criminal cases, on the contrary, he acts a prin. part. Above all the other tribunals is the court of cassa-

tion, which secures the exact application of the law, and any verdict given by any tribunal may be brought before it. By its decrees it confirms or reverses the verdict given, and in case of cassation the suit is recommenced before another tribunal instituted by the court of cassation.

5. *Public Education.*—There is in F. a system of public education which is administered by the commune, the dept., and the state, and a free education given by private insts. There is a primary and a secondary instruction, which latter is divided into the classical, the industrial, and the higher instruction. Primary instruction is given in the communal schools; the secondary, classical, or industrial instruction by the state in the lycées, by the communes in the communal coils., and by the clergy or by laymen in sems. The higher instruction is given by the univs. (*facultés*). The Coll. de France and the Museum of Nat. Hist., both in Paris, represent the independent studies; the Conservatoire des Arts and Métiers (for arts and trades), in Paris, is a sort of industrial univ. The instruction is facilitated by libraries, which exist in most of the towns, and there are learned societies in almost all the depts., some of which enjoy a very high reputation. Paris contains a great number of these, beside several great public insts., such as l'Institut de France, composed of 5 acads.

6. *Religion.*—In F. all religions are equal by law, but only the R. Caths., Prots., and Jews have state allowances.

7. *Central Government.*—The present const. of F. bears date Feb. 5, 1875. It vests the legislative power in an assembly of 2 houses—the Chamber of Deputies and the Senate—and the executive in a chief magistrate called Pres. of the Republic. The present Pres. is François J. P. Jules Grévy, elected Pres. of the Republic for 7 yrs. by the Senate and Chamber of Deputies, assembled in National Assembly Jan. 30, 1879. He is assisted by a council of state of 9 members. The Senate is composed of 80 members, of whom 75 hold their seats for life. The remaining 25 are elected by an indirect process. In the first instance the communes and municipalities of F., elect, by a majority of their members, each one of the "électeurs sénatoriaux," and these, in their turn, after a lapse of 2 months, meet together to choose the senators. No other qualification is required for a senator than to be a Frenchman and 40 yrs. of age. There are 532 members in the Chamber of Deputies, elected by universal suffrage. The only requisite to be an elector is to be possessed of citizenship and to be of the age of 21 yrs., while the only requisite for a deputy is to be a citizen and 25 yrs. of age. CAPT. PRUDENT, *Fr. Topographical Engr.*

VIII. HISTORY.—The hist. of F. begins in the 5th century with the conquest of the Rom. prov. of Gallia Transalpine by the Franks, a Gotho-Germanic tribe, who settled in the country and gave it its name. In 486 Khlodwig (Clovis), chief of the Salian Franks, a grandson of Merovæus and founder of the *Merovingian* dynasty, defeated the Rom. gov., and formed a kingdom, comprising nearly the same area as modern F. Persuaded by his wife Clotilda, he embraced Christianity, and at his death in 511 a Frankish empire was actually consolidated in Gaul. The further development of this new kingdom was seriously impeded, however, by c. wars between the E. Franks and the W., brought on by the dangerous custom of dividing the kingdom, at the death of the king, between his sons. But during the last kings of the Merovingian dynasty, who were men of weak character, a new family rose into power, capable of keeping the empire united in spite of the tendencies to separation. Pepin of Héristal, *major domus* to Clovis II., established the authority of the E. Franks, and his son, Charles Martel, routed the Saracens at Tours in 714. Charles Martel's son, Pepin, the Short, confined the last king of the Merovingian dynasty, Childeric III., in a monastery, and ascended the throne himself in 752, thus founding the *Carolingian* dynasty. Pepin's son, Charlemagne, from 768 to 814, conquered Lombardy and the N. part of Sp., subdued the Sax. along the Elbe in Hungary, ruled from the Elder and the Baltic to the Ebro and the Mediterranean, from the Atlantic to the Theiss, and laid the foundation of modern Europe. But the different tribes were still on the move, partly impelled by their own unstable instincts, partly disturbed by new swarms which from Asia continued to pour into Europe. Charlemagne stopped the invasions from Asia, and compelled the tribes to stay where they were. He transformed the chiefs of the tribes into feudal lords, vassals with power, but also with responsibility, and introduced Christianity and the insts. of the R. Cath. Ch. throughout his realm. After the death of Louis le Débonnaire, a son of Charlemagne, the empire was divided between his 3 sons by the treaty of Verdun in 843. Louis the German received that part which was called Deutschland (Ger.); Charles the Bald that called France; the long strip of land stretching between these 2 realms from the N. Sea to the Mediterranean was given to Lothair, together with It. and the title of emp. As soon as the treaty was concluded wars broke out between the contracting parties, and these wars did not cease until a new dynasty, which had grown up on Fr. soil, ascended the throne of F. It was, however, not so much their imperial ambition as their utter inability which cost the Carolingian kings their crowns. There were 40 hereditary (*i. e.* independent) vassals in the terr. of F. When, at the death of Louis V. in 987, these vassals passed by the proper heir, because he had given his allegiance to the Ger. emp., and chose for king Hugh Capet, founder of the *Capetian* dynasty, there was a Fr. nation, but there was hardly a Fr. kingdom in existence.

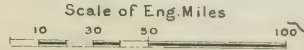
The consolidation of the royal power and the establishment of the absolute monarchy are the leading ideas in the hist. of F. under the 2 following dynasties—the house of *Capet*, from 987 to 1328, and its collateral branch, the house of *Valois*, from 1328 to 1589. The crusades acted as a means of rallying the feudal lords around the person of the king, the Ref. of curbing and destroying the heads of the nobil-

ity; the wars with Eng. and Aus. were thoroughly dynastical; the development of the cities was furthered so far as to enable the third estate to form an opposition to the nobility, and even the nobility itself was made a monarchical instrument, and transformed from a feudal aristocracy into a court nobility. How early a powerful national feeling was developed in F. was shown under Louis VI. (1108-37). In the long wars which he waged against Henry I. of Eng. about Normandy, an army of 200,000 men was immediately formed for the defence of F. Louis VI. abolished serfdom in his own terrs., and formed his cities with their adjacent dists. into corporations. But by his example he compelled his neighbors to do the same, and thus he sowed a very fertile seed of opposition to the feudal lords among their own subjects. Philip Augustus (1180-1223) made the first steps toward centralization. He formed a chamber of peers, which tended to secure uniformity in the actions of the king and his vassals; and he established the right of appeal from the decision of the feudal lord to the royal court. Meanwhile the Crown grew richer. Philip Augustus conquered Normandy, Maine, Touraine, and Poitou from the Eng.; Philip III. acquired Toulouse and Venaissin by negotiation; and Philip IV. received Navarre, Champagne, and Brrie by marriage. This latter prince could afford to treat the order of the templars in the most arbitrary and despotic manner, and on one occasion, when the nobles pressed him too hard, he baffled all their exertions by convoking for the first time (Mar. 28, 1302) the gen. estates, in which assembly the burghers took seats and voted beside the nobility and the clergy. On the accession to the throne of the house of Valois, in 1328, with Philip VI., the wars with Eng. began, the Eng. king, Edward III., claiming the crown of F. as a grandson of Philip IV. These wars lasted 100 yrs. But when at last the Maid of Orleans succeeded in rousing the national feeling and carried Charles VII. to Rheims to be crowned, it is curious to notice how all the enthusiasm of the people was concentrated on the person of the king. Although persons like Louis XI. (1461-83) and Catharine de Medici, who actually governed F. during the reign of her 3 sons, were not fit to make royalty charming to the minds of the people, they were eminently fit to make it respected and feared. Charles IX. had all the leaders of the Prot. party murdered at the massacre of St. Bartholomew; Henry III. all the leaders of the R. Cath. party murdered one after the other. When (in 1589) Henry IV. ascended the throne and founded the *Bourbon* dynasty, he must have felt quite lonesome in F.; at all events, the royal power stood now victorious. There was, indeed, something exalted and solemn about the royal power as it was exercised by Cardinal Richelieu under the reign of Louis XIII., but the impression was utterly changed by the magnificent but challenging arrogance of Louis XIV. (1643-1715). During the first yrs. of the reign of this king F. was eminently prosperous. The treas. was full, commerce and industry flourished, the army and navy were in an effective state, and new provs. were added to the kingdom. The king's prodigality was accompanied by an elegance and taste which spread a blinding radiance around him. But after some yrs. the true character of the absolute monarchy became apparent. In 1685 the king revoked the Edict of Nantes, given to the Prots. by Henry IV. as a guaranty of religious freedom. Persecutions began, thousands of the most intelligent citizens of F. were exiled, the revenues decreased, and the king's prodigality grew stronger. His second war (1689-97) was not successful, and in his last (1700-13) failure followed failure. In many dists. of F. food began to become scarce, and when the king d. he left a country utterly exhausted and a people deeply discontented. Under his successors the consciousness of the reasons came, and with it the crisis. The Fr. court was the gov. of F., and the only valid authority was the king, who governed F. by the court and a great retinue of officials, to whom the offices were sold. The people under this gov. consisted of three classes—the nobility, the clergy, and the third estate. The nobility was exempted from land-tax, from military service, from contributions to the maintenance of roads, etc., and on such conditions held more than 1/2 of the soil of F., enjoying the right of hunting, exercising police superintendence, administering justice, etc. The Ch. owned a little over 1/3 of the soil, on which it paid no regular taxes. The third estate had the whole burden of the defence of the country, of the defrayment of the public expenses, of productive labor, and was trammelled by the most absurd laws political economy ever saw. Between this people and this gov. stood a class of writers—Voltaire, Rousseau, D'Alembert, Montesquieu, Diderot—who with matchless eloquence and irresistible wit showed the demoralization on the one hand, the misery and degradation on the other. This was the situation to which the absolute monarchy in F. came. The result could be nothing else than the *Revolution*.

Money was wanting; the state was on the verge of bankruptcy. The king, Louis XVI. (1774-93), first tried different ministers of finance—Necker, Calonne, and Brienne—who could do nothing; the nobility and the clergy absolutely refused to be taxed. The king then convoked the gen. estates to meet at Versailles 1789. In this assembly the votes were cast not by poll, but by class, and thus the third estate was completely overruled by the two privileged estates. The third estate protested, demanded a vote by poll, and on June 17 constituted itself the National Assembly; it took the oath not to separate until a const. was made, and on the 23d it declared its membership inviolable. To this the king answered by ordering the concentration of a body of troops at Versailles. But on July 12 the first insurrection took place in Paris; on the 14th the Bastille was stormed, and on Aug. 4 the National Assembly abolished all feudal and manorial rights. The royal princes fled, the emigration began. On Oct. 5 the mob of Paris rushed out to Versailles and carried the king and queen back to Paris; July 14, 1790, the const. was ready, and the king took his oath on it. Still, the



MAP OF
FRANCE
Drawn and Engraved on Copper-Plate
EXPRESSLY
FOR
JOHNSON'S UNIVERSAL CYCLOPEDIA





CORSICA

Scale same as main map



MEDITERRANEAN SEA

excitement in Paris increased every day, and on the frontier the royal princes organized corps of *émigrés*, while Aus., Prus., Sax., Eng., and Sp. offered the king their help against his subjects. June 20, 1791, he and the queen tried to flee, but were stopped, brought back to Paris, and confined in the Tuileries. On Sept. 14 he had to take oath on a new const., and then the National (or Constituent) Assembly considered its work as done, dissolved, and gave place for the Legislative Assembly, which met Oct. 1, 1791. Meanwhile the protests of the foreign courts, the royalist insurrections in Calvados and Vendée, and the movements of the emigrants caused a terrible excitement in Paris. War was declared against Aus. and Prus., and when reports came of the defeat of the Fr. armies, and the king, in confidence of help from the approaching Aus., assumed a more decided attitude, the excitement grew into wild fury. Armed bands broke into the Tuileries, the Swiss guard was massacred, and the royal family brought to the Temple as prisoners. Robespierre, Marat, and Danton swayed the Parisian populace, and on the news of the Prus. invasion a tribunal of national defence was formed, the const. abolished, the Legislative Assembly dissolved, and a National Convention convoked. This last met Sept. 21, 1792, consisting of 2 parties—the Jacobins, comprising the most radical democrats, and the Girondists, the representatives of law and order under the form of a constitutional monarchy. The Jacobins were in the majority, and on Sept. 25 Fr. was declared a republic. Their power was still more strengthened by the success of the war. The king was brought to trial and executed; the Girondist leaders followed him. A committee of public safety was formed and invested with absolute power. The govt. became a perfectly unlimited despotism, and he whom the Parisian mob lifted on their shoulders a despot for the hour; the Chr. religion was abolished, and the worship of "Reason" introduced.

At this moment the revolutionary frenzy had reached its culmination. In those excesses there was something which actually disgusted Robespierre. He wanted a perfect democracy; he was willing to go through the terror of anarchy in order to break down the old social order and produce the new. But anarchy itself was not his ideal. The party called the *Enragés* was brought to the guillotine. A worship of the Supreme Being was substituted for that of Reason. But the reaction, once begun, could not be stayed. The *Enragés* were followed by Danton, and Danton by Robespierre himself. The Jacobins were now without leaders, and their club was closed. During the next yr. (1793) the executive power was placed in the hands of a Directory of 5, and the insurrection against this new const. put down by the young Gen. Bonaparte. The situation of the Directory was, nevertheless, by no means an easy one. From without it was attacked by Eng., Aus., and Rus. But this part of its duty it discharged with great success, and the armies of the young republic seemed to be unconquerable. In the interior, however, the Directory was much less successful. La Vendée was still in uproar, and when more peaceful and conciliatory measures were adopted, the royalists returned and began their intrigues. At the election of 1797 they gained the majority in the representation, and the govt. had to use very harsh means in order to save itself. The Tuileries was surrounded with troops and cannon, and the royalist members were arrested. Their election was declared illegal, and they were banished from the country. Also the financial difficulties proved too great for the govt., and the Directory had to declare the state bankrupt and reduce its obligations to $\frac{1}{2}$ their amount. Under these circumstances there arose a gen. feeling of the necessity of concentrating the govt. in one individual, and when (Nov. 9, 1799) Bonaparte overthrew the govt. of the Directory by military force and grasped the reins himself, most people in F. approved of the measure.

CLEMENS PETERSEN.

IX. FRANCO-GERMAN WAR (1870-71).—In 1866 Prus., on the basis of its victory over Aus., gave up its modest attitude of former days, and took the hegemony in Ger., whereby the old enmity between Fr. and Ger. was rekindled. The govt. of Nap. III. felt a depressing influence from the success of Prus.; the Fr. people felt offended, and the cry was heard, "Revenge for Sadowa!" When in 1870 it was communicated to the court in Paris that Prince Leopold of Hohenzollern had declared himself willing to accept the crown of Sp., the imperial govt. determined to use this event for the humiliation of Prus. The prince renounced the Sp. crown of his own free will, but the party at the Fr. court, which wished the war on any account, succeeded, and the declaration of war followed on July 19. Immediately King William gave orders for the mobilization of the whole army of the N. Ger. Confederation, and in S. Ger. the Fr. challenge produced the same outburst of patriotic enthusiasm as in the N. The king of Bavaria ordered the mobilization of his army; Baden, Hesse, and Württemberg followed the example, before the end of the month the strategical evolution on the Rhine was finished, and the march toward the Fr. frontier began.

From the beginning of the war the superiority of Ger. began to show. On Aug. 4 the crown-prince of Prus. passed the frontier and met the Fr. army at Weissenburg, and on the same and the following days decided victories were gained. At Weissenburg the Fr. retreated in wild disorder, at Wörth they fled in utter confusion, and at Saarbrück their army was defeated. The effects of those events were that, while the Ger. armies streamed over the frontier, on the Fr. side the greatest confusion prevailed. All the Fr. corps retreated, and 2 different armies—the army of Metz (or the Rhine army, Marshal Bazaine) and the army of Châlons (Marshal MacMahon)—were formed. The battles of Courcelles, Vionville, and Gravelotte followed, and the Fr. Rhine army was shut up in the fortress of Metz. The army of MacMahon was attacked at Sedan. Everybody knows the result. Offers to conclude a capitulation were made from the Fr. side, and Nap. sent a letter to King

William: "As I have not fallen at the head of my soldiers, I surrender my sword to your majesty." The king demanded the capitulation of the Fr. army as the first condition, and declared that he then would accept the imperial sword. After the conclusion of the capitulation Nap. went to the palace of Wilhelmshöhe at Cassel, and the Fr. army was sent to Coblenz, Mentz, and other Ger. fortresses.

The news of the catastrophe caused an immense commotion at Paris, and a provisional govt. of national defence was formed (Sept. 4, Trochu pres., Jules Favre v.-p.). But the military situation of F. was very bad, and the Ger. armies were still advancing. To take Paris was considered by the Gers. as the most important task of the war, and immediately after the capitulation of Sedan the victorious armies began to move toward the cap. On Sept. 19 the complete investment of Paris was carried out, extending over a line of 50 m. And in the mean time another important event had taken place. After having tried to enter into political negotiations, Bazaine determined to capitulate. On Oct. 27 he concluded a purely military capitulation, by which the fortress of Metz, with all its stores of arms and ammunition and an army of 180,000 men, was surrendered to the Gers. All Fr. was filled with terror and fury, and indulged in the most vehement accusations against the "traitor" Bazaine. The German troops were sent to the Loire and to the North.

The capitulation of Metz depressed the Parisians, but news of a victory of the army of the Loire, formed under Gen. d'Aurelle de Paladines, changed the situation completely. The Parisians began to make preparations for a great sally, but the attempt failed, and the failure was a hard blow for the defence of Paris, any prospect of breaking through the Ger. lines from within the city being completely closed. At the same time the army of the Loire suffered great defeats, and in the N., where an army had been organized under the command of Gen. Faidherbe, Mézières capitulated in the night between Dec. 31 and Jan. 1. The beginning of the yr. 1871 brought the last great battles and the decision of the war. From the 10th to the 12th the battle raged in the neighborhood of Le Mans, and the Fr. were compelled to retreat; in the beginning of the month Gen. Bourbaki had begun to operate with an army in the S. E., but on Jan. 25 he saw himself surrounded by a circle which was open only toward Switz.; the unfortunate gen. fell into melancholy on account of his defeats, which destroyed the last hope of Fr.; he shot himself through the head, and on Feb. 1 the army retreated into Switz. to be disarmed there. In the end the Fr. were defeated at St. Quentin and compelled to flee in the utmost confusion. In the mean time the lack of provisions in Paris became serious, and the military commanders were without hope. From the Ger. side the bombardment began on Jan. 3, a sally *en masse* was made, but the Fr. columns soon were compelled to retreat without having gained any advantages. On Jan. 23 Jules Favre appeared at Versailles to negotiate concerning an armistice.

The National Assembly met at Bordeaux Feb. 12, 1871. It had to decide whether peace should be concluded or the war continued. Further resistance, however, seemed a complete impossibility. Fr. was utterly exhausted and completely defeated; her long and desperate resistance had increased her loss. On Feb. 17 Adolphe Thiers was sent to the Ger. head-quarters at Versailles to negotiate for peace, and on Feb. 26 the preliminary peace was signed: Alsace and the largest part of Lorraine were ceded, 5 milliards were to be paid as war expenses, and Ger. garrisons were to remain on Fr. soil until full payment was made. This agreement was laid before the National Assembly by Thiers and accepted on Mar. 1. On the same day a part of Paris was occupied by 30,000 Ger. troops. Mar. 13 King William of Prus., emp. of Ger., left Versailles for Berlin. The definitive treaty of peace was concluded at Frankfurt-on-the-Main (May 10, 1871), and on account of the rapid payment of the war expenses the last Ger. soldier left Fr. in July 1873. (See MOLTRE'S *Military History of the War*.)

AUGUST NIEMANN.

Francia, frau'se-ah (José GASPARD RODRIGUEZ), D. D., LL.D., known as **Dr. Francia**, b. at Asuncion, Paraguay, in 1757, became a Franciscan, and was trained at the Univ. of Córdoba, now in the Argentine Republic. His father is variously stated as having been Fr., Port., and Brazilian. The young F. received doctorates in divinity and canon law, and was for some time a theological prof., and then gained distinction as an advocate in Asuncion. In 1811, when Paraguay became independent, he was made chief of the junta; in 1813 one of the consuls, in 1814 dictator for 3 yrs., in 1817 dictator for life. He forbade any one to enter or leave the country, compelled every one to work for a living, seized the goods of the rich and gave to the poor, enforced popular education, and compelled the people to obey the laws by means of new and frightful penalties. When 69 yrs. old he forgot his priestly vows and took a wife. Though a cruel man and a rigorous tyrant, Dr. F. was generally beloved by his subjects. D. Sept. 20, 1840.

Fran'cis I., king of Fr., b. at Cognac Sept. 12, 1494. He was the son of Charles, count of Angoulême, and succeeded his cousin and father-in-law, Louis XII., Jan. 1, 1515. In the next July he set out for conquest of the Milanese terr., which was defended mainly by Swiss mercenaries, winning the great battle of Marignano, the "battle of the giants" (Sept. 14-15), where he was knighted on the field by Bayard. Thereupon followed his entry into Milan. In 1518 he won Tournay from the Eng., and in 1519 began his rivalry with Charles V. in the contest for the imperial crown. F., irritated by his defeat, was led by feelings of jealousy to acts of hostility. In 1522 he began the war against the emp., the pope, and Eng., most unwisely attacking at once Navarre and the Netherlands. Prosper Colonna, at the head of the It. troops, rapidly dispossessed F. of his It. possessions, except Cremona: the Fr. were routed in Navarre; and on the E. frontier the only advantage was the check given to Charles at Mézières.

Meanwhile the Eng. invaded the N., the constable Bourbon went over to the enemy, Bonivet was driven out of It., Bayard was slain, Provence overrun by the Gers., and the queen died. F., however, rapidly cleared Provence of his enemies, and followed them into Piedmont, but was defeated and captured at the great battle of Pavia, where he performed prodigies of valor. He was kept a close prisoner at Madrid for 1 yr.; but Eng., Venice, Rome, and Genoa demanding his release, the emp. liberated him, after exacting the most humiliating conditions, which were, under the protest of F., confirmed by an oath, from which the pope hastened to release the Fr. king. The war was at once renewed in It.; Rome was sacked by the constable Bourbon, the pope imprisoned, and the Fr. army under Lautrec was destroyed before Naples by a loathsome disease, hitherto unknown in Europe. F. thereupon challenged Charles to mortal combat, but the latter, though pretending to accept, took such care of himself that a combat of words alone followed. In May 1529 both parties were exhausted, and the Peace of Cambray ensued, but the war broke out afresh in 1534 and 1542, each time with apparent but not permanent advantage to Fr. The latter part of the king's reign was marked by terrible persecutions of the Prots. The character of F. is marred by jealousy, libertinism, religious bigotry, and extravagant love of military glory. His conspicuous merits were valor, frankness, generosity, good-breeding, and a love for the liberal arts. D. Mar. 31, 1547.

Francis II. of Fr., b. at Fontainebleau Jan. 19, 1543, was the son and successor of Henry II., and came to the throne in 1559. He was the first husband of Mary queen of Scots. The king was feeble of body and mind, and the Guises were the real rulers of Fr. The great events of this reign were Condé's Huguenot conspiracy against the Guises and the many consequent executions. D. Dec. 5, 1560, and the crown went to his brother, Charles IX.

Francis I., emp. of Ger., b. Dec. 8, 1508, succeeded his father, Leopold, as duke of Lorraine in 1529, and in 1535 received Tuscany in exchange for Lorraine, succeeding the last Medicean as grand duke in 1537. In 1536 he married the archduchess Maria Theresa. In 1541 he was declared co-regent with his wife, and in 1545 was chosen emp. Maria Theresa was the true sovereign in Ger. D. Aug. 18, 1565.

Francis II. of Ger., son of Leopold II. and grandson of Francis I., b. at Florence Feb. 12, 1578; succeeded his father in 1592, in which yr. war was declared against him by Fr. at the beginning of the Revolution. Nap.'s brilliant operations in N. It. followed, and the Treaty of Campo Formio (1797) robbed him of Belg., the Milanese and part of the Rhine provs. In 1799-1800 he joined Rus. and G. Brit. in another war, but Moreau in Ger. and Nap. in It. (Marengo, June 14) brought this war to a termination favorable to Fr. in 1801. In 1804 F. took the title of emp. of Aus., joined the third coalition of 1805, and was compelled by the calamities of Ulm and Austerlitz to renounce his title of emp. of Ger. (1806), together with his claim to Venice and the Tyrol. This was the end of the Holy Rom. Empire. The Peace of Tilsit forced him to a fourth calamitous war, ending at Wagram 1809. In 1810 his daughter, Maria Louisa, was given by him in marriage to Nap. He joined the allies, and took part in the battle of Leipzig and the occupation of Fr. in 1813. Nap.'s final overthrow left F. a leading figure in the Holy Alliance, and Aus. for yrs. led the reaction against liberal politics. D. Mar. 2, 1835.

Francis I., king of the Two Sicilies, b. at Naples Aug. 19, 1777, became duke of Calabria in 1799; succeeded his father, Ferdinand I., in 1825. D. Dec. 8, 1830.

Francis II. of the Two Sicilies (FRANCESCO D'ASSISI MARIA LEOPOLDO), b. at Naples Jan. 16, 1836, succeeded his father, Ferdinand II. ("Bomba"), in 1859, and adopted his father's reactionary policy. His realm was invaded by Garibaldi's forces in 1860, and when Gaeta, his last stronghold, was surrendered (1861), F. escaped to Rome.

Francis (JOHN WAKEFIELD), M. D., LL.D., b. in New York Nov. 17, 1789, grad. at Columbia Coll. in 1809; in 1811 received his med. degree at the New York Coll. of Phys. and Surgeons; pub. with Dr. Hosack (1810-14) the *Amer. Med. and Philosophical Register*; in 1813 became prof. of materia medica in Columbia Coll. and lecturer in the Coll. of Phys. and Surgeons; went to Europe and studied under Abernethy; returned to New York, and held in the last named school successively the chairs of the institutes of med., of med. jurisprudence, and of obstetrics; was prof. of obstetrics in the Rutgers Med. Coll. 1826-30, ed. of a med. journal 1822-24; author of various professional and biographical works and of many scientific papers. D. Feb. 8, 1861.

Francis Joseph, emp. of Aus. and king of Bohemia, Hungary, etc., b. Aug. 18, 1830, son of the archduke Francis Charles and nephew of Ferdinand I., whom he succeeded in 1848. The Hungarian war was inherited, not brought on, by him. The Franco-It. war of 1859 and the Prus.-It. war of 1866 considerably reduced his dominions.

Francis (JOHN BROWN), b. in Phila. May 31, 1794, was a grandson of Nicholas Brown of Providence, R. I., grad. at Brown Univ. in 1808; studied law at Litchfield, Conn.; was in the R. I. legislature 1821-29, in the State senate 1831, 1842, and 1849-56; gov. of R. I. 1833-38, U. S. Senator 1844-45. D. Aug. 9, 1864.

Francis (SAINT) of Assisi, founder of the orders of Franciscans in the R. Cath. Ch., b. in 1182 at Assisi, and named GIOVANNI BERNARDONE, but called FRANCESCO by his father, a rich merchant who traded much with Fr., whence the child's name. He was a thoughtless, gay youth, and served as a soldier against the troops of Perugia, but was taken prisoner and confined for a yr. This imprisonment, and a consequent sickness, led him to make a vow to renounce the world—a vow which he soon forgot. But warned, as he conceived, by a voice from Heaven, he took a final vow of poverty. One day, as he was praying in ch., the crucifix, we are told, spoke and bade him repair the walls of God's house. F. stole and sold a horse and some goods belonging

to his father, and offered the money to the priest of the ch., who refused it; whereupon F. cast the money into the street, and took up his dwelling in the ch., the repair of which he undertook by begging and by the labor of his own hands. The father of F. flogged and imprisoned him for a time as a thief (1206), and F. formally refused all inheritance in his father's property. He now begged money for the repair of the chs.; washed the feet of beggars and lepers, and kissed their sores; clothed himself in a robe of serge sewed with pack-thread and tied about the waist with a rope; ate the meanest food, covering it with ashes, and wept and fasted almost continually; slept on the ground, using a stone for a pillow. In 1209, having a few personal followers, he drew up a monastic rule for them, which was in 1210 approved by Innocent III., and in the same yr. F. was made a deacon, the highest clerical position he would receive. In 1212 he was joined by St. Clara and her 2 sisters, the original Clarisses or Poor Clares of the Order of St. Francis. In 1221 he founded the Tertiary Order. Soon after, as we are told, he had a vision of Christ, and received upon his hands, feet, and side the *stigmata*, or marks resembling the wounds of Christ. Among his numerous reputed miracles was the healing of the infant Bonaventura, afterward a distinguished saint. D. Oct. 4, 1226, canonized 1228. C. W. GREENE.

Francis (SIR PHILIP), K. B., b. at Dublin Oct. 22, 1740, was the son of Philip Francis (1700-73), an Anglican clergyman; entered public life in 1756, under the patronage of Henry Fox, as a placeman in the state dept., and held afterward various places in the civil service at home and abroad until 1772; was a member of the council for Bengal 1774-80, and the constant opponent of Hastings, by whom he was badly wounded in a duel; entered Parl. in 1784, and finally left it in 1807; was prominently connected with the Hastings trial. At present he is chiefly remembered as the probable author of the *Junius* letters. D. Dec. 23, 1818.

Francis Xavier, *zav'e-et*, SAINT (FRANCISCO DE XAVIER), "patron-saint and protector of the E." b. of a noble family at the castle of Xavier, in Navarre, Apr. 7, 1506, and took his name *Xavier* from an estate of his mother's. Was ed. at the Coll. Sainte-Barbe, Paris, taught philos. in the Coll. of Beauvais, and received the doctorate from the Sorbonne. In 1534 he joined the new society proposed by his fellow-student and compatriot Loyola, which became the Society of Jesus; in 1541 he was sent by Loyola to Goa, India. During his 10 yrs.' apostleship in India, Ceylon, Japan, and Malacca, he baptized, we are told, more than 1,000,000 persons, and planted the faith in 52 kingdoms; his success was doubtless due to the exercise of the Jesuit practice of "accommodation." D. Dec. 2, 1552, canonized 1622.

Francis de Paul (SAINT), b. at Paola, Calabria, in 1416, became a Franciscan in youth, but assumed the life of a hermit near his native town. He soon acquired a wide fame by the terrible austerities of his life. In 1436 he established the order of Hermits of St. Francis, afterward called Friars Minims, Bon Hommes, and Fathers of Victory. In 1482 he visited Louis XI. of Fr., who hoped in vain to be cured by him of his last fatal illness. D. Apr. 2, 1507, canonized 1519.

Francis de Sales (SAINT), b. at the Château de Sales, near Annecy, Savoy, Aug. 21, 1567, of noble parentage, ed. at Paris and Padua; as deacon and provost of the cathedral of Geneva won fame as an eloquent preacher; became a priest in 1593; went on a mission to Savoy, whence in 1598 he procured the expulsion of certain Prot. ministers. He was then sent by the pope to convert Beza, but in vain. In 1602 he became bp. of Geneva; in 1610 he founded, with Mme. de Chantal, order of the Visitation. Wrote *L'Introduction à la vie dévote* and *L'Amour de Dieu*. D. Nov. 28, 1622, canonized 1665, made oecumenical doctor 1877.

Franciscans, *M'norites* (*Frates Minores*), **Gray Friars** (in Eng. and Ire.), sometimes called also **Seraphic Brethren**, one of the great mendicant orders of the R. Cath. Ch. Its founder (St. Francis) was b. at Assisi, It., in 1182. The founding of the order dates from May 16, 1209. In that same yr. the order was provisionally sanctioned by Innocent III., commended to the favor of the 5th Lateran Council in 1215, and finally established by Honorius III. in 1223. The rule was given in 1210. The female order of CLARISSINES (St. Clara) dates from 1212. The TERTIARIES date from 1221. And so St. Francis is called the founder of 3 orders. Medieval Europe owes much to the Franciscans. The numerical strength of the order was greatest about 50 yrs. after its foundation, when it had between 7000 and 8000 convents and nearly 200,000 monks. In the 15th century it declined, and was again greatly weakened near the close of the 18th century. The number of monks is nearly 100,000, and they are found in almost every part of the world.

Frank'e (AUGUST HERMANN), a great Ger. Lutheran divine and philan., b. Mar. 23, 1663, in Lübeck; commenced his studies at Erfurt 1679, continued at Kiel, and finished them at Leipzig in Heb., Gr., and theol. He delivered theological lectures in Leipzig 1689-90, was dean in Erfurt 1690-91; in 1691 was called to the new univ. of Halle as prof. of the Gr. and Oriental langs., and as pastor of the suburban town of Glaucha. Breithaupt and Lange were his associates in the faculty and in the spirit of practical energy in which he followed up the work of Spener. In 1715 he became pastor of the ch. of St. Ulrich. He was founder of the greatest orphan-house of Prot. Europe, of a free school, a free table for students, and of a sem. for teachers. In 1698 these insts. were brought together in one great edifice. The whole was sustained by private beneficence or by the judicious labor connected with the orphan-house. The best biographies of F. are by Niemeyer, Guericke, Kramer, and Eckstein. C. P. KRAUTH.

Franco-German War. See FRANCE.

Fran'colin, a name applied to gallinaceous birds of a group allied to the partridges, having the legs provided with spurs. They are found in the Old World.

Franconia, *fran-ko'ne-a* [Ger. *Franken*], was the name

of an old independent town, situated along the Rhine, the Neckar, and the Main, from whose dukes the Ger. empire more than once elected its ruler. It underwent many changes and modifications until, at the dissolution of the Ger. empire in 1806, it was divided between Bavaria, Sax., Hesse, and Baden.

Frankonia Mountains, the W. cluster of the White Mt. group, are in Grafton co., N. H., and are separated from the main group by the Notch. As a whole, the F. M. are not as high as the others, but the presence of little lakes adds a charm of their own. Mt. La Fayette, or the Great Haystack, is 5290 ft. high. Echo Lake, Eagle Cliff, the Profile Rock, Profile Lake, Bald Mountain, Walker's Falls, the Basin, the Flume, the Pool, and Georgiana Falls are attractive points. The mts. have deposits of iron ore.

Frangipani (i. e. "bread-breakers," from the liberality of its founders), a once illustrious family of Rome having also allied lines of the same name in Naples and Croatia. The family is traced as far back as the 7th century, and even claims to date from pagan Rome. During the 11th, 12th, and 13th centuries the name became one of the most splendid in ft. annals, but rapidly declined thereafter. Among its prominent members were CENCIO, a Ghibelline of the 12th century; GIOVANNI, in the 13th century, a soldier and founder of the Neapolitan line; CORNELIO (d. 1581), a Friulian advocate, living at Venice; CLAUDIO CORNELIO, his son (1533-1630); NICCOLÒ, a Venetian painter of the 16th century; FRANK CHRISTOPH, a Croatian conspirator (1630-71).

Frank (JACOB JOSEPH), b. in Poland in 1712, travelled in Rus. and Tur. In 1750 he declared the Talmud unfit for religious guidance, and substituted for it the *Zohar*, one of the Cabalistic works. His followers were called *Frankists* or *Zoharists*. They held that: No religion can exist without the knowledge of God; piety and the love of God are the effects of an acquaintance with his nature, and this must be sought in the study of his law, from which it must be deduced by tradition; the doctrine of Moses and the prophets has an inward meaning far deeper than that of the letter, and without which it is the source of errors; there is only one God, but revealed in three persons; God has appeared upon earth in human form, but after the entrance of sin he laid aside this form, and has since taken it again for the expiation of sin; he will once more appear in human nature, finally to deliver man from sin; Jerusalem will never be rebuilt, and a terrestrial Messiah is not to be expected. His Jewish brethren demanded the interference of the authorities; F. embraced Rom. Catholicism, and was baptized 1759, the king himself being represented by proxy as his godfather. But F. was soon accused of heresy, and was imprisoned; was released in 1773. He retired to Aus. terr., and in 1776 settled at Vienna, until, hunted down by the police, he removed to Brünn, the cap. of Moravia, where he was supported by his followers in princely splendor. In 1786 he established his residence at Offenbach, where he made even greater display. He declared himself the true Messiah, and was by his followers believed immortal until his death. D. Dec. 10, 1791.

Frankalmoin (Norman Fr. "free alms"), in Eng. law, the tenure, chiefly of lands, by spiritual service, as where a sole or aggregate corporation holds an estate of some private person, who gives it to God as free and perpetual alms. Such tenures were forbidden to be created after the 18th yr. of Edward I. (1292), but there are in Eng. many examples dating from before that time, chiefly ecclesiastical foundations or parish glebes. F. implied no fealty.

Frankfort, city and R. R. junc., cap. of Clinton co., Ind., 46 m. N. W. of Indianapolis. Pop. 1870, 1300; 1880, 2803.

Frankfort, Kan. See APPENDIX.

Frankfort, city, cap. of Ky. and of Franklin co., situated upon either side of Ky. River, on R. R. It is noted for the picturesqueness of its scenery and the fine drives in the

are the Rossmarkt (horse-market), with the monument of Gutenberg, and the Götthplatz, with the statue of Goethe. Among its public buildings are the Römer, an old building, in whose Wahlzimmer (election-chamber) the electors met, and in whose Kaisersaal (imperial hall) the elected emp. gave his first banquet; and the cathedral of St. Bartholomew, begun in 1238 and finished in the 16th century, in which the coronation of the Ger. emps. took place. It was a favorite residence of Charlemagne. In 1257 it was made a free city. After the days of Frederick Barbarossa it became the place for the election of the Ger. emps. Nap. made it the cap. of a principality. In 1848 and 1849 the Ger. Parl. sat here. After 1816 the meetings of the Ger. Diet, in which F. enjoyed an independent vote, were held here; but the city sided with Aus. in the war of 1866, and lost her autonomy. F. is the banking-house of Ger., and exercises considerable influence throughout the world. Pop. 136,819.

Frankfort-on-the-Oder, a city of Prus., on both sides of the Oder. It has considerable manufactures and a very extensive trade. Its 3 annual fairs have more than 10,000 visitors. Its univ., founded in 1506 by the elector Joachim I., was moved to Breslau in 1811. Pop. 51,147.

Frankfurter (MOSES BEN SIMEON), a Jewish scholar and printer, flourished at Amsterdam 1700-62; edited the *Great Rabbinic Bible*, which is one of the most valuable contributions to the critical study of the O. T. Scriptures. The Heb. Bibles are printed from this text. (See FÜRST, *Bibliotheca Judaica*, i. 345.)

Frankincense [Lat. *thus*], a name applied to various fragrant gums and resins. It anciently designated the substance now known in commerce as olibanum, the product of *Boswellia serrata*, an E. I. tree, and of *Platanus floribunda*, an Afr. tree, both of the order Terebinthaceae. The F. of Sierra Leone is from the *Daniellia thurifera*, a large mountain-tree. In Eng. the F. of the shops is merely common turpentine.

Frankists. See FRANK (JACOB JOSEPH).

Frankland (EDWARD), PH. D., D. C. L., F. R. S., b. at Churchtown, Lancashire, Eng. Jan. 18, 1825, ed. at Lond., Marburg, and Giessen; held successively professorships of chem. in Owen's Coll., Manchester, Bartholomew's Hospital, the Royal Inst., and the Royal School of Mines; became pres. of the Lond. Chemical Society 1871; author of pub. researches upon questions of organic chem.

Franklin, city and R. R. junc., cap. of Johnson co., Ind., 27 m. E. of Martinsville. It has a coll. Pop. 1870, 2707; 1880, 3116.

Franklin, Ky. See APPENDIX.

Franklin, La. See APPENDIX.

Franklin, R. R. junc., Norfolk co., Mass., 27 m. from Boston. Dean Acad. is situated here. Pop. tp. 1870, 2312; 1880, 4051.

Franklin, R. R. junc., Merrimack co., N. H., at the confluence of the Pemigewasset and Winnipisogee rivers, which form the Merrimack, 18 m. N. of Concord. The N. H. Orphans' Home is in this town, 3 m. S. of the v., on the farm once owned by Daniel Webster. Pop. tp. 1870, 2301; 1880, 3265.

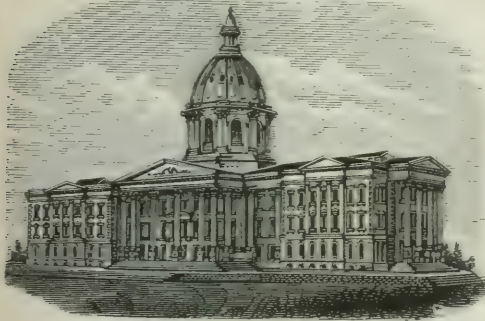
Franklin, on R. R., Warren co., O. Pop. 1870, 1832; 1880, 2385.

Franklin, city and R. R. centre, cap. of Venango co., Pa., on the Allegheny River at the mouth of French Creek. Incorporated 1868. Pop. 1870, 3908; 1880, 5010.

Franklin, cap. of Williamson co., Tenn., on R. R. and the Harpeth River, 18 m. S. of Nashville. It is the seat of Tenn. Female Coll. and of Harpeth Male Acad. Here Gen. Van Dorn was repulsed by Gen. Granger, Apr. 10, 1863, and Nov. 30, 1864, a battle was fought between forces of Gen. Hood and those of Gen. Schofield. Pop. 1870, 1532; 1880, 1632.

Franklin, Battle of. After the fall of Atlanta (Sept. 2, 1864) the Confed. authorities resolved upon an invasion of Tenn., hoping to draw Sherman back from Ga., and on Oct. 1 Hood crossed the Chattahoochee. Sherman had already sent Gen. Thomas to Nashville, and on Nov. 12 began his march to the sea. Hood moved toward Nashville, frequently engaging the U. troops under Schofield, who fell back until (Nov. 30) they reached Franklin, on the Harpeth River, 18 m. S. of Nashville. Schofield's object was to get his trains across the river and away to Nashville; Hood's object was to attack before he could do so. At 4 p. m. Hood attacked Wagner, who held the advanced position, and drove him back in confusion, with a loss of 1000 men, into and through the centre of the main lines. Hood threw his men within the broken U. lines, capturing 8 guns. At this moment Col. Opdycke, commanding a brigade which had been left within the main lines, led it into the gap, forcing back the Confeds., and recapturing the guns. Four different assaults were made by the Confeds., but each time they were repulsed. At midnight Schofield withdrew his troops and train to Nashville. Confed. loss, nearly 6000 in killed, wounded, and prisoners; U. loss, 189 killed, 1033 wounded, 1104 missing.

Franklin (BENJAMIN), LL.D., F. R. S., b. at Boston, Mass., Jan. 17, 1706. His father was an intelligent and devout chandler of Eng. birth; his mother, the daughter of Peter Folger of Nantucket, a prominent citizen. Benjamin was the 15th of a family of 17 children. To keep him from going to sea, he was apprenticed to his brother James, a printer, and by much reading, careful and assiduous writing (as much as possible after the style of the *Spectator*), together with the unassisted study of math., he acquired such knowledge and facility in writing that he ventured to print his thoughts upon public affairs in his brother's newspaper, the *New England Courant*, but the discovery of their authorship led to a quarrel between the brothers. In 1723 the young apprentice, wearying of the tyranny he experienced, broke his indentures and ran away, first to New York, and thence to Phila., where he found employment as a journeyman printer. He was in Eng. 1725-26, having been sent by Sir William Keith, the gov., who promised to set him up in business as the public printer of Phila., but failed to keep his promise. After his return to Phila. he married (1730), estab-



State Capitol (Franklin, Ky.).

vicinity, and contains the State capitol, a high school, a sem. for young ladies, an inst. for training feeble-minded children, and the State prison. Pop. 1870, 5396; 1880, 6958.

Frankfort, Connell of, a synod called by Charlemagne 794 A. D., and attended by 300 bps., who came from Ger., Gaul, Sp., It., and Eng., beside 2 delegates from the pope. It took decided action against the worship of images, and condemned the Adoptianists.

Frankfort-on-the-Main (Ger. *Frankfurt-am-Main*) was the most famous of the 4 free cities of Ger. It is now in the prov. of Hesse-Nassau, Prus., to which it was annexed in 1836. It is on the Main, over which an old stone bridge, built in 1340, crosses to its suburb, Sachsenhausen. It is entered by 7 large gates, 2 of which have been preserved in their old form, but the walls and ditches have been transformed into promenades. Among its public squares

lished the *Pennsylvania Gazette*, and soon found himself a person of the first consideration, not only in Phila. but throughout the provs., for his talents as a writer and his sound judgment in public and business affairs. He established the Phila. Library in 1742, and the Amer. Philosophical Society and the Univ. of Pa. in 1744; carried on his famous investigations into the nature of lightning 1746-52, and still later resumed them; and for his papers on the subject he was elected F. R. S. in 1775 and received the Copley gold medal. In 1753 he was made P. M.-gen. for the colonies, and several times served efficiently as com. to the mother-country and to the various colonies. From St. Andrew's, Ox., and Edinburgh in 1764 he received the degree of LL.D. He did his best to prevent the Revolutionary war by trying to avert the injustice which caused it, procured the repeal of the Stamp Act 1766, and ever warmly sustained the colonial rights. In 1775 he was chosen to the Cong., and in 1776 was one of the signers of the Dec. of Ind., having been also one of the committee to draft that instrument. He was (1776-85) employed in the diplomatic service of the U. S., chiefly at Paris, where his influence in behalf of his country was powerful and serviceable in the highest degree, and where his simplicity, dignity, and wisdom made him highly popular. He was pres. of the Pa. supreme council (in effect gov. of the State) 1785-88. In 1787 he was one of the delegates to the convention which drew up the U. S. const.

Of the writings of F., the *Busbody*, a series of admirable papers somewhat after the manner of the *Spectator*, and the incomplete *Autobiography*, are the best known, but his political, anti-slavery, financial, economic, and scientific papers are all noteworthy; pub. the famous *Poor Richard's Almanac* (1732-57). In youth he was an avowed sceptic in religious matters and of somewhat loose morals, but his practical good sense enabled him to correct his way of living, and he in later life treated the Chr. religion with reverence, though never avowing his faith in any religious system. D. Apr. 17, 1790.—His only son WILLIAM (1729-1813), was illegitimate; was royal gov. of N. J. 1762-76, but became a royalist, went to Eng., and d. there.—His grandson WILLIAM TEMPLE FRANKLIN (1760-1829), was his grandfather's secy. in Paris and the ed. of his writings. (See Bancroft's *Hist. of the U. S.*, vol. ix, ch. xxix.; the *Autobiography*, edited by JOHN BIGLOW, and PARTON'S *Life and Times of F. Franklin*.) [From orig. art. in *J. of the Univ. of N. C.*, by Rev. H. H. McFALLAND.]

Franklin (Jesse), b. in Surry co., N. C., in 1758, attained the rank of major in the Revolutionary war; was M. C. 1795-97, State senator 1805-06, U. S. Senator 1807-13, com. to the Chickasaws 1816, gov. of N. C. 1820-21, D. Sept. 1823.

Franklin (Sir John), D. C. L., F. R. S., rear-admiral, b. at Spilsby, Eng., Apr. 16, 1736; entered the navy, served at Copenhagen, Trafalgar, and New Orleans (1815), led Arctic expeditions 1818, 1819, and 1825; became post-capt. and F. R. S. 1823, knight and D. C. L. 1827, gov. of Tasmania 1836-43. In 1845 he set out on his last polar expedition in command of the Erebus and Terror. Many expeditions were sent out in search of the F. expedition, and from time to time various relics of it were found; in 1859 Capt. F. L. McClintock found at Point Victory in the Arctic region conclusive documentary evidence that F. d. near Lancaster Sound June 11, 1847, and there is no doubt that all his men also perished, though some long survived.

Franklin (WILLIAM BUEL), b. in York, Pa., Feb. 27, 1823; entered the Military Acad. at W. Pt. June 1839, grad. June 1843, and was assigned to the corps of topographical engineers; served in the war with Mex.; at W. Pt. Military Acad. as acting assistant prof. of natural and experimental philos. from Sept. 1848 to Jan. 1852; prof. of engineering and natural and experimental philos. at the New York Free Acad. (now Coll. of New York) from Jan. to Apr. 1852; on engineering duty for U. S. to May 1861; appointed col. of the 12th U. S. Inf. May 14, 1861, and brig.-gen. U. S. volunteers May 17, 1861; engaged with the Army of the Potomac in its various operations to Jan. 25, 1863; assigned to duty in the dept. of the Gulf July 1863, and engaged there in several important actions; conducted retreat to Alexandria, and directed Col. Bailey to make arrangements for the relief of Admiral Porter's fleet by the Red River dam; resigned as maj.-gen. of volunteers Nov. 9, 1865, and as col. of the 12th Inf. Mar. 15, 1866; became v.-p. and gen. agent of Colt's Firearms Manufacturing Co.; pres. of commission for laying out L. I. City 1871-72, pres. of the board of coms. for building new State-house 1872-73, consulting engineer of same.

Franklin Falls, Merrimack co., N. H. Pop. 1880, 1957.

Franklin Grove, Ill. See APPENDIX.

Franklinite [in honor of Dr. Franklin], a mineral found associated with red oxide of zinc, found chiefly at the Mine Hill and Stirling zinc-mines in Sussex co., N. J., and also at Altenburg, near Aix-la-Chapelle, Ger. It contains from 66 to 69 parts of peroxide of iron, with from 10 to 22 parts of oxide of zinc, and about the same proportion of oxide of manganese. It is worked for making zinc paint, and the residue, itself called F., is used as an iron ore.

Franklinville, N. Y. See APPENDIX.

Frank Marriage, a peculiar species of entailed estate formerly in use under the Eng. law, consisting in a gift of land by a father or kinsman to a daughter or cousin and her husband at the time of her marriage, upon the implied condition that the land was to descend to the issue of the marriage. On birth of issue the condition was regarded as performed, and the estate became alienable. But the passage of the statute *De donis conditionalibus* caused such estates, like others held in tail, to be controlled by the terms of the gift, and to be reserved exclusively for the issue for whom they were originally intended; so that the power of alienation was thus taken away. Such estates were afterward subjected to the same changes as all entailed estates.

Frank Pledge. In the early period of Eng. hist. the counties of the realm were divided into hundreds, and the hundreds were still further subdivided into tithings, which received their name (Sax. *teothung*, "a company of ten") be-

cause each was composed of 10 freeholders. These, with their families, all dwelt together, and were free pledges—i. e. sureties—for the good behavior and obedience to the law of one another. Upon the commission of any offence by any one of them, the others were obliged to have him forthcoming to answer the requisition of the law, or, in case of his escape, to bear the penalty imposed.

Franks, The. 1. *The Name and Peoples Embraced thereunder*.—The name [Ger. *frank*; Fr. *franc*; It. *franco*; Eng. *free*] is of later origin than the first historical appearance of the different peoples designated thereby. The tribes embraced 2½ centuries later under this name had already, during the reign of Augustus (27 B. C.—14 A. D.), appeared upon the Rhine. They had already at that time, in small pioneer groups, pushed across to the left bank of the Lower Rhine, while they occupied the terr. on the right from the mouth of the Ems to the Sieg and Werre. After the middle of the 4th century appear the 2 groups of this Frankish confederation under the names Salian and Riparian—the former inhabiting the districts of the Lower Rhine, the latter inhabiting the terr. of the Middle Rhine.

2. *Their Place in Teutonic History*.—Their problem in the civilization of Europe was to receive the inheritance of the Rom.-Chr. culture—to form, reform, develop, and supplement it by and with the freshness and vigor of the Germanic nature, and at the same time be formed, reformed, developed, and modified by it.

3. *The Characteristics and Conditions which made the Franks the first World-historic People of Germanic Nationality*.—a. *Their Geographical Position and Agricultural Nature*.—We find them in the middle of the 4th century separated into the 2 branches of Salian and Riparian, and occupying the fertile plains on the lower course of the Scheldt, Meuse, and Rhine. While thus the other Ger. tribes separated themselves entirely from their original homes, the F. maintained their geographical connection with the old Germanic home, from which they drew new freshness and vigor by which to oppose the influences of the decaying Rom. world. They pushed gradually and peacefully forward, settling their lands as they gained them, destroying the scanty remnants of the Celtic civilization.

b. *Their Attitude toward the Roman State*.—The F., after the first brushes of conflict with the Rom. commander Aetius in Gaul (428 A. D., and 431 A. D.), acknowledged the political supremacy of the Rom. state, occupied peacefully the land as far as the Somme by consent of the Rom. commander, and tolerated the Rom. rites and religion. And not until the Rom. gov., Syagrius of Soissons, had separated himself by his own usurpatory act from the source of his authority in Ravenna or Constantinople, and thus lost in the eyes of his Roman-Gallic subjects his legitimacy, did the Frankish king Clovis abolish these remnants of Roman supremacy.

c. *Their Attitude toward the Orthodox Romish Church*.—About 493 A. D. the Frankish king Clovis took for his consort an orthodox Chr., Clotilda, daughter of King Chilperic of Burgundy, who shortly before the marriage of his daughter had been murdered by his own brother Gundobald, also king in Burgundy, and an *Arian* by profession. The Orthodox Chrs. of Gaul believed that difference of creed was the cause of the murder, and it fired their souls with hatred against Gundobald. Clovis inherited by his marriage with Clotilda, according to the Ger. law of blood-revenge, the duty of revenging the blood of his father-in-law. Here was one point of sympathy between him and the orthodox inhabs. of all Gaul. Clotilda lost no time in attempting by her persuasions to extend this sympathy on the part of her consort, but in vain. Clovis gave way only so far as to allow his first-born son to receive the Chr. baptism. A few days afterward the babe sickened and died. A second was born to him, and likewise subjected to the Chr. rite. In 5 days this child sickened and came near unto death. In allowing these acts Clovis had been a traitor to the gods of his fatherland—those gods who had rewarded with victory and success his devotion to them, and who now punished his treason. It was therefore a matter of no small moment that this child recovered, and that the Chr. God thus vindicated himself and his power in the eyes of Clovis. Thus aroused, disturbed, and excited in spirit, the Frank neared the decisive instant. The Alemanni, a warlike Ger. tribe occupying both sides of the Rhine from Mayence to Bâle, pressed hard against the Riparian F., whose king, Sigebert, with the aid of Clovis the Salian, prepared to meet them in battle. The conflict took place in the neighborhood of the present city of Zülrich (496 A. D.). The F. fell by thousands; complete destruction threatened them. In this moment of despair Clovis lifted his eyes to heaven and pledged himself by an oath to receive the God of his Clotilda if that God would only prove his power and favor by securing to him the victory. Then he plunged once more into the heat of the battle, and won. Clovis, with 3000 of his followers, received immediately the Chr. baptism from the hand of the bp. Rhegmigius of Rheims, and vowed their allegiance to the orthodox Ch. The manner of this conversion was the *undoubted reception* by the F. of the Romish-Chr. Ch. in its totality as the infallible organ of the invincible God.

4. *The Merovingian Government*.—The first Frankish king of whom we have any mention was Clodio, while the second, Merovius, founded the dynasty which Clovis fixed firmly in power. The gov. was the patriarchal monarchy in its most warlike type. The king's court was the central point of the gov. No distinction was made between the king's private property and the state treas. The officers of his household were *ex officio* the highest officers of the state, the major-domo at their head. The gov. was administered through the agents of the king and these officials, as well as all servants and favorites of the monarch, were paid or rewarded by grants of land. The lands thus granted were already inhabited and cultivated by a Romish-Gallic peasantry; and the king's grant of land transferred the people dwelling thereon to the political jurisdiction of the grantee

—i. e. exempted the inhabs. of these grants from the *immediate* power of the king. Of course such an economy of the treas. must result in the exemption of the entire terr. of the Frankish crown from the immediate power of the king, and raise up a powerful and defiant nobility which he could not control. This cause, taken together with the conflicts engendered by the absence of any fixed law of succession within the royal family itself, and the degeneration of the Merovingian dynasty through contact with the decaying Rom. world, brought the Frankish state, after an existence of more than 2½ centuries, near to its dissolution.

3. *The Carolingian Reform*.—As at the close of the 7th and the beginning of the 8th century the dissolution of the Frankish state became imminent, 3 mighty dukes of the Carolingian house, Pepin von Landen, Pepin von Heristal, and Charles Martel, gradually and successively gathered into their own hands all political power—first in Austrasia, the more Ger. half of the kingdom, and then in Neustria, the more Romanic half. The Carolingian dukes broke the independent power of the defiant nobility; brought the royal domain back to the ownership of the Crown; established the principle that the grant of crown-lands meant only the grant of the use of the same, and that only upon condition of service to the state; extended the boundaries of the kingdom; planted the Ch. in new places; lent their aid to Boniface in the conversion of the Thuringians, Frisians, and part of the Sax.; and successfully defended the European-Chr. civilization against the terrible Moslem invasion. Not until they had virtually ruled the Frankish state for more than 50 yrs. did they move for the possession of the crown in their own name and right. It was Pepin le Bref who submitted this question first to an assembly of the magnates of the kingdom, and then, after receiving their approval of his design, appealed to the Rom. pontiff for the recognition of his authority as king of the F. Upon the reception of the affirmative reply of Pope Zacharias, Pepin was crowned and anointed by the presiding bp. at Soissons in May of 752 A. D. After the mighty Charlemagne had reduced to the sway of his sceptre all the terr. of Europe, Pope Leo III. set the crown of the Rom. emp. upon his head in the ch. of St. Peter's at the grave of the apostles, and the Rom. people greeted him as emp. and Augustus (Christmas Day of the yr. 800). With this it was said that the Rom.-Chr. empire of Constantine had been restored as the *feudal* gr. of the Rom. pontiff to Charlemagne. This manner of the origin of the imperial title gave a color and a moment to the papal assumption of the power to grant and confiscate thrones which the entire Middle Ages did not shake off. During the reign of Charlemagne (768-814) the Frankish state stood at the summit of its power and glory. But when the mighty personality which created the great empire was no more, and his only surviving son, Louis the Pious, succeeded to the sovereignty, the dissolution began. The wealth of the Crown and the powers of the state were squandered upon the clergy, and the latter half of the weak monarch's reign was a constant conflict between his sons in regard to the succession. At length it came, after the father's death (840 A. D.), to the compact of Verdun between them (Aug. 843 A. D.), according to which the eldest, Lothair, received It., the beautiful Burgundian lands, the valleys of the Meuse and Moselle, and the present Hol., and called after his name Lothairingia or Lorraine. Louis the Ger. received the more Ger. portion of the empire, E. of Lothair's kingdom; and Charles the Bald, the Romano-Gallic portion, W. of the same. We may therefore look upon this compact of Verdun as the birth-moment of the 3 great nationalities—Ger., Fr., and It.—whose friendships and hostilities, workings and interworkings, influences and reflex influences upon each other, have formed the substantial part of European continental hist. for the last thousand yrs. (See WEBER'S *Geschichte des Mittelalters*. [From orig. art. in *J. S. Univ. Cyc.*, by Prof. J. W. BURGESS, LL.B.]

Fraser (ALEXANDER CAMPBELL), LL.D., b. at Ardoch, Argyleshire, Scot., Sept. 1819, ed. at the Univ. of Edinburgh; in 1846 appointed lecturer on mental philos. in the New Coll., Edinburgh. From 1850 to 1857 was ed. of the *N. Brit. Review*, succeeding Sir William Hamilton in the latter yr. as prof. of logic and metaphysics in the Univ. of Edinburgh. Beside many valuable contributions to the *N. Brit. Review* and other periodicals, he wrote *Essays in Philos. and Rational Philos.* Pub. the *Life and Letters of Bp. Berkeley*, with an account of his philos.

Fraser (CHARLES), a painter, b. in Charleston, S. C., Aug. 20, 1782; studied law, was admitted to the bar, and practised with such success that his art-studies were suspended. In 1818 renounced the profession of the law and devoted himself to painting. In the dept. of miniature he chiefly excelled, though historical subjects and landscape tempted him. His popularity in his native city was great. At an exhibition of his works held there in 1857 there were 313 miniatures and 139 paintings in oil of other styles. Mr. F. was a man of letters as well as an artist. D. Oct. 5, 1860.

Fraser (SIMON), a Scot. officer who entered the 2d Highlanders in 1757; served on the Continent with honor; in 1761 became major of the 21st Foot, and in 1776 a brig.-gen.; served under Burgoyne in Amer.; gained an advantage over the Amers. in the action at Hubbardton, Vt., July 7, 1777; bore a prominent part in the battles at Stillwater, N. Y., in the second of which he was mortally wounded, and d. on the following morning, Oct. 8, 1777.

Fraser (SIMON). See LOVAT, LORD.

Fraser River, in Brit. Columbia, is, next to the Columbia and the Yukon, the largest Amer. river falling into the Pacific. It rises by 2 forks, one of which flows S. E. for 250 m., while the other flows from the Rocky Mts. and reaches the junction after a N. W. course of 200 m. The union is near Ft. George (about 53° 25' N. lat., 122° 40' W. lon.). The course of the main stream is S. for 800 m. Large steamers ascend it 150 m., and at high water they can go 12 m. farther up. Large sea-going vessels mostly stop at New West-

minster, 75 m. from the Gulf of Georgia. F. R. is chiefly important for the gold-mines along its banks and for its salmon fisheries.

Fraternities [from the Lat. *fraternitas*, "brotherhood"], voluntary associations of men for mutual benefit, benevolence, or pleasure. Such are the numerous secret and benevolent societies, and in a large sense the term may include the orders of the Ch. and the monastic and sacerdotal congregations, and even the orders of knighthood; also guilds, trades-unions, and the like.

Fratres Arvales [from *arvum*, a "field"], a coll. of 15 priests in anc. Rome, established at a very early period, and continuing into the 4th century. Their office was for life, while their duties were connected with agriculture, one of them being to celebrate each yr., on the 15th of May, a festive procession in honor of the gods who preside over the fields. They chanted hymns also, one of which is regarded as the earliest specimen of the Lat. lang.

Fratrilium [the equivalent of *Fratres Minores*, the "Lesser Brethren," an official title of the Franciscans], a name given to certain zealous of the 12th, 13th, 14th, and 15th centuries, who were originally Franciscans, but adopting extravagantly ascetic habits and heretical doctrines, they were condemned in 1302 by Boniface VIII. They believed in a new dispensation to take the place of the N. T., and were noted for austerities and blind ascetic zeal.

Fraud [Lat. *fraus*]. Fraud of which the law takes cognizance has the effect to render voidable every transaction into which it enters as a constituent material element. But it is not every perpetration of F. that warrants legal interposition. The law considers the *results*, either actual or to be reasonably presumed, of every act concerning which question may arise as to its fraudulent character, and exerts its remedial agency only when injury to individuals or to the public welfare has, in fact, been occasioned or is to be naturally expected, and then only in behalf of the party whose interests may be prejudiced. Another characteristic of acts deemed fraudulent in law is an intent, either actual or presumed, to occasion harm or damage to another. In a large class of cases, however, a fraudulent intent is presumed from the nature of the transaction. F. consists in artifice or concealment, with the view or expectation that a person will be misled, and the actual misleading him to his injury. Both actual F. and constructive F. are, with but few exceptions, within the cognizance either of courts of law or courts of equity under the division of jurisdiction which exists in the Eng. and Amer. systems of jurisprudence. The gen. jurisdiction of equity over the subject of F. is very comprehensive, and cases of constructive F. particularly are much more commonly considered in equity than at law. The legal remedy consists merely of an award of damages to the injured party, while the modes of equitable relief, which admit the setting aside of a fraudulent transaction or the enforcement of the specific performance of an agreement, are oftentimes much more beneficial and desirable.

Fraunhofer, FROWNHOFER, VON (JOSEPH), b. at Straubing, Bavaria, Mar. 6, 1787, was brought up to his father's trade as a glass-worker, but studied optics, astron., and math., and in 1806 became a director of the mathematical inst. of Munich. In 1815 he observed, measured, and described with admirable fidelity the dark lines of the solar spectrum, called Fraunhofer's lines, first noticed by Wollaston in 1802, and in 1817 was admitted to the Acad. of Sciences, Munich. He made many improvements in fine glass-making, in dioptric instruments, and in the machinery for the manufacture and finishing of lenses; made the noble refracting telescope of the Dorpat Observatory; in 1823 became prof. and director of the Cabinet of Physics, Munich. D. June 7, 1826.

Frazee (JOHN), a sculptor, b. in Rahway, N. J., July 18, 1790; commenced business as a stone-cutter in New Brunswick 1814, later opened a marble-yard on Broadway, N. Y. From 1819 till 1823 his work was chiefly in mantelpieces and monuments. His first bust, a head of John Wells, was executed in 1824. He subsequently made busts of Chief-Justice Marshall, Dr. Bowditch, Daniel Webster, Gen. Jackson, John Jay, Judges Story and Prescott. Crawford the sculptor took his first lessons in statuary from F. and his partner Launitz. D. Mar. 3, 1852.

O. B. FROTHINGHAM.

Frazier's Farm, Battle of (also called the battle of GLENDALE or of NEW MARKET CROSS ROADS), fought about 10 m. E. of Richmond, June 30, 1862. The U. Army of the Potomac was retreating from the Chickahominy to the James. In order to pursue it Lee divided his force on the N. side of the Chickahominy into 2 columns, one under Jackson, the other under Longstreet. Both columns re-crossed the Chickahominy by bridges which had been built by McClellan. Jackson, who was to press the U. rear, reached at noon the White Oak Creek, but found the only passage so commanded by artill. that he was forced to remain in check. Longstreet, with his own division and that of A. P. Hill, made a wide detour, heading the White Oak Swamp, and about noon struck the road by which the U. army, spreading along several m., was retreating, its head having already reached Malvern Hill. The battle which ensued was a series of sanguinary but desultory conflicts, carried on until nightfall, when the fighting ceased, as if by mutual consent. All this time Jackson was within hearing of the firing, but could not cross the creek to the aid of Longstreet. When the fighting was over the U. army pursued its unopposed retreat to Malvern Hill, while the Confeds. bivouacked upon the battle-field. The U. loss in this battle was about 1800 in killed and wounded, that of the Confeds. probably about 2000; but the divisions of Longstreet and Hill were so worn out by marching and fighting as to be unable to take any part in the battle at Malvern Hill, which was fought the next day.

Frederick I., emp. of Ger., b. in 1121. After Henry IV., emp. of the Holy Rom. Empire, had been thoroughly humiliated by Pope Gregory VII. in the celebrated snow-

covered courtyard of Canossa, he determined upon surrounding himself with a new and reliable set of followers. In pursuance of this policy he created Count Frederick von Büren duke of Suabia, and at the same time bestowed upon him the hand of his daughter Agnes. Von Büren shortly after removed his castle to the summit of a mt. named Hohen Staufen, and was thenceforth always called by that name, though his family was also known by the name of Weiblingen, from the castle Weibling—a name which was changed subsequently by the Its. into Ghibelline. When Henry IV. died, F. served Henry V. with the same fidelity. Upon the death of the latter emp. the Salic line of Ger. emps. became extinct, and a new election was ordered. F. was an applicant for the crown, but his haughty manner set the electors against him, and Lothair of Sax. was elected. Upon Lothair's death, which followed soon after his election, Conrad von Hohenstaufen, duke of Franconia and brother of F., was elected king of Ger., but he was never crowned emp. by the pope. To him succeeded his nephew Frederick, son of Frederick of Suabia, called Frederick Barbarossa (on account of his red beard), and who was 31 yrs. old when the Ger. princes elected him their king, and who was crowned as Frederick I., emp. of the Holy Rom. Empire, in 1155 by Pope Adrian IV. F. having been beaten at the battle of Legnano (1176) by his It. subjects, determined to punish Henry the Lion, the Guelphic duke of Bavaria, who had, forgetful of all F.'s past generosity, refused to accompany him on his expedition, and had thus virtually brought about its disastrous end. This was the beginning of the endless conflicts between the Ghibellines (F.'s party) and the Guelphs (the party of Duke Henry). His son Henry was crowned king of Lombardy (1186), and married to Constance, the heiress of the crown of the Two Sicilies. F. organized the great crusade in which Richard Cœur de Lion also took such prominent part. D. June 10, 1190. [From orig. art. in *J.'s Univ. Cyc.*, by A. E. KROEGER.]

Frederick II. of Ger., b. at Jesi, in the March of Ancona, Dec. 26, 1194. He was the son of Henry VI., and though elected king of the Romans, in 1196 and king of Naples and Sic. in 1209, and though duke of Suabia by inheritance, he did not succeed to the imperial crown until 1215, when, by the aid of the Ghibellines and Innocent III., his guardian, he successfully asserted his claim against Otto IV. Having engaged in the crusades, he took Jerusalem (1229) and crowned himself king; after his return he was involved in life-long wars incited by the popes. D. Dec. 13, 1250.

Frederick III. of Ger. This title is sometimes given to the duke of Aus., elected emp. in 1314, who reigned as joint emp. with Louis IV. from 1325 to his death, Jan. 13, 1330. By others he is reckoned as a king of Ger. but not an emp. The Frederick III. of hist. was a son of Ernst, duke of Styria and Carinthia, b. at Innsbruck Dec. 23, 1415; in 1440 was elected emp. He reigned 53 yrs., the longest Ger. reign. His family still bears sway in Aus. D. Aug. 19, 1493.

Frederick I., the first king of Prus., b. July 22, 1657; succeeded his father, Frederick William the Great, as elector of Prus., with the title of Frederick III., in 1688. On coming to power he enriched his treas. by lending troops, and enlarged his boundaries at expense of small neighboring states. In 1701 he took the title of king. D. Feb. 25, 1713.

Frederick II., called the GREAT, king of Prus. from 1740 to 1786, b. Jan. 24, 1712. His father, Frederick William I., left him a full treas. and the best disciplined army in Europe, and he understood how to avail himself of these advantages. Shortly after his accession the emp. Charles VI. died, and according to the Pragmatic Sanction, his daughter, Maria Theresa, succeeded to all his possessions. But in Dec. 1740 F. marched his army into Silesia, and without any declaration of war seized this whole prov. of the Aus. empire. At Mollwitz, his first battle, he fled, believing all to be lost, but his gens. gained a brilliant victory, and the ridicule which by this curious opening of his military career he threw over his own name he very soon silenced by giving proofs of a most decided military talent. The rapidity of his movements, the decisiveness of his actions, amazed his adversaries, and after the victory at Chotusitz he kept Silesia by the Peace of Breslau (1742). Two yrs. after he had to fight again for his conquest, but his victories at Hohenfriedberg, Sorr, Hennersdorf, and Kesselsdorf compelled Aus. once more to leave Silesia a Prus. possession by the Peace of Dresden (1745). But a new attempt was made to wrench the prey out of his hands. From the documents stolen in Dresden he learned that there existed an alliance between Aus., Sax., and Rus. apparently for the purpose of humiliating Prus. He immediately threw his army into Sax. (Aug. 1756), and thus began the famous Seven Years' war, in which Fr. and Swe. joined the allies, and Eng. was the only power which sided with F., Aus., Sax., and Fr. armies entered his country from the S. The Swedes took his cities and closed his ports to the N., and from the E. the Rus. hordes penetrated into the heart of his kingdom, plundered his cap., devastated and burned his cities, murdered and massacred everywhere. He won great victories at Prague, Rossbach, Zorndorf, Torgau, and Freiberg, but he also suffered great reverses of fortune at Hochkirch and Kunersdorf, and the circle of his enemies was drawn closer and closer upon him. Still, to the very last his energy was unwearying, his perseverance unbroken, his resources unexhausted, and by the Peace of Hubertburg (1763) he yielded not an inch of his land to his enemies; on the contrary, he secured to Prus. the final possession of Silesia and a respectable place in the political system of Europe. Indeed all Europe was filled with his praise. He incurred, however, great odium, even among his contemporaries, for his participation in the first division of Poland (1772), and traits of his private life and of his diplomatic negotiations utterly disparaging of his character were circulated with great malignity. As he grew old he fell behind his time; he soon fell even behind himself. His quick and refined sensibility of former days became capricious, his energy restless, his wit

coarse, his contempt and suspicion more cynical; at last a kind of stupor seemed to petrify him. He d. Aug. 17, 1786, sitting full dressed in his field-chair alone in the room.

CLEMENS PETERSEN.

Frederick Charles Nicholas, FIELD-MARSHAL PRINCE, b. at Berlin Mar. 20, 1828, a nephew of the emp. William of Ger.; served with distinction in Schleswig (1864), had an important share in the victory of Sadowa (1866), commanded the second Ger. army in the Franco-Ger. war, had command in the siege-operations against Metz, and afterward dispersed the army of the Loire.

Frederick William (THE GREAT), 11th elector of Brandenburg, b. Feb. 6, 1620, succeeded his father, George William, in 1640, and found his dominions in a deplorable state of ruin; made an advantageous peace with Swe. (1648), joined Swe. against the Poles in 1655, freed Brandenburg from the Polish sovereignty, and was himself recognized as sovereign of Prus. (1663); took a leading part (1672-73) in the war with Louis XIV., routed the Swedes at Fehrbellin (1675), and expelled them from Prus. and Pomerania. In 1685 he enriched his provs. by offering an asylum to the Fr. Prots. D. Apr. 29, 1688.

Frederick William I., king of Prus., b. Aug. 15, 1688, succeeded his father, Frederick I., in 1713; was cruel and unjust, as in the treatment of his son, the future Frederick the Great, and had a whimsical passion for forming a guard of giant soldiers, for whom he found giant wives. D. May 31, 1740.

Frederick William II., king of Prus., b. Sept. 25, 1744, succeeded his uncle, Frederick the Great, in 1786. The trans-Rhenish provs. were lost to the Fr. republic, but his share in the second and third partitions of Poland largely extended his sway. D. Nov. 16, 1797.

Frederick William III., of Prus., b. Aug. 3, 1770, succeeded his father, Frederick William II., in 1797. Having exchanged Franconia for Hanover, Nap. fell upon him, and the battles of Jena, Auerstadt, Eylau, and Friedland, followed by the peace of Tilsit (1807), reduced Prus. to half its former extent. In the Rus. invasion of 1812 the Prus. contingent was allowed to escape unharmed by Diebitch; in 1813 the War of Liberation from the Fr. was inaugurated, and Prus. became more powerful than ever before. At Waterloo the Prus. army performed a most important part. D. June 7, 1840.

Frederick William IV. of Prus., b. Oct. 15, 1795, served in the wars against Nap., and in 1840 succeeded his father, Frederick William III.; by his reactionary policy he disappointed the high hopes which had been indulged regarding him, and in 1841 he refused the request of the estates for a const. The revolution of 1848 followed, but the victories of the army gave the king confidence, and he dissolved the popular assembly. In 1858 he became insane, and d. Jan. 21, 1861.

Frederick William, crown-prince of Ger. and Prus., b. Oct. 18, 1831, son of the present emp.; married in 1858 the eldest daughter of Queen Victoria; bore an important part in the Austro-Prus. war of 1866. During the Franco-Prus. war he led the third army and won the victories of Weissenburg and Wörth. He is gen. field-marshal and gen. inspector in the Ger. army.

Frederick City, R. R. centre, cap. of Frederick co., Md., situated in a rich and fertile valley, within 3 m. of the Monocacy battle-field, and 12 m. from the battle-field of S. Mountain. The Confed. army, under Gen. Robert E. Lee, occupied F. C. for 6 days from Sept. 6, 1862, and on the 12th of the same month the U. army, under Gen. McClellan, entered and occupied the city. On July 9, 1864, it was again occupied by the Confed. army, under Gen. Jubal Early, who demanded and received as a ransom from her citizens \$200,000. It has the deaf and dumb inst. of Md., 2 colls., 2 female sems., and a nursery. Pop. 1870, 8526; 1880, 8659.

Fredericksburg, city and R. R. junc., Spottsylvania co., Va., on the S. bank of the Rappahannock River, at the head of tide-water, 92 m. from its mouth. The river is navigable. F. is 60 m. S. of Wash., 13 m. S. of the Potomac, and 61 m. N. of Richmond. A dam has been constructed across the Rappahannock, just above the city, rendering available the whole water-power of the river. F. was the scene of several bloody contests during the c. war. Pop. 1870, 4046; 1880, 5010.

Fredericksburg, Battle of, fought Dec. 13, 1862, between the U. Army of the Potomac, under Gen. Burnside, and the Confed. Army of N. Virginia, under Gen. Lee. At the beginning of Dec. the U. army occupied the N. bank of the Rappahannock, opposite F., while the Confeds. had intrenched themselves on the S. bank for a distance of several m. Burnside undertook to cross the river and drive the enemy from his strong position. The crossing was effected at several points, by means of pontoon bridges, without serious opposition, Dec. 10 and 11. The next day was employed in making dispositions for the attack, and the action opened on the morning of the 13th. There was some misunderstanding on the part of the commanders of divisions as to the part assigned to them, but the gen. plan was that Franklin, who commanded on the U. left, should assail the Confed. right under Jackson, while Sumner, on the U. right, should fall upon the Confed. left under Longstreet. Franklin's attack was, upon the whole, indecisive. The main action was upon the right, where the Confeds. were strongly posted in the rear of F., upon Marye's Hill, at the foot of which ran a narrow, sunken road, cut in the side of the hill, up to which the ground gradually sloped for ¼ m., this ascending plain being swept by artill. from the heights above. The first attempt upon the height was repelled with severe loss to the assailants. Burnside, who was on the other side of the river, where he could overlook the whole scene, ordered another assault. This was made about sunset by Humphrey's division of Hooker's corps, who advanced with unloaded muskets, toward the sunken road, in which, perfectly sheltered, about 1700 of the Con-

feels were posted, drawn up 4 deep. When the assailants, 4000 in number, came within musket-shot of the sunken road, they were met with a shower of bullets, and lost 1700 men in 14 of an hour. "Then," says Hooker, "finding that I had lost as many as my orders required me to lose, I suspended the attack, and directed that the men should hold for an advanced line a ditch which would afford shelter." The engagement was not renewed on the next day, but both armies remained in position till the night of the 15th, when, under cover of a violent storm, Burnside withdrew his force to the N. side of the river. The U. loss in this battle was 12,321, of whom 1138 were killed, 9105 wounded, 2078 missing. The Confed. loss was 5309, of whom 595 were killed, 4061 wounded, 563 missing.

Fred'ricton, city and R. R. centre, cap. of N. B. and of York co., on the river St. John, 84 m. from its mouth. Among the public buildings are the gov't-house, the prov. building, c.-h., city hall, barracks, the Univ. of N. B., Christ ch. cathedral, and the custom-house. The river is navigable to this point by large steamers; above, small steamers ply during high water, proceeding as far as the Grand Falls. A steam-ferry connects it with St. Mary's, on the opposite bank of the river. It has a Bap. sem. and a collegiate school. Pop. 6218.

Fred'rik, the name of 7 kings of Den., belonging to the Oldenburg dynasty. Under the reign of FREDERIK III. (1648-70) the const. of the country was changed from an elective monarchy, in which the power of the Crown was circumscribed within very narrow limits by the privileges of the nobility, to an hereditary monarchy, in which the Crown was invested with an absolute and unlimited power (Nov. 14, 1660). Under FREDERIK VII. (1848-63) this const. was again changed, and the present const. established (June 5, 1849), according to which the executive power rests with the king and his responsible ministry; the legislative power, with the *Thing*, consisting of an upper and a lower house, elected indirectly and directly by the people; and the judicial power, with courts, in which the judges are appointed by the king, but for life. At the death of Frederik VII. (Nov. 15, 1863) the Oldenburg dynasty became extinct.

Fredonia, city, on R. R., cap. of Wilson co., Kan., near Fall River. Pop. 1880, 923.

Fredonia, Chautauqua co., N. Y., on R. R., 40 m. S. W. of Buffalo and 3 m. from Lake Erie. It has a State normal school. The v. has for more than 45 yrs. been lighted with natural gas from the bituminous shale; one of the gas-wells is over 1000 ft. deep. The first acad. in W. N. Y. was established here in 1824. Pop. 1870, 2546; 1880, 2692.

Free Church of Scotland. The movement in the Ch. of Scot. which terminated in the formation of the Free Ch. is closely connected with controversies which have lasted for more than 300 yrs. In 1647 an act of the Assembly of the Scot. Kirk was passed, adopting the Westminster Confession with 2 modifications—the one in favor of the system of Presbytery, and the other affirming the right of the Ch. to meet in synods and assemblies without the consent of the magistrate. On Mar. 9, 1649, the Scot. Parl. passed an act abolishing patronage in the Kirk. The Gen. Assembly in June of the same yr. passed an act in which it was declared that the Kirk session, or board of elders elected by the congregation, should elect the minister, and intimate their election to the congregation for their approbation; if the majority dissented, another election was to take place. No minister was to be settled but "upon the suit and calling of the congregation."

In 1705 the act for securing the Prot. religion and Presb. ch. govt. was passed by the Scot. Parl., and received the royal sanction in 1707. This act not only confirms the act of 1690, ratifying the Confession of Faith and settling the Presb. ch. govt., but also the act abolishing the royal supremacy, and substituting the election of the session and the call of the congregation for the presentation by lay patrons. But in 1711 the act of Queen Anne for the restoration of patronage was passed, and on this act the present practice of patronage in the Ch. of Scot. rests. All parties in the Kirk united in resisting the restoration of patronage; the Gen. Assembly, while yielding to it, continued for many yrs. to protest against it.

The hist. of the Ch. of Scot. from 1711 to 1834 is marked by many instances of the intrusion of ministers into parishes against the will of the people.

About the beginning of this century the party opposed to patronage, now known as the "Evangelical party," was greatly increased. The settlement of Dr. Andrew Thomson as minister of St. George's ch., Edinburgh, in 1810, and the subsequent publication of the *Christian Instructor*, gave a great impulse to the Evangelicals. In his work of rousing the Scot. people to seek ecclesiastical reform he was joined by Dr. Thomas McCrie, the historian, and in 1815 Dr. Thomas Chalmers was removed to the Tron ch. of Glasgow, and threw all his talents and energies into the same great work. In 1825 an anti-patronage society was formed, but the majority of the Evangelical party declined to unite with it, and continued to seek the regulation and control of the law without contemplating its total abolition. In 1832 overtures were laid on the table of the Gen. Assembly, representing that the call had been reduced to a mere formality, and praying that measures be adopted to restore it to its constitutional efficiency. A motion declaring it to be inexpedient to take any action was carried by a majority of 42. At the Assembly in 1833, 45 overtures asking for the restoration of the call to its proper place in the const. of the Ch. were presented. Dr. Chalmers moved that the dissent of a majority of the parishioners be conclusive against the settlement of a minister, provided the objections were not founded on malice or caprice. A motion, in effect continuing the practice then in use, was carried by a majority of 12. The agitation of the subject was continued, and at the Gen. Assembly of the following yr. (1834) a motion made by Lord Moncrieff to the same purport as that made by Dr. Chalmers in the pre-

ceding yr. was carried by a majority of 46. The passage of this act marks the beginning of the "ten years' conflict" between the ecclesiastical and the civil power in Scot.

The first case that arose under this new act will serve as an illustration of the conflict which was carried on between the co-ordinate courts. The ch. and parish of Auchterarder having become vacant in Aug. 1834, the earl of Kinnoull, as patron, issued a presentation in favor of Mr. Robert Young, a licentiate of the Ch. The call was laid before the presbytery on Oct. 14. The call was signed by the earl of Kinnoull's factor, not a resident in the parish, and by 2 heads of families. On the other hand, 287 heads of families, being communicants, subscribed a dissent from the call; in consequence of this the presbytery rejected Mr. Young as presentee to the parish. Mr. Young appealed first to the synod, and afterward to the Assembly, but both of these courts reaffirmed the decision of the presbytery by large majorities. Thereupon the earl of Kinnoull and Mr. Young instituted a process in the court of session, contending that the rejection of Mr. Young was in violation of the statutes. On Mar. 8, 1838, the court gave its decision, by a majority of 8 against 5, to the effect that the presbytery had acted illegally and contrary to the provisions of the statute of Queen Anne for the restoration of the rights of patrons. The Gen. Assembly appealed the case to the House of Lords, which, on May 3, 1839, gave judgment to the effect that the appeal be dismissed and the decision of the court of session affirmed.

The Gen. Assembly of 1839 met prepared to deliberate on the course to be taken. Dr. Cook, as leader of what was called the Moderate party, moved, in effect, that the Gen. Assembly should instruct all presbyteries to proceed in the settlement of parishes according to the practice which prevailed previously to the passing of that act. Dr. Chalmers, as leader of the Non-intrusion party, moved a resolution affirming the readiness of the Ch. to give obedience to the civil courts so far as the civil rights and emoluments of the Ch. were concerned, but at the same time declaring that no presentee should be forced upon any parish contrary to the will of the congregation. This motion was carried by a majority of 49; it declared in effect that the civil courts might do what they chose with the emoluments of the parish of Auchterarder, but that the Ch. courts could not proceed at the dictation of these courts to the ordination and settlement of Mr. Young. Thus terminated for a time the Auchterarder case, but the collision between the Kirk and the civil courts continued.

The Gen. Assembly of 1842 transmitted to the Crown "the Claim, Declaration, and Protest against the encroachments of the court of session." It closed with a solemn declaration that at all hazards the Ch. was prepared to defend and maintain her inalienable rights. Toward the close of the same yr. a convocation was called to take into consideration the position of the Ch. in relation to the civil courts. This meeting was opened on Nov. 17, and about 450 ministers were present. A memorial to govt. was subscribed by nearly all the ministers present, by which they committed themselves to the relinquishment of the Ch. temporalities if they could no longer hold them in consistency with the free and full exercise of their spiritual functions. Mr. Maule introduced a motion into the House of Commons, Mar. 7, 1843, to the effect that the House should resolve itself into a committee to take into consideration the grievances of which the Ch. of Scot. complained; 76 voted for this motion, and 241 against it. With this decision the negotiations for relief from the conflict of opposing jurisdictions by means of legislation came to an end.

The Assembly met on May 18, 1843. After the usual preliminary services the Rev. Dr. Welsh, as moderator, declared that it was impossible to constitute a free Assembly under the conditions of establishment as now fixed by the civil authorities, and then read the protest, which having been laid on the table he left the chair and proceeded to the door; he was speedily joined by Dr. Thomas Chalmers, and they were followed by over 400 ministers and a still larger number of elders, who marched in procession to a hall which had been prepared for their reception. Dr. Chalmers was elected the first moderator of the Free Assembly, and the secession was completed by the subscription of the act of separation and disruption. 470 ministers thus abandoned the Ch. of Scot. as by law established, renouncing all rights and emoluments in that Ch. A yearly revenue of more than £100,000 sterling was voluntarily relinquished.

The distinctive principles of the Free Ch. may be summed up under 2 heads: (1) The right of those who are members of the Ch., and in full communion with her, to have the uncontrolled power of choosing their own pastors. (2) That it was the right of the Ch. through its courts and under Christ, and in accordance with the word of God, to regulate all purely spiritual and ecclesiastical affairs.

When the Free Ch. was thus constituted a great work was before it. Chs. had to be created, provision made for the support of the ministry, a coll. to be organized and sustained, and missionary operations to be carried on. So much energy and zeal were put forth that within 3½ yrs. after the disruption over \$2,000,000 had been expended on chs. and mansees, and \$350,000 had been obtained for educational purposes. The Free Ch. annually raises over \$400,000 for the sustentation fund, and through its agency the ministers in the poorest parishes receive adequate support. Nearly all the foreign missionaries connected with the Established Ch. took part with the Free Ch. Free Ch. schools have been established through Scot., and there are 3 theological colls. sustained with efficiency. [From orig. art. in *J. S. Unit. Op.*, by DAVID INGLIS, LL.D.]

Free Cities, or, as they generally were called during the Middle Ages, **Imperial Cities**, were those Ger. towns which governed themselves by elected magistrates, and formed independent communities, subject only to the emp. They were a natural creation of the unsettled state in which society found itself early in the Middle Ages; they obtained

their privileges from the emp. on account of the support they were capable of giving him in his quarrels with the nobility and clergy. In course of time most of them were incorporated into neighboring states. In 1866 Frankfort-on-the-Main was annexed to Prus., and Hamburg, Lübeck, and Bremen are now the only F. C. left.

Free Congregations. [Ger. *Freie Gemeinden*], an association of Ger. Rationalists who were originally called "Prot. Friends." At first many of them professed to be Chrs., but now they reject the doctrine of a miraculous revelation, and generally that of a personal Deity. They have been subjected in Ger. to very oppressive laws.

Freedman [Lat. *libertus, libertinus*], in anc. Rome, a free man who had been a slave. Slaves liberated by certain forms, or owned with certain conditions before liberation, or over 30 yrs. old when made free, became not only freedmen, but Rom. citizens; others belonged to the class Latini; still others had no recognized political existence.

Freedmen's Bureau was established by an act of Cong. approved Mar. 3, 1865. To it were committed the supervision and management of abandoned lands, and the control of all subjects relating to refugees and freedmen from any district of country within the territory embraced in the operations of the army, under rules and regulations prescribed by the head of the bureau and approved by the Pres. The bureau was to be under the management and control of a commissioner to be appointed by the Pres., by and with the advice and consent of the Senate. Subsequently the work was enlarged to embrace "the supervision and care of all loyal refugees and freedmen, so far as the same shall be necessary to enable them as speedily as practicable to become self-supporting citizens of the U. S., and to aid them in making the freedom conferred by proclamation of the commander-in-chief, by emancipation under the laws of States, and by constitutional amendment available and beneficial to the public."

Commissioner.—Gen. Howard was appointed com. May 12, 1865, and immediately commenced the organization of his bureau, with a large corps of assistant coms., either appointed or detailed from the army. Each assistant com.'s dist. was divided into a number of sub-dists., and a sub-assistant assigned to each. In addition to these officials there was in each State, beside the ordinary staff of an officer commanding a dist., a supt. of education.

Adjutant's Division, Etc.—The organization grew up rapidly from the different kinds of work presented in the operations immediately rendered necessary. To meet the destitution in food and clothing that the army had been temporarily supplying to some 140,000 dependants, the quartermaster's division was established, which took charge of all clothing received and sent, of all school-buildings to be rented, constructed, or finally disposed of, and generally of the issuance of supplies of all kinds. When a severe famine took place, ranging along the S. coast in Mar. 1867, a separate division was made. It met the temporary necessity, and was then closed. Sickness was so extensive, and the number of orphan children and aged infirm people so great, that a med. branch was early organized, and these several classes put under its supervision.

Land and Claim Division.—The abandoned property that came under the supervision of the bureau was upward of 800,000 acres of lands, beside 3373 town-lots. A portion served the purpose of revenue for a time. A careful record was taken, plans were entered upon for the settlement of freedmen, and afterward modified or abandoned. Finally, all or nearly all was restored to the former owners. The bureau aided in attempting the settlement of freedmen on the public lands under the Homestead law, but was never very successful in isolating independent families of refugees or freedmen.

Transportation.—During 1866, 387 refugees and 6352 freedmen (men, women, and children) were transported to places where there was employment for them and assured support. In 1867 this relief was much increased, the number of refugees sent being 778, and freed people 16,931.

Claim Division.—This was organized to take up the work undertaken and left by the Sanitary Commission, of aiding soldiers in the collection of bounties, prize-money, and other dues, without charge to them. This division applied in the bureau to the colored (soldiers, sailors, and marines) alone. The number of such claims in process of settlement in Dec. 1867 was over 4000, in 1868 upward of 17,000.

School Division.—The school division was organized very soon after the bureau went into operation. The results—viz. the rapid decrease of the dependants, and the intelligent apprehension of the new rights and privileges conferred upon the freed people—were everywhere proportioned to the light and knowledge that came through the schools established.

Benevolent Societies.—The bureau co-operated with the benevolent societies and ch. commissions throughout the country, and extended its school-work till it ceased by law—leaving, beside the nuclei for common schools, 6 univs. quite firmly established, and upward of 20 insts. that rank as colls. and normal schools. Thus, the bureau afforded a nucleus for the present extensive system of education in all the S. States.

Bounty Division.—The "bounty division" was added by act of Cong. Mar. 29, 1867. The soldiers had been everywhere defrauded by agents. A part of the system was a full, complete, and minute record of each case, so that its hist. could be easily traced. The amount of this bounty fund expended finally reached upward of \$8,000,000.

Financial Division.—The receipts and expenditures in this division during its entire existence amounted to a little more than \$13,000,000 for bureau purposes proper, and upward of \$8,000,000 for payment of bounty and prize-money to colored soldiers and sailors, making the grand total upward of \$21,000,000. Upon the question of carefulness and honesty on the part of officers of this bureau many accusations were

made. A special court of inquiry was finally ordered by Cong., which reported, exonerating the officers of the bureau from all charges.

Miscellaneous Work.—The freedmen's banks for a considerable time enjoyed the bureau countenance and aid. For a while the subject of the marriage relation gave rise to much perplexity. Agents saw to it that the marriage ceremony was performed and a careful record kept. In fact, scarcely any subject that has to be legislated upon in civil society failed at one time or other to demand the action of the bureau. In time the pauper class was gradually transferred; the asylums and hospitals one after another assumed by societies or towns; questions of land-titles closed; in brief, all operations were purposely reduced and transmuted into the common system of govt. in this country. The last things of importance given up were the schools, one asylum at Wash., and the payment of bounty. The bureau has been called a political machine. This is somewhat true; it fitted, or helped vastly to do so, the half citizen looking to full rights and responsibilities. The bureau was abnormal—a machine to relieve the shock when passing over the rough transition roadway. Its work, in its mistakes and in its successes, is now a subject of hist. [From orig. art. in *J's Univ. Cyc.*, by GEN. O. O. HOWARD, LL.D.]

Freehold, an estate of inheritance or for life in real property. An estate of F. may be either corporeal, as in land, or incorporeal, as in rents or franchises. F. of inheritance are life estates, which are either *conventional* or *legal*. Conventional F. may be either (1) for one's own life, (2) for the life of another, or (3) for some indefinite period, which may possibly last during the period of one's life. Legal life estates are (1) courtesy, (2) dower, and (3) jointure.

Freehold, R. R. Junc., cap. of Monmouth co., N. J., 24 m. E. of Trenton and 16 m. W. of Long Branch. In 1778 it was the head-quarters of the Brit. army during the battle of Monmouth, fought in the vicinity. Pop. 1880, 2432.

Free'man (EDWARD AUGUSTUS), D. C. L., LL.D., b. Aug. 2, 1823, was a scholar of Trinity Coll., Ox., 1841, a fellow in 1845, prof. in 1884; examiner in law and modern hist. at Ox. 1857–58, 1863–64; author of *The Norman Conquest of Eng.* and other works.

Freeman (JAMES), D. D., a Unit. clergyman, the first in the U. S. to call himself so. By his means the "King's chapel" in Boston, the oldest Epis. ch. in N. Eng., became the first Unit. ch. in N. Eng., and consequently in Amer. He was b. in Charlestown, Mass., Apr. 22, 1759, grad. from Harvard Coll. in 1777; was chosen reader of King's chapel in 1782; became Unit., and carried his people with him; induced them to alter the Prayer-Book in accordance with the new theol., and in 1787 was ordained pastor of the ch. by the wardens and people. The connection remained unbroken till his death, Nov. 14, 1835. Dr. F. was an accomplished scholar, a pure writer, a social, philanthropic man. He was one of the founders of the Mass. Historical Society.

Freemasonry is undoubtedly an anc. and respectable inst., embracing among its members men of every rank and condition of life, of every nation and clime, and of every religion which acknowledges a Supreme Being and has faith in the immortality of the soul; it stands pre-eminent among the insts. established for the improvement of mankind—as far above other secret associations in usefulness as it is beyond them in age. But its origin may be said to have been lost in remote antiquity. Neither tradition nor hist. can point with certainty to the precise time, place, or manner of its commencement. That the name, *Free and Accepted Mason*, and the present ceremonials and govt. of the craft, are of modern origin, not having existed farther back than the beginning of the 18th century, is certainly true. But at the same time the idea of the association was in existence then, and had been from remote time. Societies of masons were then also extant. Before letters were advanced, and when the art of printing was unknown, the discoveries in the arts and sciences must, of necessity, have been known to but few individuals. Agriculture was the grand pursuit of life. But arch. soon, in the natural order of things, arose as a science, and human skill was called into play. The triumph of mind over matter was the great feat of the first archs., who were also the first natural philos. There is no speculation in the statement that these formed themselves into an association for mutual improvement at an early date, and traditions inform us that this union of scientific men differed from the F. of to-day in little more than in name. The arts and sciences were cultivated in Egypt and the adjacent countries in Asia while all the other nations were involved in ignorance. Here alone should we look for the origin of the Masonic society.

Egypt was now the centre of civilization, and her immense pop. necessitated emigration. The first colony of the Egyptians was that conducted by Inachus about 1950 B. C.; Cecrops arrived in Attica in 1657 B. C.; Cadmus came from Phœnicia to Boeotia in 1504 B. C., and Danaus to Argolis in 1586 B. C. The savage inhabs. of Gr. regarded with awe the magic feats of the immigrants, and as they gradually obtained an insight into the arts and sciences came to regard them as gods. In the reign of Erichthonius, 1500 yrs. before our era, the mysteries of Eleusis were established in Gr. in honor of Ceres, who, in search of her daughter, had visited Triptolemus at Eleusis, and taught him the arts of agriculture and the doctrine of the immortality of the soul. Soon after, the Panathenæa were established in honor of Minerva, and the Dionysia in honor of Bacchus. We have information concerning the Eleusinian mysteries, which shows that they bore a striking resemblance to modern Masonry. The mysteries of Ceres were introduced into Athens about 1356 B. C., and with slight variations were observed in Phrygia, Cyprus, Crete, and Sic.

The Dionysia, or mysteries of Bacchus, were closely connected with those of Ceres, and perhaps more so with those of the Masons. The connection between the Eleusinian

and Dionysians appears from the accepted belief that Ceres was the mother of Bacchus; and Plutarch assures us that the Egyptian Isis was the same as Ceres, that Osiris was the same as Bacchus, and that the Dionysia of Gr. was but another name for the Pamiya of Egypt. As Bacchus was the reputed inventor of theatres and dramatic representations, that particular class of persons who possessed the exclusive right of erecting temples, theatres, and other public buildings in Asia Minor were styled the *Dionysian artificers*. They were initiated into the mysteries of their founder, and consequently into those of Eleusis. About 1000 B. C. the people of Attica resident in Asia invented the Doric and Ionian orders of arch., and returned them to the mother-country, making the name of the Dionysian artificers the synonym of talent and scientific skill. We find them established in a kind of coll. at Teos, and making themselves known to each other in travelling by words and signs. They were also divided into bodies or lodges, governed by a master and an assistant, and holding a solemn entertainment once a yr., at which they sacrificed to the gods and contributed to the wants of widows and distressed. The opinion, therefore, that the Freemasons flourished at the building of King Solomon's temple may not be so absurd as is often supposed. The mysteries of Ceres and Bacchus existed 400 yrs. before King Solomon, and there are strong reasons for believing that the Dionysian archs. existed prior to the founding of the first temple. It has been objected that the establishment of such an organization of builders in Judea by King Solomon would have been heard of in future times. But we find the body of Essenes, whose origin, doctrines, and principles have caused so much discussion among theological writers. In them we find strong distinctive points showing a similarity with modern Masonry. Some philos. have supposed that Pythagoras derived his mysteries, instituted at Crotona, chiefly from the Essenes, who were highly respected, during his travels in Egypt and Syria.

The chief difference between the anc. and modern mysteries lies in the points which concern religion. Although F. claims to be of all religions, yet there is no doubt that since its modern establishment as a society in Eng. it has received a stamp of Christianity which marks that origin. During the Dark Ages the political and intellectual condition of society was opposed to the progress of F.; but there was an insatiable taste for finery and display in ch. arch., and to encourage the building profession the pope and other potentates of Europe conferred upon their "guilds" the most important privileges, and even allowed them to be governed by their own laws, customs, and ceremonials. These guilds were composed of men of many nations; they were called *Free Masons*, and travelled from land to land, erecting those gorgeous cathedrals and abbeys which gratified the pride of the priests. Wherever the Romish religion was introduced, the Freemasons flourished. They penetrated even into Scot., and in this little land the principles of the society long remained, ages after they had been extinguished in continental kingdoms. From Scot. these principles again issued to spread over not only the Continent, but all portions of the civilized world, and Scot. seems the very Fairy-land of continental Masonry.

F. was early introduced into Eng. Freemason lodges were held at York and Kilwinning, and these lodges exercised a controlling influence over the bodies of archs. in other parts of the country. The yr. 1350 is that assigned for the revision of the York constts. under Edward III. June 24, 1502, it lays the foundation of Henry VII.'s chapel in Westminster Abbey. Thirty yrs. after it was accused of bringing schisms into the Ch. and sedition among the people, of aiding the Reform of Luther, and of desiring to avenge the death of Jacques de Molay. This induced them to draw up a formal declaration of principles, since known as the "Charter of Cologne." In 1561 Queen Elizabeth sent an armed detachment to break up the annual meeting at York. The officers sent in command made so favorable a report of the inst. that the queen became protectress of the fraternity. In the reign of James I. the society flourished, and men, not archs. nor masons, but eminent for learning, knowledge, or position, were admitted as honorary members of the body under the designation of *accepted brethren*; hence the origin of the present style of the society, *Free and Accepted Masons*. Elias Ashmole, the great antiquary, was so accepted, and took upon himself the task of recomposing the rituals of the order. His rituals were accepted in Lond., and shortly after all through Eng., and with slight changes are those now in use in Eng. and Amer. After the beheading of Charles I. Masonry took a political bias, and was employed by the partisans of the Stuarts. Charles II. termed it the *royal art*, owing to his belief that it had mainly contributed to his restoration. In 1700 the Masonic corporations, except in Eng., were dissolved. In 1717 the 4 Eng. lodges met to found a grand lodge and elect a new grand-master. George Payne was elected grand-master, and the three symbolic degrees were alone recognized. This is the date very commonly assigned by anti-Masons as that of the commencement of the society. In 1721 the order recommenced its sway on the Continent. In 1732 the "grand lodge of York," or that of the so called "Ancient Masons," recognized the necessity of union, and incorporated itself with the grand lodge of Eng. In 1733 the first provincial grand lodge was established at Boston, U. S. During all this period the Scot. Masons had been carrying on their labors with the peculiar system of an hereditary grand-master, created by James I. (Scot.) for the Rosslyn family in 1430. The prosperous state of the Eng. lodges excited their Scot. brethren, and at a meeting held in 1736 the baron Sinclair resigned his hereditary position. This led to the formation of the present grand lodge, of which the baron was the first elected grand-master. In 1738 Frederick II., king of Prus., was initiated. His association with the Scot. rite of Thirty-three Degrees is now a part of Masonic hist. everywhere. The lodge of Three Globes at Berlin, founded by Baron

Bielefeld in 1740, was raised to the dignity of a grand lodge by Frederick the Great, who was elected grand-master and continued in office till 1747. In 1751 F. had found its way into all civilized countries. Its dogma of liberty, equality, and fraternity, however, alarmed the kings and clergy. But, notwithstanding, the society flourished. The grand lodge Royal York was founded in Berlin in 1765. In 1772 the grand orient of Fr. was chartered, and the order found its way into many of the Amer. colonies.

There are now in the U. S. no fewer than 44 grand lodges, which comprise over 600,000 active members. Each grand lodge has exclusive jurisdiction in its own terr. over what are called the first 3. *Blue or Ancient* degrees. Nearly every State has a grand chapter, the ruling power of the degrees up to the 7th, or the Royal Arch. Next follow the grand councils of Royal and Select Masters, which exist in most of the States, and also govern these degrees. The "American Rite" is closed by the commanderies, which are the representatives of the anc. Knights Templars. Here, then, are 3 more degrees, making 13 in all. Each grand lodge is independent, but most of the State grand chapters acknowledge one head, styled the General Grand Chapter of the U. S. So also the grand commanderies of States owe common allegiance to the Grand Encampment of the U. S., which holds triennial sessions, is regarded as the most distinguished branch of the society, composed as it is mainly of the present or past grand commanders of States, and representing over 70,000 men of high standing. There are also in the U. S. 2 bodies of the "Ancient and Accepted Scottish Rite." (See *PIKE'S Morals and Dogma of Freemasonry*.) [From orig. art. in *J's Univ. Cyc.*, by PROF. GEORGE S. BLACKIE, M. D.]

Free Methodists, a small sect, found chiefly in W. N. Y., Ill., and Mich.

Freeport, city and R. R. centre, cap. of Stephenson co., Ill., 121 m. W. of Chicago. It has good water-power and the Ill. Benevolent Society. Pop. 1870, 7889; 1880, 8316.

Freeport, Pa. See APPENDIX.

Free-Soil Party, a former political party of the U. S., composed of the Liberty party of 1846, the Barnburner Dems. of N. Y., and of a considerable number of N. Whigs who favored a proposal to prohibit slavery in the terrs. acquired from Mex. In 1848 and 1852 they nominated presidential candidates, who did not receive any electoral votes. In 1856 the party was merged into the new Rep. organization. (See PARTIES, POLITICAL OF THE U. S.)

Free Spirit, Brethren of the. See BRETHREN OF THE FREE SPIRIT.

Free Thinker, a name given to the deistical writers of Eng. in the 17th and 18th centuries. It was bestowed on John Toland, who in 1697 was called, in a letter to Locke, "a candid free thinker." In 1709 Lord Shaftesbury spoke of "our modern free writers." The title of Anthony Collins's work, written in 1713, *A Discourse of Free Thinking, occasioned by the Rise and Growth of a Sect called Free Thinkers*, proves that the name was then in use with a somewhat definite application. However originating, by whomsoever bestowed, it was accepted by the rationalists as descriptive of their position as men who thought freely—i. e. outside of the usual lines on ecclesiastical and theological subjects. The reproach that became associated with the term in the common mind was due to the prejudice against the unbridled exercise of reason on the Chr. Scriptures and Creed, whatever the special opinions professed might be. They were simply individual scholars, writers, talkers, who freely uttered their doubts in regard to the system of "revealed religion." Their temper differed as widely as their genius or culture. Some were trained scholars, polished writers, wits, men of fashion, citizens of the world, men of letters, political and social philos.; others were poor, uneducated, unrefined. Some were masters of *periphrase*; others employed none but the homeliest speech. Their deism was of every shade. For the most part, they held very positive religious ideas; they stood by the broad facts of human consciousness, maintained the existence and unity of a personal God, affirmed the perfect order of the universe, and prophesied the future welfare of all mankind. There was not an avowed atheist among them, not a professed materialist, unless it were Coward. They were unanimous in their desire to elevate religion to a spiritual sphere, and to emancipate it from dogmatism and formalism. If any, like Bolingbroke, doubted the immortality of the soul, they were actuated in part by the thoroughness of their faith in an active law of retribution, which needed no after life for its vindication. Coward, who wrote in the spirit of a materialist, affirmed immortality as a divine gift to man, while denying that it was a natural inheritance.

The term "free thinker" is misapplied to the Frenchman of the 18th century, the contemporaries of Voltaire, the *esprit forte* who were the precursors of the Fr. Revolution. These men, forced into antagonism to a despotic system in Ch. and State, bent all their efforts to overthrow it. Hence their vehemence of thought and speech; hence their acridity of temper; hence the audacity of their speculations, the severity of their denials, and the philosophical rigidity of their speculation. They were less free thinkers than aggressive thinkers. To them the name *doctrinaire* applies. They had little sympathy with the common mind, and little faith in the intuitions of the common heart. For Eng. common-sense they substituted Parisian wit, and for Eng. seriousness Gallic levity. The Eng. F. T. pushed his inquiries into the wide field of religious speculation: the Fr. *esprit forte* took up an ultimate position outside of all religious confessions, and defended it. Both the Englishman and the Frenchman were by their principles compelled to be champions of human rights. Still the spirit of the Englishman was more democratic. The term "free thinker" is even less applicable to men like Strauss, Paulus, Baur, and the Ger. rationalists than to Diderot, D'Holbach, D'Alembert, and Voltaire. For these men, though professing in some respects the same opinions with the Englishmen, arrived at

them by different methods, and held them in a different spirit. The Englishman is the only genuine F. T. The Frenchman is a *philosopher*—the Ger. is a *rationalist*. Both are in advance of the F. T. in clearness of thought and statement, nicety of discernment, and adequacy of learning. The F. T. belongs to the last generation. The scientific thinker, the true thinker, is taking his place. (For the hist. of free thinking, see LECHNER, *Geschichte d. Deismus*), and ADAM STOREY FARRAR, *Critical Hist. of Free Thought*.)

O. B. FROTHINGHAM.

Free-Town, in W. Afr. in lat. 8° 20' N., lon. 13° 9' W., cap. of the Eng. settlement of Sierra Leone, stands in a low, unhealthy, but fertile plain near the mouth of the Bunk, and surrounded by lofty mts. Pop. 18,035.

Free Trade, in a literal sense, means trade or commercial intercourse free from artificial interference or restriction. As generally used, however, the term may be regarded as the expression of a principle of political economy which holds that the prosperity of a state or nation can best be promoted by freeing the exchange of all commodities and services between its own people, and between its own people and the people of other nations and countries, to the greatest extent possible, from all interferences and obstructions. F. T., as an economic principle or politico-commercial system, is the direct opposite to the system of *protection*, which maintains that a state or nation can most surely attain a high degree of material prosperity by "protecting" or shielding its domestic industries from the competitive sale or exchange of the products of all similar foreign industries. An explanation of either of these terms involves a presentation of the arguments adduced in support of the respective economic systems for which they are the expressions.

It is also essential to clearly appreciate the relation which "free trade" and "protection," regarded as economic systems, sustain to the subject of taxation and revenue. The nature of this relation may be stated as follows: The command of revenue being essential to the existence of organized govt., the power "to tax" is inherent in every sovereignty, and rests upon necessity. The truth of this principle the advocates of F. T. and protection alike fully recognize. The former, however, maintain that taxes should be levied for revenue purposes exclusively, and that the question as to what forms taxation had best assume becomes a mere question of experience and expediency. F. T. as an economic principle is not, therefore, antagonistic to the imposition of equitable duties on imports, provided the end sought to be attained is simply revenue, and the circumstances of the state render such form of taxation expedient. Protection, on the other hand, advocates and defends the imposition of taxes on imports for purposes other than revenue. Protection, therefore, to the exact extent to which it attains its object, is obviously antagonistic to revenue, inasmuch as revenue is only received on those commodities which *come in*, while protection is only secured when the importation of commodities is restricted or made difficult. The adjustment of a tariff for revenue in such a way as to afford what is termed "incidental protection" is based on the supposition that by arranging a scale of duties so moderate as to only restrict and not prevent importations, it is possible to secure a sufficiency of revenue for the state, and at the same time stimulate domestic manufactures by increasing the price of competitive foreign products. The essential points of the argument in favor of F. T. as contradistinguished from protection may be stated as follows:

1. The highest right of property is the right to exchange it for other property. In the absence of all freedom of exchange between man and man civilization would obviously be impossible; and to the degree in which we impede or obstruct the freedom of exchange, to that same degree we oppose the development of civilization.

2. Any system of law which denies to an individual the right to freely exchange the products of his labor, by declaring, as is generally the custom, that A, a citizen, may trade on equal terms with B, another citizen, but shall not under equally favorable circumstances trade with C, who lives in another country, reaffirms in effect the principle of slavery, for both slavery and the artificial restriction or prohibition of exchanges deny to the individual the right to use the products of his labor according to his own pleasure, or what may seem to him the best advantage.

3. The gen. result for which all men labor is to increase the abundance or diminish the scarcity of those things which are essential to their subsistence, comfort, and happiness. Different individuals have different natural capacities for making the various forces of nature and varieties of matter available for production. The different countries of the earth likewise exhibit great diversity as respects soil, climate, natural products, and opportunity. It would seem clear, therefore, in order that there may be the greatest material abundance, that each individual shall follow that line of production for which he is best fitted by natural capacity or circumstances. Free exchange between man and man—or, what is the same thing, F. T.—is therefore action in accordance with the teachings of nature. Protection, on the other hand, is an attempt to make things better than nature made them.

4. Any increase in the price of domestic products consequent on the imposition of taxes on the import of corresponding products of foreign origin is paid by the domestic consumer. Hence, a result alike deducible from theory and proved by all experience—that not only does protection to a special industry not result in any benefit to the gen. industry of a country, but also that its beneficial influence on the special industry itself is not permanent, but temporary. The price of no article can be permanently advanced by artificial agencies or otherwise, without an effort on the part of every person directly or indirectly concerned in its consumption to protect and compensate themselves by advancing the price

of the labor or products they give in exchange. If sufficient time is afforded, and local exchanges are not unduly restricted, this effort of compensation is always successful. Hence, from the very necessity of the case, no protective duty can be permanently effective; hence, also, it is that protected manufacturers in every country always proclaim, and no doubt honestly feel, that the abandonment of protection, or even its abatement, would be ruinous.

5. Upon no one argument have the advocates of protection relied more in support of their system than that contained in the assumption that if there were no restrictions on trade the opportunity to labor created by protection, and the results of the expenditure of the earnings of such labor, would be diverted to other countries to their benefit, and to the corresponding detriment of that country which, needing protection by reason of a necessity for paying higher wages or other industrial inequalities, abandons it. Specious as is this argument, there could not be a greater error of fact or a worse sophism of reason. No commodities will be given by the producers resident in foreign countries for nothing. *Product for product* is the invariable law of exchange, and we cannot buy a single article in any market except with or by a product of our own, or for money which has been obtained by the exchange of some product for it. Nothing, therefore, can or will be imported unless that in which it is paid for can be produced at home with greater final advantage.

6. The averment that prohibition or restriction of foreign imports encourages diversity of domestic industry is answered by saying that when any trade can be introduced or undertaken for fiscal or public advantage, private enterprise is competent to its accomplishment.

7. Protection, it is alleged, has a tendency to make what are termed manufactured products cheaper. A very fit and cogent answer which has been made to this assertion of the opponents of F. T. is, that if protection is to be recommended because it leads ultimately to cheapness, it were best to begin with cheapness. Another answer is to be found in the circumstance that not a single instance can be adduced to show that any reduction has ever taken place in the cost of production under a system of protection, through the agencies of new inventions, discoveries, and economies, which would not have taken place equally soon under a system of F. T.; while, on the contrary, many instances can be referred to which prove that protection, by removing the dread of foreign competition, has not only retarded invention, but also the application and use of improvements and inventions elsewhere devised and introduced.

8. It is clear that one of the essential attributes of a just law is that it bears equally upon all subjected to its influence, and that an unjust law must necessarily be also injurious. A system of law imposing protective duties must, in order to be effective, be partial and discriminating, and therefore unequal and unjust; for if a law could be devised which would afford equal protection to all the industrial interests of a nation, it would benefit in fact no interest by leaving everything relatively as before; or, in other words, the attempt to protect everything would result in protecting nothing.

9. "A tariff on imports," it is sometimes alleged by the advocates of protection, "obliges a foreigner to pay a part of our taxes." To this it may be replied that if there were any plan or device by which one nation could thus throw off its burden of taxation in any degree upon another nation, it would long ago have been universally found out and recognized, and would have been adopted by all nations to at least the extent of making the burden of taxation thus transferred in all cases reciprocal. If the principle involved in the proposition in question, therefore, could possibly be true, no possible advantage could accrue from its application. But the point itself involves an absurdity. Taxes on imports are paid by the persons who consume them; and these are not foreigners, but residents of the country into which the commodities are imported. A duty on imports may injure foreigners by depriving them of an opportunity of exchanging their products for the products of the country imposing the duty, but no import-taxes will for any length of time compel foreigners to sell their products at a loss, or to accept less than the average rate of profit on their transactions.

10. Another argument in favor of F. T. between nations is, that of all agencies it is the one most conducive to the maintenance of international peace and to the prevention of wars. The restriction of commercial intercourse among nations tends to make men strangers to each other, and prevents the formation of that union of material interests which creates and encourages in men a disposition to adjust their differences by peaceful methods rather than by physical force. On the other hand, it requires no argument to prove that F. T. in its fullest development tends to make men friends rather than strangers, for the more they exchange commodities and services the more they become acquainted with and assimilated to each other; whereby a feeling of interdependence and mutuality of interest springs up, which, it may be safely assumed, does more to maintain amicable relations between them than all the ships of war that ever were built or all the armies that ever were organized.

11. The question here naturally arises, if the above propositions in favor of F. T. are correct, and if the doctrine of protection is as false and injurious as it is represented to be, how happens it that F. T. does not at once meet with universal acceptance? One of the best answers to these questions was given by the Fr. economist Bastiat, in an article in which he showed that protection is maintained mainly by a view of what the producer gains and a concealment of what the consumer loses; and that if the losses of the million were as patent and palpable as the profits of the few, no nation would tolerate the system for a single day. Protection accumulates upon a single point the good which it effects, while the evil which it inflicts is infused throughout the community as a whole. The first result strikes the eye at once; the latter requires some investigation to become clearly perceptible. Mankind also divide themselves into 2

classes—producers and consumers, buyers and sellers. The interest of producers and sellers is that prices shall be high, or that there shall be scarcity; the interest of consumers and buyers, prices shall be low, or that there shall be abundance. But all will at once admit that it is for the gen. interest that there shall be abundance rather than scarcity.

12. In the earlier ages in Europe the principle that after every fair mercantile transaction both parties are richer than before, was not understood. On the contrary, the generally accepted theory was pithily embodied in the old proverb, "What is one man's gain must be another man's loss." Commerce, therefore, it was assumed, could benefit one country only as it injured some other. In accordance with this principle every state in Christendom exerted itself to impose the most harassing restrictions on commercial intercourse, not only as between different countries, but also as between districts of the same country, and even as between man and man. Every trade was accordingly fenced round with secrets, and the commonest trade was termed, in the lang. of the indentures of apprentices, "an art or mystery." If one nation saw profit in any one manufacture, all her efforts were at once directed to frustrate the attempts of other nations to engage in the same industry. But with the progress of civilization, and the consequent diffusion of information, the arbitrary restrictions on trade which were formerly so common in Europe have almost entirely disappeared. But the change to a more liberal state of things, though constant, has been slow, and the policy of the Middle Ages gave place to the so called and more modern policy of "protection," which, while clearly recognizing the impolicy of interfering with domestic exchanges, regards foreign trade as something different from any other trade, which it is for the interest of the state to interfere with and regulate. But under the same influences of a progressive civilization this system, too, in like manner, is disappearing. (For further information on the subject of F. T., see *BASTIAT, Sophisms of the Protectionists*; *LIEBER, Notes on the Fallacies Peculiar to Amer. Protectionists*, and the treatises on political economy by MILL, MACLEOD, CAIRNES, AMASA WALKER, PERRY, etc.) (See *PROTECTION and TARIFF*.) [From orig. art. in *J.'s Univ. Cyc.*, by HON. DAVID A. WELLS, LL.D.]

Free-Will, or Freedom of the Will. Freedom, with reference to the will, has been variously defined, the definition as a rule being the result of a theory, not a preliminary to it. The conflict has been in part on the question whether the will is free. But more generally it has turned upon the question, What is the freedom of the will? each party here conceding its freedom, but not in the sense claimed by the other. The point of division is this: Does the will necessarily and solely decide under the influence of determining causes or motives external to itself, or is its ultimate decision a self-conditioned, self-determined act? The objection ordinarily made to the first view is that it reduces the will to a necessity which destroys accountability; the objection to the latter view is that it seems to give absoluteness to the finite, a power of origination to the creature, or to make the human will a final cause, and thus to remove it out of the category of all other created things. The great argument for the second view is the seeming consciousness and the indisputable sense of accountability. The great argument for the first view is its consonance with the law of causality. In theol. the question of F.W. is associated with the doctrines of the fall, grace, predestination, and sin. C. P. KRAUTH.

Freewill (or Free) Baptists. This title properly covers several organizations of Baps., as they agree in doctrine and are in intimate fellowship. Their doctrinal peculiarities are a belief in a gen. atonement, the possibility of salvation to all men, the freedom of the will, involving man's ability to choose or refuse to accept Christ, and the original, inalienable right of true believers to commemorate the death of our Lord and Saviour in his supper. In other respects they do not differ from the larger Bap. body. Previous to 1750 the Baps. in Amer. had not attained to a membership of over 3000 in the whole country, and these were mainly immigrants from G. Brit. Both branches of Baps. really had their birth in the great revivals under Edwards, Wesley, and Whitefield. From 1745 to the end of the century many separate congregations were formed of persons who were not satisfied with the cold, formal, powerless life in the regular N. Eng. chs. The new chs. were known as New Lights and Separatists. A large portion of them ultimately rejected the doctrine of infant baptism, and adopted immersion only as baptism, which made them Baps. in fact, and led them finally to take that name. Some were high Calvinists, others believed in gen. atonement; some rejected unimmersed believers from the Lord's table, others invited them. As early as 1751 there were several chs. in R. I. and Conn. that held to a gen. atonement and free communion. In 1785 they formed the Groton Union Association, which in 1790 contained 10 chs. and 1521 members. From this location colonies went out to various sections. Shubael Stearns, with others, went to N. C. in 1751, and planted chs. which extended over the whole S. and S. W. They were known as Separate Baps. From 1780 to 1800 a movement was inaugurated to effect a union between them and the section known as regular Baps., which was mainly successful. But some of the Separatists declined to enter into the union. A section of them in N. C. and Tenn. afterward took the name of Freewill Baps., another portion took that of Gen. Baps., while some held, and still hold, to the old name of Separate Baps. Previous to 1783 a colony removed to Rensselaer co., N. Y.; a ch. was formed, great revivals followed, and chs. multiplied, spreading W. through the State and into Canada. They took the name of Free Communion Baps., but have since dropped "Communion," and use the shorter name of Free Baps. In 1779 a discussion arose among the Baps. in N. H., which resulted finally in a division. Benjamin Randall was called to an account for holding to a gen. atonement and the ability of sinners to accept

of Christ, and he was disfellowshipped. He united with a ch. in Strafford, which indorsed his views. Their opponents called them "Freewillers," but they rejected that name, claiming that they were Baps., and continued to do so until 1800, when the name had become so fixed upon them that they adopted it without further opposition. The difference between F. B. and the larger Bap. body is rapidly decreasing; the doctrines of gen. atonement, freedom of the human will, and free communion are received with more and more favor among all classes of Baps., and it is fondly hoped that the time is at hand when all will be united in bonds of fraternal fellowship. [From orig. art. in *J.'s Univ. Cyc.*, by REV. G. H. BALL.]

Freezing, the change from a liquid to a solid state, resulting from the abstraction of heat. The zero of the centigrade thermometer, equivalent to 32° F., is the F.-point of water in ordinary conditions. Under a pressure of 13,000 atmospheres water will not freeze at Fahrenheit's zero. On the other hand, such substances as paraffine, which contracts in F., have the F.-point raised by pressure.

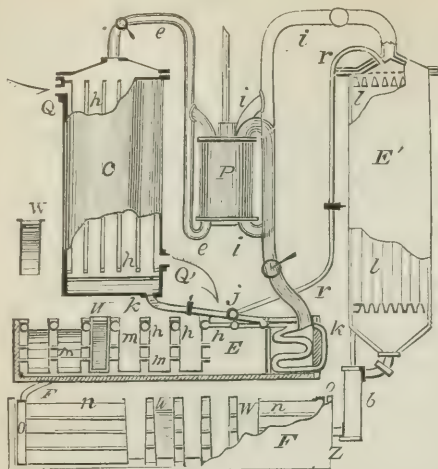
Freezing, Artificial. Artificial freezing has been performed, as a mere laboratory experiment, ever since the middle of the 17th century. Leslie's freezing of water by sulphuric acid in a vacuum in 1810, and Faraday's long subsequent achievement of solidifying water by sulphurous acid evaporating in a red-hot crucible, are only 2 of the many well known varieties of this class of experiments. A freezing temperature is produced in a variety of ways by the mingling of different chemicals. (See *FREEZING MIXTURES*.) But by far a more powerful and a more manageable principle is the absorption of caloric into vapor expanding and escaping from a volatile liquid. The vapor of water is supereminent in requiring no less than 967 (537° C.) of latent heat, while ammoniacal vapor requires 925 (514° C.), and sulphuric ether about 164 (91° C.). Yet another facility afforded by the more highly volatile liquids is the low temperature at which volatilization or ebullition takes place under the ordinary atmospheric pressure. Thus, sulphuric ether boils at 95° (35° C.). Faraday pub. in 1825 his observation that certain of the hydrocarbons boil at or near the F.-point of water. Pure ammonia boils at -36° (-38.5° C.), while carbonic acid becomes unmanageable by the great tension of its vapor at ordinary temperatures. The re-expansion of compressed air, as well as of other gases, is also powerfully refrigerative. The heat developed by compression is first to be absorbed by cold water. Then the re-expansion against pressure extinguishes caloric in the gas sufficient, if taken from its weight of water, to depress the latter in temperature at the rate of 1° for each unit of energy expended in expansion, or for the amount of work necessary to raise the same weight 772 ft. against gravity.

Within the last quarter of a century the utilization of the foregoing principles and processes has risen to the rank of a new art and manufacture. Its prin. centres or localities at the present time are New Orleans, La., and Victoria and Sydney, with one or two other prominent localities in Australia. At New Orleans some 50 tons of ice a day are now the average production at a first cost of \$7 to \$8 a ton and a selling price of \$15 to \$20. The production, both there and in Australia, where a different process is used, approximates to 7 tons of ice produced for every ton of coal consumed. Historically, as well as naturally, the progress of this branch of invention has related, first to methods for producing cold, and afterward to the methods of applying the cold with commercial economy. The first available apparatus for the continuous production of cold was the invention of a citizen of the U. S. in Eng., where his invention was patented in 1834. Perkins proposed to operate by a gas-pump which should evaporate sulphuric ether in a vessel surrounded by water or other liquid and force the ether vapor, with compression, into a metallic coil, cooled by water flowing outside in contact with it. The cold and pressure restore the ether to its liquid condition. Perkins was soon followed by imitators, especially in Fr., but, with one exception, they added nothing essential. This exception was the Fr. patent of E. Bourgeois, taken out in 1846 for the employment of the hydrocarbons, among other volatile liquids, as Perkins had employed ether, and by an apparatus operating on the same principles, although widely different in form and construction. This apparatus, also, like the former, was obviously meant for very limited uses. None of these inventions availed anything for commercial use; yet the Amer. Perkins has undoubtedly priority for as much as relates to the continuous production of cold. But in 1848-49 another citizen of the U. S., Prof. A. C. Twining, without any knowledge of the Perkins method, reinvented it in a form and with an apparatus fitted to the largest practical use by steam or other power. His invention embraced those novel forms of apparatus for applying the cold, when produced, to the manufacture of ice in commercial quantities, without one or another of which no ice-machine in the world now operates for this manufacture. The first ice-machines covered by this patent were constructed on a small scale at the Cuyahoga Works at Cleveland, O., in 1850. Thence onward to 1856 larger machines were operated, which realized the result, at that time truly surprising, of turning out in a few hours of any day of the summer season nearly a ton of sound, clear, and merchantable ice, in blocks a foot square and 6 inches thick. In 1858 the Eng. machine of James Harrison, which he had patented in Mar. 1856, was brought out in Lond., and soon after set up in Australia. It was patented after one of the modes of construction described in Twining's fundamental patent of 1853, and to this day, both in Australia and elsewhere in the Brit. provs., all the ice-machines are understood to copy that pattern with certain improvements in details by the original constructor, Daniel Siebe.

The commercial adaptations of Twining's invention, both to the cold-producing and the cold-applying uses on the largest scale, are exhibited in the annexed figure (1). In this

sketch the deeply shaded parts represent the same as shown in the patent of 1853, but the fainter outlines are modifications, although covered by that patent, by which the best

FIG. 1.



"Cleveland results" were obtained. In the shaded parts of Fig. 1 the double-acting gas-pump P draws through *i*, from the "freezing cistern" E, the vapor of "a volatile liquid—as alcohol, ether, sulphuret of carbon, etc."—and forces it through *e* into the pipes *h* of the "restorer" C, where it is restored to a liquid condition by the aid of cold water flowing through Q into and pervading the condensing vessel C, and wasting through Q', as shown. But the restored liquid re-enters E automatically through the regulated pipe and cock *k*. After coiling around in the anterior compartment, to be cooled by exposure to the issue of cold vapor into *i*, the pipe is prolonged so as to form the so called "percolator" *p*. Now, the freezing cistern E is a tight box—of which there may be any number side by side—divided across by the equally tight "water-chambers" *m*, open at top. These may be filled with water to be frozen, or, better, they may receive separate "water-vessels" (or moulds) W, with brine or other uncoagulable liquid between to assist conduction. The chambers *m* do not fill entirely across, but hug one side of E, from side to side, alternately, so as to afford a zigzag channel along and through E and around *m*, through which a cold vapor or liquid may, course across and back alternately, and refrigerate the contents of *m*. This is one form of operation; and the vacant spaces shown between the chambers, and supported across by stays, are sections of the channel.

Several other modes of applying the cold were devised by Prof. Twining.

The ice machine which has been practically the most successful is that of F. P. Carré, of Paris, Fr., in which the volatile medium employed for applying cold is ammoniacal gas. The advantage of this is that it requires no compression to liquefy it, being instantaneously soluble in water to the extent of 800 vols. A description of this, and also of the atmospheric machine of Dr. John Gorrie of New Orleans, may be found in *J's Union Cyc.* under this title. A very successful apparatus was also exhibited at the Exposition of 1878 in Paris, by Raoul Pictet, in which anhydrous sulphuric acid was the volatile substance employed.

F. A. P. BARNARD.

Freezing Mixtures. When solids are liquefied (fused or dissolved) they absorb a certain quantity of heat, which is thus rendered latent—is no longer indicated by the thermometer. *This heat is called *latent heat of fusion or fluidity*. If we mix equal weights of water at 0° C. (32° F.) and water at 79° C. (174.2° F.), the temperature of the mixture will be the mean of the 2 temperatures, or 39.5° C. (103.1° F.). But if we repeat the experiment with snow or pounded ice at 0° C. and water at 79° C., the temperature of the whole will be only 0°, but the ice will have been melted. A quantity of heat, represented by 79° C. (174.2° F.), will have been apparently lost in melting the ice. If we place in a warm room 2 vessels, one containing a kilogramme of water at 0° C., the other a kilogramme of snow at 0° C., we shall find when the snow is melted that its temperature is only 0°, while the temperature of the water in the other vessel has risen to 79° C. (174.2° F.). This principle is true of all solids: they absorb in melting a certain quantity of heat, without indicating by the thermometer any increase in temperature. The solution of most salts in water is attended with absorption of heat as the salt is liquefied. The following table contains a few illustrations of this principle:

Mixture.	Thermometer sinks—	Cold produced.
Nitrate of ammonia 1 part	From + 50° F. to + 4° F.	46° F.
Water.....1 "	" + 10° C. to - 15.55° C.	25.55° C.
Nitrate of ammonia 1 part	From + 50° F. to - 7° F.	57° F.
Carb. of soda..1 "	" + 10° C. to - 21.67° C.	31.74° C.
Water.....1 "		

The most remarkable salt in this respect is the sulphocyanide of ammonium. On dissolving this salt in an equal weight of hot water at 96° C. (204.8° F.), the outside of the vessel is covered with hoar frost, and the temperature is 2°-3° C. below zero (28.4°-26.6° F.); 98°-99° C. of heat (176.4°-178.2° F.) being required to liquefy the salt. The lowest temperatures are obtained by mixing snow or pounded ice with the salt employed, both the salt and the ice absorbing heat of liquefaction. Such mixtures are used for freezing ice-cream, champagne, etc. and for condensing very volatile vapors. The temperature of ice-cream is often 15° F. or lower. The following mixtures are used: (1) Ice 2 parts, common salt 1 part = - 5° F.; (2) ice 5, salt 2, sal-ammoniac 1 = - 12° F.; (3) ice 24, salt 10, sal-ammoniac 5, nitre 5 = - 18° F.; (4) ice 12, salt 5, nitrate of ammonia 5 = - 25° F.; (5) snow 2, chloride of calcium 3 = - 50° F. (See URE's *Dict.*, "Freezing," and WATTS's *Dict.*, "Heat.")

C. F. CHANDLER.

Freiberg, town of Sax., on the Münzbach, at the foot of the Erzgebirge. It is in one of the richest mining regions of Europe, about 1500 mines of silver, copper, and lead being worked in the vicinity. Its mining school is visited by students from all European countries. Pop. 25,445.

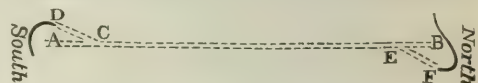
Freiburg, town of Ger., in the grand duchy of Baden, on the W. slope of the Black Forest. Its cathedral, commenced in 1122 and finished in 1514, with a tower 367 ft. high, is one of the finest specimens of Gothic arch. in Ger. It has a univ. and some manufactures. Pop. 36,401.

Freiburg, a town of Switz., on the Sarine, over which is a suspension bridge 906 ft. long and 175 ft. above the water. Its cathedral is a fine building, with a famous organ having 7800 pipes. Pop. 11,546.

Freiligrath, fril'ig-raht (FERDINAND), Ger. poet, b. at Detmold June 17, 1810; took part in the revolution of 1848; was tried for the political opinions expressed in his poems, and compelled to leave the country. D. Mar. 18, 1876.

Freind, frend (JOHN), M. D., F. R. S., b. at Croton, Eng., 1675; a distinguished phys. of Lond. D. July 26, 1728.—His brother, ROBERT FREIND (1667-1751), was a celebrated Lat. scholar; and WILLIAM FREIND, Robert's son, was a dean of Canterbury and a prominent preacher.

Fréjus, Col de, Tunnel of, or Tunnel of Mont Cenis. The Col de Fréjus is a depression in the crest of the Cottian Alps, lying about 16 m. S. W. from the summit of the Mt. Cenis pass, and rising to the height of about 9500 ft. above the sea. Under this col a gallery has been excavated by the govts. of It. and Fr. between 1857 and 1871, the execution of which was attended with many difficulties, the greatest perhaps consisting in the abrupt rise of the mt. on both sides to the height of a mile perpendicular above the culminating point of the excavation—a circumstance which rendered the sinking of shafts along the line impossible. The work could consequently be carried on only upon 2 faces, and the sole ventilation was from the orifices at the termini. The excavations consist of a straight gallery,



A B, through the mt., and 2 junction-galleries, CD and EF, to connect with the railway at Bardonneche in Piedmont on the S., and Modane in Savoy on the N. side. The termini at A and B are left open for ventilation and convenience of access, but the railway track is laid along the line D C E F. The length of the subterranean way traversed by the trains is 8 Eng. m. The entrance at D is 4236 ft. above the sea-level. From this point the grade ascends for 2635 ft. at the rate of 2.64 ft. per m.; then at the rate of 1.73 ft. per m. for 7200 ft.; then at 2.64 ft. per m. for 8500 ft.; then a summit-level of 10824 ft. at a height of 4244 ft. above the sea; then a uniform descending grade of about 115 ft. to the m. to the N. terminus, which is at the height of 3801.4 ft. above the sea, or 434.60 ft. lower than the S. entrance.

In the S. portion of the tunnel the arch is a curve of 7 centres, with its crown at the height of 19.68 ft.; a width of 26.24 ft. at the spring, and 25.81 ft. at the level of the rails, including a sidewalk 18 inches in width on each side. On the N. division the arch is the segment of a circle, its crown being 1 ft. lower than on the S. The total amount of rock excavation is computed at nearly 1,000,000 cubic yards. The total cost is computed at about \$15,000,000. From 1857 to 1861 the drilling in the S. division, and from 1857 to 1863 that in the N. division, was executed by hand-labor; after those dates by machine-drills driven by compressed air forced into tubes by the power derived from the torrent Medozet near Bardonneche and the Arc at Modane. The air thus supplied ventilated and cooled the gallery to a moderate temperature. In 1863, the yr. after the introduction of the machine-drills, the rate of progress in excavation averaged 7 ft. per day, but as experience was gained the rate gradually rose to 14 ft. 9 inches. Near the centre of the tunnel is established an observatory. The temperature at this point is constant at about 85° F. Upon the removal of the last partition of rock between the laboring parties, a strong current of air poured through from the N., and this is said to maintain itself constantly.

GEORGE P. MARSH.

Frelinghuy'sen (FREDERICK), lawyer, b. in N. J. Apr. 13, 1753, grad. at Princeton 1770; was in Cong. in 1775, in 1778-79, and in 1782-83; served in the Revolutionary war, becoming a col., and after the war served as maj.-gen. on the W. frontier against the Indians; was U. S. Senator from N. J. 1793-96. D. Apr. 13, 1804.

Frelinghuy'sen (FREDERICK THEODORE), b. at Milltown, N. J., Aug. 4, 1817, a nephew of Theodore Frelinghuy'sen, who adopted him as a son; grad. at Rutgers Coll. 1836, was called to the bar in 1839; atty.-gen. of N. J. 1861

and 1806; U. S. Senator 1806-09, elected again to the U. S. Senate in 1817, and served the full term to 1827. In Jan. 1827 he was selected as one of the 3 Rep. Senators on the electoral commission. He was appointed sec. of state by Pres. Arthur Dec. 12, 1851.

Frelinghuysen (THEODORE, LL.D., son of Gen. Frederick Frelinghuysen, b. at Millstone, N. J., Mar. 28, 1787, grad. at Princeton 1804; was admitted to the bar 1808; was capt. of volunteers 1812-15, atty.-gen. of N. J. 1817-29, U. S. Senator 1829-35, mayor of Newark 1837 and 1838; removed to New York 1838; chancellor of the Univ. of New York 1838-50, pres. of Rutgers Coll., New Brunswick, N. J., 1850-62. In 1844 Mr. F. was Whig candidate for V.-P. on the Clay ticket. D. Apr. 12, 1892.

Frelinghuysen (THEODORE JACOBUS), b. at Lingen, E. Friesland (now in Prus.), about 1691; was ordained to the Reformed ministry; came in 1720 to Amer., and became the Dut. pastor at Raritan (now New Brunswick), N. J. His 5 sons were all ministers of the Reformed Ch.

Fremont, Michl. See APPENDIX.

Fremont, city and R. R. junc., cap. of Dodge co., Neb., 45 m. W. of Omaha. Pop. 1870, 1195; 1880, 3013.

Fremont, city and R. R. centre, cap. of Sandusky co., O., on Sandusky River, 30 m. E. of Toledo. The city has purchased the Ft. Stephenson property, the scene of Croghan's victory, as a public park. Pop. 1870, 5455; 1880, 8446.

Fremont (JOHN CHARLES), b. in Savannah, Ga., Jan. 21, 1813. His father was a Fr. emigrant. Though left an orphan when 4 yrs. old, he received a good education, graduating at Charleston Coll., S. C., at the age of 17. He taught math., and turned his attention to engineering, having received a commission as lieut. of engineers in the U. S. A. Subsequently, most of his time was for several yrs. occupied in govt. surveys and explorations in the Rocky Mts. In 1842 he explored the S. Pass, and his exploits during the Mex. war gave him great distinction. He was one of the first two Senators from Cal., serving 1849-51. In 1856 he was the Rep. candidate for Pres. of the U. S., in opposition to James Buchanan, the Dem. candidate. In 1861-62 he was a maj.-gen. of the U. army. Was gov. of Ari. 1878-82.

ALEXANDER H. STEPHENS.

French (AUGUSTUS C.), a native of N. H., ed. at Harvard Coll.; became a lawyer of Ill., a law prof. of McKendree Coll., and was gov. of Ill. 1846-53. D. Sept. 4, 1864.

French (BENJAMIN F.), b. in Richmond, Va., June 8, 1799; author of poems and papers in periodicals, and became a planter and merchant of La. Pub. *Historical Collections of La. and Hist. of the Iron Trade in the U. S.* Was a liberal benefactor of the Fisk Free Library in New Orleans, and afterward removed to New York.

French (MRS. L. VIRGINIA), b. in Va. 1830, was a Miss Smith; she wrote much under the name of "L'Inconnue." In 1852 she became connected with the *Southern Ladies' Book of New Orleans*; was ed. of the *Crusader*, Atlanta, Ga. Wrote *Wind-Whispers and Legends of the South*. D. Mar. 31, 1881.

French (WILLIAM HENRY), b. at Baltimore, Md., Jan. 13, 1815, grad. at W. Pt. 1837; served in the Seminole war in Fla., and on the Canada border during the disturbances 1837-38. During the war with Mex. he served on the staff of Gen. Patterson and as aide to Gen. Pierce. Appointed a brig.-gen. Sept. 1861, he served in the Army of the Potomac during the Peninsular campaign in Va. and in the Md. campaign of 1862; appointed maj.-gen. of volunteers Nov. 1862; served in the Rappahannock campaign 1862-63; commanded 3d army corps from July 1863 to May 1864, when he was mustered out of the volunteer service. Served on the Pacific coast from 1865 to 1872, in command of 2d Ari. D. May 30, 1881.

French Berries, the dried berries of various species of *Rhamnus* or buckthorn, brought from the Mediterranean; produce a bright but not very permanent yellow dye. They are also called *Berr* and *Ayignon berries*.

French River, rises in N. C. near the Blue Ridge, flows N. W. into Tenn., receives the Nolichucky, turns S. W., and joins the Holston (now called Tenn.) 3 m. above Knoxville. It is navigable 30 m. by steamboats. It is about 200 m. in length.

French Chalk, a variety of talc, the hydrated silicate of magnesia.

French Language and Literature. The Fr. is the old popular Lat. in a modern form. It has been developed in Fr. chiefly through Celtic and Teutonic influences, combined with those of climate and condition. This modification of the spoken Lat. had been going on nearly 400 yrs., when the fact seems to have been recognized that the lang. of the people was distinct from the written Lat. used in chs., convents, and courts of justice. Therefore, by a decree of the Council at Tours in A. D. 813, the bps. were directed to translate their sermons into Romance (*Roman*) the modified Lat., the popular speech. The oldest known documents of the Romance are the oath of Louis the German and that of the army of Charles the Bald taken at Strasburg in 842. In them we have a sort of photograph of the lang. in its transition state.

The N. and S. sections of the country being practically independent of each other, and characterized by different conditions, the various dialects of each assumed a form and method of pron. peculiar to itself. Hence arose in the 9th and 10th centuries the recognition of 2 gen. divisions or groups of dialects, named, from the affirmative adverb in each, the *Langue d'Oc* and the *Langue d'Oïl*. The former was spoken in the entire section S. of the river Loire. It developed rapidly under the favoring circumstances of climate, condition, and culture till in the 11th century it began to be employed in Provencal poetry. For the next 200 yrs. its harmonious musical character, as displayed in the songs of the Troubadours, rendered it extremely and almost universally popular. The *Langue d'Oïl* was spoken in the provs. of the N. and E. This lang. was not uniform, like that of the S., but existed as distinct dialects, with some lit., particularly in the independent provs. of Nor-

mandy, Picardy, Burgundy, and the Isle of France. Though recognized as the *French* lang. probably as early as the 11th century, it did not become widely known in Europe till after the conquest of Constantinople (1204). It then gained great popularity, and was employed by several foreign writers. During the 12th, 13th, and early part of the 14th centuries the lang. existed in a form now called Old Fr., which was intermediate between the synthetic Lat. and the analytic Fr. After the 14th century the lang. began to assume those characteristics which are peculiar to modern Fr. With the 15th century commenced the formation of the classic and modern Fr. Very marked changes were effected in grammatical forms, in orthography, and in syntax. The lang. became more analytic. It was more simple and less like the Lat. In the 16th century the It. influence was quite marked, and many It. and some Sp. words were introduced. These additions were richer in simple and comic than in noble and serious terms.

During the previous centuries of formation and growth the Fr. had been generally regarded as suited only to the common people, while the Lat. was employed at court and by the ed. classes generally. But Francis I. (1515) adopted the Fr. at court, and by royal decree recognized the Fr. as the national lang. Thenceforth it received the attention of the great and learned. The transformation which had been wrought in the 14th and 15th centuries had caused the old lit. to be neglected and forgotten, and had thus left the lang. exposed to greater modification through foreign influence. But Marot and Malherbe, Amyot and Montaigne, did much to increase its vigor, to purify and enrich its form. Rabelais gave it suppleness and vivacity, Calvin firmness and precision. The Fr. Acad. exerted its authority, and under its auspices, aided by the pens of Voiture and Balzac, Corneille and Descartes, the rules and standards of pure Fr. became established. This lang., forcible and elegant in Pascal, copious and free in La Bruyère, harmonious and noble in Fénelon, majestic and sublime in Bossuet, reached its maturity and comparative perfection in the latter half of the 17th century. In the 18th century the lang. gained somewhat in copiousness and variety. Under the fiery trials and terrible struggles of the Revolution it found new energy of expression, while during the present century a large number of words have been introduced from Eng., Ger., etc.

The chief characteristics of the Fr. lang. are precision and perspicuity: "What is not clear is not French." Hence its almost uniform use in diplomacy since it was first employed at the conferences of Nimeguen in 1678. For the last 200 yrs. it has largely superseded the Lat. as the lang. of intercommunication among scholars and scientific men.

LITERATURE.—Fr. lit. undoubtedly commenced in the 11th century, but no existing works have a date prior to the 12th century. The earliest composers, called Trouvères, were generally men of little education. Having no acquaintance with the lit. of Rome or Gr., they sung in an original, artless style the sentiments and noble deeds of Chr. and feudal heroes. As the poetry developed under the hands of the monks and others with the advance of learning, it assumed a narrative or epic form, depicting the serious and thoughtful character of the people, in striking contrast with the lyric poetry of the Troubadours in the S., which was lively and emotional.

Chansons de Geste.—Among the early poems of the Trouvères were the *Chansons de Geste*—songs celebrating the most illustrious deeds of noble warriors. These have been grouped in 3 cycles, the first relating to Charlemagne and his paladins; the second, to King Arthur and the Knights of the Round Table; the third, to Alexander and the heroes of anc. time. Of the first cycle, the earliest and most important is the *Chanson de Roland*, which describes, in about 4000 verses, the betrayal and defeat of Roland and his braves in the valley of Roncevaux, and the vengeance which was inflicted upon the victors by Charlemagne. The cycle of Arthur was founded upon Celtic legends. The prin. poems were those of Merlin, "the enchanter," of Lancelot of the Lake, of Perceval, and the search of the Holy Graal. The *Roman de Brut* (1155) was a fabulous hist. of the kings of Brit. from the capture of Troy to 689 A. D. It was partly a translation of an earlier work, and was written in verse by Robert Wace, who wrote also the *Roman de Rou*, a long hist. of the dukes of Normandy. In the 3d cycle the heroes of Gr. bear the impress of the character, habits, and chivalric sentiments of the Middle Ages. The prin. poem, *Alexandre le Grand*, was written in verses of 12 syllables (hence the name "Alexandrine verse"). The *Falliaux* were short poetical tales—some moral, some satirical and witty, presenting the comic side of life and character. Among the most noted productions of the feudal period were the *Roman de Renard* and the *Roman de la Rose*.

Lyric Poetry.—The earliest lyric poets of any note were Count Thibaut of Champagne (1201-53) and Besselin (d. about 1418). Charles of Orléans, a royal poet (1391-1465), sang in beautiful verses the praises of chivalry as it shone in its bright glory before disappearing. Villon, the type of the Parisian populace of his time, was a bad man but an excellent poet. His chief work, *Le Grand Testament*, secured for him the first place among the old Fr. poets.

History.—The first important work in prose lit. was the *Histoire de la conquête de Constantinople*, by Villahermès (about 1167-1213). In the *Mémoires* (a life of St. Louis, Sire de Joinville (1223-1317), the model of the feudal baron, delineates the life of "the most pious king" and the exploits of the last crusade. Froissart (1337-1410) gives in his *Chroniques* a vivid picture of chivalry in its grandeur and in its decline. With Commynes (1445-1509) we see the dawn of hist. in its modern and philosophical sense. In this connection should be noticed also Christine de Pisan (1363-1420), Alain Chartier (1386-1458), and Jean Gerson (1363-1429).

Drama.—The early dramatic writings (*mystères*) bore a religious character. The subjects were biblical, and the actors and scenery were connected with the Ch. The first co.,

organized in 1402, called "La Fraternité de la Passion," represented the entire life of Christ in a mystery-play consisting of 67,000 verses, employing 86 actors, and occupying several weeks in the representation. Not long after a company of lawyers' clerks (La Basoche) began to represent the moralities, allegorical subjects. From their secular profession being under less restraint, they represented farces and amusing scenes from common life, and thus originated modern comedy. The early lit. was in its most flourishing condition in the 13th century. In the 14th and 15th centuries the insts. of the country were changing—the ideas of the people, and even their lang., undergoing modifications. In this transition from the old which was declining to the new which was forming there was not a favorable field for lit., and only a few notable works were produced.

The Renaissance.—While Fr. had thus lost her literary pre-eminence, lit. and Sp. had entered upon a brilliant career under the influences which followed the revival of anc. art and learning, the study of the Gr. and Rom. classics. The lit. of those countries, reacting upon that of Fr., opened a new period in Fr. lit., the Renaissance of the 16th century. We note, among the poets, Ronsard (1524–85), Du Bellay (1524–60), Marot (1495–1544), and Amyot (1513–93), and among the prose-writers, Brantôme (1527–1614), Margaret of Navarre (1492–1549), Despériers (d. 1544), and Bodin (1530–96). But the most important work in politics was the celebrated *Satire Ménippée*. Rabelais (1483–1553), "the great jester of France," in his *Vie de Gargantua et de Pantagruel*, satirized almost everything his age accepted. Montaigne (1533–92) sought to answer the question, *Que sais-je?* Calvin (1509–64) brought the disconnected doctrines of the Prot. into a complete system. His *Institution de la religion Chrétienne* secured for him the title of "one of the fathers of the Fr. lang." At the beginning of the 17th century, Malherbe (1556–1628) wrote poetry more remarkable for beauty of lang. than for originality of thought. His rival, Regnier (1573–1613), gained reputation as a satirist. The *Lettres* of Balzac (1588–1654) and Voiture (1598–1648) were valuable as the expression of society. Authors were mostly connected with the literary circle of the Hôtel de Rambouillet, or wrote under the patronage of Richelieu.

Age of Louis XIV.—The period occupied by the life and reign of Louis XIV. (1638–1715) was so remarkable in every dept. of lit. and art as to have secured a place among the great epochs of the world, like that of Pericles in Gr. and of Augustus in Rome. In *Philosophy* the highest place belongs to Descartes, who had just drawn (1637) the attention of the world to his *Discours de la Méthode*, "the first masterpiece of modern Fr. prose." Pascal followed with his *Lettres provinciales* and *Pensées*. Malebranche met with extraordinary success in his *Recherche de la Vérité* and his *Méditation chrétienne et métaphysique*. In *Poetry* Corneille rose from the intrigues and farces of his contemporaries to the heights of the classic drama. In his *Cid*, *Cinna*, *Les Horaces*, and *Polyeucte* he portrayed in elevated style the noblest elements of character. Close beside him in importance stood Racine, with his *Andromaque*, *Phédre*, *Iphigénie*, *Esther*, and *Athalie*, portraying the more tender emotions of the heart. Molière, a master in comedy, wrote a great variety of plays, of which the most perfect are the *Misanthrope*, *Tartuffe*, and *Les Femmes savantes*. La Fontaine produced a great number of *fables*. Boileau wrote *L'Art poétique*, also *Épîtres*, *Satires*, and *Le Lutrin*. *Eloquence* was confined to the pulpit, which alone offered a free field for oratorical talent. There Bossuet, Bourdaloue, Massillon, Fléchier, and Fénelon won great honor by their sermons. Fénelon wrote also the *Aventures de Télémaque*. In *History* Bossuet wrote the *Histoire des variations des Églises protestantes*, a masterly polemic treatise, and the eloquent *Discours sur l'histoire universelle*. The unrivalled *Lettres* of Madame de Sévigné gave a vivid picture of society and of the times. In *Morals*, La Rochefoucauld wrote the *Maximes*, while La Bruyère in his *Caractères* sought to promote true reform by separating what is true and noble from the weak and vain. Belonging partly to this period and also to the succeeding, Le Sage should be noticed for his comedies, and for his popular romance *Gil Blas*.

The 18th century presented a striking contrast to the preceding both in character and lit. It was an age of scepticism and revolt against accepted doctrines and established usages. Writers, occupied with social and political reforms, neglected poetry, and sought the practical rather than the ideal. In this age Voltaire was chief. Montesquieu wrote the *Lettres Persanes* and his *Esprit des lois*, and J. J. Rousseau assumed the rôle of reformer. He advanced new and valuable ideas on education in *L'Émile*, and in his *Contrat social* propounded political theories on the rights of man which produced their fruit in the Revolution of 1789. His *Nouvelle Héloïse*, a romance of the passions, contains some grand descriptions. His *Confessions*, interesting though sad, reveal an immoral life and an unsound philosophy. Buffon in his *Histoire naturelle* undertook to describe the universe in its full extent and in detail. After these 4 leaders may be noticed Bernardin de St. Pierre, a great lover of nature and virtue, who wrote *Paul et Virginie*, a literary gem in style and sentiment; André Chénier, Delille, celebrated for his translations; Mirabeau, Beaumarchais, who displayed the talent of a satirist in *Le Barbier de Séville* and *Le mariage de Figaro*; La Harpe, Lebrun, Condillac, and Diderot, the materialist, a prolific writer on all subjects, and author, in connection with D'Alembert, of the famous *Encyclopédie*. Helvetius in his work *De l'Esprit*, Baron d'Holbach in his *Système de la Nature*, and Lamettrie in his *L'homme Machine*, all manifested a spirit extremely hostile to religion.

In the 19th century lit. assumed a new form, corresponding to the new political and social condition under which it flourished. The classic models of the 17th century were set aside, and new models created, drawn from nature and from man emancipated and animated with real Chr. sentiment. The principles which had been shaken in the preceding age were re-established on a new basis. Chief

in this literary reform was Chateaubriand. Rejecting the impiety of Voltaire, purifying the principles of Rousseau, he sought, in his *Génie du Christianisme*, to bring men back to faith, while his *Martyres* revealed the superiority of Chr. to pagan morals and life. Scarcely less was the influence exerted by Mme. de Staël with her popular romance *Corinne* and her philosophical treatise *De l'Allemagne*.

Romanticists.—During the Restoration the literary reform reached its extreme development in *romanticism*, the complete emancipation of lit. from conventional rules. Among the most prominent in this movement were Victor Hugo and Alexandre Dumas, who secured the acceptance of such works as *Hernani*, *Marion Delorme*, and *Henri III.*, in which may be traced the influence of Shakspeare and Schiller. They were assisted in this work by Alfred de Vigny, author of *Cinq-Mars*, Alfred de Musset, the humorist, and the brothers Deschamps. But of all Fr. poets Lamartine possessed the most soul, and displayed it in the most perfect poetry. While the poetry of Lamartine charmed the imagination, the *Chansons* of Béranger delighted the senses. Delavigne gained a good reputation with his *Messéniens*. As dramatists, Andrieux, A. Dumas, O. Feuillet, Victor Hugo, J. Sandeau, and E. Scribe have won distinction. In romance the most successful writers have been Victor Hugo, A. Dumas, George Sand (Mme. Dudevant), Balzac, Mérimée, and Bayle. Archæology and Oriental lit. have been cultivated by Champollion, Renan, and Rémusat. In nat. hist. and math. Cuvier stands prominent with his great work on the *Règne animal*. In political science De Tocqueville has won a favorable distinction by works relating to Amer. insts. Constant, a Prot. and an orator, was chief of the liberal school. In essays and criticism many have gained great distinction. Among the most eminent should be noticed Ampère, Gautier, Girardin, Renan, Ste.-Beuve, and Taine. In philos., Bonald, Joseph de Maistre, and Lamennais opposed the unchristian teaching of the school of Voltaire by treating of law, duty, and God as supreme and absolute. Cousin sought to harmonize liberty with law, philos. with religion, while positivism has been affirmed by Auguste Comte in his *Cours de philosophie positive*.

History.—In this dept. Fr. lit. is particularly rich in this century. Of the philosophic school the chief is Guizot, revealing in his *Histoire de la Civilisation* a breadth of view which has been unsurpassed. While Guizot explains the idea of hist., De Barante (of the descriptive school) paints a fine picture in his *Histoire des ducs de Bourgogne*. Augustin Thierry contributed much to historical study; Villemain gave models of eloquence; Sismondi, lacking in sentiment, sometimes too severe in criticism, displays a wonderful amount of learning. Michelet traces the prevailing law and unfolds the results of first causes in a style poetic and attractive, but sometimes misleading. Mignet, in his *Révolution française*, presents ideas rather than men. Ste.-Beuve deserves mention here for his *Histoire de Port Royal*; Louis Blanc, for his *Histoire de la Révolution française*, and Henri Martin, for his *Histoire de France*, which is the most complete and valuable yet produced. Thiers rose to the first rank by his *Histoire de la Révolution française*; his *Histoire du Consulat et de l'Empire* is a masterpiece in comprehensiveness and perspicuity, in sustained interest, and in grace and naturalness of style. (See E. LITTRÉ, *Histoire de la langue française*, *Dictionnaire de la langue française*, and GERUZZI, *Histoire littéraire de la France*.) [From orig. art. in *J's Unit. Cyc.*, by PROF. W. L. MONTAGUE.]

French Polish, a solution of 1½ lbs. of shell-lac in 1 gal. of alcohol, or 12 ounces of shell-lac, 2 ounces of elemi, 3 ounces of copal in 1 gal. of alcohol.

French Prophets, Prot. enthusiasts, who arose in Fr., principally after the termination of the religious wars in the Cévennes. They were few in number until the opening of the 18th century, when they amounted to many thousands. About 1706 some of their prophets went into Eng. and Scot. and rapidly gained converts. They predicted the speedy establishment of the Messiah's kingdom, and pretended to possess the gift of tongues and the power of working miracles. They had persisted that one of their number who had died could be raised from the dead, and falling in this speedily declined in influence and numbers. They also existed in Ger. and Amer., and from them in Eng. sprang the Shakers.

French Purple, a beautiful dye obtained from lichens. (See *ARCHIL*.)

Frère (CHARLES TRÉODORE), a Fr. painter, b. in Paris in 1815, was a pupil of Coignet and Roqueplan, and made his first public appearance at the exhibition of 1834. Two yrs. later he went to Algeria, traversed the desert, visited the lands of the E., and was at the taking of the city of Constantine by the Fr. on Oct. 13, 1837. His pictures mostly represent E. scenes and manners, streets, squares, market-places, bazaars, cafés, with an occasional reminiscence of military life. They are of small size and elaborate execution, rich and harmonious in color, correct in drawing, and pleasing in tone. The artist has been twice honored with the medal—once in 1848, and again in 1865.

Frère (RT. Hon. SIR HENRY BARTLE EDWARD), D. C. L., b. in 1815, ed. at India Coll., Haileybury; entered Bengal civil service 1833; served with distinction during Indian mutiny; was gov. of Bombay 1862–67, pres. of the Royal Geographical Society 1873–74; negotiated the treaty of 1873 with Zanzibar, by which the latter agreed to co-operate in suppressing the slave-trade.

Frère (RT. Hon. JOHN HOOKHAM), b. in Lond. May 21, 1769, ed. at Eton and Caius Coll., Cambridge, where he took his master's degree in 1795; at once entered the foreign office; was in Par. 1796–1802, under-sec. of state for foreign affairs 1799, envoy to Port. 1800, envoy to Sp. 1802–04, minister to Sp. 1808–09. D. Jan. 7, 1846. He was a poet of much merit, and one of the founders of the *Quarterly Review*; author of *King Arthur and his Round Table*.

Frère (PIERRE ÉDOUARD), a Fr. painter in genre, b. in Paris Jan. 10, 1819, pursued the course of study at the École

des Beaux Arts; worked in the studio of Paul Delaroche, and in 1843 exhibited his first picture in the Salon. He is a prolific artist, but careful, with a pure sentiment, a delicate taste, and a fine pencil. His subjects are chosen from humble (frequently from domestic) life, comprising interiors with children, chamber scenes, incidents of labor or amusement, graceful idyls of common experience in great variety, the feeling sometimes bordering on the sentimental, but always healthy and sweet. Numerous examples of his work have come to this country, and been eagerly bought. The lithographer has made his best pieces familiar to all frequenters of print-shops. M. F. has received 2 third-class medals—in 1850 and 1855—and a second-class medal in 1852. At the close of the exposition of 1855 he was decorated with the cross of the Legion of Honor.

Frerichs (FRIEDRICH THEODOR), M. D., b. at Aurich, Hanover, Mar. 24, 1819, graduated at Göttingen and studied at the leading European capitals; became an exceedingly popular med. lecturer at Göttingen; became in 1852 prof. of pathology and therapeutics at Breslau and director of the school of clinical med. His best work is a *Practical Treatise on Diseases of the Liver*. D. Mar. 1885.

Fréron (ELIE CATHERINE), b. at Quimper, Fr., 1719, ed. at the Coll. Louis-le-Grand, Paris; left the Jesuits, among whom he was a prof., in 1739. Disappointed of a benefice, he entered upon the life of a journalist. D. Mar. 10, 1776. He is remembered for his life-long hostility to Voltaire and the Encyclopedists, who fully returned his hatred.

Fresco [It. "fresh"], or **Fresco-Painting**, a term applied to paintings executed on fresh or moistened plaster. In *buon fresco*, mineral colors, mixed with water or lime-water, are applied directly to the smooth wet face of good lime mortar, in which case crystalline surface almost impervious to moisture is formed. The earliest specimens of *buon F.* are probably those of Pietro d'Orvieto, in the Campo Santo at Pisa. The usual method of painting on plastered walls in Giotto's time was to allow the plaster to dry thoroughly and then to re-wet such portions of it as the artist could cover with color at a single sitting. This is called by later Its. *fresco secco*, or dry *F.* Many suppose that the old Rom. *F.* were generally executed in this way, but some of them are certainly in *tempera*, and others in *encaustic*. After the beginning of the 15th century *buon F.*, or painting on undried plaster, became the favorite art of the greatest It. masters, and Masaccio, Mantegna, Ghirlandajo, Perugino, Luini, Fra Bartolommeo, Raphael, Michael Angelo, Correggio, all became glorious through it. The subject to be represented on the wall was first drawn and shaded on paper backed with cloth; this cartoon was then applied to the wall, the outlines were pricked through into the wet plaster, and a fine black powder being blown into the perforated lines, a distinct drawing was left behind. To name the great *F.* of It. would be to give the list of a large proportion of her finest pictures. Those of Giotto may perhaps be best studied at Assisi and Padua—those of Fra Angelico at Florence and Orvieto. The SS. Annunziata at Florence possesses some of Andrea del Sarto's best *F.* The Camera of San Paolo at Parma contains beautiful *F.* by Correggio, not to speak of the domes of San Giovanni and of the cathedral. The Sistine Chapel at Rome is Michael Angelo's crowning work, and the Stanze of Raphael, also in the Vatican, are among the noblest efforts of his genius. Perhaps no artistic production has ever received higher praise than Leonardo da Vinci's *Last Supper* in the convent of Sta. Maria delle Grazie in Milan. Unhappily, this work has almost perished. This art declined after the age of the great masters. In Ger. *fresco secco* has been lately revived in a novel form through the invention, by Prof. von Fuchs, of a solution of silica called water-glass. Repeated applications of this solution are made to the surface of the best well dried common mortar; after which it is again allowed to dry thoroughly. The whole surface is then rubbed and polished; after this it is twice re-washed with the water-glass, and once more left to dry completely. Mineral colors, prepared in water, are then applied for the decoration, and the artist can correct or change as freely as if working in oils and on canvas. When the whole is finished the entire surface is carefully sprinkled over with the solution, after which the painting is believed to be secure against atmospheric influences. This kind of *F.* is called *scheochrome*, and may be seen in Munich and Berlin, where Kaubach, Overbeck, Cornelius, Schnorr, and other Ger. artists have exerted their best powers.

GEORGE P. MARSH.

Frese-nius (KARL REMIGIUS), b. at Frankfort-on-the-Main Dec. 28, 1818, studied at Bonn and Giessen, and became Liebig's assistant; founded the *Zeitschrift für analytische Chemie* in 1862 at Brunswick; author of *Anleitung zur qualitativen Analyse*.

Fresnel (AUGUSTIN JEAN), F. R. S., an illustrious Fr. physicist and inventor, b. at Broglie, Eure, in Normandy, May 10, 1788. D. July 14, 1827. His great life-work was compressed into 5 yrs. (1819-24). That work, for which commerce, and indeed the whole human race, owes him a debt of gratitude, was the perfecting of the dioptric system of illumination for light-houses. His system has received comparatively few improvements, and is now almost universally employed in light-houses.

Fresno City, on R. R., cap. Fresno co., Cal., 207 m. S. E. of San Francisco. Pop. 1880, 1112.

Freund, froit (WILHELM), Ph. D., b. of Jewish parents at Kempen, Pruss., Jan. 27, 1806, has been engaged for several yrs. in issuing *F.'s Schüler-Bibliothek*, a series of annotations to the Gr. and Lat. authors.

Frey, or **Freyr**, in Scandinavian mythology, the brother of Freya and the son of Njörd. He is beloved of all gods and men, and is himself the god of pleasure and fruitfulness. He is the husband of Gerda, the beautiful daughter of the giant Gylmir, for whose love he forfeited his good sword, which the gods sorely needed for their defence. He was especially worshipped in anc. Swe.

Frey'a, or **Frey'ia** (the "beloved"), the Scandinavian Venus, called also Vanadis, daughter of Njörd, the air-god, and wife of the god Odur, for whom she perpetually weeps tears of gold. Friday (*dies Veneris*) is Freya's day.

Freycinet (CHARLES LUCIS). See APPENDIX.

Freytag (GUSTAV). See APPENDIX.

Fri'ar [Lat. *frater*; Fr. *frère*, "a brother"], a member of a monastic brotherhood. The Dominicans were called *Black F.*, from their garments, and also *Preaching F.* The Franciscans were *Grey F.*; the Carmelites at one time were called *Barred F.*, from their striped robes, but in later times they were called *White F.* Monks not priests are called *F.*; after taking priests' orders they lose this distinctive name.

Friction, 1. Friction is that force, always acting as a resistance, which is experienced when it is attempted to move one body upon another which is pressed into close contact with it. It is generally supposed to be due to the interlocking of the asperities of the two surfaces, and to abrasion by tearing them off. *F.* is of 2 kinds—sliding *F.*, when one body is forced to slide upon another; and rolling *F.*, when it is attempted to cause one body to roll upon another. When 2 bodies are at rest and in contact, it requires more force to get up relative motion than to overcome *F.* after that motion has commenced. The "*F.* of rest" or "*F.* of quiescence" is therefore greater than the "*F.* of motion." 2. In order to determine the real expenditure of power in doing work, and to ascertain the efficiency of machines, it is necessary to learn the amount of frictional resistance and to estimate the quantity of work which may be absorbed by it in each case. It is this force which has most effect in reducing the efficiency of mechanical combinations. 3. The investigation of the laws of *F.* has employed many of the most distinguished philos. and engineers. The earliest extended researches were those of Coulomb, made during the latter half of the last century. The investigations of George Rennie, made under the direction of the Fr. govt., are usually accepted as standard. 4. By experiments the following law has been proven to exist: Frictional resistance is simply proportional to the force with which the rubbing surfaces are pressed together, and is independent of the extent of those surfaces and of the velocity of rubbing. 5. *Fluid F.*, so called, is a resistance due to viscosity of the fluid, and to the resistance of the inertia of those particles which are subjected to change of motion. The resistance of well formed vessels is caused almost entirely by "*fluid F.*" [From orig. art. in *J.'s Univ. Cyc.*, by Prop. R. H. THURSTON.]

Friday [either "Freya's day," *dies Veneris*, or "Friga's day;" Ger. *Freitag*; Fr. *Vendredi*], the 6th day of the week. In the E., Lat., and Anglican chs. all *F.* except Christmas (or in some R. Cath. dioceses all *F.* except those in Advent, but always the Ember Day in Advent) are fasts of obligation, in memory of the passion of our Lord, which is especially commemorated on Good *F.* In the folk-lore of many nations *F.* is considered an unlucky day.

Friedländer (DAVID), a Jewish scholar, b. at Königsberg, Pruss., Dec. 6, 1750, was attracted to Berlin by the reform labors of Moses Mendelssohn, after whose decease he became himself the leader of the Berlin Jews in educational and social reforms. He proposed a union of the Jewish with the Chr. Ch., but asked that the Jews be admitted into the Chr. fold without acknowledging the Messiah. D. Dec. 25, 1834.

Friend, Neb. See APPENDIX.

Friend'ly (or **Tonga Islands**, a group of over 150 islands, situated in the Pacific between lat. 13° and 25° S. and lon. 172° and 177° E. The smaller ones generally are of coral formation, while the larger ones are of volcanic origin. They have few native animals, but plenty of yams, sweet potatoes, and bread fruits. Pop. about 30,000.

Friends, or **Quakers**, a society of professing Chrs., retain among themselves the title of the "Society of Friends," but, though given in scorn, they never felt ashamed of the term "Quaker," which brings to mind the text, "The Lord reigneth; let the people tremble." The rise of the *F.* marks the period when the conflict for liberty of conscience resulted in a permanent victory. Like all the religious societies which have arisen since the Reformation, they strove to realize a greater conformity to the apostolic pattern, and the fundamental doctrines of the *F.* were not set forth as new truths, but as pure, primitive Christianity: being brought to Christ by the revelation of his Spirit in their own hearts, the *F.* were brought into unity of doctrine as a Ch. of which they regarded Christ alone the Founder, and over which they believed Christ alone to be the Head.

It was in 1646, during the first stages of civil and religious commotions, that George Fox, then in his 23d yr., began his labors as a minister of the gospel. Upon the scriptural doctrine that all spiritual knowledge comes through the revelation of the Lord Jesus Christ by his Spirit, and that he is Head, "personally and perceptibly," over all things to his Ch., rests the whole superstructure of the doctrines, mode of worship, and ch. order of the *F.* On these cardinal doctrines, as also upon those of the offices of the Holy Spirit, the fall of man, justification by faith, on sanctification, on the inspiration and authority of the Holy Scriptures, the writings of George Fox and his contemporaries, Penn. Pennington, Barclay, and others, are full and explicit. As regards the sacraments of the Ch., the *F.* never assumed a merely negative position, but one emphatically positive; but they renounced the outward ordinance of communion, because in the obedience of faith they had been brought to know of the spiritual supper of the Lord—the bread of life and the wine of the kingdom. And upon the same basis of the immediate Headship of Christ in the Ch. rest the views of the *F.* upon ch. order and govt. Gathered out of every sect and rank, the early *F.* were not brought together like loose and disjointed stones in a chaotic mass, but it was their belief that it was the will of God by the same divine power which had called them individually to himself to

build them up together, a spiritual house. In all the transactions of the Ch. it is their custom to wait for and obtain the immediate guidance of the Holy Spirit as the true spirit of judgment. And on any occasion where this unity of feeling is wanting and cannot be attained to, they either dismiss the question or defer it for future action. The influence of some distinctive principles of the F. upon the world at large has often been the subject of remark by writers outside of the society. Their early opposition to slavery and the slave-trade, their testimony against all wars as at variance with the gospel of peace, the recognized position and sphere of woman in the affairs of their Ch., and their most prominent scriptural doctrine of the personal experimental work of spiritual religion in the heart by and through the immediate perceptible operations and indwelling of the Spirit of God, are views that are finding increasing acceptance throughout Christendom. [From Orig. art. in *J.'s Univ. Cyc.*, by EDWARD BROWN.]

Friendship, Allegany co., N. Y., on R. R., 21 m. N. E. of Olean, has an acad., and is the seat of Baxter's Musical Univ. Pop. 1870, 474; 1880, 1134.

Friends of God, a body of religious persons in the 14th century who constituted an unorganized brotherhood. Some were laymen, like Nicholas of Bâle; others were monks, like Tauler, the great Dominican mystic. The F. of G. adhered to the Ch., but attempted great reforms in it.

Fries (ELIAS), b. in Swe. Aug. 15, 1794; became prof. of bot. at Lund 1828, prof. of economy at Upsala in 1834. Was chiefly distinguished as a student of the mosses, sea-weeds, lichens, etc.; author of *Systema Orbis Vegetabilium*, *Corpus Florarum Provinciarum Suecicæ*, *Summa Vegetabilium Scandinavie*, etc. D. Feb. 8, 1878.

Fries (JACOB FRIEDRICH), b. at Barby, near Magdeburg, Aug. 23, 1773, was trained in the Moravian sem. of his native place, and then studied at the univs. of Leipzig and Jena; began in 1801 to lecture at Jena, and in 1805 was made prof. of philos. and elementary math. at Heidelberg; returned to Jena as prof. of theoretical philos. In philos. he followed the doctrines of Kant, but he believed that his master's method needed perfecting. F. developed the doctrine that the sensible is the object of knowledge, the supra-sensible the object of faith, and the manifestation or revelation of the supra-sensible in the sensible the object of presentiment. He called his system "philosophical anthropology," since he made all further knowledge dependent on man's self-knowledge. His most important work is *Neue Kritik der Vernunft*. D. Aug. 10, 1843.

Frieser, von (RICHARD), BARON, b. Aug. 9, 1808, at Thürnesdorf; entered the service of the govt. in 1834. In May 1849, when the revolution broke out in Dresden, he distinguished himself by his coolness and his firm adherence to the govt. Differences between him and the minister of state, Von Beust, caused him to retire in 1852, but in 1859 he was recalled and appointed minister of finance. In 1866 he was a member of the committee which governed the country during the war and the absence of the king. In 1870 he showed great energy in the negotiations with the S. Ger. states, and served effectively in the establishment of the unity of Ger.

Frigate Bird, or Man-of-War Bird (*Tachypetes aquila*), a large tropical sea-bird of the order Steganopodes, with a long, forked tail, and wings, often 8 or 10 ft. in expanse, glossy greenish black. It is capable of very long, graceful, and powerful flight.

Frigga, in the Scandinavian mythology, the wife of Odin and the most venerable of goddesses. She was the goddess of marriage and of fruitfulness. Some say that Friday was "Frigga's day;" others say that "Freya's day" is intended.

Frigid Zone [Lat. *frigidus*, "cold"], in geog., the arctic and antarctic regions; the portions of the earth's surface which lie respectively N. of the arctic and S. of the antarctic circle. The N. and S. frigid zones have each an area of very nearly 8,229,748 sq. m., and within these zones the sun does not rise and set every day of 24 hours.

Frilled Lizard, a name applied to *Chlamydosaurus*, a singular lizard with a large plated frill. *Chlamydo-*



Frilled Lizard.

saurus Kingii is a native of Australia. The frill, when the animal has attained maturity, extends considerably beyond the legs.

Fringe [Heb. *gedil*, "twisted thread"—i. e. a "tassel"], an ornament appended to the 4 corners of the outer garment worn by the Israelites, and put there as a reminder of their allegiance to Jehovah and to assist them in the faithful observance of the Decalogue. As the Heb. law is said to contain 613 commandments, Jewish tradition has so arranged it that the word *לִצַּץ*, which is numerically 600, with 8 threads and 5 knots holding these together, should constitute a perfect symbol of the Law; and to this day every orthodox Jew observes the law in the wearing of the

F. Obligated to relinquish the large outer fringed garment, they wear it in a smaller form as an under-garment. This explains why the poor woman with the issue of blood was so anxious to touch the hem (fringe) of Christ's garment.

Fringe Tree, or Old Man's Beard, an ornamental shrub, growing as far N. as Pa. and S. to Fla. It is the *Chionanthus Virginica*, of the order Oleaceæ. Its petals are white and curiously fringed, whence the name.

Fringillidae [*Fringilla*, the typical genus], a family of oscine birds, which are characterized by their truly conic bill, shorter than the head, tomlia evidently angulated, upper tomlum usually with a subterminal notch, and 9 primaries. It embraces finches, sparrows, grosbeaks, buntings, etc.

Frische Hafl ["Fresh-water Sea"], a lagoon with an area of 318 sq. m. on the coast of Prus. In ancient days it formed a lake, separated from the Baltic by a narrow band of land. But in 1510 the Baltic broke through, and formed a permanent passage from 10 to 15 ft. deep.

Fristi, free'se (PAOLO), F. R. S., b. at Milan Apr. 13, 1728, became a Barnabite monk; in 1764 was made prof. of math. at the Univ. of Milan, where he d. Nov. 22, 1787. He was profoundly versed in math. and physics, and possessed a positive character, in consequence of which he was involved in perpetual controversies.

Frisians, The, called by the Roms. *Frisii*, in the Middle Ages *Frisones* or *Frisiones*, and by themselves *Frisan*, were a Teutonic race which was first heard of in 13 b. c., when Drusus found them dwelling, together with the Batavi, the Bructeri, and the Chauci, on the N. W. coast of Ger., between the mouth of the Rhine and the mouth of the Ems. They were at that time an expanding race. They wholly absorbed the Chauci, and as the Frankish tribes drew southward F. tribes stepped in and possessed themselves of the land as far as the mouth of the Scheldt. They also spread toward the N., along the coast of the Ger. Ocean, as far as Jutland, where they were known under the name of *Strand Frieser*. Soon, however, the Franks turned their arms northward. In 689 the F. chief Ratbad was defeated at Dorsted by Pepin de Herstal, and he and his subjects, the *Frisii majores*, or W. F. (who occupied dists. which are now W. of the Zuider-Zee), were compelled to embrace Christianity. In 734 the same fate overtook that part of the *Frisii minores*, or E. F., who lived in the region now between the Zuider-Zee and the Ems. Charles Martel defeated their chief Poppo, in a bloody battle, and afterward sent the holy Bonifacius into the country to preach Christianity among them. Finally, Charlemagne subdued (785) the rest of the E. F. inhabiting the dists. between the Ems and the Elbe. By his *Lex Frisionum* the whole terr. of the F. was divided into 3 parts, of which that part situated in the W. fell to Charles the Bald at the division of the Carolingian empire, and in time was merged into the present Dut. provs. of Hol., Zealand, Guelderland, and Utrecht, losing its F. character almost entirely. The 2 other parts, both situated farther E., but separated from each other by the Ems, fell to Louis the German, and received the names, respectively, of W. and E. Friesland, of which the former is the present Dut. prov. of Friesland, and the latter belongs to Hanover. Here the F. character prevailed, and the lang. has survived until our days. The first who called the attention of scholars to the F. lang. was the Dan. philologist Rasmus Rask, whose gram. of the lang., *Frisish Sprogloze* (Copenhagen, 1825), was translated into Dut. in 1832 by Hettema. It was followed in 1840 by a dict. by Richthofen, *Altfriesisches Wörterbuch*. In its oldest form the F. lang. exists only in law books, of which the most remarkable are the *Asegabuch*, written in 1200, and valid for all F.; the *Emsiger Domes*, from 1312; the *Brokmerbrief* and the *Recht der Rüstringer*, from the middle of the 14th century. They have been collected and pub. in Richthofen's *Friesische Rechtsquellen*. In our days the F. lang. has disappeared from ch., school, court, and educated people's conversation. It is now spoken only by the peasants of a few islands in the Ger. Ocean, such as Heligoland, and of a few isolated parishes of Oldenburg, Hanover, and some towns of the Netherlands, such as Moolwurum, Hindeloopen, and Leeuwarden; but is broken up in dialects which are unintelligible outside of their native places. Mr. A. Hettema has written much in and about the F. lang. CLEMENS PETERSEN.

Fritih (WILLIAM POWELL), R. A., an Eng. artist, b. at Studley, near Ripon, in 1819; has produced many paintings, among which is a scene from the *Vicar of Wakefield*; entered the Royal Acad. in 1852.

Fritillary [from the Lat. *fritillus*, a "dice-box," from the dice-like marks on the petals], the *F. meleagris* of Europe, a lilaceous plant common in cultivation; the flower is spotted with purple, red, and yellow; hence it is often called checkered lily. The crown imperial (*F. imperialis*) is a fine showy flower of Per. origin. There are some 20 species. Of these the *F. atropurpurea*, *pubica*, etc., grow in the U. S.

Fritzsche, frit'sheh (CHRISTIAN FRIEDRICH), b. at Nauendorf, Ger., Aug. 17, 1776, ed. at Franke's orphan asylum and at Leipzig; became a Lutheran divine and prof. of theol. at Halle. Author of *Vorlesungen über den Abendmahl*; *De amantissima Jesu Christi*. D. at Zürich 1850.—His sons are or were all univ. profs. and authors of learned works.

Fritzsche (FRANZ VOLKMAR), a distinguished philologist, b. at Steinbach, Sax., Jan. 26, 1806, studied philology at the Univ. of Leipzig; became prof. of eloquence and poetry in Rostock 1828. He edited *Inalogi Deorum* of Lucian, the *Thesophorizuse* and the *Ranæ* of Aristophanes. In defence of his teacher, Hermann, against Otfried Müller, F. pub. a *Recension des Buches Aschylos Eumeniden von K. O. Müller*. A second part was added to it.

Froben, or Frobenius (JOHANN), a learned printer, b. at Hammelburg, in Franconia, in 1460. He received his education at the Univ. of Bâle, then served as corrector under Amerbach and Petri until 1491, when he established his own printing-office in Bâle. His first publication was a Lat. Bible, and he is said to have been the first, or among the first, to introduce into Ger. the use of Rom. letters. F. was a warm

friend of Erasmus, and the pub. of many of his works issued collectively by Jerome Froben, 1540. D. Oct. 1527.

Frobisher (Sir MARTIN, an Eng. navigator, b. at Doncaster, Yorkshire, the first Englishman to sail in search of a N. W. passage. He was aided in his enterprise by Dudley, earl of Warwick, and sailed from Deptford in June 1576, with 3 vessels of small size. F. reached that part of Greenland which he named Meta Incognita, and passed through the strait to which he gave his name. In 1585 he accompanied Sir Francis Drake to the W. I.; in 1594 he was sent to aid Henry IV. against the Spaniards and Leaguers; in an attack upon them at Croyzon, near Brest, he was mortally wounded, and d. Nov. 7, 1594.

Frobisher Strait, an arm of the sea in Brit. N. Amer., between Hudson Strait and Northumberland Inlet, extending W. from the ocean at the entrance of Davis Strait; it is 240 m. long, and has a mean width of 30 m.

Froebel (FRIEDRICH), b. Apr. 21, 1782, at Oberweissbach, in Thuringia. His mother died before his remembrance, and his half orphanage quickened his sensibility and stimulated him to reflection. An elder brother undertook to teach him the sexual system of bot., and show him how, by the union of opposites, harmony and beauty gradually grow out of differences. At 13 he was apprenticed to a forester, who taught him wood-lore and math.; later he went to the Univ. of Jena, studied the natural sciences, and became in 1813 curator of the mineralogical museum of Berlin. Later he met the educator Gruner, and visited Pestalozzi for the first time. After that he began a school in Keilhau with 6 pupils. Karl Froebel, one of these children, now an old man keeping school in Edinburgh, describes this school as a paradise of children. The plan was to educate the children by putting them at work, and making nature itself and what they produced by their own hands, their books. It was not till 1840 that he founded his first kindergarten at Brandenburg. Twenty-three yrs. before he had pub. his first work, *Menschenziehung* ("Human Education"), in which may be discerned the seeds of the kindergarten. At that time it was his idea that the child until he was 7 yrs. old should be exclusively ed. by the mother. Later, he saw that it was simply impossible for mothers with several children to devote themselves to the development of each child, but that from the time children were 3 yrs. old till 7, it was a relief to have them gather into companies, to be taken care of for several hours of every day by a kindergartner. He elaborated the method, and has left it a gospel to childhood, for its principle is that free creativeness is at once the means and end of human education, and begins in spontaneous play. The reform of education begun by Rousseau, and carried on by Fichte, Pestalozzi, and Diesterweg, finally culminated in F.'s principle of educating the human being in its first yrs. purely by its own spontaneous activities. D. June 21, 1852. [From orig. art. in *J's Univ. Cyc.*, by ELIZABETH P. PEABODY.]

Froebel (JULIUS), nephew of Friedrich, b. in Griesheim, Ger., in 1806, studied at several Ger. univs.; held professorships of mineralogy and other sciences at Zürich 1833-44; took part in the revolution of 1848, and entered the Frankfurt Parl.; was arrested and tried for a political offence at Vienna, escaped, and removed to the U. S.; returned to Ger., and became again involved with the authorities; became in 1873 Ger. consul at Smyrna. Author of *Grundzüge eines Systems der Krystallogie*.

Frog [cognate directly with the A.-S. *frogga*, and immediately with the Ger. *Frosch* and Dut. *vroesch*], a name applied to tailless Amphibians representing several distinct families. The common F. of the U. S. belong to the family Ranidae and the genus *Rana*, of which there are about 40 species, found in almost all portions of the world except Australasia and S. Amer. Nearly a dozen are found in the U. S.; the best known are the common bull-F. (*Rana Catesbeiana*), the shad-F. (*Rana halecina*), the wood-F. (*Rana sylvatica*), the marsh-F. (*Rana palustris*), and the spring-F. (*Rana fontinalis*). The common F. of Europe and the wood-F. of the U. S. may be known by a reddish-brown color and by a dark, bridle-like stripe passing from the snout and through the eye backward. Although not universally popular, there is an increased tendency to the appreciation of F. as a delicacy for the table in this country, as there has long been in Fr.; and in most of our large cities F. can be obtained in select places in proper season. In Fr. and in S. Europe generally, they are a favorite article of diet. Froggeries abound in which the animals are raised and kept.

Frog Fish. See ANGLER.

Frog-Spawn, properly the name of the well known gelatinous mass inclosing the ova of frogs; but the name is extended in rural dists. to some of the large green freshwater Algae, which form slimy masses in streams and ditches—notably to those of the family Batrachospermaceae, of which *Batrachospermum moniliforme* is a very common species both in Europe and the U. S.

Frog-Spittle, Cuckoo-Spit, or Toad-Spit, a popular name for a frothy substance often seen on grasses, weeds, and even trees, resembling human saliva in appearance, caused by the larva of various Hemiptera. In Europe the larva of *Cicada spinosa* is a very common cause. In the U. S. the genera *Heleochora* and *Aphrophora* are among the froth-producers. This froth is the sap of the plant.

Frois-sart (JEAN), b. at Valenciennes, Fr., in 1337; travelled much in Flanders, Fr., Scot., It., and other countries; became canon of Chimay 1390. The time of his death is not known. He is chiefly memorable for his *Chronicles*, the most important historical monument of the Middle Ages that we possess; they are a faithful picture of his times, and of their places, customs, and people.

Fromentin (ELIGIUS), b. in Fr., became a priest and Jesuit; came to the U. S.; was U. S. Senator from La. 1813-19; and U. S. judge in W. Fla. during Jackson's governorship. D. Oct. 6, 1822.

Fronde [Fr. for a "sling," the name was probably given from an incident in a street-fight; according to others,

from the squibs hurled by the anti-Mazarin party at the court], a faction of Fr. nobles who opposed Cardinal Mazarin during a part of the minority of Louis XIV. The policy of Richelieu had led to a centralized despotism, against which (Aug. 27, 1648) the people of Paris rose in arms. In the Oct. following the popular demands were acceded to, but the nobles seized the opportunity of trying to regain their old power. The struggle lasted from 1649 to 1652, and as far as military results were concerned were favorable to the nobles, but as they had no strong leadership, and no definite object except self-aggrandizement, Mazarin in 1653 snatched from his mutually jealous enemies the fruits of their victory.

Frontenac, fron-teh-nahk', de (LOUIS DE BUADE), COMTE, b. in 1621 in Fr.; served in the army in It., Flanders, Ger., and Candia. In 1672 was appointed gov.-gen. of Canada by Louis XIV. His first governorship of New Fr. (1672-82) was marked by the building of Ft. Frontenac (now Kingston, Ont.) and the expeditions of La Salle, Marquette, and Joliet; but he was hampered by the action of his intendant and of Laval, bp. of Que., and was recalled; in 1689, Canada being almost ruined under his successors, he was sent out again. He repulsed the forces of Phips before Que. (1690), and d. there Nov. 28, 1698.

Frontinus (SEXTUS JULIUS), a Roman writer, distinguished also in civil and military affairs, b. about 40 A. D., though the exact yr. is not known. His first appearance in public life was as *prator urbanus* in A. D. 70, under Vespasian. He was twice honored with the office of consul, and in A. D. 97 was appointed by Nerva *curator aquarum* (supt. of aqueducts), to which appointment no doubt he owes his most valuable publication. He d. probably in 103. F. has left us a work on military tactics, entitled *Strategematicon libri IV*. More important than this is the other extant work of F., *De Aquæ ductibus urbis Romæ liber*, in which he describes the construction and maintenance of those vast and expensive structures which made Rome enviable among anc. cities for its ample water-supply. Beside these, several treatises on land-measurement are ascribed to F., only fragments of which remain.

Frontlet. See PHYLACTERIES.

Fron'to (MARCUS CORNELIUS), a distinguished rhetorician, b. at Cirta, in Afr., about 90 A. D. Having removed to Rome, he was intrusted with the education of the imperial princes, M. Aurelius and L. Verus. In 143 he held for a short time the office of consul. He d. about the yr. 168. His only literary remains are certain letters, among them a portion of his correspondence with the emp. Antoninus Pius, and with his former pupils, Marcus Aurelius and Lucius Verus.

Frossard, fro-sar' (CHARLES AUGUSTE), b. Apr. 26, 1807, entered the Fr. army 1827; participated in the campaign in Belg. 1831-32, distinguished himself in Algeria; was in 1846 engaged in the erection of the fortifications of Paris; took part in the siege of Rome in 1849, and in Jan. 1855 received the command of the second engineering corps of the Crimean army. In the It. war in 1859 he was chief of the whole engineering dept., and shortly afterward appointed gov. to the imperial prince. As commander of the second army corps in the Franco-Ger. war F. arranged the attack on Saarbrücken (Aug. 2, 1870), and was thoroughly beaten out of the place on Aug. 6. On the capitulation of Metz he fell into Ger. captivity. D. Sept. 3, 1875.

Frost [allied to freeze; Ger. *Frost*] properly designates frozen dew, rime, or hoar-F., often called *white F.*, to distinguish it from *black F.*, which is the effect produced upon herbs and leaves by the freezing of their juices. The freezing of soil-moisture is popularly called *F. also*. Hoar-F. is frozen dew, or rather a deposit of minute ice-crystals in the place of dew, for the freezing does not follow the formation of the dew-drop. The conditions for the formation of white F. are precisely those requisite for the formation of dew, except that those conditions act more powerfully on account of the lower temperature of the earth and air. The hygienic effect of F. is generally salutary. Malarial fevers are favorably modified by it, and the spread of cholera and of yellow fever is usually checked at once.

Frost (JOHN), LL.D., b. at Kennebunk, Me., Jan. 26, 1800, grad. at Harvard in 1822. Wrote *Pictorial Hist. of the World* and *Pictorial Hist. of the U. S.* D. Dec. 28, 1859.

Frost (WILLIAM EDWARD), R. A., b. at Wandsworth, Eng., Sept. 1810; attained distinction as a portrait-painter, but since 1839 has chiefly painted mythological pictures. His *Prometheus Bound* won the gold medal of the Acad. D. June 4, 1877.

Frost-bite and Freez'ing are conditions caused by the action of cold upon the animal economy. F.-B. is local and partial—freezing is gen. and more or less complete. Severe F.-B. may lead to gangrene, but the milder forms often result in nothing worse than chilblains, which are very annoying, but not dangerous. Zinc ointment, glycerine, and stimulating applications are useful. Gen. freezing, if rapid, may result in speedy death; but more frequently the vital functions pass for a time into a state of abeyance, which may last, it is said, for some days, and then be terminated by death. In recovering frozen and unconscious persons it is held that a very slow restoration of the normal temperature is safest, apparently because sudden warmth arouses dormant energies which demand immediate aëration of the blood, which failing, death at once ensues.

Frostburg, on R. R. Allegany co., Md., 17 m. from Cumberland, on a plateau between Savage and Dan's mts., 1255 ft. above Cumberland and 1792 ft. above tide, immediately over the great coal-basin of W. Md. Pop. of dist. 1870, 6131; 1880, 4057.

Froth Fly. See FROG-SPITTLE.

Frothingham (ELLEN), daughter of N. L. b. in Boston Mar. 25, 1835; noted for translations of 3 difficult masterpieces—Lessing's *Nathan der Weise*, Goethe's *Hermann and Dorothea*, in verse, and Lessing's *Laokoon*.

Frothingham (NATHANIEL LANGDON), D. D., b. in Boston, Mass., July 23, 1793, entered Harvard Coll. at the age of 14 in the class of 1811; in 1812 received the appointment of teacher of rhetoric at Harvard, in 1815 became pastor of the First ch. in Boston; retired from the pulpit in 1850, and devoted himself to lit., living in Boston. Dr. F. contributed to lit. poetical translations from the Gr., Lat., It., and Ger.; was one of our earliest students of Ger., and did good service in introducing the finest Ger. thought to Amer. readers. D. Apr. 4, 1870.

Frothingham (OCTAVIUS BROOKS), son of N. L., b. in Boston Nov. 26, 1822, ed. at the Public Lat. School, grad. at Harvard Coll. 1843; studied theol. at Cambridge, and settled in Salem, Mass., 1847; removed to Jersey City, N. J., 1855, and after a ministry of 4 yrs. went to New York and established the Third Unit. society. Mr. F. belonged to the radical wing of the Units, for a time, but became at last a rationalist, and assumed the attitude of an independent preacher. From the beginning he has been pres. of the Free Religious Association, the aim whereof was the emancipation of religion from all sectarian limits, the reconciliation of faiths, and the application of the scientific method to the study of theol. This places him outside of Christianity as a special religion, and forbids his calling himself by any particular name. Wrote *Religion of Humanity*, *Life of Theodore Parker*, and *Beliefs of the Unbelievers*. He was one of the associate eds. of *J'n Univ. Cyc.*

Froude, frood (JAMES ANTHONY), LL.D., b. at Dartington, Eng., Apr. 23, 1818, ed. at Westminster and Oriel Coll. Ox., where he grad. with honor; became a fellow of Exeter Coll. 1842, was ordained a deacon in 1845, but soon changed his religious opinions, which had been extremely High Ch.; pub. *Shadows of the Clouds and Nemesis of Faith*, which were condemned by the authorities of the univ. In 1850 he began to write for *Fraser's Magazine* and other periodicals. His greatest work, *The Hist. of Eng. from the Fall of Wolsey to the Defeat of the Sp. Armada*, is remarkable for its novel views and abundance of fresh material. In 1869 he was made rector of the Univ. of St. Andrew's. In 1872-73 he lectured in the U. S.

Frozen Wells. Certain wells in the N. U. S. contain ice during the whole or part of the yr., sometimes rendering the drawing of water impracticable. Examples are in Brandon, Vt., Owego, N. Y., Lyman, N. H., and Ware, Mass. The first is 35 ft. deep, dug in 1858 through gravel and marly clay. The frozen mass of gravel is about 15 ft. thick, showing itself at 14 ft. below the surface. In the winter the water freezes entirely over, and in the summer the stones of the walls are lined with ice several inches thick, the temperature rarely rising above the freezing-point. At numerous localities in the same region, also in the Alps, the Jura, and the Ural Mts., ice accumulates in rock-caverns and among the fragments at the base of precipices, sometimes sufficiently abundant to be an article of commerce. The caverns usually have 2 lateral openings. This causes a current of air, which evaporates the water upon the sides and floor of the cavern, thus producing congelation, since in this way an immense amount of heat is taken up into the latent state. Less ice is formed in the winter than in the summer in the caverns. At Monte Testaceo in Rome this principle is employed for the artificial manufacture of ice. It has been suggested that the freezing of water in the wells may be due to the interpenetration of the interstices of the gravel with air which has motion in one or the other direction according to circumstances, and thus removes so much heat as to freeze the water. In the Brandon example particular excavations near the well may possibly give rise to the air-currents, and deposits of clay may prevent the access of external heat. Or if the ice be not annually renewed by means of the currents, it is possible the frozen area may be a remnant of the glacial sheet which enveloped most of the N. continents during the Drift period. Under favorable conditions such masses may be preserved for thousands of yrs., and form a nucleus to which more frost may be added at certain seasons of the yr. C. H. HITCHCOCK.

Fructidor ("fruit-month"), in the Fr. republican calendar of 1792-1806, the 12th and last month in the yr., extending from Aug. 18 to Sept. 16.

Fruiteose, Fruit-sugar, or Inverted Sugar, a mixture of dextro-glucose and lævo-glucose in equal quantities; occurs in fruits, and is formed by the action of acids on cane-sugar. (See SUGAR AND GLUCOSE.)

Fruit [Lat. *fructus*], in a wide sense, is the perfected ovary of a flowering plant, with its proper envelopes. Some F., like the strawberry, result from the blending of many ovaries with a fleshy receptacle. In others, as the fig, the fleshy receptacle is hollow, and the whole inflorescence, including many pericarps, is blended in the F. A F. consists of the seed and its surrounding pericarp, and F. receive various gen. names according to the nature of the pericarp.

Fruit-culture. *Its History.*—The first records of F.-C. give the fig, almond, peach, orange, citron, apples, pears, cherries, plums, quinces, service-berries, gooseberries, grapes, mulberries, strawberries, currants, raspberries, and all the nuts now in cultivation. The list here referred to gives the status of F.-C. in about 400 of our present era. Melons were largely grown in great variety 800 to 900 yrs. since. The Romans were the first introducers and disseminators; to them Fr., Eng., etc., are indebted. In the 16th century the practice of hastening the ripening of fruits by laying hot limestones underneath the branches of trees and watering with hot water was known. Fr. has grown and distributed more fruit trees than any other nation. Only the common fruits are natives of Ger. The S. of Ger., as a rule, is the only part suited to the finer fruits. The apple, pear, cherry, etc., were grown there in A. D. 800, and grafting was then practised, as well as the making of wine and cider. In 1105 a proclamation required every landholder to plant yearly at least 12 fruit trees, so that for many yrs. from 30,000 to 40,000 trees were annually planted. The in-

crease of F.-C. from this time forward for some 50 yrs. was astonishing. It then flagged, owing to wars and troubles of various sorts. The pestilence of 1683 was one of the agents in checking vine-culture especially. Rus. has done little in the growing of fruits in the open air. Poland, like Rus., can claim little for out-door hardy fruit-growing. Sp., where more varieties of fruits can be grown than in any other terr., deserves little credit on account of progress. Some of the finest wines of the world are made there. The native fruits of the Brit. Islands were of a poor nature, and the improved varieties were introduced by the Romans. Eng. had no fruit of value until the close of the 10th century, and then little beside the grape. The orchards, nurseries, and commercial gardens of the British Islands perhaps equal those of Fr., and may be summed up as comprising most of the hardy fruits, while the tender sorts, as peaches, figs, etc., are mostly grown under artificial protection. With the various sections, leaving what we term the Brit. Islands above noted, we have Asia, Asia Minor, and Per., but we find nothing relating to fruit-growing that shows any idea other than to eat of what Providence has given for their healthful support. The Chl. in early times grew few fruits but such as were natural to their climate—oranges, mangoes, etc. At the present time they grow nearly all varieties of fruits. N. Amer., including Canada and the U. S., and even Mex., had most of its fruits introduced by the Fr. and the Romish missionaries. The Fr. may be said to have been strictly the pioneers in apple and pear growing. Most of the grapes now grown in Cal. were introduced by the Jesuit fathers, and it may be said that wherever the Romish missionaries settled the grape was a specialty with them. S. Amer., with a climate of great capabilities for the growing of fruits, has done but little. The vine and the peach, with the olive and orange, are the prin. cultivated fruits. The hist. of fruits in the W. I. and in Australia discovers the fact that in the former only tropical fruits are successful, while in Australia almost any fruit can be grown successfully, but those of the N. temperate climates, like our Middle States, cannot be grown with the flavor, aroma, and keeping qualities that they have here. The lists of fruits and dates already given are those of the earliest hist. of which we have record, but all the nations have advanced in collections of varieties, and also in systematic knowledge of culture. Fr., the Brit. Islands, and the U. S. have without doubt increased most rapidly in varieties, while Ger. has produced the most new valuable pears, and the U. S. the most apples, hardy good grapes, and peaches. The lists in the books of varieties now grown give, as to their origin, $\frac{1}{4}$ of the pears, apples, plums, cherries, quinces, and peaches to Eng.; of hardy grapes she has produced none, but of apricots, currants, and nectarines perhaps more than any other country. Ger. has produced the most varieties of pears during the past 200 yrs., while Fr. has grown and offered for sale more sorts of fruits than any other country except the U. S.

Production of Trees from Seedlings and Cuttings in the Nursery.—The production of new varieties is from seeds. Improved sorts are usually gained from seeds taken from fruit of trees of varied sorts allied in nature and standing near each other, but the largest number of best fruits have come from nature's own commingling. The growing of seedlings of all the fleshy fruits is simply to gather the best seeds, and from the time of gathering to keep them packed in moist sand or moss, exposed to out-door temperature, and shaded from the sun. The same care is required with all the nut fruits. The currant, gooseberry, and grape can be grown from what are termed cuttings—i. e. pieces of wood of the past year's growth, having each 3 to 4 buds. The best season for making and planting these cuttings is in autumn as soon as the wood and foliage are ripe.

The Pruning of Trees and Vines.—If the operator will study nature in the pruning of fruit trees, he will note that any cutting of limbs from the time the buds start their growth in spring until they have ripened the last bud of the season creates disease of the roots, sometimes exhibiting itself in what is called canker, sometimes in blight, etc. Nature, when trees stand and grow in the open ground, where the sun and air reach all points, starts the branches from 1 to 2 ft. from the ground. This shades the foundation from the sun, and holds a balance of lever-power against high winds. The standard apple, pear, plum, peach, etc., in open field orchards should, on the other hand, have their first branches start at 4 to 5 ft. from the ground. In the pruning of inner branches, and the shortening-in of such as seem to grow more than the rest of the tree, the best time is a week or two before the swelling of the buds in the spring. The pruning of grape-vines was commenced in this country from the methods followed with a different species of grape upon the Rhine, but Amer. grapes cannot be confined like the European, neither can health or longevity be maintained by following European teachings. In pruning our native grapes, as soon in autumn as the fruit and wood have mainly ripened is the time to operate. The stems to be left should be not too large nor very long, but of good medium size, well ripened to a deep rich brown. (See VINE CULTURE.)

Gathering and Keeping of Fruits.—No variety of fruit should be gathered when there is any moisture upon it. Strawberries, raspberries, and blackberries are to be gathered just when fully ripe. Peaches, if for shipment, should be left upon the trees until they are well colored and will give to the pressure of the inside of the thumb. If wanted for family use, either for the table or canning, they should remain upon the tree until they are really soft and juicy. The same holds with plums, apricots, and nectarines. These 4 named sorts may be counted ripe when the side next the sun is a little soft. The ripeness of pears is decided by the lifting of the fruit, when, if nearly or quite ripe, it will separate readily at the junction of the stem with the spur. The very late autumn and winter varieties should hang upon the tree until near the time of a sharp frost. The gathering of early ripening summer apples is done when a

soft jar of the limb causes them to drop from the spur. The later ripening summer varieties, as well as the early varieties of autumn, should be gathered as soon as they show the color belonging to them, and on opening are found with dark-brown seeds. So gathered, and kept in a cool, dark, airy place, they will remain good a long time. The late fall apples and the early winter sorts will do to gather at about the same time, or say as soon as the seeds show a brownish-black color. The best winter-keepers should be gathered just before severe frosts. [From orig. art. in *J.'s Vocab. Cyp.* by F. R. ELLIOTT.]

Fry (BENJAMIN ST. JAMES), Meth. clergyman and journalist, b. June 16, 1824, studied at Woodward Coll., O.; joined the ministry in O. Conference in 1847; served as chaplain in the U. S. A. 1861-64; was chosen by Gen. Conference to be ed. of *The Central Chr. Advocate*, St. Louis, 1872. Wrote *Property Consecrated*.

Fry (ELIZABETH), daughter of John Gurney and wife of Joseph Fry of Lond., was b. at Bramerton, Norfolk, Eng., May 21, 1780; was bred up a Friend, and under the ministrations of William Savery, an Amer. Quaker, she in 1798 became awakened to a new religious life; was married in 1800, and then resumed her former habit of visiting the poor and sick, afterward extending her attention to seamen, prisoners, outcasts, and the vicious classes. D. Oct. 12, 1845. (See her *Memoirs*, by T. TIMPSON.)

Fry (JAMES B.), b. Feb. 22, 1827, in Carrollton, Greene co., Ill., grad. at the U. S. Military Acad. 1847; was commissioned as brevet second lieut. in the 3d U. S. Artill., and joined it in the city of Mex. during the Mex. war; served as instructor and adjutant at the Military Acad. 1854-59; appointed assistant adjutant-gen. 1861, chief of staff to Brig-Gen. McDowell during his campaign of 1861, taking part in the first battle of Bull Run; as chief of staff to Maj-Gen. Buell in 1861-62, taking part in the battle of Shiloh and subsequent operations; provost marshal-gen. of the U. S. (brig-gen.) 1863-66, after the system of voluntary enlistment had proved inadequate. As provost marshal-gen. he put into the army by conscription, substitution, and voluntary enlistment, 1,120,621 men; arrested and returned to the army 75,562 deserters; made an exact enrolment of the national forces, showing that there remained in the country liable to conscription, but not called out, 2,254,063 men; and collected, under a money-commutation clause of the enrolment act, \$26,366,316.78. His *Final Report of the Operations of the Bureau of the Provost Marshal-gen. of the U. S., from the commencement of the business, Mar. 17, 1863, until the Bureau terminated by law, Aug. 28, 1866*, is pub. as a Congressional document. Became brevet maj.-gen. U. S. A.; served since 1866 as adjutant-gen. of the military divisions of the Pacific, the S., and the Atlantic; retired in 1881.

Fry (WILLIAM HENRY), a journalist and composer, b. in Phila. Aug. 1815, son of Wm. Fry, proprietor of the *Phila. National Gazette*; in 1835 his first orchestral compositions, 4 overtures, were performed by the Phila. Philharmonic Society; became ed. of the *Phila. Ledger* 1844. His first opera produced entire was *Leonora*, performed in Phila. in 1845; from 1846 to 1852 he resided in Europe, principally in Paris, and was engaged as correspondent to several leading Amer. journals. Upon his return from Europe he joined the editorial staff of the *New York Tribune*, where he continued until his death, Dec. 21, 1864.

Fryxell (ANDERS), a celebrated Swe. historian, b. at Hesselkog, Dalecarlia, Feb. 7, 1795, studied philos. and theol. at the Univ. of Upsala. From 1822 to 1836 was director of one of the most prominent educational insts. of Stockholm, and in 1824 wrote a gram. of the Swe. lang., which is used in all the higher schools of the country. In 1836 was appointed provost of N. Wermland, an ecclesiastical position in the Lutheran Ch. intermediate between minister and bp., but in 1847 resigned this office in order to devote himself entirely to historical studies. Hist. is cultivated in Swe. with great interest and with superior talent, but among the many able productions which this branch of Swe. lit. contains, F.'s *Berättelser ur Svenska Historien* occupies a foremost place. CLEMENS PETERSEN.

Fu'ad Pa'cha, a Tur. statesman, b. at Constantinople in 1814. In 1849 he became minister of the interior, and from Aug. 1852 to Mar. 1853, from May 1855 to July 1857, and in Jan. 1858, he occupied the position of minister of foreign affairs. He participated as a plenipotentiary in the conference at Paris; in Nov. 1861 was appointed grand vizier. F. P. was a man of Fr. education and tendencies, and the chief support of the reform party in the Tur. empire. In 1868 he induced the sultan to make a tour in W. Europe, in order to make him see with his own eyes the advantages of European civilization. In his political activity he was very successful, especially in crushing the revolution of Crete in 1867. D. Feb. 3, 1869.

Fuaceae. See SEA-WEEDS.

Fu'ca, de (JUAN), a Gr. navigator, discovered the Strait of San Juan de Fuca (1592). D. 1602.

Fuchsia, fû'she-a, a genus of dicotyledonous plants, belonging to the natural order Onagraceae, and named after Leonhard von Fuchs, a celebrated Ger. botanist (b. in Suabia in 1501, d. in Tübingen, where he was a prof., in 1566). The popular name of the genus is "ear-drop," from the appearance of the pendulous flowers. These are very showy, of a red, violet, or rose color in their native state. They sport and hybridize easily, and hence result the numerous varieties known in floriculture. Those with white or cream-colored tints are the most highly prized. The tube of the calyx is showy in appearance, like the corolla, and is extended much beyond the ovary. It is bell-shaped or tubular, with 4 spreading lobes. The petals are also 4 in number, and the stamens 8. The style is long and thread-shaped, and surmounted by a club-shaped stigma. The flowers are on axillary peduncles. The plants are mostly smooth, with opposite or whorled leaves. They are either tender shrubs, climbers, or trees, natives of S. Amer. as far as Fuegia, and

also of the S. parts of N. Amer.; and New Zealand has some native species. Their best known habitat is the Andes of Chili and Peru. The species now in cultivation have been so much changed by art that it is often difficult to recognize their origin. They may be divided into short and long flowered and panicle F. The plant forms a berry which is sweet or only pleasantly acid, and which is eaten in the countries where it is native. A black dye is said to be formed from the wood in Chili. F. are easily propagated by cuttings, and have become so abundant that they are within the reach of even the poorer classes, in whose windows or small garden-plots they are often seen growing. They thrive in a light rich soil. They grow well in the open air in the summer time, but in the N. U. S. have to be housed in winter. There is no class of plants except the geraniums with which the gardener has been able to do so much. There appears to be no limit to the curious freaks of color which they may be made to assume, and it is said that they occasionally become striped. They are familiar to all in conservatories and in floral ornamentation. W. W. BAILEY.

Fu'cino, or Cela'no [Lat. *Fucinus*], **Lake and Tunnel of**. This lake lies about 50 m. E. of Rome, at the height of 2300 ft. above the sea, in a mt.-basin in the Apennines having no known natural outlet. Its depth and superficial extent have at all times been subject to great variation. In 1816 it covered 42,000 acres, with a maximum depth of 75½ ft.; in 1835 its area was but 33,000 acres, its greatest depth 34 ft. The cultivation of the debatable zone, of about 9000 acres, between these extremes was of course attended with risk of loss, and at low water the freshly bared soil sent up miasmatic exhalations. To obviate such evils, and to gain an addition of fertile soil for agricultural purposes, Julius Caesar contemplated the excavation of a tunnel to discharge the superfluous water into the river Liris, now Garigliano, 62 ft. lower than the bottom of the lake. The work was commenced by Claudius, and completed after 11 yrs. of labor. The length of the Claudian tunnel was more than 3¼ m. The tunnel was admirably engineered, and the methods of excavation much resembled those employed at the present day. The execution of the work by the constructors was most unfaithful, and was soon obstructed and fell into total decay. At various subsequent periods attempts were made to restore the tunnel, but it does not appear that anything was effected until, by the enterprise of Prince Alessandro Torlonia of Rome, the entire line has been rebuilt at a cost of more than \$6,000,000. The new tunnel, which is designed to drain the lake, follows the original course, and includes the entire anc. channel, every vestige of the Rom. tunnel having been removed in excavating the new. It is constructed with the utmost solidity; its cross-section measures 215 square ft., allowing a discharge of 2400 cubic ft. to the second; the new tunnel is longer than the old by 2200 ft. Hence, its total length falls little short of 4 m. From the entrance of the emissary a canal 8 miles long and 62 ft. wide at bottom, requiring 4,000,000 cubic yards of cutting, has been excavated to the deepest part of the lake, which will soon be drained to the bottom.

GEORGE P. MARSH.

Fucus. See SEA-WEEDS.

Fu'el. Every substance is a F. which may be used for the generation of heat by its combustion in air. Many chemical reactions evolve heat from factors which are in no proper sense F. Properly speaking, only carbon and hydrogen, and the compounds of these 2 factors with each other, and with oxygen, nitrogen, etc., are F. This classification includes all the forms of coal, coke, charcoal, wood, turf, oils of every kind, and combustible gases. With the exception of animal oils, all descriptions of F. are of vegetable origin. F. differ very greatly in the amount of volatile matters they contain. Thus, wood and turf contain a large percentage of free water, which is driven out or evaporated during combustion, while, in common with bituminous coals and lignites, they evolve also a large vol. of combustible gases, tar, and other pyrogenic products. Such F. burn with abundant flame, often with smoke, from imperfect combustion, and are well adapted to the generation of steam, the production of illuminating gas, and are preferred in many metallurgical processes. On the other hand, anthracite coal, coke, and charcoal from wood burn with little flame and no smoke, evolve little or no watery vapor, and from their firmness under the weight of a load and the high temperature they evolve are specially adapted to smelting iron and other metals, and to the production of a steady heat for any purpose. F. also differ much in the amount of ash left by their combustion. In a few cases the ash is less than 1 per cent. of the weight of the F. The best coal yields 5 per cent. of ash or more per cent. of incombustible mineral matter. The presence of foreign matter of an incombustible nature in F. is a loss of useful effect.

The value of the Pa. anthracite over all other coals as an agent for the production of high heats, especially in the high furnace and in the reduction and smelting of metals, is now generally admitted. The highest evaporative power, as in the production of steam, is not, however, found in anthracite, but in the semi-bituminous coals, like those of Broadtop and the Cumberland region, and the coal of the Cruzot Basin, in which the proportion of hydrogen or volatile hydrocarbon is not greater than can be perfectly consumed in the furnace and flues of steam-boilers.

Bituminous Coal contains a variable quantity of volatile matter, expelled as combustible gases, and leaves behind coke of variable strength. Heated at lower temperatures, many of the coals of this class produce hydrocarbon oils, while coal-tar is a product of their destructive distillation at all temperatures, whence the name *bituminous*. When these coals agglutinate to form a hollow fire, they are called caking coals or fat coals. The mass softens and becomes pasty under heat and semi-viscid. This softening is attended

with the escape of gas. With a higher heat in close vessels, the escape of gas ceases gradually, and finally leaves a porous mass of gray-black color, which is coke. The *non-caking* or *free-burning* bituminous coals are like the caking coals in appearance, but they leave no proper coke.

Cannel Coal is a fuel of inconstant properties, owing its character to local peculiarities of origin. The *torbanite* seems like a clay saturated with bituminous matter. It yields only 8.8 of fixed carbon. *Albertite* is regarded by Dana as an asphaltum, although commercially sold as an enriching coal. *Grahamite* is another asphaltum-like hydrocarbon, and seems to have had an origin similar to albertite. It has been largely used for enriching illuminating gas, but is now said to be exhausted.

Brown Coal differs from bituminous coal chiefly in containing a larger amount of constitutional oxygen, more combined water, and in being more friable. Its powder is distinctly brown, whence its name, but it is sometimes of a pitchy black color. It is found in Col., Wyo., and Ut. Terrs., in Cal., and elsewhere on the Pacific coast. The brown coals are not caking, but free-burning coals, yielding much gas, and are good steam coals. Chemically considered, all the coals are oxygenated hydrocarbons, the amount of oxygen they contain gradually increasing from anthracites in caking and non-caking coals, and in brown coals.

Charcoal, prepared from hard woods at a high temperature, is the purest form of carbon available as a F., being entirely free of sulphur and yielding only a little alkaline ash. Burning to carbonic acid by oxygen, it forms the standard of comparison for the heat evolved by other less pure forms of F. *Coke* is less efficient than charcoal, just in proportion to the amount of ash it leaves, but owing to its much greater strength under the crushing weight of the high furnace, as well also as its greater cheapness, it is the preferred F. for the high iron furnace.

Liquid Fuels.—The hydrocarbon oils, produced artificially by the distillation of bituminous schists, offer a resource for F. where their abundance enables them to compete with solid F. The use of the vapor of the liquid hydrocarbons used under boilers, and even under the iron stills employed in the distillation of coal-tar of gas-works, as well as of petroleum products, has given most satisfactory results, reducing the time required for distilling a given charge fully $\frac{1}{2}$, and acting almost without injury to the stills, which are rapidly injured by the use of coal fires. The unprecedented increase in the production of petroleum, which seems far from having reached its limits, renders the use of liquid F. a subject of considerable importance.

Gas.—The use of a natural flow of marsh-gas from artesian borings as F. is possible only in certain limited areas, but is by no means an uncommon circumstance. But the introduction of Siemens's gas furnace has demonstrated that the use of F. in the state of gas offers for many purposes singular advantages both as respects economy, efficiency, and convenience. The dynamical theory of heat, as proposed by Joule and Mayer about 1846, led Mr. Siemens to take up a line of investigation with a view to a realization of some of the economic results which that theory rendered possible, and the fruit of these investigations is seen in "the regenerative gas furnace" now so well known, and which may be truly said to have worked a revolution in the methods of producing, applying, and economizing heat. It is now evident that for many purposes gas is the best form in which F. can be applied for producing the highest temperature with the least loss of heat, and that the gas regenerative furnace of Siemens is the invention which has advanced us in the right direction more than any other improvement yet made in the generation and application of heat.

Wood.—The value of wood as F. depends on its density in the dry state. Wood is composed of carbon, hydrogen, and oxygen, and the mineral matter derived from the soil, constituting its ash. Fresh wood contains from $\frac{1}{5}$ to $\frac{1}{2}$ its weight of water, which diminishes its value as F. Exposed to dry air, wood loses a portion of its water, but being peculiarly liable to absorb moisture, it will take up a portion of water from damp air, so that it is never free from hygroscopic moisture, and is always in a condition of unstable equilibrium in this respect.

Peat and Turf.—In many N. countries the vegetation of mosses, ferns, sedges, confervæ, rushes, reeds, and numerous small plants accumulates in swamps, morasses, and low places, each winter adding its quota to the mass of decomposing vegetable matter, in its turn the soil of a new vegetation the ensuing spring. Thus, considerable accumulations are formed in process of time, the lower portions of which are black, unctuous, and somewhat dense, and are called *peat*, while the upper layers are spongy, fibrous, and less perfectly decomposed, and are called *turf*. In Hol., N. Ger., Ire., Scot., and some parts of N. Amer. this material is rather extensively used as F.

Calorific Power and Calorific Intensity are terms employed with a well defined meaning in treating of the combustion of F. The *calorific power* of a body is the total number of heat-units it is capable of imparting, *e. g.* to water, when it is burned in pure oxygen. The combustion of F. means only its union with oxygen. The value of any F. as a source of heat may be determined *theoretically*, if its chemical composition is known. But there are so many circumstances affecting the results so obtained that we must look to the results of actual trial in some form of experimental apparatus. The calorimeter of Rumford has been chiefly employed in these researches. The evaporation of water in a well constructed steam-boiler affords more trustworthy results for determining the value of F. than any laboratory methods are capable of producing, or than can be deduced by computation from the chemical constitution of the F.

The *calorific value of the limits of W. Amer.* has been lately discussed. The results obtained from a calculation of the elementary const. of these F. places them much higher in the scale of calorific value than was anticipated. We are

as yet almost completely ignorant of the molecular structure and evaporative power of these valuable F., which are the only resource for the metallurgy and industry of a vast area destitute of all other resources for artificial heat. *Wollongongite* is a hydrocarbon mineral (of the nature of amber) from Australia. It occurs in cubical blocks without lamination; breaks in broad conchoidal surfaces, extremely tough, and resounding like hard wood under the blows of the hammer. Formerly F. was interesting to mankind chiefly as the means of producing artificial heat in cold climates and for its use in the culinary art, which distinguishes civilized man from the savage. But the advance in modern times in chemical and metallurgical arts, and the introduction of steam as a vehicle for the transportation of heat, has given to F. a value before unknown, leading not only to the development of all its available sources of supply, but to the study of its economical application with a view to obtaining from it the greatest useful effect and benefit possible. (See J. A. PHILLIPS'S *Metallurgy*, art. "Fuel," and T. BOY'S *Practical Treatise on Heat*. See also ANTHRACITE, CHARCOAL, COAL, COKE, FLAME, FURNACE, GAS-LIGHTING, HEAT, LIGNITE, and METALLURGY.) [From orig. art. in *J's Lib. Cyc.*, by PROF. B. SILLIMAN, M. D.]

Fugger, a celebrated Ger. family now represented by 2 lines of princes and several lines of counts and "most illustrious counts."—JOHANN FUGGER, a rich weaver of Augsburg in the 14th century (d. 1499), was the founder. His descendants became leading bankers, miners, and merchants, and the family was ennobled in 1504. Several were distinguished soldiers and statesmen, and many were liberal patrons of art. The F. are R. Caths.

Fugitive from Justice, one who, having committed a crime within one jurisdiction, flees into another to escape punishment. Between the different civilized nations numerous treaties have been formed providing for the arrest of such F. and their delivery to the authorities of the country in which the crime was committed, upon proper demand. A return of criminals fleeing from one State of the U. into another may, in like manner, be effected under the U. S. const. and the laws of Cong. (See EXTRADITION.)

Fugitive-Slave Law. At the time of the adoption of the U. S. const. the necessity of making provision for the protection of a right of property in slaves against inter-State interference, as an indispensable prerequisite to the formation of any stable and harmonious union, was generally recognized. Slavery was firmly established throughout a large section of the country, whose inhabs. considered its maintenance as essential to the welfare of their domestic interests and the development of their resources. But unless some restraint were placed upon the legislation of those States in which slavery did not exist, and of those in which it might, at some future day, be abolished, one part of the country, it was evident, might be made a refuge and an asylum for the slaves from another, and their reclamation prohibited. To prevent these probable evils a provision was inserted in the const., at the instance of reps. of the slaveholding States, in the following terms: "No person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due." No reference was made to the existence of slavery in express terms, but the understood intention of this provision was that fugitive *slaves* might be reclaimed. In the exercise of the constitutional power thus created, Cong. in 1793 passed a law providing measures for the recapture of slaves by their masters. Summary proceedings of a ministerial nature were instituted, by which a recovery might be obtained with all practicable expedition, and heavy penalties were imposed for hindering or obstructing a slave-owner or his agent in seizing fugitives and carrying them back again into servitude. The machinery of the courts was put at the disposal of the slave-proprietors to effect the restoration of their property. In the interpretation of this act by the courts it was decided that the subject of the surrender of fugitives from service was exclusively within the sphere of congressional legislation, and could not be abridged or interfered with by any action on the part of the States; and the provisions in the act were adjudged to be constitutional both by the tribunals of the gen. govt. and of some of the States separately.

In the first yrs. after the enactment of this law the enforcement of its provisions was accomplished with but little difficulty. But the great industrial and social development of the free States, together with the influences of a natural feeling of humanity, could not suffer the previous state of opinion to continue. It is not surprising, therefore, that the act of 1793 became difficult of enforcement, and that numerous and sometimes irresistible obstacles were opposed to those attempting to carry its provisions into effect. The slave States therefore demanded a more stringent and efficacious law to secure the rendition of escaped slaves. The hostility to slavery had not as yet attained such gen. extension and acceptance as to prevent this demand from being granted, and in 1850 a new F.-S. L. was passed. As this new enactment contained substantially the same provisions as the law of 1793, as well as more stringent regulations, an exposition of its contents will give a comprehensive survey of the entire legislation for the reclamation of fugitive slaves from the time when the first law upon the subject was passed down to the abolition of slavery during the war of 1861-65. The judicial functions exercised under the act were vested in certain U. S. officers called commissioners, and in the judges of the circuit and dist. courts and of the superior courts of Terrs. Upon the escape of a fugitive his owner or a duly authorized agent was empowered to obtain from either of these officials a warrant for his apprehension, or to make the arrest without process, provided that were possible. After the arrest the slave was required to be brought before the com. or court, in order that

the claim of the alleged owner might be summarily determined. Upon the exhibition of satisfactory proof of the rightfulness of the owner's title by the introduction of testimony or of depositions taken in the State from which the slave had fled, together with proof by affidavit of the slave's identity, of the fact that he owed service to the claimant, and that he had escaped, it was made the duty of the judicial officer before whom the proceeding was instituted to deliver to the owner a certificate stating the substantial facts which had appeared upon the investigation, and authorizing the immediate removal of the fugitive to the State from which his escape had been made. The testimony of the slave himself was declared inadmissible. The final certificate granted was made conclusive of the right of removal, and all power of appeal was denied. All citizens were commanded to aid the proper officers in the execution of the law and in overcoming resistance wherever their services might be desired.

An examination of these various provisions will disclose the immense power with which slaveholders were intrusted. The judicial proceedings were made entirely *ex parte*, efficient safeguards were not provided to prevent the commission of perjury, and all right of appeal was prohibited. Moreover, citizens who might be inclined to interfere to protect the slave from injustice and violence were deterred by the imposition of heavy penalties. The constitutionality of this law was sustained, and it was adjudged enforceable under like circumstances and in the same manner as had been decided with reference to the previous law of 1793. The evils arising from the severity of the fugitive laws wrought their own remedy, and the excesses committed under them were undoubtedly beneficial in the end. These awoke the N. to a clear sense of the enormity of slavery, and were chiefly instrumental in effecting that change of public opinion which culminated in the formation of the Rep. party in 1856, and its elevation to supremacy in the national gov't. in 1860. The c. war which followed had slavery as its ultimate cause, and achieved the extinction of slavery as its leading result.

GEORGE CHASE.

Fugue, fug, a branch or species of musical composition in which a certain theme or subject (consisting of a short melodious phrase) is first given out by one of the parts, and then taken up successively by the other parts, elaborately treated in various keys and with various harmonies, with the view of developing its beauty or interest by presenting it in a diversity of aspects and relations. F. are written for 2, 3, 4, or more voices or parts, each of which in turn takes up the leading theme, and afterward continues its course as tributary to the gen. harmony. Beside the *simple* (i. e. a F. with only 1 theme or subject) there are also *double* F. with 2 or more subjects.

Fulco, or **Foulques** (anglicized *Fulk*) of **Neully**, one of the greatest pulpit-orators of the Middle Ages, and the chief preacher of the 5th crusade, flourished in the second half of the 12th century. In the first yrs. of his priestly office he led a life of miserable slackness, for which he afterward tried to atone by the severest asceticism. In a coarse cowl and gird with leather he journeyed as a preacher of repentance, and fearlessly condemned the vices of learned and unlearned, high and low. Peter the Chanter had been looked to as the great preacher of the 5th crusade, but his sudden death at the very inauguration of the movement led Innocent III. to select F., and he was asked not only to preach repentance, but to request men to give proof of penitence by hastening to the land of promise. He did not, however, live to see the results of the crusade. D. 1201. (See Cox, *The Crusades*.)

Fulgentius (FABRIS CLAUDIUS GORDIANUS), SAINT, bp. of Ruspe in Numidia, "the Augustine of the 6th century," b. at Telepte in Afr. 468 A. D.; in 504 he was made bp. of Ruspe, and now became one of the ablest apologists of Catholic Christianity. The Arian Vandals predominating, he got frequently into difficulty, and was twice banished to Sardinia. In 523 a favorable change in the gov't. brought about a recall of F. and all other expelled bps. He was renowned for piety, learning, and every virtue. He is commemorated in the Ch. of Rome on Jan. 1. His writings are mostly against Arianism and Pelagianism. His best work is *De veritate prædicationis et gradu Dei*. D. 533.

Fulgentius (FABRIS PLANCIANUS), a Lat. grammarian of whose life nothing certain is known. He is supposed to have lived in Afr. about the beginning of the 6th century A. D. Under his name 3 works have come down to us; the first, *Mythologicon* or *Mythologiarum libri III.*, of considerable service in the study of anc. mythology; the second, *Expositio Sermonum Antiquorum*, or, more correctly, *De abstrusis Sermonibus*, a brief list of rare or obsolete expressions; the third, *De Expositione Virgiliana Continentia*, or *De allegoria librorum Virgilii*, an allegorical explanation of Vergil's *Æneid*, as representing human life.

Fulgurites [Lat. *fulgur*, "lightning"], tubes of vitrified sand found in sand-banks and sandy soils. They are produced by the intense heat of electrical discharges, which fuses the sand together.

Fuller (ANDREW), b. at Wicken, Cambridgeshire, Eng., Feb. 6, 1754; bore a prominent part in the propagation of Calvinistic doctrines of a less extreme type than generally prevailed at that time in his denomination, and was one of the leaders in the revival of the foreign mission-work among the Eng. Prots. Author of *The Gospel Worthy of all Acceptation* and *The Gospel its own Witness*. D. May 7, 1815.

Fuller (ARTHUR BUCKMINSTER), b. at Cambridgeport, Mass., Aug. 10, 1822, grad. at Harvard Univ. 1849; studied theol. at Cambridge Divinity School, and removed to Ill. as teacher and preacher; was pastor of a Unit. ch. in Manchester, N. H., 1848-53, in Boston 1853-59, and then settled at Watertown as a pastor. At an early period of the c. war he volunteered his services, and was appointed chaplain of the 16th Mass. Volunteers. At Fredericksburg he accompanied a few companies of his regiment across the Rappa-

hannock under a deadly fire, when he was killed by a sharp-shooter Dec. 11, 1862.

Fuller (MARGARET). See OSSOLI.

Fuller (RICHARD), D. D., b. at Beaufort, S. C., April 28, 1804, grad. at Harvard in 1821; became a lawyer when 20 yrs. old, and at once attained great reputation and success. After recovery from a severe illness he united with the P. E. Ch., but in 1833 entered the Bap. ministry at Beaufort. Since 1847 he was the pastor of the 7th Bap. ch., Baltimore, Md., and was regarded as one of the ablest and most eloquent preachers of his denomination. Wrote *Correspondence on Domestic Slavery, Baptism and Communion*, and was one of the eds. of the *Psalmist*. D. Oct. 20, 1876.

Fuller (THOMAS), D. D., b. at Aldwinkle, North Hants, Eng., June 1608, grad. at Queen's Coll., Cambridge, with the highest honors; was made chaplain to Charles II. in 1660. Author of *Good Thoughts in Bad Times*, *Good Thoughts in Worse Times*, *Holy and Profane State*, *Ch. Hist. of Brit.*, and *Worthies of Eng.* His writings are remarkable for quaintness, wit, sagacity, learning, and moral elevation; and his above named works are Eng. classics. D. Aug. 15, 1661.

Fuller (TIMOTHY), b. at Chilmark, Mass., July 11, 1778, grad. at Harvard in 1801; was a prominent Dem. orator; State senator 1813-16, M. C. 1817-25, speaker of the House in Mass. 1825, and one of gov.'s council 1838; was father of Margaret, Arthur B., and R. F. Fuller. D. Oct. 1, 1835.

Fuller's Earth, a greenish-white oolitic clay, chiefly found in Bedfordshire, Kent, and Surrey in Eng., and at many points on the Continent. From $\frac{1}{4}$ to $\frac{1}{5}$ of the mass is alumina, the rest chiefly silica and water, with some lime and other ingredients. It was formerly much used by cloth-dressers for cleansing the oil from woollen fabrics.

Fullerton (WILLIAM), a lawyer and jurist, b. at Wayanda, Orange co., N. Y., May 1, 1818, grad. at Union Coll., Schenectady, N. Y., 1838; was for some time partner of Hon. Charles O'Connor; was appointed a judge of supreme court of New York in 1867, and elected without opposition to fill a vacancy, and held the office until 1868; returned to legal practice in New York city.

Fulling, an operation by which fabrics made of carded wool are shrunk, thickened, and partially felted. The woven goods are scoured and boiled, then soaped, and finally either beaten in the fulling-stocks or passed through rollers. The process lasts from 48 to 65 hours. When complete, the threads are scarcely perceptible, the tendency to unravel is overcome, and the cloth shrinks often nearly $\frac{1}{4}$ in length, and sometimes about $\frac{1}{2}$ in breadth.

Full Power, in diplomacy, is a document given by a sovereign to his ambassador, indicating what subjects he can treat about and his amount of power. As to the question whether the sovereign is bound if the agent acts according to his F. P., see WHEATON's *Elements*, iii. 2, § 5.

Fulmar, a name given to sea-birds of the family Procellariæ, and especially to the genus *Fulmarus*, which feed upon fish, etc. The best known is the *F. glacialis*, F., or F. petrel of the N. Atlantic.

Fulminates. The F. are salts of fulminic acid. Fulminic acid is not known in the free state.

Fulminating Mercury, *Mercuric Fulminate*, *Fulminate de Mercure*, *Knallquicksilber*.—Fulminating mercury is best prepared by dissolving 1 part of mercury in 12 parts of nitric acid (sp. gr. 1.3); pour this solution into 11 parts of alcohol of 85 to 88 per cent.; place the vessel containing the mixture over a water-bath until the solution becomes turbid, darkens in color, and begins to show signs of ebullition, giving off dense white fumes; remove it from the bath, and the action will continue with vigorous effervescence and abundant evolution of heavy white ethereal fumes. The reaction should be allowed to continue until heavy white fumes are no longer given off, and the solution becomes clear or nearly clear. Fill up with cold water, and on standing a short time the F. will settle to the bottom of the vessel. Wash by decantation or upon a filter. Fulminating mercury is highly explosive, and its explosion is easily brought about. Its explosive action is so sudden that it may be said to detonate. It explodes when heated to 186° C. or if exposed to a strong blow.

Fulminating Powder (U. S. A. *Ordnance Manual*).—Drain 2 lbs. F. on blotting-paper till it retains 20 per cent. of moisture. Add 60 per cent. of its weight of refined, pulverized nitre; thoroughly mix and dry. In the fuzes or exploders largely used for firing nitro-glycerine and its preparations, and gun-cotton, fulminating mercury must be employed in order to obtain the proper effect.

Fulminating Silver, *Argentio Fulminate*, *Fulminate d'Argent*, *Knallsilber*.—Fulminating silver is prepared like fulminating mercury, silver nitrate being used instead of mercury nitrate. The greatest care must be used in its preparation, as it is much more easily exploded than fulminating mercury. When perfectly dry it explodes on the slightest provocation. [From orig. art. in *J.'s Univ. Cyc.*, by W. N. HILL.]

Fulton, R. R. junc., Whiteside co., Ill., on Miss. River. Its lumber interests are very large. The N. Ill. Coll. is situated here. Pop. 1870, 1875, 1880, 1733.

Fulton, Ky. See APPENDIX.

Fulton, city, cap. of Callaway co., Mo., 15 m. from the Mo. River, on R. R. midway between Jefferson City and Mexico. It is the seat of Westminster Coll., the deaf and dumb and the insane asylums of the State; also 2 State insts., male and female, under the control of the Presb. Ch. Pop. 1870, 1585; 1880, 2409.

Fulton, R. R. junc., Oswego co., N. Y., on the Oswego River, 25 m. N. of Syracuse on the Oswego Canal. It has water-power and a sem. Pop. 1870, 3505; 1880, 3941.

Fulton (JUSTIN D.), D. D., b. Mar. 1, 1823, at Sherburn, Madison co., N. Y., grad. at the Univ. of Rochester 1851, and at Rochester Theological Sem. 1853; ordained to the Bap. ministry at St. Louis (where he edited the *Gospel Banner*) in 1854; settled in Sandusky, O., 1856, Albany, N. Y., 1859.

Boston, Mass., 1863, and Brooklyn, N. Y., 1873. Author of *R. Cath. Element in Amer. Hist.*, *Rome in Amer.*, etc. An able advocate of temperance.

Fulton (ROBERT), b. at Little Britain, Pa., in 1765; went to Phila. when 17 yrs. old, and practised miniature-painting there and in New York; afterward went to Lond. and became a pupil of West. In Eng. he met with the duke of Bridgewater, the father of the Eng. canal system; with Lord Stanhope, an enthusiastic mechanician; with Watt, the inventor of the steam-engine; and his attention was turned to mechanical invention. His machines for marble-sawing, rope-making, flax-spinning, and removing earth from excavations soon after appeared. His *Treatise on the Improvement of Canal Navigation* (1796), and a series of essays on canals, were followed by a Brit. patent for canal improvements, consisting chiefly in the substitution of inclined planes for locks. He resided in Paris 1797-1806, and brought forward a submarine torpedo-boat for maritime defence, which was successively rejected by the Fr., the Brit. (1805), and the U. S. governments (1810). In 1803 he undertook the construction of a steamboat on the Seine, having in 1793 addressed a letter upon the subject to Lord Stanhope. In 1803, in company with Henry Bell, the first successful Brit. steam navigator, he visited the Clyde, where Symington's steam canal towboat was then plying. F.'s Seine experiment was but partly successful. Aided by Chancellor Livingston, then U. S. minister in Fr., he purchased (1806) a powerful Boulton and Watt engine and shipped it to New York, where he built and launched (in 1807) the *Clermont*, his first successful steamboat, which, however, attained a speed of only 5 m. an hour when going up the Hudson. His first U. S. patents (1809 and 1811) covered only some points regarding the attachment of the paddle-wheels to the axle of the crank, and throughout life he was involved in lawsuits with parties infringing upon his claims. He constructed many steamboats, ferry-boats, etc., among which was the U. S. steamer *Fulton* the First (built 1814), the first war-steamer ever constructed. From mistakes in her model she never attained much speed, and in 1829 was blown up by accident. His great merit was his persistency in the belief that steam navigation was a desideratum of Amer. commerce. Millar's successful double boat of 1788 was a plaything, Symington's towboat of 1803 was not adapted to its special purpose of canal service, John Fitch's machinery had fatal errors of construction; and of the many other previous experiments with steam as a motive-power for vessels, all the rest were failures. D. Feb. 21, 1815. [From orig. art. in *J.'s Univ. Cyc.*, by C. W. GREENE, M. D.]

Fulton (WILLIAM S.), b. in Cecil co., Md., June 2, 1795, grad. at Baltimore Coll. in 1813; served as a volunteer in the war of 1812; became sec. of Gen. Jackson in Tenn.; was the first Territorial sec. of Ark.; gov. of Ark. 1835-36, U. S. Senator 1836-44. D. Aug. 15, 1844.

Fulvia, a Rom. lady, the wife of P. Clodius, by whom she had a daughter, Clodia, wife of Augustus. After the murder of Clodius, her third husband was Mark Antony, for whose sake she abandoned the dissolute habits of her earlier life, entering heartily into his ambitious plans. When her husband was dallying with Cleopatra she created an insurrection for the purpose of recalling him, but was driven from It. At Athens she met her husband, who treated her with great harshness, whereupon she d. of chagrin (b. c. 40). F. left 2 sons by Antony.

Fumigation [Lat. *fumigatio*, from *fumus*, "smoke"], (1) the application of fumes, gas, or vapor to purify clothing, goods, or apartments supposed to be imbued with infectious or contagious matter. This may be effected by hot air, strong oxidizers, ozone, chlorine, permanganates, vapors of nitric, chlorhydric, sulphurous, or carbolic acids, which destroy the effluvia by decomposing them chemically, or by extinguishing cell-life in the cryptogamic and infusorial organisms, which, in some instances at least, constitute the infection. The process of deodorizing by burning fragrant pastilles, coffee, etc., or by vaporizing vinegar or other odorant substances, simply disguises but does not neutralize the objectionable effluvia. (2) The act of applying smoke or vapors medicinally. Thus, stramonium, benzoil, the sulphide or oxide of mercury, etc. are used as F. in affections of the throat and lungs, and are introduced either by diffusing the vapors through the air to be respired or by means of cigarettes and pipes in which the meds. are "smoked." The introduction of nitrous oxide gas, ether, chloroform, etc., as for anæsthetic purposes, is termed *inhalation*.

Fumitory, the *Fumaria officinalis*, a weed of Europe, now naturalized in the U. S., belonging to the order Fumariaceæ. Its name is from the Lat. *fumus*, "smoke," referring to the odor. This herb is in parts of Europe valued as a tonic, diaphoretic, and aperient, and is esteemed for the treatment of skin diseases.

Fuuck, or **Fuencius** (JOHN NICHOLAS), a Lat. scholar, b. at Marburg Mar. 29, 1693; appointed in 1730 prof. of eloquence and librarian in the acad. at Rinteln. His chief contribution to classical learning is a hist. of the Lat. lang., which he divides into periods corresponding to the different periods of man's life, to each of which a separate treatise is devoted. The titles are—1, *De Origine Latine lingue tractatus*; 2, *De Puertitia Latine lingue*; 3, *De Adolescentia ling. Latine*; 4, *De Virili Etate ling. Latine*; 5, *De imminente lingue Latine Senectute*; 6, *De Vegeta ling. Lat. Senectute*; 7, *De inerti et decrepita ling. Lat. Senectute*. D. Dec. 17, 1777.

Function [from the Lat. *fungor*, *functus*, to "perform"]. One quantity is said to be a F. of another when it is so connected with it that no change can be made in the latter without producing a corresponding change in the former. If 2 varying quantities are connected by an equation, either may be taken as the F., and the other is then called the *independent variable*. A quantity is a F. of 2 or more variables when it is so connected with them that no change can be made in either of the latter without producing a cor-

responding change in the former. Every F. of one variable may be represented by the ordinate of a curve whose abscissa is the corresponding value of the independent variable; every F. of 2 variables may be represented by the ordinate of a surface whose abscissas are the corresponding values of the other 2 variables. (See *J.'s Univ. Cyc.*)

Fundamentals [Lat. *fundamentum*, the "foundation"], or **Fundamental Articles of Faith**, those doctrines which are involved in the right of a system to exist—its foundation. It is a relative term, and when a doctrine is asserted to be F. a necessary question always is, *To what?* It is also expressive of degrees of necessity, and allows of the questions, In what respect? How far? It is therefore never a defining word till it has been defined. There may be a perfect agreement on the gen. sense of the word, and a total diversity as to the propriety of its application. F. are more or less generic as to that to which they are related has more or less of the generic in it. If a doctrine be conceded to be F. to Christianity, it must be held by every one entitled to the name of Chr. But each body has doctrines F. to its system which are not held by the entire Chr. Ch. F. have been divided into—(1) primary, the explicit knowledge of which is necessary to salvation, and as (a) constituent, (b) conservative, either as antecedent or consequent; and (2) secondary, implied in the first. Involuntary ignorance of the secondary does not remove the foundation of salvation, but denial of them does. The doctrine of F. articles has been most agitated in the earliest and latest efforts to unite the Lutherans and the Reformed.

C. P. KRAUTH.

Funds, The Funding System, Sinking Fund. National debts are composed of loans negotiated at different periods. These may not carry a uniform rate of interest or have the same date of maturity, but the debt as a whole is characterized as the *public funds*. The funding of a debt consists in dividing it into shares, represented by certificates, on which interest is paid. These certificates are known as bonds. No way has yet been invented by which certain branches of civil service can be carried on without the levying of a tax and the necessary appendage of a public treas. Many branches of social economy are beyond the scope of private management, as the laying out of high-roads, the supply of water in cities, lamps, police, and the support of tribunals of justice. Advancing to matters of national concern, such as the common defence, it is manifest that a public treas. is the inevitable step of social improvement, hence the const. of public credit and the funding of debt. The fact that a govt. bond is convertible into money is the source of the error that it is the equivalent of money, and of the deduction that national debt is money. This delusion disappears when we reflect that a great harvest of the country's productions is appropriated to the payment of yearly interest on the bond, and finally to the redemption of the prin.

Sinking Fund.—The first regular plan for the gradual extinction of the national debt of G. Brit. was a sinking fund, adopted in 1716. It was found to be easier to lay hands on the accumulated fund than to negotiate new loans. The plan of holding the fund inviolable for the purpose of liquidation was soon abandoned. In 1733 began the regular practice of resorting to it for the supplies of the yr. whenever there was a deficiency in the gen. accounts. But it was soon apparent that the sinking fund was a snare. After many modifications it was finally abandoned in 1828 by act of Parl. Notwithstanding this fact the delusion of the sinking fund has been adopted in the U. S., and is pursued with all the seriousness of children who endow their dumb toys with life and understanding. The truth is that the only actual sinking fund is in the surplus of revenue over expenditures. Everything else for liquidation is a delusion. [From orig. art. in *J.'s Univ. Cyc.*, by J. S. GIBBONS.]

Fundy, Bay of [once called *Fundy Bay*, a corruption of the Fr. *fond de la baie*, the "Head of the Bay," a name still given to the upper part of the Bay of Fundy], an arm of the Atlantic extending N. E. between N. B. on the N. W. and N. S. on the S. E. Spring tides, in parts of the B. of F., have been known to rise over 70 ft., and come pouring in like an immense bore.

Fü'nen, or **Fuhnen** [Dan. *Fyen*], next to Seeland, the largest of the Dan. islands, separated from Seeland by the Great Belt and from Jutland by the Little Belt. Area, 1123 sq. m. Pop. 182,816.

Fu'neral, Funeral Rites [Lat. *funus*, *funeris*, a "dead body"]. The disposal of the bodies of the departed has in all ages and in nearly all countries excited a profound interest in the living. The 2 prin. modes which are and have been observed are *burial* in the earth or sea, and *cremation* or burning.

Burial of the Dead.—Burials are either in graves in which the body is deposited directly in the earth and covered by it, or in vaults or tombs, usually subterranean. Burial in the sea takes place from ships which are too far from the land to permit interment to take place. The body, placed in a suitable canvas sack, is committed to the sea, shot or other suitable weights being attached to the feet. Burial in the earth is usually accompanied by religious ceremonies. Masses and requiems are prescribed in the rituals of some Chr. chs.; but more commonly in Prot. communities a simple rite, followed by a few words of sympathy and religious counsel, with a prayer for the living friends, completes the service. In Oriental countries it is common to have hired mourners at F. Many aboriginal tribes suspend their dead in trees or place them upon raised platforms. Some tribes carry the bones of the dead with them on their migrations. The Parsees expose their dead until the kites and vultures have removed the soft tissues, when the bones are placed in an ossuary.

Burning of the Dead.—This was common in many anc. countries. The practice in Gr. and It. was to burn the dead upon a F. pyre of wood, upon which oil, incense, and spices were placed. Finally, the embers were quenched with wine,

and the ashes, placed in an urn, were deposited in a sepulchre or subterranean cell, or in some cases buried in the earth at the spot where the incineration took place. Within a few yrs. a feeling has been developed to establish cremation as a means of disposing of human bodies after death wherever it should be desired. Many experiments have been made, with human remains and those of the inferior animals, to ascertain the quickest and least objectionable method. The result is Siemens's cremation furnace.

Cremation will be for many yrs. after its adoption confined to large towns. The expense necessarily incurred in the erection of furnaces and other apparatus would indicate the probable formation of joint-stock companies to accomplish it. Two societies have been organized in New York city—one among the Eng. and the other among the Ger. portion of the pop.—and it is probable that in a few yrs. this rite will be available for those who prefer it. In Dresden a furnace is in operation. The disposal of the ashes is left to the choice of the survivors. They may be placed in the family vaults already built in many of our cemeteries, or new devices may be adopted as the custom becomes popular.

Cremation Furnace.—The Siemens cremation furnace consists of, first, the furnace in which the body is placed for cremation; and secondly, the regenerators, in which the gas and air used for combustion are heated before entering the cremation-chamber. The gas for combustion is prepared at a distance from the furnace, and led to it through underground flues. The regenerators consist of fire-brick chambers filled with fire-brick laid loosely, having regular spaces between them through which the air and gas can pass. The gas and air, admitted through separate valves, pass upward through the loosely laid fire-brick, and become heated by contact with them. The heated gas and air unite at the entrance to the cremation-chamber, where combustion ensues, producing an intense heat and flame. The burned gases, after circulating through the furnace, pass back again to the end of the furnace at which they entered, and downward through the regenerators, heating the loosely laid fire-brick in their descent, and passing out at the bottom of the regenerators, comparatively cold, to a high chimney-stack, whence they escape into the air. The furnace is raised to a strong heat before the body is introduced, and after the body is in the furnace and the door closed, the amount of gas supplied to the furnace is gradually diminished, as the gases coming from the body are sufficient to support combustion. In this way no foul vapor can escape into the air, every particle being oxidized; and when the process is completed—which takes about half an hour—nothing is left in the furnace but a small quantity of white ash. [From orig. art. in *J. S. Univ. Cyc.*, by SAMUEL SEXTON, M. D.]

Fungi [plu. of Lat. *fungus*, a "mushroom"]. For gen. purposes a fungus may be described as a cryptogamic plant, closely related to lichens, deriving nourishment from the substance on which it grows. Some forms occur in every description of soil, others affect decaying wood, and others flourish on what would appear to be healthy trees. Smaller forms occur on decaying organic substances; some are parasitic upon living plants, a few on living animals, and others are submerged in water or developed on naked stones, leaven cisterns, plastered walls, dirty glass, etc.

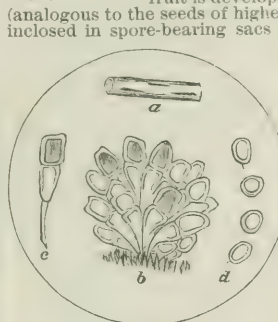
Fungi and Man.—The relation of F. to the human subject is still a matter of controversy, some eminent men contending that many diseases may be attributed to minute F., while others hold that the F. are not the cause of the disease, but are developed in the unhealthy tissues; but too many fatal cases of poisoning by fungi have occurred to leave any doubt of the deleterious effect of numerous species on the human subject. Some, indeed, are edible, and in numerous countries the common mushroom (*Agaricus campestris*) enjoys the widest popularity as an esculent, more especially in the cultivated varieties. Truffles (*Tuber aestivum*, etc.) and morels (*Morchella esculenta*) are favorites not only in Europe, but also in the vales of Cashmere, India. Numerous other species are also more or less eaten. The cultivation of F. for esculent purposes has not hitherto been successful with any other species than the ordinary mushroom. F. useful to man in med. or the arts are by no means numerous or of importance. *Ergot*, developed on rye, wheat, and the germs of various grasses, still maintains its position in the pharmacopoeia, but is almost the only fungus now employed (and that sparingly) by the legitimate med. practitioner.

Fungi and Plants.—Many diseases in plants are undoubtedly produced by F. First in importance is the potato

murrain, which



A fertile plume of *Penicillium*, with pencils of spores; magnified 150 diameters.



Spordifera.

mines. Gardner records a Brazilian species of agaric which gives out a bright phosphorescent light, somewhat similar to that emitted by the larger fire-flies. Drummond reports the occurrence of agarics growing on tree-stumps which emitted a bright light during the night; and the phenomenon is a familiar one in the U. S., where it has the rustic names of "fox-fire" and "fire-wood." Mr. Hugh Low states that he has seen the jungle in Borneo all in a blaze of light, by which he could see to read as he was riding on the jungle-road. Worthington Smith writes of *Polygaster amarus*, found in mines in Wales, being so bright that it could be seen in the dark at a distance of 20 yards. A striking example is recorded by Rev. M. J. Berkeley, in which a log of timber 24 ft. long had the inside of the bark covered with a white mycelium. This was so luminous that when wrapped in 5 folds of paper the light penetrated through all the folds on either side as brightly as if the specimen was exposed. [From orig. art. in *J. S. Univ. Cyc.*, by M. C. COOKE, F. R. S.]

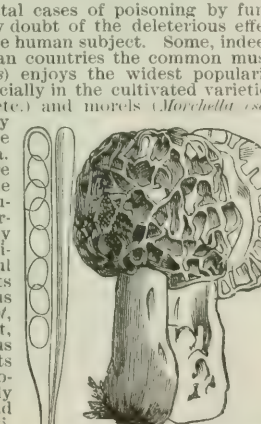
Fur. See FUR and the FUR TRADE, by L. P. BROCKETT. **Furies.** See ECUMENIDES. **Furius**, the name of a Roman, historical characters, mostly of the old patrician gens Furia; but some plebeians bore the name also. The most famous of all was L. Furius, a pretor who overthrew the Gauls in the great battle of Cremona (200 B. C.) and received a triumph.

Furlanetto (GISEPPE), successor in Lat. lexicography to Faccioli and Forcellini, b. in Padua Aug. 30, 1775, ed. at the sem. in Padua; became prof. in the Coll. of Sta. Justina, prof. of hermeneutics in the univ., and finally director of the sem. In 1816 he pub. 2 fasciculi of additions to the Lexicon of Forcellini, and then undertook a thorough revision of the whole work, which was pub. in 4 vols. 4to, Padua, 1823-31. D. Nov. 2, 1848.

Furlong (A. S. *furlang*), i. e. the "length of a furrow," 10 rods in linear measure; the eighth of an Eng. or U. S. statute m., corresponding to the *stadium*, which was the eighth of a Rom. m. There are also several local F., and the word is sometimes used for the name of a square or land measure.

Furnace, fur'nas [Lat. *fornax*]. The use of F. for imparting heat under various conditions is common to nearly all the industrial arts, especially to the treatment and utilization of metals and minerals. F. may be classified as follows: I. According to the methods of applying heat. (1) *Open fires*, in which the material under treatment is heated in the fuel-chamber either in contact with the fuel or with the heat radiated directly from it, or with both. (2) *Reverberatory furnaces*, in which the material under treatment is heated in a chamber separate from and adjoining the fuel-chamber by means of the hot gaseous products of combustion and by radiation from the heated walls of the chamber. II. Ac-

Coprinus micaceus (Europe and U. S.), order Agaricini.



Morchella esculenta, the common edible morel of Europe and the U. S.

cording to the method of utilizing the fuel: (1) *Coal furnaces*, in which the heat utilized is the direct product of the combustion of solid fuel. (2) *Gas furnaces*, in which the fuel enters the F. in the form of a gas.

Description of Furnaces.—Of the open fires, the smith's forge is the oldest. It consists, in its simplest form, merely of a pile of coal from 1 to 2 ft. in diameter, beneath which a blast is forced through a tuyere leading from a hand bellows. Iron or steel bars inserted in the fire may receive a welding heat. In large smith-shops these fires, sometimes 50 or more in number, are arranged in a suitable building, each with its blast-pipe from a common power blowing-machine, and its water-bosh, anvil, and other appurtenances, and its chimney leading to a common chimney. A portable smith's forge is usually a light iron stand holding the platform for the fire, and also some form of hand blowing-machine and a water-bosh. The earliest smelting F. were open fires, not much larger than smith's forges, and the same crude apparatus is still employed where fuel is plentiful both for smelting ore and for decarburizing crude cast iron. The more elaborate forms of F. are: *The reverberatory heating furnace*, employed for heating iron and steel masses of 300 to 2000 lbs. weight; *the reverberatory melting furnace*, or "air" furnace for solid fuel; *the cementing furnace*, employed for heating wrought iron in contact with carbon to make carburized iron, called "blister steel," which is then rolled into marketable shapes or broken up and melted in crucibles to make cast steel; *the cupola furnace*, used for melting iron in foundries; and *the gas furnace*. The mere mingling of combustible gas and air is but one element in the production of the great and manageable heats obtained in a gas F. The regenerative principle—i. e. utilizing the otherwise waste escaping heat to raise the temperature of the entering air and gas—is the subject of those modern improvements which are bringing the gas F. into almost universal use. There are 2 systems of regeneration—1st, the one by means of which Messrs. C. W. and F. Siemens of Lond. have developed the highly perfected and generally used Siemens F. This consists in passing the heated products of combustion, as they leave the F., over vast surfaces of brick, upon which they deposit their heat. The entering air and gas are then passed over these hot brick surfaces, and, so to speak, wash off the heat from them and take it up themselves. Meanwhile, the escaping products of composition are heating other brick surfaces, which in their turn yield their heat to the incoming gases. This is the alternating system. 2d. The other form of regenerator is, properly speaking, a stove, in which the outgoing gases pass on one side of thin conducting partitions, while the incoming gases flow along the opposite side, the heat being continuously transmitted through the partitions. This continuous system of regeneration, although employed in a limited or an imperfect manner long prior to Siemens's experiments, and considerably improved by Gorman in the Eng. F. bearing his name, has recently been raised to the Siemens standard of excellence by Sellers, and also by Frank, in this country. The gas-producer has also been the subject of many modifications to suit different fuels. *The pot furnace* is a small F., worked at a high temperature, for heating fire-clay or plumbago crucibles or pots in which metals are melted. In the manufacture of crucible steel the pots containing the ingredients are about 15 inches high by 10 inches in diameter. From 2 to 6 of them are placed in a "melting-hole," which is a fire-brick F. just large enough to hold them and the fire in which they are partially buried. The top of the F. opens, by means of a lid, on the gen. floor of the building; a grate beneath communicates with a subterranean ash-pit and gangway. The fire in a coal F. is urged by a powerful blast, and the escaping heat from a long row of melting-holes passes under a common steam-boiler. When the metal is ready to cast, the lid of the F. is drawn to one side, the pot is lifted out, the cover of the pot is removed, and the metal is poured into a mould. *The puddling furnace* is a reverberatory F., in which crude cast iron is melted and subjected to the oxidizing action of air and of oxide of iron, in order to remove its carbon and silicon, and thus convert it into a pasty mass of malleable iron. [From orig. art. in *J. N. Univ. Cyc.* By A. L. HOLLEY, C. E.]

Furnace. (HERATINE. See WARMING.)

Furness (HORACE HOWARD), son of Rev. Dr. William H. b. in Phila. Nov. 2, 1833, grad. at Harvard Coll. 1854; studied law in the office of Hon. William M. Meredith, and was admitted to practice 1859; furnished chapters in *Trobat* and *Italy's Practice on Ejection*; "Domestic" and "Foreign Attachment," etc.; pub. part of *New Variorum* ed. of Shakspeare's plays—viz. *Romeo and Juliet*, *Macbeth*, *King Lear*, and *Hamlet*; honorary member of Ger. Shakspeare Society, and a v-p. of the New Shakspeare Society, Lond.

Furness (WILLIAM HENRY), D. D., a clergyman, b. in Boston, Mass., Apr. 20, 1802, a graduate of the Boston Lat. School and of Harvard Coll. 1820; studied theol. at Cambridge, and was ordained pastor of the First Congl. Unit. ch. in Phila. in 1825; there he has since remained. Dr. F. is widely known as an author; has written devotional poetry of tender feeling; has made numerous translations from the Ger. poets, and has pub. a vol. of prose tales from the Ger. (1856). But his name will be remembered in connection with the anti-slavery movement, in which he took an intense interest, and on which he frequently and earnestly preached; and with the attempt to recover the character of Jesus by a fresh study of his biographers. His chief literary works were on this theme, the successive vols. being simply attempts at more complete and convincing statement. Wrote *Remarks on the Four Gospels, Jesus and His Biography*, a *Hist. of Jesus, Thoughts on the Life and Character of Jesus of Nazareth*, *The Veil Partly Lifted*, and *Jesus*. He also translated from the Ger. with notes and comments, Dr. Daniel Schenkel's *Character of Jesus*, an elaborate essay written as a reply to Renan's work. (For an estimate of his view of Jesus, see the *N. Amer. Review* for Oct. 1850.) Dr. F. is re-

markable for earnestness of religious conviction, and for delicacy of literary taste. His fame as a preacher stands very high. In sectarian controversies he has never taken part, nor has he been interested in the extension of the Unit. faith as a peculiarity, preferring to stand outside of organizations.

O. B. FROTHINGHAM.

Furness (WILLIAM HENRY, JR.), son of the above, an artist, b. in Phila. May 21, 1828; d. in Cambridge, Mass., Mar. 4, 1867. On leaving school at the age of 16, he went into a counting-room, but was there only 1 yr., his passion being for art. His skill in crayon portraits gained him reputation and money; he went to Brooklyn, N. Y., thence soon after to Boston, where a residence of 2 or 3 yrs. enabled him to accumulate sufficient means by his pencil to spend more than 2 yrs. abroad, studying art in Düsseldorf, Munich, Dresden, and Venice. On his return he established himself as a portrait-painter in Phila., married, removed his studio to Boston, and lived in Cambridge. His improvement as an artist was rapid, and at the time of his death he stood in the front rank of his profession. His best work is marked by firmness of drawing, truth of color, fidelity to characteristic traits of feature, and fine feeling of expression. His genius was delicate, his spirit gentle, his taste refined; but earnest study saved him from weakness, and his simple love of truth imparted to his portraits a living charm. He was fortunate in his subjects. Charles Sumner, Lucretia Mott, Dr. Furness, John W. Field, Hamilton Wilde the painter, J. P. Lesley, the daughter of R. W. Emerson, with many persons beside of intellect and character, sat to him. But his best work gave only the promise of what he might have done had he lived.

O. B. FROTHINGHAM.

Furniture, fur'-ne-tür [Fr. *fournir*, "to furnish"].

FIG. 1.



Egyptian State Chair.

word, though sometimes used in a larger sense, has for its usual signification "whatever must be supplied to a house, a room, or the like, to make it habitable, convenient, or agreeable." Savage nations require very little F., semi-civilized nations using more, while nations of the highest culture require a much greater variety.

F., as now produced in Eng., Fr., Ger., and the U. S., may be divided into 3 classes. The first or highest class demands for its production the highest order of talent. Within the

FIG. 2.



Chair of the 12th century.

past 30 yrs. in Europe, and more recently in the U. S., there has been a growing demand for F. of more artistic and original design. Many of the latest designs are intended to meet this requirement. The

second class is made of good materials; the work is mostly hand-wrought, and well carved, where carving is required.

FIG. 3.



Baron's Chair of the 15th century.

F. of this class has many merits, but it is to the first class what a very fine chromo is to a painting of the highest merit. The 3d class is cheap, often clumsy, never artistic, and always perishable, defects being concealed by glue, paint, putty, veneering, and upholstery; made in the rough, and often from unseasoned lumber, far away in some rural dist., and sent to the cities to be there finished up.

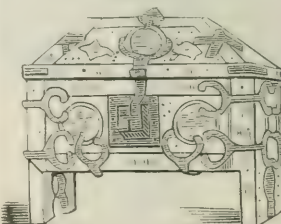
Accompanying are characteristic examples of some articles of F. of different people and ages. The

Egyptian state chairs (Fig. 1) were often of great beauty, and ornamented with carvings in wood, ivory, and metal. The

chair of the 12th century (Fig. 2), if not very ornate, has the substantial merit of being comfortable. In striking contrast with these is the rude

baron's chair of the 15th century (Fig. 3), which seems to have served for a pattern for a long time, and might have come over in the Mayflower. The coffer or strong-box of the 12th century (Fig. 4) is of wood, ornamented with elaborate metal-work, serving also for further security. In Scandinavian countries the art of carving in wood was carried to high perfection as early as the 14th century, being especially

FIG. 4.



Coffer or strong-box of the 12th century.

used in ch.-stalls, wardrobes, movable closets, and bed-

steads. The missal-closet (Fig. 5) is an admirable example of this class of F.

L. P. BROOKETT.

Furruckabad', a city of Brit. India, capital of the district of the same name, on the Ganges, between Calcutta and Delhi. It is one of the commercial centres of Upper Hindostan. Pop. 39,394.

Furs and the Fur Trade.

The use of the skins of wool- and fur-bearing animals for clothing goes back to the earliest times. All savage and half-civilized nations living in cold climates use garments of skins and furs. But aside from this use for clothing and protection from the cold, F. have been in all ages in demand for purposes of luxury and ornament. The Chi. and Japanese have used the furs of the ermine, sable, and podolian or fiery fox as articles of luxury and symbols of rank for some 3000 years. The Rom. aristocracy used the most costly F. Those brought from the Arctic regions were specially in demand. In the Sarcenic wars and the crusades, European princes acquired the habit of using costly F., and in the 13th century sumptuary laws were passed prohibiting their use. The Baltic ports were the great depots of the F. trade for several centuries, the F. being brought thither from the great fairs of Moscow and Nijni-Novgorod; but after the discovery of the Amer. continent, only the ermine, sable, and kolinski came to the Baltic; Amer. furnishing the beaver, the pine and stone martens, mink, lynx, badger, raccoon, 5 species of fox, the seal and sea-otter, the opossum, muskrat, the bison, black, white, and grizzly bears, large gray wolf, and cougar.

The F. trade was almost wholly monopolized by 4 or 5 great cos. from the first. The prin. of these were the Dutch W. I. Co., till 1684; a Fr. co., which had its trading-posts and forts from Hudson's Bay to New Orleans, and which was succeeded, when the Brit. govt. had taken possession of Canada, by the Hudson Bay Co. and its great rival, the N. W. Co.; the Amer. F. Co. of John Jacob Astor, whose posts on the Pacific were sold out by his resident partner, but who maintained his ground in the region E. of the Rocky Mts.; and the Rus. Amer. F. Co., which sold out to the U. S. when the U. S. bought Alaska. Other smaller cos. were formed at different times, but for the most part the F. trade has been in the hands of individuals for the last 40 yrs. or more. There is now only the Alaska Commercial Co., organized in 1870, which controls the capture of seals and sea-otters in the vicinity of Alaska, and pays the govt. about \$300,000 a yr. royalty for the privilege.

There are frequent changes of fashions in F. The Rus. sable has been for centuries a highly valued F. A genuine Rus. sable can always be recognized by blowing the F., the hairs turning and lying smooth in any direction. No other F. will do this. The kolinski or Japanese sable is next in value. The pine marten, Hudson's Bay or Amer. sable, the stone marten, the fisher marten, and the mink are all members of the *Mustela* family. Seal skins are the only fine F. which are commonly dyed. Beaver is now in great request for hats, but is not much worn in other garments. The F. of the Amer. skunk, sold under the name of black marten or Alaska sable, is now one of the most popular of the F. of moderate price; it is thoroughly deodorized. The finest of the fox F., the silver fox, is very scarce. The blue fox is also valuable; the white, cross, red, gray, and kit foxes less so; wolf skins, bear skins (black, white, and brown), lion, badger, and wolverene skins are in demand for lap-robies. The ermine, once regarded as too scarce and valuable for any but judges and princely families to wear, is now only in demand for children. Other F. are the chinchilla, now very popular; Astrakhan and Per. lambs. the gray Poland and Ukrainian lambs, otter, lynx, fish dressed grebe, and the cheaper F.—coney, muskrat, nutria, opossum, raccoon, hare, Hungarian squirrel, gray squirrel, wild and house black cat, etc. Most of these cheaper F. are used in the hat trade. As brought to the manufacturers, F. have been usually merely stretched and dried by the capots, or possibly a solution of alum has been applied to the flesh side. When they are to be dressed for making up they are placed in tubs, with a quantity of rancid butter, and then trampled by the bare feet of men until the pelt is softened and partially tanned. They are next scraped on the flesh side, to remove portions of the flesh or cellular

tissue which have adhered to the skin, and the grease is removed by trampling them again very thoroughly with fine sawdust. They are next beaten many times, and the fur combed out. In making up F. goods, some manufacturers cut the skins into very narrow strips, and by carefully matching every scrap, however small, and sewing the whole neatly, they save nearly or quite 40 per cent. in material.

SEE SEAL SKINS.

L. P. BROOKETT.

Fur-Seal, a name given in common to those species of the family Otariidae, or eared seals, which possess an abundant and dense under-coat of fine fur. Several species, representing 2 genera, belong to this group, and are all, to a greater or less extent, the objects of eager search. The species of the Alaskan seas is the *Callorhinus ursinus*; the S. species have not been identified with complete certainty, but 3 species at least are generally recognized—viz. *Arctocephalus*, *Phoca*, and *Urolophus*.

Furze, or **Gorse**, the *Ulex Europæus*, an Old World shrub of the order Leguminosæ, having numerous solitary golden-yellow flowers of much beauty. It has several varieties, some of which are cultivated in gardens. F. is grown as a cover to foxes and as sheep-pasture. In Belg. the waste sandy lands yield large crops of F., which is gathered green, cut fine, and fed to live-stock.

Fuse. See FUSE, by GEN. H. L. ABBOT, U. S. Engineers.

Fusel Oil, a collective name for a variety of alcohols and compound ethers which are produced during vinous fermentation, and which pass over with the alcohol when fermented liquors are distilled. It is, in fact, the F. O. that the different kinds of spirits owe their distinguishing qualities, as when the F. O. is completely removed from them, pure alcohol, more or less dilute, alone remains. F. O. varies with the material from which the spirits are prepared: that from the potato consists chiefly of amyl alcohol, with some propyl and butyl alcohol, etc.; that from Indian corn is chiefly amyl alcohol, with compound ethers consisting of the acetate, caprylate, formate, caproate, and cenanthylate of ethyl and amyl. F. O. from beet-molasses contains butylic and amyl alcohols, and compound ethers of valerianic, caproic, cenanthylic, caprylic, and pelargonic acids, with ethyl, amyl, etc. The F. O. from marc brandy contains considerable propyl alcohol, with methyl, ethylic, butylic, amyl, and caproic alcohol. Ethylic or common alcohol is in all F. O. C. F. CHANDLER.

Fusibility, the property by which solids become fluid when heated. Most solids are fusible; some, however, undergo decomposition without fusing. The temperature at which solids melt (the melting point) differs greatly for different substances, but it is always constant for the same substance. The temperature remains constant during the entire period of melting. Many bodies are usually liquid (melted) because the temperature of the air is much above their melting-points. Most solids when heated to their melting-points pass from solids to perfect liquids, but some pass through an intermediate pasty condition (*citreous fusion*) before they become fluid. This property in glass enables workmen to blow and press it into form, and the forging and welding properties of wrought iron and platinum are due to the same circumstance. The *freezing-point* is the temperature at which the melted body solidifies; it is generally identical with the melting-point. We can, however, often cool a liquid below its melting-point without its solidifying. We may cool water, if we keep it perfectly still, to -15° C. ($+5^{\circ}$ F.) without its freezing, but if we drop in a grain of sand or agitate it, it at once rises to 0° C. (32° F.) and freezes. A change of volume occurs at the moment of melting, usually an expansion, but in the case of water and a few metals it is condensation. The melting-points of bodies are slightly affected by pressure—that of ice being lowered, that of wax being raised. Substances which expand on liquefying have their melting-points raised; those which contract have their melting-points lowered. Mixtures, as of fatty acids, alkaline chlorides, or alkaline carbonates, or of metals, often fuse at temperatures below the melting-points of the simple bodies. Fluxes, partly by their chemical action in reducing compounds to the metallic state, and partly by presenting a readily fusible medium, promote the fusion of metals. The following table of melting-points is taken from Pouillet:

Names.	Centigrade.	Fahrenheit.
Mercury	-39°	-38°
Ice	0	32
Phosphorus	43	109.4
Spermaceti	49	120.2
Stearine	49-53	120.2-109.4
Potassium	58	136.4
White wax	68	154.4
Stearic acid	70	158
Sodium	90	194
Iodine	117	244.6
Sulphur	114	235.2
Tin	230	446
Bismuth	262	505.6
Lead	320	608
Zinc	360	680
Antimony	482	900.6
Silver	1000	1832
Copper	1250	2282
White cast iron	1070-1200	1952-2192
Gray " "	1100-1200	2012-2192
Steel	1300-1400	2372-2552
Wrought iron	1500-1600	2732-2912

C. F. CHANDLER.

Fu'sible Cal'culus, in pathology, one of the most common of the forms of urinary calculus. It is often large, brittle, soft, smooth, and whitish. It contains the ammonio-magnesian phosphate, mixed with calcium phosphate and some animal matter, and fuses into a glass without much difficulty before the blowpipe; whence the name.

Fusible Metals, alloys which melt at comparatively low temperatures. It is a curious fact that alloys often melt at temperatures far below the melting-points of their constituents. Bismuth, fusing at 202° C. (395.6° F.), tin, at 230° C. (446° F.), and lead, at 320° C. (608° F.), form alloys which melt in boiling water. Cadmium lowers the melting-point still farther.

FUSIBLE ALLOYS.			
Bismuth.	Lead.	Tin.	Cadmium.
8	5	3	..
2	1	1	..
5	3	2	..
8	4	2	2
Melting-points.			
100° C. = 212° F.			
93.9° C. = 201° F.			
92.8° C. = 199° F.			
71.1° C. = 160° F.			

The second alloy of the table is a most remarkable one; when it cools from fusion it expands while still soft, and when used for taking impressions of dies reproduces the finest lines with the greatest accuracy. The last alloy of the table has been used by dentists for filling teeth, being applied in the melted state with little tools like soldering-irons. Plugs of fusible metal, mixed to fuse at certain definite temperatures, have been suggested as safety-valves for steam-boilers. They are found, however, to undergo changes in use which modify their fusibility, making them entirely unreliable.

C. F. CHANDLER.

Fustian, fust'yan [from *Fostal*, a suburb of Old Cairo, where it was first made], a cotton fabric resembling velvet. In addition to the usual warp and weft, there is an additional weft, which is brought above the surface in loops. When these are cut, the ends rising above the surface produce a short nap, which entirely hides the tissue beneath. This is smoothed by shearing, singeing, and brushing.

Fustic [remotely from the Lat. *fustus*, a "stick"], a name applied to several yellow dyewoods. (1) True F., tree *F.*, yellow Brazil-wood, old *F.*, etc., is the wood of *Morus* (*Broussonetia* or *Maclura tinctoria*), a large tree of the order Moraceæ growing in the W. I. and S. and Central Amer. It affords a very permanent and valuable yellow dye. (2) Bastard F. is believed to be a smaller variety of the same wood, but inferior in quality. (3) Young F., fustet, or Venetian sumach, called also Hungarian or Zante F., is the wood of *Rhus Cotinus*, a sumach tree of the Levant. It makes a brighter yellow than old F., but one which is not so permanent. No kind of F. is of much practical value except when compounded with other dyestuffs. Mixed with other appropriate dyes, F. is of great value in obtaining green, yellow, orange, brown, and drab tints, and even blacks and reds; but it is necessarily excluded from blues, violets, purples, and kindred shades. The F. are employed for cottons, woollens, and silks.

Fuze, a device whereby an explosion may be effected at a safe distance from its destructive action. The charge may be in motion or be stationary, and a short or a long time may be desirable between the act of the operator and its effect. Hence numerous contrivances are employed. For projectiles, including shells, case-shot, carcasses, explosive bullets, and grenades, F. are classified as time, percussion, concussion, and combination F., but confusion often exists in the use of these terms. Time F. consist of cases of paper, wood, or metal containing the ingredients of gunpowder, varied to suit the required rate of burning. Being selected or cut to the proper length, they are inserted in the F.-hole of the projectile, where, being ignited by the flame of discharge or by a match, they communicate fire to the inclosed bursting charge at the desired point of the trajectory. Percussion F. are designed to cause an explosion only after the projectile strikes the object. Concussion F. are employed to obviate a difficulty peculiar to rifled guns—viz. that the length of the projectile, and, in many varieties, its expanding base, cuts off the flame of discharge from a time F., and thus prevents its ignition. In them the shock in the bore of the piece is utilized to ignite a time F. of proper length for the range required. The combination F. consists of a time or concussion F., with some additional device by which explosion at once results when the projectile strikes. When the explosive is stationary, as in ordinary or military mining—including torpedoes planted for the defence of a river or harbor—quite different F. are necessary; which may be classed as time, contact, or electrical. The first class ordinarily consists of trains of quick-match, ignited by slow-match cut to a sufficient length to allow the operator to escape to a safe distance before the explosion. Contact F. for the torpedo service are analogous to percussion F. for the artil. The great objection to the whole class is that they debar a route to friends as well as to foes. Electrical F., being perfectly under the control of the operator, obviate this difficulty. [From orig. art. in *J's Univ. Cyc.*, by GEN. H. L. ABBOT.]

Fyrouz I., an Arsacide king of Per. (the name is also spelled Feroze and Firouz), usually identified with the Pacorus of the Gr. and Lat. writers, called also ARSACES XXIV. as king of Parthia; reigned 83-103 A. D. *Fyrouz* signifies "victorious."

Fyrouz II., a Sassanide monarch of Per. (the Perosis of Byzantine writers, reigned 458-484 A. D. He succeeded his younger brother, Hormuz, whom he overthrew by the aid of the White Huns and put to death. A dreadful famine marked the first part of his reign, and the king became involved in wars with the White Huns, who finally defeated him with great slaughter, F. and 29 of his sons being among the slain.

Fyrouz III., titular king of Per., son of Yezdegerd III., the last Sassanide monarch. Expelled by the Mohammedans from Per., he fled to the domains of the Chi. emp. Kao-Tsong (Tait-Song), by whom he was recognized. He is the *Pilouse* of Chi. historians, and seems to have been a Chi. viceroy in Bokhara. D. 679. His son, Ninus, was the last Sassanide who bore the royal title.

Fyrouz (or **Feroze**) **Shah I.** (ROKN-ED-DEEN, the "support of the Faith"), a Mohammedan king of Delhi who

succeeded his father, Altamsh, in 1236. He was a vicious prince, and was deposed by the sultana Rezia, his sister, in 1236.—**FYROUZ SHAH II.** (JELAL-ED-DEEN, "glory of the Faith") reigned at Delhi 1289-96; was an Afghan usurper who succeeded the last Gouride sovereign; was murdered by his nephew and successor, Allah-ed-Deen, in 1296.—**FYROUZ SHAH III.**, king of Delhi, b. 1296; succeeded Mohammed III. in 1351; abdicated 1386, and d. 1388. He founded in 1354 a city now called Ferozepoor, formerly Fyrouzabad, and began the construction of the great canal-system now known by his name.

Fyt, or **Feydt**, fit (JAN), a Flemish painter, b. at Antwerp in 1609. As a painter of animals he was excelled by no Flemish artist except perhaps Snyders. His dogs, and especially his greyhounds, are regarded as the best ever painted. D. 1671.

Fyzabad, town of Brit. India, in the prov. of Oude, on the right bank of the Ghoggra. The pop. is estimated at 55,570, but the town is now falling into decay.

G.

G is a consonant, and the 7th letter in most modern European langs. In Eng. it has (1) a hard sound, that of the mute *k*, plus a vocalization; and (2) before *e*, *i*, and *y* the soft sound of *j*. (3) When it follows *n*, the two usually stand for the nasal sound of *ng*, especially at the end of a word. In the midst of a word *g* following *n* sometimes retains the *j* sound (*manager*); sometimes *g* not only unites in the nasal *ng* sound, but has a secondary hard *g* sound (*anger*); finally, it may have its appropriate nasal sound without qualification (*changer*). In chem. G stands for glumium.

Gablenz, von (LUDWIG KARL WILHELM, BARON, AUS. gen., a son of the Sax. lieutenant-gen. Gablenz, b. at Jena July 19, 1814, ed. at the military acad. of Dresden. He served first in the Sax. horse-guard, but in 1833 entered the Aus. service, and became, after 6 yrs., a capt. of horse. In 1848 he fought in It. under Radetzky with distinction, and was made a major of the staff. In 1859 distinguished himself in the disastrous battle of Solferino; in 1863 was made a lieutenant-marshal, and in 1864 received the command of the 6th army corps, which, together with a Prus. corps, and with the Prus. field-marshal Wrangel as commander-in-chief, was sent against the Danes in Schleswig-Holstein; was made gov. of Holstein. In 1866 he commanded the 10th army corps, and at Trautenau on June 28 gained the only advantage which the Aus. could boast of in that war. He also took part in the battle of Sadowa. In 1868 was made a gen. of horse, and in 1869 gen. in command of Hungary. Retired Nov. 28, 1871; shot himself Jan. 28, 1874.

Gaboon, a river in W. Afr., falls into the Atlantic near the equator. In 1845 the Fr. planted a colony here, which was broken up in 1871, but has since been re-established. The G. colony has several missions, R. Cath. and Prot.

Gabriel, ga'bre-el [Heb. "mighty one of God"], the name of the heavenly being who communicated prophetic tidings to Daniel, and foretold in later times the birth of Jesus Christ and of St. John the Baptist. G. in Jewish, Chr., and Mohammedan traditions is one of the great archangels.

Gabriel, St., Orders of (R. Cath.), (1) a congregation of lay conventional brethren (*conventuales*) and of non-conventional gentlemen (*confraternitates*) at Bologna. They are engaged in the work of instruction. (2) The "Brothers of St. Gabriel" in Fr., founded in 1835. They are engaged in instructing the young, chiefly in matters of doctrine.

Gad [Heb. "fortune" or "troop"], 7th son of Jacob by Zilpah, and founder of the tribe of Gad. They disappear after the time of Tighath-Pileser IV., who carried them into captivity 740 B. C.—**GAD**, the "king's seer," a prophet who wrote a book of the acts of David, which is not extant.

Gad'ara [not to be mistaken for Gerasa], a stronghold of Trans-Jordanic Pal., on a hill just S. of the Hieromax, about 8 m. S. E. of Lake Tiberias. It is first mentioned by Polybius (*Hist.* v. 71), who relates its capture by Antiochus the Great (218 B. C.), and speaks of it as "the strongest of all the cities in that part of the country." Its ruins, called by the Arabs *Um Keis*, occupy a space about 2 m. in circumference. The anc. pavement of the prin. street is described by Porter as almost perfect. There are hot baths on the bank of the river near by. The present inhabs. occupy old tombs in the limestone rock.

R. D. HIRCHCOCK.

Gade (NIELS WILHELM), b. Feb. 22, 1817, at Copenhagen; received a musical education, and in 1841 the musical society gave him a prize for his first overture, *Echo of Ossian*. His first symphony, in C minor, attracted still greater attention, and on the invitation of Mendelssohn he went in 1843 to Leipzig, where, with a few interruptions, he resided till 1848 as director of the concerts of the Gewandhaus. On his return to Copenhagen, in 1848, he became director of the musical society, and developed great activity as a composer. His most celebrated works are *Comala*, *The Elf-King's Daughter*, and *The Crusaders*.

Gad-Fly. See HORSE-FLY.

Gad'idæ [*Gadus*, one of the genera], a family of anacanthine fishes, which includes the cod, haddock, hake, etc. The body is elongated and conoidal; the mouth obliquely cleft; the supramaxillary bones straight and little expanded backward; the teeth acute; the branchial apertures cleft far forward below; the caudal fin encroaches on the caudal peduncle; the pectoral fins are narrow, the ventral fins jugular. The species are chiefly confined to the cold waters of the globe, and mostly to those of the N. hemisphere, but a few types are found in the cold deep waters of the lower lats. and reascend toward the surface in oceans of the S. hemisphere. Several well marked sub-families express the chief modifications of the vertical and ventral fins: (1) *Gadina*, including the true cod-fishes (*Gadus*), the pollacks (*Pollachius*), the haddock (*Melanogrammus*), the tom-cods (*Microgadus*), whiting (*Merlangus*), etc.; (2) *Phycina*,

with the so called "hake" not the true hake, which is a *Merluccius*, of the N. Eng. and neighboring provincial coasts; (3) *Lutina* with 2 types, *Mula*, the true ling, which is marine, and *Lota*, embracing the cusk or burbot of the interior lakes and rivers of the N.; (4) *Ciliatina*, and (5) *Brosminae*, represented by *Brosminius*, which is consumed in large quantities on some portions of the N. Eng. and N. coasts of Amer. and known under the names of cusk and torsk. Over 70 species of the family have been described, among which are several genera peculiar to the depths of the tropical or sub-tropical seas, where the water has a low temperature compared with the surface and the land. As many as 17 species have been discovered along E. coast of N. Amer., but only 3 or 4 in the W. or Pacific region. THEODORE GILL.

Gadsden, Ala. See APPENDIX.

Gadsden (CHRISTOPHER), a lieutenant-gov. of S. C., b. in Charleston, S. C., in 1724; ed. in Eng., returning to Charleston in 1741; engaged in mercantile business. In 1765 he was appointed a delegate to the Cong. which met at New York in Oct. to petition against the Stamp Act; was also chosen M. C. in 1774; was col. and brig.-gen. of S. C. Volunteers in 1775, and engaged in the siege of Charleston in 1776; several months after the capitulation he was arrested by order of Lord Cornwallis and transported to St. Augustine, where a parole was offered him, which he refused, and remained in close confinement for 42 weeks. In 1782 he was chosen gov. of S. C., but declined the office, continuing, however, his exertions for the good of his country, both in the assembly and council. D. Aug. 23, 1805.

Gadsden (CHRISTOPHER EDWARDS), D. D., b. at Charleston, S. C., Nov. 25, 1785, a grandson of Christopher Gadsden, grad. at Yale 1804; became a deacon in the P. E. Ch. 1807, a presbyter 1810; held rectorships in Berkeley and in Charleston, S. C.; became bp. of S. C. 1840; was ed. of the *Gospel Messenger*, founder of the P. E. Society, and a devoted friend to the colored race. D. June 24, 1852.

Gadsden (JAMES), b. at Charleston, S. C., May 15, 1788, grad. from Yale Coll. 1806, and engaged in commercial business in Charleston until 1812, when he was appointed second lieutenant of engineers U. S. A.; served during the war with G. Brit. (1812-15), as aide-de-camp to Gen. Jackson 1816, with whom he served in Fla.; promoted to be capt. 1818; member of the legislative council of Fla. Terr. (1824), and com. to treat for removal of Seminole Indians to S. Fla.; U. S. minister to Mex. 1853, and negotiated purchase of Ariz., which purchase is known by his name. D. Dec. 26, 1858.

Gadsden Purchase, a name given to that part of Ari. and of N. M. which lies S. of the river Gila. This region was purchased from Mex. for the U. S. by Gen. James Gadsden by convention dated Dec. 30, 1853, the U. S. paying \$10,000,000, and Mex. giving up a large amount (stated at from \$15,000,000 to \$30,000,000), in claims for Indian depredations. The sale was very unpopular in Mex., where it was a prin. cause of Santa Anna's banishment as a traitor (1855). Area of Purchase, 45,355 sq. m.

Gadwall, or **Gray Duck** (*Chaulasmodon streperus*), a wild duck of Asia, Europe, Amer., and N. Afr. Is very quick, and hard to shoot, but is highly prized for the table. Inhabits both fresh and saline marshes, and is a bird of passage.

Gaelic Language and Literature. The term Gaelic (from *Gael*, "wanderers," a common name of the Irish and Highland Scotch, and not from the word *Gallus*, a "Gaul") or Gadhelic, in a wide sense, is synonymous with the Erse or N. W. group of Celtic tongues, including the Irish, the Manx, and the Highland Scotch. Indeed, the 3 may be regarded as dialects, or groups of dialects, of the same mother-tongue. But the name is more commonly limited to the Celtic lang. spoken in some of the islands and in parts of the Highlands of Scot. It is also prevalent in Cape Breton and in some other Brit. colonial possessions. The G. differs from the Irish in its vocabulary, retaining words which the Irish has dropped, and dropping words which the Irish has retained; and in both words have changed their primitive meanings; new idioms have arisen in each, and new grammatical forms; and each has numerous peculiarities of pronunciation, the Irish retaining more of the characters of the anc. tongue.

The G. lit. is much less important than the Irish. The most famous work is the so called Ossianic poems, of which Macpherson professed to give a translation. It is now generally conceded that his translation is a forgery, and that no poems of the kind can be found to exist in the memories of the Highlanders. But Ossian (or Oisín) was himself an Irishman, and there are very considerable Ossianic remains which are strictly Irish. Most of the extant lit. is either poetical, traditional, or religious.

Gae'ta (Lat. *Cajeta*), a fortified sea-coast town of S. It., about 40 m. N. W. of Naples. It was an anc. Gr. colony, on a steep promontory overlooking the Bay of Gaeta. It was the first among the It. towns to form, after the downfall of the Rom. power, an independent communal gov't. This little commonwealth was a republic in the time of Charlemagne; coined money, and was ruled by its own dukes or doges until 1230. It sustained many noteworthy sieges during the Middle Ages, was the retreat of Pius IX. in 1848-49, and the only stronghold that made a spirited resistance in defence of the ex-king of Naples. The citadel surrendered to Gen. Cialdini on Feb. 13, 1861, after 3 months' defence. Pop. about 5000.

Gage (THOMAS), the last gov. of Mass. appointed by the king, and commander-in-chief of the Brit. force in Amer., b. in Eng., a son of Viscount Gage; was appointed gov. of Montreal in 1760, and on the departure of Gen. Amherst succeeded him as commander-in-chief of the Brit. forces in Amer.; was appointed gov. of Mass., and arrived in Boston May 17, 1774. Several regiments soon followed him, the repair of fortifications on Boston Neck was begun, the powder in Charlestown arsenal was seized, and detachments sent out to Salem and Concord to take possession of stores, which led to the battle of Lexington. In May 1775 the provincial cong. of Mass. de-

clared Gen. G. unworthy of obedience, and the exercise of his functions was henceforth confined to Boston. In June he issued a proclamation offering pardon to all rebels excepting Samuel Adams and John Hancock, and established martial law. The battle of Bunker Hill occurred a few days later, after which G. was relieved by Sir William Howe, and returned to Eng. the following Oct. D. Apr. 2, 1877.

Gail (JEAN BAPTISTE), a learned Hellenist, b. at Paris in 1755; appointed assistant to Vauvilliers in the chair of Gr. in the Coll. of Fr.; became curator of the Gr. and Lat. MSS. in the Imperial Library and member of the Inst. of Fr. His prin. works are editions of *Theocritus*, with translation; *Anacreon*, *Homer*, *Xenophon*, *Thucydides*, and a collection of philological essays and memoirs entitled *Le Philologue*. D. 1829.

Gail (JEAN FRANÇOIS), son of the preceding, b. in Paris in 1795, was for a time assistant to his father in the Coll. of Fr. Pub. *On the Nature of the Bacchus-Worship in Gr.*, an edition of the *Periplus* of Scylax, and an edition of the *Geographi Graeci Minores*. D. 1845.

Gaillard (EDWIN SAMUEL), A. M., M. D., LL.D., b. in Charleston dist., S. C., Jan. 16, 1827. Took his literary degree 1845 at Columbia, S. C.; received first honors in S. C. Med. Coll. 1854; went to Europe 1857; returning thence, settled in New York city; was awarded the "Fiske Fund Prize" for his essay on ozone. During the war became med. director of army and inspector of hospitals; established the *Richmond and Louisville Med. Journal* 1866; removed to Louisville, Ky., with his journal, by the unanimous request of the Med. Society of that State, 1868, and became prof. of the principles and practice of med. in the Louisville Med. Coll. Ed. of *Amer. Med. Weekly*.

Gaillard (JOHN), b. in St. Stephen's, S. C., was U. S. Senator 1804-26. D. Feb. 26, 1826.

Gaines (EDMUND PENDLETON), a gen., b. in Culpeper co., Va., Mar. 20, 1777; appointed second lieutenant 6th U. S. Inf. Jan. 1799, and first lieutenant Feb. 1802; U. S. collector of the port of Mobile, Ala., 1805, capt. 1807, and brig.-gen. U. S. A. 1814; for gallant conduct in the defence of Ft. Erie, Aug. 1814, he was brevetted maj.-gen., and received the thanks of Cong. and a gold medal; given command of S. military dist., whence transferred to command of W. division. D. June 6, 1849.

Gaines (JOHN P.), b. in Ky., served in the war with Mex. as major in the Ky. Volunteer Cav.; volunteer aide to Gen. Scott, and distinguished at Molino del Rey; M. C. from Ky. 1847-49, gov. of Or. Terr. 1850-53. D. 1858.

Gaines (MYRA CLARK), wife of Gen. E. P. Gaines and daughter of Daniel Clark, a citizen of New Orleans of Irish birth, who (according to testimony brought out by the famous lawsuit in which the daughter was long involved) in 1803 privately married Zulime des Granges, a Frenchwoman, the reputed wife of one Des Granges, who, it is alleged, had a wife living at the time of his marriage to Zulime. Myra, the second child of Mr. Clark by this woman, was b. in New Orleans in 1805, and was ed. principally in Phila., where she lived as Myra Davis, Clark and Zulime having separated, and the latter having married a third time. Clark d. in 1813, and the daughter in 1832 was married to W. W. Whitney, then a resident of New York. Shortly afterward Mr. Whitney and his wife received from Mrs. Davis, with whom Myra had been brought up, information of the fact that she was the legitimate daughter of Clark, and that not long before his death he had by will given his large estate entirely to her. After Mr. Whitney's death his widow married Gen. Gaines in 1839. The missing will was never produced, but its previous existence was sustained (1856). To prove her legitimacy was now necessary, since by the laws of La. the child of an adulterous union could not inherit even by will of the parent. The U. S. supreme court finally decided this point in her favor, after many yrs. of litigation. She next (1856-67) successfully maintained an action in equity before the U. S. supreme court to recover her property, most of which was in New Orleans, and had been disposed of according to a will by which in 1811 Clark had devised his estate to his mother. In 1874 Mrs. G. had recovered possession of several million dollars' worth of this property. Its total value before the war was some \$30,000,000. D. Jan. 9, 1885.

Gaines (RICHARDSON WILSON), M. A., b. in Maysville, Ky., Dec. 9, 1825. In 1857 the family removed to Tuscaloosa, Ala., the seat of the State Univ., at which he grad. in 1845 at the head of his class; was appointed tutor, and subsequently adjunct prof., of anc. langs. in the univ., and in 1851 resigned to visit Europe, where he spent 3 yrs. in travel and study; was elected at his return prof. of Lat. and Fr. in the Univ. of Miss., and in 1860 prof. of anc. langs. in Oakland Coll.; from 1861 to 1864 was paymaster in the Confed. army; was afterward prof. of anc. langs. in Davidson Coll., N. C., and in 1874 prof. of Lat. and Fr. in Central Univ., Richmond, Ky.; prepared an exhaustive treatise on *Lat. Pronunciation in the Colls. of the U. S.*

Gaines's Mill. See COLD HARBOR.

Gainesville, R. R. junc., cap. of Alachua co., Fla., 98 m. S. W. of Fernandina. It has 3 acads. Pop. not given in census of 1880.

Gainesville, R. R. junc., cap. of Hall co., Ga., 53 m. N. E. of Atlanta. It has a coll. It is situated on the summit of the Chattahoochee ridge, that divides the waters of the Atlantic and Gulf. It has fine springs—chalybeate, limestone, and freestone—and is a health resort. Pop. 1870, 472; 1880, 1919.

Gainesville, on R. R., cap. of Cooke co., Tex., 8 m. S. of Red River. It has 2 insts. of learning. Pop. 1880, 2667.

Gainsborough (THOMAS), an Eng. painter of landscapes and portraits, b. in Sudbury, Suffolk, 1727; d. in Lond. Aug. 2, 1788. He was an artist from childhood, for he sketched at 10 and painted at 12. Gravelot and Hayman were his instructors. When only 16 he painted landscapes and portraits in Hatton Garden. Marriage with a young lady of moderate fortune made him comparatively independent, and for several yrs. he lived at Ipswich and Bath, painting portraits with rapidly increasing success. Returning to Lond. in 1774, he gained reputation by portraits of

the royal family and eminent people. The portraits of Mrs. Sheridan, Mrs. Siddons, and Mrs. Graham are among his best. G.'s fame, however, rests on his landscapes, which, though not, strictly speaking, original in style, had a character of their own for simplicity of theme and treatment, subdued tone of color, and idyllic charm of feeling. He left 56 paintings and 148 drawings. (O. R. PROTHINGHAM.)

Gaisford (THOMAS), one of the most distinguished Eng. classical scholars, b. at Ifford, Wilts, Dec. 22, 1779, ed. at Christ Ch., Ox.; took orders in the Ch., but devoted himself to classical learning; appointed prof. of Gr. in the Univ. of Ox. in 1811, and dean of Christ Ch. in 1831. His prin. works are eds. of *Hephæstionis Enchiridion de Metrica*, *Poeta Græci Minores*, *Stobæi Florilegium*, *Sophocles Tragicus*, *Herodoti Historia*, *Sexti Læpidii Pædagogus Græci*, *Scriptores Latini rei Metricæ*, *Eusebii Demonstratio Evangelica*, and *Elymologicon Magnum*. D. June 2, 1855.

Gaius, or **Caïus**, a famous Rom. jurist of whose personal hist. little is known. He certainly wrote during the reigns of Hadrian and the Antonines. He was the author of numerous works upon the Rom. law, of which the most important was the *Institutes*, discovered by Niebuhr in 1816 in a palimpsest at Verona.

Galangal, a stimulant, aromatic drug, derived chiefly from the *Alpinia officinarum*, of the order Zingiberaceæ, a native of S. Chi. It resembles ginger, and is used for the same purposes. **Greater G.**, a substitute for the true, is the root-stock of *Alpinia G.* of Java.

Galanthus. See SNOWDROP.

Galapagos Islands ("Tortoise Islands"), a group of 13 small islands in the Pacific, on the equator, between lon. 89° and 92° W. The Ecuadorians planted in 1832 a penal colony here. The islands are noticeable on account of the land-turtles which are found in great numbers.

Gala'tia, or **Gallagre'cia**, a country in Asia Minor, inhabited by a colony of Gauls, who in the 3d century B. C. invaded Gr., crossed the Hellespont, subdued Troas, and in 230 B. C. were compelled by Attalus I., king of Pergamus, to settle here. They formed a state with a democratic govt., which, about 70 B. C., was transformed into a monarchy, but shortly after their country was made a Rom. prov. The apostle Paul visited them twice, and addressed to them one of his earliest Epistles.

Galatians, Epistle of St. Paul to the, written from Ephesus in 55 or 56 to the disciples in Galatia, where Paul had founded chs. The occasion of the Epistle was the interference of certain persons who sought to impose Jewish laws on Paul's converts. This is, next to the Romans, the most important of his Epistles.

Ga'latz, or **Galacez**, city of Roumania, on the Danube, which here is navigable for vessels of 300 tons; is the centre of trade between Vienna and Constantinople. Pop. 80,763.

Galaxy [Gr. γαλαξίας, from γάλα, "milk"], or **Milky Way**, a circle of nebulous or cloud-like light spanning the entire heavens, with the appearance of which every one is familiar. One of the anc. philos. is said to have conjectured that it was really formed of stars too small to be singly visible to the naked eye. This conjecture was strengthened by Galileo, who, scanning that part of the heavens with his telescope, found minute stars in great numbers; and it was entirely confirmed by his successors, especially by Herschel, in whose telescopes the cloudiness seemed to be entirely resolved into stars. The number of the smallest telescopic stars in the G. is now known to be greater than in all the rest of the heavens, so that this cloudy girdle really forms the most important part of the visible universe. The true constitution of the G. is still one of the unsolved problems of astron. Probably it is a vast irregular ring of star-clusters, near the centre of which our sun is situated. But no certain data exist for fixing the position of this ring among the other stars, and our means of measuring the distances of the stars are too imperfect to enable us to collect such data. The solution of the problem must therefore be left to future generations. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. S. NEWCOMB.]

Gal'ba (SERVIUS SULPICIUS), a Rom. emp., b. Dec. 24, B. C. 3, near Terracina; was adopted by his step-mother, a relation of the wife of Augustus; was prætor 20 A. D., consul in 33; commanded in Gaul 39-41, defeating the Gers. with severe loss; commanded in Afr. 45-46, and attained great honors at Rome; held command in Sp. 61-68; was saluted emp. by his men, and went to Rome, where he succeeded Nero in 68, but his avarice and cruelty rendered him unpopular, and he was murdered by the prætorians Jan. 15, 69 A. D.

Gal'banum [Gr. γαλβάνη; Lat. *galbanum*], a gum-resin brought from the Levant, India, and Per. It is the concrete juice of some unascertained plant, probably a *Ferula*. It is antispasmodic, expectorant, and stimulant, and is used as an ingredient of plasters.

Gale, Sweet Gale, or Dutch Myrtle, the *Myrica Gale*, a fragrant European and N. Amer. shrub, growing in cold, wet lands. It abounds in an essential oil. It has been used in med. against the itch, and will keep away moths and other insect vermin.

Galen, the anglicized name of CLAUDIUS GALENUS, a phys., b. at Pergamus, in Mysia, 130 A. D. He became phys. to the gladiatorial school of his native town; went to Rome, became phys. to the family of Marcus Aurelius, and afterward returned to Pergamus. The time and place of his death are not known with certainty. He found the med. profession divided into several sects and parties, but after his time there was but one, the Galenic, and for 1300 yrs. his was by far the highest authority in the profession. He was a laborious dissector of animals, and practised surgery at Pergamus, but not at Rome. He wrote a vast number of treatises upon philos., logic, and med. subjects. Perhaps his most famous work was the *Ars Medica*, but his best treatises are those upon diagnosis and semeiology.

Gale'na, the sulphide of lead, consisting of lead 86.6, sulphur 13.4, and the ore from which metallic lead is almost ex-

clusively obtained. It crystallizes in cubes, has a blue-gray color and a highly metallic lustre, like that of freshly cut metallic lead. G. generally, perhaps always, contains silver, sometimes in such quantity as to become a rich silver ore. It is a conspicuous element in many mineral veins, and is largely worked as an ore for lead or for the silver it holds. In Cornwall it is associated with tin; in the Hartz Mts. and in Transylvania the silver ore is chiefly argentiferous G. In the U. S., G. is of very frequent occurrence in the veins contained in the crystalline rocks of the Allegheny belt of N. Eng., the Adirondacs, and Canada. It is also found in the Silurian rocks of the Shawangung Mts., Rossie, N. Y., and Lexington, Ky., where it occurs in fissure-veins, and in the lead-regions of the Upper Miss. and S. Mo., where it fills or lines crevices called *gash-veins* in the Lower Silurian and Carboniferous limestones. G. is found in all silver-mining dists. of Col., Ut., and Nev., where it is generally rich in silver.

Galena, city and R. R. centre, cap. of Jo Davies co., Ill., on the Galena (or Fèvre) River, 5 m. from its junction with the Miss., 180 m. W. N. W. of Chicago, and 445 m. by water above St. Louis. It is built on bluffs on either side of the river, which is ordinarily navigable by steamboats. The town is named for the mines of lead-sulphide (galena) which abound in this vicinity. There are 72 lead-producing tps. in Wis. and Ill., for which G. is the business-centre. These tps. cover a million acres of land, mostly very fertile. The town has abundant water-power. G. is the seat of the Northwestern Ger.-Eng. Normal School and a convent of Dominican nuns. Pop. 1870, 7019; 1880, 6451.

Galena. See KAN. See APPENDIX.

Gale'rius, or **Maxim'ian II.** (GALERIUS VALERIUS MAXIMIANUS, called also ARMENTARIUS), a Dacian peasant, who served with such distinction in the Rom. army that Diocletian gave him his daughter in marriage, and in 292 A. D. declared him Cæsar and Jovius. He was the prime mover in the Diocletian persecution. In 305 he became Augustus, jointly with Constantius Chlorus; in 307 the revolt of Maxentius deprived him of It. and Afr., Gaul and Brit. having been already lost to Constantine, but he still reigned in the E., and distinguished himself by works of internal improvement. D. May 311 A. D.

Galesburg, city and R. R. centre, cap. of Knox co., Ill., 163 m. S. W. of Chicago. The R. R. has extensive works here. Knox Coll. and Female Sem. and Lombard Univ. are located here. Pop. 1870, 10,158; 1880, 11,437.

Galicia, gal-ish'e-a, a prov. of Aus., consisting of the old ters. of Galicia, Lodomeria, Auschwitz, Zator, and Cracow, and now divided into 2 governmental dists., Lemberg and Cracow. It is bounded S. by Hungary, from which it is separated by the Carpathians; E. and N. by Rus. and Poland, toward which it has no natural boundaries, except in some places where the Dniester and the Vistula make the line of demarcation. The surface is a terrace, through which the Carpathian Mts. gradually sink into the great E. European plain. The soil is fertile, but the climate is cold—long winters with deep snow and short hot summers. Grain, flax, hemp, and hops are grown, but the grape will not ripen. Fine horses and excellent cattle are reared, and the forests are stocked with deer and wolves. Of minerals, iron and rock-salt abound; the latter especially is of great importance. G. has an area of 30,299 sq. m., with 6,000,326 inhabs., Polish and Ruthenian Slav, with the gen. character of the Polish society. There is a class of nobles, who have warlike passions, a romantic temper, and elegant manners; and there is a peasantry, rude, filthy, ignorant, and intemperate. But there is no middle class, no manufacturers, no merchants except the Jews, who live in abject and miserable condition, despised and ill-treated both by the peasantry and the nobility. In this unfortunate structure of society lay the possibility of the division of Poland; and since G. (in 1772) came to Aus. it has made great advances in the track of modern civilization, in spite of the rebellions which have convulsed it, and whose gen. character has been the murder of the nobility by the peasantry. The Ruthenians are mostly R. Caths. of the Ruthenian rite; the Poles, R. Caths. of the Lat. rite; their number is about equal.

Gal'ilee [Heb. גליל, *Galil*, "a wheel" or "circle"], a name applied originally to the 20 towns round about Kedesh-Naphtali, given by Solomon to Hiram in return for services rendered in building the Temple at Jerusalem; but in the Rom. period it was the name of the northernmost of the 3 great provs. of W. Pal., including the anc. ters. of Issachar, Zebulun, Asher, and Naphtali. Lower G. appears to have begun with the S. boundary of Esdraelon, and to have extended some 8 or 10 m. N. of Nazareth. All N. of that was called Upper G. The whole prov. is supposed to have had an area of 2000 sq. m. In the time of Christ it was the most densely peopled and thrifty portion of Pal. According to Josephus, it contained 204 towns (*Autobiography*, § 45), and was noted both for the fertility of its soil and the bravery of its inhabs. (*Jewish War*, 3, 3, 2). The pop. of the whole prov., but especially the N. part of it, was largely heathen. This was so in the time of the Maccabees (1 Macc. v. 17-23). Strabo (b. 54 B. C.) says the prov. was "inhabited generally by mixed tribes of Egyptians, Ars., and Phœnicians." (*Geog.* xvi. 2, 34). In Isa. ix. 1, and Matt. iv. 15, it is called "Galilee of the Gentiles." The Jews who lived there were far less bigoted than their brethren in Judea. Hence the greater part of Christ's life was spent in G., and most of his disciples were Galileans. (For an elaborate argument in support of the position that the pop. of G. in the time of Christ was not mainly heathen, see the *Bibliotheca Sacra* for Jan. and for Apr. 1874.) R. D. HITCHCOCK.

Galilee, Sea of. See GENNESARET, LAKE OF.
Galile'io (GALILEO), commonly called **Galile'o**, an eminent It. math. and astron., b. at Pisa Feb. 14, 1564. He discovered the isochronism of the pendulum; also invented the microscope and the thermometer. He made one of the first telescopes ever applied to the uses of astron., and al-

though it only had a power of 30, he discovered with it the mountainous character of the moon's surface, detected the phases of Venus, the satellites of Jupiter, the ring of Saturn, and the solar spots. Beside being eminent as an astronomer, he was equally noted as a physicist and a mechanician; was a bold and earnest expounder of the Copernican system, and by his teaching aroused many enemies, and was finally in his old age forced to abjure his belief in the doctrines in which he still believed. D. Jan. 9, 1642. [From orig. art. in *J. s. Univ. Cyc.*, by PROF. A. DE GUBERNATIS.]

Gallingale, a name applied popularly to certain sedges of the genus *Cyperus*, and more particularly to *C. longus*, a bulbous sedge of Europe. Its bulbs have been employed in med., but are now more used by perfumers, who extract from them a substance having a fragrance like violets.

Gallion, city and R. R. June, Crawford co., O., 64 m. N. of Columbus. Pop. 1870, 3523; 1880, 5035.

Galipea. See **ANGOSTURA BARK**.

Galipot [Fr.], the concrete turpentine which collects upon pine trees in the S. of Fr.; called also *barras*; used in pharmaceutical compounds in European practice.

Gall (FRANZ JOSEPH), M. D., b. at Tiefenbrunn, in Baden, Mar. 9, 1758; studied at Baden, Bruchsal, Strasburg, and Vienna, where in 1785 he took his med. degree. He compared the differences in the shapes of men's heads, believing that these differences would afford the best index to the mental and moral characters of persons examined. In 1796 he began to lecture at Vienna upon his new theory, since known as phrenology, but in 1805 the Aus. govt. interdicted his lectures. In 1807 he repaired to Paris, and became a practitioner of med. Wrote *Anatomie et Physiologie du Systeme Nerveux et Sur l'origine des qualites morales et de facultes intellectuelles*. D. Aug. 22, 1828.

Gallait, gah-lä' (Louis), historical painter, b. at Tournay, Belg., in 1810. His studies were pursued in Antwerp, but chiefly in Paris; his first pictures were exhibited in Brussels, and soon gained for him fame; but he has been a more frequent contributor since 1835 to the Fr. exhibitions. His great subjects are taken from the hist. of the Low Countries: *The Duke of Alba in the Netherlands*, *The Last Moments of Egmont*, *The Last Honors paid to Egmont and Horn*, *The Abdication of Charles V.* But he has painted other scenes, partly historical and partly imaginative: *The Death of Palestrina*, *Job and his Friends*, *Montaigne visiting Tasso*, *Baldwin crowned Emp. of Constantinople*, *The Temptation of St. Anthony*, etc. His paintings are of large size and full of action; is a member of the Royal Acad. of Belg., an honorary member of Royal Acad. of Lond., and a foreign associate of Paris Acad. of Fine Arts; obtained a medal in 1835 and decoration of Legion of Honor in 1841.

Gallias, a powerful race of E. Afr., who have for yrs. been gradually encroaching upon the Abyssinians proper. They are divided into many tribes, are partly Mohammedan, while the majority are pagans.

Gallatin, Mo. See **APPENDIX**.

Gallatin, cap. of Sumner co., Tenn., 26 m. from Nashville, on R. R., and 3 m. from the Cumberland River. Pop. 1870, 2123; 1880, 1938.

Gallatin (ALBERT), LL.D., an Amer. statesman, b. at Geneva, Switz., of an anc. patrician family, Jan. 29, 1761. He was left an orphan in his infancy, and was ed. under the care of a distinguished lady, a friend and relation of his mother. He grad. in 1779 at the Univ. of Geneva, and being deeply imbued with the liberal spirit of the times, he declined offers of advantageous employment under one of the sovereigns of Ger., and emigrated to the U. S. He landed at Boston July 14, 1780, and soon after proceeded to Me., where he served as a volunteer under Col. Allen, made advances to the govt. for the support of the Amer. troops, and was placed in command of a small fort at Passamaquoddy, defended by a body of militia, volunteers, and Indians. In 1783 he was prof. of the Fr. lang. at Harvard Univ., and the following yr. he purchased large tracts of land in W. Va.: in 1789 was elected a member of the convention to amend the const. of Pa., and united himself with the Rep. party; in 1790 was elected to the house of reps. of Pa.; in 1793 was elected U. S. Senator, but his eligibility was contested on the ground of his not having been a sufficient length of time a citizen. In Oct. 1794 was again elected, by the concurring votes of *all parties*, to the legislature, and on the same day was elected M. C. for the adjacent dist. of Washington and Allegheny counties, in which he did not reside. In Dec. 1795 he took his seat in Cong., and on the accession of Mr. Jefferson to the Presidency in 1801 was appointed sec. of the treas.; he paid particular attention to the financial concerns of the country, and on his motion the committee of ways and means was first organized. G. remained at the head of the treas. until 1813, a period of 12 yrs., and exercised a great influence in the gen. administration of the govt.; in 1813, without resigning his office, he proceeded to St. Petersburg as envoy extraordinary of the U. S. G. Brit. having refused the mediation of Rus., he agreed to treat directly with the U. S. Mr. G. having arranged with Lord Castlereagh that the negotiations should be transferred to Ghent, he proceeded there in 1814, and in conjunction with his distinguished associates negotiated the treaty of peace. In 1815 he went to Lond., where, with Messrs. Adams and Clay, he negotiated a commercial convention between the two countries. In 1816 he went out to Fr. as minister of the U. S. In 1824, when nominated for V.-P. of the U. S. by the Rep. members of Cong., he declined the nomination. In 1826 he was appointed envoy extraordinary to Eng., returned to the U. S. in Dec. 1827, and resided in the city of New York. In 1830 he was chosen pres. of the council of the Univ. of the City of New York. An early disciple of the school of Adam Smith, he was always in favor of free trade, and assisted at the free-trade convention held at Phila. in 1831. The same yr. (1831) he became pres. of the National Bank; he had been for several yrs., and was at the time of his death (Aug. 12, 1849), pres. of the New York His-

torical Society, and also pres. of the Amer. Ethnological Society. [From orig. art. in *J. s. Univ. Cyc.*, by PROF. ALBERT H. GALLATIN.]

Gallaudet' (EDWARD MINER), PH. D., LL.D., a son of Dr. T. H. Gallaudet, b. in Hartford, Conn., Feb. 5, 1837; taught in the Hartford Asylum in 1856, and in 1857 took a prominent part in organizing the Columbia inst. for the deaf and dumb. In 1864 he took the preliminary measures for founding the National Deaf-Mute Coll. at Wash., of which he became pres., acting also as prof. of moral and political science. In 1868 he pub. a report of his observations in the deaf-mute schools of Europe. He is also author of other reports on deaf-mute education.

Gallaudet (THOMAS), D. D., son of Dr. T. H. Gallaudet, b. at Hartford, Conn., June 3, 1822, grad. at Trinity Coll. of that city 1842; was 1843-58 prof. in the New York inst. for deaf mutes; took orders in the P. E. Ch. 1850; became rector of St. Ann's ch., New York, 1852, and instituted in it regular services for deaf mutes and their friends; gen. manager of Ch. Mission to deaf mutes 1872, pastor of sisterhood of Good Shepherd 1869, chaplain of Midnight Mission 1871. Wrote on education of deaf mutes.

Gallaudet (THOMAS HOPKINS), LL.D., b. in Phila. Dec. 10, 1787, grad. at Yale 1805; was tutor there 1808-10; studied at Andover Theological Sem. 1811-14; studied law also; visited Europe 1814-15 in the interest of the Hartford inst. for deaf mutes, to the superintendency of which he had been appointed; returned in 1816, accompanied by Laurent Clerc; was in charge of the asylum 1817-30, and afterward remained a director; was chaplain of the insane retreat at Hartford 1838-51; author of *Sixteen Discourses, The Child's Book of the Soul*, etc., and wrote valuable articles for *Annals of the Deaf and Dumb*. D. Sept. 9, 1851.

Galle (JOHANN GOTTFRIED), PH. D., b. at Pabsthaus, Ger., June 9, 1812, studied at Wittenberg and Berlin, and became astronomical assistant in the Berlin Observatory, under Encke; discovered 3 comets 1839-40, and in 1846, following the directions sent him by Leverrier, on the evening of the day when he received them, found the planet Neptune. In 1851 he became prof. of astron. at Breslau; twice received the Lalande prize; author of numerous papers and some treatises on climatology and astron.

Galle [Fr. *galee*, *galere*], a form of ship, the direct offspring of the *navis* of the ancients. The name is properly given to a class of vessels formerly much used in the Mediterranean. They were long, narrow ships, propelled partly by sails, but chiefly by oars. The oars were in one or more banks or tiers, and were often worked by convicts or by slaves. In such cases the rowers were chained to their oars. Several varieties of open boats are known as G.

Gallia, commonly anglicized as **Gaul**, the name given by the Romans to the regions inhabited by Celts in It. and what is now Fr. Celtic It. was called Cisalpine Gaul, and that part N. of the Po was called Transpadane Gaul, while what is now Fr. was Transalpine Gaul, G. Uterior, also G. Comata, or "long-haired Gaul." G. Braccata, "breached Gaul," was also called G. Narbonensis, and was a strip along the Mediterranean coast of Fr.—CISALPINE GAUL may be defined as having had the Rubicon as its E. and the Trebia as its S. W. landmark. The Rom. power gradually trenching upon Cisalpine Gaul, and it finally received a special form of govt. under the Romans.—TRANSALPINE GAUL, the G. of Cæsar, was divided in his time into Aquitania, which lay S. W. of the Garonne; G. Proper, or the region of the Celtæ or Galli, extending from the Garonne to the Saône and Marne; and G. Belgica, bounded E. by the Rhine. Julius Cæsar and his successors adopted, with much success, the policy of Romanizing Gaul, and in later times it became to some extent Germanized, and most of its distinctively Celtic traits disappeared.

Gallie Acid, discovered by Scheele, occurs in most astringent parts of plants, associated with tannic acid, as gall-nuts, sumach, divi-divi, green and black tea, sandalwood, walnuts, etc. G. A. is usually obtained by the fermentation of gall-nuts. The powdered gall-nuts are exposed to the air for a month or 6 weeks in a moist state, at a temperature of 20° to 25° C. (68° to 77° F.). By this fermentation the tannic acid of the nut-galls yields G. A. and glucose. By the action of acids or alkalis the tannic acid is decomposed in the same manner. Tannic acid is rapidly converted into G. A. by boiling in dilute sulphuric acid. The G. A. crystallizes in long silky needles or in triclinic prisms, which are inodorous and have an astringent taste. They dissolve in 100 parts of cold and in 3 parts of boiling water. The solution reddens litmus. They are very soluble in alcohol, less so in ether, and soluble in glycerine to the extent of 40 grains in a fluid ounce. Heated to 210° C. (410° F.), G. A. is converted into pyrogallie acid and carbon dioxide. If exposed to the air, the aqueous solution of G. A., especially if alkalis are present, disengages carbon dioxide and deposits a black substance. It does not precipitate gelatine, which distinguishes it from tannic acid. With ferric salts (sesquichlorides) it produces a deep bluish-black color. It is the agent most frequently employed to reduce silver in hair dyes. The most effective dyes consist of 2 fluids, to be applied successively—first, an ammoniacal solution of nitrate of silver; second, an alcoholic solution of G. A. In med., G. A. is used as an astringent, especially for internal use, as tannic acid, though more powerful, is rendered insoluble by gelatine. It is used to check hemorrhages from the chest and uterus; is used in pyrosis and for night-sweats of phthisis. For external use it is inferior to tannic acid. C. F. CHANDLER.

Gallicanism, the name generally applied to a movement within the R. Cath. Ch. in Fr. which wishes to vindicate the national position of the Fr. Ch. against the encroachments of the papal court. The question is one of const. and administration only, not of doctrines and dogmas; and the liberty which is desired is not a schism or the establishment of an independent Gallican Ch., but simply a limitation of the papal authority in favor of the episcopal.

The prin. events in this movement are: the Pragmatic Sanction of 1269, the Declaration of the clergy of Fr. of 1682, and the Concordat of 1813.

Gallienus (PUBLIUS LICINIUS VALERIANUS EGNATIUS), son of Valerian, was raised to the purple by his father in 253, and in 260 became sole emp. His reign was greatly disturbed by the invasions of Gers., Franks, Goths, Sarmatians, Pers., and others; a dire pestilence decimated the people, and the so called thirty tyrants created anarchy throughout the empire. He was killed by his own soldiers at the siege of Milan, 268 A. D.

Gallinæ, Gallinæ, or Raso'res, an order of carinate birds, with short, obtuse, and vaulted bill, feathered or broadly scutellated; short tarsus, toes webbed at base, concave and short wings, usually elevated hallux, and very deeply notched sternum. It includes the common fowl, pheasant, turkey, guinea-hen, etc.

Gall-Insects are insects which live within abnormal growths or excrescences produced on different parts of plants, either by the action of the indweller or by that of its parent; the animal in the one case being the arch. of its own dwelling; in the other, born within its already constructed abode. Many different families of insects are represented by gall-producers, and they occur in all the orders except the 2 lowest, the Straight-wing insects (Orthoptera) and the Nerve-wing insects (Neuroptera).

Order Hymenoptera, or Clear-wing Flies.—By far the greater number of G.-I. belong to this order and to the family Cynipidæ. It comprises 2 sub-families, the Cynipidæ Pseudæ, or true gall-makers, and the Cynipidæ Inquilinæ, or guest gall-flies. The typical genus, *Cynips*, has a curved ovipositor, hidden within a valve in repose. With this the female pierces the plant-tissues, and therein consigns an egg, together with a small quantity of a peculiar poisonous fluid. Under the influence of this fluid the gall rapidly develops, and is generally fully formed before the egg hatches. One of the most interesting biological features of these gall-flies is the fact that 2 entirely different galls, produced on the same tree at different seasons of the yr., may be made by insects specifically related. Thus, there is a large woolly gall, the deformation of a bud, which grows on our black oaks in spring, and which produces in summer a common gall-fly which is bisexual. The female oviposits between the acorn and cupule of the previous yr.'s setting, and the result is a pip-like gall imbedded in that position, and generally about half exposed. These fall with the acorn, and the second spring succeeding give forth flies which are all females, and which produce the woolly galls of spring.

The next most extensive family of gall-making insects in this order is that of the Saw-flies (Tenthredinidæ). These flies are generally of larger size than the true gall-flies, and only comparatively few of the species of a few genera in the family possess the gall-making habit. The females are characterized by having a saw-like ovipositor, by the aid of which they insert their eggs in the tissues of plants, mostly of the willow family. These eggs are also accompanied by a peculiar poison, which causes the gall to fully form, in most cases, before the young larva hatches. The larvæ—called "false caterpillars"—are at once distinguished from those of other gall-making insects by the large head, but more especially by having 20 legs (6 true and 14 false).

Order Diptera, or Two-winged Flies.—The gall-making insects of this order belong to 2 families—the Cecidomyiidae and the Trypetidae. The first contains the larger number of gall-making species, known as gall-gnats or gall-midges. They are all of small size and obscure color, and look not unlike small mosquitoes. Many of the species so closely resemble each other that they are more easily distinguished by the galls they produce than by any characters which the mature flies present. The female has a telescopic ovipositor, with which she is enabled to thrust her eggs into the soft parts of plants. The egg is very small and accompanied by some secretion which causes the gall to form before the larva hatches. These larvæ are legless and easily distinguished from the larvæ of the true gall-flies, by being more elongate, by being of an orange color, by having a very small pointed head, and by a very characteristic horny process called the "breast-bone," the tips of which are armed with sharp points, which serve to lacerate the walls of the gall, and thus assist in making a passage-way for the future exit of the perfect insect. The gall-gnat larvæ either quit their galls and enter the ground to transform, or remain in them and spin a very delicate cocoon, like gold-beaters' skin, for the same purpose. In either case, the pupa, which usually is furnished with a pair of little horns on the head, works its way to the surface, in order that the perfect gnat may escape; whereas in the other two gall-making families we have considered the flies perfect within their respective galls, and either eat their own way out or pass through a passage-way partly prepared by the larva.

The second family of Diptera containing gall-makers is the Trypetidae. These flies have the form and size of the house-fly, but are more colored, the wings being transparent and marked with various shaped cloudings. The larva is white, and contracts when full grown to a brownish pupa within the gall. The fly escapes by continued fretting and moistening of a small space in its prison-wall, the face being temporarily very much swollen for this purpose, and the gall-substance having generally become soft by exposure to the weather. The female has a boring ovipositor, for forcing her eggs into tips of herbaceous plants.

Order Hemiptera, or Bugs.—The Amer. gall-making insects of this order, so far as known, belong solely to the Homopterous division, or Whole-wing bugs, and are confined to 2 families, the Plant-lice (Aphidæ) and Flea-lice (Psyllidæ). With the insects of all the orders so far considered, the gall is produced by the action of an irritating poisonous secretion inserted into the plant-tissue by the parent. With those now under consideration the gall is also formed under the influence of a poisonous irritation, but this irritation is con-

veyed by the newly hatched insect, principally by the insertion of its proboscis, very much as the common bed-bug causes irritation and swelling of human flesh by the insertion of its beak. In the plant-lice the original arch. of the gall breeds and dies within it, but her numerous young either issue as soon as born and found new galls, or else remain with their parent till full grown, when they also issue from their gall and scatter. In either case the gall gapes or cracks open to allow their exit. To this order belongs *Peniphys castatrix* Planchon, the notorious grape-vine Phylloxera, which makes wrinkled galls on the under side of the leaves of some vines. The mother-louse fills her gall with eggs, and the young hatching escape and found new galls, and become parthenogenetic mothers; this virginal reproduction continuing for several generations, until, with the fall of the leaf, the last generation creeps on to the roots. The Flea-lice form galls of various shapes and sizes on the leaves of hackberry (*Celtis*). In life-habits they differ from all the other G.-I., and agree with their nearest relatives, the plant-lice, only in being the archs. of their own galls. The egg, glued in spring to tender leaf, soon hatches, and under the irritation caused by the young *Psylla* the gall soon imbeds it. Within this gall the insect dwells till it has acquired the pupa state, which is generally by the time the leaves begin to turn and drop. Then, by means of certain horny spines at the end of its body this pupa works its way out of its prison, and once out soon gives forth the perfect fly. The galls made by these flea-lice are usually quite hard and woody, and generally one-celled.

Order Coleoptera, or Beetles.—The gall-making insects of this order in the U. S. belong to 2 families, the Snout-beetles and the Buprestids. In each family the habit is confined to a single genus; though, if we consider the gall-making beetles of other countries, the genera might be multiplied, especially in the gall-weevils. The insects issue by a passage-way partly prepared beforehand by the larva.

Order Lepidoptera, or Scaly-wing Insects.—The gall-making habit obtains in but few of the insects of this order, and these are confined to the Heterocerous division, or Moths, and almost entirely to a few genera in Tineidæ family. They issue from the gall through a neatly contrived doorway.

Acarina, or Gall-Mites.—These minute animals are not true insects, but belong to the class of Arachnida (spiders, etc.), which are distinguished from true insects by having 8 instead of 6 true legs. The more perfect galls produced by mites are pocket-shaped, and the mites which produce them belong mostly to the genus *Phytolus*, which contains species of elongate form and possessing but 6 legs, in which respect they depart from the normal character of their class, and approach more nearly the true insects. [From orig. art. in *J. S. Univ. Zool.*, by C. V. RILEY, M. D., Ph. D.]

Gallinule, a name applied to several birds of the genera Gallinula, Porphyrio, and others of the sub-family Gallinulæ of the family Rallidæ.

Gallipoli (Gr. ΚΑΛΛΙΠΟΛΙΣ), city of European Tur., in the prov. of Roumili, at the N. E. end of the Dardanelles, and about 110 m. W. S. W. of Constantinople. It is miserably built, but has 2 good harbors, large manufactures of earthenware and morocco leather, and has a very extensive trade. G. was the first European town that fell into the hands of the Turks in 1357, nearly a century before the fall of Constantinople. It is the key to Constantinople and the Black Sea, and was occupied by the allied armies of Eng. and Fr. in 1854. It has a Gr. bp. Its bazaars are frequented by all nations. Its pop., which in 1810 was 15,000, and in 1815 was 80,000, is now about 25,000. R. D. HITCHCOCK.

Gallipolis, gal-le-po-leece', city and R. R. junction, cap. of Gallia co., O., on the O. River, about equidistant from Pittsburgh and Cin., with which cities it has regular packet-line connections. It is above the highest water-mark, and has an acad. Pop. 1870, 3711; 1880, 4400.

Gallisonnière, gah-le-so-ne-air', de la (AUGUSTIN FÉLIX ELISABETH BARRIN), COUNT, b. at Anjou, Fr., 1742; served under his uncle, the gov.-gen. de la Gallisonnière, in the marine service in Canada; entered the army, and was made *maréchal de camp* 1788, and grand-seneschal of the sword for Anjou 1789, by virtue of which office he was pres. of the nobles in the states-gen. in that yr. He was chosen to preside over the assembled Three Estates at the beginning of the Revolution; became an *émigré* and fought against the revolutionists, but in 1801 returned, and was in public life under Nap. When the Bourbons returned he was made lieut.-gen., but retired from public life in 1815. D. Mar. 2, 1828.

Gallisonnière, de la (ROLAND MICHEL BARRIN), MARQUIS, b. at Rochefort, Fr., Nov. 11, 1693; entered the Fr. navy 1710; while having the rank of a capt. was (1745-49) gov.-gen. of Canada. His administration was marked by troubles with the Eng. in N. S. and the O. Valley. He next was chief of the bureau of maps and charts. In 1756 he defeated Byng off Minorca (for which defeat Byng was afterward executed). D. Oct. 26, 1756.

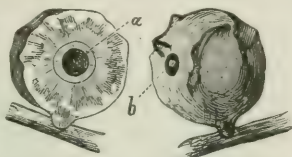
Gallitzin, a Rus. princely house whose origin is Lithuanian. The name comes from *Golitz* ("leather gauntlet"), a surname of one of the ancestors of the family, distinguished as the wearer of gloves of this kind. Ivan the Terrible in the 16th century made one of the family a boyar, and since that time there have been many diplomatists, gens., and politicians among the princes of this house.—PRINCE DMITRI (1735-1803), father of the missionary Gallitzin, was a diplomatist and author of several scientific works.—His wife, AMALIE VON SCHMETTAU (1748-1806), abandoned the society of her infidel husband, became a R. Cath., and was distinguished for piety and literary talents.—PRINCE EMMANUEL (1804-53) wrote upon science and literary subjects, and was an amateur musical composer and oil-painter.

Gallitzin (DEMETRIUS AUGUSTINE), PRINCE, son of Prince Dmitri Gallitzin and of the Princess Amalie von Schmettau, b. at The Hague Dec. 22, 1770. In 1787 he followed his mother's example and became a R. Cath. He was an officer

of the Rus. guard, and served for a time as a staff officer in the Aus. force in Brabant; in 1792 came to Amer., became a Sulpician, studied theol. at Baltimore, and in 1795 took priest's orders. He officiated at Conewango, Pa., and other places in the Middle Atlantic States. In 1798 he founded the R. Cath. town of Loretto, Pa. He was called "Father Smith," and labored with zeal and self-denial. In 1809 he resumed his original name. Wrote *Defence of Catholic Principles*, *Appeal to the Prot. Public*, and other works. D. May 6, 1840.

Gallitzin (ELIZABETH), a cousin of the preceding, b. 1796; became a R. Cath., and at Rome joined the Society of the Sacred Heart. In 1840 she came to the U. S.; founded a school of the Sacred Heart in New York, an inst. at McSherrystown, Pa., and a mission and convent, now at St. Mary's, Kan. D. Dec. 8, 1843.

Gall-Nuts are hard, spherical swellings, of an olive-gray, wrinkled exterior and yellowish-brown interior, formed by *Cynips Gallæ-tinctorie* (Geoff.) on the twigs of a species of oak, common throughout Syria and Asia Minor. They are collected by the poor, and exported from Smyrna, Aleppo, and other parts of the Levant, as well as from the E. I., to all portions of the civilized world, and used for dyeing purposes and in the manufacture of writing-inks. [From orig. art. in *J.'s Univ. Cyc.*, by C. V. RILEY, M. D., Ph. D.]



Gall-nuts: a, section, showing central chamber; b, hole from which the fly has issued.

Gallon [Fr. *galon*, a "grocer's box"], the standard unit of liquid capacity in the U. S. and of liquid and dry capacity in G. Brit. The capacity of the G. has been very variable. The hist. of its changes may be found by consulting *J.'s Univ. Cyc.* under this title. By act of Parl. of G. Brit. of the 5th Anne (1706), its capacity was fixed at 231 cubic inches, and so continued until 1826, at which time it was defined by law to be a vessel capable of containing 10 lbs. or 70,000 grains of distilled water at the temperature of 62° F. Thus determined, the capacity of the Brit. or so called imperial G. is $277\frac{7}{8}$ / 1000 cubic inches.

In the U. S. no system of weights and measures has been established by act of Cong. Our G., bushel, foot, yard, lb., avoirdupois, and lb. troy have been inherited from G. Brit. For purposes of coinage only, the lb. troy at the Mint in Phila., copied from the Brit. standard lb. troy, has been made also the standard here. The control over the subject which is now practically exercised by the sec. of the treas. was originally assumed by Mr. Sec. McLane in 1832 as being the legitimate prerogative of that dept. A resolution of the Senate of the U. S. of May 1, 1830, having ordered an examination to be made of the weights and measures in use in the several custom-houses, and these having been reported to be discordant, and some of them largely so, Mr. McLane, in communicating this result to the pres. of the Senate, added, "It is believed, however, that this dept. has full authority to correct the evil by causing uniform and accurate weights and measures and authentic standards to be supplied to all the custom-houses." Mr. McLane accordingly proceeded to construct such standards, the superintendency of the construction being committed to Mr. F. R. Hassler, chief of the Coast Survey, by whom the previous examination and report had been made. This report, dated Jan. 27, 1832, stated the "legal capacity" of the G. to be 231 cubic inches, and that of the bushel—the Winchester bushel being assumed to be legal—2150.42 cubic inches; but he placed the temperature of comparison at 59.83° F. (meaning the temperature of maximum density of water, which is more nearly 39.1° F.), and proposed (as he afterward practised) the adjustment of these measures by making the G. to contain $58.372\frac{1}{2}$ / 1000 grains of distilled water of this density, and the bushel $54.391\frac{1}{2}$ / 100 grains. The Brit. standard temperature of comparison being 62° F., it follows that the so-called Winchester bushel of the U. S. and the Winchester bushel of G. Brit., when compared at any common temperature, differ in capacity by more than a cubic inch and a half, the first mentioned being the larger. Cong. has since given a legal sanction to the proceedings of the treas. dept. above described, by the passage of a joint resolution (approved June 14, 1836) directing that a complete set of all the weights and measures adopted as standards be delivered to the gov. of each State of the U. S. In 1829 an act was passed by the legislature of the State of N. Y. to regulate measures of capacity, by which the G. was made a measure capable of containing 8 lbs. of distilled water at maximum density, or $221\frac{1}{2}$ / 1000 cubic inches, being neither in simple relation (as it seems to be) with the imperial G., nor in harmony with the G. of 231 cubic inches in common use. In the revision of the statutes in 1851 this act was repealed, and the measures fixed as above described by the treas. dept. of the U. S. were adopted as standards in this State. F. A. P. BARNARD.

Gallotannic Acid. See TANNIC ACID.

Galls are abnormal excrescences produced on living plants by insects or mites, which develop therein. These deformations are found on all parts of plants, and present a great variety of form, color, and texture. Many of them resemble familiar fruits, flowers, and vegetables, while a few, like fruits, are eaten by man. G. are, in every case, the result of the combined action of an animal and vegetable organism, and would necessarily cease to exist if either of the organisms which jointly co-operate to produce them were swept out of existence. G. are technically separated into 2 groups—the "monothalamous," or one-celled G., each nourishing a single individual; and the "polythalamous," or many-celled, nourishing many individuals under a common envelope. [From orig. art. in *J.'s Univ. Cyc.*, by C. V. RILEY, M. D., Ph. D.]

Gall Stones, concretions of inspissated bile and biliary salts. Black or "pepper-corn" G. S. often accumulate in great numbers within the liver in the ramifications of the biliary duct. G. S. of larger size, single or many, form in the gall-bladder. They consist of accretions in concentric layers of cholesterine and biliary salts; if single, they are round or oval; if numerous, they are polygonal, with faces or facets where they are in contact with other stones. The escape of G. S. into the intestine causes the painful attack of biliary colic. The solution and removal of G. S. as well as their prevention is favored by use of bicarbonate of soda, chlorate of soda, and cathartics.

Gall'up (JOSEPH ADAM), M. D., b. at Stonington, Conn., Mar. 30, 1769, took his med. degree at Dartmouth 1798; practised in Vt.; was pres. and prof. in the med. school at Castleton 1820-23, lecturer in the State Univ., and one of the founders and first profs. in the med. school at Woodstock. Author of *On the Institutes of Med.* D. Oct. 12, 1849.

Galluppi (PASQUALE), b. at Tropea, in Calabria, in 1770. In 1831 he was appointed prof. of logic and metaphysics in the Univ. of Naples. Being elected a member of the Inst. of Fr., he wrote for it 2 memoirs—one on transcendental idealism and absolute rationalism, the other on the theodicy of the anc. philos. Wrote *Elements of Philos. for the Use of the Young* and other philosophical works. D. 1846.

Gall'us (C. CORNELIUS), the friend of Virgil, distinguished as a poet and soldier, was b. at Forum Julii, b. c. 66. He commanded a division of the army against Antony at the battle of Actium, and soon after was sent to Egypt, of which he was made gov. after its reduction to a Rom. prov. He was removed from this position and condemned to exile with loss of his estates, upon which he put an end to his life (b. c. 26). G. composed 4 books of elegies, and translated into Lat. the poems of Euphorion of Chalcis. All his writings have perished, though certain epigrams in the Lat. *Anthology* pass under his name.

Galt, gawlt (SIR ALEXANDER TILLOCH), K. C. M. G., son of John Galt, b. at Chelsea, Eng., Sept. 6, 1817; entered the service of the Brit. and Amer. Land Co. 1839; was its manager 1844-56; went into the Canadian Parl. 1849; finance minister 1858-62, 1864-66; was a principal founder of the R. R. system of Canada; received his title in 1869.

Galt (JOHN), b. in Irvine, Scot., May 2, 1779; was employed for a time in mercantile pursuits; studied law, and spent 3 yrs. in travelling in the Levant and S. Europe, and after his return to Lond. assisted in the management of the *Star*, a newspaper. He produced a large number of dramas, novels, and other writings, among which are *Laurie Todd* and an *Autobiography*. From 1826 to 1829 he was in Canada, where he acted as agent for the Canada Co., and founded the town of Guelph. D. Apr. 11, 1839.

Galu'sha (JONAS), a Revolutionary soldier, b. about 1751, was a judge of the Vt. supreme court 1795-97 and 1800-06, gov. of Vt. 1809-13 and 1815-20. D. Oct. 8, 1834.

Gal'va, city and R. R. junc., Henry co., Ill., 141 m. W. by S. from Chicago and 45 m. from Rock Island, on one of the highest points of the dividing ridge between the Miss. and Ill. river-basins. Pop. 1870, 2160; 1880, 2148.

Galvani, gahl-vah'nee (ALVINSIO or LUIGI), b. at Bologna Sept. 9, 1737, grad. M. D. at Bologna 1762; became a lecturer upon anat.; made important observations upon osteology and the kidneys and ear of birds, and in 1786 was led to the discovery of electric currents by the accidental contact of the dissected legs of a frog with a scapel, which provoked muscular contractions. D. Dec. 4, 1798.

Galvanism. The early investigator, Luigi Galvani, concerned himself only with that dept. of it known as "animal electricity." His theory was opposed by Volta, who maintained that the contact of dissimilar substances was the source of the energy displayed in this class of actions. What we call the chemical theory of dynamic electricity was first enunciated by Fabroni in 1792. This theory was elucidated and extended by many others, among whom we may notice especially Davy and Faraday. [From orig. art. in *J.'s Univ. Cyc.*, by PRES. HENRY MORTON, Ph. D.]

Galvanized Iron (an incorrect name) is iron coated with zinc by dipping it into a bath of melted amalgam of zinc and mercury, containing a little sodium. Before galvanizing it is usually dusted with sal-ammoniac powder. It is a very useful treatment for iron roofs, telegraph wire, ships' bolts, etc. The name galvanized iron might properly be given to sheet iron coated with tin by an electro-plating process.

Galvanometer, an instrument for measuring dynamic electricity, is of various forms. (See ELECTRICITY.)

Galvanoplasty (syn. *Electrometallurgy*), the art of working in metals by the aid of electricity. The metals most readily separated from their solutions by electricity, and most useful when deposited, are copper, silver, gold, and nickel. The process is resorted to (1) for reproducing seals, coins, medallions, wood-cuts, engravings in metal, busts, bas-reliefs, etc.; (2) for coating base metals with silver, gold, nickel, or platinum; (3) for etching copper-plates for the engraver. (See ELECTROTYPE, GILDING, NICKEL PLATING, PHOTOGRAPHY, and SILVER PLATING.)

Galveston, an important R. R. and commercial centre and city, cap. of Galveston co., Tex., the prin. seaport of the State, on Galveston Island, between Galveston Bay and the Gulf of Mex. It is connected by R. Rs. with all parts of the State to which R. Rs. extend, and by regular lines of steamships with Liverpool, New York, New Orleans, and the ports of W. Tex. and Vera Cruz, etc., Mex. Sail-vessels engage largely in direct trade with G. Brit. and the continent of Europe, in the coffee-trade with Rio Janeiro, in the W. I. and Mex. trade, also in that with N. U. S. ports. There are 2 libraries, a R. Cath. univ., a med. school, and an orphanage. Oranges and other tropical fruits grow in the open air, and vegetable gardens flourish all the yr. Pop. 1870, 13,818; 1880, 22,248; 1885, about 35,000.

Gal'vez, de (BERNARDO), COUNT, b. at Malaga, Sp., 1756, was the son of the viceroy of Mex. In 1776 became col. of

the La. regiment, and was gov. of La. 1777-83. He captured Baton Rouge, Pass Manchac, Natchez, Mobile, and Pensacola from the Brit., and was made lieut.-gen., count, and capt.-gen. of La. and Fla. In 1784 he became capt.-gen. of Cuba, and in the same yr. succeeded his father as viceroy of Mex. Built palace of Chapultepec. D. Nov. 30, 1786.

Gal'way, town of Ire., on Galway Bay, at the mouth of the Corrib. It is the terminus of the Midland Great Western R. R., is the seat of one of the queen's colls. for Ire., and has a R. Cath. bp. Pop. 13,184.

Gama (or Grama) Grass [said to be from *Gama*, one of the Maldive Islands, or from M. Gama, who first cultivated it], the *Tripsacum dactyloides*, a large grass of N. and tropical Amer. The name is given in the Far W. to various species of buffalo-grass (chiefly *Bouteloua*), which furnish good pasturage for stock.

Gama, da (Vasco), b. at Sines, Port., about 1460; was a mariner and a gentleman of the king's household, and in 1497 was despatched in command of the royal squadron to the E. I. by way of the Cape of Good Hope, lately discovered by Diaz. G. coasted the E. shores of Afr., visited India, returning to Lisbon in 1499; made his second voyage in 1502-03. In 1524 he was sent out as viceroy. D. Dec. 24, 1524.

Gama'iel the ELDER, a famous Jewish doctor and Pharisee, instructor of St. Paul. D. about 50 A. D.—**GAMALIEL** the YOUNGER, grandson of the above (b. 50, d. 116), was also a famous rabbi, and strove to blend Platonism with Judaism.

Gambetta (Léon), b. at Cahors of Genoese parents, Oct. 30, 1838; was an obscure lawyer until 1868, when he pleaded in a political case which made him known to the masses. In 1869 he was elected deputy to the Corps Législatif as rep. of radicalism. On Sept. 4, 1870, G. became a member of the revolutionary govt. During the siege of Paris he left the city, and vainly attempted, from Tours, and afterward from Bordeaux, to arrest the Ger. invasion. In 1871 he was returned member to the Versailles National Assembly, abandoned the cause of the Commune, and supported M. Thiers, after whose fall G. tried to become again leader of the Left of the Assembly. Pres. of Chamber of Deputies, 1879, prime minister Nov. 1881-Jan. 1882. D. Dec. 31, 1882.

Gambia, a deep and powerful river which traverses the region of W. Afr. known as Senegambia. It falls into the Atlantic at Bathurst, in lat. 13° 28' N., lon. 16° 35' W.

Gambier (James) Baron, G. C. B., b. in the Bahamas of Huguenot stock, Oct. 13, 1756; entered the Brit. navy; served with distinction against the Amer. revolutionists and the Fr.; rear-admiral 1795, vice-admiral 1799, admiral 1805; bombarded Copenhagen, and was made a baron 1807; was one of the coms. who drew up the Treaty of Ghent 1814. D. Apr. 19, 1833.

Gambir, or **Gamb'er** (*Terra Japonica*), a variety of catechu. It is the solid astringent extract obtained by infusing the leaves and shoots of the *Naucleria (Uncaria) G.* in warm water, and evaporating the solution to dryness. The best G. is made at Riouw, in the Isle of Brittany, in the E. Archipelago. It is principally exported from Singapore, in brown masses covered with matting. Its peculiar properties, which make it useful in tanning leather, are due to tannic acid, which is called catechu-tannic acid, as it differs from gallo-tannic acid in giving a grayish-green precipitate with ferric salts, while the latter gives a bluish-black precipitate, and in giving no precipitate with tartar emetic. (See TANNIC ACID.)

Gambling-Houses. The most degrading form which the vice of gambling has assumed is that by which houses are dedicated to it. In Fr. from the days of St. Louis to Louis XIV., gambling was steadily progressing, and in Paris gaming-houses were first licensed 1775. In 1838, by the motion of J. B. Delessert, all G.-H. were closed. The great G.-H. of Ger., now suppressed, were at Baden, Homburg, and Wiesbaden, to which may be added Spa and Aix-la-Chapelle. These towns combined every attraction, and to the mineral springs which first made them places of resort were added walks, drives, gardens, balls, reading-rooms, and public music. In 1872 all these moral pest-houses were put an end to. At present that at Monaco is the only one left, and there may be still beheld the spectacle of a prince so degraded as to live by vice. In all countries a decline in public honesty has been in exact ratio to the spread of gambling. In such places cheating becomes a science, and the houses colleges of deceit; loaded dice have been dug up in Pompeii, and the Egyptians knew how to throw a sure six. But it is in the great G.-H. of modern times that a thousand means of systematically plundering the public have been deliberately invented and practised. [From orig. art. in *J.'s Univ. Cyc.*, by C. G. LELAND, Lond.]

Gamboge, or **Camboge**, the dried juice from the trunk of a tree growing in Cambodia and Siam, lately determined to be the *Garcinia morella*, variety *pedicellata*, order Clusiaceae. G. is a brittle, resinous substance, odorless, but of acrid taste, orange-yellow in mass, and a splendid pure yellow in powder. It consists essentially of a gum and resin, without volatile oil.

Game-Laws, laws regulating the killing and taking of game. In the U. S. the right to kill game is enjoyed equally by all citizens, and the only common-law restriction against its exercise arises from the necessity of avoiding the commission of a trespass upon the lands of other persons. But statutory provisions have been adopted in a large number of the States prohibiting the act of taking certain valuable kinds of game except at certain seasons of the yr.

Games, Ancient. See GRECIAN GAMES.

Gam'ing, in law. Gaming consists in the playing of games of hazard for money or some article of pecuniary value. At common law this was not recognized as a criminal offence, and was only made punishable when it had been employed as a means for the commission of fraud. Thus, cheating by the use of false dice or deceptive cards subjected the defrauder to indictment. Public gaming-

houses also were deemed common nuisances, and might be suppressed. But in all cases where the persons engaging in G. were the victims of no imposition, and the play was fairly conducted, not only was the act not deemed to deserve legal punishment, but the courts would lend their aid to enable the winner of money to recover it from the loser. But in modern times statutes have been enacted both in Eng. and in the several States of the U., making the practice unlawful and imposing penalties upon those engaging in it, or providing means for its repression. Thus, in New York all wagers or bets upon any G. or upon any uncertain event are pronounced unlawful, and all contracts for the payment of money when the question of chance is determined are void. In Mass. obtaining money by gambling is declared larceny.

GEORGE CHASE.

Gam'ing-Houses, houses kept for the purpose of enticing people to gamble for money or other articles of value. At common law these may be suppressed as public nuisances, on account of their tendency to produce public disorder by the assembling of many persons, or to promote cheating and other corrupt practices. It is necessary in order to sustain an indictment that the house be used commonly for gaming purposes. Such a use upon a single occasion would not be sufficient. In a number of the States statutes have been passed regulating or prohibiting the keeping of G.-H.

Gam'mell (William), LL.D., a teacher and author, b. in Medfield, Mass., Feb. 10, 1812, grad. at Brown Univ. 1831; afterward prof. till 1864. Wrote a *Life of Roger Williams*, a *Hist. of Amer. Bap. Missions*, etc.

Gan'do, a kingdom of Upper Soudan, W. Afr., on both sides of the Niger, inhabited by a people of the Foola race. In connection with Sokota it seems destined to be the centre of Mohammedan civilization in W. and Middle Afr. It has a cap. of the same name, and suffers much from a bad administration.

Ganges (Gr. Γάγγης; Hindoo, *Gangá*), the prin. river of Hindostan. Its entire length is about 1500 m.; its gen. direction, first S. E. and then E. It begins its upper course, under the name of Bhagirathi, at an elevation of 13,800 ft., in the Himalaya Mts., where it issues from under an immense bed of snow, between 3 peaks from the height of 13,800 to 22,000 ft.; rushes out from the Himalayas in wild torrents; joins the Alakananda, receives the name of Ganges, and, having descended more than 12,000 ft. during a course of 160 m., enters, at Hurdwar, the plain of Hindostan, and begins its middle course. From Hurdwar to Seebung, where the lower course of the G. begins, the distance is nearly 1100 m. At Hurdwar the G. becomes navigable. Below Allahabad it receives several large affluents, and passing by Benares, Patna, Bahar, and Moorsheadabad on its way to Calcutta, it forms a highway of communication through one of the most fertile and most thickly peopled regions on the earth. The delta of the G. begins at a distance of 200 m. from the sea, and forms a perfect wilderness of creeks and rivers, all of which are subject to tidal influences. The N. arms unite with the waters of the Brahmapootra; the southernmost, the Hoogly, opens the widest and deepest passage to the Bay of Bengal. Like all other deltas, it was formed by the mud which the river carries along with it, whose annual average has been computed at 534,000,000 tons. This large tract of low, alluvial land is yearly inundated from the beginning of May to the beginning of Nov. In the middle of Aug. only the houses built on mounds and the tops of the trees are seen; the whole landscape is one sheet of water. In Nov., when the waters have subsided, acres of land have been carried away, and in other places acres of land have been formed. The river is worshipped by the natives as the goddess "Ganga," and the whole Hindoo mythology is interwoven with symbols and pictures referring to it.

Gan'gion (Gr. γάγγιον). In gen. terms, a G. is an accumulation of gray nervous matter or cineritious substance. More exactly, a G. consists of nerve-cells and nerve-fibres mingled in various proportions and bearing relations to one another, of blood-vessels, and of a frame work of connective tissue. The term (plu. *ganglia*) is also applied to parts of the gray matter of the brain and spinal cord, having more or less definite shapes and boundaries, and being the seat of certain functions. A G. may be of any shape, and may be of microscopic size or as large as a finger-nail. The exact functions of ganglia are not well known. In gen. terms, they may be the standing-point of motor impulses and the reception-point of sensory impressions. Many reflex actions are wholly under the control of ganglia. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. E. C. SEGIN, M. D.]

Gan'gionic Nervous System is an appendage of the cerebro-spinal system, existing in a rudimentary condition in nearly all Vertebrata, and attaining its most complete development in man. It consists of ganglia placed in front of the vertebral column from the base of the skull to the coccyx, or lowest bone of the spine. These ganglia are united by vertical nervous cords, which form the chains of the sympathetic. This single ganglion is the point of union of the 2 chains. From these ganglia nerves proceed in 2 directions: (1) to the spinal nerves and thence to the spinal cord; and (2) to various organs and to other ganglia near the important organs. They are nearly all symmetrically placed on either side of the median line, and together with intricate networks of nerve-fibres coming to and going from them, constitute what are called plexuses. Some of the nerves connecting the vertebral chain of ganglia with the visceral ganglia are designated by special names. All these are visible to the naked eye, but there are innumerable microscopic ganglia in the sympathetic.

The functions of the G. N. S. are motor, sensory, and nutritive, and are only imperfectly known. (1) The following are the chief movements which are controlled by the sympathetic: In the head, certain movements of the iris, of muscles of the internal ear, of muscles of the soft palate; in the chest, the cardiac contractions by the cervical ganglia

and cardiac plexuses; in the abdomen, the peristaltic movements of the stomach and intestines, the evacuative movements of the bladder and uterus. The most striking peculiarity of this motor energy is that it is wholly withdrawn from the influence of volition. Motor energy is also shown in the range of the G. N. S. in the movements of blood-vessels. The anatomical basis of this function lies in this, that blood-vessels possess a muscular coat, and receive numerous filaments from sympathetic ganglia. Experiment shows that if the ganglia or nerves supplying blood-vessels be removed or severed, the vessels relax and remain dilated; while if these nervous elements be irritated (as by electricity), the vessels diminish in size by contraction of their muscular coats. This law, that the G. N. S. controls vascular contractility, was enunciated by Brown-Séquard. It has since been shown that this function of the sympathetic nervous system is in great part borrowed from the spinal cord, the chief vaso-motor centre for the body being in the medulla oblongata.

The intimate connection between the 2 systems is shown in many normal and pathological actions. Phys. and psychic pain may arrest the heart's action; certain emotions cause palpitation; others may cause intermittent cardiac contractions. The peristaltic movements of the stomach are produced by reflex actions, taking place chiefly within the circuit of the great sympathetic; yet active mental exertion or an emotion may arrest these actions, producing acute indigestion; and, *vice versa*, an intense irritation of the stomach may cause headache, vertigo, mental depression. An emotion may produce jaundice. The various intestinal functions are done by the agency of ganglia and nerves of the abdominal sympathetic; but we find that worms or undigested food may set up convulsions in infants or melancholia in the adult; and the action of cold upon the skin of the body is a well known cause of diarrhoea. Turning now to purely local vascular movements, it is a matter of common observation that we blush or turn pale in consequence of unexpressed mental states.

The above facts justify the following generalizations: (1) That while many local movements and secretions are under the immediate control of ganglia of the sympathetic system, the relations existing between this and the cerebrospinal are most intimate, and that actions of a reflex order are constantly taking place, involving the activity of both systems. (2) The sensations arising in the G. N. S. are usually vague and dull; in perfect health there are no visceral sensations. When excessively excited, however, the ganglia and nerves of this system are capable of evolving most intense pain (colic, passage of calculi, angina pectoris). (3) As regards the relations of the G. N. S. to nutrition, properly speaking, we know little or nothing. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. E. C. SEGUIN, M. D.]

Gangrene [Gr. γάγγραινα], the death, or partial death, of an organ or any portion of the body. Debility from any cause, and especially from old age, is the great predisposing agency. Among the exciting causes may be mentioned mechanical injuries and obstruction either to the ingress of arterial blood to or egress of venous blood from a part. The immediate cause of the death of a part is always the complete cessation of the capillary circulation in it.

Gannet, a name applied to the sea-birds of the genus *Sula* (family *Sulidae*), as the common G. (*S. bassana*), called solan goose in Eng., and the booby G. (*S. leucogastra*), both occur along the Atlantic coast of the U. S.

Gannett (EZRA STILES), D. D., a Unit. clergyman, b. in Cambridge, Mass., May 4, 1801. A student at Phillips Acad., Andover, a graduate of Harvard Coll. in 1820, and of Cambridge Divinity School in 1823, he passed at once into the ministry as colleague pastor with Dr. W. E. Channing, being ordained in Federal st. ch., Boston, June 20, 1824. In that charge he remained till his death. His great activities were wholly devoted to his ministry; he was an ardent preacher, a keen theologian and controversialist, an impassioned writer and speaker on religious and ethical themes, and a consecrated pastor. He founded *The Scripture Interpreter*, edited for some yrs. *The Monthly Miscellany*, and was joint ed. with Dr. Alvan Lamson (1844-49) of *The Chr. Examiner*. As a leader of his denomination he was known in Eng. as well as at home. Its benevolent operations he had deeply at heart; and though both in theol. and politics he was conservative, his passion for righteousness was felt in almost every movement of social philanthropy that was active in his time. D. Aug. 28, 1871. O. B. FROTHINGHAM.

Ganoids. See FISH, by Prof. T. GILL, M. D., Ph. D., and FOSSIL FISHES, by Prof. J. S. NEWBERRY, M. D., LL.D.

Gansevoort, ganss'voort (PETER), b. at Albany, N. Y., July 17, 1749; appointed major 2d N. Y. regiment 1775, and accompanied the army of Montgomery in its invasion of Canada; the following yr., while in command of Ft. Stanwix, he successfully withstood a siege of nearly 3 weeks against the Brit. and Indian forces under St. Leger, by which he prevented the latter from co-operating with Burgoyne. In 1781 N. Y. made him brig.-gen., and in 1809 he was appointed in the U. S. A. with the same rank. D. July 2, 1812.

Ganymede [Γανυμήδης], in Gr. mythology, the beautiful son of Tros and Calirrhoe, stolen by Zeus, who took G. to Olympus, where he became the cup-bearer of the gods.

Gapes, a disease of fowls and other birds, caused by the presence of trematode worms (*Fasciola tracheidis*) in the windpipe. The number of worms present is sometimes so great as to choke the bird. More commonly they cause inflammation and difficulty of breathing. Similar organisms have been found in the air-passages of mammals, but are easily detected, nor is there any effective treatment.

Garanin, a preparation of madder, obtained by first exhausting the pulverized madder with water, treating it with sulphuric acid at 100° C. (212° F.), and again washing. For most purposes G. is preferred to madder; it produces more brilliant colors, requires less after-treatment, and leaves the whites clearer.

García, gar-see'a (MANUEL DE POPULO VICENTE), father of Mmes. Malibran and Viardot, b. at Seville, Sp., Jan. 22, 1775; was a fine tenor singer and an able instructor. Wrote the opera *Caliph of Bagdad*. D. June 2, 1832.—His son MANUEL, b. Mar. 17, 1805, in Madrid, attained a world-wide fame as a teacher of vocal music.

Garcilaso de la Vega, "the Spanish Petrarch," b. 1503 at Toledo; d. at Nice 1536. His poems (*Obras*, 1553) are of high excellence.

Garcilaso de la Vega, b. at Cuzco, Peru, 1530, was the son of the Sp. gov. of Cuzco by a Peruvian princess of the Inca blood; served as a soldier in Europe, but is chiefly remembered for his *Commentaries*, a valuable narrative of Peruvian hist. before and during the war of conquest. D. in Sp. about 1615.

Garda, Lago di (the anc. *Lacus Benacus*), the largest lake of N. It., stretches nearly from N. to S. on the boundary between the Lombardian and Venetian terrs. It is 33 m. long, 10 m. broad, receives several small streams, and sends its waters through the Mincio to the Po.

Garden (ALEXANDER), M. D., F. R. S., b. in 1728 in Scot., grad. at Aberdeen in 1748; was a student under Dr. John Gregory; settled in 1752 at Charleston, S. C. He was an able botanist and zoologist, and in 1773 was chosen to the Royal Society. In 1783 he went to Eng., being a loyalist, and his property was confiscated, but afterward given to his son. He became v.-p. of Royal Society. Linnæus named the genus *Gardenia* in his honor. D. Apr. 15, 1791.

Garden (MAJOR ALEXANDER), b. at Charleston, S. C., Dec. 4, 1757, ed. at Westminster and the Univ. of Glasgow; returned to S. C. in 1780, and joined the Revolutionary army. The confiscated property of his father, who was a loyalist and had gone to Eng., was given him after the war. Wrote *Anecdotes of the Revolutionary War*. D. Feb. 29, 1829.

Gardenia [named in honor of Dr. Alexander Garden of Edinburgh and Charleston, S. C. (1728-91)], a genus of plants of the order Rubiaceæ, including some of the most beautiful and fragrant shrubs and trees known. Among them, the *G. grandiflora* and other species of Chl. yield a valuable yellow dye, and the *G. campanulata* is used in med. Some species are called Cape jasmine, and came originally from E. Asia and S. Afr. Excellent timber and resins are produced by various species.

Gardiner, city, Kennebec co., Me., on R. R. and the Kennebec River, 41 m. from its mouth, and opposite Pittston. It is divided by the Cobossee River, which here empties into the Kennebec, forming in its passage through the city a very valuable water-power. The Cobossee is spanned by 8 dams within 1 m. from its mouth, with a total fall of 133 ft. above low tide. It is the head-quarters of the ice business on the Kennebec, which is one of the greatest industries of the city. Pop. 1870, 4497; 1880, 4439.

Gardiner (JOHN), son of Dr. Sylvester Gardiner (1707-86), b. at Boston, Mass., 1731; studied law in the Inner Temple, and was called to the bar in Eng., and practised in Lond. and in Wales; became in 1766 atty.-gen. of St. Kitt's, W. I.; removed after the Revolution to Boston, Mass., and in 1786 to Pownalboro', Me. (then Mass.); was in the Mass. legislature 1789-93; procured the abolition of the laws of primogeniture in Mass., the prohibition of special pleading, and the repeal of the anti-theatrical laws. He was one of the leaders of the original Unit. movement in Boston 1787. Was drowned off Cape Ann Oct. 15, 1793. He was a man of great learning, wit, and eloquence, and a zealous republican.

Gardiner (STEPHEN), D. D., LL.D., b. at Bury St. Edmunds, Eng., 1483, ed. at Cambridge; became Wolsey's sec., and in 1528 was sent by Henry VIII. to Rome to further his application for divorce; became sec. of state 1529, bp. of Winchester 1531, chancellor of Cambridge Univ. 1540; opposed, as far as he dared, the Ref.; came into great power on Cromwell's fall; married the king to Catharine Parr 1543; was imprisoned during Edward VI.'s reign; restored to his bishopric by Queen Mary and made lord chancellor 1553. He was a severe persecutor of Protestantism and a man of extraordinary learning. Wrote *A Necessary Doctrine of a Chr. Man*. D. Nov. 12, 1555.

Gardiner (SYLVESTER), M. D., b. at Kingston, R. I., 1707, studied med. in Paris and Lond.; became a practitioner and drug-merchant at Boston, Mass.; acquired wealth, founded (1760) the present city of Gardiner, Me., and colonized it with Gers.; prepared a prayer-book, was a loyalist in the Revolution, and went to Eng. in 1776; returned to Amer. in 1785. Some 100,000 acres of his lands were confiscated, but his heirs regained possession. D. Aug. 8, 1786.

Gardner, R. R. junc., Worcester co., Mass., 27 m. from Worcester, the co.-seat. It is the chief seat of the chair manufacturing interests in the co. Over 200 different varieties of chairs are made here and shipped to all parts of the world. Pop. tp. 1870, 3333; 1880, 4988.

Gardner (AUGUSTUS KINSLEY), M. D., b. at Roxbury, Mass., July 31, 1821, studied at Harvard Coll., after which he studied in Europe; settled in New York, where he occupied prominent positions in hospitals and asylums; was for a time prof. of diseases of females and clinical midwifery in the New York Med. Coll. His enlarged edition of Tyler Smith's *Lectures* and his translation of Scanzoni's *Diseases of Females* are standard text-books. D. Apr. 7, 1876.

Gardner (CHARLES K.), b. in N. J. 1796; entered the U. S. army as ensign in 1808, subsequently served as major 23d Inf. In the war of 1812 was prominent as adjutant-gen. of the division of the N., under Maj.-Gen. Brown, participating in several battles; appointed adjutant-gen. Mar. 12, 1814. In 1818 he resigned from the army, and during the administration of Pres. Jackson was first assistant P. M.-gen.; auditor of the treas. for the P. O. dept. under Van Buren's administration, subsequently com. to settle affairs connected with the Indians in the S. States; was P. M. of the city of Wash. during Polk's, and surveyor-gen. of Or. during Pierce's administration; he was then transferred to an

office in the treas. dept. Wrote *Compend of Inf. Tactics and Dict. of the Army*, etc. D. Nov. 1, 1869.

Gardner (Gen. JOHN LANE), b. in Boston, Mass., Aug. 1, 1793, entered the U. S. A. in 1812 as third lieu. of inf.; saw active service first in Canada; in 1833 was brevetted major in the 4th Artil.; served during the Fla. war; was promoted to the full rank of major; commanded his regiment throughout the Mex. war, and at the battle of Contreras commanded the right column of attack, and was brevetted col. for gallant service. Was placed in command of Charleston harbor in 1869; though having less than 50 effective men in Ft. Moultrie, he obtained, by an arrangement with Col. J. P. Taylor, commissary-gen. (unknown to the sec. of war), 6 months' provisions, and announced his intention to defend the fort to the last extremity. Sec. Floyd thereupon relieved him from command, ordering him to report to Gen. Twiggs in Tex. Major Anderson, his successor, on removing his command to Ft. Sumter, secretly carried thither the provisions which Col. Gardner's foresight had secured. He was promoted to be col. of the 2d Artil. 1861, and in the following yr. retired. In 1865 was brevetted brig.-gen. D. Feb. 19, 1869.

Garfield (JAMES A.), LL.D., 20th Pres. of U. S., b. in Orange, Cuyahoga co., O., Nov. 19, 1831, grad. at Williams Coll., Mass., 1856; studied and practised law; member of O. senate 1859-60. In the c. war he entered the service in 1861 as col. 42d O. Volunteers, and served in S. E. Ky., where (Jan. 1862), in command of a brigade, he forced Humphrey Marshall with his command to evacuate Ky., for which service he was promoted to be brig.-gen. of volunteers Jan. 11, 1862, and served at Shiloh, Corinth, etc.; in 1863 Gen. Rosecrans appointed him his chief of staff, with whom he continued to serve until Dec. 5, having in the mean time (Sept. 19, 1863) been promoted to be maj.-gen. of volunteers for gallantry at the battle of Chickamauga, when he resigned to occupy his seat in the 38th Cong., to which he had been elected, and was re-elected to each succeeding Cong., serving as chairman of the committees on military affairs, banking, and appropriations. Elected U. S. Senator from O. Jan. 13, 1880. Nominated for Pres. of the U. S. by the Reps. at Chicago, June 8, 1880, and elected Nov. 2, 1880; shot and mortally wounded July 2, 1881, by Charles J. Guiteau, who was lying in wait for him at the R. R. depot in Wash., D. C., as the Presidential party was about leaving for an extended pleasure trip through N. Eng. Pres. G. was removed in a critical condition, Sept. 6, 1881, from the White House at Wash., in a specially arranged car to Long Branch, N. J., where he d. Sept. 19, 1881.

Gar-Fish, a name given several fishes: (1) To those of the genus *Belone*; *Belone longirostris* inhabits the Amer. seas and rivers. (2) To the gar-pikes, of the family *Lepidosteidae*, remarkable for their ganoid scales.

Gar-ganey, or **Summer Teal**, the *Querquedula circoia*, a wild-duck of the Old World.

Garget-Root, **Poke**, or **Skoke**, the *Phytolacca decandra* (order Phytolacaceae), a large perennial herb of the U. S., naturalized to some extent in S. Europe. Its root is useful in veterinary practice, and in the diseases of mankind it has some power as an alterative. Its shoots are used as a potherb, but should only be so used when very young, and care should be taken to boil them thoroughly, otherwise they may prove a powerful irritant poison. The berries afford a rich but fugitive purple, employed in Fr. for coloring wines; but the berries have poisonous properties. The root should not be given to the horse, for it is believed to be very poisonous to that animal.

Garibaldi, gar-e-bal'de (GIUSEPPE), a great It. gen. and patriot, b. at Nice July 4, 1807. In his youth he made many voyages as a sailor, but having taken part, in 1833 and 1834, in the movement of the Young Italians, which ended in the unhappy expedition of Savoy, he was driven into exile. In 1836 he arrived in S. Amer. He offered his services to the republic of Rio Grande, and showed such zeal in her defence that after the battle of San Antonio, Feb. 6, 1846, he received the title of "the hero of Montevideo." But he had not forgotten his native land; and, roused by the events of 1848, in Apr. of that yr., he, with his wife Anita, a Sp. Amer., and a few brave comrades, left Montevideo and returned to It. At the moment of his arrival the army of Charles Albert had begun to give way. G. offered him his services; they were refused. Finally, however, the provisional govt. of Lombardy intrusted G. with the command of a body of volunteers. With these he obtained some successes of small military importance. Lombardy having fallen once more wholly into the hands of the Aus., G. offered his sword to the republic of Rome, and the supreme command was given to him and to Gen. Roselli. The glory of the defence of Rome against Fr. intervention in 1849 chiefly belongs to G. Escaping from Rome, after the fall of the city, with 3000 of his followers, he took refuge in San Marino, but being surrounded on all sides by the Aus. forces, he found himself obliged to disband his troops. Nothing remained but to seek a place of safety for his wife and himself; but Anita d. in childbirth. The patriot, alone in his grief, repaired to Chiavari in Liguria, and there the govt. of the king of Sardinia offered him the choice between prison and exile. G. sailed for Tunis, but that town refused to receive him. Thereupon he went back to the island of Maddalena. Here he provided for himself some time by hunting and fishing, but finally went again to Amer. There he was prosperous in business, and was able on his return in 1854 to purchase the N. part of Capraia. Here he remained until 1859, in which yr. he organized the band of the Alpine chasseurs—a body of volunteers that made the whole Lombard campaign, having crossed the Ticino 11 days before the Fr. troops. After the peace of Villafranca, so unfortunate for It., G. formed in Central It. the corps of the chasseurs of the Apennines. The policy of Piedmont prevented him from carrying out his plan of throwing himself upon the papal provs., but Count Cavour assisted him in the expedition against Sic. The island be-

ing in a state of insurrection, on May 11, 1860, G. landed at Marsala, defeated near Calatafini on the 15th the Bourbon army, on May 27 entered gloriously into Palermo, and assumed the dictatorship of the island. On July 30 he gained a decisive victory over the Bourbon troops; on the 28th the fortress of Messina fell into his hands. On Aug. 25 he gave battle at Reggio in Calabria, conquered, and then marched upon Naples. King Francis fled to Gaeta; G. entered triumphant into Naples, and was there proclaimed dictator of the Two Sicilies. Count Cavour feared the victorious G. He therefore sent a body of Piedmontese troops into the ex-kingdom of Naples. G. and the Piedmontese together gained the victory of Volturmo, after which took place a *universal vote* for the annexation of the kingdom of the Two Sicilies to that part of It. which was then governed by King Victor Emmanuel. The annexation being voted on Nov. 9, 1860, G. retired to his island solitude of Capraia. The cession of Nice and Savoy to Fr. having taken place, he entered the It. Parl. and protested against surrendering to a foreign power a portion of the It. soil. He did not lose heart; he knew that Venice and Rome were still to be liberated. For the former, in May 1862, he undertook the expedition of Sarnico, which was broken up in its beginning; then that of Rome, which ended in the battle of Aspromonte, where It. riflemen assailed him, wounded him with a ball in the foot, and took him prisoner on Aug. 29, 1862. On Dec. 19, 1862, G. returned to Capraia. On the breaking out of the war of 1866 for the liberation of Venice, G. assumed command of a body of volunteers, with whom he advanced into the Trentino, and the only It. victories of the inglorious campaign of that yr. were those obtained by the Garibaldians. The following yr. G. once more attempted with his volunteers to liberate Rome; he entered the Campagna, defeated the papal troops at Monterotondo on Oct. 25, 1867, and marched upon Rome; but near Mentana, meeting the Fr. and papal army, he was defeated. G. was for some time held a prisoner; afterward he was permitted to return to Capraia. In 1870 the misfortunes of Fr. and a warm appeal from Gambetta decided him to hasten to the aid of the Fr. republic against the Prus. In Fr. he received the command of the "volunteers of the Vosges;" his son Ricciotti on Oct. 19 obtained a small victory over the Prus., and that these latter advanced no farther in that direction was wholly due to the corps commanded by G. As an acknowledgment, he was elected deputy to the Assembly at Bordeaux, but he renounced his deputyship and returned to Capraia. He has pub. 3 romances, all below mediocrity, and was a man of heart and of action, but neither a statesman nor a man of letters.

The frequent collisions into which G. was brought with the royal government produced in him an alienation of sentiment toward the dynasty and the governing classes in It., which often led him to treat the present political organization of the people as a failure. This opinion cannot be admitted to be well founded. And in justice to the Its. it must be stated that G. enjoyed, in the universal gratitude of his countrymen, the highest reward to which the soul of a patriot can aspire. Member of the It. Parl. for 1875. D. June 1, 1882.

F. A. P. BARNARD.

Gariglia'no [Lat. *Liris*], a river of S. It., receives the water of Lago di Fucino, forms the marshes of Minturnæ, and enters the Mediterranean 9 m. E. of Gaeta.

Garland (AGUSTUS H.), lawyer, b. in Tipton co., Tenn., June 14, 1832, ed. at Bairdstown; removed to Ark.; opposed secession as a policy until his State passed her ordinance withdrawing from the U., then cast his fortunes with hers; was elected to the provisional Cong. of the Confed. States in 1861; was re-elected to the House of the same Cong. in 1862; afterward elected to the Confed. Senate; in 1874 gov. under new const. of Ark.; U. S. Senator 1877-85; became U. S. atty.-gen. Mar. 6, 1885.

Garland (JOHN), b. in Va. in 1792; first lieu. 35th regiment of inf., U. S. A., 1813; served in war with G. Brit. and in Mex. war; brevetted brig.-gen. D. June 5, 1861.

Garland (LONDON CABELL), A. M., LL.D., math., b. at Lovington, Va., Mar. 21, 1810, ed. at Hampden-Sidney Coll., Va.; was prof. of chem. at Washington Coll., Va., 1830-33, in Randolph-Macon Coll., Va., 1833-35, its pres. to 1846, and at the same time prof. of pure and mixed math. In 1847 prof. of Eng. lit., and afterward of math., in the Univ. of Ala., and in 1855 its pres.; in 1866 became prof. of physics and astron. in the Univ. of Miss.; afterward prof. of physics in Vanderbilt Univ., Nashville, Tenn. Has written on plane and spherical trigonometry, and also in periodicals of M. E. Ch. S.

Gar'lic, the *Allium sativum*, a plant allied to the onion (order Liliaceae), much used as a condiment in S. Europe. The part chiefly employed is the bulb, or rather the collection of small bulbs (cloves of garlic). G. has a taste resembling that of the onion, but much stronger. It is employed in med. as a stimulant, expectorant, diaphoretic, and revulsive. It is for the most part used externally.

Gar'net, a precious stone belonging to the monometallic or cubic system of crystallization; specific gravity, 3.6 to 4.2; hardness, 6.5 to 7.5. There are several varieties, differing in color and chemical composition, but agreeing in other properties. When colorless, the common G. consists of silica, lime, and alumina in the proportion of about 38 parts of each of the 2 former to 24 of the latter. The precious or Oriental G. (*almandine*) owes its fiery brightness to an infusion of about 40 per cent. of the protoxide of iron, the lime being absent. The *pyrope*, or Bohemian G., contains a less proportion of iron; it has also an infusion of magnesia and the oxide of chromium. These, with the *essonite*, or cinnamon stone, found chiefly in Ceylon, and containing no iron, are the only varieties used in jewelry. The Oriental G. or almandine is found in alluvial soil, into which it has been washed out of its matrix. When very large, it is cut with a flat base and convex upper surface, and is then termed a *carbuncle*. The *pyrope*, or Bohemian G., found chiefly in Aus. and Ger., is smaller, and less esteemed. They are sometimes sold as "Ceylon rubies." The G. was frequently selected for en-

graving upon by the artists of the Roman empire. It was also a favorite gem with engravers of Sassanian period, but is rarely employed now, owing to its hardness and brittleness.

Garnett (HENRY HOWLAND, D. D. See APPENDIX.
Garnett, R. R. junr., cap. of Anderson co., Kan., 52 m. S. of Lawrence, on the Pottawatomie River, a small tributary of the Osage or Marais des Cygnes. It has a coal under the auspices of the United Presb. denomination. Pop. 1870, 1219; 1880, 1389.

Garnett (JAMES M.), b. June 8, 1750, at Elmwood, Essex co., Va.; served several yrs. as member of the legislature of that State, and as M. C. from 1805 to 1809; member of constitutional convention of Va. in 1829. D. May 1843.

Garnett (MISCOC R. H.), b. in Essex co., Va., ed. at the Univ. of the State; became a lawyer by profession; was a member of the constitutional convention of Va. in 1850, of the house of delegates of that State in 1853-54 and 1855-56; M. C. 1857-59, and re-elected to the 36th Cong., but resigned his seat on the secession of Va. (1861), and d. during the war. **Garnett** (RICHAUD BROOKS), b. in Va. in 1819, grad. at W. P. T. July 1841, and entered the army as second lieut. 6th Inf. On the outbreak of c. war he resigned, and was appointed col. in the Confed. army, serving in W. Va.; became a brig.-gen. in Gen. Lee's army. Killed at the battle of Gettysburg, Pa., July 3, 1863.

Garnett (ROBERT SELDEN), b. in Va. in 1820, grad. at W. P. T. July 1841, and entered the army as brevet second lieut. of art. served on the N. frontier and as assistant instructor of inf. tactics at W. P. T. till 1844. In the Mex. war he distinguished himself at the battles of Palo Alto, Resaca de la Palma, Monterey, and Buena Vista; served as aide-de-camp to Gen. Taylor from June 1846 till Jan. 1849; was commandant of cadets at Military Acad. 1852-54; commanded the operations against Puget Sound Indians in 1858. On the outbreak of the c. war he resigned from the U. S. A., was appointed a Confed. brig.-gen. and commanded the dept. of W. Va.; was killed at the action of Carrick's Ford, July 13, 1861.

Garnier-Pagès gar-ne-ä' pah-zhes' (LOUIS AUSTINE), a Fr. author and statesman, b. at Marseilles July 18, 1803. During the reign of Louis Philippe, G.-P. was a member of the Chamber of Deputies. In 1848 was minister of finances in the provisional govt. of the republic, and became unpopular. Under the empire he was elected deputy to Corps Législatif. In 1869 was elected again, but his popularity was gone. Wrote *Hist. of the Revolution of 1848*, D. Nov. 1, 1878.

Garnishment [Fr. *garnir*, to "warn" or "furnish"], a process of attachment by which a creditor obtains the security of property belonging to his debtor which is in the possession of third persons. It consists in a *warning* or notification given to the person holding the property, who is called a *garnishee*, commanding him not to make payment or delivery to the debtor, but to be in readiness to answer the plaintiff's claim by retaining the property in his own hands. Whenever a debtor against whom an action is instituted has himself a claim against a debtor of his own, the latter may be made a garnishee. The effect of G. is to place the garnishee in a position resembling that of a trustee. On this account it is known in some of the States, especially in N. Eng., as the "trustee process." As a general rule, any person is capable of being made garnishee, not excepting corporations and persons acting in a representative capacity as executors and administrators. But an officer of the law, as a clerk or receiver, or a trustee holding funds as agent of a court, a financial agent of the govt., a sheriff holding funds in an official capacity, or an assignee in bankruptcy, cannot be made garnishees. The same is true of an agent, unless he has an independent control of the goods, since his possession is the possession of his principal. Provision is generally made for the examination of a garnishee under oath in relation to the nature and amount of his indebtedness, and he may make any defence against the attaching creditor which might be made against the person to whom the debt was primarily due or to whom the property was to be rendered. (See ATTACHMENT.)

Garonne, gar-ronn', a river of Fr., rises in the Pyrenees, within the Sp. frontier; is at Toulouse connected with the Mediterranean by a canal, joins the Dordogne, and assumes the name of Gironde, entering the Atlantic through an estuary 50 m. long.

Garrard (Col. JAMES), b. in Stafford co., Va., Jan. 14, 1749; served in the Revolutionary war and in the Va. legislature; in 1782 settled in Bourbon co., Ky., near Paris; became gov. of Ky. 1796-1804. D. Jan. 19, 1822.

Garrard (KENNER), b. in Ky. in 1828, grad. at the U. S. Military Acad. 1851, entered the army as brevet second lieut. of art. Served principally in garrison and on frontier duty 1851-61; in Sept. 1862 was appointed col. 146th N. Y. Volunteers, and was engaged in the battles of Fredericksburg, Chancellorsville, and Gettysburg. Appointed brig.-gen. of volunteers July 1863. In Feb. 1864 commanded a cav. division in the Army of the Cumberland, participating in the engagements about Chattanooga and in Ga. during the Atlanta campaign, pursuit of Confed. army to Dalton, and with his command in the 16th army corps at the battle of Nashville, Tenn., Dec. 1864. In the operations against Mobile, 1865, he led the party which stormed and captured Blakely; was brevetted col., brig.-gen., and maj.-gen. U. S. A. D. May 15, 1879.

Garrattson (FREEBORN), a preacher, b. in Md. Aug. 15, 1752, joined the Meth. ministry in 1775; was a chief founder of his denomination in N. S., N. Y., and W. N. Eng. He took a prominent part in the organization of the M. E. Ch. at Baltimore in 1784. D. Sept. 26, 1822.

Garrick (DAVID), an Eng. actor, b. at Hereford, Feb. 30, 1716. He was of Fr. extraction. His grandfather, bearing the name of Garrigue, a Fr. Prot., came to Eng. on the revocation of the Edict of Nantes. His father was a captain in the English army; his mother was the daughter of a vicar of Lichfield cathedral. He attended the grammar school at Lichfield; subsequently, when 15 yrs. old, became

one of the pupils in Dr. Samuel Johnson's acad. His passion for the stage early showed itself in remarkable gifts for mimicry and recitation, and in a desire to frequent theatres. In 1735 he went to Lond. with Dr. Johnson, proposing to study law, but gave it up, lacking the means of support. A short experience as a wine-merchant in partnership with his brother Peter satisfied him that trade was not his calling, and he adopted the theatrical profession. In June 1749 Mr. G. married the Viennese dancer, Eva Maria Violetta, an amiable and accomplished woman, who had graced the boards of Drury Lane. She brought him a moderate fortune, and was to him a faithful wife. The Shakspeare Jubilee at Stratford-on-Avon, which continued 3 days and was represented 92 successive times at Drury Lane, was arranged by him in 1769; in 1776 after acting through his favorite characters—the last performance being for the benefit of the Decayed Actors' Fund, established by himself—he retired from the stage, D. Jan. 30, 1779. He was buried in Westminster Abbey, beneath the monument to Shakspeare. Pope said of him: "He never had his equal as an actor, and never will." Mrs. G. survived her husband many yrs. She was 98 yrs. old when she d., in full possession of her faculties, on Oct. 16, 1822. O. B. FROTHINGHAM.

Garrison (WILLIAM LLOYD), the pioneer of the modern anti-slavery movement in the U. S., b. in Newburyport, Mass., Dec. 12, 1804; served an apprenticeship to the printing business in the office of the *Herald* in his native place, and while doing so wrote extensively for that and other journals, mainly upon political topics, carefully preserving his incognito. Having ended his apprenticeship in 1825, he soon afterward assumed the editorship of the *Free Press*, a new paper, in his native place; in 1827 became ed. of the *National Philanthropist*, pub. in Boston, and devoted to the cause of temperance. In 1828 went to Bennington, Vt., to edit a new paper, the *Journal of the Times*. His anti-slavery utterances therein attracted the attention of Benjamin Lundy, a Quaker, who was engaged in the publication of the *Genius of Universal Emancipation* in Baltimore, and who went to Bennington to induce Mr. G. to join him in the editorship of that paper. The *Journal of the Times* not having proved successful, he yielded to the Quaker's persuasions, and went to Baltimore in the fall of 1829. In the very first number of the *Genius of Universal Emancipation* which appeared under his and Mr. Lundy's joint editorship was developed a radical difference in their opinions. Mr. Lundy advocating gradual and Mr. G. immediate emancipation as the inalienable right of the slave and the duty of the master. Subsequently another difference appeared. Mr. Lundy favoring and Mr. G. opposing the scheme for colonizing the slaves as a condition of emancipation. They were one, however, in a common hatred of slavery, and as each appended his own initials to whatever he wrote in the paper, the partnership was agreeable to both parties. In May 1830 Mr. G. was convicted of a libel, which consisted in denouncing Capt. Todd as guilty of "domestic piracy" in conveying a cargo of slaves from Baltimore to New Orleans. For this he was sentenced to pay a fine of \$50 and costs of court. Being unable to pay he was committed to jail. His imprisonment awakened much sympathy in the N. States. At the end of 7 weeks he was set at liberty, his fine being paid by Mr. Arthur Tappan, a merchant of New York. Henry Clay had made arrangements to do what Mr. Tappan did, but was too late. He now turned his steps toward the N. States, delivering lectures. He insisted that every slave had a right to immediate emancipation without expatriation, and that it was a sin to hold him in bondage for a single instant. Others had denounced slavery as an evil, but Mr. G. was the first to declare it a sin and demand its immediate abolition in the name of God and of humanity. He thus became the leader of an anti-slavery movement founded upon the principle of immediate in distinction from gradual emancipation. On Jan. 1, 1831, he commenced, in partnership with Isaac Knapp, the publication, in Boston, of *The Liberator*, a weekly journal, the motto of which was, "My country is the world—my countrymen are all mankind." From that time until the war of 1861-65 the discussion of slavery in all its relations to civil and religious insts. went on with constantly augmenting force, in spite of every effort to arrest it. *The Liberator* was kept alive only by great economy, diligence, and self-sacrifice on the part of its editor and its publisher. For a long time they set the types mainly with their own hands, while their small and obscure office was their only home, and they subsisted on the humblest fare. A S. magistrate having begged the interposition of the mayor of Boston to suppress the "incendiary" sheet, that officer, the distinguished Harrison Gray Otis, wrote in reply that his agents had "ferreted out the paper and its editor, whose office was an obscure hole, his only visible auxiliary a negro boy, his supporters a very few insignificant persons of all colors." In Dec. 1831 the legislature of Ga. offered a reward of \$5000 to any person who should arrest, bring to trial, and prosecute to conviction, under the laws of that State, the editor or the publisher. On Jan. 1, 1832, under Mr. G.'s direct inspiration, was organized the N. Eng. Anti-Slavery Society, the first association ever formed in this country on the principle of immediate emancipation. As an agent of this society he soon afterward went to Eng. and was warmly received by the great body of Eng. abolitionists, who were then on the eve of their great triumph over slavery in the W. I. In Dec. 1833 the Amer. Anti-Slavery Society was organized in Phila. The Declaration of Sentiments issued by the convention was from Mr. G.'s pen. In Oct. 1835 a pro-slavery mob of "gentlemen of property and standing" broke into the anti-slavery office in Boston, dispersing a meeting of women, and seizing Mr. G. and dragging him through the streets with a rope around his body. His life was saved with great difficulty, and only by the city authorities' taking him to jail for protection. He was released the next day, but was compelled to go into the country for safety. In 1838 he took

a prominent part in the organization of the N. Eng. Non-Resistance Society, writing its Declaration of Sentiments. In 1839-40 the abolitionists were divided upon the question of admitting women to take part in the proceedings of the anti-slavery societies; Mr. G. took the affirmative. About this time there was also a division in the anti-slavery ranks upon the question of forming an anti-slavery political party. Mr. G. took the negative of this question, contending that the tendency of a political party would be to destroy the purity of the anti-slavery movement and postpone its triumph. He subsequently came to the conclusion that the conditions of union between the North and South, as expressed in the const., were in themselves immoral and therefore that it was wrong to take an oath to support that instrument. Henceforth he was an open advocate of the dissolution of the U., which he declared to be, in Script. phrase, "a covenant with death and an agreement with hell." In 1843 he was chosen pres. of the Amer. Anti-Slavery Society, and held the office until the close of the c. war in 1865, when, slavery having been abolished and its rehabilitation made impossible by an alteration of the U. S. const., he resigned, announcing that his career as an abolitionist was ended, and that in his judgment the society ought to be dissolved. He continued the publication of *The Liberator*, however, until the close of that yr., and in the last issue had the satisfaction of putting on record the official proclamation of the adoption of the amendment to the const. forever prohibiting slavery in the U. S. His paper thus covered the whole period from the beginning of the agitation for the abolition of slavery in 1831 until the final and complete triumph of the cause in 1865. Mr. G. made his fourth visit to Eng. in 1867. Was author of a vol. of *Sonnets and other Poems*. D. May 24, 1879. [From orig. art. in *J.'s Univ. Cyc.*, by OLIVER JOHNSON.]

Garrot, a name sometimes given to the harlequin duck, the golden-eye, and buffle-head or spirit duck.

Garrote [Sp. a "stick"], a form of cap. punishment employed in Sp. and Sp. Amer. A metallic collar is put around the neck of the victim, and a screw at the back of the collar is turned in such a way that its point crushes the spinal cord, causing instant death. Originally a stout cord was tied about the neck, and the culprit was strangled by twisting the cord with a stick (*garrote*). Robbery and choking the person robbed is often called *garroting*.

Garter, Or'der of the, the most illustrious Brit. order of knighthood, founded, according to Selden, Apr. 23, 1344, by King Edward III. The common tradition is that King Edward was dancing with the countess of Salisbury, when she let fall her garter, which the king tied about his own leg, but observing that the act excited much attention, he restored it to the owner, exclaiming, *Honi soit qui mal y pense*—"Evil be to him who evil thinks"—words which are still the motto of the order. The order was founded in honor of the Holy Trinity, the Blessed Virgin, St. Edward the Confessor, and St. George, but the latter was its prin. patron. Ladies were admitted as late as the reign of Edward IV. (1461-83), since which time no ladies but the sovereign are received into it. At present there are, beside the sovereign, the prince of Wales and such other princes of the blood as may be chosen, 25 regular knights of the Garter, extra knights being admitted by special statute. In 1874 there were 49 knights, none of a rank below that of earl. In 1873 the Shah of Pers. received the Garter. The bp. of Winchester is prelate of the order, the bp. of Ox. chancellor, the dean of Westminster registrar, and there is a king of arms and an usher of the black rod; but none of these officials are knights of the Garter. The knights are termed "knights of the Golden Garter," or "knights of the most noble order of St. George and the Garter."

Gar'ter Prin'cipal King of Arms, the chief herald of Eng. and of the order of the Garter. As Principal king of arms he is the head of the coll. of heralds, subject to the earl marshal. As Garter king of arms he is independent of that officer. According to most authorities, Henry V. instituted this office, but others say that Henry VIII. first gave the title to Guienne king of arms, his first herald for the Fr. possessions.

Gas. A gas is a permanently elastic fluid. By a *fluid* in this definition is meant a condition of matter in which the particles have great freedom of motion; by *elastic*, a condition in which the material particles are in a state of tension, in consequence of which they exert pressure against every surface with which the body comes in contact. By virtue of its inherent elasticity a G. tends to expand indefinitely; by virtue of its fluid condition it transmits the pressure it exerts equally in all directions. A liquid also, when rendered elastic by stress of any kind, transmits pressure equally in all directions, but this elasticity is dependent on the external force; it is not inherent in the liquid. G. differ from liquids in their compressibility even more markedly than in their elasticity. Liquids are frequently called *incompressible fluids*; for even when exposed to the greatest attainable pressure, their vol. alters so slightly that the shrinkage can be detected only by delicate experiments. G., on the other hand, are very *compressible fluids*; and the simple law which obtains between the vol. and tension of a mass of G. is the most characteristic feature of the aeriform state. When a mass of G. is exposed to pressure the vol. diminishes until the increased tension balances the pressure; and, if the temperature does not change, we find, in gen., that the tension is inversely proportional to the vol.—the less the vol. the greater the tension; and on the other hand, when the G. is allowed to expand, the larger the vol. the less the tension.

With certain very prominent exceptions all G., by the combined action of pressure and cold, may be condensed to liquids. When by pressing a piston into a cylinder we reduce the vol. of a mass of sulphurous oxide G., for example, we find that the tension increases, but in an ever lessening ratio, up to a certain value. As soon, however, as

this value is reached, a further reduction of vol. causes no increase of tension, but a portion of the G. becomes a liquid, and afterward the piston descends under a constant pressure until the whole mass is liquefied. This greatest value which the tension reaches is called the *maximum tension* of the G.; and although it varies with the temperature, there appears to be for each G. a temperature which has been called the *critical temperature*, below which the G. presents phenomena similar to those obtained with sulphurous oxide, and above which it is in a condition in which its tension increases indefinitely, however great the pressure to which it is exposed. Another characteristic feature of G. appears in the fact that the same change of temperature causes in all of them the same change of tension or vol. When a G. is confined, the effect of heat is to increase its tension; when free to expand under a constant pressure, the effect is to increase its vol. A third characteristic quality of aeriform matter is the power of motion inherent in its parts. The parts of a solid or a liquid show no disposition to leave the mass. Isolate in a vacuum space, so far as possible, a solid or liquid body; no separation from the mass takes place, except in so far as by evaporation from the surface the material changes into the aeriform condition, and thus acquires power of motion. But open to a mass of G. an aperture into a vacuum, and the material rushes through the door with an enormous velocity.

The modern theory of chem. regards every mass of matter as an aggregate of small isolated particles which cannot be further subdivided without destroying the identity of the substance, and these particles it calls molecules. The molecules of the same material are supposed to be alike in every respect, and those of different materials to differ in all those qualities which distinguish substances. These molecules are pieces of matter of measurable dimensions, with shape, motion, and laws of action, intelligible subjects of scientific investigation. In every chemical process the change takes place between molecules, and in these changes definite proportions by weight are preserved, because the different molecules have definite weights. The modern theory of heat assumes that all thermal phenomena are the manifestations of molecular motions, and that molecular activity is the measure of that condition of matter which we call temperature. In a solid or liquid the molecules are crowded together, and, although in motion, their path is exceedingly circumscribed; but in a G. the molecules are widely separated, and their free path, although not larger than the waves of light, is still large as compared with their own dimensions. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. J. P. COOKE.]

Gas'cony [Fr. *Gascogne*], an old prov. of Fr., between the Pyrenees, the Garonne, and the Atlantic. In the 6th century it received its name from the Basques (*Vascones*), who settled here. Half a century later it became a part of Aquitania, and in 1152, when Eleanor married Henry Plantagenet, it became an Eng. possession, and remained so until 1453, when the Fr. reconquered it. It is now divided into 4 depts.

Gas-Engine, a name given to certain prime movers of moderate dimensions introduced in recent yrs., in which the motive-power is derived from the explosive energy of a mixture of inflammable gas with atmospheric air. These engines were originally operated by means of the gas in ordinary use for artificial illumination; but it has been found that the vapor of any volatile hydrocarbon will serve equally well; and this fact has contributed to the gen. availability, if not to the economy, of this source of motive-power. The first engine of this kind was patented in Fr. in 1799, by an ingenious artisan named Lebon, and was in every essential particular identical in principle and in construction with one of the most successful G.-E. of the present day, but failed nevertheless to prove a success, having attracted no notice in the scientific world of the period, and inspired no confidence in the industrial. The engine of Lebon had the gen. form of a reciprocating steam-engine, and operated as follows: From a reservoir containing a sufficient supply of inflammable gas, a certain measured charge was drawn and introduced, in mixture with a similarly measured charge of atmospheric air, into the cylinder, on alternate sides of the piston successively; and this mixture was then fired by means of the electric spark. The inventor seems to have overlooked no provision necessary to secure the success of his design. His engine was entirely self-regulating, and mechanically as well as theoretically it was a success. But economically it failed; for at that time inflammable gas had not been introduced for the gen. purposes of illumination, and its preparation for the engine involved a disproportionate expense; static electricity, so dependent on atmospheric conditions for its regularity of action, was the only known source of the electric spark; and finally the mechanic arts were yet unequal to the requisitions of a problem involving the peculiar difficulties which the construction of this engine presented. A reproduction to all intents and purposes of the engine here described was patented in Fr. in 1860 by an inventor named Lenoir. This engine has found its way somewhat extensively into use, having been employed not only in Paris and most of the provs. of Fr., but also in other European countries, including Russ., and in Cuba, Peru, and Chili.

Another engine belonging to this class, and in many respects resembling the one just described, is that of Mr. Hugon, also of Paris. Hugon's engine employs 2 little constantly burning gas-jets placed just outside the valve-box, instead of the electric spark, to fire the successive charges in the cylinder. Two little movable jets, in recesses constructed in a slider operated by the engine, are alternately lighted at the external burners, and then drawn inward by the slider, so as to inflame the charges at the proper moment. The movable jets are of course extinguished by the explosion, but on the reversal of the movement of the slider they are relighted again at the external burners. In all

engines of this class it is necessary that a current of cold water should be kept constantly circulating around the cylinder, to prevent its becoming overheated; and in order to facilitate this object the cylinder is surrounded by a jacket, leaving a free interval for such circulation.

A G.-E. quite different in principle from either of the foregoing was exhibited at the Paris Exposition of 1867 by its inventors, Messrs. Otto and Langen of Cologne in Rhenish Prus. In this the cylinder was upright, and the piston was heavy. By the explosion of the gas this piston was thrown upward, and its weight, aided by the pressure of the atmosphere in its descent, constituted the driving power. In this form it was very noisy, but the inventors have greatly modified it since, and have done away with this objection.

A very excellent engine of this day is an Amer. invention patented by George E. Brayton, Apr. 2, 1872, and known as Brayton's Ready Motor, in which petroleum is the fuel ordinarily used, though it was originally designed for gas. This engine employed originally, like those already described, a mixture of gas or vapor with atmospheric air in explosive proportions—say 1 part of the former to 12 of the latter—but it differed from the others in burning this mixture in the cylinder without explosion, and expending upon the piston the energy derived from its combustion with the same steady pressure as that exerted by steam in the steam-engine or by rarefied air in the hot-air engine. This remarkable effect was produced by the simple expedient of delivering the gaseous mixture into the cylinder through the meshes of a separating sheet of wire-gauze, and inflaming the mixture on the surface of the gauze next the cylinder. The same phenomenon occurs here which is seen in Davy's safety-lamp. When the lamp is lighted and immersed in an explosive mixture, the gas which passes through the meshes of the wire-gauze cap burns quietly in the interior, so that the whole cap seems to be full of flame; but the gauze effectually prevents this flame from reaching and igniting the mixture outside. So in this engine the flame is confined to the cylinder and is prevented by the wire-gauze screen from running back through the passages and exploding the mixture in the reservoir. For greater security 2 or 3 successive screens are introduced. Instead of gas, petroleum vapor is now usually employed with this engine, having been found to work equally well. F. A. P. BARNARD.

Gas-Lighting (Ger. *Gasbeleuchtung*; Fr. *l'éclairage au gaz*). 1. *Gas-Works*.—Combustible gases issue from the earth in various parts of the world, constituting what are called gas-springs or wells. The holy fires of Baku, on the Caspian, and many of the sacred fires of the Grs., were thus supplied with fuel. The city of Erie, Pa., has gas-wells, bored as such, which furnish gas to be used as fuel under steam-boilers. A well at Burning Springs on the Little Kanawha, W. Va., 900 ft. deep and 4 inches in diameter, supplies, through a 2-inch pipe over 1 m. long, 28 boilers of 12 horsepower each, 50 stoves, and many lights. The fire-damp of coal-mines is the same gas, which was produced during the formation of the coal from vegetable matter, and is liberated by the pick of the miner to make an explosive mixture with the air of the mine. The gas which bubbles to the surface in stagnant pools is of the same character. In all cases these combustible gases consist chiefly of *marsh-gas* or *methane*, also called light carburetted hydrogen.

2. *Early History of Gas-Lighting*.—The real inventor of practical G.-L. was William Murdoch, who in 1792 lighted his house and office at Redruth in Cornwall with gas made from coal. In 1798 he constructed gas-works at the shops of Boulton, Watt & Co. at Soho, and first publicly exhibited the gas in 1802 at the Peace of Amiens. In 1805 the cotton-mills of Phillips & Lee at Salford were lighted with gas by Boulton, Watt & Co., under the direction of Murdoch; and at about the same time the mills at Sowerby Bridge were lighted by the same firm under the direction of Mr. Clegg. In 1804 Winsor lectured on gas at the Lyceum Theatre in Lond., exhibiting the gas, but making a great mystery of the process. He finally obtained permission to light a few street-lamps with gas in Pall Mall, which he did in 1809, and organized the National Light and Heat Co., applying for a charter, which was refused. A great newspaper war was then initiated by him, in order to create a popular interest in the new light. In 1810 Parl. authorized his Majesty to grant a charter within 3 yrs. On Dec. 31, 1813, Westminster Bridge was lighted, and soon after the oil-lights in the streets of St. Margaret's, Westminster, were replaced by gas, and the next yr. (1815) Guildhall was lighted. The popular ignorance with regard to gases in gen. was so great that when gas was finally admitted into the House of Commons, the arch. directed that the pipes be placed 4 or 5 inches from the walls, lest their heat should fire the building. In 1822 there were 4 great cos. in Lond., using 1315 retorts and 47 gas-holders, and making 397,000,000 cubic feet of gas annually. Now every large city in the civilized world is lighted by gas, giving rise, with the collateral business of making the fixtures, burners, etc., and working up the waste products, to one of the most extensive industries.

3. *Materials Used for Making Gas*.—All vegetable and animal substances when exposed in close vessels to a red heat undergo destructive distillation, yielding gas, water, and tar, and leaving a residue of charcoal or coke. A few only are adapted for the economical production of illuminating gas. Bituminous coal is the material generally selected, though under certain circumstances several others have been, and are even now, employed. The most important of these are petroleum or some of its less valuable products (as naphtha or residuum), rosin, wood, peat, cheap oils, and fats. The mixture of hydrogen and carbonic oxide, called "water-gas," produced by passing steam over red-hot coke, charcoal, or anthracite, or a mixture of steam and petroleum vapor or gas through a red-hot retort, has been, and is now, employed with success in the manufacture of illuminating gas, its want of illuminating power being supplied by rich gases from petroleum naphtha.

4. *Cool-gas* is made from bituminous coal. The following are the most important varieties of mineral coal:

1. Anthracite.
2. Bituminous, { Non-caking.
 { Caking.
 { Cannel.
3. Lignite, or brown coal.

In addition to these coals, there are bituminous shales, such as the Boghead mineral from Scot., the Wallongongite from Australia, and the paper shales of Ger. There are also asphaltic minerals, which, while they are never used alone, are very important when added to poor coals to the extent of 5 or 10 per cent., as enriching materials, for the purpose of improving the quality of the gas. The most important of these asphalts are albertite from N. S. and grahamite from W. Va. These asphalts produce large quantities of extremely rich gas, but their cost limits the quantity that can be used. Next to them in quantity and quality of the gas come the rich bituminous shales above mentioned, but they too are not found in sufficient quantities to be used alone. Of true coals, the cannels yield the richest gas, and in Eng. they are sometimes used exclusively. The caking coal is, however, the chief material employed. The advantage of this variety of coal is due to its abundance and consequent cheapness, and to the fact that when heated it undergoes a kind of fusion, and furnishes a compact porous coke of great value as fuel. The gas from caking coal is inferior in illuminating power, but this deficiency is supplied by the use of a certain proportion of richer cannels and other enriching materials. The percentage of sulphur in gas-coal is a matter of considerable importance, as, while about half of this sulphur remains in the coke, the other half passes into the volatile products, and is divided between the gas, the ammonia-water, and the tar. As the sulphur contained in the gas must be removed in the process of purification, the cost of this part of the process increases with the percentage of the sulphur contained in the coal.

The manufacture of coal-gas includes 3 distinct operations: (1) the distillation of the coal; (2) the separation of the water, tar, and other condensable matters—*condensation*; (3) the removal of sulphur compounds and carbonic acid—*purification*.

Retorts.—The distillation is effected in long horizontal, semi-cylindrical, D-shaped retorts of cast iron, or more generally of clay, which consist of 2 parts—the body and the mouth-piece. (Fig. 1, C.) They are closed when in use by a lid, properly luted and held in place by a screw. The retorts are set in groups or benches of 3, 5, 6, or 7, heated by one fire of coke. The coal is charged in at the front of the retort through the mouth-piece, generally in an iron scoop, which is inverted before it is withdrawn, leaving the coal evenly distributed on the bottom of the retort. When the distillation is completed, the lid is removed, and the red-hot coke is drawn out into an iron wheelbarrow, spread out in the yard, and quenched with water. About $\frac{1}{3}$ of the coke obtained is required for heating the retorts; the rest is sold. The work of charging the red-hot retorts and drawing the coke is very laborious and exhausting, and an effective machine for performing this duty has long been a desideratum. Such a machine has been invented by Mr. T. F. Rowland of Greenpoint, N. Y., and is figured and described in the *Coal and Iron Record* of Sept. 24, 1873. The intensity and duration of the heat to which the coal is exposed are matters of great importance. For iron retorts a dull cherry (1470° F.) to a clear cherry-red heat (1830° F.) is most suitable. For clay retorts a deep orange (2010° F.) to a clear orange (2190° F.), or even a white heat (2370° F.) is employed, the coal itself being exposed in either case to a temperature of 1500° to 1600° F. The effect of too low a temperature is to produce a larger proportion of condensable vapors, which are lost in the form of tar, while too high a temperature injures the quality of the gas by decomposing it into non-luminous marsh-gas and hydrogen. To prevent the reduction of the illuminating power of the gas by too high a temperature, it is also necessary to remove the gas from the retort as soon as possible, and not to permit its pressure to be increased by obstacles to its ready escape. For the accomplishment of this object an exhaustor or gas-pump is employed—not so much to suck the gas out of the retort (the partial vacuum produced in the retort rarely exceeds 1 inch of the water-column in the pressure-gauge) as to push the gas ahead through the condenser, washer, and purifiers into the holder, and thus make room for more gas to follow from the retort.

The Standpipe.—From the retorts the gas and vapors pass up through the ascension or standpipe, which is attached to the mouth-piece, to the hydraulic main.

The Hydraulic Main (Fig. 1, B).—This is a large horizontal tube half filled with tar which condenses from the gas, the constant level of which is maintained by an overflow to the tar-well. To prevent the escape of gas from the hydraulic main when the retorts are opened, the standpipe makes a double turn and enters the hydraulic main from above, its end dipping 3 or 4 inches into the tar, which makes an effective seal. The hydraulic main is really the first element of the condensing apparatus, for here the condensable vapors begin to separate, as tar and ammonia-water.

The Exhauster (not shown in Fig. 1).—From this main the gas passes to the exhauster, or gas-pump, which pushes it forward to the condenser, or refrigerator.

The Condenser (Fig. 1, D) consists of a series of iron tubes placed in the open air, or more commonly in cisterns of cold water. By a simple contrivance (Fig. 1, E) the tar and ammonia-water which separate from the gas as it traverses the condenser readily flow off into their respective wells. From 50 to 100 square ft. of tube-surface is allowed for every 1000 ft. of gas to be cooled per hour. At the works of the New York Gas-Light Co. a multitubular condenser is in use, consisting of 2 sets of 8 boxes, each containing 100 tubes, 3 inches in diameter and 15 ft. long. The gas passes up in one set of tubes and down in the next, through the entire series of 16 boxes, thus traversing 240 ft. of 3-inch pipe

cooled by a constantly changing water-supply outside. The action of this condenser is more than its name implies. While the warm gas contains steam and various condensable vapors, which are liquefied and separated here, it also bears along a considerable quantity of tar, in the form of globules, spray, or fog, too minute to be deposited by gravity. This tar is already condensed to liquid, and it requires for its separation actual contact with a bath of tar, as in the tubes of the condenser; the tortuous journey also favors the *licking up* of the tar-globules by the tarry surfaces.

The *Washer* (not shown in Fig. 1).—The gas next enters the *washer*, and then at many works a scrubber, both designed to render more complete the separation of the tar and ammonia, and also to separate some of the sulphur compounds. The washer consists of a series of compartments, through which the gas passes, and where it is exposed to jets of water. At the East-side works of the Manhattan Co. the washer consists of a series of 36 cells, 3 ft. square and 10 ft. high, each supplied with 2 jets of water, which enter at the side and are thrown into spray by impinging against an iron plate. The gas passes through the entire series.

The *scrubber* (Fig. 1, O) is a large chamber partially filled

with coke, fragments of fire-brick or paving stones which are kept constantly wet by a spray of water. It serves to remove the last portions of tar, etc.

The *products* of the distillation of coal are coke, ammonia-water, tar, and gas.

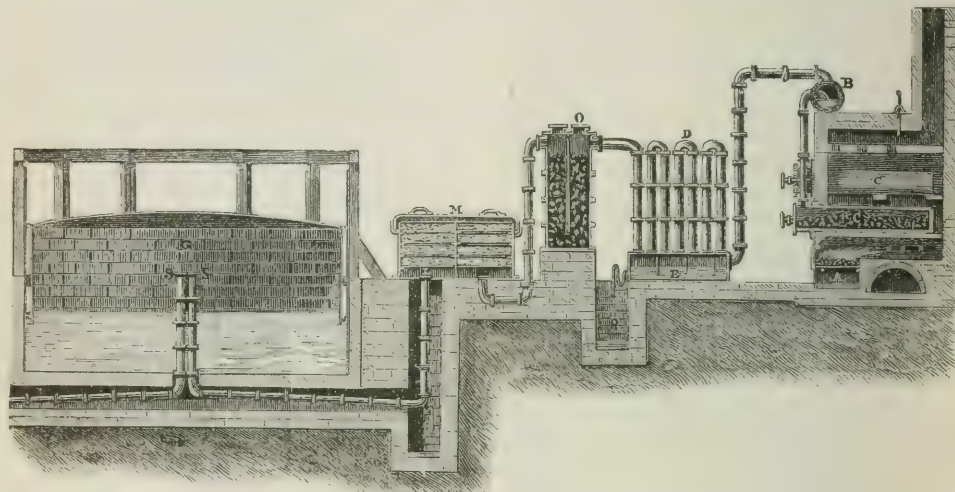
1. The *coke* consists of carbon, with from 3 to 10 per cent. of sulphide of iron and from 3 to 15 per cent. of ash. It is used for fuel.

2. The *ammonia-water* contains bicarbonate, hydrosulphate, chloride, cyanide, and sulphocyanide of ammonium. It is the chief source of ammoniac salts.

3. The *tar* contains (1) the hydrocarbons—benzol, toluol, xylol, cumol, cymol, naphthalene, anthracene, etc.; (2) phenol, carbolic acid, cresol or cresylic acid, phlorol, thymol, etc.; (3) acetic, butyric, rosolic, brunolic, etc. acids; (4) the bases or amines—aniline, toluidine, xyldine, etc.; (5) pitch. It is the source of the above mentioned bodies, from which the greatest variety of interesting products result.

4. The *gas* consists of (1) *luminants*—olefant gas, acetylene, and vapors of the volatile hydrocarbons and other substances mentioned as occurring in the tar; (2) *divulents*—hydrogen and marsh-gas, which constitute the greater part of the gas (75 to 90 per cent.), and carbonic oxide; (3) *impurities*—sulphuretted hydrogen, sulphide of ammonium, bisul-

Fig. 1.



Coal-Gas Works.

phide of carbon, etc., ammonia, carbon dioxide, nitrogen, and oxygen.

Purification.—The above mentioned impurities, which are not separated from the crude gas either in the condenser, washer, or scrubber, are all more or less objectionable. All the sulphur compounds produce sulphuric acid, when the gas is burned, which vitiate the atmosphere, and may even cause serious damage to books, and silks and other textile fabrics. Ammonia is objectionable, because it attacks the fittings, corrodes the meters, and fixes the stop-cocks. It also has the property of holding tar in suspension. When burned it is partially converted into nitrous acid. Ammonia is in some respects advantageous; it unites with the sulphuric acid produced during combustion, and forms harmless sulphate of ammonia; and it is also said to prevent the deposition of naphthalene in the mains. The nitrogen and oxygen which are generally present in gas are supposed to be entirely due to atmospheric air, which unavoidably gains admission when retorts are charged, purifiers changed, etc. Nitrogen diminishes slightly the illuminating power of the gas, as it absorbs a portion of the heat of combustion, without contributing either heat or light. It may also form nitrous or nitric acid, and thus vitiate the atmosphere. Oxygen is more objectionable than nitrogen; it diminishes the illuminating power of the gas very materially, as already stated in connection with the *exhauster*. Carbonic acid also occasions a considerable loss of light; 1 per cent. of this gas is said to diminish the illuminating power of coal-gas 5 per cent. There are 4 methods of purifying gas now in use:

1. The *Wet-Lime Process*.—This process involves passing the gas through milk of lime. It is the oldest process in use, and is very effective in removing both sulphur compounds and carbonic acid; it has been generally abandoned.

2. The *Dry-Lime Process*.—In this process dry or slightly moist hydrate of lime is placed on trays in iron boxes, through which the gas is made to pass. This process is very effective, and has mostly superseded the wet-lime process.

3. The *Laming Process*.—In 1849 Mr. Laming introduced the hydrated sesquioxide of iron as a substitute for lime for purifying gas, preparing it of a suitable quality by mixing copperas (sulphate of iron) with slaked lime and sawdust, and exposing the mixture to the air to oxidize the protoxide of iron to the sesquioxide. The resulting mixture contains hydrated sesquioxide of iron, sulphate of lime, and sawdust. When an excess of hydrate of lime is employed, the resulting mixture contains this substance also.

4. The *Iron-Ore Process*.—A few months after Laming introduced the artificial hydrated sesquioxide of iron in Fr. Mr. J. M. Hills applied the natural hydrated sesquioxide of iron, or "bog iron ore," in Eng. This material, like the

Laming mixture, may be used again and again, and does not evolve offensive odors when exposed to the air.

Composition of the Purified Gas.—The following table shows the percentage composition of the purified coal-gas as it is delivered to consumers:

	Heidel- berg.	Bonn.	Chem- nitz.	London common.	London cannel.
Hydrogen	44.00	39.80	51.29	46.00	27.70
Marsh-gas	38.40	43.12	36.45	39.50	50.00
Carbonic oxide	5.73	4.66	4.45	7.50	6.80
Olefant gas and other hydrocar- bons	7.27	4.75	4.91	3.80	13.00
Nitrogen	4.23	4.65	1.41	0.50	0.40
Oxygen	not det.	not det.	0.41	not det.	not det.
Carbonic acid	0.37	3.02	1.08	0.70	0.10
Aqueous vapor ..	not det.	not det.	not det.	2.00	2.00

The difference in the percentages of carbonic acid is largely due to the method of purification. When lime is used, nearly all of this gas is removed, otherwise not.

The *station-meter* is the apparatus through which the purified gas next passes on its way to the holder. This is constructed on the same principle as the wet meter, described farther on; it measures the gas produced and registers the quantity in cubic ft.

The *holder or gasometer* is the vessel in which the gas is stored. It consists of an enormous bell, or a cylinder with a conical top, constructed of iron plates, and floating in a cistern of water. The bell is supported by chains led over pulleys fastened to iron columns and provided with weights to counterbalance the greater part of the weight of the holder, which is not allowed to exert a pressure on the gas more than equivalent to a column of water 6 inches high, this pressure being sufficient to force the gas through the mains to the consumers. In order to economize depth in the cisterns, the holders are often telescopic. The largest holder in the world is in Lond.; it is 230 ft. in diameter, and holds 3,000,000 cubic ft. of gas. The largest in the U. S. is that of the New York Gas-Light Co. on 21st st. It is 168 ft. in diameter, is supported by 16 columns 72 ft. high, and stands 70 ft. high when full. Its capacity is 1,500,000 cubic ft.

The *governor or pressure-regulator* is an automatic valve through which the gas passes from the holder to the consumers. It regulates the pressure of gas in the mains.

The *mains* distribute the gas throughout the city, being laid about 3 ft. under ground. They are generally made of

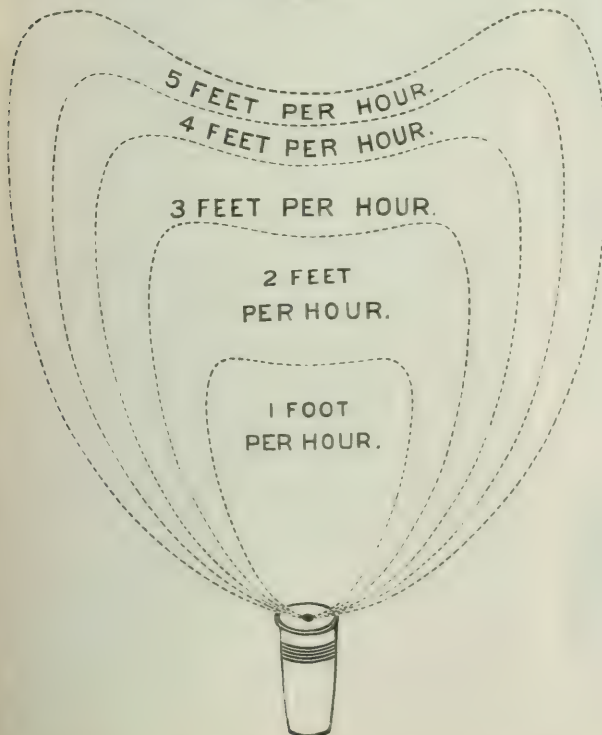
cast iron, and are from 24 inches down to 3 inches in diameter. They are cast in convenient lengths, one end being enlarged into a socket, which receives the small end of the next length. The joint is made tight with hempen rope and lead. A certain percentage of leakage is unavoidable, but this can be reduced to a minimum by the exercise of a little care. The best plan is to test each length of pipe by closing one end with a plug, connecting the other end with a small forcing air-pump, such as is used by gas-fitters, and while the pipe is immersed in water forcing air into it. Bubbles of air passing through the pipe will reveal every imperfection in the metal. The location of each leak can be recorded by making a circle around it with chalk. Small holes can be closed by hammering the metal together; if large holes are detected, the pipe should be rejected. Immersing the pipes in hot coal-tar is a very effective preventive of leakage. Leakage is said to often amount to 16 per cent. of all the gas produced, or even more; by the above mentioned precautions it may be reduced to 2 per cent. As there is always a certain condensation of water and oily or tarry matter in the mains, receivers or wells are constructed at convenient points, and the mains are laid inclining toward them. From time to time the condensed liquids are pumped out of the wells into a portable tank and thrown into the tar-well at the works. Complaint is sometimes made of an excessive condensation of naphthalene in crystals or crusts, which seriously diminish the capacity of the pipes.

Service-pipes of wrought iron convey the gas from the mains to the buildings of the consumers. They should be protected when crossing sunken areas, as otherwise they are liable in cold weather to be entirely closed by the hoarfrost formed in them by the freezing of the aqueous vapor always present in gas.

The *house-meter* receives the gas when it enters the premises of the consumer, measures the quantity which passes through it, and records it on a series of dials. In the early days of G.-L., consumers were supplied by contract, according to the number of burners and the number of hours the gas was burned. To avoid excessive use beyond the time agreed upon, the gas was turned on and off the premises at the proper time by an employé of the gas co. Sir John Congreve invented an "hour-meter," to be connected with the inlet cock, which was simply a clock which ran only while the cock was open, and thus recorded the hours of consumption. This system resulted in an enormous waste of gas, as the consumer who paid as much for lighting one burner as for all his burners was sure to light them all. The ingenuity of the gas engineers was then severely taxed to invent a meter by which the quantity of gas actually consumed could be accurately measured. Their efforts were at last entirely successful, and the meters now in use are wonderfully simple and extremely accurate. The measurement of gas presents difficulties not encountered in any other case. The gas must be measured while in actual use, as no system of measurement and storage would be practical. Its flow must not be interrupted in the slightest degree, as otherwise the lights would be extinguished, or at least be made to flicker unendurably.

Samuel Clegg in 1815 constructed the first meter, consisting of 2 gas-holders working alternately, which was a failure. In 1816 he invented a rotating meter, applying the principle

FIG. 4.



Form and size of flames from a 3-foot fish-tail, lava tip burner.

on which all wet meters are now constructed. This meter was still very imperfect. In 1819 John Malam invented the 4-chambered drum meter, which was improved by Crosley, Wright, and others, and is now in use. Malam also invented a dry meter in 1820, consisting of 6 bellows radiating from a shaft. In 1833 Bogardus, an Amer. (Bojardin, a Frenchman, some say), invented a dry meter, which consisted of a vessel divided by a flexible diaphragm, which was the parent of all subsequent dry meters. Defries invented the 3-chamber dry meter now in use, and Croll and Richards invented the 2-chamber or double-bellows meter now very generally used. Two kinds of meters are now employed: (1) the "wet meter," which must be partially filled with water to be effective; (2) the "dry meter," which requires no liquid.

The accuracy of the meters is very often questioned by consumers. The resemblance of the dials leads them to infer that, like clocks, the meters may run fast or slow. But the case is not parallel; the meter is an engine in which the gas is the motive power, and unless the gas passes through the meter it cannot move. On its dials are faithfully recorded the number of its revolutions in cubic ft. All waste and leakage is recorded as well as the useful consumption. Some think that the increased pressure makes the meter spin round faster and record against the consumer; but if he regulate the burners so as to prevent "blowing," he at once neutralizes the effect of the increased pressure. From the nature of things, the injury which the meter suffers in use must generally be against the co. If a valve leaks or a rust-hole occurs in the measuring drum, or a crack in the

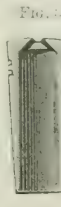
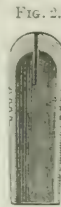


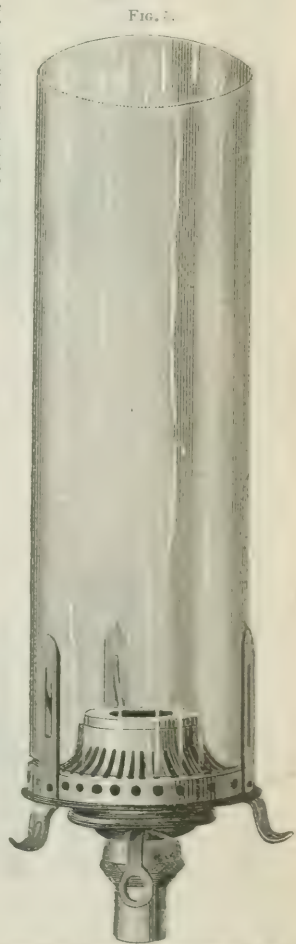
Fig. 2. 4-foot bat-wing lava tip. Fig. 3. 2-foot fish-tail, lava tip.

leather, gas gets through without being recorded. Sometimes the valves of a dry meter become fixed in such a position as to let the gas through without moving. The meters are all tested by State inspectors by passing a certain number of cubic ft. through each, and noting whether it is properly recorded on the dials. In N. Y. and Mass. a meter is stamped correct when it varies less than 2 per cent. in O. the tolerance is 3 per cent.

Prof. Wormley, State inspector for O., in testing 2321 new meters found only 13 that varied over $\frac{1}{4}$ of 1 per cent. Mr. Stimpson, State inspector in Mass., in 1 yr. tested 11,300 meters; only 148 failed to come within the requirements of the law.

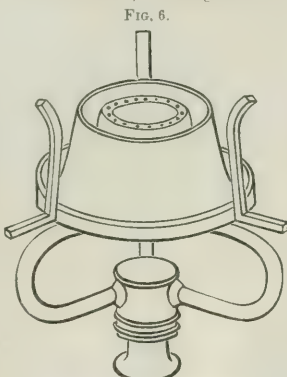
Very few of these varied 5 per cent.; 62 averaged 6.47 per cent. against the cos., and 85 averaged 4.5 per cent. short.

Gas-burners now in use are of 3 kinds: (1) the bat-wing, a burner with a slit (Figs. 2, 7, 10); (2) the fish-tail, with 2 oblique holes in the end facing each other (Figs. 3, 4, 8, 11, 12); (3) the argand, a circular burner with a ring of small holes, and provided with a glass chimney and an interior



Argand burner. Glass chimney and interior burner.

supply of air (Figs. 5, 6). Burners are made of iron, brass, or soapstone ("lava"); the latter is preferable, as the holes are not liable to be stopped by rust. The amount of light produced by a given gas varies enormously with the conditions under which it is burned. The maximum amount of light is obtained by burning it on the verge of smoking, while in the Bunsen burner, used for heating purposes in chemical laboratories, the flame is blue and non-luminous. The loss of light is due to a too rapid mixing or contact of the gas with the air. This is controlled by the size and shape of the holes in the burner, the height of the chimney, and the distribution of the air (in the argand), and in all cases by the pressure. The holes and slits for rich gas should be small, as such gas requires more air than poor gas. Under the same pressure a burner which consumes 4 ft. of gas per hour gives more light than 2 burners consuming each 2 ft. There is no economy of light in small burners. The pressure of the gas is a most important consideration. Argands give most light under a pressure of $\frac{1}{10}$ inch, bat-wings, and fish-tails under a pressure of $\frac{3}{10}$ to $\frac{4}{10}$ inch. As gas is supplied to consumers under pressures varying from 3 or 4 inches down to $\frac{1}{10}$, it is very desirable to check the flow of gas when it is excessive. This can be done by the use of regulators, by turning the gas off at the meter, by partly closing the cocks on the fixtures, or by introducing a check into the burner. Check-burners should always be used; they are constructed in various ways—always by placing some obstruction in the way of the gas to



Sugg's London burner, lava.

Fig. 7. Fig. 8. Fig. 9. Fig. 10.



Fig. 7, 7-foot bat-wing, lava tip, mounted in pillar. Fig. 8, 6-foot fish-tail, lava tip, mounted in pillar. Fig. 9, brass pillar for lava tips. Fig. 10, 7-foot bat-wing, lava tip.

retard its escape. A very simple plan is to screw a 5 or 6 ft. burner over a 3 or 4 ft. burner. With regard to a choice of form, the argand is best for ordinary gas; it gives a very steady flame and consumes the gas to the best advantage. The best form of argand made in the U. S. is shown in Fig. 5. It is provided with a cut-off or check of very simple

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

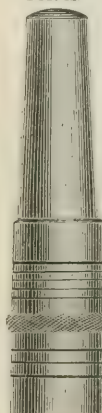


Fig. 11, check burner, a 5-foot burner screwed upon a 3-foot burner. Fig. 12, 5-foot brass, fish-tail burner. Fig. 13, 3-foot base for a check burner. Fig. 14, another base for a check burner.

construction. The best burner yet constructed is Sugg's Lond. burner, shown in Fig. 6 without its chimney. Bat-wing burners cannot be used in globes or shades, as the

flame is so broad as to crack the glass; fish-tails must then be employed. Five or six ft. lava-tipped check bat-wings are the most economical burners for gen. use. The Gas referees of Lond. found that some burners gave only $\frac{1}{4}$ the light obtained from the same quantity of gas by a Sugg burner. They estimated that the use of good burners in Lond. would save $\frac{1}{4}$ of the \$10,000,000 annually paid for gas.

The loss of light by the use of shades, chimneys, etc., is very considerable, largely due to the conversion of light into heat. The following numbers, selected from the results of Prof. F. H. Storer of Boston, are a sufficient illustration:

Description of glass.	Thickness of glass.	Loss of light.
Thick Eng. plate.....	$\frac{1}{4}$ inch.....	6.15
Crystal plate.....	$\frac{1}{8}$ ".....	8.61
Eng. crown.....	$\frac{1}{8}$ ".....	13.08
Double Ger. (Belg.) ground.....	$\frac{1}{8}$ ".....	62.34
Orange-colored window-glass.....	$\frac{1}{16}$ ".....	34.48
Ruby.....	$\frac{1}{16}$ ".....	89.62
A porcelain transparency.....	$\frac{1}{16}$ ".....	97.68

Pressure.—As already stated, a certain amount of pressure is required to force the gas through the street-mains, house-meters, pipes, and burners. The pressure is measured by the height of a column of water supported by the gas in a U-shaped tube, one end of which is open to the air, while the other is connected with the gas-supply. It is estimated that there should be a pressure of 1 inch at the entrance to the premises of every consumer, 0.2 inch being required to force the gas through the meter, 0.2 inch for the house-pipes, and 0.6 inch for the burners. This pressure is exerted by the weight of the great gas-holders at the works. Were the consumption of gas uniform during the entire 24 hours, the holder could be properly balanced once for all, and a uniform pressure would be exerted at all times—4 or 5 inches are found to be necessary for large dists.—but when no gas is burned, no pressure is required, and when little gas is burned, 4 or 5 inches would be excessive. Consequently, the pressure must be graduated according to the hourly consumption. For this purpose the governor, already mentioned, is employed at the works to regulate the flow, and consequently the pressure, of the gas from the holder to the street-mains. The following table exhibits the variation in pressure caused by irregularities of consumption. The holders of the New York Gas-lighting Co. are on East 21st st.; its dist. extends from Grand st. to the lower end of the island at Whitehall st.; Hester st. is well within the dist.

PRESSURE OF THE GAS IN INCHES OF WATER.

	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	10 P.M.	12 P.M.
21st st.....	1.7	2.	5.5	4.2	2.9	1.9	1.0
Hester st.....	1.6	1.7	2.4	2.2	1.9	1.6	1.2
Whitehall st.....	1.0	1.	0.6	1.1	1.1	1.0	0.8

It is thus seen that a uniform pressure throughout the dist. supplied is absolutely impossible. In order to secure a sufficient pressure at the extremities of the dist. an excessive pressure must be produced at the intermediate points; and as the pressure must be varied from hour to hour at the works, it will vary at the premises of most of the consumers. The consumer must therefore regulate the pressure for himself: (1) by carefully adjusting the main cock at the meter; (2) by adjusting the cock at each burner; (3) by using check burners; (4) by attaching a regulator at the meter. It sometimes happens that the consumer cannot get sufficient pressure to supply his burners, when he of course fails to get the light he requires, and concludes that the gas is poor. This difficulty may be due to several causes: (1) insufficient pressure at the works; (2) the street-mains are too small or are obstructed; (3) the service-pipe is too small or obstructed; (4) the meter is too small or out of order; (5) the house-pipes are too small or obstructed; (6) the fixtures are obstructed; (7) the burners are too small, defective, or obstructed. By comparing notes with neighboring consumers, and consulting an intelligent gas-fitter, the real cause of the deficient light can generally be ascertained. In large buildings there should be a separate cock and regulator on each floor to prevent irregularity of pressure.

Regulators are constructed on the same principle as the governor at the works. They contain automatic valves which partially close when the pressure increases, and open when it diminishes. They may be applied to the entire supply of gas at the meter or to each burner.

The illuminating power of gas is dependent upon several conditions (see FLAME): (1) liberation of solid particles of carbon from the olefiant gas and rich hydrocarbon vapors by the heat of the flame, or the oxidation of the hydrogen at the points in the flame when the supply of oxygen is not sufficient for both hydrogen and carbon; (2) the temperature of the flame, which renders the carbon particles luminous; (3) to the density of the materials burned; (4) to the density of the products. These conditions depend upon the chemical composition of the gas and the manner of its combustion. Gases rich in olefiant gas and heavy hydrocarbons furnish the most luminous flames. The character of the burner, the dimensions of the chimney with argands, and the pressure determine the manner of combustion by regulating the supply and admixture of air. A low pressure with a burner which secures a supply of air just sufficient to prevent smoking—i.e. the escape of unconsumed carbon—secures the maximum amount of light. The pressure and quality of the gas being fixed, it was formerly supposed that the light produced was directly as the rate of combustion, and that consequently 2 like burners consuming each 3 ft. of gas per hour would give the same amount of light as one similar burner consuming 6 ft. Recent investigations make it extremely probable that the amount of light increases as the square of the consumption. (Farmer's Theorem.) Consequently, the light from the 2 burners would be $3 \times 3 + 3 \times 3 = 18$, while that from the one 6-ft. burner would be $6 \times 6 = 36$. Thus, the large burner gives twice as much light for the same consumption as the 2 small

burners; hence, the economy of a few large burners over many small ones.

Carbureting or Carbonizing Gas.—It having been established that the illuminating power of gas depends upon the presence of heavy hydrocarbon vapors, numerous means have been contrived and patented for adding such vapors to the gas. The materials available are the naphtha of coal-tar and the naphtha of petroleum or coal oil. Coal-tar naphtha is by far the most effective, though most expensive. Dr. Letheby (*Chem. News*, xi. 1865, p. 126) found that while 1 grain per cubic ft. of gas of some naphthas increased the illuminating power 9 per cent., the same quantity of other naphthas raised it only 1.69 per cent. Under favorable circumstances he found that a gal. of coal-tar naphtha would enrich 6000 ft. of gas, adding over 10 grains per cubic ft., and increase its illuminating power 68 per cent., thus making it equal to 10,000 ft. of the original gas. The practical gain is 4000 ft., costing the price of 1 gal. of naphtha, about \$1. The conditions which effect the carbonization are (1) quality of the gas, (2) quality of the naphtha, (3) construction of the carburetter, (4) temperature of the carburetter. The last condition is very essential to success. If the carburetter is placed in a warm situation, the naphtha evaporates too rapidly, the gas becomes overcharged, and the flames smoke. The burners must be adjusted to the character of the gas, and if the gas varies from day to day from irregularity in the carbonization, the annoyance becomes intolerable. Another difficulty arises from the condensation of the naphtha in the house-pipes and fixtures, by which they become obstructed and cease to deliver gas. These difficulties have led to the ill-success which has attended this apparently logical method of enriching gas.

Photometric Test. (See PHOTOMETER.)—Two forms of the photometer only are used for testing illuminating gas: (1) Bunsen's photometer; (2) Lowe's jet photometer. Bunsen's photometer, as improved by Dr. Letheby, consists of a graduated bar about 98 inches long, placed on edge having at one end a candle-holder, at the other a gas-burner. A saddle rests on the bar, and bears a disk of white paper made transparent by paraffine, except a spot in the centre. The instrument is set up in a dark room with dull black walls and ceiling. The test candle is of spermaceti, of uniform calibre, and of such a size as to consume as nearly as possible 2 grains of spermaceti per minute. The accessory apparatus consists of a balance to weigh the candle before and after the experiment, a governor to regulate the pressure of the gas, a pressure-gauge to show the pressure, a very accurate meter to show the consumption during each minute, a clock to strike minutes. The clock and meter are now combined with a single dial, bearing one hand to indicate minutes, and another to mark the consumption of gas, so arranged that when the consumption is exactly 5 ft. of gas per hour the 2 hands move together, one exactly covering the other. To make a test the gas is lighted at the burner, the pressure regulated at 0.5 inch, the cock fixed so as to make the consumption as nearly as possible 5 ft. per hour, or .0933 ft. per minute. The candle is lighted, balanced, time when balanced noted, and the candle carefully placed in its socket at the end of the bar. The disk of paper is then moved along the bar till both sides are equally illuminated, which is easily determined by the disappearance to the eye of the opaque spot. This position of the disk is the point between the candle and the gas-burner at which equal quantities of light fall on the same area of surface. By the principle that the amount of light which falls on a given surface is inversely as the square of the distance, it is easy to determine the comparative illuminating power of the gas as compared with the candle. If the disk is midway between them, then the gas-flame equals the candle. If the disk is only half as far from the candle as from the gas, the gas-flame = $\frac{2 \times 2}{1 \times 1} = 4$ times the illuminating power of the candle. If $\frac{1}{4}$ as far from the candle, $\frac{3 \times 3}{1 \times 1} = 9$ candle-power; $\frac{4 \times 4}{1 \times 1} = 16$ candle-power.

The bar being graduated on this principle, the observer, having found the proper position for the disk, reads the value of the gas-flame in candles. It is customary to make 10 observations in as many minutes, and average the results. If on weighing the candle it is found to have consumed exactly 2 grains per minute, and if the meter shows a consumption of exactly 5 ft. per hour, the test is complete. Otherwise, a correction must be made as follows: Multiply the average observed candle-power by the grains of candle burned in 15 minutes, divide by the hourly consumption of gas, and divide the quotient by 6. This gives the value of 5 ft. of gas expressed in standard spermaceti candles burning 2 grains per minute or 120 grains per hour. To determine the cost of such light, we have only to remember that 1 lb. avoirdupois = 7000 grains. Thus, if the 16-candle gas costs \$3 per 1000 ft., and spermaceti candles 40 cents per lb., 1000 ft. of gas = 120 grains \times 16 candles \times 1000 hours = 7000 grains in a lb. = 54.85 lbs.; and 1000 ft. of the gas (\$3) furnishes as much light as 54.85 lbs. of candles (\$21.94). The same method of examination is applicable to oils and to the comparison of burners. The burner now used as the standard for ordinary coal-gas is Sugg's Lond. patent (Fig. 6). Lowe's jet photometer is not properly a photometer. Its use is based on the production of a flame of a given height through the same single-jet burner. Under a standard pressure the flame will maintain a uniform height as long as the gas is unchanged in composition. The moment the density of the gas changes by the increase or decrease of any of its constituents, its flow—which is always inversely as the square root of its density—will be accelerated or retarded, and the flame will rise or fall. This instrument is an indicator of constancy of quality, not a photometer or light-measurer.

V. Oil-Gas.—As a matter of fact, whenever oil is burned in lamps, it is first converted into gas at the wick. This is by far the most economical method of making oil-gas. Nevertheless, when gas-lights were first introduced coal

was quickly replaced by oil. Cheap refuse oils and fats were employed, kitchen grease, and whale oil. The gas was obtained by allowing a stream of the oil or melted fat to trickle into a red-hot tube or a retort filled with coke or similar porous solid. The oil was at once converted into a permanent gas, which, owing to the freedom of the oil from nitrogen and sulphur, contained no ammonia or sulphur compounds, and consequently required no purification, merely washing with water to condense the liquid products. A considerable residue of charcoal is always left in the retort. Oil-gas possesses a very high illuminating power, several times that of ordinary coal-gas, and must be burned through very small burners to prevent smoking. From 1824 to 1838 the New York Gas-Light Co. used oil exclusively, selling gas at \$10 per 1000 cubic ft.

VI. Rosin-Gas was introduced when oil-gas became too expensive. The rosin was melted either alone or with a little oil of turpentine, and allowed to run into a red-hot retort containing coke, etc.: 100 lbs. rosin yielded from 1000 to 1300 cubic ft. of gas, which required no purification, except by cold water to condense certain oily vapors. The gas has a sp. gr. of 0.660 to 0.850, and is little inferior in illuminating power to oil-gas. From 1828 to 1848 the New York Gas-Light Co. supplied rosin-gas exclusively, at \$7 per 1000 cubic ft. It was then replaced by coal-gas at \$2.50.

VII. Wood-Gas.—When dry wood is subjected to destructive distillation it yields (1) gas, (2) tar, (3) water containing acetic acid and wood naphtha, and leaves (4) a residuum of charcoal. In 1799 Lebon patented a process for making wood-gas, but his gas possessed so little illuminating power that the process was a failure. In 1849 Pertenkofer of Munich found that when the volatile products of the distillation of wood at a temperature from 482° F. to 522° F. (the gas, tar, etc.) were passed through a red-hot tube, the volume of the gas was increased, while by the decomposition of the tarry oils a considerable quantity of olefiant gas and rich hydrocarbon vapors were produced, a rich and valuable gas being obtained. This process has been introduced in many European cities where coal is not available. The wood is kiln-dried by the waste heat of the retorts, fire being generally selected. In some cases a little bog-head mineral or other rich coal or shale is added as an enricher. This gas has been introduced in Switz., Nor., Swe., Rus., etc. In 1856 wood-gas was made at the Phila. gas-works, and was found to be cheaper than coal-gas, and fully equal to it in illuminating power.

VIII. Petroleum and Naphtha-Gas. See PETROLEUM. IX. Air-Gas. See PETROLEUM. X. Water-Gas. See WATER-GAS. XI. Oxy-hydrogen Gas-lighting. See OXYGEN.

For further details with regard to G-L, the following works may be consulted: MRS. PRATT'S *Chem.*; BOWDITCH, *The Analysis, Technical Valuation, Purification, and Use of Coal-Gas*, and CLEGG, *On the Manufacture of Coal-Gas*.

C. F. CHANDLER.

Gasparin, gahs-pah-ran', de (AGÉSOR ÉTIENNE), COCNET, b. at Orange, Fr., July 10, 1810, was much in public life until 1846; disapproved of the revolution of 1848, and after Nap. III. came into power retired to Switz., where he engaged in literary pursuits. De G. wrote several vols., chiefly upon religious and social questions; 2 of which—*Les États-Unis en 1861* and *L'Amérique devant l'Europe*—were translated into Eng. and widely read in the U. S. D. May 14, 1871.

Gassendi, gas-sen-dee (P. FERRE), b. in Provence Jan. 22, 1592; pushed his researches in every dept. of human learning, and attained renown in many fields. He became a prof. of math. at Paris; was a friend of Descartes, and held a famous controversy with him, in which G. gained a victory over his more original and brilliant but less accomplished opponent. G. was an able opponent of the Aristotelian philos., adopting Epicureanism; but he was a good churchman and a conscientious conservative, who espoused the cause of physical science only from a conviction of its truth. Molière was his pupil. D. Oct. 24, 1655.

Gas Tar. See TAR.

Gastein, gahs'tin, a valley, some 30 m. long, in Aus., S. of Salzburg. Here are 3 v.—Hofgastein, Dörfgastein, and Wildbadgastein—the last one of the most fashionable watering places in Europe. It has thermal springs, renowned for their efficacy in the treatment of many chronic diseases.

Gastein, The Convention of, was concluded (Aug. 14, 1865) between Aus. and Prus. to regulate the relations of these 2 powers with respect to Schleswig, Holstein, and Lauenburg, taken from Den. By it they agreed that Schleswig should be placed under Prus., Holstein under Aus. administration, while Lauenburg should be annexed to Prus., Aus. ceding its part of it for 2,000,000 thalers.

Gas'ton (WILLIAM), b. at Killingly, Conn., Oct. 3, 1820, grad. at Brown Univ.; practised law at Roxbury (now a part of Boston, Mass.) until 1867, when he removed to Boston; was mayor of Roxbury 1861-62, State senator 1868, mayor of Boston 1871, and again in 1872; was chosen gov. of Mass. in 1874.

Gaston (WILLIAM), LL.D., b. at Newberne, N. C., Sept. 19, 1778, grad. in 1796 at Princeton; came to the bar in 1798; was M. C. from N. C. 1813-17, where he was one of the ablest of the Federalists; judge of the State supreme court 1835-44, although a R. Cath. and as such incapable of holding office by the const. of N. C.; declined the U. S. Senatorship 1840. D. Jan. 23, 1844.

Gaston de Foix, fwah, a nephew of Louis XII. of Fr., b. 1489; led the army of Louis XII. in It., vanquished the besiegers of Bologna, defeated the army of Venice near Brescia, and took the city by storm; won the great battle of Ravenna (Apr. 11, 1512), and was killed on the same day.

Gastric Juice [Gr. γαστήρ, the "stomach"], the fluid which in the stomachs of the higher animals adapts certain food-elements for immediate absorption into the circulatory system, and assists in the reduction of the residue to the substance generally known as chyme. Its existence, long before suspected, was first demonstrated by Réaumur in

1752. It is a clear yellowish liquid, with a strong acid reaction, a slight odor, and a saltish taste, and will keep with but little change for a great length of time. It holds in solution various inorganic salts (chiefly chlorides and phosphates); a nitrogenized substance, called pepsin or gasterase, precipitated from solution by lead-acetate and by alcohol; and a free acid, regarded by some as lactic, by others as hydrochloric, by others as a peculiar "chlorohydropeptic" acid, while some assert that a part or all of its acidity is due to acid phosphate of lime. By its action, either in the test-tube or in the stomach, albumen, casein, fibrine, etc., are reduced to states in which they are called peptones (albuminose). Fats, sugar, and starch are not acted upon by it to any great extent, though it may assist in converting cane-sugar to grape-sugar, preparatory to its absorption into the nutritive fluid. It appears, further, that the action of the G. J. upon meats and most other solid substances is not entirely final. While a certain amount of albuminose is made ready for absorption, and is actually taken up by the vessels of the stomach, the great bulk of the food is passed on as chyme, in a partly prepared state for the further action of the pancreatic secretion, the intestinal juice, and the bile, all of which play important parts in digesting food. The pepsin appears to act chiefly as a ferment or catalytic agent. The G. J. is secreted by those stomach-tubes which contain pavement epithelium. The amount daily produced is placed at 14 lbs., but as it is constantly being reabsorbed, there is at no time much of it present in the stomach. Its production appears to be to a great extent under the control of the pneumogastric nerves. WILLARD PARKER.

Gas-Wells. See GAS AND GAS-LIGHTING.

Gatchina, a town of Rus., 30 m. S. W. of St. Petersburg, has an imperial palace surrounded by one of the most beautiful parks in Europe. Pop. 8337.

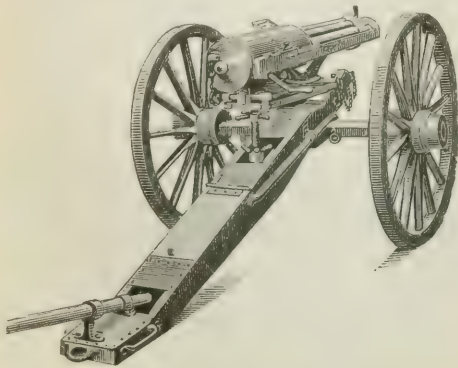
Gates (HORATIO), b. in Eng. in 1728; entered the Brit. army, attained the rank of major without purchase; at the capture of Martinico was aide to Gen. Monkton, and was among the first troops to land at Halifax under Lord Cornwallis. He was with Braddock at his defeat in 1755, where he was shot through the body. At the conclusion of that war he purchased an estate in Va., on which he resided till the commencement of war with G. Brit. in 1775, when he was appointed by Cong. adjutant-gen. with the rank of brig.-gen. He accompanied Gen. Washington when that officer went to take command at Cambridge, and in June 1776 was appointed to the command of the army in Canada; in May 1777 he was superseded by Gen. Schuyler, but in Aug. following in turn superseded that officer in the N. dept. The success which attended his operations there, in the surrender of Burgoyne and the Brit. army at Saratoga on Oct. 17, 1777, after the battles of Sept. 19 and Oct. 7 at and near Bemis's Heights, in Stillwater tp., gave him a brilliant reputation. After the capture of Gen. Lincoln he was appointed, June 13, 1780, to command the S. dept.; on Aug. 16 following he was defeated at Camden by Cornwallis, and in Dec. was superseded by Gen. Greene, but restored in 1782. After the peace he retired to his farm in Berkeley co., Va., till 1790, whence he went to reside in New York, having first emancipated his slaves. D. Apr. 10, 1806.

Gatesville, Tex. See APPENDIX.

Gath, in Pal., was one of the 5 cities of the Philistines, and, as it stood on the frontiers of Judah, it played a conspicuous part in the wars between those 2 peoples. Goliath was b. there. Porter (1857) identifies it with *Tell-es-Sâfeh*, 10 m. E. of Ashdod. Thomson (*Land and Book*, 1858) thinks that Gath, Bethogabra, Eleutheropolis, and *Beit Jibrin* (about 5 m. S. E. of *Tell-es-Sâfeh*) are all one and the same city. At each of these points is a small modern v. in the midst of ruins.

Gatling (RICHARD JORDAN), an inventor, b. in Hertford co., N. C., Sept. 12, 1818, and since a resident of Hartford, Conn. His first invention was a screw for the propulsion of water-craft; subsequently he devised a machine for sowing wheat in drills, then (1847-49) he studied med. He also discovered a method of transmitting power through the medium of compressed air, and invented a double-acting hembreak. Dr. G.'s greatest invention, made in 1861-62, is the mitrailleuse, a repeating machine-gun, universally known as the Gatling gun. At the first trial it fired 200 shots per minute. It has since been adopted into the service for use with troops and for the flank defence of fortifications.

Gatling Gun, a repeating machine-gun or mitrailleuse invented by R. J. Gatling. The gun consists of a number of breech-loading rifled barrels revolving about a common



Gatling Gun.

axis, with which they lie parallel. These barrels are loaded and fired while revolving, the empty cartridge-shells being ejected in continuous succession. Each barrel is fired only once in a revolution, so that the 10-barrel G. G. fires 10 times in one revolution. The working of the gun is simple. One man places one end of a feed-case full of cartridges into a hopper at the top of the gun, while another man turns a crank, by which the gun is revolved. An able-bodied man can turn the crank of a .45-inch calibre gun 40 times per minute for 2 or 3 minutes, 400 shots per minute.

Gauchos. See GUACHOS.

Gaul. See GALLIA.

Gaul'ey Moun'tains, in W. Va., are a part of the ridge known farther S. W. as the Cumberland Mts. The name is given to the Little Gauley Mts. in Nicholas co., and is sometimes extended indefinitely to the same range farther to the N. E.

Gauls. See CELTS.

Gault, The, originally a provincial name for a stratum of stiff blue calcareous clay or marl occurring in the S. and E. of Eng., but now accepted as a term to designate a stratigraphical horizon in the Cretaceous formation of Europe. This stratum of clay is regarded as the commencement of the Upper Cretaceous. It intervenes between the Lower and the Upper Greensands, and lithologically is very distinct from either; palaeontologically, its fossils represent a fauna marked by a strong preponderance of forms closely related to those of the Upper Greensand.

Gaultheria [named in honor of Dr. Gaultier of Que.], a genus of shrubs mostly small, found in N. and S. Amer., Asia, Australia, etc. The typical species is the *G. procumbens*, the wintergreen or checkerberry of the U. S. and Canada. Its fruit and young leaves abound in the oil of wintergreen, used in pharmacy and confectionery. The *G.* (now *Chiogenes*) *hispida*, the sweet birch (*Betula lenta*), and several other plants yield the same oil.

Gaur, a very large wild ox (*Bibos gaurus*) of the jungles of India. It has no dewlap, and is characterized by a high ridge along the back, and peculiarly marked by white hair upon the legs. Its flesh is excellent. Its voice is quite different from that of the ox.

Gauss (KARL FRIEDRICH), b. in Brunswick, Ger., Apr. 30, 1777; solved when 18 yrs. old the problem of the division of the circle into 17 equal parts, and afterward became famous for skill in the indeterminate analysis; became in 1807 prof. of astron. at Göttingen; received in 1810 the Lalande medal for calculating by a new method the orbits of Ceres and Pallas; made after 1821 important improvements in geodetic methods and instruments; after 1831 devoted much attention to terrestrial magnetism. G. is regarded as one of the first maths. of this century. D. Feb. 23, 1855.

Gautama, properly the name of the great Solar race of E. I. warrior-princes, but more especially the name of SAKYA-MUNI (*Sakya* is a family name; *muni* = *mónos*, "solitary"), otherwise called GAUTAMA BOODDHA, the alleged founder of Buddhism. He was b. 624 B. C., the son of Sudhodana, king of Kapilavastu, in the N. of India, and in youth was called *Siddharta*. The story of his life is a tissue of fables, but it is generally believed that there is a historical basis to the story. In early life he was of ascetic habits, but he abandoned himself to pleasure for a time. His singular wisdom, which was the fruit of merits gained in previous states of existence, led him to renounce the world, and after yrs. of study, bodily maceration, and contemplation, he discovered the supreme truth that to return to the ignorance and state of non-sentient repose whence man sprang is the highest possible good. He was made a *boddha*, and after a time passed into Nirvana, or unconsciousness, having d. at Kusinagara in 543 B. C. His body was burned, but numerous relics of him were preserved and became venerated. The Brahmans teach that he was the 9th avatar of Vishnu, sent to delude and destroy the Asura race.

Gautier, go-te-à' (THÉOPHILE), b. at Tarbes, Fr., Aug. 31, 1811, a Parisian *littérateur* of the romantic school; 1836-56 art-critic and dramatic censor for the *Presse*; literary ed. of the *Moniteur Universel* 1856, of the *Journal Officiel* 1869. Author of *Histoire de l'art dramatique en France*, *Le capitaine Fracasse*, etc. His criticism shows the influence of the Ger. philos., by which he was profoundly influenced, but without losing his own independence. D. Oct. 23, 1872.

Gau'zu-vi'va, *Coassus nemorivagus*, a delicate little sheep-like deer of Brazil. It is of a grayish-brown color, and has small horns.

Gavazzi, gah-vaht'see (ALESSANDRO), an eloquent champion of It. independence, unity, and evangelization, b. at Bologna in 1809. In 1825 he joined the monastic order of Barnabites, and was afterward appointed prof. of rhetoric at Naples. Shortly after the accession of Pope Pius IX. (1846) he removed to Rome, drawn thither by sympathy with the reformatory spirit of the new pontiff. In 1848 he was made suddenly famous by an impassioned oration which he pronounced in the Pantheon in commemoration of the patriots who had fallen on the plains of Lombardy in the war with Aus. The pope, who then shared in the national enthusiasm, appointed him chaplain-gen. and almoner of the Rom. legion (16,000 strong), raised to take part in the struggle. These troops, which had marched to Vicenza, were soon recalled. But G., instead of returning with them, broke with the pope, and became another Peter the Hermit, preaching a new crusade. Florence, Genoa, and Bologna all rang with his appeals. The new republic made him chaplain-gen. of the army. The Fr. occupation of Rome (in July 1849) drove him into exile. He visited Eng., Scot., the U. S., and Canada, lecturing against the Papal Ch. In 1851, while in Lond., he pub. first his *Memoirs*, and a few months later his *Orations*. In 1860 he was with Garibaldi in Sic. In 1870 he was again in Eng., and in 1873 came once more to the U. S. He became an evangelist in Rome, and lectures on rational theology and homiletics in the coll. of the "Free Christian Ch. in Italy." R. D. HITCHCOCK.

Gavial, or **Na'koo** (the *Garialis Gangeticus*), the largest of living Crocodilia, at times attaining a length of 30 ft., inhabiting India. It is characterized by long and narrow jaws and has about 120 teeth. It is inoffensive to man, feeding chiefly upon fishes and other small animals.

Gav'it (JOHN E.), b. in New York Oct. 29, 1817; began business in Albany when 30 yrs. old, as a bank-note engraver and printer. He felt a great interest in astron., and was an expert microscopist. His knowledge of optics and the canons of art was minute and exhaustive, and at his death he was pres. of the New York Microscopical Society. As an engraver of bank-notes he introduced great and decisive improvements in his art and in his business. In 1855 he organized the Amer. Bank-Note Co. in New York, of which he was supt. until 1866, and then pres. This co. furnished bonds, bank-notes, revenue stamps, etc., not only to the U. S., but also to the govts. and banks of Sp., It., Gr., Switz., all the states of S. and Central Amer., and Japan. D. Aug. 25, 1874.



Gavial.

Gay (JOHN), b. in Devonshire, Eng., 1688; pub. *Rural Sports*, a poem (1711), which won him Pope's life-long favor; acquired wealth, but lost it in the S. Sea Bubble, and after 1727 was dependant upon the bounty of the duke of Queensberry. His excellent *Fables* and *The Beggar's Opera* are especially noteworthy. D. Dec. 4, 1732.

Gay (WINCKWORTH ALLAN), a landscape-painter, b. in Hingham, Mass., Aug. 19, 1821; studied with Prof. Robert Weir of W. Pt., afterward with Constant Troyon in Paris; passed several yrs. in Europe; is best known in his own country in Boston, where his quiet, meditative pictures, chiefly of N. Eng. scenery, are much prized.

Gav'al, a species (*Bibos frontalis*) of ox, found in hilly parts of India, E. of the Brahmapootra. It is reared for its hide and flesh, and has rich but scanty milk.

Gayarré (CHARLES E. ARTHUR), b. at New Orleans, La., Jan. 3, 1805, ed. at the Coll. of New Orleans and studied law in Phila.; admitted to the bar in 1829; in 1831 became deputy atty.-gen. of La.; presiding judge of the New Orleans city court in 1833; was elected in 1835 to the U. S. Senate, but did not take his seat; was sec. of state in La. 1846-53. He is best known as the author of a series of important works upon the hist. of La.

Gay-feather, a name for the *Liatris scariosa* and *spicata*, and perhaps for other species of that genus of composite herbs. They grow extensively throughout most of the U. S., have bulbous roots, a terebinthinate taste, and active medicinal properties. These plants are among those locally known as "rattlesnake master."

Gayle (JOHN), b. in Sumter dist., S. C., Sept. 11, 1792, ed. at S. C. Coll.; removed in 1813 to Ala.; entered the legislature in 1817, became a judge of the Ala. supreme court 1823, gov. 1831-35, M. C. 1847-49; became in 1849 a judge of the U. S. dist. court for Ala. D. July 20, 1859.

Gay-Lussac (JOSEPH LOUIS), an eminent Fr. chemist, b. at St. Leonard, Haute-Vienne, Sept. 6, 1778; was admitted, Dec. 27, 1797, to the Polytechnic School; assigned in 1800 as assistant to Berthollet in the govt. chemical works at Arcueil, and promoted soon after to be assistant prof. in the Polytechnic. In 1804 made 2 balloon ascensions, attaining in the last ascent the great height of 23,000 ft. In the same yr. became associated with Humboldt in eudiometrical experiments, in the course of which he demonstrated that oxygen and hydrogen unite to form water in the proportions by vol. of 100 of the first to 200 of the second. This led to the announcement (in 1805) that gases always combine in definite proportions by vol. In 1805, in company with Humboldt, he left Paris on a scientific tour through Europe. Was elected to the Acad. of Sciences in 1806, prof. of chem. at the Polytechnic School in 1809, and also prof. of physics at the Sorbonne, and in 1832 prof. of chem. at the Jardin des Plantes. In 1807 determined the coefficient of expansion of gases at constant pressure with increase of temperature. In 1808, with Thénard, he discovered a chemical process for obtaining, from their alkaline oxides, potassium and sodium in quantity. Other results arrived at by these 2 discoverers were the decomposition of boric acid and the production of boron, and the demonstration of the probably elementary nature of chlorine. In 1813 G.-L. investigated the nature of iodine, and pointed out the analogy between chlorine, iodine, and sulphur. In 1815 was made his discovery of the compound radical cyanogen, with its singularly energetic compounds, especially cyanhydric or prussic acid. In 1816 he invented his portable syphon (or mountain) barometer. In 1818 he was appointed supt. of the govt. gunpowder and saltpetre works, and was subsequently called on to advise in the administration of the excise, and in 1829 was made chief assayer to the mint. While acting in these capacities he originated many processes and instruments for the application of scientific principles to industry. In 1831 was chosen delegate to the Chamber of Deputies from St. Leonard, and in 1839 was made a peer of Fr. D. May 9, 1850.

Ga'za ["the strong," now *Ghuzzeh*], in Pal., the southernmost and strongest of the 5 royal cities of the Philistines. Along with Damascus, it is one of the oldest cities in the world. Commanding the road to Egypt, it has been the scene of repeated and desperate struggles. Samson's exploits have made it famous. It was captured by Alexander the Great after a siege of nearly 5 months. In 634 it fell

into the hands of the Saracens for a time, and since the battle of Hattin in 1187 has remained Mohammedan. G. is now about 3 m. from the Mediterranean, nearly the whole space between it and the sea being covered with ruins. It consists of a group of villages. The nucleus stands on a hill, with its buildings of stone, the suburbs containing only mud-houes. The pop. is estimated at 15,000, mostly Mohammedans.

R. D. HITCHCOCK.

Gaza (THEODORUS), b. about 1405 at Thessalonica; left that town on its capture by the Turks in 1430; was rector and prof. of Gr. in the gymnasium of Ferrara; was employed 1450-56 by Pope Nicholas V., and 1456-58 by Alfonso the Magnanimous of Naples. D. in 1478. His Gr. gram. (1495) was long famous.

Gazelle [Ar. *gazāl*], *Gazella dorcas* and allied species, antelopes of Afr. and Asia. The G. are celebrated for their elegant forms and the beauty of their eyes. They are easily tamed, and become great favorites from the gentleness of their disposition.

Gea'ry (JOHN WHITE), b. in Mt. Pleasant, Westmoreland co., Pa., Dec. 30, 1819, studied at Jefferson Coll., Cannonsburg, Pa.; became a C. E. In the war with Mex. (1846-48) he went to the seat of war as lieut.-col. 2d Pa. Volunteers, serving during the campaign from Vera Cruz to the city of Mexico with distinction; was promoted to the colonelcy of his regiment, and on the capture of the city of Mexico was placed in command of the citadel. In 1849 he was appointed by Pres. Polk P. M. of San Francisco, Cal., with authority to organize the postal service throughout our then new Pacific coast terr.; soon afterward he was elected alcalde of the city, and was appointed by the military gov. judge of the first instance for San Francisco; remained in San Francisco till 1852, exercising a large influence in organizing the govt. of that city, whose first mayor he was (1850). Returned to Pa. in 1852, and in 1856 was sent by Pres. Pierce to Kan. as gov. At the outbreak of the c. war he raised and equipped the 28th Pa. Volunteers, commanding it in several engagements in the Shenandoah Valley; was promoted to be maj.-gen. and placed in command of a division; in 1866 was elected gov. of Pa. by the Rep. party, and re-elected in 1869. D. Feb. 9, 1873.

Gebang' Palm, one of the most valuable of palms, the *Corypha Gebanga* of Java and the neighboring regions. It yields sago, roofing thatch, material for hats, fishing-nets, cloth, cordage, etc., and its roots afford a valuable remedy for diarrhoea.

Geck'o (named from the cry), a name given to lizards of the family Geckotidae. The *Phrynosoma* G. of Afr. (whose footsteps were thought to be the cause of the leprosy, and which was considered able to eat steel) and the *G. vernus* of Asia are among the best known. Other species are found in Amer., Australia, etc. They generally have the power of climbing walls, walking upon ceilings with the back downward, etc.

Ged'des (GEORGE), b. Feb. 14, 1809, at Fairmount, Onondaga co., N. Y. Elected a member of the senate of N. Y. in 1847, and re-elected in 1849, he made an exhaustive report in favor of a gen. R. R. law enabling persons to construct and operate R. Rs. without the aid of special legislation—a measure which was carried through the senate in 1851. From 1853 to 1856 he had charge of the lowering of the channel of the Seneca River; in 1861 pres. of N. Y. State Agricultural Society, and from 1865 to 1871 State supt. of the Onondaga salt springs. D. Oct. 8, 1883.

Geddes (JAMES), b. near Carlisle, Pa., July 22, 1763, removed to N. Y. and settled at Geddes, Onondaga co., N. Y. (named in his honor). 1794: was a prominent mover and agitator of the subject of a canal from Lake Erie to the Hudson River, and in 1808 was appointed to make the preliminary surveys of the route, reporting the plan practicable and not difficult to accomplish; in addition to his duties of judge of Onondaga co., he accepted (1816) the appointment of engineer of the Erie Canal; appointed chief engineer of the Champlain Canal 1818, and in 1822 engineer to make surveys for a canal from the O. River to Lake Erie; in 1827 employed by the U. S. govt. to locate the Chesapeake and O. Canal, and 1828 by the State of Pa. upon its canals. D. Aug. 19, 1838.

Geer (GEORGE JARVIS), D. D., b. Feb. 24, 1821, in Waterbury, Conn., grad. at Trinity Coll., Hartford, in 1842, and from the Gen. Theological Sem. 1845; ordained deacon in Christ ch. (P. E.), Hartford, Conn., 1845; became rector of Christ ch., Ballston Spa, N. Y., 1845; ordained presbyter in Ballston Spa 1846; became associate rector of the ch. of the Holy Apostles, New York, 1852, rector of St. Timothy's ch., New York, 1857. In 1858, as joint ed. with Rev. Dr. Muhlenberg and Bp. Bedell, by appointment of the bps., he pub. the *Tyne-Book of the P. E. Ch.*; wrote *The Conversion of St. Paul*. Rector of St. Timothy's ch., New York, was first pres. of the Free Ch. Guild of New York, and a member of the Gen. Convention of 1874 from the diocese of New York.

Geffrard (FABRE), a gen., b. at L'Anse à Veau, Hayti, Sept. 19, 1806, son of Gen. Nicolas Geffrard, who had cooperated with Dessalines and Pétion. Young G., though himself a *griffe* ($\frac{3}{4}$ Afr. blood), took the part of the mulattoes against the blacks; in 1849 was made a duke by Souloque; in 1858 led in the revolution against Souloque, and banished him in 1860; pres. of Hayti 1860-67; was himself banished, and retired to Jamaica. D. Dec. 31, 1878.

Gehen'na [Heb. *Ge-hinnom*, the "vale of Hinnom"], a deep gorge lying S. of Jerusalem. It was called also Tophet, "place of fire," because the practice of burning infants as sacrifices to heathen gods was carried on here by idolatrous Jews (it is, however, denied by some that they were actually burned). To break up this practice, Josiah defiled the place by making it the receptacle of all sorts of filth. We are told that perpetual fires were kept up to destroy this offal; hence, Gehenna and Tophet became synonyms for Hell.

Geij'jer (ERIC GUSTAF), a Swe. poet and historian, b. at

Ransäter Jan. 12, 1783, was prof. of hist. in Upsala from 1810 to 1846. He was the leader of that wing of the romantic school in Swe. lit. called the Gothic, and his poems, not numerous, are among the finest gems of Swe. poetry. It was as an historian, however, that G. acquired his greatest fame, especially as author of *Svenska Folkets Historia* ("Hist. of the Swe. People"). His first historical work was *Nära Elkes Höfder* ("Annals of Swe."). In 1839 he pub. *Sketch of the State of Swe. from Charles XII. to Gustavus III.*, and in 1844, *Life of Charles XII. John*. He also edited the posthumous papers of Gustavus III. in 1843, and, in connection with Funt and Schroeder, the *Scriptores Rerum Suecicarum Medii Ævi*, from 1818 to 1828. His *Hist. of the Swe. People* is a most remarkable book, and ranks among the very first works of historiography. D. Apr. 23, 1847.

Geissler's Tubes, made of very hard glass, and containing each some one gas in a highly rarefied state. Each end of the tube is pierced with an electrode from an induction coil; and if the glass, the rarefied gas, and the current be properly adjusted to each other, the most beautiful luminous appearances may be seen. The carbonic acid vacuum in a small spiral G. T. emits so much light that it has been employed as a means of illuminating the cavities of the human body for diagnostic purposes. Each gas gives its own peculiar light and spectrum.

Gelasius I., SAINT, pope, succeeded Felix III. Mar. 1, 492; was the first pope who claimed complete independence of the synods and the civil authority. He wrote against the Nestorian and Eutychian heresies. D. Nov. 19, 496.—**GELASIUS II.**, POPE (GIOVANNI DI GAETA), succeeded Pascal II. in 1118, but was imprisoned in the same yr.; escaped and fled to Gaeta. The emp. Henry V. caused the antipope Gregory VIII. to be chosen in his stead. D. at Cluny Jan. 29, 1119.

Gelatine, jella-tin, a semi-solid substance of a soft, tremulous consistence, produced from certain animal membranes (skin, fibrous tissue, etc.) by the action of hot water. Isinglass, calf's-foot jelly, glue, etc. are chiefly composed of G. In its ordinary form it contains much water, which may be dried out, leaving a glassy, brittle mass, which swells, but does not dissolve, in cold water. The G. from cartilage is called chondrine, and is somewhat different from true G. It has been long known that it exists abundantly in bone-soups, etc. For a long time it was held to be innutritious, but at present a considerable (but not high) nutritive value is conceded to it. G. is thrown down from the watery solution by alcohol, by a solution of corrosive sublimate, by tannic acid, and by chlorine gas. G. is extensively used in the arts—as *finings* for beer, as a dressing for silk and other fabrics, as a coating for dragees and pills, as a material for the capsules which hold unpleasant meds., for preparing tracing paper, as a material for delicate casts, as the basis of numerous jellies for the table; and dried G. plates are employed in photolithography and the kindred arts.

Gelée, zheh-lä (CLAUDE), better known as CLAUDE LORRAINE, where he was b. (in the little town of Chamaigne) in the yr. 1600. His parents were poor, and the youth, early left an orphan, passed through severe struggles in pursuing the bent of his genius. His first studies were with an elder brother, a wood-engraver at Fribourg. Thence he went to Rome, thence to Naples, thence back again to Rome. He travelled through Romagna and Lombardy, worked some time in Venice, visited parts of Ger., studied the scenery of the Tyrol, remained a short time in Nantes, returned to It. by way of Lyons and Marseilles, and finally made his residence in Rome, where his great works were painted, and where he d. Nov. 21, 1682. During his life-time this painter's fame was very high. After his death his reputation increased, and even yet he ranks with the greatest landscape-painters of the world. The landscapes of Claude are not literal copies of nature, but copies of nature suffused with sentiment and feeling. His paintings are, therefore, to a greater or less degree, compositions. The *Liber Veritatis*, as it is called, is a collection of drawings made by Claude himself for the purpose of identifying his pictures and detecting counterfeits. There were 6 vols. His works commanded high prices, and were numerous. Smith's *Catalogue raisonné* describes 400 pieces. They are found in all the European galleries, but the most celebrated of them are in Eng. For dissenting opinions in regard to the merits of Claude one should consult the *Discourses* of Sir Joshua Reynolds and Ruskin's *Modern Painters*. O. B. FROTHINGHAM.

Gellius. See AULUS GELLIUS.

Gelon [Gr. Γέλων], tyrant of Syracuse, b. at Gela; became tyrant of Syracuse in 485; destroyed the army of Carthage in the great battle of Himera (480 b. c.). D. 478 b. c.

Gelsemium (from *gelsemium*, an It. name for the jasmine), a genus of plants of the order Loganiaceæ. The yellow jasmine of the S. States is a beautiful evergreen climber (the *G. sempervirens*). Though the whole plant is poisonous, it is a valuable med.; should be used cautiously.

Gem [Lat. *gemma*], in art and archaeology, a small stone, generally precious as to material, cut in ornamental design or with inscriptions. While G. are in close relation to the jeweller's art, they are in reality more nearly allied to the highest art, since there are no objects known which in so small a sphere call for such elegance of taste and perfect skill. The 2 divisions of the art are the making of *intaglios*—which, as the name in It. denotes, are cut in like a seal—and *cameos*, a word of doubtful origin, but which probably comes from a Gr. term signifying "ground." Cameos are simply bas-reliefs, and since the days of Gr. art it has been usual to copy celebrated statues in this manner. Intaglios, the earliest G., first appear as the *scarabs* (*scarabæi*) or beetle-shaped signets worn in rings by the Egyptians from a very early period. Many of these were exquisitely cut. The Grs., though the latest in the field of G.-cutting, speedily excelled all their predecessors. Contemporary with the Grs., the Etruscans attained great excellence in G.-engraving. The art finally attained its highest perfection in Sic. and Magna Græcia. Among the Romans, G.-engraving flourished, and

under Augustus it reached its very highest point. Cabinets of G. became numerous. The latest intaglio in anc. style was the signet of Lothaire (A. D. 823). The finest sapphire ever cut is an intaglio bearing a head of Augustus. [From *Orig. art. in J.'s Univ. Cyc.*, by CHARLES G. LELAND.]

Genara. See TALMUD, by REV. SAMUEL ADLER, Ph. D. **Genbloux**, or **Gembloirs**, town of Belg., celebrated as the scene of the great victory of Don John of Aus. over the United Netherlands in 1578.

Gemini (the "Twins"), a sign of the zodiac, into which the sun enters about May 21, and from which it passes June 21. Also, a constellation of zodiac, now corresponding to sign Cancer. Castor and Pollux are the two prin. stars.

Georgius (GEORGIUS), or **Georgius Pletho**, b. at Constantinople about 1390, held office under Manuel Palæologus in 1426; in 1438 a delegate to the Council of Florence; was tutor to Bessarion and the associate of Cosimo de' Medici; in 1441 engaged in the imperial service in the Peloponnesus, and is said to have lived 100 yrs. He is chiefly remembered as a leader of the Restoration of learning.

Geus/bok [Dut. *gemsbok*], the *Oryx gazella*, a large antelope of S. Afr. It has straight horns about 2½ ft. long. It is courageous, and a swift runner.

Geunider (GEORGE), b. at Ingelfingen, Württemberg, Apr. 13, 1816; learned his profession, violin-making, in Paris, and in 1847 removed to Boston, Mass., where he acquired much fame as a musical-instrument maker. In 1852 he removed to New York. His violins took the first prize in the World's Fair of 1851, Lond., and a new violin shown by him at the Vienna Exposition of 1873 was pronounced an anc. instrument of the best type. He uses natural unpared wood, believing that instruments made of artificially cured wood lose their value speedily.

Gen'der [from the same root with *γένος*, *genus*, etc.], in gram., must not be confounded with sex in nature. The phenomenon of G. presents some of the most obscure problems which the science of lang. has to grapple with. Several langs. have no G. at all. Others have had grammatical G., but have lost it; as, for instance, the Per. and the Eng. Some langs. have only 2 G., masculine and feminine; others have 3, masculine, feminine, and neuter; as the Gr., Lat., and Ger. The question why a certain noun is masculine or feminine or neuter may bring the most learned grammarian to despair, while the most ignorant man never makes a mistake when he is born and bred to the lang.

Genealogy [Gr. *γενεά*, "race," and *λόγος*, "discourse"], the science of descents. As a record of families it holds an intermediate place between biography, which treats of persons, and hist., of which the subject is the rise and progress of the nation. In Eng., as in most countries in which the feudal system has prevailed, the laws of the descent of families are intimately connected with those of the descent and tenure of lands. Where estates pass to a single heir, it is essential that the derivation of that heir from the blood of the first lord should be clearly proved; and as the lines of descent may become successively extinguished, the order in which collaterals succeed must be definitely settled. The latter is the work of the lawyer, the former is the office of the genealogist, whose duty it is to trace out and record the hist. of families and the relationship of the several branches to one another. In Amer. the work of the genealogist is a little different. The division of landed estates among the children or other representatives of the last proprietor obviates the necessity of the production of a single heir. The hist. of land-titles is provided for by a system of public records, and the functions of the genealogist are limited merely to the hist. of families. The results of genealogical investigations are either embodied in pedigrees, arranged as a tree, in which the common ancestor represents the root and the descendants the branches, or constructed in the form of tables, in which the ancestor and the descendants appear in successive rows of squares or circles, properly connected by lines; or genealogists adopt a narrative form, called a family hist., by which means they are able to condense their records into a vol. of moderate size, and at the same time to make their statements at greater length. As a science G. insists upon evidence; no genealogist will accept a mere family tradition, but always require sufficient proof. [From *Orig. art. in J.'s Univ. Cyc.*, by REV. B. R. BETTS.]

General, in certain R. Cath. religious orders, the highest officer of the order. The G. of the Jesuits is chosen for life, and holds one of the most influential positions in the Ch. Most other G. hold office for 3 yrs., and they usually reside at Rome. The G. of the Dominicans is chosen for life.

General Assembly. In the Presb. Ch. the G. A. is the highest of 4 courts, the other 3 being, in their order, session, presbytery, synod. In Amer. there are at present 3 G. A.: (1) that of the Presb. Ch. N.; (2) that of the Presb. Ch. S.; (3) that of the Cumberland Presb. Ch. The highest court of the smaller Presb. bodies is the synod.

General Convention, The, was originally an association of members of the Eng. chs. in the U. S., formed after the Revolution for the purpose of promoting a closer union among those chs. During the period of colonial dependence the Eng. congregations had been under the jurisdiction of the bp. of Lond. When at the close of the war his authority was withdrawn, they found themselves without any bond of union beyond that of a common faith; but as the chs. in every State asserted for themselves the rights of national chs. there was danger that even this bond of union might be lost. The probs. which the members of the "Church of England in America" were called upon to solve were these: To secure an episcopal succession, and to arrange a system by which there might be a uniformity through the different States. The first was accomplished, after some delay, by the consecration of some bps. in Eng. for Amer. The second was attained by the establishment of a G. C. The G. C. has power to consent to the formation of new dioceses, to provide the mode of trying bps., and to establish and revise a Book of Common Prayer.

General Lien. See LIEN.

General Rules of the M. E. Ch., written by John Wesley, in consultation with his brother, Charles Wesley, in 1743. Thenceforward the "General Rules" were the only conditions of membership in the Wesleyan societies; and when Wesley sent over Dr. Coke to organize "the M. E. Ch. in the U. S. of Amer." they were inserted in the *Discipline* of the latter, and remain there still, as the "terms of membership." In Stevens's *Hist. of the M. E. Ch.* it is said that "the Articles of Religion and the G. R. are both parts of the organic or constitutional law of Amer. Methodism," but the G. R. prescribe the "only condition" of membership, without allusion to the Articles. Conformity to the doctrines of the Ch. is required as a functional qualification for the ministry, but ch. members cannot be excluded for personal opinions while their lives conform to the practical discipline of the Ch. [*From orig. art. in J.'s Univ. Cyc., by ABEL STEVENS, LL.D.*]

Generation. See REPRODUCTION, by PROF. T. GILL, M. D.

Genera'tion, Sponta'neous, the supposed (or real) origination of living organisms without parent organisms to produce them, out of inorganic, or at least non-living, matter, and under the influence of forces purely phys. The fact that the minute forms of organic life, both animal and vegetable, constantly make their appearance wherever conditions exist favorable to their preservation, notwithstanding the absence of all evidence of pre-existing germs from which they may have sprung, has given rise to 2 opposing theories in regard to this matter—viz. first, that such germs do exist; that they pervade the atmosphere in countless numbers and in nearly all places; that they possess an almost indestructible tenacity of life, and are developed into active growth wherever they find a suitable nidus; and secondly, that no such organic antecedents are necessary at all; that these microscopic forms of life are constantly coming into existence *de novo* under the operation of the ordinary powers of nature, and therefore that they originate by a generation which is truly spontaneous. It is to be observed that the advocates of this latter theory do not necessarily reject the former. They admit its possible truth, but they deny that it embraces all the truth, or even the essential truth; for the germ-theory can only account for the propagation of life after life has originated, whereas the theory of S. G. accounts for the origin of life itself. No subject in the hist. of science has been more sharply debated than this; and no subject has ever been experimentally investigated with greater zeal, with more earnest solicitude to reach the truth, or with results more singularly or persistently discordant.

The notion of S. G. is not, by any means, of modern origin. It has been entertained by naturalists in every age since the dawn of scientific hist. But the earlier naturalists—Aristotle and Lucretius, for instance—conceived that organisms of a high order of complexity, such as insects or fishes or reptiles, might be directly produced out of the moist earth softened by showers, or out of the slime and mud of rivers; whereas those of our time have long since abandoned any such extravagant notions, and confine themselves to the assertion that life in its spontaneous origin is manifested only under the simplest forms, and especially in infusions of organic matter. Both sides of this question have been argued with the most intense zeal, and the investigators of both parties have professed to rely on the results of the most carefully conducted experiments. The opponents of the doctrine have asserted that living organisms never spontaneously appear in infusions hermetically sealed from the air, and which have been subjected to a heat sufficiently intense to destroy the germs they may have contained. The other party affirm that such organisms do appear in spite of all such precautions. It cannot be denied that experiments conducted by different men, and seemingly with equal care, have given contradictory results. The men who in our own time have most actively engaged in this controversy have been Huxley, Tyndall, and Bastian in Eng., Wyman in the U. S., and Pouchet and Pasteur in Fr. The latest elaborate experimental research on this subject was made by Tyndall in 1877, and is admitted generally to have conclusively demonstrated that there is no such thing as S. G. (See the article on this subject in *J.'s Univ. Cyc.*, by F. A. P. BARNARD.)

Genesee' River rises in Pa., and flows in a gen. N. direction through the State of N. Y., and after a course of some 120 m., falls into Lake Ontario 7 m. N. of Rochester. It is navigable for 5 m. by lake vessels. There are grand falls at Portageville, at Rochester, and other points.

Genesee'o, city, Henry co., Ill., on R. R., 159 m. W. by S. of Chicago and 23 m. E. of Rock Island on the Miss. River. It is an important grain and stock shipping-point. Pop. 1870, 3042; 1880, 3518.

Geneseco, on R. R., cap. of Livingston co., N. Y., 30 m. S. of Rochester, on the Genesee River. It has a State normal school, an acad., a free public library, and a free reading-room. Pop. 1880, 1925.

Gen'esis [Gr. *gēneas*, "generation;" called in Heb. *bereshith*, "in the beginning," which is its first word in the Heb. text], one of the most anc. of existing books, beginning with an account of the creation, and ending with the story of Abraham and his early descendants. Its authorship is ordinarily ascribed to Moses, but some have questioned its unity, regarding it as a compilation from older records; and still others have questioned its historical character.

Genest, or **Genêt** (EDMOND CHARLES), a brother of Mme. Campan, b. at Versailles Jan. 8, 1763; was 1789-92 chargé d'affaires at St. Petersburg; Fr. minister to the U. S. 1793-94, when Washington demanded his recall, G. having taken unwarrantable measures with the design of forcing the U. S. into a war with G. Brit. After his recall G. settled at Schodack, Rensselaer co., N. Y., was naturalized, and married first (1794) a daughter of George Clinton, and then (after

1810) a Miss Osgood. Was translator of Idman's treatise on the Finns and their lang. D. July 14, 1834.

Gen'et, a name given to species of the family Viverridae. The common G. of Afr. is the best known; it is the *Genetta vulgaris*. At Constantinople and other places it is domesticated, and used to destroy rats and mice. It is gentle, and prized for its beautiful fur. It has a faint smell of musk.

Gene'va [Fr. *Genève*; Ger. *Genf*], a town of Switz., on both sides of the Rhone, at the point where it issues from the Lake of Geneva. Its industry is nearly confined to the manufacture of watches, music-boxes, and jewelry. Its monuments are of no great magnificence, but its beautiful situation and the part it has played in European civilization have made it one of the most conspicuous places in Europe. The educational insts. of G. and its scientific collections are very celebrated. The duke of Brunswick, who d. at G. Aug. 19, 1873, bequeathed to the city his whole fortune, about \$20,000,000. Pop. 1880, 50,043; with suburbs, 68,320.

Geneva, R. R. junc., cap. of Kane co., Ill., on Fox River, 35 m. from Chicago. It has an excellent water-power. Pop. 1880, 1239.

Geneva, R. R. junc., Ontario co., N. Y., at the foot of Seneca Lake, half way between Rochester and Syracuse, and is the N. terminus of Seneca and Cayuga Canal. Steamers ply daily between G. and Watkins, at the head of Seneca Lake. G. is the seat of Hobart Coll. It derives its prosperity from its nurseries. Pop. 1870, 5521; 1880, 5878.

Geneva, Ashtabula co., O., on R. R., 45 m. N. E. of Cleveland. Pop. 1870, 1090; 1880, 1903.

Geneva (Geneva Lake sta.), Walworth co., Wis., 10 m. S. E. of the co.-seat, on R. R. and Geneva Lake. It has a ladies' sem. Pop. 1880, 1969.

Geneva, Lake of, or **Leman**, 1226 ft. above the sea, between Switz. and Savoy (now a part of Fr.), extending 45 m. from E. to W. in the shape of a crescent. Its width varies from 1 m. at the W. end to nearly 10 m. at the E. end, where its greatest depth reaches 980 ft. It is traversed by the Rhone, which discharges into it its muddy waters, and issues from it at Geneva a pure and transparent stream of a deep blue color.

Geneva, The Convention of, concluded at Geneva Aug. 22, 1864, was intended to mitigate by legitimate means the evils attending war, and to better the situation of the wounded, by declaring neutral the phys., the entire med. staff, and those places on the battle-field where wounds are dressed. In order to make such places and persons more easily recognized, it was agreed to distinguish the buildings and places by a white flag with a red cross, and the persons by a white band with a red cross, to be worn around the arm. The ratifications of the convention were exchanged June 22, 1865.

Geneviève, Canons of St., a branch of the Canons Regular, first proposed by Charles Faure in 1614, who, with the assistance of Cardinal de la Rochefoucauld, established the new congregation. In 1634 Pope Urban VIII. confirmed the organization. They were called *Genevécains* in Fr.

Geneviève, Daughters of St., called also **Miramions**, a former body of religious women in Fr. who took no monastic vows, but devoted themselves to teaching and to caring for the sick. The order was founded in 1636, and in 1665 was united to the proper Miramions (founded in 1661). The united order attained extensive usefulness.

Gen'ghis Khan (the "greatest of khans"), originally **Temudjin**, b. Jan. 25, 1155, son of the chief of the Mongol tribe Neyrun; succeeded his father when 13 yrs. old, but a c. war followed, and in 1178 he was compelled to flee to Toghrul Unggh, khan of the Kerait Tartars, whose daughter he married, and whose armies he commanded with success. In 1203 he made himself master of the Keraites, in 1204 chief of Mongolia. In 1206 he was declared *Genghis Khan*, or chief of rulers. He attacked N. Chi., crossed the Great Wall 1211, sacked and burned Peking 1215, exterminated some rebellious tribes; attacked Allah-deen Mohammed, sultan of Carismia, 1218; conquered all Toorkistan 1220; ravaged Balkh, Khorassan, and Per.; plundered all Asia as far S. as the Sutej River, and penetrated Europe as far as the Dnieper, carrying destruction everywhere. G. d. at Liupan in Chi. Aug. 24, 1227. His 4 sons carried on his work of terror. G. was the founder of what became the Mogul empire. His chief cap. was Karukorum in Tartary. (See Howorth's *Hist. of the Mongols*.)

Gen'ipap, the whitish-green fruit of *Genipa Americana*, a S. Amer. tree of the order Rubiaceæ. It has a rich purple juice and an agreeable vinous flavor. The fruit of *Genipa Brasiliensis* is not good until over-ripe; the juice is used in dyeing, and affords a deep violet.

Genius, *jé-ne-us*, plu. *Gen'ii* [Lat. (akin to Gr. *γίγνομαι*), *gigno*, *genui*; perhaps related to the Ar. *jinn*, plu. *jinn*]. Among the Roms. the G. were tutelary spirits attached to persons, peoples, or places. There were evil as well as good G. In modern translations from the Arabic the *Jinn* are often called G., but whether the names are kindred to each other is a disputed question.

Genlis, de (STÉPHANIE FÉLICITÉ DUCRET DE ST. AUBIN), COUNTESS, b. near Autun, Fr., Jan. 25, 1746; in 1761 was married to the count de Genlis; in 1770 became attached to the household of the duke de Chartres (afterward the citizen Egalité); in 1782 became gov. to his children and his mistress. In 1793 she was obliged to leave Fr. From Nap. and Joseph Bonaparte she subsequently received liberal pensions. Among her best writings are the educational works designed for her young pupils, the Orleans princes, and *Mademoiselle de Clermont*, a short novel of great excellence. D. Dec. 31, 1830.

Gennes'aret, Lake of [mentioned only 4 times in the O. T.], in Pal., between lat. 32° 42' and 32° 54' N., is found by recent measurement to be 12¼ m. long and 6¼ m. wide. Its surface is 653 ft. below the level of the Mediterranean. Its greatest depth is 165 ft. Its waters are clear, cool, and

sweet, abounding with fish. Its whole E. side is bounded by a steep mt.-wall, rising nearly 2000 ft., and spreading off into the table-land of Bashan. On the W. side there is a similar, though less lofty, wall along the S. half of the lake. It was the centre of our Lord's ministry and the scene of many miracles. Nine cities then stood upon its shores, only 2 of which (Tiberias, with its 2000 inhabs., and Magdala, with its 20 mud-hovels) now remain.

Genoa, jen'-o-a, a maritime town of It., on the gulf of the same name. The port of the city is formed by a small bay, receding inland, between the torrents of Polcevera and Bisagno. The harbor, further sheltered by 2 piers, is in no danger of being shoaled up, as are so many It. seaports. A R. R. connects G. with Turin and a littoral line affords easy communication with Nice and Marseilles on the W., and with Spezia, Florence, Rome, etc. on the S. Steamers run regularly to different It. ports and to Marseilles and Tunis. G. contains many grand chs. and palaces, with some fine streets, though, from the unfavorable form of the hills upon which it is built, the city communication is chiefly carried on by means of narrow, ill-lighted, sometimes stair-like thoroughfares, scarcely passable for mules. The most noteworthy chs. are: S. Maria di Carignano; St. Andrea and St. Ambrogio, begun in the 6th century; St. Annunziata, very gorgeous; St. Lorenzo, the cathedral, built in 1100. The Carlo Felice is the finest of the theatres. In the Piazza d'Acqua is a monument to Christopher Columbus, who was born near G. The favorite promenade is the elevated park called Acqua Sola, behind which a winding ascent leads to a bastion 150 ft. above the park itself.

The traditional hist. of G. is obscure, but Livy mentions it as adhering to Rome against Carthage, by which it was destroyed 204 b. c., and soon after rebuilt by its allies. In the 6th century it fell into the hands of the Lombards, who in turn were dispossessed by Charlemagne. After the dissolution of the empire of the Franks it passed through much the same vicissitudes as other large It. towns, suffering from the Saracens, whose depredations forced G. to strengthen her navy, thus laying the foundation of her great maritime power. For further security she formed an alliance with Pisa, but conflicts were afterward frequent between the 2 commonwealths. With Venice also G. carried on wars disastrous to both. In 1240 G. was able to place Michael Paleologus on the throne of Constantinople, and received from him, in addition to her already extensive E. possessions, the cession of suburbs of Constantinople, which she retained till 1453, and of the port of Smyrna, so that for a time she controlled the commerce of India through the Black and Caspian seas, Corsica, Minorca, Marseilles, Nice, etc. successively fell into the hands of the Genoese, and their dominion might have extended still wider but for their internal dissensions. The early govt. of G., democratic in form, was turbulent until 1270. The first doge was elected in 1339. In 1499 Fr. obtained possession of G., but in 1528 Andrea Doria restored his country to independence. In 1656 G. lost 70,000 of her citizens by the plague. Bonaparte in 1796 gave G. the title of the Ligurian Republic, but in 1802 he annexed both town and prov. to Fr. By the peace of 1815 the Genoese terr. became a part of the kingdom of Sard., and is now a prov. of It.

The construction of the St. Gothard R. R. now makes G. the nearest Mediterranean port for W. and Central Ger. The schools and charitable insts. of G. are numerous and well sustained. A princely gift has been made to the municipality by the duke and duchess di Galliera. The duchess has bestowed the magnificent Brignole-Sale palace, with its superb collection of pictures and its rich and rare library, upon the city of G., "for the promotion of the study of the fine arts and of classical lit." A large sum of money accompanied this donation. Pop. 1881, 179,515.

Genoa, Gulf of, is the name generally given to the Mediterranean N. of Corsica, where between Spezia and Oneglia the coast of It. retreats with a large curve.

Genre (zhon'r) **Paint'ing** [Fr. *genre*, a "kind" or "sort"; *é. e.* painting of a special kind] occupies an intermediate position between the historical picture and the landscape, and is composed of elements borrowed from those 2 fields. It may accentuate these elements differently, and thus become subdivided itself into several branches. The historical character may predominate, and produce what is generally called the historical genre picture. The Berlin painter Adolph Mentzel's representations of the life and time of Frederick the Great, the Belg. painter Wapper's representation of Charles I. taking leave of his children, or Nicaise de Keyser's of the emp. Max visiting Memling; the numerous pictures in which the topics are taken from works of poetry, such as Ary Scheffer's *Faust* and *Marguerite*, from Goethe's *Faust*; Eugene Delacroix's *The Murder of the By. of Liege*, from Walter Scott's *Quentin Durward*, or his *Shipwreck*, from Byron's *Don Juan*; Gustave Doré's illustrations to Dante and Cervantes; W. Mulready's representation of scenes in Shakespeare and Molière—all such pictures are not exactly historical painting, and yet they are so near to it that they cannot well be called simply G. P. Or, on the other hand, the landscape character may be the predominant element, and produce what is generally called still-life painting. A great number of pictures by masters of the elder Dut. school, representing perhaps a decayed doorsill, on which a cat basks in the sunlight, or the interior of a poor room, where one single sunbeam steals in and reveals all the charms of cleanliness and neatness, are not exactly landscape pictures, but they approach so near to that branch of painting as to form a sort of transition to it. G. P. forms now one of the chief branches of painting in gen. and almost every country has one or more excellent, and quite a number of able, genre painters. The most celebrated names in Fr. are Gérôme, Hebert, and Jules Breton; in Ger., Adolph Schrödter, Jacob Becker, Karl Hübaer, Rudolph Jordan, and Henry Ritter, all belonging to the school

of Düsseldorf, and evincing its faults in their art of coloring; in Sp., Escosura and Luis Ruiperez; in Amer., Winslow Homer; in Belg., Alfred Stevens; in Den., Carl Block; in the Netherlands, Israels; in Eng., Thomas Faed; in Rus., Peroff.

Gen'serie, king of the Vandals from 428 A. D.; crossed to Afr. in 429, burned Hippo in 431, banished the Catholic bps. 437, captured Carthage 439, and dismantled all the Afr. towns except Carthage; overran Sic. 440, sacked Rome for 14 days and nights 455; remained master of Carthage and the terror of both E. and W. empires. D. Jan. 24, 477.

Gentian, jen'shan, a genus of plants of the natural order Gentianaceæ, is a perennial plant, with a thick, long, branching root, erect stem 3 or 4 ft. high, broad, ovate, bright-green leaves, and rather large, bright-yellow flowers. The dried root is an important drug. It is of spongy texture, faint odor, but intensely bitter taste.

Gentiana'ceæ [from *Gentiana*, one of the genera], a natural order of exogenous herbs, rarely shrubs, with a watery, bitter juice, and mainly opposite and entire leaves, without stipules. They are found in nearly every part of the world, mainly, however, in the temperate and frigid zones. A few are climbing. They have, as a rule, tonic properties. There are 60 genera and 450 species.

Gen'tile [from the Lat. *gens*, *gentis*, a "people;" Heb. *goyim*; Gr. *ἔθνη*, "nations"], one not a Jew; a name applied by the Jews to all who were not of their own nationality. The Mormons apply the term G. to those who are neither Mormons, Jews, nor aboriginal Indians, for they regard the latter as a remnant of the 10 lost tribes of Israel.

Genus [Lat. *genus*; Gr. *γένος*, "kind"], the lowest group in the animal or vegetable kingdom with which a name is connected that habitually enters into the composition of the specific designation of each independent species; thus, we have in the wolf and jackal (1) representatives of a genus (*Canis*), to which they belong in common with a number of other animals; and (2) of peculiar species; the specific name of each (*Canis lupus* and *Canis aureus*) is, as a whole, peculiar to itself and shared with no other species. The G., as now limited, has been defined as the expression of the ultimate modification of structure.

Geodesy [Gr. *γεωδαια*, from *γῆ*, "earth," and *δαίω*, "I divide"]. G. is the higher science of surveying, in which the magnitude and figure of the earth are taken into account. The size and form of the earth are such that no areas of any considerable extent can be correctly admeasured and mapped without due regard to its curvature. Due N. lines, 10 m. apart, deemed parallel in plane surveying, have, in fact, such a convergence in middle lats. as to approach each other 150 ft. in 10 m. The operations of a geodetical survey divide, therefore, into 2 prin. parts: First, the measurement of the distances and angles on the surface of the earth, to determine the geometrical figure of the area surveyed; secondly, the determination of the position of this figure with regard to the astronomical meridian, lat., and lon., or its situation on the surface of the globe.

The first operation, which is that of trigonometrical surveying, requires the lineal measurement of base-lines and the observation of horizontal angles in the triangulation. The lineal measurement of a line consists in the continued repetition of some unit of length, which operation may be performed either by optical means or by actual contact. The optical mode of measurement consists in bringing into coincidence, side by side, lines drawn on 2 measuring-bars; or, where a greater degree of precision is desired, in the employment of a micrometric microscope, mounted on a very solid support, which is pointed on the forward end of one bar, and with which the rear end of the next bar is brought into coincidence; the ends being defined either by a fine line or other suitable optical means. In the method of measuring by contact care must be had not to disturb the position of the bar which remains in place, and against which the next succeeding one is made to abut. It is therefore admissible only to touch it with a very light pressure. To this end Repsold's level of contact was first employed in the measurement of base-lines by Struve in Rus., and was subsequently adopted by Bache in the U. S. in a measuring apparatus which may be considered as the most perfect hitherto employed. From such a base-line the triangulation proceeds, by gradually increasing steps, to sides of as great length as the nature of the country will admit of. In a country of moderate elevations, sides from 25 to 40 m. are usually attained. In mountainous regions, sides from 60 to 80 m. are common, while 100 m. is very rarely attained.

The horizontal angles subtended at the different points of the triangulation are measured by means of a theodolite, the axis of which is placed in the vertical of the station-point occupied, and by means of which are measured the angles between the vertical planes passing through the station-points observed upon. The angles thus measured are, therefore, the spherical—or, more precisely speaking, the spheroidal—angles of the triangle; their sum should exceed 2 right angles by an amount dependent on the ratio of the area of the triangle to that of the whole sphere, and known as the spherical excess. Since the triangles are always small compared with the whole sphere, it is extremely convenient to compute the length of the sides as if they were plane triangles, each angle being diminished by $\frac{1}{3}$ of the spherical excess. All geodetic operations are reduced to the level of the ocean, and represent the surface of equilibrium at that level—a surface which is affected by the varying densities of the earth's crust, and which therefore will differ in many localities from the closest approximation to an average geometrical figure. It is necessary, therefore, to reduce the length of each base-line to what it would be at the level of the sea, to which end it is only necessary to know its elevation above that level, and allow for the divergence of the radii passing through its ends. The angles of the triangulation, being measured in the horizontal plane of each station, are the same whatever altitude they are measured at.

The geometrical figure and dimensions of a system of triangulation having been determined by the methods heretofore sketched, the next step is to determine its position in azimuth, lat., and lon. The azimuth is determined by observations on the pole-star, preferably at its elongations, when the accurate knowledge of time does not affect the result; by which means the meridian plane is referred to some point included in the system of horizontal angles of the triangulation. The determination of lat. is effected by the observation of the zenith-distances at upper and lower culminations of circumpolar stars, or else by the measurement of zenith-distances of stars the declinations of which have been well ascertained at fixed observatories. The most convenient practice for determination of lat. in the field is that of equal zenith-distances, first suggested by Gauss, and put in practical shape by Talcott. By far the most precise method of determining differences of lon. is by means of the electric telegraph, which is substantially as follows: A transit-instrument, astronomical clock, and chronograph are mounted at each station. After suitable observations for instrumental corrections at each station, which are recorded only at the place of observation, the clock at the E. station is first put in connection with the circuit, so as to write on the chronographs at both stations. Next that at the W. station is made to perform the same service. Now, since these records have been obtained at both stations, it will be easily seen that if there be any sensible interval of time consumed in the transmission of the signals, the difference of lon. obtained from the record at the E. station will be too great by that interval, and that at the W. station will be too small by the same amount. The mean result will give the lon. free from this error, and the difference measures double the time of transmission of the signals through the whole circuit. When, by the operations heretofore indicated, the trigonometrical network of a country has been determined, and its situation in respect to the astronomical meridian, the equator, and the assumed first meridian has been ascertained, it remains to compute for each point of the triangulation its lat. and lon., in order to project the same upon a map. With the determination of the lat. and lon. of each triangulation-point, and of their relative distances and bearings, the work of G. is concluded. [From orig. art. in *J.'s Univ. Cyc.*, by Supt. J. E. HILGARD, *U. S. Coast Survey*.]

Geoffroy St.-Hilaire (ÉTIENNE), b. Apr. 15, 1772, at Étampes, Fr., became prof. of zoology in the Jardin des Plantes 1798; was actively engaged in the Egyptian exploration 1798-1802; became prof. of zoology in the Faculty of Sciences 1809. In 1829 his famous controversy with Cuvier broke out, regarding the unity of plan lying at the basis of the philosophic or transcendental system of comparative anat., the soundness of which system Cuvier denied. D. June 20, 1844.

Geoffroy St.-Hilaire (ISIDORE), son of the foregoing, b. at Paris Dec. 16, 1805, became his father's assistant 1824; entered the Inst. 1833, became prof. of zoology in the Museum 1841, and in the Faculty of Science 1854; prof. in the Société d'Acclimatation 1854. D. Nov. 10, 1861.

Geographical Distribution of Diseases. It has long been known that certain diseases are endemic, or peculiarly prevalent at all times, or at certain seasons of the yr., in particular regions. The anc. knew this, and recorded many interesting facts in relation to it; but the idea of a generalization of the known facts originated in the present century. The G. D. of D. is largely dependent upon the *physical conditions* of the various countries of the globe.

Latitude and climatic zones are intimately associated in their influences upon disease. Thus, the intertropical zone is the home of the worst forms of malarious fevers, cholera, and hepatic diseases. Farther N. and S. are the zones of typhus, typhoid, and intermittent fevers, scarlatina, and the like. Except intermittent fevers, few of their diseases are endemic. But they are peculiarly subject to epidemics or occasional severe visitations of some prevalent disease. In the N. hemisphere we find northward of the zone last mentioned the zone of catarrhal diseases of the air-passages—a zone which has no S. representative, for all the habitable land in the S. hemisphere is free from catarrhal diseases of any kind. Catarrhal diseases prevail also to a great extent in portions of the intertropical and warm zones, but their seat is the alimentary canal, rather than the respiratory mucous surfaces. The zone of catarrhal disease extends N. as far as the human race is found.

Elevation above the sea-level is another important point to be considered. In heart disease it may have a direct effect upon the patient's comfort and length of life.

Drainage.—Of late yrs. the relation of soil-moisture to the prevalence of consumption, enteric and other fevers, dysentery, and scarlatina has attracted much attention. Dry soils, it must be conceded, are the healthiest by far, other conditions being equal.

Geological Characters of Soils.—That goitre, calculus, and cretinism prevail upon calcareous soils, and that the inhabs. of alluvial tracts are liable to fevers, have long been known. But that a high and dry region with a porous soil, and in gen. the dry volcanic regions, should be the homes of fevers is by no means easy to explain. It has been suggested that some dry soils may be receptive and retentive of the organic germs upon the presence of which many diseases are supposed to depend.

Vegetation.—The influence of vegetation upon gen. health is sometimes injurious and sometimes beneficial. The belief that microscopic plant-germs are the direct cause of many diseases is becoming a gen. one. On the one hand, the beneficial influence of trees and herbs in warding off diseases is clearly established. On the other hand, it has been held that the mangrove-belts of tropical regions breed fevers. There is no question that if living vegetation wards off disease, decaying vegetation is a most fruitful source of it.

Animal life affects the distribution of disease much less

directly than vegetable. Guinea-worm prevails in the tropical parts of the Old World, and tape-worm about the Gulf of Bothnia, to an astonishing degree.

Races, Acclimation.—That there is a difference in the vital character of the different races is now generally conceded. The Polynesian race seems dying out. The rapid destruction of the Amer. Indians illustrates the probable truth that the vital force of some races is becoming exhausted. The mixed races are generally inferior, physically, to both parent stocks. People of the different races generally thrive best upon their own soil. The prevailing *personal habits* of any people materially affect the public health—e. g. the avoidance of an un-mixed fish-diet has extinguished the leprosy once endemic in the Farø Islands.

The Continents.—No part of the world seems so well adapted to human health and development as *Europe*. Here the conditions of temperature, soil, and moisture seem almost perfect; and with increased attention to public health the future will, it may be hoped, be far more free than the past from pestilences, famines, and the ravages of endemic disease. The diseases of *Asia* much resemble those of Europe, except that in the intertropical regions the diseases have that peculiar character already indicated. *Africa* is the home of acute and deadly diseases of the intertropical type. *Australia* has almost no widely prevailing diseases. *N. America* appears less congenial to human health than Europe. The gen. results of the investigation of the census returns may be stated as follows: (1) Other things being equal, there is more mortality from lung diseases in a N. than in a S. lat.; in a wet than in a dry region; at a low than at a high level, the pine regions of the S. being, however, remarkably free from pulmonary disease, though low and having a large rainfall. (2) Malarial fevers are most fatal, *cateris paribus*, in S. lats. and in wet and low regions, but are also for the most part comparatively insignificant in the great pine forests. (3) The continued fevers and intestinal catarrhs are most deadly in the S., but prevail to a formidable degree throughout the land. The Pacific coast and the W. plains and mts. are exceptionally healthful. The science of the geography of disease requires careful collection of more facts by competent observers. [From orig. art. in *J.'s Univ. Cyc.*, by CHAS. W. GREENE, M. D.]

Geography (Gr. γῆ, the "earth," and γράφω, to "write" or "describe"), literally a description of the earth. A simple description, including the nature and distribution of the land and waters, of the climate and natural productions, of the various countries of the globe, together with an account of the people and nations inhabiting them, and of their social and political condition, was the substance of the first geographical writings transmitted to us by the anc. Though our information on all parts of the earth is now far more extensive and reliable, most of the geographical treatises still confine themselves to the task of drawing similar pictures, which seem to most readers sufficient for practical purposes. This is *General Descriptive G.* But the great progress of phys., natural, and ethnographical sciences has awakened a desire for a higher, more comprehensive, and intelligent knowledge of our earth. The reflecting mind wishes to learn *why* these natural phenomena are as they appear, *how* they are produced, and what *laws* govern them. It seeks to understand the relations of mutual dependence which bind them together, as causes and effects, into a vast system, one great individual mechanism, which is the terrestrial globe itself, with all it contains. This is *Scientific G.*, which may be defined as the science of the gen. phenomena of the present life of the globe in reference to their connection and mutual dependence. It may be asked whether a science which thus embraces the whole domain of nature and man has a claim to an individual existence; but when geol. has taught us the composition of the earth's crust and the hist. of its gradual formation, physics, the laws which govern matter; when bot. and zoology have classified the plants and animals according to their affinities and differences in a grand system of life; when ethnography and hist. have done their special work—it still remains for G. to trace out the relations of these various orders of things to each other. G. needs the results of all these sciences, but is not to be confounded with them.

G., as the science of the earth, is naturally divided into 3 great depts. corresponding to 3 orders of facts: the earth considered as a planet, as a part of the solar system—*Astronomical G.*; the earth considered in itself—the *G. of Nature*, or *Physical G.*; the earth considered as the abode of man—the *G. of Man*. These 3 depts. are usually called *Mathematical, Physical, and Political G.*

MATHEMATICAL G. embraces 2 distinct sciences, both of which need math. as their prin. instrument: *a. Astronomical G.*, which treats of the position of the earth in the solar system, of its gen. form, its movements of rotation and revolution around the sun as causes of the daily and annual changes in the distribution of solar light on the surface of our planet, or the succession of days and nights and seasons. *b. Mathematical G.* proper includes *Geodesy* (from γῆ, the "earth," and μέτρον, to "divide"—viz. in mathematical figures), which teaches the scientific methods of ascertaining the exact form of the earth, and of all portions of its surface, and their precise location in lon. and lat.; *Topography* (τόπος, a "place," and γράφω, to "describe"), which surveys the minor features of relief and position of land and water, the location of mts., rivers, and places; and *Cartography*, which teaches how to represent the same on maps and globes.

PHYSICAL G. is the G. of nature. Physics, or nat. philos., is its prin. helpmate. When it confines itself to a simple description of the natural features of the land, climate, plants, and animals, it is called *Physiography* (from φύσις, "nature," and γράφω, to "write"), a term which is fast coming into use. When applied to the waters, it is *Hydrography* (from ὕδωρ, "water," and γράφω, to "write").

Physical G. proper, however, goes farther, and seeks by

careful comparison to discover the *laws* which regulate the structure and distribution of the land-masses and oceans. It shows how the relief of the continents controls their drainage and shapes the vast river-systems, so useful and so characteristic of each of them; how the very forms of the lands, together with their size and relative situation, modify the climate, the productions, and therefore the capacity of each country for commerce and civilization. It not only describes the great marine currents which circulate in the bosom of the oceans, but seeks to discover their causes, trace their connection, and the vast influence they exert upon climate, either by heating or cooling the superincumbent atmosphere. It is not enough for it to find that the temperature is highest in the equatorial regions of our globe, and gradually decreases toward the poles; it inquires into the cause of that fundamental law of the distribution of heat. But while this gen. law is well established, why is it that mts. which rise from the burning, tropical plains of the Amazon and the Ganges are capped with everlasting snow? that in Jan. snow obstructs the streets in New York city, while in the same lat. the orange tree flourishes under a genial sun and in a mild atmosphere in Naples, and flowers and perpetual verdure grace the gardens in the islands of the Azores in the midst of the Atlantic? that on the E. of the Amer. continent Labrador is but a frozen peninsula, where no tree can grow, no agriculture is possible, in the same lat. where in Europe, on the other side of the Atlantic, the cities of Christiania, Stockholm, St. Petersburg flourish in the midst of cultivated fields? Looking at the distribution of rain-water, that other element of climate indispensable for all that has life on earth, why is it that it is so unequal, varying from a complete or almost total absence in the deserts to an amount which would cover the ground with a layer of 50 ft. of water? Why are the sunny regions of the tropics blessed with a quantity of rain-water several times greater than that which falls in our temperate regions, while the foggy regions toward the poles receive as many times less? Why are the rains periodical in the warm regions, and more and more equally distributed throughout the yr. as we recede from them toward the poles? To answer all such questions, phys. G. must find out the laws which govern the distribution of heat and of the rains. It must study the course of the winds, which are the carriers of warm and cold air from one place to another, and of the rains from the common reservoir of the ocean to the interior of the continents. It thus shows that upon all these elements, properly combined, and modified in their action by the forms, extent, and situation of the land-masses and oceans, depend the distribution of life, vegetable and animal, on the surface of the globe, and the degree of usefulness to man of each portion of his domain.

The scientific treatment of every portion of this vast field of research expands into a science. The study of the globe as a unit, irrespective of its surface, involving that of its gen. form, as given by geodesy, its density, its magnetism, its specific temperature, forms a group to which may fitly be applied the name of *Physics of the Earth*, already much in use. Taking up the surface, *Geomorphology* (from *γῆ*, the "earth," and *μορφή*, the "form") studies the forms, horizontal and vertical, the relief of the solid land, including the basin of the oceans, and endeavors to discover the laws of their phys. structure and peculiar arrangement; *Hydrology*, those which regulate the inland and oceanic waters, and their movements. *Climatology*, or the science of climates, aided by meteorology, inquires into the nature and character of those combinations of phys. agencies, especially of heat and moisture, which, acting through the atmosphere, foster nature's life. The *G. of Plants*, raised by Humboldt's researches to a science, and the *G. of Animals* make it a special object to ascertain how the plants and animals, in each natural region, are associated in characteristic groups called *floras* and *faunas*, and to discover their relation with the special climatic influences under which they live.

THE *G. OF MAN*, Political G., or the globe as the abode of human races and societies, can be viewed under different aspects. It may be a simple description of the various races and nations of men as found in their present dwelling-places; *Ethnography* (*ἔθνος*, "nation," and *γράφω*, to "write"), the scientific form of which, inquiring into the principles underlying their nature, relations, and formation, is *Ethnology*. To give a description of the civilized nations, their characteristics, their boundaries and extent, their terms, an enumeration of their cities, an account of their const. and govt., of their pop. and resources, is the object of *Political G.* proper, while *Statistics* gives the numerical data relating to these various branches of the subject.

But aside from this descriptive part, a multitude of questions arise. We see that each large portion of the earth is tenanted by a peculiar race—the black in Afr., the yellow in E. Asia, the white in W. Asia and Europe, the so called red in both Americas, etc. Is there any phys. peculiarity of relief or climate in each of these natural regions which can account for these deep modifications of the human type? What influence have these continents exerted, with their plateaus, plains, and mts., on the formation of nations and langs.—on the course of the migrations which have spread them over the whole face of the earth? The hist. of mankind shows that each individual continent has performed a different part in the progress of civilization. Asia, the great parent continent, is also the mother of the races and of civilization; in Europe and N. Amer. man's development has attained its highest pitch. Is there in their structure, climate, situation, and geographical properties anything which fits them better than others for such functions? Were there special geographical features which enabled Pal., Gr., and It. to play on the theatre of hist. the brilliant parts for which they have been conspicuous? All these and similar questions are to be answered by what we may call *Historical or Philosophical G.*, the sister and indispensable handmaid of the Philos. of Hist.

A. GUYOT.

Geology [from the Gr. *γῆ*, the "earth," and *λόγος*, "discourse"] is that branch of natural science which treats of the structure of the crust of the earth and the mode of formation of its rocks, together with the hist. of phys. changes and of life during the successive stages of its hist. The geological hist. of the earth is ascertained by a study of the successive beds of rock which have been deposited on its surface, and of the masses which have been forced up in a liquid state from within its crust, together with the fossil remains of animals and plants which certain of the beds contain. As thus established, it is usually divided into 4 great periods with their subdivisions: I. The Eozoic, or period of the dawn of life (1. Laurentian; 2. Huronian); II. Palæozoic, or period of anc. life (1. Cambrian; 2. Siluro-Cambrian; 3. Silurian; 4. Devonian; 5. Carboniferous; 6. Permian); III. Mesozoic, or middle period of life (1. Triassic; 2. Jurassic; 3. Cretaceous); IV. Neozoic, or recent period of life (1. Eocene; 2. Miocene; 3. Pliocene; 4. Post-pliocene and recent).

I. **PRIMITIVE CONDITION OF THE EARTH.**—In the oldest condition of the earth its surface was covered with water more generally than at present, and sediments were deposited in the waters. The earth must, however, have an earlier hist. than this. This primitive condition of the earth is a subject of speculation rather than of knowledge; still, we may begin with a consideration of a fact bearing upon these questions which has long excited attention. It is the observed increase in temperature in descending into deep mines and in the water of deep artesian wells. All these observations indicate that the crust of the earth is a shell covering a molten mass of rocky matter, and imagination would easily carry us back to a time when this crust had not yet been formed, and the earth rolled through space an incandescent globe, with all its water in a gaseous state.

II. **Eozoic TIME.**—Here we have actual monuments to study. The Laurentian rocks occupy a very wide space in the N. part of Amer., stretching along the N. side of the river St. Lawrence from Labrador to Lake Superior, and thence northwardly to an unknown distance, constituting a wild dist. often rising into hills 4000 ft. high. S. of this ridge the mass of the Adirondac Mts. rises to the height of 6000 ft. Along the E. coast of N. Amer. a lower ridge of Laurentian rock is seen in Newfoundland and in N. B. In the Old World rocks of this age do not appear so extensively. They have been recognized in Nor. and Swe., in the Hebrides, and in Bohemia, but it is in N. Amer. that we may best investigate their nature. They are very different in their external aspect from the silt and mud, the sand and gravel, and the shell and coral rocks of the modern sea. Yet the difference is one in condition rather than in composition. Deeply buried in the earth under newer sediments, they have been baked until sandstones, gravels, and clays have become crystalline, as gneiss, mica-schist, hornblende-schist, and quartzite. In like manner, certain finer calcareous sediments have been changed into Labrador feldspar, and what were once common limestones appear as crystalline marbles. Geologists long looked in vain for evidences of life in the Laurentian period, but one well marked animal fossil has at length been found in the Laurentian of Canada—*Eozoön Canadense*, a gigantic representative of one of the lowest forms of animal life. The existence of such creatures supposes that of other organisms on which they could feed, but no traces of these have been observed.

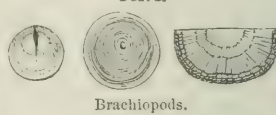
III. **THE PALÆOZOIC TIME.**—(1) *The Cambrian, or Primordial.*—Between the Laurentian period and the age which we call Primordial, a great gap exists in our knowledge of the succession of life, representing a vast lapse of time, in which the Laurentian sediments were altered, and another immense series of beds, the Huronian and Lower Cambrian, were formed in the bottom of the sea. In Bavaria a great series of gneissic rocks corresponding to the Laurentian has been found. Above these are the Hercynian mica-slate and primitive clay-slate. In Eng. the Longwynd group of rocks in Shropshire and in Wales, and their equivalents in Ire., appear to be the immediate successors to the Huronian, and have afforded some obscure worm-burrows and fragments of crustaceans. These rocks show a marked advance in

life. In Ire. the curious *Oldhamia* appears to occur in rocks equally old. In the Middle Cambrian, various forms of marine life abound. The beds of the Middle and Upper Primordial are especially rich in crustaceans of the order

Trilobites. The Primordial sediments must have at one time been very widely distributed, and must have filled up many of the inequalities produced by the contortion of the Laurentian beds. Their thicker and more massive portions are necessarily along the borders of the Laurentian continent; and as they in their turn were raised up into land, they became exposed to the denuding action first of the sea, and afterward of the rain and rivers.

(2) *The Siluro-Cambrian, or Lower Silurian.*—In N. Amer. the great Trenton group of limestones, with the Utica shale and Hudson River group, is remarkable for its extensive distribution and the thick limestones which it contains. The Trenton limestone can be traced over 40 degrees of lon., and throughout this space it is composed almost entirely of comminuted corals, crinoids, and shells. The muddy and sandy deposits of the Utica and Hudson periods which succeed are almost as extensive. The Siluro-Cambrian presents us with a definite phys. geog., which is a key to the life-conditions of the time. In this period the N. currents had deposited in the sea 2 long submarine ridges running to the S. from the extreme ends of the Laurentian nucleus, constituting the foundations of the Rocky Mts. and the Alleghanies. Between these the extensive triangular area now constituting the greater part of N. Amer. was a shallow oceanic plateau,

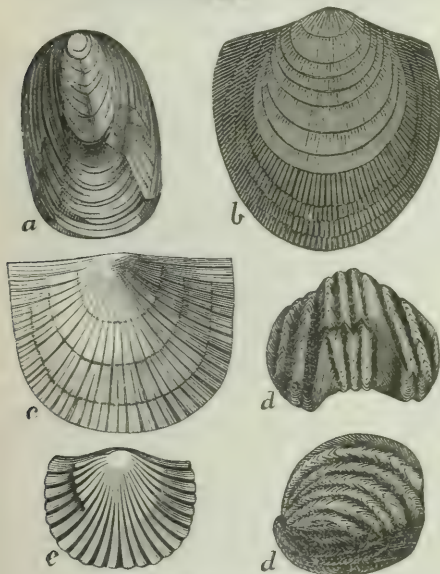
FIG. 1.



Brachiopods.

sheltered from the cold polar currents by the Laurentian land on the N., and separated by the ridges already mentioned from the Atlantic and Pacific. It was on this great plateau of warm and sheltered ocean that the Silurian fauna lived. During the long Silurian period the great Amer. plateau underwent many revolutions, sometimes being more deeply submerged, and having clear water tenanted by vast numbers of shell-fishes; at others rising, so as to become shallow and to receive deposits of sand and mud. In Europe there seems to have been a great internal plateau bounded by the embryo hills of W. Europe on the W., and harboring a very similar assemblage of creatures to those existing in Amer. Further, during the 2 Silurian periods themselves there were great changes. Previous to the beginning of the age both plateaus seem to have been invaded by sandy and muddy sediments, and these circumstances were not favorable to the preservation of organic remains. It is further to be observed, in the case of these beds, that if we begin at the W. side of Europe and proceed easterly, or at the E. side of Amer. and proceed westerly, they become progressively thinner, the greater amount of material being deposited at the edges of the future continents. In the animal life of this period we may remark the vast abundance of corals. The polyps were represented in the Silurian seas by a great number of allied forms, equally effectual with those of the modern ocean in the work of secreting carbonate of lime in stony masses, and therefore in the building up of continents. Zoologists separate the rugose corals and the tabulate corals of the Silurian from those of the modern seas. Next to the corals we place the crinoids, or stonelielias, creatures realizing a new creative idea, to be expanded into all the multifarious types of the star-fishes and sea-urchins. A typical crinoid consists of a flexible jointed stem, composed of short cylindrical disks, a box-like body on top, and fine radiating jointed arms furnished with branches, or fringes, all articulated and capable of being flexed in any direction. Such a creature has more the aspect of a flower than an animal; yet it is really an animal, and subsists by collecting with its arms and drifting into its mouth minute creatures floating in the water. Among

FIG. 2.



Brachiopods from the Silurian.

shell-fishes there were not only nautili like ours, but a great number of species have been discovered, many as much as 12 ft. in length, and accounts have been given of individuals of much larger growth, which must have been in those days the tyrants of the seas. Among the soft shell-fishes of the Silurian we meet with the Trilobites, represented by many species; while an allied group of shell-fishes of low organization but gigantic size, the Eurypterids, came in with the Upper Silurian, and had powerful limbs, long flexible bodies, and great eyes in the front of the head.

3. *The Silurian proper, or Upper Silurian.*—The central mass of this formation in E. Amer. is the great Niagara limestone, constituting the abrupt escarpment over which Niagara pours its waters. Under the Niagara limestone are the sandy and pebbly beds of the Medina and Oneida formations, and above it, in the typical N. Y. regions, are shallow water sandstones, marls, and magnesian limestones, constituting the Salina group, supporting a mixed calcareous and argillaceous series, the Lower Helderberg group. In its

FIG. 3.



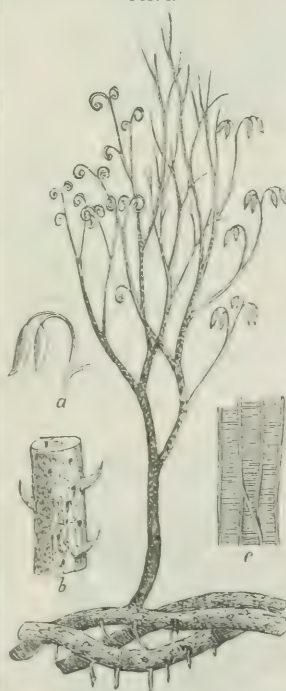
Pteraspis, a mottled fish of the Upper Silurian.

upper member we find the first appearance of fishes and of land-plants. The land-plants of the Upper Silurian are confined to a few species, representing members of the family

of club-mosses. The fishes come in here as forerunners of the dynasty of the Vertebrates, which from that day to this have been the masters of the world, and which culminate only in man himself. They appear to have had cartilaginous skeletons, shagreen-like skin, strong bony spines, and trenchant teeth, and they asserted their claims to dominancy by being predaceous and carnivorous creatures, which must have rendered themselves formidable to their invertebrate contemporaries.

(4) *The Devonian, or Erian.*—In this age our knowledge of land-plants greatly increases, and our continents were more definitely assuming their present forms. The lowest Devonian beds in the Pa. and N. Y. series are sandy deposits, the Oriskany and Schoharie sandstones. These are succeeded by a great oceanic limestone rich in corals, and named, from its concretions of hornstone, an impure flint, the Corniferous limestone. Associated with it are the Hamilton and Genesee shales. Above these are the sandy and muddy beds known as the Portage and Chemung groups; still rich in marine fossils, but holding also many fossil plants. In the more eastern part of Amer., as along the Appalachian ridges and in Gaspé and N. B., the great marine limestone is absent, and shallow water and littoral beds, in some places rich in land-plants, are alone developed. Sand and mud and pebble banks were almost universal over our 2 great continental plateaus in the Older and Newer Devonian. But in the Middle there were in some places oceanic areas with coral reefs; in others, shallow flats and swamps rich in vegetation. Had we lived in that age, we should not have seen great continents like those that now exist, but we could have roamed over lovely islands with breezy hills and dense lowland jungles, and we could have sailed over blue coral seas, glowing below with all the fanciful forms and brilliant colors of polyp-life, and filled with active and beautiful fishes. From the abundant life of the Devonian period we may select its corals, its fishes, and its land-plants. The fishes occur only in the newer beds of this formation, and are not of large size nor very abundant. It is to be observed that they indicate the existence of 2 distinct types of fishes—the Ganoids, protected with bony plates and scales, and the Placoids, or shark-like fishes—and that in the existing world these fishes are regarded as occupying a high place in their class. With the Devonian there comes a vast increase to the finny armies; and so characteristic are these that the Devonian has been called the Age of Fishes. Among the plants of the Devonian, those of the genus *Psilophyton*, of which there are several species, grew on swampy flats liable to inundation. They constitute the most characteristic and abundant members of the Lower Devonian flora. More distinctly allied to the modern club-mosses were the *Lepidodendron*, gigantic arborescent club-mosses or Lycopodiums. Another feature of this anc. vegetation was the occurrence of dense brakes of *Calamites*, plants which were exaggerations of the modern Equisetums, attaining to a diameter of several inches, and to a great height. Probably allied to the *Calamites* were the beautiful star-leaves of the genus *Asterophyllites*. The ferns are among the most beautiful plants of the modern world in point of foliage, and they are very anc. in regard to geological time, making their appearance abundantly in the Middle Devonian. There seems to have been in the Devonian a prevalence of forms of ferns allied to the modern genera *Hymenophyllum* and *Trichomanes*. There were also tree-ferns. Of all the plants of the Palæozoic forests, the most singular are the *Sigillaria*. They had tall slender stems, with vertical rows of narrow 2-nerved leaves. Rising still higher in the vegetable kingdom, we reach unquestionable Gymnosperms in the pine trees of the genus *Dadoxylon*, whose drifted trunks, preserved in stone by the infiltration of silicious or calcareous matter, occur in the sandstones of N. Y., O., and N. B. The oldest known remains of insects were found in the Devonian rocks of N. B.

FIG. 4.



Psilophyton princeps: a, fruit; b, scalariform tissue of the axis, highly magnified; c, cross-section of the trunk.

infiltration of silicious or calcareous matter, occur in the sandstones of N. Y., O., and N. B. The oldest known remains of insects were found in the Devonian rocks of N. B.

(5) *The Carboniferous.*—That age of the world's list, which, from its richness in vegetable matter destined to be converted into coal, has been named the Carboniferous, is in relation to living beings the most complete of the Palæozoic periods. In it those varied arrangements of land and water which had been increasing in perfection in the previous periods attained to their highest development. In it the forms of animal and plant life culminated. The Permian, which succeeded, was but the decadence of the Carboniferous, preparatory to the introduction of a new order of

things. The complete Carboniferous series may be arranged in the following subordinate groups: (1) *The Upper Coal Formation*, containing coal-formation plants, but not produc-

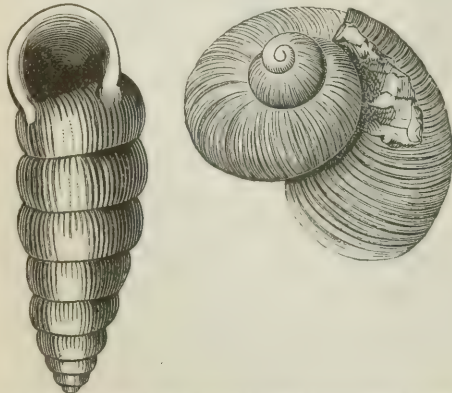
FIG. 5.



Sigillaria and *Lepidodendron*, restored.

tive coals. (2) *The Middle Coal Formation*, containing the productive coal-beds. (3) *The Millstone-grit Series*, with a few fossil plants and thin coal-seams, not productive. (4) *The Carboniferous Limestone*, holding marine fossils. (5) *The Lower Coal Measures*, holding some of the fossils of the Middle Coal Formation, and thin coals not productive, but differing both in flora and fauna from the Upper Devonian. The most remarkable facts in the Carboniferous period are its land-life, the introduction of reptiles, and the culmination of the Palaeozoic flora, accompanied with vast accumulations of vegetable matter in the form of coal. In the Carboniferous, insects existed. The winged insects belong to 3 of the orders into which modern insects are divided. Conspicuous among them are representatives of the cockroaches. Another group, represented by many species in the coal forests, was that of the may-flies and shad-flies or ephemeras. Another group of insects was that of the weevils, a family of beetles, whose grubs must have found plenty of nuts and fruits to devour, and also the gally-worms or millipedes seem to have swarmed in the coal forests. A

FIG. 6.



The two oldest Land-Snails, *Pupia Vetusia* and *Cionulus priscaus*.

few species of scorpions and spiders, very like those of the modern world, have been found in the coal-measures, where we also meet, for the first time, the land-snails, so

familiar now in every part of the world. Perhaps the most fish-like of the reptilian animals of the Carboniferous are the curious creatures which constitute the genus *Archegosaurus*. Their large heads, short necks, supports for permanent gills, feeble limbs, and long tails for swimming, show that they were aquatic creatures, possessing lungs and true feet, better adapted for swimming than for creeping. From these creatures the other coal reptiles diverge, and ascend along 2 lines of progress, the one leading to gigantic crocodile-like animals, provided with powerful jaws and teeth, the other leading to small and delicate lizard-like species, with well-developed limbs, large ribs, and ornate horny scales and spines. Of the trees of the Coal period, we no-

FIG. 7.



Reptiles of the Carboniferous Period, restored.

tice that which is the most conspicuous tree in the swampy levels—the *Sigillaria*, or seal tree, so called from the stamp-like marks left by the fall of its leaves. These trees present tall, pillar-like trunks, often ribbed vertically with raised bands, and marked with rows of scars left by the fallen leaves. They are sometimes branchless, or divide at top into a few thick limbs, covered with long, rigid, grass-like foliage. On their branches they bear long, slender spikes of fruit, and we may conjecture that quantities of nut-like seeds scattered over the ground around their trunks are their produce. The roots of these trees were perhaps more singular than their stems; spreading widely in the soft soil by regular bifurcation, they ran out in long snake-like cords, studded all over with thick cylindrical rootlets, which spread from them in every direction. They resembled in form those cable-like root-stocks of the pond-lilies which run through the slime of lakes. Along with those trees we observe others of a more graceful and branching form, the successors of those *Lepidodendra* already noticed in the Devonian, and which still abound in the Carboniferous, and attain to larger dimensions than their older relations.

(6) *The Permian* formation does not occur in E. Amer., but in the W. it is represented by limestones and sandstones of considerable thickness and extent. In Europe the magnesian limestone (the *Zechstein* of the Gers.) is its prin. deposit. With respect to the first point above named, the earth's crust was subjected in the Permian period to some of the grandest movements which have occurred in the whole course of geologic time, and we can fix the limits of these with some distinctness. If we examine the Permian rocks in Eng. and Ger., we shall find that everywhere they lie on the upturned edges of the preceding Carboniferous beds. In other words, the latter have been thrown into a series of folds, and the tops of these folds have been more or less worn away before the Permian beds were placed on them. But if we pass on to the E., in the great plain between the Volga and the Ural Mts., where, in the "anc. kingdom of Perm." the greatest known area of these rocks is found, we find, on the contrary, that the Permian and Carboniferous are conformable to one another.

IV. THE MESOZOIC TIME.—(1) *The Trias*.—The red sandstones and their associated beds are the best known Amer. representatives of these rocks. They are remarkable for their fossil footprints of gigantic bird-like reptiles, and also for the ejections of volcanic rocks which have been poured through them. With reference to life, the Trias is remarkable for the introduction of many forms of reptilian life, heralding the Age of Reptiles, and for the first appearance of the Mammalia, or ordinary quadrupeds.

(2) *The Jurassic*.—The Trias is succeeded by a great and complex system of formations, usually known as the Jurassic from its admirable development and exposure in the range of the Jura, but which the Eng. geologists often name the "Oolitic," from the occurrence in it of beds of oolite or roe-stone. This rock, of which the beautiful cream-colored limestone of Bath in Eng. is an illustration, consists of an infinity of little spheres, like seeds or the roe of a fish. Under the microscope these are seen to present concentric layers, and often to have a minute grain of sand or fragment of shell in the centre. They are, in short, miniature concretions, produced by the aggregation of the calcareous matter around centres by a process of molecular attraction to which fine sediments, and especially those containing much lime, are very prone. The Jurassic was emphatically the Age of Reptiles. Among the most remarkable of these were the great terrestrial group of Dinosaurs, many of them huge in

bulk, some of them biped, and combining the characters of the modern Reptilia with features now restricted to birds and mammals. The flying reptiles of the Pterodactyl group were not less marvellous. Species of these creatures from W. Amer. must have been bat-like reptiles, with wings more than 20 ft. in expanse. Some of these, like *Plesiosaurus*, had short bodies and long, swan-like necks; others, like *Ichthyosaurus*, had gigantic heads and long, flexible bodies; others, like *Mosasaurus*, rivalled the fabled sea-serpent in the immense extension of their bodies. The Jurassic period also presents numerous small mammals allied to the humbler marsupials of New Hol., and one very remarkable type of bird, the *Archæopteryx*, which, with the feet and gen. form of a modern percher, combined peculiarities of tail and wings which tend toward the reptiles. The Jurassic shores were clothed with an abundant flora, which changed considerably in its form during the lapse of this long time. Perhaps no feature of this period is more characteristic than the great abundance of those singular plants, the Cycads, which in the modern flora are placed near to the pines, but in their appearance and habit more resemble palms.

(3) *The Cretaceous*.—At the close of the Triassic the E. and W. continents seem to have been as extensive as at present. The Cretaceous began with a great subsidence, more complete in the E. than in the W. hemisphere, but very widespread in both. This led to the deposition over the Jurassic rocks of the chalk of W. Europe—a very remarkable rock, produced only in the abyssal depths of the ocean: and associated with this are extensive deposits of greensand, made up largely of grains of the mineral glauconite.

IV. TERTIARY, OR NEOZOIC TIME.—(1) *The Eocene*.—This has been very thoroughly studied in the Tertiary basins of Paris and Lond. The Lond. clay is Lower Eocene, but in the beds of the Isle of Wight and neighboring parts of the S. of Eng. we have the Middle and Upper members of the series. They are not so largely developed as in the Paris basin, where we have a thick marine limestone, the *calcaire grèsier*, abounding in marine remains, and in some beds composed of shells of Foraminifera. The sea in which this lime-

is 3 ft. 4 inches in length, and when provided with its soft parts, including a long snout or trunk in front, it must have been at least 5 or 6 ft. long. Such a head, if it belonged to a quadruped of ordinary proportions, must represent an animal as large in proportion to our elephant as an ele-

FIG. 9.



Sinotherium giganteum, from the Miocene of India.

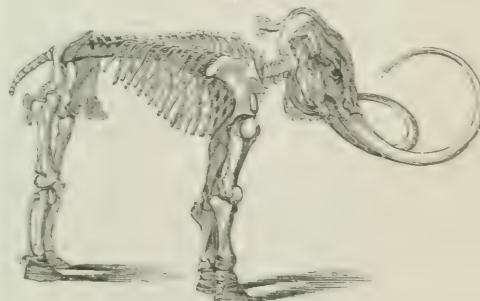
phant to an ox. The Miocene is also remarkable for its flora, which is of very modern type, but presents the remarkable peculiarity that plants now confined to the more temperate regions extended N. to Greenland and Spitzbergen.

(3) *The Pliocene*.—Beds of this age occur along the coast of N. and S. C., containing from 40 to 60 per cent. of living species of shells, and the calcareous and sandy beds known in Eng. as clay may be regarded as a representative in that country. With regard to animal life, many of the old gigantic pachyderms have disappeared, and in their stead some familiar modern genera were introduced. The Pliocene was terminated by the cold or Glacial period, in which a remarkable lowering of temperature occurred over all the N. hemisphere, accompanied by a great subsidence, which laid all the lower parts of our continents under water. This terminated much of the life of the Pliocene, and replaced it with boreal and arctic forms, like the great hairy Siberian mammoth and the woolly rhinoceros.

(4) *The Post-pliocene, or Glacial*.—The warm climate and rich vegetation of the Miocene extended far into the Pliocene; but as the pliocene age went on, frost settled down upon the N. hemisphere, and a change took place in its vegetable productions. This Pliocene refrigeration appears to have gone on increasing into the Post-pliocene age, and attained its maximum in the Glacial period, when our continents were covered with a sheet of ice. Then occurred a very gen. subsidence, in which they were submerged under the waters of an icy sea, tenanted by marine animals now belonging to boreal and arctic regions. After this they rose to constitute the dry land of man and his contemporaries.

The Post-glacial and Modern.—In the Post-glacial, for the first time in the great series of continental elevations and depressions, we find the land peopled with familiar forms. Nearly all the modern European animals have left their bones in the deposits which belong to this period, but with them are others either locally or wholly extinct. Among the

FIG. 10.

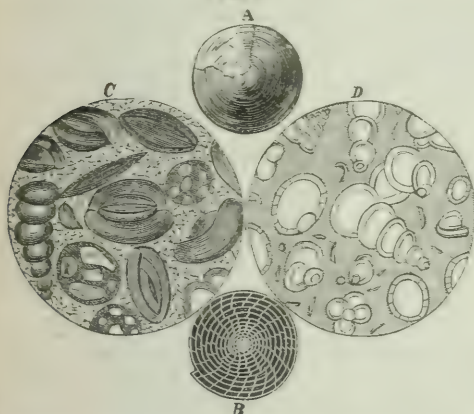


The Mammoth.

extinct animals are the mammoth, the Tichorine rhinoceros, and the great hippopotamus, the *Machairodus*, and the cave bear. Among the locally extinct are the reindeer, the lion, and the Cape hyæna. In the Post-glacial and Modern deposits we have remains of man and his works, and in the Modern the geological ages pass into modern hist. [From orig. art. in *J. Sci. Univ. Cyp.*, by PROF. J. W. DAWSON, LL.D.]

Geology, Chemical. The science of geol. is concerned not only with the phys. agencies which have presided over the changes of the earth, but with the chemical agencies which have been arranging from the elements of the globe their present combinations. Chem., therefore, finds a wide application in geol., and to this study we give the name of chemical geology. Beginning with the rock-masses, we

FIG. 8.



Foraminiferal Rock-builders: A, *Nannulites* *brigitte*, Eocene; B, the same, showing chambered interior; C, Miocene limestone, magnified, Eocene, Paris; D, chalk, section magnified, Cretaceous.

stone was deposited, a portion of the great Atlantic area of the period, became shallow, so that beds of sand succeeded those of limestone, and finally it was dried up into lake-basins, in which gypsum, magnesium sediments, and silicious limestone were deposited. These lakes or ponds were no doubt resorted to by animals from all the surrounding country in search of the saline mud and water which they afforded. Hence there occur vast numbers of bones of Mammalia, and in some marly beds numerous footprints occur. The mammals were largely pachyderms of extinct genera, but Carnivora and Marsupials are also represented.

(2) *The Miocene*.—In the mammalian life of this period we find three remarkable points of difference as compared with the Eocene: (1) We now find a great number of more specialized and peculiar forms. (2) We find in the latter period a far greater proportion of large carnivorous animals. (3) We find much greater variety of mammals than either in the Eocene or the Modern, and a remarkable abundance of species of gigantic size. The Miocene is the culminating age of the Mammalia, and this accords with its remarkably genial climate. In Europe the beds of this age present for the first time examples of the monkeys. Among carnivorous animals we have cat-like creatures, one of which is the terrible *Machairodus*, distinguished from all modern animals of its group by the long, sabre-shaped canines of its upper jaw, fitting it to pull down and destroy those large pachyderms which could have easily shaken off a lion or a tiger. Here also we have the elephants, the mastodon, a great, coarsely-built, hog-like elephant, some species of which had tusks both in the upper and lower jaw: the rhinoceros, the hippopotamus, and the horse, all of extinct species. We have also giraffes, stags, and antelopes. Here also, for the first time, we find the curious and exceptional group of Edentates, represented by a large ant-eater. Of all the animals of the European Miocene, the most wonderful and unlike any modern beast is the Dinotheria, a quadruped of somewhat elephantine form. Some yrs. ago a huge haunch-bone supposed to belong to this creature was discovered, and from this it was inferred that the Dinotheria may have been a pouched animal, perhaps allied to the kangaroos. The skull

have to consider first, the mode of their generation (geogeny); second, their composition (geognosy). We discern a time when the oldest Palaeozoic rocks were not yet deposited, and when the Eozoic rocks formed the surface. Going further, we may form some notion of the generation of the Eozoic rocks, and speculate upon the condition of the earth when even these were not. The hypothesis of the igneous origin of the earth, supposing a liquid globe condensing from a vaporous mass, is now universally admitted, and starting from this we have the basis of a scheme of chemical geogeny. The conclusion as to the earth's interior is that it is solid, and that solidification commenced at the centre. C. G. has, however, only to do with the superficial portions, and analogies lead us to conclude that the primitive surface was irregular and consisted of a compound of silicates. Upon this, as cooling went on, there would be precipitated the acid compounds of chlorine and sulphur from the primeval atmosphere, by which the silicates would be decomposed. This process would soon terminate, and be succeeded by the decomposition of portions of the silicates by waters holding in solution carbonic acid. From this process would result the separation of silicate and the formation of carbonates. These being carried down to the sea in solution, the alkaline carbonate would, from the dissolved chloride of calcium, precipitate carbonate of lime, with the production of chloride of sodium; we thus get a conception of the process which may have given rise at once to the formation of limestone, clay, silica, and sea-salt. Coming now to the chemical composition of the rocks, we distinguish them into so called crystalline and uncrystalline divisions; but to discuss the whole question of their varieties would exceed the limits of this sketch. It will, however, be necessary to give some notion of the different classes of crystalline silicated rocks, considered geognostically: 1. Those which have been deposited from water, and are designated indigenous rocks. 2. Those which are of igneous origin, and called eruptive or exotic rocks. 3. Those which have been deposited from solution in fissures of previously formed rocks, and have been called endogenous rocks.

The origin and mode of formation of the indigenous crystalline rocks are supposed by one school to be plutonic—i.e. to have been formed from the successive cooling of the primitive crust of the earth, and to have acquired the stratiform arrangement observed in their constituent minerals from movements in the cooling mass. These ancient crystalline rocks are supposed to be neither stratified nor eruptive rocks in the accepted sense of these terms, but to partake of the nature of both of these classes. The relations of the internal heat of the earth are very important in connection with geological chem. The earth is slowly cooling, and at an early period in its hist. the augmentation of heat in descending must have been much more rapid than it now is, so that atmospheric waters penetrating the crust to no great depth would attain a temperature at which their solvent power would be greatly increased. It has been found that water, either pure or impregnated with the saline matters often met with in mineral waters, has its solvent power greatly exalted when heated to temperatures above the ordinary boiling-point. The Eozoic or crystalline stratified rocks consist of several distinct series, deposited, like the later formations, through long ages, and sustaining to each other such relations as to show that one series had been partially broken up or destroyed before the deposition of the succeeding one. A study of the elements of these crystalline rocks shows that essentially the same chemical agencies were at work in those earlier times as at present, and that the differences are rather in kind than in degree. The agencies of organic life are among the most important of those which from a very early age have contributed to changes in the chem. of the earth. We have seen that the condition of the first-formed globe was one of general oxidation, and after the affinities of the stronger acids were satisfied, the whole of the sulphur must have existed as sulphates, all of the carbon either as carbonates or free carbonic acid, all of the hydrogen as water, etc. A great prob. to be solved is that of the deoxidation of these elements as a condition preliminary to their entering into new combinations; and this can be effected in one way only—viz. by the intervention of organic life. It is the function of vegetation under the stimulus of solar light and heat to decompose carbonic acid and water, setting free oxygen, and giving rise to hydrocarbonaceous bodies, which in many cases, after having served the purposes of plants, become in turn a part of living animals. When in the course of nature plants and animals die, their remains, in a dead or disorganized form, constitute what is spoken of as organic matter. This, by taking up oxygen either in the process of combustion or of slow decay, is again transformed into carbonic acid and water. While living, the vegetable organism effects the reduction of carbonic acid and water, and is thus the source of carbon and hydrogen as they appear in the earth in the various forms of graphite, coal, petroleum, and hydrocarbon gases. In addition to this, growing plants and animals reduce sulphates, as appears from the sulphuretted compounds which occur in many of them. These organisms, moreover, by a process of selection, remove from the media in which they live certain mineral elements, which through this intervention become fixed and concentrated. Thus, the phosphates of the soil through vegetation are accumulated in the bones of vertebrate animals.

There is another agency which is not less important in its relations to the chem. of the rocks, and that is the slow sub-aerial decomposition of the crystalline silicated rocks under the influence of atmospheric agents. In those regions of the earth from which comparatively recent changes have not removed the products of decay this process is seen to have attacked the feldspars. In like manner, the protoxide silicates have given up in a soluble form the lime and magnesia which they contained, together with a part of the silica, leaving behind with the remaining silica the oxides of

iron and manganese raised to a higher degree of oxidation. This process of decay is seen to have penetrated to a depth of several hundred ft. in many regions, and the beds and veins of metallic sulphides inclosed in the decayed crystalline rocks have undergone a somewhat similar change. This process of decay has been effected by the action of the carbonic acid and oxygen of the air dissolved in atmospheric waters, which, while oxidizing iron and sulphur, have removed in the form of carbonates, the bases lime, magnesia, and the alkalis, together with a portion of silica, which was liberated from its compounds in a soluble form. Such a process as this was active from a very early period; and this decay was a preliminary to the process of denudation by the action of water, which removed the clay and separated it from the unchanged quartz; which latter, by its further attrition, gave rise to grains of sand. The carbonates which in a dissolved form have come from the decaying crystalline rocks, and have been conveyed to the sea, have played an important part in the chem. of its waters. The early sea contained a great predominance of lime and magnesia salts relatively to the soda salts; in other words, a much larger part of the chlorine which the ocean from the first contained was combined with earthy bases, and a less portion consequently with sodium, than in the modern ocean. In strict accordance with this is the fact that the saline mineral waters of the older rocks, which may be looked upon as fossil sea-waters imprisoned since a very early date, contain a great predominance of chlorides of calcium and magnesium, while modern sea-waters have no chloride of calcium.

Another not less important factor in the chem. of the sea has been evaporation. Climatic conditions have over large areas favored the evaporation of waters, as is now the case in certain desert regions, and inclosed sea-basins have often been subject to this action. A further continuation of the process of evaporation would give rise to the separation of rock-salt, and at a later stage to salts like carnallite, tachydrite, and karstenite, which are found in a solid form in certain saliferous formations, with all the evidences of a slow evaporation of sea-water. Closely related to this subject is that of saline and alkaline mineral waters: of these the first consist of the elements of the ocean-waters imprisoned in the anc. strata, sometimes as fossil sea-water, and at other times as the bitterns or the solid salts resulting from its evaporation. From these sources, which in fissured and dislocated strata are in communication with atmospheric waters, the saline matters, more or less diluted, are brought to the surface as mineral springs. The source of alkaline springs is to be sought in the slow subterranean decomposition of feldspathic sediments, which yield to infiltrating waters carbonated or silicated alkalis; and from the mingling of these with the saline waters already mentioned various intermediate kinds of waters are produced. The origin of volcanic products is a problem of great interest in geol. The various molten rocks and lavas poured out from beneath the surface of the earth embrace great varieties in chemical composition, and are moreover accompanied by watery vapor and several gaseous products. The origin of all these is probably to be sought in the action of heat upon stratified rocks. [From *orig. art. in J.'s Univ. Cyc.*, by Prof. T. STERRY HUNT, F.R.S., LL.D.]

Geometrical Mean, the second of 3 continued proportionals, or the second of the terms of a geometrical progression containing 3 terms. The G. M. of 2 numbers is equal to the square root of their product. If we assume 2 terms, and insert any number of terms, so that the whole forms a geometrical progression, all the inserted terms are called G. M. to these two.

Geometrical Progression is a series of numbers, each one of which is the product of the preceding one multiplied by a common and constant ratio. A G. P. may be increasing or decreasing, according as the constant ratio is greater or less than unity.

Geometry [Gr. from *γῆ*, the "earth," and *μετρον*, "measure"], that branch of math. whose object is to investigate the properties and relations of geometrical magnitudes. The subjects treated of in G. are *volumes, surfaces, lines, and angles*. A vol. is a limited portion of space; it has 3 dimensions—length, breadth, and thickness or height. That which separates a vol. from the rest of space is called a *surface*; a surface has length and breadth, but not thickness. If we conceive a surface to be made up of 2 parts, that which separates these parts is called a *line*; a line has length, but neither breadth nor thickness. If we conceive a line to be made up of 2 parts, that which separates these parts is called a *point*; a point has position, without length, breadth, or thickness. These are the fundamental concepts of G. Considered in a reverse order, we may conceive a line to be generated by a point moving according to some fixed law; a surface to be generated by a line moving according to some fixed law; and a vol. to be generated by a surface moving according to some fixed law. In taking this view of the subject we have the additional concept of *direction*. The difference of direction of 2 lines, or the inclination of one line to another, is called an *angle*.

The object of G. is to deduce the properties and relations of geometrical magnitudes. A *property* of a geometrical magnitude is an attribute that is common to every individual of the class to which the magnitude belongs; thus, it is a property of a triangle that the sum of its 3 angles is equal to 2 right angles. A property may be *characteristic*, or *secondary*. A characteristic property is one that is peculiar to a particular class of magnitudes, but is not possessed by any other class; thus, it is a characteristic property of a triangle that it has but 3 angles. A secondary property is one that is shared by magnitudes of other classes; thus, it is a property of a square that its area is equal to the product of its perimeter by $\frac{1}{2}$ the radius of the inscribed circle. This property is secondary, because it is a property common to all regular polygons. The enunciation of a characteristic property is a sufficient definition of a magnitude. In fact, the definition

of a magnitude usually consists of a statement of one or more of its characteristic properties: thus, we say that a triangle is a polygon having 3 angles: it might also be defined as a polygon of 3 sides. Since the same magnitude may have several characteristic properties, it follows that the same magnitude may have several definitions. The relations deduced by geometrical reasoning are of 2 kinds—those of equality or inequality, and those of proportionality.

The truths of G. form a chain of dependent propositions which may be divided into 3 classes. The first class of truths are those implied in the definitions; for example, when we say that a quadrilateral is a polygon of 4 sides, we imply that such a figure may exist. The second class of truths are self-evident or intuitive: these are called axioms: thus, the proposition that a whole is greater than any of its parts is self-evident—i. e. its truth is universally admitted. The third class of truths are those which are inferred from definitions, axioms, and truths already established: these are called demonstrative truths. The train of reasoning by which a geometrical truth is inferred from truths already established is called a demonstration. Beside the ordinary methods of demonstration, there is one much used by the ancients, in their higher investigations, and known as the *method of exhaustions*. This method is closely connected with the modern *method of limits*. As an example of this method we may instance the mode of determining the area of a circle in plane G. It is first shown that 2 regular polygons, having the same number of sides, can be constructed, the one inscribed within, and the other circumscribed about, a given circle whose areas differ from each other by less than a given area. By continually increasing the number of sides, this difference is continually diminished or *exhausted*; as the 2 polygons approach each other in area, each becomes more nearly equal to the circle; finally, when the number of sides is made infinitely great—i. e. when the limit is reached—the 2 polygons become equal to each other and to the circle. This method of proceeding enables the geometer to find an approximate value for the area of the circle true to any desired degree of accuracy.

WM. G. PECK.

Geophagism [Gr. γῆ, "earth," and φάειν, "to eat"], or **Dirt-eating**, a habit among uncivilized nations. The Ottomans of S. Amer. eat, we are informed, a pound and a half of ferruginous clay daily; and the negroes and lower classes of whites in some of the U. S. have a similar practice. In Lapland and N. Scandinavia bergmehl is mixed with flour in making bread, but it is by no means unlikely that the diatoms it contains are nutritious to some extent. Dirt-eating is also one of the forms of the *pica, malacia*, or depraved appetite, common among chlorotic young women.

George, duke of Sax., the second son of the late King John of Sax., was b. Aug. 8, 1832, and gave the first proofs of his ability in the campaign of 1866. In the beginning of the Franco-Ger. war he commanded the first division of the Sax. army corps, but after the battle of Metz he received the command of the whole army corps, and led it with distinction in the encounters of Nouart and Beaumont, in the battle of Sedan, and during the siege of Paris.

George I., the first Hanoverian king of G. Brit., b. at Osnabrück May 28, 1660, was the son of Ernst August, elector of Hanover, and great-grandson of James I. of Eng. In 1698 he became elector, and succeeded Anne as sovereign of G. Brit. in 1714; was never popular in Eng., which he in turn disliked, although he served Brit. interests faithfully; his private character was thoroughly bad. D. June 10, 1727.

George I., king of Gr., with the title "king of the Hellenes," b. at Copenhagen Dec. 24, 1845, second son of the king of Den. He was elected Mar. 30, 1863, King Otto having been deposed Oct. 23, 1862. The Cretan war (1866-69) caused some complications with foreign powers, and during the last yr. the boundaries of the kingdom have been extended. In 1867 he married a niece of the Rus. czar.

George II., of G. Brit., b. at Hanover Oct. 30, 1683; married in 1705 the princess Wilhelmina Carolina of Brandenburg-Anspach; succeeded his father in 1727. His Eng. reign was adorned by men great in art, letters, war, and diplomacy. He took command at the battle of Dettingen (1743), and won a victory in spite of tactical blunders. Other great events of his reign were the battle of Minden 1739, of Fontenoy 1745, the second Stuart invasion 1745-46, the wars of Clive in India, and the conquest of Canada. The king was a man of obstinate temper and of vicious habits, but he advocated liberal public measures, by means of which Eng. made great material and industrial progress. D. Oct. 25, 1760.

George III., of G. Brit., son of Frederick, prince of Wales, b. in Lond. June 4, 1738, succeeded his grandfather, George II., in 1760. He was the first Hanoverian king who had a Brit. education. He was a man of conscientious principles, but this was neutralized by his sluggishness, his obstinacy, his revengeful hostility to the opponents of his policy, and his partiality to his friends. The annals of his reign are replete with great events: the Sp. war of 1762-63, the Wilkes controversy 1762-82, the passage of the Amer. Stamp Act 1765, the publication of the Junius letters 1769-72, the Amer. Revolution 1775-83, the Fox and North coalition 1783, the Fr. Revolution 1789 *seq.*, the Irish Rebellion 1798, and the Napoleonic wars. The king's mind was naturally infirm, and in 1810 a fifth attack of insanity proved incurable. Blindness also supervened, and in 1811 the prince of Wales became regent. D. Jan. 29, 1820. His reign is memorable as a time of great literary and industrial activity.

George IV., king of G. Brit., b. Aug. 12, 1762; received a careful training, but became early conspicuous for loose moral habits; in 1781 joined the Whig opposition to his father's public policy; in 1791 he got into trouble with his Whig friends, and then became a Tory; married Caroline Amelia of Brunswick 1795, and in 1796 separated from her on the ground of her supposed adultery. In 1811 G. became regent, and in 1830 king. The wars with Nap. that of 1812-15 in N. Amer., the Catholic emancipation, the conquest of Aracan, the healthy advance of liberal ideas in G. Brit., and,

above all, the progress of the phys. sciences in Eng., are the events of his reign. (See THACKERAY, *The Four Georges, The Græville Memoirs*.) D. June 26, 1830.

George V., ex-king of Hanover. See CUMBERLAND AND TEVIOTDALE, DUKE OF.

George, SAINT, patron of Eng. since 1348, is reputed to have been born in Pal. in the third century, became, according to the legend, a prince in Cappadocia. He was a Chr., and suffered martyrdom at Nicomedia in 303, some say Apr. 23, for having torn down the edict of Diocletian against Chrs., the emp. himself being then in the city. He is venerated in the E. and Lat. chs., and even by the Mohammedans is regarded with great reverence. He is distinguished for his exploit of rescuing a king's daughter from a dragon; but this story is a mediæval invention. He is sometimes identified with G. of Cappadocia, a fuller, who in 361 was killed by the pagans. But authorities decide that they are not identical.

George (ENOCH), b. in Lancaster co., Va., in 1767; entered the M. E. ministry as an itinerant in 1790, while residing in N. C.; was made presiding elder in the Charleston (S. C.) dist. 1796, where his powerful eloquence and great zeal led to a large increase in the numbers and effectiveness of his denomination. In 1816 he was chosen a bp., after which his usefulness was still more conspicuous. He was a man of rare native abilities, and was widely known and beloved. D. Aug. 23, 1828.

George (WILLIAM S.), b. in Derby, Vt., Mar. 3, 1825; removed to N. H., and attended the common schools; at 13 yrs. of age commenced learning the trade of a printer, at 20 removed to Mass., became foreman, printer, and ed.; in 1862 removed to Mich.; won his chief success in journalism on the *Detroit Tribune*; became pub. and ed. of the *Lausling Republican* in 1868. D. Dec. 27, 1881.

George, Lake, in the State of N. Y., having Warren co. on the N. W. and Washington co. on the greater part of its S. E. border. Its length is 36 m.; breadth, from 1 to 3 m. It was the scene of important military operations during the Fr. and Indian war of 1755-59. The lake is 310 ft. above tide. Its outlet flows into Lake Champlain. The lake contains some 300 islands. Its waters are clear, and are, in some places, 400 ft. deep. It is sometimes called Lake Horicon, but its Indian name was Caniadierioit.

Georgetown, cap. of Brit. Guiana, at the mouth of the Demerara. It is very unhealthy. It is the seat of an Anglican bp. Pop. 47,175.

Georgetown, on R. R., cap. of Clear Creek co., Col., located in the heart of the Rocky Mts. in a beautiful valley, 51 m. W. of Denver. Two branches of Clear Creek run through the town. It is the centre of the great silver-region, and contains several large reduction-works. Pop. 1870, 802; 1880, 3294.

Georgetown, D. C., situated at the head of navigation on the Potomac, 125 m. from its mouth, is W. N. W. of Wash. G. was founded in 1751, and is the terminus of the Chesapeake and O. Canal, which extends 185 m. to the bituminous coal-fields in the Alleghany Mts. It has Georgetown Coll., the Acad. of the Visitation, under Catholic auspices, 2 sems. for young ladies, and several private acads., also Peabody Library and Linthicum Inst. Pop. 1870, 11,384; 1880, 12,578.

Georgetown, on R. R., cap. of Scott co., Ky., 12 m. N. of Lexington. It is situated in the heart of the "Blue-grass country," possesses good water-power, and has a coll. and 2 female sems. Pop. 1870, 1570; 1880, 2061.

Georgetown, cap. of Georgetown co., S. C., on R. R. and Winyaw Bay. It is a great turpentine section; has direct communication with New York by several lines of schooners. Pop. 1870, 3080; 1880, 2557.

Georgetown, on R. R., cap. of Williamson co., Tex., 28 m. N. of Austin. It is the seat of the "Tex. Univ." Pop. 1870, 479; 1880, 1354.

Georgetown College, D. C., founded in 1789, when the first building was erected; classes began in 1792, chartered by Cong. as a univ. 1815, med. dept. organized 1851, law dept. 1870; buildings were added from time to time, the last in 1854. Students can enter the coll. at any age, though young children are not admitted, and no previous scholastic attainments are required beyond the mere rudiments of knowledge. The applicant is examined, and placed in the class for which he is fitted by his previous course of study. For those who begin at the lowest point a 7 yrs.' course is required; this term may be shortened by extraordinary diligence or proficiency, but promotions are rarely made except at the close of the scholastic yr. No departure from the regular course is permitted. One fourth or one fifth of the students are non-Catholics. The schools of law and med. are conducted in Wash., and neither the profs. nor the students of these schools live within the coll. or form any part of the community directed by its superiors. The coll. is, and always has been, directed by the Jesuits. It has no endowments, and is supported by the fees paid for tuition. No school of theol. is carried on in connection with it.

Georgia [Rus. *Grusia*] has now no geographical significance, being divided into the Rus. govts. of Tiflis, Kutais, Elizabetopol, Baku, and Erivan; but it was formerly a kingdom, comprising the terr. S. of the Caucasian Mts., between the Black and the Caspian seas, and bounded S. by Asiatic Tur. and Per. After the death of Alexander the Great the Georgians established themselves as an independent people, and although they were conquered and made tributary several times by the Arabian caliphs, by Timoor, and by Per., they maintained a position as a state until the beginning of this century, when G. was merged into the Rus. empire. In 315 A. D. the Georgians were converted to Christianity, but at present many of them are Mohammedans. Their lang. forms a very interesting intermediate link between the Aryan langs. and the monosyllabic ones of E. Asia. Georgian women are, like the Circassians, celebrated for their personal beauty.

Georgia, jor'je-a (so named in honor of George I. of Eng.), one of the S. Atlantic States, and one of the original 13, lying between 30° 20' and 35° N. lat. and 80° 48' and 85° 38' W. lon.; bounded N. by N. C. and Tenn., E. by S. C. and



Georgia Seal.

the Atlantic, S. by Fla., and W. by Fla. and Ala.; extreme length from N. to S., 320 m.; extreme breadth from E. to W., 254 m.; area, 59,475 sq. m., or 38,064,000 acres.

Topography—Mountains, Rivers, Etc.—G. is well watered. Of the rivers running to the Atlantic the prin. are the Savannah, forming boundary between G. and S. C., and its affluents; the Ogeechee and Cannouchee; the Altamaha, formed by junction of Oconee and Ocmulgee, and their affluents, Little Ocmulgee and Appalachee; the Satilla and St. Mary's (between which is the great Okefenokee swamp) drain the S. E. The Withlacoochee and Alapaha, uniting in Fla. to form the Suwannee; the Ochlochonee, and the Flint and Chattahoochee, uniting at the Fla. line to form the Appalachian, are the prin. rivers flowing directly into the Gulf. There are also in the N. W. large affluents of the Ala., the Coosa, and some tributaries of the Tenn. Numerous islands along the coast, and 7 sounds between these and the mainland. Coast-line, about 480 m. The coast, for 20 m. inland, is low and swampy; at that distance it rises by terrace formation 70 to 100 ft. for 20 m. more, when a second terrace appears, rising gradually to 575 ft. above the sea in Baldwin co., 160 to 200 m. from the sea. Here the foot-hills begin, and rise in the W. and N. W. to 2500 and 4000 ft. The mt.-dist. covers 25 cos., lying mostly N. W. of the Chattahoochee. The hills run in nearly parallel ranges with each other, though with outlying spurs. There are many beautiful cataracts and waterfalls in this region.

Minerals and Mining.—Gold has been found in most of the cos. of the N. W. of the State. The value of the gold and silver (all placer gold has some silver, and most of that from the deep mines also) in 1880 was \$81,361, of which only \$332 was silver; in 1881 it was estimated at 150,000. From the organization of the Mint in 1793 to June 30, 1881, \$7,516,305 in gold and silver had been deposited there from G.; the whole production had probably exceeded \$10,000,000. There is, however, very little silver in the State. There is some copper and lead, much fossiliferous iron, and coal of good quality. The rarer metals are also found, though not abundantly. There are petroleum, gypsum, fluo-spar, talc, soapstone, asbestos, tripoli, barytes, hydraulic cement, and precious stones of the third or fourth rank; also many fossils.

Soil and Vegetation.—Soil of the alluvial lands very rich; trees—cypress, cedar, live oak, magnolia, gum tree, liquid amber, sweet bay, wild orange, palmetto, canes, etc.; the G. live oak is the finest in the country. The higher lands have a soil somewhat less fertile, but over a large region the stately G. yellow pine grows abundantly; other trees of the highlands are black walnut, chestnut, tulip tree, hickory, poplar, sycamore, beech, maple, ash, elm, fir, spruce, birch, and bay laurel. In the sandy lands there are pines and scrub oaks. Flowering shrubs are abundant. In S. E. G. oranges, lemons, bananas, olives, etc. come to perfection, and the prin. crops are rice, sugar-cane, sea-island and some upland cotton, sweet potatoes, and corn. In middle and S. G. cotton is the favorite crop, but clover, wheat, and Indian corn are also grown, and peaches, apples, pears, cherries, grapes, and melons are finer than almost anywhere else; tobacco, sorghum, ground-nuts, and both the sweet and Irish potato are largely grown. N. E. G. is mountainous, but has a moderately good soil for grain and grazing. N. W. G. is a fine farming country if well cultivated; wheat, corn, and the grasses grow well everywhere, and cotton in the river valleys. S. W. G. is all cotton and rice land. Forests cover nearly half the State.

Animals.—The black and brown bear, panther, and wild cat in N. E. and N. W. G.; the raccoon, opossum, woodchuck, deer, rabbits, squirrels, etc. all over the State; alligators in the S. rivers and estuaries, sea-turtles on the coast; 3 poisonous serpents; many insect pests in the S.

Climate.—In the lowlands and S. W. G., hot, moist, sickly in summer; heat protracted, but not excessive; mean temperature of the yr. about 60°; winters pleasant; rainfall about 45 inches. Middle G. has greater but less protracted heat in summer, rising sometimes to 103° F. in June, July, and

Aug.; winters mild and pleasant; mean temperature, 60° to 61° F.; rainfall, about 42 inches. N. G. has a fine climate; mean temperature, 55.9°; heat in summer not excessive; winter, some frost, but no intense cold; rainfall, about 56 inches.

Agricultural Products.—Cotton and Indian corn are the great staples. The cotton crop of 1880 was 814,441 bales; the corn crop was 23,202,018 bushels; oats, 5,548,743 bushels; wheat, 3,159,771 bushels; rice, 25,369,687 lbs., etc.

Manufactures.—G. largely increased its manufactures from 1870 to 1880, especially in lumber, timber, and naval stores, from its unrivalled forests of yellow pine; in cotton goods and yarns; iron and steel, woollen goods, tobacco, etc. In 1880 it had 3538 manufactures; value of products, \$36,440,948.

Fisheries.—There are extensive and profitable shad fisheries on the Savannah and Ogeechee rivers, which send the first shad to the N., and fisheries for pompano, red snapper, and other sea-fish, turtles, etc., at Brunswick, St. Mary's, etc.

Railroads.—There were, in 1880, 2673 m. of R. R. in operation in G., several of them trunk roads connecting with New York, Phila., and Baltimore; with Cin. via Chattanooga, Chicago, New Orleans, Memphis, and St. Louis, and with 2 or 3 of the Pacific lines.

Finances.—The assessed valuation of real and personal estate in G. in 1880 was \$239,472,599, the true valuation being estimated at \$312,067,293; the public debt (State) which is acknowledged amounts to \$9,351,500, beside which there is a R. R. debt which has been repudiated of about \$8,000,000; the current receipts from taxes, etc. generally exceed the expenditure, and the acknowledged debt is being gradually reduced by means of a sinking fund.

Commerce.—The direct foreign commerce of G. in 1881 was, exports, \$29,027,584; imports, \$885,133. The exports were mostly of cotton, long and short staple, with some lumber and timber. The internal commerce of the State is large.

Banks, Etc.—In Nov. 1881 there were 12 national banks in operation, with \$2,281,000 of paid-up cap.; \$2,086,000 U. S. bonds on deposit, \$2,044,272 circulation, a part of which is secured by U. S. legal-tender notes. In May 1881 there were 22 State banks and trust cos., cap. \$2,959,758; deposits, \$3,961,950; 30 private bankers, with \$478,910 cap., \$1,308,131 deposits; and 2 savings banks, with 929,082 deposits. There are 5 fire and 2 life insurance cos. in the State.

Education, Etc.—At the last public school enrolment there were 433,444 children of school age (6–18 yrs.) in G.; of these, 226,627 were enrolled in the public schools, but the average daily attendance was only 132,000; about 34,000 more were in private schools. Whole number of public schools, 5939; of private schools, 936; number of teachers, 6146; of teachers of private schools, 951; income of public schools in 1879, \$465,748; no school fund reported, nor average wages of teachers or duration of public schools; \$6,900 granted by Peabody fund to schools of the State. The number of secondary schools of respectable and some of them of high grade, is large. The high schools of Atlanta, Savannah, Augusta, and Macon are excellent. There are 7 univs. and colls. in G., 4 non-sectarian (one the State univ.), 3 denominational; these colls. had 53 profs. and instructors and 871 students. There were 6 scientific schools, 5 of them under the agricultural college endowment; 2 theological schools, with 4 profs. and 192 students; 2 law schools, with 7 profs. and 10 students; 4 med. schools, with 45 profs. and 298 students. There are also insts. of special instruction for the deaf and dumb, the blind, and for industrial education for freedmen. There are a normal school and several normal classes. There were in G., in 1880, 45 public libraries, with about 125,000 vols. and 200 newspapers and periodicals.

Churches.—There were in 1880 about 3250 chs. of all denominations, and a membership of about 320,000; the Baps. lead, and are followed closely by the Meths.; the other denominations are, Presbs., R. Caths., Episcopalians, Lutherans, Univts., Jews, Congregationalists, etc.

Population.—In 1860 G. had 1,057,286 inhabs.; in 1870, 1,184,109; in 1880, 1,542,180 (white, 816,906; colored, 725,274, including 17 Chi. and 124 Indians).

Principal Cities and Towns.—Atlanta (cap.), 37,409; Savannah, 30,709; Augusta, 21,891; Macon, 12,749; Columbus, 10,123; Athens, 6099; Milledgeville, 3800; Rome, 3877; Americus, 3635; Griffin, 3620; Albany, 3216; Brunswick, Thomasville, La Grange, Albany, Cuthbert, Marietta, Newnan, Barnesville, and Gainesville are thriving towns.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Appling.....	6-J	5,068	5,276	Baxley.....	110
Baker.....	7-G	6,843	7,207	Newton.....	167
Baldwin.....	4-H	10,618	13,806	Milledgeville.....	3,500
Banks.....	2-H	4,973	7,337	Homer.....	140
Barrow.....	2-F	10,566	18,690	Cartersville.....	2,037
Berrien.....	7-H	6,818	8,619	Nashville.....	928
Bibb.....	4-H	21,235	27,147	Macon.....	12,749
Brooks.....	7-H	8,242	11,727	Quitman.....	1,400
Bryan.....	5-K	5,252	4,929	Bryan.....	1,372
Bullock.....	5-J	5,610	8,053	Statesborough.....	1,036
Burke.....	4-J	17,679	27,128	Waynesborough.....	1,008
Butts.....	3-G	6,841	8,311	Jackson.....	212
Calhoun.....	6-F	5,503	7,024	Morgan.....	111
Camden.....	7-K	4,615	6,183	St. Mary's.....	1,375
Campbell.....	3-G	9,176	9,970	Fairburn.....	563
Carroll.....	3-F	11,752	16,201	Carrollton.....	928
Catoosa.....	1-F	4,409	4,739	Ringgold.....	436
Charlton.....	7-J	1,897	2,154	Trader's Hill.....	403
Chatham.....	5-K	41,279	45,023	Savannah.....	30,709
Chattahoochee.....	5-F	6,059	5,670	Cusseta.....	166
Chattooga.....	2-F	6,202	10,021	Summersville.....	340
Cherokee.....	2-G	16,399	14,225	Sumner.....	383
Clarke.....	2-H	12,941	11,702	Athens.....	6,099
Clay.....	6-F	5,493	6,650	Fort Gaines.....	867
Clayton.....	3-G	5,477	8,027	Jonesborough.....	1,048
Clinch.....	7-I	3,945	4,138	Honolulu.....	1,908
Cobb.....	2-G	13,214	20,748	Marietta.....	2,227

* Reference for location of counties. See map of Georgia and Alabama in article Alabama.

COUNTIES.	Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Appling	6-I	3,192	5,070	Douglas	790
Bolton	7-II	1,654	2,527	Moultrie	790
Columbia	3-I	15,529	10,465	Appling	2,006
Crawford	3-F	15,875	21,109	Newnan	2,006
Dade	1-E	3,003	8,456	Trenton	255
Dawson	2-G	4,369	5,837	Dawsonville	189
Decatur	7-G	15,183	19,072	Bainbridge	1,436
De Kalb	3-G	10,014	14,387	Decatur	639
Dodge	3-I	5,353	8,221	Eastman	279
Dooly	5-H	9,790	12,420	Vienno	3,216
Dougherty	6-G	11,517	12,622	Albany	286
Douglas	3-F	6,998	6,904	Douglasville	279
Early	3-F	1,978	7,611	Bikely	31
Effingham	7-K	4,214	5,978	Springfield	927
Elbert	2-I	9,249	12,957	Elberton	186
Emmanuel	4-J	6,134	9,759	Swainsborough	143
Fannin	5-F	5,429	7,243	Morganton	178
Fayette	3-G	8,221	15,406	Fayetteville	357
Floyd	2-F	17,230	24,418	Rome	250
Forsyth	2-G	7,983	10,539	Cumming	184
Franklin	2-H	7,493	11,433	Carnesville	35
Fulton	3-G	35,446	49,137	Atlanta	200
Gilmer	1-E	6,544	8,364	Ellijay	2,891
Glascock	3-I	2,736	3,577	Gibson	510
Glynn	7-K	5,376	6,497	Brunswick	1,621
Gordon	2-F	9,268	11,171	Calhoun	463
Greene	3-H	12,434	17,547	Greensborough	291
Gwinnett	2-G	12,440	19,531	Lawrenceville	1,919
Habersham	1-H	6,322	8,718	Clarksville	348
Hall	2-H	9,607	15,298	Gainesville	493
Hancock	3-I	11,317	16,989	Sparta	511
Hamilton	4-F	4,004	5,374	Buchanan	575
Harris	2-F	15,781	17,748	Hamilton	294
Hart	2-I	6,783	9,094	Harwell	358
Heard	3-F	7,866	8,769	Franklin	162
Henry	3-G	10,102	14,193	McDonough	50
Holston	6-H	20,406	27,414	Perry	336
Irwin	2-H	1,837	2,697	Irwinville	419
Jackson	2-H	11,181	16,297	Jefferson	511
Jasper	3-H	10,439	11,851	Monticello	575
Jefferson	4-J	12,190	15,671	Louisville	294
Jones	4-I	2,954	4,800	Wrightsville	602
Laurens	5-I	7,944	11,811	Clinton	700
Lee	6-G	9,367	10,577	Dublin	1,543
Liberty	6-K	7,688	10,649	Leesburgh	234
Lincolen	3-I	5,413	6,412	Hinesville	1,415
Lowndes	7-I	11,042	14,058	Lindcolton	250
Lumpkin	2-G	5,181	6,526	Valdosta	1,105
McDuffie	3-I	4,491	6,241	Dahlonega	1,879
McIntosh	6-K	11,458	11,675	Thomson	1,574
Madison	5-G	5,297	7,578	Darien	1,258
Marion	5-G	8,000	8,598	Oglethorpe	929
Meriwether	4-F	13,756	17,651	Danielsville	529
Miller	7-F	3,091	3,720	Buena Vista	490
Milledge	2-G	4,294	6,261	Greenville	119
Mitchell	4-G	9,632	12,801	Colquitt	164
Monroe	4-G	17,213	25,008	Alpharetta	672
Montgomery	5-I	3,586	5,381	Canalia	69
Morgan	3-H	10,696	14,032	Forest	1,874
Murray	1-F	6,500	8,269	Mt. Vernon	234
Muskeget	2-G	16,663	19,663	Madison	1,013
Newton	3-H	14,615	13,822	Spring Place	1,415
Oconee	3-H	11,782	15,400	Covington	250
Oglethorpe	2-H	7,629	10,887	Watkinsville	441
Oakland	2-F	5,317	7,590	Lexington	186
Peach	7-J	2,778	4,538	Dallas	178
Pierce	7-J	2,778	4,538	Jasper	245
Pike	4-G	10,905	15,439	Blackshear	178
Polk	2-F	7,822	11,452	Zebulon	1,342
Polk	5-H	11,940	14,058	Cedartown	1,371
Pulaski	6-I	10,461	14,058	Hawkinsville	245
Quitman	6-F	4,150	4,392	Evanton	180
Rabun	1-H	3,255	4,634	Georgetown	2,129
Randolph	6-F	10,561	13,341	Clayton	21,531
Richmond	5-J	25,724	34,665	Cuthbert	1,374
Rockdale	5-G	5,129	6,888	Augusta	1,374
Schley	5-G	9,175	12,786	Conyers	182
Scriven	4-K	10,205	12,585	Ellisville	314
Spalding	5-F	14,204	18,239	Sylvania	3,620
Stewart	5-F	16,539	21,113	Griffin	2,754
Talbot	4-F	11,913	14,713	Lumpkin	1,576
Taliaferro	3-I	4,796	7,034	Americus	2,555
Tatnall	5-J	4,860	6,988	Talbot	104
Taylor	5-G	7,143	9,597	Crawfordville	168
Telfair	6-I	3,245	4,838	Reidsville	2,754
Terrell	6-G	9,053	10,451	Butler	1,576
Thomas	7-G	14,523	20,597	McKee	2,555
Town	1-G	2,780	3,261	Thomaston	184
Troup	4-F	17,632	20,565	Hiwassee	2,295
Twigs	4-H	8,545	9,378	La Grange	156
Union	1-G	5,267	6,351	Jefferson	101
Upson	4-G	9,430	12,400	Blairsville	570
Walker	1-E	9,925	11,036	Thomaston	207
Walton	2-H	11,038	15,622	La Fayette	530
Ware	7-I	2,959	4,159	Monroe	628
Warren	3-I	10,545	10,985	Warren Cross	1,022
Washington	4-I	15,842	21,394	Warrenton	1,279
Wayne	7-J	2,177	3,580	Sandersville	582
Webster	5-G	4,677	5,237	Jessup	139
White	1-E	4,606	5,541	Preston	187
Whitfield	1-F	10,117	11,300	Cleveland	2,516
Wilcox	6-H	2,439	3,109	Dutton	61
Wilkes	3-I	11,796	15,385	Abbeville	2,199
Wilkinson	4-H	9,383	12,061	Washington	274
Worth	6-H	3,778	5,392	Irwinville	304
Total		1,184,109	1,542,180	Isabella	101

History.—G. was one of the 13 original States, but was settled much later than the others; patent for it granted to Oglethorpe, Whitefield, the Wesleys, *et al.* June 9, 1732; first colony (120 persons) came in 1733; objects of the colony, to establish a barrier between the Sp. and Indians on the S. and S. C. and N. C. on the N., and to provide a refuge for the needy and destitute, and especially poor debtors, or phans, and friendless children and youth; the latter object was Whitefield's. Savannah founded in 1733; the colony was at first military, and the colonists received their lands on condition of military service; this occasioned discontent, and the colonists deserted to N. C.; the policy was changed, and 50 acres of land offered free to settlers, and many Scotch and Ger. emigrants came in. War between

G. Brit. and Sp. 1739-43; Oglethorpe attacked Sp. in Fla. in 1739, but expedition was a failure; Sp. attacked Savannah in 1742, but were alarmed by Oglethorpe's stratagems and returned to Fla.; after the peace Georgians demanded slaves, which had been prohibited to them; in 1752 the trustees surrendered the colony to the crown, and negro slavery was permitted; progress of the colony rapid for next 20 yrs.; in 1736 the commerce of the colony amounted to \$741,615, and in 1775 to \$1,086,270. It was at this time that G., not itself suffering from Brit. oppression, from sympathy for the other colonies made common lot with them in the Revolutionary war. During that war G. suffered severely; was overrun by Brit. troops; Savannah captured in 1778, Augusta and Sudbury in 1779; Savannah held by Brit. till close of the war, despite the efforts of the Amers. and Fr. to retake it. G. formed first const. in 1777, second in 1785, and the third, which with some amendments lasted till 1861, in 1798; U. S. const. ratified in Jan. 1788. There was some difficulty with the Creeks and Cherokees from 1783 to 1790, but treaties of peace with those nations were concluded in 1790 and 1791, and in 1802 the Creeks ceded to the U. S. what now constitutes the finest counties of S. W. G.; these lands were subsequently assigned to G., and the State in turn relinquished to the U. S. all its claims W. of the Chattahoochee—i. e. Ala. and Miss. In 1860 G. followed the lead of S. C. and seceded in Jan. 1861, though with a large minority in opposition; took an active part in the c. war; from the battle of Chickamauga in Sept. 1863 to the winter of 1864-65 it was almost constantly the scene of conflict; Sherman's march to Atlanta and his "march to the sea" were both almost entirely in its terr.; Savannah captured Dec. 1864. G. repealed the act of secession Oct. 30, 1865; a new const. adopted, and the 13th amendment to the const. of the U. S. ratified, but Cong. was dissatisfied with their const. and the State was put under military rule, and a new constitutional convention ordered, which formed the present const., ratified in 1868; State restored to the U. on its ratification of the 14th amendment in 1868-69, but on its refusal to ratify the 15th amendment was again put under military rule; on compliance with this demand it was reinstated. The great National Exposition of cotton and other S. products at Atlanta in the autumn of 1881 gave its agricultural and manufacturing interests a very powerful impulse. The following list embraces all the gov's. of G. since the adoption of the U. S. const.:

George Walton	1789-90	William Schley	1835-37
Edward Telfair	1790-93	George R. Gilmer	1837-39
George Matthews	1793-96	Charles J. McDonald	1839-43
Jared Irwin	1796-98	George W. Crawford	1843-47
James Jackson	1798-1801	George W. B. Towns	1847-51
David Emanuel (actg.)	1801	Howell Cobb	1851-53
Josiah Tatnall	1801-02	Herschel V. Johnson	1853-57
John Milledge	1802-06	Joseph E. Brown	1857-65
Jared Irwin	1806-09	Jas. Johnson (prov.)	1865
David B. Mitchell	1809-13	Charles J. Jenkins	1865-67
Peter Early	1813-15	Gen. T. H. Ruger (prov.)	1867-68
David B. Mitchell	1815-17	Rufus B. Bullock	1868-72
William Rabun	1817-19	James Milton Smith	1872-77
Matthew Talbot (actg.)	1819	Alfred H. Colquitt	1877-82
John Clarke	1819-23	Alex. H. Stephens	1882-83
George M. Troup	1823-27	J. S. Boynton (acting)	1883
John Forsyth	1827-29	Henry D. McDaniel	1883-86
George R. Gilmer	1829-31		
Wilson Lumpkin	1831-35		

Georgia, Gulf of, the body of water between the mainland of Brit. Columbia and Vancouver Island.

Georgian Bay, the E. portion of Lake Huron, lying within the prov. of Ontario, Canada, and separated from the rest of the lake by the Great Manitoulin Island and by a peninsula (Cobots Head). The bay was formerly called Lake Manitoulin. Length, 120 m.; breadth, 50 m.

Georgian Language and Literature. The G. lang. is placed by Latham in his Diocurian group, which has been variously classed as either Turanian or Dravidian, or as related to the monosyllabic tongues of S. E. Asia, but some authorities state that it is quite distinct from the other langs. of the Caucasus, and assign to it an Indo-European origin; and some make it a link between the monosyllabic and the Aryan tongues. Though harsh in sound, it has many merits. Some of the lit. is of high antiquity. It consists chiefly of romances, histories, pseudo-histories, poetry, and ch. lit. The G. Bible is of the 10th century. The golden age of G. letters was the 17th and 18th centuries.

Geranium (*Gr. γεράνιον, "cranesbill"*) is the typical genus of the order Geraniaceae. It has 10 stamens with perfect anthers; 5 are longer than the others, and have glands at the base alternate with the petals. The persistent sepals are imbricated, and the petals usually convolute in the bud, while the stamens are slightly monadelphous. The receptacle has a very long extension, which gives the name of "cranesbill" to the genus. The 5 carpels and the styles are adnate to this. When ripe and dry, the pods are torn off and carried away by the styles, which curve elastically and throw out the seeds. Our common wild *G. maculatum* well exhibits the characteristics of the genus. It flowers in Apr. or May. The G. are herbaceous, with rose-colored, purplish, or white flowers, sometimes variegated. They generally have a strong odor—often agreeable, but sometimes offensive, as in *G. Robertianum*. They contain tannin, often in large quantities, and from the astrinency which this imparts are used in med. *G. maculatum* contains very large quantities of it, and is often called *alum-root*. It is used as a remedy for dysentery. The true G. are not much used in cultivation, the plants from the Cape of Good Hope, generally known by the name, in fact belonging to the kindred genus *Pelargonium*. Of these there are very many—some valued for their rich scarlet, pink, or white blossoms, and some for the fragrance of their leaves. There are no plants

better known in floriculture, or more sought after for indoor or garden ornamentation. As they cross easily, many hybrids have been formed, and it is now often difficult to determine the parentage of an individual. The pelargoniums are mostly shrubby. While the flowers of the G. usually are purple or some related color, a species exists in the S. of Europe (the G. *chrysanthum*) which has yellow flowers. Those used in cultivation are easily propagated by cuttings. The genus contains about 500 species, unequally distributed over the world. W. W. BAILEY.

Gérard, zha-rar' (CÉCILE JULES BASILE), b. at Pignans, Var, Fr., June 14, 1817; went to Algeria as a *spahi* in 1842. His *La chasse au Lion* and *Gérard le tueur des lions* made him widely known as "Gérard the Lion-killer." In 1863 he set out to explore parts of W. Afr., and after many misfortunes was drowned in the river Jong, Sept. 1864.

Gérard (ÉTIENNE MAURICE), COUNT, b. at Damvillers, Fr., Apr. 4, 1773; distinguished himself in many of Nap.'s prin. battles; commanded the army of the Moselle 1815; returned to Fr. 1817; was made war-minister and marshal 1830, reduced Antwerp 1832, became a peer of Fr. 1832, prime minister 1834, commander of the national guard 1838, sena. tor 1852. D. Aug. 17, 1852.

Gérard (FRANÇOIS PASCAL SIMON), BARON, b. at Rome 1770; began to study painting under David 1786; became the first Fr. portrait-painter of his time; was patronized by Nap. and made a baron by Louis XVIII. Among his numerous historical paintings are *The Battle of Austerlitz* and *Coronation of Charles X.* D. Jan. 11, 1837.

Ger'sa, the name of 2 places in Pal.: I. Also written **Ger'sa** and **Ger'sa**, on the E. side of the Lake of Galilee, just opposite Magdala. At this point the herd of swine perished (Matt. viii. 28-32). The ruins which now mark the spot are within a few rods of the shore, and the mt. just behind is pierced with anc. tombs. II. (Arabic, *Jerash*) 20 m. E. of the Jordan, in a shallow valley about 5 m. N. of the Zerkā (anc. *Jubbok*), and about the same distance N. E. of Dibbin, or Dhibān, where the Moabite Stone was found in 1868. This place is first mentioned by Josephus (*Jew. War.* 1, 4, 8) as captured by Alexander Jannæus (105-78 B. C.) about 85 B. C. It was one of the 10 cities of *Decapolis*. Having been twice destroyed, it was rebuilt with great splendor in the time of the Antonines (138-180 A. D.). Its ruins are the most extensive and beautiful E. of the Jordan. A bp. of G. attended the Council of Seleucia, in 359, another that of Chalcedon, in 451. R. D. HITCHCOCK.

Gerboa. See JERBOA.

Gerfalcon. See GYR FALCON.

Gerhardt (CHARLES FRÉDÉRIC), b. at Strasburg, Fr., Aug. 18, 1816, studied chem. under Liebig; prof. at Montpellier 1844-48; pursued chemical investigations in Paris for some yrs.; 1855-56 prof. of chem. and pharmacy at Strasburg. His *Traité de chimie organique* is a work of great value. D. Aug. 19, 1856.

Ger'izim and **E'bal**, mts. of W. Pal., about half way between Jerusalem and Nazareth. They face each other across a narrow and exceedingly fertile valley, in which stands the town of Nablous, the anc. *Shechem* or *Sychar*. G., on the S. side of the valley, is 2650 ft. above the sea; E., on the N. side, about 2750. G. is the sacred mt. of the Samaritans, where the handful that survive (150 persons in all) still observe the 3 great festivals of the Mosaic ritual.

Germ [Lat. *germen*], or **Em'bryo**, is the essential part of the seed of a plant. All the other portions of the flower and fruit serve merely to develop or protect it. It possesses in a rudimentary condition all the essential portions of a mature plant, and varies greatly in size, position, and the quantity of nourishment it requires. Sometimes the embryo occupies the whole seed, but often it is surrounded by albumen or starch, or has similar nutritious matter stored away in its own tissue. It consists of the *cotyledons*, or seed-leaves; the *plumule*, or small leaves of the ordinary kind folded together between the cotyledons; and the *radicle*, or stem from which the true roots afterward develop. It is from the number of cotyledons that the classes of phanerogamous plants take their names and leading character. The name *germ* is equally applied to any growing point, as of a bud. The embryo is the G. of a seed. Moreover, G. was the name applied by Linnaeus and his contemporaries to what is now named the ovary or ovarium; but this use is now completely obsolete. (See OVULE.)

German Cath'olics, a sect in Ger. which in 1844 seceded from the R. Cath. Ch. in consequence of the exhibition of "the holy coat" at Treves. Two elements entered into the composition of the sect. The dominant element was rationalistic, represented by Johannes Ronge, whose letter of Oct. 1, 1844, to Bp. Arnoldi of Treves inaugurated the whole movement. The weaker evangelical element was represented by Johann Czerski, a R. Cath. priest of Posen, who had left the Ch. Aug. 22. The first congregation was that organized in 1844 by Czerski himself at Schneidemühl, under the name of "Christian Catholic." The first Creed put forth was the *Confession of Schneidemühl*, drawn up by Czerski, and differing but little from the R. Cath. faith. The *Confession of Breslau*, drawn up by Ronge, was less conservative and orthodox. The Creed adopted by the council which met at Leipzig Mar. 22, 1845, was substantially Ronge's *Confession of Breslau*. At this time there were more than 100 congregations, and by the end of the yr. nearly 300. Meanwhile, another sect, called "Free Congregations" (*Freie Gemeinden*), composed of rankly rationalistic seceders from Prot. chs., and dating from 1841, had been making considerable headway in Ger. Both of these sects were strengthened by the revolution of 1848, and weakened by the reaction that followed. They came together at Gotha in 1859, under the name of *Bund freireligiöser Gemeinden*, but the vitality of the movement was even then nearly spent. Since then disintegration and decay have gone steadily on. R. D. HITCHCOCK.

German Empire, established by treaties between the N. Ger. Confederation and the S. Ger. states Dec. 1870, enlarged by the annexation of Alsace and Ger. Lorraine by the peace of Frankfurt-on-the-Main, May 10, 1871, is situated in the centre of Europe, and bounded N. by the N. Sea, Den., and the Baltic; E. by Rus., Poland, and Galicia; S. by Aus. and Switz., and W. by Fr., Luxemburg, Belg., and the Netherlands. The total area of the empire amounts to 212,091 sq. m. The area of the several states is given in the following table, with their pops. according to census of 1880:

STATES.	Area, Eng. sq. m.	Population Dec. 1, 1880.
Prussia.....	137,066	27,279,111
Bavaria.....	29,292	5,284,778
Württemberg.....	7,675	1,971,118
Saxony.....	6,777	2,972,805
Baden.....	5,851	1,570,254
Mecklenburg-Schwerin.....	4,934	577,055
Hesse.....	2,866	936,340
Oldenburg.....	2,417	337,478
Brunswick.....	1,526	349,367
Saxe-Weimar.....	1,421	309,577
Mecklenburg-Strelitz.....	997	100,269
Saxe-Meiningen.....	933	207,075
Anhalt.....	869	232,592
Saxe-Coburg.....	816	194,716
Saxe-Altenburg.....	509	155,036
Waldeck.....	466	56,522
Lippe.....	445	120,246
Schwarzburg-Rudolstadt.....	340	80,296
Schwarzburg-Sondershausen.....	318	71,107
Reuss-Schleitz.....	297	101,330
Schaumburg-Lippe.....	212	25,374
Reuss-Greiz.....	148	50,782
Hamburg.....	148	453,869
Lübeck.....	127	63,571
Bremen.....	106	156,723
Alsace-Lorraine.....	5,580	1,566,670
Total.....	212,091	45,234,061

Surface.—With respect to its surface, Ger. consists of 3 different regions—the alpine region along the S. frontier, the mt.-region of Central Ger., and the N. Ger. lowland. Of the Alps, only some smaller portions of the N. belt of the central and E. Alps belong to the G. E.: to Bavaria—namely, to the W. the Algauer and Bavarian Alps, and to the E. of the Inn, the Salzburger Alps. Those parts of the Alps which belong to Ger. consist of Bunter sandstone, lime, lias, new red sandstone, Jurassic, chalk, and oligocene. The Alps, lifted by tremendous forces from their originally horizontal position, pressed forward, and sometimes wholly overturned, rise often through perpendicular walls or steep precipices into jagged peaks covered with snow or glaciers. Along the N. terminations of the Alps the Suabian-Bavarian plateau extends; to the S. W. it stretches beyond the boundaries of the empire into Switz., as far as the Lake of Geneva, and to the E., in Aus., it connects with the plain of the March and the Hungarian lowlands. It is broadest between Rosenheim, where the Inn issues from the Alps, and Ratisbon, where the Danube pushes farthest to the N. The S. side of the plateau is bounded by a belt of Alps belonging to the older Tertiary formation; the N. W., from the Lake of Geneva to Regensburg (in which region the Rhine-fall at Schaffhausen is found), by Jurassic mts., and the N. E. by the Bavarian and Bohemian mts., consisting of granite and gneiss. The river-valleys of the plateau have first a N. and then a N. E. direction. The fertility of the plateau is small in the centre where large forests abound, but great in the granary of Bavaria, between the Inn and the Danube. Those parts of the plateau which belong to Würtemberg are more varied with hills and vales, but even there the fertility of the soil is not great. The climate is generally rough, and vine-cultivation succeeds only on the opposite side of the plateau, at the Lake of Constance, and along the Danube below Regensburg.

The mts. of Central Ger. are separated from the Alps by the Suabian-Bavarian plateau, but connected with the Carpathian Mts. between the sources of the Oder and the Vistula. They consist of 3 systems: the Rhenish-Westphalian slate mts., or the Batavian system; the Rhenish system; and the Hercynian or Sudetic system. (1) The Rhenish-Westphalian slate mts., or the Batavian system, form a plateau of no considerable height, but in many ways torn by deep river-valleys. It occupies parts of Rhenish Pruss., Westphalia, and Hesse-Nassau, is traversed by the Rhine, which between Bingen and Bonn forms a deep and often very narrow valley. It consists chiefly of strata belonging to the Devonian formation. To the W. of the Rhine the Moselle forms in the slate mts. a deep and very winding valley, separating Hunsrück from Eifel. S. of the Moselle, Hunsrück extends to the Saar, and contains some hill-ranges. N. of the Moselle, the Eifel forms a plateau without hill-ranges. Especially the E. part abounds in volcanic products, such as lava and mineral waters. The W. part is very rough and barren. The N. W. part of Eifel, the Hohe Venn, is entirely bare, and constitutes the most inhospitable region of the empire. On the E. side of the Rhine the hill-ranges of Hunsrück are continued by those of Taunus. They are rich in forests and mineral springs, and are celebrated for their magnificent vineyards. To the N., Taunus slopes gently toward the fruitful valley of the Lahn, on whose N. side the plateau of Westerwald (657 metres) extends, strewn all over with basalt, and is rich in forests, iron, and brown coal, and which sends forth at Königswinter the volcanic Sieben Gebirge as an outpost toward the Rhine and the lowland. (2) The Rhenish system follows the course of

the Rhine from Bâle to Mainz, whence it continues to the E. of the slate mts., to the Weser. With its 2 highest branches, the Vosges and the Black Forest, it incloses the low plain of the Upper Rhine, which is the finest region of Ger., on account of the fertility of the soil, the mild climate, the excellent fruit, and the superior wine. The Rhenish system consists, in its middle chains and plateaus, of sandstone; in its lower parts, of lime and red sandstone; in its highest part, in the S., of granite and gneiss, and in the N. parts heavy masses of basalt are found. In both groups small streams descend on the steep side, while large rivers have their sources on the opposite sides, the Moselle in the Vosges in Fr., and the Neckar and the Danube in the Black Forest. To the E. of the low plain a small range of hills connects the Black Forest with Odenwald, which is separated from Spessart by the Main. Odenwald and Spessart are very similar, being of the same height (about 630 metres) and same formation, sandstone prevailing, with granite and gneiss on the W. side. On the N. sandstone plateau of the Hesse, Vogels Berg arises between Giessen and Hanau, consisting mostly of basalt, covered with forests. Just E. of Vogels Berg lies the High Rhön, in which group basalt is very prominent. The higher parts, which are treeless and occupied by moorland and grass-fields, are covered during the winter with heavy snow-masses, and resemble the N. countries more than any other part of the empire. (3) The Hercynian or Sudetic system comprises the N. E. part of the mts. of Central Ger., and has a gen. direction from S. E. to N. W. It consists of 2 well marked mt.-lines. The S. contains Böhmer Wald, Fichtel Gebirge, Thüringer Wald, and Teutoburger Wald; the N., the mts. of Silesia, the Hartz, and the Weser Mts. The ground between the 2 lines is occupied by the mt.-regions of Bohemia and Moravia, the Erzgebirge, and the terraces of Thuringia. The largest part of this system, from the sources of the Danube and the Oder to the Thüringer Wald, consists chiefly of granite and gneiss; in the N. W. parts influences from the other systems are apparent. The Böhmer Wald forms the boundary between Bohemia and Bavaria. It is chiefly composed of gneiss and granite, and consists of several chains, the principal one of which is on the frontier between the 2 countries, and is, like the chains belonging to Bohemia, entirely covered with forests. The Fichtel Gebirge form the watershed between the Danube, Elbe, and Rhine. From it the Eger flows E., and the Saale N., both to the Elbe; the Main W. to the Rhine, and the Naab S. to the Danube. Granite and gneiss form the prin. rocks of this group. Gneiss is found especially on the plateau of Frankenwald, which leads from Fichtel Gebirge to the Thüringer Wald, and is covered with magnificent forests. The Thüringer Wald, so important as the boundary which separates the Franconians in the S. from the Thuringians in the N., forms to the S. E. a broad plateau, but to the N. W. a real edge, terminating in a cone. In the S. E. part the rocks of the Silurian and Devonian formations are most prominent. The N. W. part consists of porphyry and different kinds of crystalline rocks. To the N. of the Thüringer Wald, the Thuringian terraces extend to the Hartz, the plateau of Eichsfeld forming the watershed between the Weser and the Elbe. The Hartz is a group of mts. 56 m. long, situated between the Leine and Saale. Its most beautiful points are found along its N. border, with the Brocken (1141 metres). The prin. rocks of the Hartz, along whose N. border chalk formations have assumed wonderful forms, are granite, Silurian rocks, red sandstone, melaphyre, and zechstein. The N. W. part of the Hercynian system consists of numerous ranges, in which are found coal, Jurassic rocks, and chalk. The Teutoburger Wald, wholly to the W. of the Weser, and the Weser Mts., with the gates of the Weser, beyond Minden, run in the same direction as the 2 prin. lines of the system. At the Elbe above Pirna we meet the sandstone mts. of the Elbe, which, under the name of Sax. Switz., have acquired a fame not quite deserved. They are continued to the E. by the Lausitzer mts., on which the Spree originates. E. of the Lausitzer mts. the Silesian mts. begin, which extend in a S. E. direction to the large basin of the upper Oder, beyond which the Carpathians begin. Within these boundaries the Silesian mts. are divided twice by cuts, once at the upper Bober, and once at Glatz. In the basin of the upper Bober rises the Riesengebirge, on the boundary between Silesia and Bohemia. This group contains the highest mts. of Central Ger., well marked ridges covered with forests, and beautiful valleys.

The N. Ger. lowland is a small part of the great European lowland, which occupies almost the whole of E. Europe, and to the W. reaches as far as the Strait of Dover. In Ger. that part of the lowland which lies to the W. of the Elbe differs from that which lies to the E. Fertile marshes extend along the N. Sea, also on the E. side of the Elbe, along the whole W. coast of Schleswig-Holstein. Here, in the W. part of the Ger. lowland, large swamps alternate with sand-fields (the Lüneburger Heide). In the E. part hill-ranges appear; of special interest is the Baltic-Uralic ridge, which begins in Jutland, curves around the Baltic through Schleswig-Holstein, Mecklenburg, Brandenburg, Pomerania, and Prus., is traversed by the Oder and the Vistula, and forms in Rus. a most important watershed. It consists of a broad, undulating extension, and is rich in lakes.

Hydrography.—The G. E. borders on two seas, the N. Sea and the Baltic. In the N. Sea a number of islands are scattered along the coast from the Netherlands to Jutland, the gulfs of Dollart and Jade cut deeply into the mainland, and the mouths of the Weser, Elbe, and Eider expand into a sort of gulfs. The Baltic forms long, narrow, and deep gulfs in Schleswig-Holstein (Flensburg, Kiel). A remarkable feature are the Haffs, large fresh-water lakes or estuaries of rivers (the Pomeranian Haff, the Frische Haff, and the Kurische Haff). The G. E. owns parts of 7 river-valleys and 3 large coast-streams. Of the latter, the Prezel flows to the Baltic, and the Eider and Ems to the N. Sea; of the former, the Memel, Vistula, and Oder flow to the Baltic, the Elbe, Weser,

and Rhine to the N. Sea, and the Danube to the Black Sea. Of all these rivers, the Weser is the only one which belongs entirely to the G. E.—of the Elbe and Oder, the largest part; of the Rhine, the larger half. The Vistula rises in the Carpathians, and belongs, in a small part of its upper course, to Silesia: it then traverses Galicia and Poland, and enters Prus. above Thorn. Its largest feeder in Poland is the Narew, with the Bug. The Oder has its sources in Moravia. Its only important affluent from the right side is the Warthe, which receives from the right the Netze, which again communicates with the Vistula through the Bromberger Canal. The Oder is in Brandenburg connected with the Elbe by the Fr. Wilhelm Canal, which leads to the Spree, and the Finow Canal, which leads to the Havel. The Elbe (321 m. long) rises in Bohemia in the Riesengebirge; flows through N. Bohemia, where it receives the Moldau and the Ezer; enters the G. E. through the sandstone mts. of the Elbe and the lowland at Dresden; traverses Sax., Anhalt, Hanover, Mecklenburg, and Schleswig-Holstein, and falls into the N. Sea. It is decidedly the most important river of N. Ger.; near its mouth stands the most important port of Ger., Hamburg. On the right the Elbe receives the Havel, through whose affluent, the Spree, on which Berlin stands, it connects by canals with the Oder. On the left it receives the Mulde, the Saale, the Ilm, on which Weimar stands; the Unstrut, the Bode, and the White Elster, on which Leipsic stands. The Weser is formed by the Werra and the Fulda; receives on the right the Aller, through the Ocker, and Leine; on the left the Hunte, passes by Bremen, and falls into the N. Sea below Bremerhafen. The Ems flows in Westphalia and Hanover. The Rhine (948 m.), the prin. water-road in W. Ger., originates from several sources in the Swiss Alps, and divides in the Netherlands into numerous branches. That part of the Rhine which lies between the Lake of Constance and Bâle belongs partly to Switz. and partly to Ger. On the right the Rhine receives the Neckar and the Main, which is formed by the White Main from the Fichtel Gebirge, and the Red Main. Other affluents of the Rhine on its right are the Lahn, Sieg, Ruhr, and Lippe. On its left it receives at Coblenz the Moselle, which rises on the Fr. side of the Vosges, traverses Metz, and receives on the right side the Saar, which also comes from the Vosges. At Strasburg the Rhine-Rhone and the Rhine-Marne canals connect the Rhine and the Ill with the Rhone and the Marne. The Danube (1771 m.), the prin. river of S. Ger., is formed at Donaueschingen by the Brege and the Brigach, which both rise in the Black Forest. After breaking through the Jura it flows along the N. border of the Suabian-Bavarian plateau, through Würtemberg and Bavaria, and enters Aus. It becomes navigable at Ulm, and receives from the left the Altmühl, the Naab, and the Regen, and from the right the Iller, Lech, Isar, and Inn. The last rises in Switz., is the prin. stream of the N. Tyrol, and joins the Danube after receiving from the right the Salza. There are many lakes in Ger., but no great ones. Most of them are situated in the vicinity of the Alps and on the Baltic-Uralic ridge or near the Baltic. In the S. the lakes of Chiem, Würm, and Ammer are the most important; King's Lake the most beautiful.

Climate.—The G. E. is situated in the happy temperate zone. Only a few peaks of the Alps on the S. boundary of Bavaria rise into the snow-region. In the other mts. there are also a few points where the snow may last into the summer, and sometimes the whole yr. round. But the whole country lies in the region in which the warm and moist winds still have power enough to resist the arctic currents, and in which rain may occur at every season. The vine and the maize reach in Ger. their northernmost boundary. The chestnut has its northernmost boundary between Coblenz and Cologne, but it is still found in the Hartz. The peach ripens still in Rhenish Prus.; the walnut succeeds even in W. Prus. The flowering of fruit trees takes place at Memel 8 days later than at Königsberg, 3 weeks later than at Berlin, and 4 weeks later than on the Rhine. The beet-root succeeds well in the regions between the Oder and the Weser, but in E. Prus. it contains very little sugar. Of the forest trees, the red beech stops a little S. of Königsberg. Although the climate generally is healthy, yet epidemics and epidemics occur, such as fevers in the swamp districts and goitre in some mt.-regions, and among epidemics cholera and smallpox.

Minerals.—The production of gold is very small; more important is that of silver. At Freiberg and at Klausthal in the Hartz are mining acads., of which the former is the centre of the whole science of metallurgy and mining. Lead ore and copper ore are annually mined, and Ger. is very rich in iron ore. Zinc, manganese ore, bismuth, antimony, cobalt, nickel, tin, and quicksilver are found in small quantities. Coal is the most important mineral which Ger. possesses, and it is found in 7 large and several minor deposits, the largest of which is that in Upper Silesia. The deposits of brown-coal are still more extensive, and comprise a W. (the basins of the lower Rhine) and an E. division (from the Thuringian terraces to the coast-regions of E. Prus.). There is peat in the moorlands of the N. Ger. lowland, and amber is found on the coast of the Baltic. Of precious stones are found the topaz, the chrysoprase, the agate, and different species of rock-crystals. For larger articles of art, serpentine, alabaster, marble of various kinds are used; also the erratic blocks of the N. Ger. lowland and the granite from the Fichtel Gebirge. Gypsum, phosphorite, fluor-spar and heavy spar, and magnesite are found in different deposits; limestone, building-stone, and freestone everywhere. Sandstone comes from Sax. Switz., brick and tiles are made of the clay and loam of the lowlands; millstones are found in Eifel, lithographic stones, roofing slate, table slate, grapholite, chalk, graphite, and kaolin in different mts. The production of salt increases every yr., but many of the salines have ceased to be worked since the discovery of the large strata of rock-salt. Among these, that in the Alps of Salzburg has been in operation for a long time. Iron pyrites are

very frequently found; alum in the brown-coal formations, and Ger. is very rich in mineral springs.

Agriculture.—Of the total area of the G. E. fields and gardens occupy 48.5 per cent., meadows and pastures 17.7 per cent., forests 25.3 per cent., and waste land 8.5 per cent. In the Prus. provs. the largest proportions of fields are found in Schleswig-Holstein, Posen, Sax., Pomerania, and Silesia. Forests are most frequent in the interior. The most important products for food are wheat, spelt, rye, barley, oats, and potatoes. The cultivation of maize is insignificant; peas are found everywhere; lupine is much cultivated on the poorer fields in N. Ger. The cultivation of fruit trees is carried on with success through the whole country. The vineyards are found, together with the orchards, in the S. W. part of the country. Vegetables are grown near all the large cities. Landscape-gardening is principally carried on at the princely palaces, with which large hot-houses are generally connected. The cultivation of oil-seeds has much decreased, but a considerable quantity is still produced for exportation. Of dyestuffs are produced madder, safflower, etc. The cultivation of flax is now increasing. Beside the production of wood the forests have the office of regulating the climate. They are the keepers of the moisture, and the stand of the water-courses depends on them. The reckless destruction of the forests has had injurious consequences in many parts of the G. E.

The Animal Kingdom.—The breeding of horses is of importance in E. Prus., Schleswig-Holstein, Mecklenburg, Hanover, Brunswick, and several places in the S. Ger. states. For cattle-breeding the marshes along the N. Sea are of great importance; also all the S. Ger. states and the W. part of the Prus. state, the Rhine region. Sheep-breeding seems at present to have passed its point of culmination. Swine are numerous in the province of Sax., in Thuringia, Hesse, and the N. part of Baden; goats are kept by small householders in the mt. regions. Of useful game, hares, the red deer, and the fallow deer are raised. The elk is found in a forest at the Kurische Haft. The roe is very frequent; the chamois is found in the Bavarian Alps, the wild-boar in some of the extensive forests of N. Ger. The breeding of rabbits is increasing. The marmot is found in Alpine regions, the beaver on the Elbe, the seal at the sea. Among the beasts of prey the wolf is the most dangerous; the fox is very common, also the marten, weasel, and fitchet. Great care is bestowed on the breeding of poultry, and singing birds are protected by law. Fish cultivation is steadily developing. The best fresh-water fishes are the carp, the sheat-fish, the bezola, and the trout. Both in fresh and salt water live the perch, eel, pike, and rudd. Among the salt-water fishes the herring and the flounder are the most important; also the salmon in the Rhine, and the sturgeon. Many crabs and oysters are consumed. Bees are extensively kept in Silesia.

Religion.—The Westphalian treaty of 1648 regulated the relations of the confessions. In gen., the Evangelical Ch. is most numerous in N. Ger. and the R. Cath. in S. In all the S. Ger. states but Württemberg the Jews are very numerous, especially in the towns along the Rhine and in the villages which formerly belonged to the Knights of the Empire.

Manufactures.—The manufacturing industry of Ger. has been subject to immense fluctuations during the last 30 yrs. In 1860 it was influenced by the war in Amer.; later it suffered much from the unsettled state of Europe; after the close of the war against Fr. it rose at once to a height none had ever expected, but from which it fell in 1873, partly in consequence of fraudulent operations. The manufacture of woollens employs about 250,000 hands. Coarse woollen stuffs are still made by the country pop. in the N. E. part of the empire as a secondary occupation, while the making of cloth, which once was very common, has now ceased almost entirely. The industry in flax and hemp is increasing, and the centre of this business is Bielefeld in Westphalia and its vicinity. Sail-making is important in the seaports; cordage is made in Westphalia. Cotton manufactures are important in Alsace-Lorraine, in the kingdom of Sax., and in Württemberg. The silk and velvet manufactures have their centre in Rhenish Prus., in the cities of Crefeld, Elberfeld, Barmen, and Viersen. Among the other branches of the weaving industry of great importance are lace-making and embroidery, the manufacture of galloons and fringes, of umbrellas, of ready-made clothes, corsets, and oilcloth. Auxiliary branches of the yarn and cloth manufacturing industry are the dyeing and printing establishments. The manufacture of leather is important in the S. and W. states. Fine boots and gloves are made for exportation. For the manufacture of paper there are 950 establishments in the empire, employing more than 25,000 hands. Among the other branches of industry in animal and vegetable materials, the manufacture of straw goods in the Black Forest and the Vosges is important, and of basket-work in Upper Franconia in Bavaria. There are 10,000 saw-mills in the empire, and the manufacture of furniture for exportation is important. The manufacture of tobacco and cigars is carried on in 3600 establishments, which employ about 70,000 hands. For the manufacture of food there are 65,000 corn-mills in the empire. Magdeburg is the prin. sugar-market. Meat is salted in large establishments; the *saucis de foies gras* of Strasburg, the Westphalian hams, the smoked beef of Hamburg, and the Pomeranian goosebreasts are famous. In the manufacture of beverages, Bavaria occupies the first place in beer-brewing in the world. Bavarian beer is now made throughout the whole of N. Ger., but it cannot compete with the genuine Bavarian product. The brandy-distilleries of Ger. number 25,000, of which many, however, are only worked by the country pop. as a secondary occupation. Sparkling wines are manufactured in the Rhine regions. Of vinegar-factories there are 1600 in the empire. There are 650 factories for the manufacture of chemicals and dyestuffs. There are 18,000 brick-kilns in Ger. For the manufacture of glass and glassware there are 300 establishments in the empire, employing 35,000 hands. Of other manufactures of stone

and earth, there are in Ger. 5200 lime-kilns and 400 gypsum-mills. The first steam-engine in Ger. was put in operation Apr. 4, 1788, at Friedrichshütte, near Tarnowitz, in Upper Silesia. Twenty-five yrs. ago the most of the locomotives and machines were imported from foreign countries, but since that time the Ger. machine-works have improved so much that they are capable not only of satisfying all domestic wants, but even of exporting. Since 1867 the exportation of machinery from the Ger. Zollverein has exceeded the importation. The manufacture of railway cars has large establishments. War-vessels are built at Kiel, Dantzic, and Wilhelmshaven on the Jade. Large iron-clads, however, are bought from foreign countries. Pianofortes of great perfection, organs, harmoniums, string instruments of different kinds, and musical-boxes are made at different places. The manufacture of watches employs about 10,300 hands in the Black Forest. Munich is the centre for the manufacture of scientific and optical instruments. The manufacture of iron and steel goods is the chief industrial pursuit in large parts of Westphalia, Rhenish Prus., and Lorraine. The largest establishment for the manufacture of cast steel, and generally the largest industrial establishment of the empire, is that of Krupp at Essen in Rhenish Prus., celebrated for its cannon. The manufacture of other metals is important.

Commerce.—The Zollverein, established in 1833 by the acceptance by Bavaria and Württemberg of the commercial agreements existing between Prus. and the Hessian countries, and now comprising all the Ger. states, has exercised a large and beneficial influence on the commerce of the empire by abrogating injurious restraints and destroying many unnatural barriers. The Ger. custom law dates from July 1, 1869; a new tariff was introduced Oct. 1, 1873. All duties on export and transit are abolished, and the duty on imports is very reasonable. The commercial fleet of Ger. occupies the third place, and follows immediately after those of G. Brit. and N. Amer. Among the seaports of the empire, Hamburg and Bremen occupy the first places. They maintain numerous steamship lines, and the main stream of emigration passes through them. The first railway in Ger., the Ludwigsbahn, from Nuremberg to Fürth, was opened Dec. 7, 1835. The post and telegraphs are uniformly organized throughout the empire, though in Bavaria and Württemberg they have separate administrations. Between the G. E. and Austro-Hungary there exists a postal convention of May 7, 1872, and a telegraph convention of Oct. 5, 1871. The most important banking inst. is the Bank of Prus., founded in 1765, and in 1846 transformed into a stock inst. Savings banks and the Deutsche Genossenschaftswesen, founded in 1850 by Schulze-Delitsch, are very common.

Education.—For gen. education the Ger. people are deeply indebted to Pestalozzi and his disciples, who, aided by political circumstances during the early part of the present century, succeeded in reforming the whole school-system of Prus. This reform received a hard blow, however, from the reaction which in Prus. began after 1840 with Eichhorn. The retrograde movement was at first hardly apparent; in many points it worked even beneficially, but it became very evident after the introduction of the new school regulation of 1854, and in 1872 it was generally acknowledged that school matters in Ger. had fallen into a sort of dissolution. The regulation of 1854 left the course of the national Ger. development, and hoped to quench the ideas of the revolution and of modern times by an ecclesiastical reaction and a narrow patriotism. At the head of the ecclesiastical reaction stood the Ultramontane party, and it pursued its plans in every direction. But, fortunately, the successful wars of 1866 and 1870 and the foundation of a Prot. empire formed an effective opposition to the Ultramontane party, and made the mistakes of the reaction apparent. The normal schools suffered still more than the primary schools in this period, both from a vicious system and from insufficient teachers. Improvements have certainly taken place since 1872, but a thorough reform of the matter is demanded, and for it a liberal grant of money is necessary.

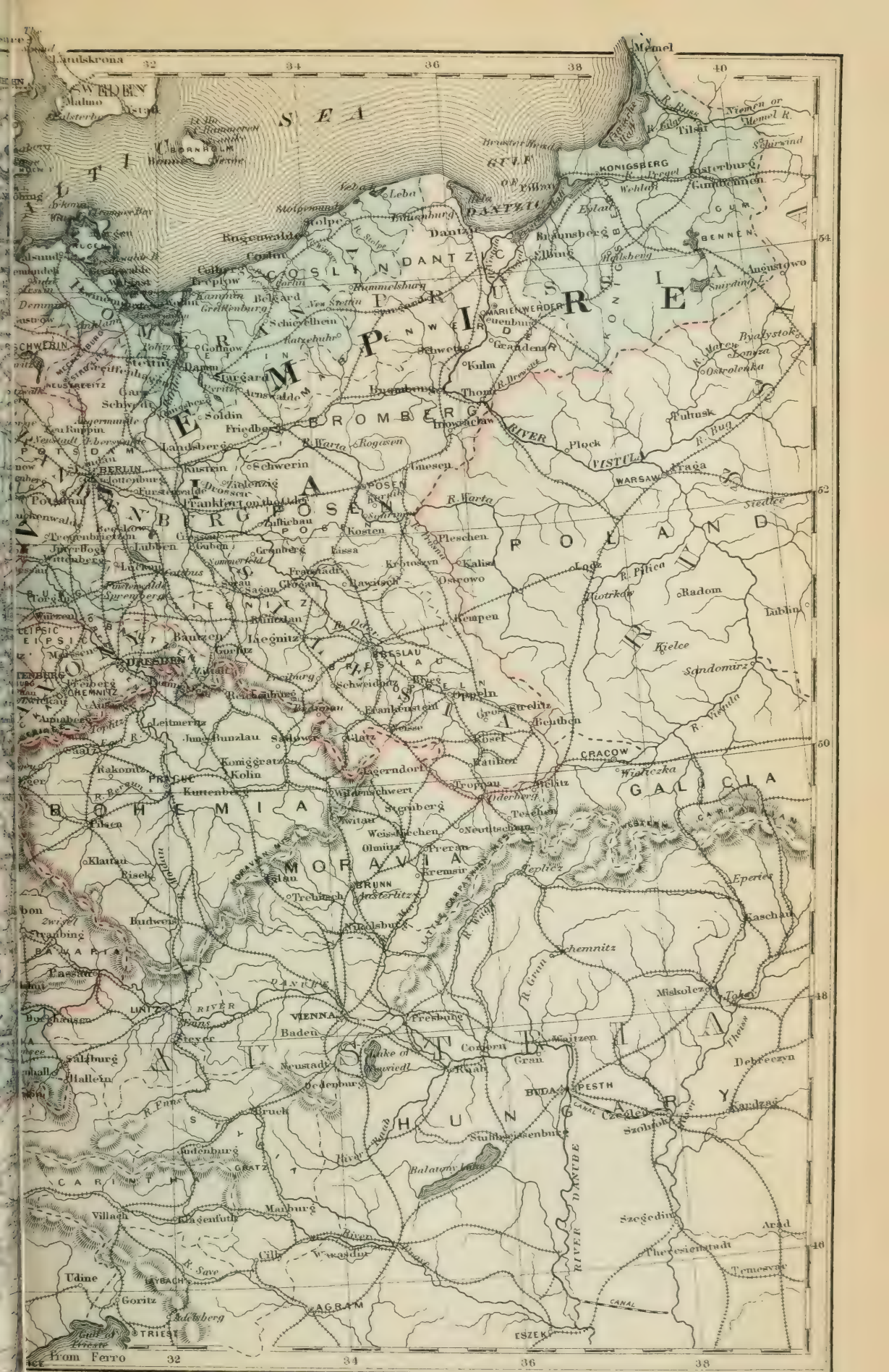
The Constitution of the empire bears date Apr. 16, 1871. By it all the states of Ger. "form an eternal union for the protection of the realm and the care of the welfare of the Ger. people." The supreme direction of the military and political affairs of the empire is vested in the king of Prus., who, as such, bears the title of *Deutscher Kaiser*. According to Art. 11 of the const. "the *kaiser* represents the empire internationally," and can declare war, if defensive, and make peace. To declare war, if not merely defensive, the *kaiser* must have the consent of the Bundesrath, or Federal Council, in which body, together with the Reichstag, or Diet of the Realm, are vested the legislative functions of the empire. The Bundesrath represents the individual states of Ger., and the Reichstag the Ger. nation. The members of the Bundesrath, 59 in number, are appointed by the govts. of the individual states for each session, while the members of the Reichstag, 397 in number, are elected by universal suffrage and ballot, for the term of 3 yrs.

Finances.—The revenues of the empire are derived from toll, excise of consumption, post, and telegraph. A common imperial income-tax will be introduced. In the financial yr. ending Mar. 31, 1882, the receipts and expenses of the empire amounted to 556,811,409 marks. Feb. 1, 1883, the total funded debt of the empire amounted to 370,000,000 marks; the whole debt bears int. at 4 per cent. Beside the funded there exists an unfunded debt, represented by Reichs-Kassenscheine or imperial treasure bills, outstanding to the amount of 155,785,540 marks Apr. 1, 1883. The armed power consists of the army, the navy, and the *Landsturm*. The army is divided into the standing army and the *Landwehr*. The navy consists of the fleet and the *Seewehr*. The standing army and the fleet are always ready for war. The *Landwehr* and *Seewehr* serve as their support. The *Landsturm* becomes active only when an enemy invades the terr. of the empire. The duty of military service is universal throughout the empire, and substitution is not allowed. The de-

MAP OF THE
GERMAN EMPIRE

Drawn and Engraved on Copper-Plate
EXPRESSLY
FOR
JOHNSON'S UNIVERSAL CYCLOPEDIA
Scale of Eng. Miles
0 50 100





velopment of a navy first began in 1848 as a merely Prus. concern. It is now a force of the empire, under the command of the emp. It has a flag in common with the merchant fleet—black, white, and red.

History.—In pre-historic times Ger. was inhabited by tribes of the Celtic family. They built their houses on piles in the lakes, and possessed tools and instruments of stone; later, of bronze and iron. A few centuries before Christ the Ger. races came from the E., and in the 4th century A. D. they had driven the Celtic tribes into the Vosges. Meanwhile they had met with the Romans.—the first time in 113 B. C., and although the Ger. tribes were defeated by Marius, still danger threatened Rome from the N. Cæsar did not attack the Gers., and when the emp. Augustus tried to bring the Ger. race under the Rom. yoke, the Rom. legions were trampled down in the battle of Teutoburger Wald (9 A. D.), and the liberty and independence of the Ger. race were established forever: the Sax. lived between the Baltic and Hartz, the Franks between the lower Rhine and Fichtel Gebirge, the Alemanni along the upper Rhine, and the Goths along the lower Danube. In 375 the Huns burst into Europe, and then began the migration of nations, which caused great changes in Ger. Ger. tribes from the Vistula, Oder, and Elbe moved farther to the W.; other Ger. tribes went to It., while in the present Fr. Clovis founded the empire of the Franks. Under his descendants, the Merovingians, the strength of the empire was much impaired by being divided, until at last the Carolingian family grasped the reins under the title of *major-domus*. With Charlemagne (768-814) the power of the Carolingians reached its highest point; but by the treaty of Verdun, between the sons of Louis the Pious (814-40), Ger. became separated from Fr., and Lorraine was thrown between them as the apple of discord. Ludwig the Child, the last Carolingian in Ger., d. in 911. At this time the Gers. were threatened by the Norsemen, by the Wends, and by the Hungarians, while in the interior a tribal division became more prominent; so that at the extinction of the Carolingian house Ger. was divided into 5 large dukedoms—Sax., Franconia, Suabia, Bavaria, and Lorraine. The Franks elected their own duke, Conrad, king of Ger., and he was acknowledged by the other tribes with the exception of Lorraine, which fell to Fr. Conrad did not succeed in consolidating the empire, but after his death the Franks and the Saxons chose the mighty Sax. duke Henry for king. Henry I. (911-918) is the founder of the G. E. He vindicated the royal authority against the dukes, acquired Lorraine for Ger., and fought with success against his foreign enemies. Of still greater consequence was the reign of his son, Otto I. the Great (936-973), who assumed the imperial title; but under his successors the royal authority lost much; the princes and the ecclesiastical dignitaries became very bold, and the popes began to aspire to the empire of the world. With Conrad II. (1024-39) begins the Franconian or Salic dynasty, under which the royal power culminated in Ger.; the govt. of Henry III. (d. 1056) was severe in the interior, and in papal affairs he was referred to as an arbiter; but Henry IV. (d. 1106) was compelled to greatly humiliate himself at Canossa and acknowledge the supremacy of the Ch. He continued to struggle against the Ch., and at one time expelled the pope from Rome, but at last his own son was won over to the papal party and rose against him. With Henry V. the Franconian dynasty became extinct, and on the death of his successors the house of Hohenstaufen ascended to the Ger. crown (1138-1254). Of this house Frederick I. Barbarossa tried to extend the power beyond the boundaries of his empire, and while in Ger. he curbed the mighty vassal, Henry the Lion, he gained influence in Lower It. But under Frederick II. the empire suffered frightfully in the struggles against the popes, and after his death the house of Hohenstaufen declined rapidly. Conradin, the last of the family, was beheaded at Naples in 1268, while trying to reconquer his heritage in Lower It. from the invader, Charles of Anjou. In Ger. William of Hol. reigned to 1256, but then followed an interregnum to 1273. On the election of Rodolph I. the house of Hapsburg ascended the Ger. throne. Rodolph restored gen. tranquillity and laid the foundation of the Aus. state, and under Albert I. the Swiss Confederation was formed. With Henry VII. (1308-13) the house of Luxemburg acquired the Ger. crown. Ludwig of Bavaria (1314-47) made the election of the Ger. emp. independent of the papal confirmation, and Charles IV., who founded the univ. of Prague, pub. the Golden Bull, by which the election of the Ger. king by 7 electors became finally settled, but under his successor the club-law increased: associations of princes and lords originated; the Holy Fehme extended its authority; the Hansa acquired dominion over the N. seas, and the emp. was deposed. Under Sigismund (1410-37) the councils of Constance and Bale were held in order to reform the Ch., but the result of the former was the burning of Huss, that of the latter the war of the Hussites. The time of the Ref. was inaugurated, and under Maximilian I. (1493-1519) Martin Luther began his work (Oct. 31, 1517). The emp. brought the club-law to an end, and the reign of his grandson, Charles V. (1519-56), was one of the most remarkable periods in the hist. of Ger. At the Diet of Worms (1521) Luther defended himself; at that of Speyer (1529) his adherents protested against decisions unfavorable to them; at that of Augsburg (1530) they set forth their creed. Other events of his reign are the peasants' war (1524-25); the appearance of the Anabaptists at Münster (1535); the Schmalkaldian war (1546-47); the Agreement of Passau (1552); the Peace of Augsburg (1555); his several wars with Fr., and the counter-Reformation which took place within the R. Cath. Ch., partly through the establishment of the order of Jesuits, partly through the Council of Trent (1545-63), whose decisions have ruled the R. Cath. Ch. up to our time. Charles V. retired, and under his successors the confusion increased, until 1618 the Thirty Years' war broke out. In the beginning the R. Caths. gained great advantage, and about 1630 it seemed as if the total fall of the Prot. cause was at hand.

But the interference of the Swe. king, Gustavus Adolphus, saved Prot. freedom in Ger., and the intermeddling of Fr. after 1635 transformed the war from a religious to a merely political contest. By the Peace of Westphalia (1648) the Lutherans and the Reformed obtained free exercise of religion, but large tracts of land were lost to Fr. and Swe., and the Ger. countries were to a great extent withdrawn from the influence of the emp. Under the slow and hesitating Leopold I. (1657-1705) Ger. sank to the lowest state of degradation. While Louis XIV. devastated the most beautiful part of Ger., the Ger. princes allied themselves with Fr. against the emp., and their court-circles imitated Fr. immorality and prodigality. At the same time Prus. grew into a kingdom. Frederick William, the elector of Brandenburg, gained a victory over the Swedes at Fehrbellin, and when in 1701 Frederick I. was crowned king, his country assumed the name of Prus., and the state soon ranked among the great powers. In 1711 Ger. was compelled to make an unfavorable peace with Fr., and the prodigality of most Ger. courts had reached an unexampled height. In the yr. 1740 the male line of the house of Hapsburg became extinct, and Frederick the Great became king of Prus. In the 2 Silesian wars he took and kept some parts of Silesia. While domestic wars devastated Germany Frederick the Great prepared himself for war. In the Seven Years' war he proved himself superior to all his enemies (Aus., Rus., Fr., Swe., and most of the smaller Ger. states), and at last Aus. was compelled to make peace at Hubertsburg (1763). From that moment there existed in Ger. a destructive dualism, until in 1866 Prus. acquired a decided superiority. The emp., Joseph II. (1765-90), tried by religious freedom and political reforms to bring his people up to the standard of the age. But he was less successful in this respect than the Prus. king had been, partly because he introduced his reforms with some violence, partly because he was thwarted by the R. Cath. clergy. Nevertheless, his reforms were of great importance to Aus., and in spite of a violent reaction they still form the foundation of Aus. life. As in 1789 the Fr. Revolution broke out, Aus. and Prus. united in a war against Fr.; but after the Reign of Terror had passed away Prus. made peace with Fr., and after the victories of Bonaparte in It. (1796), which opened the way for him into Styria, Aus. concluded peace at Campo Formio (1797), giving up Lombardy and receiving Venice. In 1799 Aus. again began war against Fr. The Fr. were repeatedly defeated, but by the battle of Marengo (June 14, 1800) Aus. lost It. and was compelled to conclude the Peace of Lunéville (1801), by which the Rhine became the boundary of Fr. In 1804 Nap. became emp. of Fr.: 1805 Aus. lost large terrs. by the Peace of Presburg; 1806 the emp. Francis abdicated his dignity as chief of the empire and assumed the title of emp. of Aus., and Prus., under Frederick William III. (1797-1840), felt compelled to declare war: she was completely defeated at Jena and Auerstädt (1806), and after the battles of Eylau and Friedland (1807) peace was concluded at Tilsit, by which Prus. lost $\frac{1}{2}$ of her possessions and only kept the other half on very hard conditions. In the war of 1809 Aus. was defeated at Wagram, and by the Peace of Schonbrunn she lost some terrs., but after Nap.'s retreat from Rus. the Ger. War of Deliverance began. It was the battle of Leipsic which decided the destiny of Ger. and Nap. (1813). Nap. abdicated and retired to Elba; by the Treaty of Paris the Bourbons returned to Fr., and Ger. affairs were regulated, after a plan of Metternich, by the Cong. of Vienna (1814-15). From this time and up to 1848 the influence of Metternich, the Aus. minister, was predominant in Europe. By the establishment of the Zollverein in 1833 Prus. laid the foundation of united Ger. In 1848 she had become a constitutional state, but its const. was later altered under the influence of the reaction. In 1861 William I. became king of Prus. He first tried to return to constitutional views, but in 1862 he appointed Bismarck minister of state, and a violent reaction took place. In 1864 he acquired Schleswig and Holstein for Ger.; in June 1866 the war between Aus. and Prus. broke out, and after the battle at Sadowa the Prus. armies appeared before Vienna. By the Peace of Prague (Aug. 23, 1866) Aus. retired altogether from the German Confederation and acknowledged the changes and annexations which Prus. had made in Ger. Prus. now established the N. Ger. Confederation, including the whole Ger. empire. In July 1870 Fr. declared war, but the surprising success of the Prus. arms brought about the unity of Ger. (See FRANCO-GERMAN WAR, in FRANCE.) The new G. E. was founded, and (Jan. 18, 1871) the king of Prus. was proclaimed emp. of Ger., under the name of William I. [From orig. art. in *J. S. Univ. Cyc.*, by GUSTAV NEUMANN.]

Germania was used by the Romans, as the common name for the vast but half unknown regions extending between the Rhine and the Vistula, and from the Danube to the N. Sea and the Baltic. The first time they made any real acquaintance with the inhabs. of this terr. was through Cæsar's campaign in Gaul.

Germanic Union. See GERMAN EMPIRE; PRUSSIA.

Germanicus (CÆSAR). b. in 15 B. C., a son of Nero Claudius Drusus, the brother of Tiberius, and Antonia; was adopted in 4 A. D. by Tiberius. In 14 he was made commander-in-chief of the legions on the Rhine, and gained great victories. But Tiberius became afraid of his popularity, and recalled him in 17. He was then sent to the E. against the Parthians and Armenians. Caligula, the emp., and Agrippina the Younger, mother of Nero, were his children. D. probably poisoned, Oct. 9, 19 A. D.

German Ivy, a climbing plant often seen in parlor culture, and popular for its rapid growth and ivy-like leaves, is not an ivy at all. It is the *Senecio nemorosus* (order Compositæ), a native of S. Afr. Out of doors it is very handsome, but will not stand the lightest touch of frost.

German Language and Literature. The G. lang. belongs to the Teutonic branch of the Indo-European family, and is a sister of the Gothic. It consisted, and consists still, of 2 dialects—High G., spoken in Suabia, Bavaria,

Aus., and parts of Franconia; and Low G., spoken in the N. and N. W. parts of Ger. The latter, which developed into the A.-S., the Dut., the Flemish, etc., has produced one remarkable literary monument, the *Heiland* (*heiland*, "saviour"), a Chr. epos from the 9th century, written in alliterative verses. The former in its second form (known as Middle High G.) was used by the Minnesingers in the 12th and 13th centuries, by the Meistersingers in the 14th and 15th, and in the 16th century Luther's translation of the Bible (1534) made it, in its third form (known as New High G.), the literary lang. of the Ger. people, the medium of Ger. civilization. In its present shape the G. lang. is exceedingly rich both in materials and in forms, surpassing both Eng. and Fr. in these, but its style is inferior.

The hist. of the G. lit. begins with or shortly after the Ref. Before that time there was a lit., but it had no hist. During the first period, from Charlemagne to the house of Hohenstauffen—that is, from the 9th to the 12th century—it was the Ch. that made the lit.; during the second, from the 12th to the 14th, it was the court; and during the third, before and under the Ref., it was the middle class, the burghers, the workshop. Charlemagne took some interest in the popular songs and mythological lore of the Ger. nations, and had a collection made. But his prin. task was to introduce Christianity into the country. It was translations of Lat. prayers and hymns which were needed, and this lit. the monks undertook to furnish. Much more original literature was shown by the Minnesingers between the 12th and 14th centuries. With them the national spirit of the Ger. people breaks forth for the first time in spontaneous poetical inspiration. The most celebrated of these knightly poets were Walter von der Vogelweide, Hartman von der Aue, Wolfram von Eschenbach, and Conrad von Würzburg. The highest production of the period is the *Nibelungenlied*. An excellent collection of minor songs and ballads is given by Lachmann and Haupt under the title *Des Minnesangs Frühling* (Leipzig, 1857). With the exception of certain books of edification and confession, and of some hymns, the rest of the lit. of the following period is rather tame (even its satires) and clumsy (even its chronicles). But it was eminently practical. It derived its authority not from its enthusiasm and power of charming, but from its purpose and power of instructing. The lyrical productions of the Meistersingers are extremely artificial expositions of dry and often narrow moral ideas, but they were held in very great esteem in their own time. Hans Sachs (1494-1576), a shoemaker in Nuremberg, the son of a tailor, and the master of all Meistersingers, wrote 4275 such pieces, which he pub. on fly-leaves. But his 208 dramas or dialogues in prose are much more interesting. All the germs which the period contained, however, were entirely cut off by the horrors of the Thirty Years' war. But before the war ended lit. made a new start in Ger., under the shelter of the univ., as the business of the learned and addressing itself only to the educated class. With Martin Opitz (1597-1639) the movement began. A number of men, all of learning, some of talent—Paul Flemming (1609-40), Andreas Gryphius (1616-64), Philip von Zesen (1619-89)—gathered around him, and formed the so called "first Silesian school." Literary societies were established at the univs. and at the courts, and much was done for the purification of the lang. Something, too, was done for the development of taste, but here was the weak point. The school could do nothing but imitate. A reaction, emphasizing the originality of the production, arose. At the head of this reaction stood Hofmann von Hofmannswaldau (1618-79) and Kaspar von Lohenstein (1635-83), founding the "second Silesian school." There was a correlation between the first Silesian school and the philos. of Leibnitz, and between the second and the pietism of Spener and Franke, but only a very elaborate analysis could show the connection. The lines in which Ger. civilization moved on were as yet widely separated from each other, and the connection between them was not established until the end of the next period, with Kant, Winckelmann, Lessing, and Herder. The movements of the first and second Silesian school had to be made over twice, and on a rising scale, first by Gottsched (1700-66) and his antagonist Bodmer (1698-1783); then by Klopstock (1724-1803) and Wieland (1733-1813), before Lessing's criticism (1729-81) finally brought the whole stream into one broad bed. In the latter part of the 18th century a new epoch begins—the period of Goethe (1749-1832). It was great in every respect. History (John von Müller, Schlosser, Ranke), philology (Wolff, Voss, Hermann, Lachmann, Böckh), theol. (Schleiermacher, Neander), philos. (Fichte, Schelling, Hegel), and the exact sciences (Alex. von Humboldt) were cultivated, not only with success but with genius. But in spite of this great complexity the whole epoch centres in Goethe, and all its productions may be classified with relation to him. The intimate co-operation of Goethe and Schiller (1759-1805) actually governed the G. lit. through several yrs. But while every one of Goethe's larger works formed a school, and became the starting-point of a new tendency, the direct influence of Schiller is comparatively small. The most prominent of Schiller's disciples are Christian Grabbe (1801-36), Friedrich Hebbel (1813-63), Friedrich Halm, and Heinrich Laube. Among Goethe's immediate followers there was one, Heinrich von Kleist (1776-1811), of eminent talent both as a dramatist and as a novelist. From Goethe's *Iphigenia*, and from his and Schiller's ballads, issued not only a poetical school, but a broad tendency of civilization, whose most eminent representative in the lit. was Franz Grillparzer (1791-1872). In strong opposition to Schiller, but in sympathy with Goethe, and actually inspired by several of his works, especially by *Faust*, developed the Romantic school, comprising a great number of highly gifted men—poets, critics, historians, philologists, and philos. Considered as a whole, the school was more critical than productive. Of the works of the 2 brothers Schlegel, August Wilhelm (1767-1845) and Friedrich (1772-1829), nothing has any interest now but their critical,

historical, and philosophical essays. Of the works of Ludwig Tieck (1773-1853), the novels are still entertaining by their elegant irony, but his name is best known as a dramatist and as an excellent translator. Novalis (1772-1801), Clemens Brentano (1778-1842), E. T. A. Hoffmann (1776-1822), Lenau (1802-50), and others were more exclusively poets, but none of them possessed a very comprehensive or very intensive talent. It must be noticed, however, that this contains only very few truly popular elements, such as those of Ludwig Uhland (1787-1862); those who try to be poets of the people become awkward, confused, and rough, like Ernst Moritz Arndt (1769-1860) and Friedrich Ludwig Jahn (1778-1852). So also think men like Ludwig Börne (1786-1837), Heinrich Heine (1799-1856), Julian Schmidt, and Wolfgang Menzel; and the gen. tone of Ger. criticism seems to indicate that this is felt and acknowledged in Ger., and a new starting-point, with a broader and truly popular principle, sought for. CLEMENS PETERSEN.

German Ocean. See NORTH SEA.

German Philology. See PHILOLOGY.

German Ref. Church. See APPENDIX.

German Seventh-Day Baptists, a sect founded in 1728 at Ephrata, Pa., by Conrad Beisel, who led a secession from the so called Dunkers. The members in 1732 entered a conventual life and adopted the Capuchin habit. Their prin. settlement is at Snowhill, Pa. They take no monastic vows, hold property in common, keep the seventh day sacred, recommend celibacy, but do not forbid marriage.

German Silver, an alloy of variable const., designed as an imitation of silver. Eight parts of copper to 3 or 4 each of zinc and nickel make a very fair imitation, and the addition of 2 or 3 per cent. of iron renders it whiter but less malleable. A very malleable sort has 10 parts of copper, 6 of zinc, and 4 of nickel. The Chi. *pakfong* is essentially the same as G. S.

Ger'mantown, on R. R., a former borough, now included in the 22d ward of Phila., Pa. It is 6 m. N. W. of the old State-house, and was settled by Gers. in 1684, under Francis Daniel Pastorius. Here was fought (Oct. 4, 1777) the battle of G. G. contains a community of Vincentian Fathers, a R. Cath. coll. and sem. Pop. of ward 1870, 22,605; 1880, 31,798.

Germany. See GERMAN EMPIRE, by G. NEUMANN.

Germination [Lat. *germinatio*, a "sprouting forth,"

from *germen*, a "sprout" or "bud"], in bot., is the term to denote the first steps of the development of the embryo or "germ" in the seed into the plant. It is naturally extended to the analogous development of any cryptogamous plant from its spore, which answers to seed. The embryo, originated in the ovule through its fertilization by a grain of pollen (see GERM and FERTILIZATION), completes its first stage of development in the seed while connected with the mother-plant; when the seed matures it has a period of rest; after which, when placed in favorable circumstances, G. takes place. The conditions necessary to or favorable for this are a congenial temperature, varying with the species, moisture, and darkness or a certain amount of obscurity. In the process water is absorbed, and certain chemical changes set on foot, through which solid nourishing matter in the seed is gradually liquefied and made available for growth. A certain amount of carbonic acid gas is evolved and the temperature raised (which becomes very perceptible in bulk, as is seen in the malting of barley), showing that a portion of the store in the seed is consumed or decomposed to render the rest available. Sometimes this store of food is in the embryo itself, usually in the cotyledons, as in the bean and pea, when the germ makes the whole kernel of the seed; sometimes mainly outside of it, as in corn and other grain. When the germ has developed into a plantlet, with root established in the soil and foliage in the air and light, so that it can provide its own nourishment, G. is completed. A. GRAY.

Germ-Theory of Disease, a theory which ascribes disease in gen., and infectious diseases in particular, to the introduction into living organisms of minute parasitic forms of life, and their subsequent multiplication to the obstruction of the vital functions. Though this theory has, in recent yrs., attracted a great deal of attention, in consequence of the deserved celebrity of some of its advocates, it is not, as is commonly supposed, a theory which has originated in recent yrs. Traces of it appear in writings of very high antiquity. But whatever plausibility this theory might at that early period have seemed to possess, it could then claim no higher rank than that of a bare hypothesis, and it has only been in times comparatively recent that observation has brought to light a sufficient number of facts apparently favoring it to justify our advancing it in the arena of scientific discussion to the higher dignity of a theory. It would be absurd to attribute all diseases to the invasion of the diseased system by microscopic parasites. From the

1, section of seed of morning-glory, showing the embryo; 2, same embryo detached and straightened; 3, germination of the morning-glory; 4, same, further developed.



laws of organic life, it is obvious that the causes of disease must be various. In the large majority, the vital functions are, earlier or later, more or less disturbed, if not arrested, by an endless variety of causes tending to produce disease and premature death. In the human race life is often shortened by ignorant or wilful disregard of the conditions necessary to the preservation of health. Accident, also, often exposes individuals to deleterious influences. But beside these causes of disease there are other influences directly morbid which cut short the duration of life. Poisons belong to this class. Other noxious influences, of which the pernicious consequences are more widely spread, are those which produce the diseases called zymotic. Such are malaria, contagion, and infection, instrumentalities to which are owing the wide-spread ravages of epidemics. It may further be remarked that there are many cases in which the disease has been transmitted by inheritance from a parent similarly affected.

With all those varieties of disease which begin and end in the individual our present discussion has nothing to do. It is the propagation of disease only which concerns us. As to contagious diseases, the G.-T. does not stand alone. Opposed to it are 2 others. The first of these may be properly called the chemical, and the second the vital or bioplasmic theory. The G.-T. proper presumes that the diseased person is suffering from an invasion of his system by microscopic alga or fungoid vegetative forms having the property of rapid self-multiplication, and that the spores which proceed from these fungi are wafted by the air, from person to person, penetrating the systems of the healthy, and establishing new colonies to generate disease in them. We know that the numbers of these spores which all fungi produce are incalculable. It is true that to ordinary observation the presence of foreign matters in the atmosphere is not perceptible, but when the air is left apparently free from all foreign admixture, it is demonstrably full of organic particles so extremely light as not to subside for many hours, or even days, of perfect rest. It is evident that, if disease is not produced by the invasion of the blood or viscera of the patient by a parasitic vegetation, it is not for want of the germs from which such vegetation might spring. It is therefore important to consider first what has been already ascertained of the effects of such parasitic growths infesting the animal organism. A simple form of fungus, called the *Sarcina ventriculi*, is often found in matters thrown up by persons laboring under disorder of the stomach. It has also been met with in other parts of the body when diseased. But it is likewise found, and not unfrequently, in the stomachs of persons in perfect health, and may accumulate there in considerable quantities without causing inconvenience. This parasite, therefore, cannot be regarded as an inciting cause of disease. The stomachs of many worms and insects are found, moreover, to be frequently infested with fungi, which grow there in great luxuriance. But there are diseases produced by invasions of parasitic fungi in animals of much higher grade than worms or insects. There are, for example, many cutaneous diseases among men, caused demonstrably by the presence and multiplication of microscopic forms of parasitic life, usually vegetable, but sometimes animal. The *Tinea favosa*, a disease of the scalp, happily rare, covers the head with yellow scales consisting almost wholly of a fungoid vegetation. The thrush in the mouths of children is made up of white patches of similar vegetable character. The widely prevalent and frequently fatal malady known as *diphtheria* has been proved to proceed from a penetration of the tissues by particular forms of bacteria, one of them called the *Micrococcus* and another *Bacterium termo*; while still other analogous organisms appear in the false membranes which form in the mouth and fauces. Again, the epidemic among cattle called in Eng. "the blood" is shown by the researches of Davaine to be occasioned by the presence in the blood of the diseased animals of innumerable living organisms resembling vibrios. This disease is communicable to man, producing "malignant pustule," and this is attended with the development of the same organisms in the pustules thus produced.

As to the constant presence of vegetable organisms in the blood of men or animals suffering under infectious diseases of whatever kind, it is impossible to entertain a doubt. Dr. J. H. Salisbury of Cleveland, O., affirms that in healthy as well as in diseased blood there are always present 2 species of cryptogams—the one alga and the other fungoid. In the pustules of smallpox Dr. Salisbury claims further to have observed a cryptogam having both a fungoid and an alga development, of which the spores are also found in the blood. Again, in typhoid fever a peculiar alga development is developed upon the external surface of the entire body and upon the mucous membrane of the interior cavities, which is regarded as the efficient cause of the disease and the means by which it is propagated. About 40 yrs. ago the yeast-plant was discovered. Till that discovery the chemical theory of disease had a strong support in the imagined analogy of fermentation. To the suggestion, after the discovery, that fermentation is probably a consequence of the rapid growth of the plant, there was at first a very gen. and natural dissent; but when, in 1843, Helmholtz made a direct experimental test of the question, by placing a fermenting liquid side by side with one of the same kind not fermenting, both being contained in the same vessel, but separated by a membrane which permitted the mingling of the liquids but prevented the passage of the plant, that analogy lost its force, for the fermenting liquid continued to ferment, while the quiescent liquid remained quiescent. The case of fermentation assumed now a significance quite the contrary of that which it had before seemed to possess, and it began to be considered quite as conclusive in favor of the G.-T. as it had been before in favor of the chemical. But independently of the argument derived from the detection, or supposed detection, in the body of the patient, of the microscopic parasites which are the presumed cause

of his disease, there are some considerations of a gen. nature bearing upon the question, which must be admitted to favor strongly the truth of this theory. It is, in the first place, a material substance, and not merely a dynamic influence, by which the infection of disease is communicated from individual to individual. This is proved by the fact that it is conveyed in merchandise, in clothing, in letters, in books, etc.; and that, in these and similar objects, if they are closely packed and excluded from the air, it will preserve its energy for an indefinite length of time. Now, being a material substance, the fact is significant that we find in it a power of reproduction, or of self-multiplication, which is at once strikingly analogous to that of all low living organisms, and at the same time difficult to be explained on any theory of chemical combination or decomposition. Another consideration, pointing in the same direction, is the fact that every contagious disease preserves forever the same invariable type. Still another consideration of no less interest is derived from the phenomena attending the propagation of the class of diseases distinguished as *misomatically contagious*. These diseases are not communicated from individual to individual, yet they never make their appearance in any place to which a diseased individual, or objects which have been in contact with such an individual, or morbid matter proceeding from such an one, has not been conveyed. This anomaly is in entire harmony with what we know of the modes of reproduction of sundry known forms of parasitic animal life. The embryos must pass through 2 stages of development—one within the body of the animal which they infest, and the other without.

Yet the G.-T. of D., at least when stated in all its generality, cannot be said as yet to have obtained acceptance with a majority of the med. profession. Serious difficulties present themselves in connection with the subject, which as yet it fails to explain, and among these are the objections that the theory demands a belief in the existence of about 20 different kinds of organisms never known in their mature state, and whose existence is not demonstrated, but simply postulated; and that these germs, if they exist, are not the germs of any known organisms, because such germs have been experimentally shown to be incapable of producing the particular diseases these are assumed to cause. What account shall we give, then, of the multiplication of fungi and Algae in diseased blood, if these organisms are not the cause of the disease? Simply, that the diseased condition furnishes to the organisms the pabulum, which is not present in the healthy state. For the cause of the disease we must, on this supposition, look elsewhere, and we shall be compelled, perhaps, to fall back upon the chemical doctrine of sympathetic decomposition. Many causes, in fact, produce profound changes in the blood with which parasites have nothing to do. This is true of prussic acid and of the venom of serpents, both of which produce fatal effects with singular rapidity.

In view of the conflicting character of the evidence surrounding the vexed problem under consideration, it may be permitted us, perhaps, at present, to hold by the conclusion that neither the G.-T. of contagious disease nor the chemical theory is exclusively true, but that each of these morbid influences has a range of action of its own, and that in some cases it is eminently probable that the disease in its inception is attributable to one of these causes, and that is the chemical, but owes its subsequent virulence mainly to the other—that is, to the presence of rapidly multiplying vegetable organisms.

F. A. P. BARNARD.

Gérôme, zhâ-rôm' (JEAN LÉON), b. at Vésoul, Fr., May 11, 1824, son of a jeweller; became a student of painting with Paul Delaroche 1841; followed for a time the course at the École des Beaux Arts, and in 1844 went with his master to It. In 1863 he was appointed prof. of painting in the École des Beaux Arts; in 1865 was chosen member of the Acad.; obtained a third-class medal in 1847, 2 second-class in 1848 and 1855, and a medal of honor at the Universal Exposition of 1867. In 1855 he was created a chevalier of the Legion of Honor, in 1867 he was made an officer, then 2 yrs. later the decoration of the Red Eagle was conferred on him. G.'s pictures are well known through the photograph: *The Duel after the Masquerade*, *The Death of Cæsar*, *Cæsar and the Gladiators*, *King Candaules*, *Phryne*, *Cleopatra and Cæsar*, *Jerusalem*, are among the most familiar. The artist loves sombre and sinister themes, with a strong element of sensual life in them. *The Age of Augustus*, *The Decay of the Empire*, *The Plague at Marseilles*, *The Death of St. Jerome*, are examples. His works are all powerfully imaginative and suggestive; a morbid taint runs through them, but they are clearly drawn and carefully studied; few of them are bright or glad, but few are destitute of a subtle and fascinating beauty.

O. B. FROTHINGHAM.

Geropig'a, **Geropig'ia**, or **Jerupig'ia**, a factitious liquor exported from Port. as brandy, and imported into the U. S. and G. Brit. as wine. It is variable in composition, but generally consists of grape-juice, brandy, sugar, logwood extract, and other ingredients. It is used in making imitations of wine and other liquors.

Ger'ry (ELBRIDGE), b. at Marblehead, Mass., July 17, 1744, grad. at Harvard in 1762; became a merchant of his native town; was specially interested in the naval operations of the Revolution, and was the founder of the Mass. admiralty court; in the Continental Cong. 1776-85; signed the Dec. of Ind.; one of the framers of the U. S. const. 1787, but refused to sign it; in Cong. again 1789-93; was with Pinckney and Marshall a special minister to Fr. 1797; chosen gov. of Mass. (Anti-Federalist) 1810 and 1811; chosen V.-P. of the U. S. 1812. D. Nov. 23, 1814.

Gerson, de (JEAN CHARLIER), called DOCTOR CHRISTIANISSIMUS, b. at Gerson, Fr., Dec. 14, 1363. In 1377 he was sent to the Coll. of Navarre, Paris, studied theol. under D'Ailly, from whose hands in 1392 he received the doctor's hat, having previously been employed upon missions to the rival popes, with a view to ending the great schism. In 1414 he went to

the Council of Constance, in which he represented the Gallican Ch., and favored the superiority of the councils to the pope and the reform of the Ch. within itself. He advocated the burning of Huss. His opposition to the Dominicans raised up so many enemies that he retired to Ger., where he lived until 1419, after which he went to the Celestine convent of Lyons and became a catechist of poor children. There he d. July 12, 1429. G.'s chief aim was the reform of the Ch. from within itself. He was the great founder of Gallicanism.

Gerstäcker (FRIEDRICH), b. in Hamburg, Ger., May 16, 1816. After a brief schooling he ran away to Bremen, whence he shipped for New York. After journeying through the U. S. and Canada, performing such work as he could get, he returned to Ger. in 1843 and pub. an account of his travels. He spent the yrs. 1849-52 in making a journey around the world, and a narrative of his travels became very popular. Later he made the tour of S. Amer., and accompanied Duke Ernest of Gotha on a tour through Afr.; visited Central Amer., and started upon another journey around the world. D. May 31, 1872.

Ger'vas, a S. Amer. and W. I. shrub, *Stachytarpheta Jamaicensis* (order Verbenaceæ), whose leaves have valuable medicinal properties and are used as a substitute for tea.

Ger'vase of Tilbury, b. at Tilbury, Essex, Eng., was a reputed nephew of Henry II., and about 1208 was made marshal of the kingdom of Arles. Wrote *Otia Imperialia*, a medley of hist., curious learning, fables, and the natural science of that day; and perhaps a *Hist. of Brit.*, which must not be confounded with the valuable *Chronicle* of Gervase of Canterbury.

Gervinus (GEORG GOTTFRIED), b. at Darmstadt, Ger., May 20, 1805; was 1836-37 prof. of hist. and lit. at Göttingen, but lost his place for political reasons; became honorary prof. at Heidelberg 1844, and d. there Mar. 18, 1871. Wrote *Geschichte der Angelsachsen im Ueberliff. Geschichte der deutschen Dichtung*, and *Geschichte des neunzehnten Jahrhunderts*.

Gese'nus (FRIEDRICH HEINRICH WILHELM), D. D., b. at Nordhausen Feb. 3, 1786; became prof. of theol. at Halle in 1810. He gave a great impulse to Oriental learning by his philological works. The chief of these are *Hebräisches und Chaldäisches Handwörterbuch*, *Hebräische Grammatik*, and *Kritische Geschichte der Hebr. Sprache*. D. Oct. 23, 1842.

Ges'ner (ABRAHAM), b. at Cornwallis, N. S., in 1797; acquired reputation as a naturalist and chemist; was appointed to make a geological survey of the lower provs. of the Dominion of Canada; wrote works on geol. and industrial resources of N. S. and N. B. D. Apr. 29, 1864.

Gesner (JOHANN MATTHIAS), a Lat. scholar and ed., b. at Roth, near Ansbach, Apr. 9, 1691, studied in the Univ. of Jena; was appointed rector of the Thomas School in Leipzig in 1730, whence he was transferred, on the establishment of the Univ. of Göttingen, to that inst. as prof. of philos. in 1734. His literary productions were chiefly eds. of the Lat. authors and works in illustration of them—viz. *Scriptores Rei Rusticæ Latini*, *Plinii Epistole*, *Claudians*, *Horatii Elogia*, *Quintilian*, *Norus lingue et eruditioris Romanæ The-saurus*, and *Opuscula*. D. Aug. 4, 1761.

Gesner, von (CONRAD), M. D., b. at Zürich, Switz., Mar. 26, 1516; was a phys. and prof. in his native town; author of many learned works, including *Bibliotheca Universalis* (1545-48), a noted bibliographical treatise. D. Dec. 13, 1565. —JOHANN VON GESNER (b. at Zürich Mar. 28, 1709; d. 1790) was a leading writer upon bot., physics, and math.

Gesneria'ceæ [from *Gesneria*, one of the genera], a natural order of exogenous herbs and shrubs, mainly tropical. Some are handsome greenhouse plants, and a few yield useful dyes or fruits. Neither the U. S. nor Europe have any plants of this order.

Gesta Romano'rum, one of the oldest medieval collections of pious legends. It was compiled probably by one Elinandus at a very uncertain date, and moral reflections were interpolated by Peter Berchorius (d. 1362), a Benedictine of Poitou. It was written in Lat., but translated into most of the tongues of Europe, and down to the revival of learning was extensively read.

Gesta'tion, the carrying of the young animal by the mother up to the time of its birth. This being effected by the uterus, occurs only in the Mammalia, since the females of that class alone possess that organ. G. begins with conception, and is brought to an end by parturition, and includes the progress of the young animal in development throughout this period. In birds and other oviparous animals the germ is expelled from the body of the female as one of the constituents of the egg, and subsequently undergoes further development during incubation until the young is hatched. In the Mammalia the young animal—called the embryo in the human species during the first 4 months, and afterward till birth the fetus—is not separated from the mother till so far developed as to be capable of at once maintaining life independently of her.

The fecundity of mammals varies greatly in the different groups of the class and the duration of G. G. occurs far less frequently in animals still in the wild state than in the same when they have been thoroughly domesticated. Pigeons breed in the former state twice a yr.; in the latter, 6 times or more. The fecundity of the domesticated rabbit is astonishing. Since it begins to breed at 6 months, and has 7 litters a yr., each of from 4 to 12, or even more, it was calculated that the descendants of a single pair of rabbits would, without interference, amount in 4 yrs. to 1,274,840. In the human species the first is rarely a twin birth, especially if the mother be quite young; the maximum fecundity of woman is at 25 or 26 yrs., although most cases of triple, quadruple, and quintuple births have occurred after 30.

The duration of G. is variable, but there is an indefinite ratio to the size of the parent, the larger animals usually carrying their young longer than the smaller. In some, the young are born with eyes open and ready to run about, but in others they are less developed at birth, the eyes not opening for several days afterward. A very remarkable example of

imperfect development at birth is presented by the kangaroo. The young animal is expelled from the uterus at the end of 39 days, while less than half an inch long, and in a gelatinous condition, and then placed in a little pocket formed by a fold of skin in the inguinal region, where it remains, attached to a teat, until so far developed as to be capable of living when separated from the mother. Animals have the following periods of G.: (1) *Herbivora*.—The elephant, 20 or 21 months; the giraffe, 14 months; dromedary, 12 months; buffalo, 12 months; ass, 12 months; mare, upward of 11 months; the tapir, between 10 and 11 months; rhinoceros, 9 months; the cow, 9 months; many of the larger deer, over 8 months; reindeer, 8 months; sheep and goat, 5 months; the sow, 4 months. (2) *Rodentia*.—The beaver, 4 months; dormouse, 31 days; rabbit, 30 to 31 days; squirrel and rat, 28 days; guinea-pig, 21 days or less. (3) *Carnivora*.—The bear, 6 months; lion, 108 days (Van der Hoeven says 3 months); the puma, 79 days; the fox, wolf, and dog, 62 or 63 days; the cat, 55 or 56 days. (4) *Marsupialia*.—The kangaroo (the largest), only 39 days; the opossum, 26 days. (5) *Cetacea*.—The Greenland whale, about 10 months. (6) *Quadrumania*.—The most common duration for the varieties of monkeys is 7 months, and they produce 1 and sometimes 2 at a birth. The duration of G. for the human female generally accepted is 280 days from the termination of the last preceding menstrual epoch, and 275 days after insemination. [From orig. art. in *J's Univ. Cyc.*, by PROF. E. R. PEASLEE, M. D., LL.D.]

Get'a, the anc. name of the Dacians. The old belief, that the G. were of the same race as the Goths, is not now generally received.

Get'shem'ane [Gr. *Γεθσημανη*; Heb. *Gath* and *Shemen*, "olive-press"], a garden, or orchard rather, at the foot of the Mt. of Olives, where our Lord spent a part of the night preceding his crucifixion, and which had been a place of frequent resort for him and his disciples (John xviii. 2). The spot now shown by Lat. monks is a short half mile from Jerusalem, nearly opposite the Golden Gate, just across the Kedron, at the angle made by the 2 paths that lead up over Olivet. The garden is nearly square, 160 ft. from N. to S. and 150 from E. to W., contains 8 large olive trees which are believed to be at least 1200 or 1300 yrs. old, and since about 1840 or 1850 has been inclosed by a high stone wall. The actual spot, in Dr. Robinson's opinion (1838), may have been a little farther up the hill. Dr. Thomson (1858) pronounces in favor of a more secluded locality several hundred yards to the N. E. of the present G. R. D. HITCHCOCK.

Get'tysburg, R. R. junc., cap. of Adams co., Pa., on S. border of the State, 8 m. from "Mason and Dixon's line," 28 m. W. by S. of York, and 25 E. by S. of Chambersburg. G. is the seat of Pa. Coll. and a Lutheran theological sem. The G. Springs Hotel and Katalysine Spring are 1¼ m. to the W. The battle of G. occurred in and around this town July 1, 2, and 3, 1863. The National Cemetery at G. contains the bodies of 3580 U. soldiers, with a central monument costing \$50,000 and a bronze statue of Gen. Reynolds costing \$13,000. The Confed. dead have nearly all been removed from the battle-field to S. cemeteries. Pop. 1870, 3074; 1880, 2814.

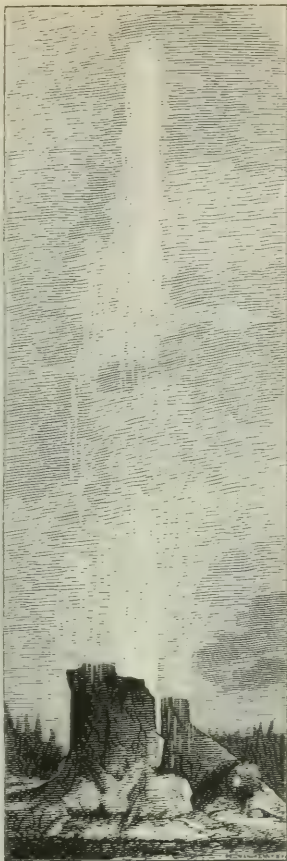
Get'tysburg, Battle of, was fought July 1-3, 1863, between the U. army under Gen. Meade and the Confeds. under Gen. Lee. During the month of May the 2 armies lay fronting each other upon opposite banks of the Rappahannock. Early in June Lee began his movement for the invasion of Pa., crossing the Potomac on the 24th and 25th, and reaching Chambersburg, Pa., on the 27th. Gen. Hooker, then in command of the Army of the Potomac, moved in the same gen. direction, but on the 28th was relieved, and the command given to Gen. Meade. In order to prevent his communications from being severed, Lee turned back toward Get'tysburg to give battle to the U. army. Meade had intended to give battle at a spot several m. from Get'tysburg, near which was, however, a small portion of his army. This came into collision, a little before noon July 1, with the advance of Lee, and was forced back, taking up a strong position upon Cemetery Hill, in the rear of Get'tysburg. Hancock, who had been sent forward to examine the position, reported that Get'tysburg was the place at which to receive the Confed. attack, and Meade hurried his whole force to that point.

The action on the second day, July 2, began about noon with an attempt made by Lee to seize Round Top, a rocky hill from which the U. position could be enfiladed. This attempt was unsuccessful; but the action became gen., and on another part of the field Sickles's corps, which had taken post in advance of what Meade regarded as the true line, was forced back for a considerable distance. When this day's fighting closed Lee was convinced that he had greatly the advantage, and he resolved to press it the next day.

On the morning of July 3 an attempt was made upon the extreme U. right, but it was repelled. The main attack upon the centre was preluded by a cannonade from 150 guns, which was replied to by 80, little injury being inflicted by either side. About noon the U. fire was slackened in order to cool the guns, and Lee, thinking that the batteries were silenced, launched a column of 15,000 or 18,000 against the U. lines. Some of this column actually surmounted the low works, and a brief hand-to-hand fight ensued. But the column was practically annihilated, only a small portion escaping death or capture. The forces on each side were probably about 80,000, though all were not really engaged. No official report of the Confed. loss was ever published; the best estimates put it at about 18,000 killed and wounded and 13,600 missing, most of them prisoners. The U. loss was about 16,500 killed and wounded and 8600 missing. [From orig. art. in *J's Univ. Cyc.*, by GEN. J. WATTS DE PESTER.]

Gey'er (HENRY SHEFFIE), b. at Frederick, Md., Dec. 9, 1790, was admitted to the bar 1811; an officer during the war of 1812-15; removed to St. Louis; was the first speaker of the Mo. house, and twice re-elected; pub. *Statutes of Mo.*; one of the framers of the code of 1825; declined secretaryship of war 1850; U. S. Senator 1851-57. D. Mar. 5, 1859.

Geyser, gî'ser [Icelandic *geysa*, to "gush forth"], the name given to springs of boiling water found in Iceland, but applied more especially to the Great G., situated 70 m. from Reikjavik. The mouth of the Great G. consists of a mound 15 ft. high, whose top contains a basin 4 ft. deep and 72 ft. in diameter, generally filled with hot water, 188° F. at the edge and 221° at the centre, where it wells up through a shaft 8 ft. wide and 83 ft. deep. When the spring is in a quiet state the water ascends slowly up the shaft, is cooled off in the basin, and discharges itself through a small aperture. But every 4 or 5 hours a subterranean noise is heard, an ebullition takes place in the basin, and jets of boiling water are thrown up through the shaft; about every 30 hours the jets ascend 100 ft., and such vols. of vapors are discharged as to form clouds which shut in the horizon on all sides. After such an eruption the basin is empty for several hours. Outside of Iceland there are G.-fields in New Zealand, Formosa, and the U. S. In this country the most important are in the National Park, and principally in Wyo. Terr., which exceed in grandeur any elsewhere known, several of the springs occasionally throwing up streams of water over 200 ft. high.



Giant Geyser,
National Park, U. S.

Ghaut, or **Ghât** [Eng. *gate*], in India, (1) a pass through a mtn. range; (2) a landing-place or stairway for going on or off boats in the rivers of India. Some of them are architecturally fine structures.

Ghaunts, **The**, two chains of mts. in the peninsula of Hindostan, running respectively along the E. and W. coasts, joining each other in Cape Comorin, and inclosing the tableland of the Deccan. The W. G. form a distinct range. Their gold-mines have long been worked, but in 1874 rich gold-bearing strata were discovered. The E. G. are lower, and often interrupted.

Ghee [Hindoo, *ghi*], butter made in India from the milk of the buffalo or the cow. The milk is boiled, cooled, curdled with sour milk, churned, and after the butter comes put aside till it begins to grow rancid; then boiled, mixed with sour milk (*dhye*), salt, and sometimes with aromatics.

Ghent, or **Gand**, city of Belg., situated at the confluence of the Scheldt and the Lys, and traversed with numerous canals, which divide the city into 26 islands, has the gen. character of a town of the Middle Ages; narrow streets, with houses towering like castles, alternate with open quays lined with elegant edifices. Among the edifices the town-house, with a front finished in 1200, is a very interesting structure, and the cathedral, with a crypt built 941, is one of the most splendid church edifices of Belg. Of public places the most remarkable are the Vrydag-markt, where the executions under the duke of Alva took place, and the Kauter, a parade-ground and flower-market, where Van Eyck and Jacob van Artevelde lived. The spinning, weaving, and cotton-printing industries, the manufactures of leather, sugar, and machinery are considerable; horticulture is largely carried on. Its commerce is extensive.

In historical respects G. is a famous place. In 949 the emperor Otto the Great built a castle in order to defend the city against the counts of Flanders. In the 14th century G. under Jacob van Artevelde waged violent wars against the dukes of Burgundy. It mustered at that time an army of 50,000 men; the contingent of the wool-weavers alone was 18,000 men. In the 15th century it fought against Charles the Bold, but under the emp. Charles V. its splendor began to wane. In 1576 the "Pacification de Gand" was concluded in G. It was conquered in 1584 by the duke of Parma, and in 1678 by Louis XIV. of Fr.; on the establishment of the kingdom of Belg. in 1830 it became a Belg. possession. Pop. 133,755.

Ghent, Treaty of. This treaty, concluded Dec. 24, 1814, ratified Feb. 17, 1815, put an end to the war of 1812. It provided (1) for the restoration of places taken and property there found; (2) for a commission to decide to which power certain islands in Passamaquoddy Bay belonged; (3) for several commissions touching boundaries, and reference to a friendly state, if the parties could not agree; (4) that both powers should do their best to abolish the slave-trade. But of impressment of seamen, and the fisheries (see **FISHERIES**), it said nothing.

THEODORE D. WOOLSEY.

Ghibellines. See **GUELPHS**.

Ghiberti, ge-ber'tee (LORENZO), an It. goldsmith and sculptor, lived and wrought in Florence from 1378 to 1455. He came from a family of goldsmiths, and he was still young (but 23) when he competed with the most illustrious sculptors of his time for the honor of designing and executing a bronze folding-door for the Baptistery of San Giovanni, one of the 2 having already been made by Andrea Pisano. Twenty-one yrs. the artist devoted to his task, and the door when finished was so beautiful that he was commissioned to execute another as companion to it. About an equal length of time was spent on the second, which was declared superior to the first. These bronze gates have made G.'s renown, casting into the shade other lovely pieces—a statue of John the Baptist outside of Or San Michele, two bas-reliefs on the baptismal font in the cathedral of Siena, the St. Stephen, the St. Matthew, and even the sarcophagus of St. Zenobius, in the S. Maria del Fiore—which with the gates are the finest works of their kind in It. O. B. FROTHINGHAM.

Ghi'ka, a princely family of the Danubian principalities, over which several G. ruled as hospodars, and in which many of them held high state offices. Since the beginning of this century, Alexander, Constantin, Demetrius, and John have been the most celebrated members of the G. family. Prince John Ghika d. Apr. 1881.

Ghirlandajo, gîr-lahn-dah-yo (DOMENICO BIGORDI, or, as some say, CORRADI), a Florentine painter, b. in Florence probably in 1449, and d. probably in 1498; the dates vary. As a boy he was remarkable for correctness of eye and hand. The chapels and chs. of Florence bear testimony still to the originality, freshness, and delicacy, as well as to the exuberance of his genius. He painted men and women in the costumes of their time, discarded tinsel ornaments, gilded scroll-work, and plaster borderings, substituting in their place honest brush-work. The aerial perspective was so wonderful that he is credited with having been the discoverer of its laws. He painted in oil, but chiefly in fresco, and very much in places exposed to the weather, which explains the ruinous condition of many of his pictures. When about 30 yrs. old Pope Sixtus IV. invited him to Rome to assist in decorating his chapel. Of his 2 pictures there, but one, *Christ calling Peter and Andrew from their Nets*, is preserved. G. painted in Pisa, Lucca, and Siena, but his best work is seen in Florence, especially in the Tasseti chapel, in the ch. of the Trinità and in the choir of Santa Maria Novella. In the first series portraits are introduced of Lorenzo de' Medici and other eminent Florentines, and in the last series, in the portion illustrating the life of the Virgin, is the celebrated portrait of Ginevra de' Renci, a young beauty of Florence. O. B. FROTHINGHAM.

Ghiznevides, a dynasty of Afghan monarchs who reigned at Ghazni (Ghizni or Ghuznee) and at Lahore from 961 A. D. to 1184. At the time of the Sultan Mahmud (d. 1030) the empire had its widest extent, occupying a great part of Per., W. Tartary, a part of India, and the intermediate countries.

Ghog'gra, or **Ghog'ra**, a river of Hindostan, one of the largest affluents of the Ganges, rises at an elevation of between 17,000 and 18,000 ft., in the glaciers of the Himalayas; enters the plains of Hindostan at an elevation of 738 ft., and joins the Ganges 150 m. below Benares, after a course of about 600 m.

Ghost [A.-S. *gâst*, "spirit," "breath"], the spirit of a human being, or, in a more popular sense, an apparition, or a departed human spirit made visible. Belief in the occasional appearance of G. exists in all countries, and has existed in all ages. Artificial G., such as are seen upon the stage, are easily made by means of glass plates which reflect only a faint outline of the person who personates the G.

Ghost, Holy. See **HOLY GHOST**.

Ghost-Moth, *Hepialus humuli*, a European moth of the family Bombycidae, whose destructive larvæ, known as *otters*, bore in hop-vines and the stalks and roots of many plants. The moths are white below and brown above, and as the upper surface is turned toward or away from the spectator in flight, the moth appears and disappears by turns.

Giant and Dwarf. The term *giant* [Gr. *γίγας*] is primarily mythological. The Gr. G. were huge earth-born beings, who revolted against the gods, who finally slew them. The Norse mythology gives the G. a prominent place. The G. are held by some to represent the adverse forces of nature; by others, human enemies of foreign race. In authentic hist. there are accounts of races of men of very large size. There are well authenticated instances of persons exceeding 7½ ft. in height. Several are on record of men measuring 9 or even 9½ ft., but these examples are open to some question.—**DWARF** [Gothic *zwerg*; perhaps, says Grimm, the Gr. *θεωπυγος*, "divine worker"] is also a mythological name. Dwarfs, fairies, elves, pygmies, pixies, etc. figure in the traditionary lore of many nations. The Grs. placed the pygmies on the banks of the Upper Nile, where modern travellers have found tribes of dwarfish men. The Esquimaux and other far N. races are also undersized. It is probable that the character of the food and the other surroundings have in these instances determined the dwarfish habit. A dwarfed state is sometimes associated with rachitic deformity, but many D. are perfectly symmetrical.

Giant Powder. See **DYNAMITE**.

Giant's Causeway, **The**, on the N. coast of Ire. The coast for some m. is formed of dark volcanic rocks, which by their unequal decomposition give rise to a line of cliffs from 400 to 500 ft. in height. The Causeway itself is a promontory of columnar basalt that has been laid bare by the waves, but has itself resisted their action; and here the visitor can make his way for a long distance over an irregular floor formed of perfectly developed polygonal columns.

Gibbes (ROBERT WILSON), M. D., b. at Columbia, S. C., July 8, 1809, grad. at S. C. Coll. 1827, where he became prof. of chem.; took his med. degree in Phila.; became distinguished as a paleontologist, ornithologist, ichthyologist, and

antiquary, as well as a phys.; was mayor of Columbia, and for a time ed. of the *Daily South Carolinian*; became in 1861 surgeon-gen. of S. C. In 1865, when Columbia was burned, his mansion, with its treasures of art and lit. and its valuable cabinets, was burned. Wrote a *Monograph of the Siquilidae*, *Typhoid Pneumonia*, *Documentary Hist. of S. C.*, and many scientific papers. D. Oct. 15, 1866.

Gibbites, a sect of Scot. in the last part of the 17th century. They combined some of the doctrines of the Quakers with others of the strict Covenanters, and were never numerous. Their leader was a sailor named John Gibb.

Gibbon, a name applied to Simiidae of the E. I., of the genus *Hylobates*, the lowest of anthropomorphic apes. They are very long-armed, and have naked callosities upon the buttocks. They live among the branches of trees.

Gibbon (EDWARD), b. at Putney, Surrey, Apr. 27, 1737; in 1753 declared himself a R. Cath.; was placed under the instruction of a minister of Lausanne, under whose training he renounced Rom. Catholicism (1754), and acquired a vast knowledge of hist. and of Lat. and Fr. lit. He entered Parl. in 1774; was a constant Tory, and became a member of the board of trade. Wrote *Hist. of the Decline and Fall of the Rom. Empire* (1776-1788). D. Jan. 16, 1794.

Gibbon (JOHN), b. in Pa. 1826, grad. at U. S. Military Acad. July 1847, and entered the army as brevet second lieut. of artil.; promoted to be col. 36th Inf. 1866; was present at the city of Mex.; subsequently was in garrison and on frontier duty till 1861; then served as chief of artil. of Gen. McDowell's army May 1862, when he took command first of a brigade and afterward of a division, in the Army of the Potomac, participating in the second battle of Bull Run, the battles of S. Mountain, Antietam, Fredericksburg, Chancellorsville, Gettysburg, the Wilderness, Spotsylvania, Cold Harbor, etc.; he subsequently commanded the 24th army corps in the operations about Petersburg up to the surrender of Lee; received the successive brevets from major to that of maj.-gen. U. S. A.

Gibbons (GRINLING), a wood-carver, b. in Rotterdam in 1648; came to Lond. after the Great Fire of 1666, and was taken into the employment of Charles II., and afterward of George I. Several of the princely houses of Eng.—Chatsworth, Petworth, and Burghley—contain specimens of his exquisite work in screens, sideboards, chimney-pieces, ornamental panels with flowers, fruit, birds, carved with a precision and delicacy that entitle them to the rank of works of very fine art. D. Aug. 3, 1721.

Gibbons (WILLIAM), M. D., was one of the fifth in descent from the Quaker emigrants who accompanied William Penn and settled in Pa. about 1673-80; b. in Phila. Aug. 10, 1781, and was ed. by his father, who was for some yrs. a classical teacher in that city; in 1805 received the degree of M. D. from the Univ. of Pa., soon after which he settled in Wilmington, Del. About 1823-25 Wilmington became the headquarters of a prolonged religious controversy originating in an attack by an eminent Presb. clergyman, under the signature of "Paul," on the principles and doctrines of the Society of Friends. The dispute soon enlarged, and grew into a gen. polemical war between the Unitarians and the Trinitarians. Dr. G., though deeply interested, did not appear in the controversy as a writer, but near the close of it, under the signature of "Vindex," he addressed a letter to the Presbs. entitled *Truth Vindicated*, an able and successful refutation of the charges preferred by "Paul," and one of the clearest expositions, and perhaps the best defense, of the doctrines of Friends which has been pub. in modern times. Dr. G. also established and maintained for several yrs. at his own expense, a publication called *The Berean*, which, covering the period from Feb. 1824 to Sept. 1828, is esteemed by the Society of Friends as their best accredited hist. extant of the events connected with the division of that Society into "Friends" and "Orthodox Friends," which was consummated in 1827.

Gibbs (ALFRED), b. in New York 1824, grad. at W. Pt., and entered the army as brevet second lieut. mounted rifles, July 1846. Served in the war with Mex.; from 1848 to 1856 was aide-de-camp to Gen. Persifer F. Smith, serving on the Pacific coast and in Tex.; from 1856 to 1861 was engaged mostly on frontier duty. In July 1861 he was taken prisoner in N. M.; upon being paroled (Aug. 1862), he was appointed col. of 130th N. Y. Volunteers, Sept. 1862, being engaged in operations at Suffolk, Va.; during Gen. Grant's Richmond campaign participated as cav. commander in various actions till Aug. 1864, then in the battles of Opequan, Fisher's Hill, and Cedar Creek; appointed brig.-gen. of volunteers Oct. 19, 1864; in the final conflict with and pursuit of the Confed. army of N. Va. commanded a brigade of cav. and was engaged at Dinwiddie C.-H., Five Forks, Sailor's Creek, etc.; subsequently commanded a cav. brigade and division in the division of the Gulf, and was mustered out of the volunteer service Feb. 1866. Received the various brevets from major to that of maj.-gen. U. S. A. Promoted in the army to be major 7th Cav. in 1866. D. Dec. 26, 1868.

Gibbs (JOSHUA WILLARD), LL.D., b. at Salem, Mass., Apr. 30, 1790, grad. at Yale in 1809; was tutor there 1811-15, prof. of sacred lit. 1824-61, librarian of the coll. 1824-43. Among his works are a Heb. lexicon, an abridgment of Gesenius's lexicon, *Philological Studies*, *Teutonic Etymology*, etc. D. Mar. 25, 1861.

Gibbs (WOLCOTT), M. D., LL.D., b. in New York Feb. 21, 1822; grad. at Columbia Coll. 1841, studied chem. and physics in Giessen and Berlin; became prof. of physics and chem. in the Coll. of the City of New York 1849; in 1863 took the Rumford professorship in Harvard Univ. Dr. G. is the author of many valuable chemical researches; has made extensive contributions to analytical chem., also in the dept. of physics. His memoirs on these subjects are in the *Amer. Journal of Science and Arts*.

Gibel, or **Prussian Carp**, a European fresh-water fish (*Carassius gibelio*), cognate with the goldfish.

Gibraltar, *Gebel at Tarik* ("Tarik's Mountain"), the

southernmost promontory of Sp., is an insulated rock connected with the mainland only by a low, sandy slip of land. The Rock of G. is 1400 ft. high, almost perpendicular on its S. and E. sides, and sloping and accessible only on its N. and W. sides. Here is situated the town of G. G. is chiefly important as a fortress. In 1704 it was taken by the Eng., who have fortified it so as to make it impregnable.

Gibraltar, Strait of, connects the Atlantic with the Mediterranean by a channel 15 m. wide and 900 fathoms deep, between Sp. and Afr. The central current of the channel constantly sets from the Atlantic into the Mediterranean, and makes it very difficult for sailing vessels to pass through to the Atlantic unless aided by a brisk E. wind. The lower level of water in the Mediterranean is caused by its greater evaporation.

Gibson (CHARLES BELL), M. D., b. in Baltimore, Md., Feb. 1816. Soon after his birth the family moved to Phila., where his father became prof. of surgery in the Univ. of Pa. The son was invited to the chair of surgery in Washington Med. Coll., Baltimore, and in 1848 to the same professorship in the Richmond Med. Coll., Va. When that State seceded he was made surgeon-gen. in Richmond he became the chief consulting surgeon and operator. D. Apr. 23, 1895.

Gibson (EDMUND), D. D., b. at Bampton, Westmoreland, Eng., 1669; became bp. of Lincoln 1715, of Lond. 1723. D. Sept. 6, 1748. He was a man of virtue and learning, but of intolerant spirit, for he advocated penal laws against the Quakers and caused Meade's edition of the *Restitution of Scervetus* to be burned. His polemical works, written against Romanism and infidelity, are highly esteemed.

Gibson (GEORGE), b. in Pa.; entered the army as capt. of inf. in 1808, served through the war with G. Brit. 1812-15, appointed commissary gen. 1815, which position he held for over 40 yrs.; brevet maj.-gen. U. S. A. D. Sept. 21, 1861.

Gibson (JOHN), an Eng. sculptor, b. July 19, 1790, at Gyllyn, near Conway, Wales; first studied sculpture under the Messrs. Francis, statuary of Liverpool. Several gentlemen supplied him with money for a 2 yrs. residence in Rome. There, in 1817, Canova welcomed him, admitted him to his studio and acad., and procured for him distinguished patronage. His first pieces, *Mars and Venus* and *Hero and Leander*, were executed for the duke of Devonshire. After Canova's death (in 1822) G. placed himself under Thorwaldsen. In Rome he lived, revisiting Eng. but once in 24 yrs. The patronage of the rich and great was lavished on him. G. partially revived the anc. practice of tinting marble statues by adding color to the *Aurora*, the *Venus*, and the statue of the queen, but did not carry the questionable practice far. He was regularly an exhibitor at the Royal Acad. in Lond., was chosen an associate in 1833, and made a member in 1836. He was also a member of the acads. of Munich, St. Petersburg, Turin, and St. Luke in Rome. D. Jan. 27, 1866.

Gibson (JOHN BANNISTER), LL.D., b. in Carlisle, Pa., Nov. 8, 1780, grad. at Dickinson Coll. 1800; studied law; admitted to the bar in Cumberland Co. 1803; practised in Carlisle and Beaver, Pa., and Hagerstown, Md.; member of Pa. legislature 1810-11, appointed judge in 1813, promoted to the supreme court of Pa. 1816, and was chief justice 1827-51, when amendment to const. made the office elective, and he was elected by a large majority. D. May 3, 1853.

Gibson (WILLIAM), M. D., LL.D., b. in Baltimore, Md., 1781. He took his med. degree from the Univ. of Edinburgh; was the pupil and associate of Sir Charles Bell, and in 1819 succeeded Dr. Physick in the chair of surgery in Phila. Wrote a *System of Surgery* and *Rambles in Europe*. He resigned his professorship in 1855. D. 1868.

Gibson City, R. R. June, Ford co., Ill. Pop. 1880, 1260. **Giddings** (J. WITT C.), b. in Susquehanna co., Pa., July 18, 1827; studied law, and removed to Tex. in 1852, making Brenham his residence; opposed secession in 1861, but immediately after the withdrawal of that State from the U. entered the Confed. service as a private in the 21st Tex. Cav., and rose to the rank of col. In 1866 was a member of the constitutional convention of Tex., and subsequently a member of the 42d and 43d Congs.

Giddings (JOSHUA REED), b. at Tioga Point, Pa., Oct. 6, 1795. His father removed from Lyme, Conn., to Pa. in 1772. Six weeks after the birth of their child his parents removed to Canandaigua, N. Y. When he was about 10 yrs. old they removed to Ashtabula co., O., a part of the Conn. W. Reserve. His youth was one of severe toil, yet he became a man of great size and strength, as well as of capacious mind and generous and enterprising spirit. After Hull's surrender in 1812 he enlisted as a volunteer in the U. S. service, and took part in a severe action near Sandusky Bay. After Proctor's retreat the troops with which G. served were sent home. His education was obtained by reading books, mostly borrowed, and read at night by the light of a hickory fire. He taught school, studied law, was admitted to the bar in 1821. In 1826 he went as a representative to the State legislature, but was defeated in running for State senator in 1828; devoted himself to his profession, in which he rose to the first rank. In 1839 he was sent to Cong. He was not then, and was never, an abolitionist in the strict sense of the term. The men who claimed that title did not approve his views and seldom commended his action. His adhesion to the Whig party exposed him to their assaults. They labored for the abolition of slavery in the States, while he admitted that it was out of the reach of Federal enactments. He revered the const. which they denounced. He zealously labored to preserve the U. which they were willing to divide. At the same time, he believed that Cong. had no right to protect slavery in the States, that slavery was a great evil, and that it was wrong and unconstitutional to compel the free States or the gen. govt. to return fugitive slaves to their owners. He also believed it was the duty of Cong. to prohibit slavery in D. C. and the Terrs., and to break up the coastwise slave-trade. He opposed the Fla. war, on the ground that

it was an attempt to recapture fugitive slaves at the expense of the U. S. In 1841 the *Creole*, a vessel laden with slaves, sailed from Norfolk, Va., for New Orleans. The slaves arose, seized the vessel, and finally found the Brit. port of Nassau, N. P., where they were recognized as free. Mr. Webster, then sec. of state, having demanded compensation of the Brit. govt., Mr. G. introduced into the House resolutions declaring that the slaves upon the *Creole* were guilty of no crime in taking their freedom upon the high seas, inasmuch as they were outside of the jurisdiction of Va., that persons held in slavery cease to be slaves when upon the high seas, and that the demand for the slaves or for compensation for them was not warranted by the U. S. const. For presenting these resolutions (which he temporarily withdrew at the earnest request of many friends) Mr. G. received the censure of the House, without being permitted to speak in his own defence. He thereupon resigned, but was at once re-elected without opposition. In his early yrs. in Cong. his views were shared by no member except his friend John Quincy Adams. In 1843 he produced the famous "Pacificus" essays upon the slavery question. He zealously opposed the annexation of Texas. In 1844 he successfully opposed the bill to pay for the Amistad negroes. He strongly favored the Wilmot proviso. Upon the nomination of Gen. Taylor for the Presidency in 1848 he left the Whigs and joined the new Free-Soil party. He declined to vote for a Whig speaker of the House in 1847 and 1849, and thus in the latter yr. caused the choice of a Dem. speaker. In 1859, after 21 yrs.' service, he closed his Congressional career. Wrote the *Exiles of Florida*, an historical sketch. In 1861 he was appointed consul-gen. to Brit. N. Amer.; in 1864 pub. *The Rebellion, its Authors and Causes*. D. May 27, 1894. [From orig. art. in *J. S. Univ. Cyc.*, by HON. A. G. RIDDLE, M. C.]

Gier Eagle, a bird mentioned in the Bible. It is generally thought to be the Egyptian vulture, but some believe it is the pelican of the Levant.

Gieseler (JOHANN KARL LUDWIG), b. at Petershagen, Ger., Mar. 3, 1792; became prof. of theol. at Bonn 1819, and at Göttingen 1831. His great work on *Church History* is one of the most valuable and impartial works of the kind ever produced. D. July 8, 1854.

Gilford (ROBERT SWAIN), an Amer. painter, b. on the island of Naushon, Gosnold, Mass., Dec. 23, 1840. His parents were poor laboring people. Living on the sea-shore (his father was a boatman), the boy's love for art early showed itself in marine studies. His only education for the first 10 yrs. was derived from the public school. From that time onward he was indebted to his own exertions for his mental acquirements. A natural taste for art was developed by a Ger. artist, who employed the lad in little services. Good friends, seeing his promise and attracted by his character, lent their aid. The youth rapidly rose in power and reputation, and stands in the front rank of landscape-painters. His best pieces are from studies made in the E. in 1870-71.

O. B. FROTHINGHAM.

Gifford (SANDFORD ROBINSON), an artist, b. in Greenfield, Saratoga co., N. Y., July 10, 1823. His ancestors were among the earliest settlers in N. Eng. Mr. G. received a fair education; was 2 yrs. at Brown Univ. (1842-44); came to New York in 1845, and studied drawing, perspective, and anat. with John Rubens Smith; drew from casts and from life at the National Acad., and attended lectures on anat. at the Crosby st. Med. Coll. At this time he painted portraits. His attention was directed to landscape-painting in 1846 by pedestrian tours among the Catskill Mts. and the Berkshire Hills. In 1851 G. was elected an associate of the National Acad., and in 1854 an academician. Two yrs. and a half (1855-57) were spent in Europe. At the breaking out of the c. war G. joined the 7th N. Y. regiment, and saw 6 months of service. Eighteen months more in Europe (1868-69) added to his stores of material. Subsequently the artist visited Col., Ut., Cal., Or., Brit. Columbia, and Alaska. His *Mansfield Mount, Shrewsbury River, San Giorgio, Tirol, On the Nile, Venetian Sails, Baltimore* in 1862, are among his most characteristic pieces. D. Aug. 29, 1880. O. B. FROTHINGHAM.

Gifford (WILLIAM), b. at Ashburton, Eng., Apr. 1757. His successful *Baviad* (1797), directed against the Della Cruscan, was followed by the *Mæviad* (1795) and the severe *Epistle to Peter Pindar*, which called forth an equally caustic reply. In 1797 he became editor of the *Anti-Jacobin*, and in 1809 of the *Quarterly Review*. His reputation is founded on his work as a critic. He was a most bitter enemy of the Whigs, and was distinguished for his hostility to Hunt, Keats, and all the liberal authors of his day. His eds. of the old Eng. dramatists are noteworthy. D. Dec. 31, 1826.

Gift, in law, a voluntary or gratuitous transfer of personal property. G. are divided into 2 classes—G. *inter vivos*, or between living persons, and G. *causa mortis*—i. e. bestowed in anticipation of the donor's death.

I. *Gifts inter vivos*.—Strictly speaking, this technical designation is incorrect, since all G. must necessarily be made between living persons, but it has become firmly established as a legal term. The real distinction is, that G. of this class may be complete within the donor's lifetime, while G. *causa mortis* only take absolute effect from his death, being, as long as life lasts, conditional and revocable. The capacity to confer G. which shall be valid and irrevocable demands the same qualifications in the donor as to make binding contracts or to perform other legal acts. (See CONTRACT.) Coverture, infancy, insanity, and duress would be causes of disability, in consequence of which the G. might be retracted. When the donor is under no incompetency, there must be a delivery of the property conferred into the possession of the donee. The delivery may be either actual, as by placing the very article intended to be given in the hands of the donee, or constructive. Giving the key of a warehouse in which the goods are deposited, or an order upon a bailee which the latter accepts, are instances of a sufficient constructive delivery. The thing given must have an actual existence. The promise of the donor, though in writing,

cannot be the subject of such a G. Thus, if a person give his own promissory note or his check drawn upon a banker to another, the donor's title is not affected until the money is collected, and before that time the G. is revocable. The G. in such cases is but a promise without consideration. After a complete and valid delivery of a G. has been made, the only remaining cause for which it may be avoided is that the donor's act was induced by fraudulent means, or that the G. would be prejudicial to the rights of creditors.

II. *Gifts causa mortis*.—G. bestowed in anticipation of death differ, in several important respects, from G. *inter vivos*. They are conferred only upon the presumed condition that they shall take effect in case the donor dies by his existing disorder. A recovery from the illness operates of itself as an avoidance of the G. Moreover, as long as the donor lives he has power to revoke his G., even though actual delivery may have been made. But apart from these fundamental distinctions there is a gen. resemblance between the 2 classes of G. The same rules as to legal capacity are applicable, and as to the effect of the donor's gratuitous promises. The doctrine of constructive delivery as applied to valid rights of action, such as mortgages, policies of life insurance, deposits in savings banks, etc., has been carried farther than in G. *inter vivos*, in order to effectuate the donor's intent. Mere delivery in such cases is in gen. sufficient, even though there be no written assignment of the mortgage, policy of insurance, etc. Moreover, the same qualifications are applicable as to the effect of fraud upon the legality of the G., and the rights of existing creditors receive the same protection.

GEORGE CHASE.

Gignoux, zhén-yoo' (FRANÇOIS RÉGIS), a landscape-painter, b. at Lyons, Fr., in 1816, ed. at Fribourg; studied art in the Acad. of St. Pierre at Lyons; entered later the School of Fine Arts in Paris, and afterward was a pupil of Delaroche. In 1840 he came to Amer., married, and entered on an industrious career in New York and Brooklyn. His pictures are sincere studies of Nature, chiefly in her more cheerful aspects. His style is unambitious; his subjects commonly unobtrusive, as, for example, *Spring, The First Snow, The Indian Summer*. He was, however, bold at times, as in the *Niagara in Winter, the Bernese Alps at Sunrise*, and other large canvases. The *Niagara by Moonlight* is a good example of his power. D. Aug. 1882. O. B. FROTHINGHAM.

Gila Ri'o, a river which rises in N. M., in the Sierra Madre, and flows first S. W., then S., and finally W., joining the Rio Colorado about 180 m. from its mouth. Its total length is not far from 500 m. One half its course is through mt.-cañons. Its lower valley abounds in ruins, the relics of an anc. civilization.

Gilbert (Sir HUMPHREY), b. at Dartmouth, Eng., 1539, ed. at Eton and Ox.; entered the army; in 1570 suppressed a rebellion in Ire., where he was made commander-in-chief, gov. of Munster, and knighted; wrote *Discourse of Discoverie for a New Passage to Cathaia and the E. I.*; in 1578 received a patent from Queen Elizabeth authorizing him to take possession of any uncolonized lands in N. Amer., upon payment to the crown of a fifth of all the gold and silver found. In 1579 he sailed for Newfoundland, but one of his vessels was lost and the others returned to Eng. Four yrs. later another small squadron was fitted out for him, which reached Newfoundland in Aug., and G. took possession of the island in the name of the queen. He soon proceeded to explore the coast S., but his largest vessel was wrecked upon Cape Breton; the squadron was dispersed, and G. with 2 small vessels set sail for Eng. In Sept. a gale sprung up, and of the whole squadron only one vessel reached Eng.

Gilbert (NATHANIEL), a lawyer and speaker in the house of assembly in Antigua, W. I., is distinguished as the founder of Methodism in those islands. He was in Eng. in 1738, when he and two of his slaves heard Wesley preach. Master and slaves became converts. On his return to the W. I., G. held religious meetings in his own house. He became a local preacher of Methodism, and founded a society, chiefly of blacks, which was the beginning of the extensive Wesleyan missions in the archipelago, by which many thousands of negroes have been Christianized. Methodism became one of the chief means of W. I. emancipation, and it now prevails through most of the islands. ABEL STEVENS.

Gilbertines, an order of monks and nuns founded in Eng. by St. Gilbert of Sempringham (1083-1189). It at first contained only nuns who were Benedictines, but in most of their houses were also monks who were canons regular of St. Augustine. There were also lay brothers, who followed the Cistercian rule. G. were extinguished by Henry VIII.

Gilbert Islands, or the **Kingsmill Group**, the south-easternmost group of Micronesia, containing 16 inhabited islands of coral formation, situated in the Pacific, between lat. 1° S. and 32° 30' N. and lon. 172° and 174° 30' E., and belonging to the Mulgrave Archipelago. The islands are low, and covered only with a thin layer of vegetable mould. Cocoa-nuts, taro, and pandanus are cultivated. The inhabs., who number about 60,000, and have some resemblance to the Malays, are very rude, and are occasional cannibals. Promising missions are maintained here by Hawaiian and Amer. Congregationalists.

Gilder (WILLIAM H.), b. in Phila. Sept. 17, 1812, ed. at the Wesleyan Univ., Conn., and entered the ministry in 1833. In 1840 he began a Meth. paper in Phila. called the *Depository*. He was several yrs. prin. of the female inst. at Bordentown, N. J., and subsequently pres. of the female coll. St. Thomas's Hall, Flushing, L. I. Was ed. of the *Literary Register*. In 1862 he became chaplain in the army. D. 1864.

Gilding, the application of a thin layer of gold upon the surface of another substance. Gold-leaf is made to adhere by the use of "gold-size," or by "oil-size." For gilding book-covers the leaf is made to adhere by heat and pressure (if the cover is of cloth), or by the use of albumen or gelatine for leather-work. Gold is often applied to metals by means of an amalgam or a solution. Whatever method is employed, the gilded surface has to be burnished

afterward. Much G. is done by the electrotype process, or even by simple immersion of the article to be gilded in a gold solution. Glass and porcelain are gilded by the encaustic method.

Gilead ("rocky region"), a dist. of Pal., bounded W. by the Jordan, E. by the Ar. desert, N. by the Hieromax (*Yarmuk*), and S. by the Arnon (*Mojib*). N. G. extended from the Hieromax to the Jabbok (*Zerka*), about 35 m.; in the time of Moses was under the dominion of Og, king of Bashan, and after its conquest was assigned to the half-tribe of Manasseh. S. G. extended from the Jabbok to the Arnon, about 50 m.; in the time of Moses belonged to Sihon, king of the Amorites, and after its conquest was assigned to the tribes of Reuben and Gad. In this S. portion, which at one time belonged to the Moabites, were Nebo, Pisgah, and Peor. The whole dist. is wildly mountainous (the greatest elevation being about 4000 ft. above the sea), clad with noble forests, and very fertile. The streams, unlike those W. of the Jordan, are perennial. R. D. HITCHCOCK.

Gilead, Balm of, a product of Oriental lands, once highly valued for its odor as well as for its medicinal properties. It is the product of *Amryris Gileadensis*, an evergreen shrub now found chiefly on the shores of the Red Sea. The "B. of G. tree" of the U. S. is the *Populus balsamifera*, a tall poplar whose buds are in spring covered with resin, which is used in domestic med.

Giles (HENRY), a clergyman, lecturer, and author, b. Nov. 1, 1809, in Craanford, Wexford co., Ire., ed. in Belfast, at the Royal Acad., in the R. Cath. faith; this he departed from till he became a Unit. As a minister of this sect he preached in Greenock and in Liverpool; in the latter city he bore an able part in the controversy between the Units. and Episcopalians, in 1839. In 1840 he came to Amer., where his excellence as a preacher and lecturer made him known as a man of brilliant gifts. Wrote *Lectures and Essays, Chr. Thought on Life, Illustrations of Genius, Human Life in Shakespeare*. D. July 10, 1882. O. B. FROTHINGHAM.

Giles (WILLIAM BRANCH), b. in Amelia co., Va., Aug. 12, 1762, ed. at Princeton, N. J.; became a lawyer of Petersburg, Va.; was M. C. 1790-98, 1801-02, in the U. S. Senate 1804-15, gov. of Va. 1827-30, Presidential elector 1801, 1805. He was noted as a debater and parliamentarian. D. Dec. 4, 1830.

Gill (THEODORE NICHOLAS), M. A., M. D., Ph. D., naturalist, resident at Wash., D. C., b. in the city of New York Mar. 21, 1837; received a classical education in private schools and under special tutors; honorary M. A., M. D., and Ph. D., and member of the National Acad. of Sciences. His earlier contributions to science were chiefly on fishes, and later on mammals, but he has pub. articles on mollusks, crustaceans, and other depts. of nat. hist. The most noteworthy of these are *Arrangement of the Families of Mollusks, Arrangement of the Families of Mammals, and Arrangement of the Families of Fishes*, all pub. by the Smithsonian Inst. He was one of the associate eds. of *J.'s Univ. Cyc.*

Gill'lem (ALVAN C.), b. in Tenn. 1830, grad. at the U. S. Military Acad. July 1851, and entered the army as brevet second lieutenant of artil.; served in garrison and on frontier duty 1851-61, and in the war in defence of Ft. Taylor, Fla., and at the battle of Shiloh and siege of Corinth; appointed col. 10th Tenn. Volunteers May 1862, appointed brig.-gen. of volunteers Aug. 1863, and participated and commanded in numerous engagements and expeditions in Tenn. Upon the reorganization of the State govt. of Tenn. he was v.-p. of the convention to revise the const. and a member of the State legislature; he subsequently commanded a cav. division, and was engaged in various expeditions and combats in Tenn. and N. C. In Sept. 1866 he was mustered out of the volunteer service; received the successive brevets from major to that of maj.-gen. U. S. A.; assigned in 1870 to the command of the 1st Cav. He was conspicuous in the pursuit of the Modoc Indians, in Cal., which resulted in their capture. D. Dec. 2, 1875.

Gilles'pie (WILLIAM MITCHELL), LL.D., b. in New York 1816, grad. at Columbia Coll. 1834; studied in Europe; returned in 1845, and was prof. of civil engineering in Union Coll. 1845-68; author of *Rome as Seen by a New Yorker* in 1843-44, *Roads and Railroads, Philos. of Math.*, after Comte; a treatise on *Land-Surveying*, another on *Levelling, Topography, and the Higher Surveying*. D. Jan. 1, 1868.

Gill'lett (EZRA HALL), D.D., b. at Colchester, Conn., July 15, 1823, grad. at Yale 1841, and at Union Theological Sem. 1844; was pastor of the Presb. ch., Harlem, N. Y., 1845-68; in 1868 was appointed prof. of political economy, ethics, and hist. in the Univ. of New York; wrote much for the *Amer. Theological Review*, the *Presb. Quarterly*, the *Historical Magazine*, and other periodicals, and pub. *The Life and Times of John Huss, Hist. of the Presb. Ch. in the U. S. of Amer., God in Human Thought, and The Moral System*. D. Sept. 2, 1875.

Gill'flower [Fr. *gigofle*, a "clove," alluding to the odor of some kinds; others say *July Flower*], a popular name for the cruciferous plants of the genus *Matthiola*, called also by the gen. name of stock or stock-gillflower. They are herbaceous or partly shrubby. All the common kinds are European.

Gill'iss (JAMES MELVIN), b. in D. C. in 1810; mdpn. U. S. N. 1827, capt. 1862; organized one of the first astronomical observatories in the U. S. 1838; organized the naval observatory 1842-45; was put in charge of National Observatory 1861. Pub. *Amer. Astronomical Observations* and a *Report of the U. S. Astronomical Expedition of 1849-52*, beside many scientific papers. He also introduced important improvements in astronomical instruments. D. Feb. 9, 1865.

Gill'more (QUINCY ADAMS), b. at Black River, Lorain co., O., Feb. 28, 1825, grad. at W. Pt. at the head of the class of 1849, and entered the army as brevet second lieutenant of engineers; served 3 yrs. as assistant engineer at Hampton Roads, Va., returning to W. Pt. in 1852 as instructor of military engineering. In July 1856 he was promoted to be first lieutenant, and placed in charge of the engineer agency at

New York. He was promoted to a captaincy Aug. 1861, made chief engineer of the Pt. Royal expedition under Brig.-Gen. T. W. Sherman, and was placed in command of the troops engaged in the siege of Ft. Pulaski. After nearly 2 months of incessant labor the fort was completely invested and the Savannah River blockaded. On Apr. 10, 1862, the commandant of Ft. Pulaski having refused to surrender, the bombardment was commenced; on the next day the ft. was surrendered. In Aug. 1862 Gen. G. was assigned to the command of a division of troops in Ky. In Jan. 1863 he was placed in command of the central district of Ky., defeating Gen. Pegram at the battle of Somerset. In June 1863 he was called to command the dept. of the South, and in July following the 10th army corps. It was while holding this command that he conducted the operations against Charleston, comprising the descent on Morris Island, the reduction and capture of Ft. Wagner, and the bombardment and practical demolition of Ft. Sumter from batteries 2 m. distant. Transferred to the James River in 1864 in command of 10th army corps, he was engaged (May 13) in the assault in front of Drury's Bluff, and (May 16) at the battle of Drury's Bluff. Summoned to Wash. in July, on the approach of Early, he commanded 2 divisions of the 19th army corps in the defence of that city and subsequent pursuit of Early's command. From Nov. 1864 to Feb. 1865 he commanded the dept. of the South, resigning his volunteer commission Dec. 1865. After serving on various boards he was assigned to duty as engineer in charge of fortifications on Staten Island, N. Y., and S. Atlantic coast. In June 1863 became major, and Jan. 1874 lieutenant-col. of engineers, and has been brevetted maj.-gen. U. S. A. Became col. of engineers Feb. 27, 1883. Wrote *A Practical Treatise on Limes, Hydraulic Cements, and Mortars, and Engineer and Artillery Operations against the Defences of Charleston* in 1863. [From orig. art. in *J.'s Univ. Cyc.*, by G. C. SIMMONS.]

Gill-over-the-Ground, or Ground Ivy, the *Nepeta Glechoma*, a strong-smelling, trailing plant naturalized in the U. S. from Europe, belongs to the Labiate.

Gil'man, R. R. June, Iroquois co., Ill. It has a library building and a public library, and 2 public fountains flowing artesian water. Pop. 1880, 1299.

Gilman (DANIEL COIT), LL.D., b. at Norwich, Conn., July 6, 1831, grad. at Yale in 1852; supt. of schools, New Haven, Conn., 1856-60; prof. of phys. and political geog. at Yale 1856-72, supt. of schools in Conn. 1863-65, pres. of Univ. of Cal. 1872-75; became in 1875 pres. of Johns Hopkins Univ., Baltimore, Md.

Gilman (JOHN TAYLOR), b. at Exeter, N. H., Dec. 19, 1753; joined the Revolutionary army at Cambridge, Mass., 1776; was in Cong. 1782-83, treas. of N. H. 1783-92, gov. 1794-1805 and 1813-16. D. Sept. 1, 1828.

Gilman (NICHOLAS), a brother of J. T. Gilman; b. about 1762, was sent to Cong. from N. H. in 1786; was one of the framers of the U. S. const., and was again in Cong. 1789-97, and U. S. Senator 1805-14. D. May 2, 1814.

Gil'mer (GEORGE ROCKINGHAM), b. in what is now Oglethorpe co., Ga., Apr. 11, 1790; became a lawyer of Lexington, Ga.; was 1813-18 an officer of the 43d U. S. Inf., and served against the Creeks; was gov. of Ga. 1829-31, 1837-39; was in Cong. 1821-23, 1827-29, 1839-35; a Presidential elector in 1836 and 1840; trustee of Ga. Univ. for 30 yrs., and in his will left to it large benefactions. Author of *Georgians*. D. Nov. 15, 1859.

Gilmer (JEREMY FRANCIS), b. in Guilford co., N. C., Feb. 23, 1818, grad. at the U. S. Military Acad., and entered the army as second lieutenant of engineers July 1839, and continued in the service of the U. S. till 1861, being then capt. of engineers, when he resigned; appointed major of engineers C. S. A. Sept. 1861, and served as assistant of the latter on the staff of Gen. A. S. Johnston until the death of the latter on the field at Shiloh Apr. 6, 1862; was assigned (Aug. 9, 1862) to the office of chief of engineer bureau at Richmond, Va., with the rank of col. of engineers. Promoted to be maj.-gen. C. S. A. Aug. 20, 1863, he was ordered temporarily to Charleston, S. C., to direct the defences of that city; returning to Richmond in June 1864, he took charge of the engineer bureau till the close of the war.

Gilmer (JOHN A.), b. in Guilford co., N. C., Nov. 4, 1805; member of the 35th and 36th Congs.; from the latter he withdrew in 1861; was delegate to the national U. convention at Phila. in 1866. D. May 4, 1868.

Gilmer (THOMAS WALKER), a native of Va.; was gov. in 1840 and M. C. 1841-43, when he was appointed sec. of the navy by Pres. Tyler; was in this office when killed by the accident on the U. S. steamer Princeton, Feb. 28, 1844.

Gil'more (JOSEPH ALBREE), b. in Weston, Vt., June 10, 1811; went to Boston, and engaged in mercantile pursuits; removed to Concord, N. H., in 1843, and continued in the same business for a time, but subsequently became supt. of several railroads; member of the State senate 1858-59, pres. of that body 1859, gov. of N. H. 1863-65. D. Apr. 17, 1867.

Gilmore (JOSEPH HENRY), b. at Boston, Mass., Apr. 29, 1834, grad. at Brown Univ. 1853; studied theol. at Newton Sem., where he was instructor in Heb. 1861-62; was pastor of Bap. chs. at Fisherville, N. H., and Rochester, N. Y.; in 1868 prof. of logic in Rochester Univ.

Gil'roy, city, Santa Clara co., Cal., on R. R., 80 m. from San Francisco and 30 m. from San José, the co.-seat. Pop. 1870, 1625; 1880, 1621.

Gilt-head, a name given to a species of Sparus (*S. auratus*) in Eng. It is also given to several other marine fishes.

Gil Vioen'te, best of Port. dramatists, called "the Portuguese Plautus," b. probably in Barcellos in 1485; became an actor, and was patronized by John III. He was one of the fathers of the modern drama. D. 1557.

Gin, or **Gene'va** [Fr. *genèvre*, Dut. *jenewer*, "juniperberry"], an alcoholic spirit distilled from grain and flavored with the volatile oil of juniper. A prin. seat of its manufacture is Schiedam in the Netherlands, and hence the liquor sometimes bears the names of Hollands and Schiedam

schnapps. One part by measure of barley-malt and 2 parts of the best rye are usually mashed together for G., but buckwheat and other grains have a limited use. The mashing at 165° F. lasts until the grains are brought to a smooth paste, when, after resting the process 2 hours, the whole mash is cooled to 80° by adding the spent wash of a former distillation till the worts show 33 by Dica's hydrometer. Good yeast is added, and the grains and worts ferment for 2 or 3 days. Grains and all ("whole worts") are then put into the still, and the low wines are taken off, which are very weak. These are then redistilled with about 1 lb. of juniper-berries to every 50 gals. of low wines; a little salt and a pugil of hops may be added. The resulting liquor is G. Ordinary Brit. and Amer. G. is made by rectifying corn-whiskey with a little oil of juniper or oil of turpentine, while coriander, grains of paradise, orange-peel, etc. still further improve or modify the flavor. The oil of juniper or of turpentine present gives G. a diuretic quality which gives it a great popular reputation for the cure of diseases of the kidneys; but there is no question that the abuse of G. in supposed kidney disease is a fruitful cause of diseases it is intended to cure.

Ginger [Gr. *zingiberis*; Lat. *zingiber*; Sans. *srīṅgavēra*, "horn-shaped"], the prepared rhizome of *Zingiber officinale* (order Zingiberaceae), a plant native to India and S. Chi., now cultivated in tropical Amer. and W. Afr. The root-stock is the part employed. If dried, it constitutes the *black G.* of commerce, but if it be decocted also it is called *white G.* G. is used as a flavoring for food and meds., and has valuable stimulant and carminative properties. It is generally used in the powdered state, and is liable to adulteration.

Ginkgo Tree, a large tree of Chi. and Japan, the *Salicburia adiantifolia* (order Coniferae, sub-order Taxineae), now rather common in Europe and the U. S. It is prized for its timber, which resembles that of pine.

Ginseng [Chi.], the root of the *Aralia* (*Panax*) *G.* of Asia, and of the *Aralia quinquefolia* of the U. S., which resemble each other very much, and are perhaps identical. It has a pleasant aromatic taste, but its medicinal qualities are not important.

Giober'ti (VINCENTO), a distinguished It. philos. and statesman, the prophet of the uprising of It., as was Mazzini its apostle; b. in Turin Apr. 5, 1801. Left an orphan in his boyhood, he was early trained to loneliness and want. At 16 G. obtained a place in the ecclesiastical household of the king of Sardinia. He became an earnest student of the Bible, of ecclesiastical hist., and of the Lat. and It. classics, reading at the same time contemporaneous works with great avidity. The varied reading of G. soon rendered his mind almost encyclopædic, and at the same time quick, elastic, and apt at everything. In 1823 G. was made D. D., and 2 yrs. later he took sacerdotal orders. His dissertations, *De deo et religione naturali* and *De Christiana religione et theologicis virtutibus*, secured him the chair of theol. in the Univ. of Turin. In 1828 he went into Lombardy, where he made the acquaintance of Manzoni; and into Central It., where he became the friend of Giacomo Leopardi. In 1830 the work of Rosmini concerning *L'origine delle idee* was pub. at Rome, and G. was the first to study, teach, and circulate it. He now gathered about him certain young priests and other ardent juvenile students, whom he endeavored to lead to free and independent habits of thought. Instigated by the Jesuits, the eyes of the police were soon upon him. G. resigned his office; 30 days after, while walking and philosophizing with some of his friends, he was arrested (May 31, 1833), was detained in prison 4 months, and then sent into banishment. His name was also cancelled from the list of doctors of the univ. on the charge of his being a *corrupter of youth*. He went to Paris, where he devoted himself entirely to the study of philos. After 15 months in Paris he went to Brussels to teach philos. in a private inst. There he began the publication of his *Teoria del Soprannaturale*. Then followed the publication of the *Introduzione allo studio della Filosofia*, undoubtedly his greatest philosophical work. In 1842 G. was offered the chair of philos. in the Univ. of Pisa, but the intrigues of a *Sanfedista* minister of the court of Sardinia rendered his election impossible. In 1843 his most popular work, entitled *Del primato morale e civile degli Italiani*, appeared at Brussels. This work was a trumpet-call. Somewhat exaggerated, its object was to magnify the civil and national power of the papacy in It. The clergy were roused by it, and began to take part in the agitation in favor of It. independence. The *Primato* was followed by *I Prolegomeni*, a still bolder work, in which he was very careful to distinguish between the Jesuits and the rest of the clergy. The Jesuits were prompt to attack him, and he defended himself triumphantly in a work called *Il Gesùita Moderno*. One month after the glorious "five days" of Milan, and after 15 yrs. of exile, G. already proclaimed a prophet throughout It., left Paris for Turin, where he was most enthusiastically received. From thence he made a triumphal journey through Lombardy and Tuscany to Rome, and there preached the necessity of a Guelph confederacy of It. princes, with the pope at their head. The Subalpine Parl. having opened, G. was elected pres. of the chambers, and he and Collegno were afterward named presidents of the new ministry. After the defeat of Custozza (1848) the ministry was obliged to resign, and was succeeded by the Revel cabinet. This again having fallen, G. was recalled, and he selected Rattazzi as a colleague. It was this ministry that in the spring of 1849 advised the resumption of hostilities which were to end in the disaster of Novara. After that discomfiture the ministry of Pinelli was formed, and G. was sent to Paris, as minister, to secure the good offices of Fr. diplomacy in the negotiations for peace with Aus. He could obtain nothing, but, once there, he remained, and, although broken in health and crushed in spirit, he sought comfort in his studies. He wrote at that time his beautiful book, *Del Rinascimento civile d'Italia*, in which he prophesied the greatness of Cavour; and he prepared his *Prolegomena*, pub. after his death, which occurred in Paris, Oct. 25, 1852. F. A. P. BARNARD.

Giorgio'ne (GIORGIO BARBARELLI), an It. artist, b. at Castelfranco about 1477, the same yr. with Titian, with whom he was a fellow-student in the school of Giovanni Bellini in Venice. Being gifted with original powers, he early departed from the traditions of the school, and, aided by the study of Leonardo da Vinci, acquired a freedom and breadth of treatment and a richness of color till then unknown in art. His pictures rank with the work of the greatest masters. G. passed his life in Venice, and d. there in 1511.

Giot'to, di (BORDONE), an eminent It. painter, sculptor, and arch., b. at Vespignano in 1276; d. in 1336. He was a shepherd, and was discovered by Cimabue drawing figures on stones. To Cimabue he owed his introduction to art and his earliest instruction, but to his own genius was due his success. In composition, design, and color G. was a creator. His works, which are very numerous, are found in all the chief galleries of It., but the most admired are in Padua, Bologna, and Florence. The genius of G. was felt throughout It. from Venice to Naples: the It. art of his age felt in every dept. the influence of his commanding mind. Taddeo, Gaddi, Spinello Aretino, and Niccolò da Pietro were his most famous pupils, but innumerable compositions in chapel and sacristy show how deep a mark he made on his time. G. was a personal friend of Dante: his portrait of the great poet on the wall of the palace of the Podestà in Florence, though defaced by time and marred by restorers, is still recognizable as a masterpiece. O. B. FROTHINGHAM.

Giraffe, [Arabic-Egyptian *zorafah*, "long-neck"], or **Camelopard** [Lat. *camelopardalis*, the "camel-pard"], *Camelopardalis giraffa*, a ruminant inhabiting a large portion of Afr. The length of its legs, the excessive length of its neck, and the persistent, bony horns covered with skin are characteristics. It feeds chiefly upon the leaves of trees. It runs with an awkward amble, and is not very swift.

Girard, III. See APPENDIX.

Girard, city and R. R. Junc., cap. of Crawford co., Kan., 126 m. S. of Kansas City. Pop. 1880, 1289.

Girard (STEPHEN), b. near Bordeaux, Fr., May 24, 1750; became a sailor, and before the Revolution engaged as the master of vessels in the Amer. coasting and W. I. trade; during the Revolution was a grocer, sutler, and liquor-seller in and near Phila., where he had already married and separated from his wife. He was again in the W. I. and coastwise trade in partnership with John, his brother, in 1780-90; gained money by receiving valuables from the Haytian planters during the insurrection (1791-1804), for much of this property was never called for, and by leasing property in Phila. when business was dull at low rates, and then renting at high rates in times of industrial activity. In 1812 became a private banker. He was for yrs. by far the wealthiest man in the U. S. He was very eccentric in his habits, a free thinker, ungracious in manner and ill-tempered, but was always a liberal benefactor of public charities, and even of chs., which he despised. During several yellow-fever seasons in Phila. no citizen was more active in relieving distress by free expenditure of money or by personal care of the sick; and at his death nearly all his estate was bequeathed to various charitable and municipal insts. of Phila. and New Orleans, and to the founding of Girard Coll. for orphan boys. D. Dec. 26, 1831.

Girard' College, at Phila., Pa., was founded by the bequest of more than \$2,000,000, left by Stephen Girard, for the benefit of poor white male orphans, who are admitted between the ages of 6 and 10, and, according to the will of the founder, are to be apprenticed to some industrial occupation when between the ages of 14 and 18. The buildings are situated 2 m. N. W. of the old State-house. The principal building, with fine Corinthian columns, is by far the best specimen of Gr. arch. in Amer. It is built mainly of white marble, as nearly as possible in accordance with the minute directions left by Mr. Girard, according to whose will no minister or ecclesiastic of any sect or ch. is allowed to visit the premises on any pretext, or to have any connection with the inst. It now accommodates some 500 boys, who are supported as well as ed. by the inst.

Girardin, zhe-rar-dan', de (EMILE), b. in Paris June 22, 1806, natural son of the count de Girardin; entered upon journalism as conductor of *Le Voleur*, a periodical compiled from other journals, and *La Mode*, a fashion-paper. His great distinction was gained as conductor of the *Presse*, a cheap daily, which he edited from 1836 to 1856. This journal made him one of the great political powers of Fr. In 1848 he persuaded Louis Philippe to abdicate. Under Nap. III. he was a vigorous member of the opposition, but in 1870 he was made a senator. De G. was never constant to any political principle except hostility to G. Brit. and friendship for Rus. D. Apr. 27, 1881.—His first wife, DELPHINE (b. Jan. 26, 1804; d. June 29, 1855), was a very talented poet and author of clever novels and highly successful plays. Her *salon* was one of the social and political centres of Paris.

Girardin (SAINT-MARC), b. at Paris Feb. 12, 1801; studied at first law; wrote in 1827 an article in the *Journal des Débats*, which made a great sensation, and after that time participated in politics, both as a journalist and as a member of the legislative assembly. In 1822 he received a prize from the Acad. for a paper on Le Sage, in 1827 another for a paper on Bossuet, and in 1828 a third for his *Tableau de la littérature française au xvi. siècle*. In 1844 he became a member of the Acad. In 1831 he succeeded Guizot as prof. in hist. at the Sorbonne, which chair he changed in 1834 for that of Fr. lit. and poetry; and for more than 30 yrs. he delivered his lectures, often to an audience of 3000 or 4000 people. His prin. work is *Cours de littérature dramatique*. In 1869 he retired from his chair at the Sorbonne, but continued as ed. of *Journal des Savants*. D. Apr. 11, 1873. CLEMENS PETERSEN.

Giraso'le [It. "sun-turning," because its finest tints appear only in a strong light], a precious stone of various colors and qualities, but all distinguished by a strong, deep, reflected light. The fire-opal and quartz resinite are among its varieties.

Girdle of Venus, the *Cintum Veneris*, a Ctenophore found in the Mediterranean, etc., noted for its elongated, ribbon-like form. Its mouth is about midway of its length.

Girgeh, or **Geergeh** [from *Girgis*, or *George*, the patron saint of the Coptic Ch.], an Egyptian town, of Chr. origin, on the W. bank of the Nile, about 108 m. below Thebes and 12 m. from the ruins of Abydos. It was formerly the cap. of Upper Egypt, and a town of fine appearance, with its palm trees, 8 minarets, and R. Cath. monastery (the oldest in Egypt), standing about $\frac{1}{4}$ m. from the river. The Nile is now rapidly washing it away. Pop. about 10,000.

Girgen'ti [Lat. *Agrirentum*; Gr. *Αγραγας*], a maritime town of Sic., founded 584 b. c. by a Gr. colony from Gela, at the foot of an older acropolis called Camicus. Through commerce with Carthage the new colony grew rapidly rich and powerful, though later it suffered greatly from wars with that city. In the days of its greatest prosperity Agrirentum contained 200,000 inhabs. within its walls, and including suburbs the pop. is said to have reached 800,000. G. stands on a high steep rock, commanding a fine view of the Mediterranean, while, conspicuous everywhere, rise the vast temples, more or less in ruins, which bear witness to its former greatness. Among these are the temple of Concord, a beautiful Doric structure, and one of the best preserved of all the anc. temples; the temple of Juno, also in partial preservation; and the temple of Jupiter Olympius, the largest in Sic., and still imposing in its ruins. Other striking remains of temples, towers, and tombs are seen on every side. Works are now in progress for improving the harbor, which, though not good, is the most available on the S. coast of Sic. Pop. 21,274.

Giron'dists [Fr. *Girondins*, from the Gironde, whence several of their leaders came], the conservative republican party of the Fr. legislative assembly from Oct. 1791 to Oct. 1793. In Mar. 1792 the king selected 4 of them for his new ministers, but dismissed them June 13, which led to a popular insurrection. On Aug. 11 they were recalled. The party of the Mountain (1792) and the Jacobins (1793) violently opposed them, and the latter (June 2) procured the arrest of 30 of their leaders. In Oct. the leaders were arraigned before the revolutionary tribunal, but so strong was their defence that not even that court could convict them. But by order of the Convention they were sent that very night to the guillotine (Oct. 31, 1793). During the following yr. great numbers of other real and suspected G. perished.

Gitt'ades, a statuary, arch., and poet of Lacedæmon, flourished about 536 b. c. He erected the temple and fashioned the statue of Athena Polouchos ("city protector"), also called Chalciæcus ("of the brazen house"), in his native city. He composed a hymn in honor of the same goddess, with a few other poems in the Doric dialect.

Gitt'schin, town of Bohemia, where an encounter took place, June 29, 1866, between the Prus. and Aus.; the latter were defeated, losing about 4000, beside 2000 prisoners; the Prus. loss was about 2000. Pop. 6570.

Giuliani, joo-lee-ah'nee (GIAMBATTISTA), b. at Canelli, in Piedmont, in 1818. He entered the religious order of the Somaschi, and between 1837 and 1847 held various professorships in different schools of learning, occupying himself at the same time with the profound study of Dante. In 1845 he pub. his celebrated *Saggio di un Nuovo Commento della Commedia di Dante Alighieri*; in 1846, before the Scientific Cong. of Genoa, he declared that the *Divina Commedia* embodied the earliest and most authentic material for It. hist. In 1847-48, while prof. in the Univ. of Genoa, he was named, under the new liberal reforms, censor of the Press, the duties of which office he performed with great dignity and liberality. Among the works of G. are *Sul vivente Linguaggio della Toscana*, *Le Norme di Commentare la Divina Commedia, tratte dall' Epistola di Dante a Cangrande*, and *Metodo di commentare la Divina Commedia*.

Giulio Romano, an It. painter and arch., b. at Rome in 1492; d. in Mantua in 1546. The family name was PIRRI. As a painter, much of his reputation has been due to his association with Raphael, who held him in high esteem, intrusted to him the execution of important works, placed him at the head of his scholars, made him one of his heirs, and, dying, confided to him, along with Gio. Fran. Penni, the finishing of his uncompleted pieces. The pupil did not justify the master's predilection. His pictures, while showing boldness of conception, learning, and mastery of materials, are destitute of harmony, grace, delicacy of sentiment, and refinement of expression. His success was greatest in battle pieces. In sacred subjects he did not excel, though his most famous picture, in the ch. of St. Stefano at Genoa, was one of this kind—*The Martyrdom of St. Stephen*, an important work, and still regarded as a masterpiece of composition and drawing. His celebrated paintings, *The Apparition of the Cross to Constantine* and *The Battle between Constantine and Maxentius*, in the Hall of Constantine at the Vatican, and *The Fall of the Giants*, in the Palazzo del Tè at Mantua, are examples of his grandest manner. G. R.'s fame rests more on his capacities as an arch. than on his genius as a painter, though his arch. had the same gen. characteristics with his painting. Leo X. and Clement VII. employed him on the Vatican, and when in Rome he erected 2 palaces, the ch. Madonna del Orto, and other buildings. The cardinal Gonzaga had a saying that Mantua belonged to G. R. by right of creation. When the emp. Charles V. came to Mantua, the arch. erected the triumphal arches in his honor. His renown became so great that the pope invited him to return to Rome and undertake the construction of St. Peter's, but death prevented.

Giusti (GIUSEPPE), b. at Monsummano, near Pescia, 1809. While still a student the MS. poems of G. G. were greatly in vogue. The revolutionary attempts of 1831 roused his patriotic spirit, and it found expression in his admirable satires. The satires of G. remained many yrs. in MS., but immediately upon their publication they everywhere excited great enthusiasm. They were the noble precursors of the

revolutionary movements of 1848. When the first Tuscan national assembly was convoked, G. was elected deputy, and by voting with the conservatives he brought upon himself the hatred of the radicals. The grand duke being restored, G. saw his dearest hopes crushed, and d. Mar. 31, 1850, a few months after.

Glab'rio (C. ACILIUS) filled the offices of quæstor B. C. 203, and tribune of the plebs, and acted as interpreter to the Athenian embassy, consisting of the 3 philos. Carneades, Critolaus, and Diogenes, before the Rom. senate, B. C. 155. He wrote a hist. of Rome in Gr., translated by a certain Claudius into Lat., of which only fragments remain.

Glacier, glas'e-er [Fr. from Lat. *glacies*, "ice"], is the name of continuous masses of ice that originate in the region of perpetual snow, but extend far below the snow-line, often reaching the zone of forests. The surface is undulating, scarred by deep clefts, and toward the lower end strewn with sand, rough gravel, and trains of large blocks. At a recent geological period they attained enormous dimensions, and had an important share in fashioning the surface of the earth. G. on a large scale are still found in the Alps, Himalayas, Rocky Mts., Scandinavia, and Greenland.

Origin of Glaciers.—The higher region of high mts. is subject to a constant alternation between heat and cold. The sun shining upon the mass of snow-dust and minute crystals melts them, and fuses them together till they form grains of larger size, which are frozen together into compact particles of ice during the next interval of cold. At first this process is confined to the uppermost layer of the snow, but as the alternate melting and congelation are frequently renewed, a similar change extends through the mass, which is gradually converted into that condition that has been called *névé*, or in Ger. *Firn*. A section of the upper strata of the *névé* shows successive layers, whose upper surfaces are more near the condition of ice than the underlying portions. In the lapse of yrs. the *névé* increases layer by layer, one of them corresponding to every considerable fall of snow, until a great weight presses on the lower and older portions of the mass. When the accumulated mass, and the weight consequently pressing on the lower strata, are great enough, the whole begins to yield in the direction of least resistance, and with a slow, constant motion to crawl downward toward the lower region, where the ice, being exposed to a higher temperature, is rapidly consumed: the mass has become a G.

Motion of Glaciers.—It will now be understood that the essential attribute of G. is the fact of their progressive motion from the upper level where they are formed toward the lower valleys. A G. does not move as a rigid body, slipping forward on its bed, whose parts retain their relative positions during its progress; it does not move by dilatation, or the expansion of the substance of the ice in the direction of least resistance; it does move as a plastic substance, conforming to the laws that regulate the motion of imperfect fluids. This plasticity of G. ice is mainly owing to that peculiar property of ice called regelation. A G. is enabled, without losing its continuity, to advance in a sinuous channel, not only changing its external form to suit the irregularities of its bed, but also suffering internal dislocations by the constant rearrangement of its parts. When the gen. movement of the G. tends to draw asunder adjoining portions of ice, this is unable to obey the strain, the mass is rent through, and in this manner are formed the *crevasses*. These are among the best known and most characteristic of glacier phenomena.

Veined Structure of Glacier Ice.—G. ice is usually of a nearly white color, and this tint is due to the multitude of minute air-bubbles contained in it. But very often the mass is seamed by countless parallel veins of the purer azure color characteristic of ordinary ice. This is found to arise from the fact that the blue veins are almost completely free from air-bubbles. The blue veins are first developed in parts of the G. that have been subjected to extreme pressure, because intense pressure causes portions of the compressed ice to be converted into water, thus facilitating the escape of the imprisoned air-bubbles. [From orig. art. in *J. s. Univ. Cyc.*, by J. BALL, F. R. S.]

Gladiator, glad'e-à-tur [Lat., from *gladius*, a "sword"], in anc. Rome a person who was employed to engage in combat at public shows. This custom was introduced into Rome in 264 b. c. Gladiatorial shows (*munera*) were at first exhibited chiefly at funerals, but later they were shown on the grandest scale as mere entertainments. G. were captives, slaves, criminals, or even free citizens. The life of a vanquished G. might be spared or not according to the will of the spectators.

Gladi'olus (a "little sword," alluding to the shape of the leaves), a genus of plants of the order Iridacææ. Most of the species have bulbs, and are S. Afr. The starchy bulbs of some Afr. species are used as food. But the genus is chiefly noteworthy for its beautiful flowers.

Glad'stone (Rt. Hon. WILLIAM EWART), D. C. L., b. at Liverpool, Eng., Dec. 29, 1809, fourth son of Sir John Gladstone, Bart., a Scot. merchant; entered Parl. in 1833; became in 1835 under-sec. for the colonies, under Peel; was sworn of the privy council 1841, and became v.-p. of the board of trade and master of the mint; sec. of state for the colonies 1845-46; in 1868 became first lord of the treas. and prime minister, retaining that position until Feb. 17, 1874, when the ministry of Disraeli came into power. Mr. G.'s premiership was characterized by many important measures, such as the disestablishment of the Irish Ch. (1869), the Irish Land Bill (1870), immense reforms in legal administration, the abolishment by royal warrant of the purchase of commissions in the army (1871), and the settlement of difficulties with the U. S. by the Geneva Conference. G. entered public life a Tory and a High Churchman, but his political views have gradually changed, and since 1859 he has been a leader of the Liberal party. Author of *The State in its Relations with the Ch., Ch. Principles Considered, A Chapter of*

Autobiography, and *Juventus Mundi*. His pamphlet on the *Vatican Decrees* produced a profound sensation, and has called forth numerous replies. G. is the present premier (1885), appointed Apr. 28, 1880.

Glagolitic Alphabet [Slavic *glagol*, a "word"], one of the S. Slavic alphabets. According to Schafarik, it is older than the so called Cyrillic, and was itself the invention of St. Cyril (see CYRILLIC ALPHABET), while the so called Cyrillic is a corruption of this. Others make the G. much older than the time of Cyril. Still others regard the present G. as a corruption of the so called Cyrillic. There is a small G. lit., chiefly ecclesiastical. A G. liturgy is used by some Dalmatian and Istrien R. Cath. dioceses.

Glanders (*equinus, malleus humidus*), a contagious disease of the horse, ass, and mule, communicable to man, but not, as far as is known, to other animals. It is characterized by an inflamed state of the nasal mucous membrane. The lymphatic glands are secondarily affected. When the swelling of the nasal affection, the disease is called farcy. Four types of the disease are recognized; but even the mildest form is seldom really cured. G. has proved fatal to man in less than a week, but it has been known to last a yr. or more. Every glandered or farcy-budded horse should be killed at once, or reserved for experimental treatment by competent veterinarians.

Glascock (THOMAS), b. in Ga.; served as lieut. at the siege of Savannah, under Count Pulaski; was appointed col. of the troops ordered out by the legislature in defence of Ga. against the Indians, in the war of 1812, on the W. frontier, and was afterward appointed gen. of militia; was M. C. from Ga. 1836-39. D. May 9, 1841.

Glasgow, the commercial and industrial metropolis of Scot., on both sides of the Clyde, 21 m. from its mouth. The name is said to signify "dark glen," referring to a ravine in the N. E. part of the city. Here stands on an eminence the cathedral, founded in 1187, but not finished until the present century, and one of the finest buildings in the country. Close by stands the univ., founded in 1451, and from these 2 buildings as its nucleus the city gradually developed. When by the union between Scot. and Eng. the trade with the Amer. colonies was opened to Scotch enterprise, G. became the centre of the tobacco trade, and later of the sugar trade with the W. I. Still more rapidly has it developed in this century, having become the centre of the cotton and iron manufacturing industries of Scot. The Clyde has been made navigable for vessels of 2000 tons burden, and an excellent harbor has been formed on the Clyde and Forth Canal. The city has 3 fine parks—the Green (140 acres), Queen's Park (100 acres), and Kelvin Grove (40 acres). Many elegant monuments are scattered throughout the city, among which are the statues of James Watt, Sir Robert Peel, and Sir John Moore, and it possesses a valuable collection of pictures, several good public libraries, and a large number of benevolent, educational, and scientific insts. Pop. 1881, 674,095.

Glasgow, University of, founded in 1451; Lord Hamilton gave it a building in 1490; Mary queen of Scots assisted the univ. in her day; her son, James I. of G. Brit., gave it its present charter in 1577. In 1870 its new buildings were opened. The Hunterian museum was presented to the univ. in 1781. Beside the regular academical course, there are law, divinity, med. and scientific examinations, degrees, and professorships.

Glasgow, R. R. junc., cap. of Barren co., Ky. It has a male and female coll., and is only 3 m. from the flowing oil-wells of Ky. Pop. 1870, 733; 1880, 1510.

Glasgow, R. R. junc., city, Howard co., Mo., in the N. E. part of the co., on the Mo. River. It contains a public library and a large library building and hall and 2 colls. G. is a great tobacco market. Pop. 1870, 1795; 1880, 1841.

Glasites, the followers of John Glas (1695-1773), a Scot. minister. The sect is more generally known as the SANDEMANIANS (q. v.).

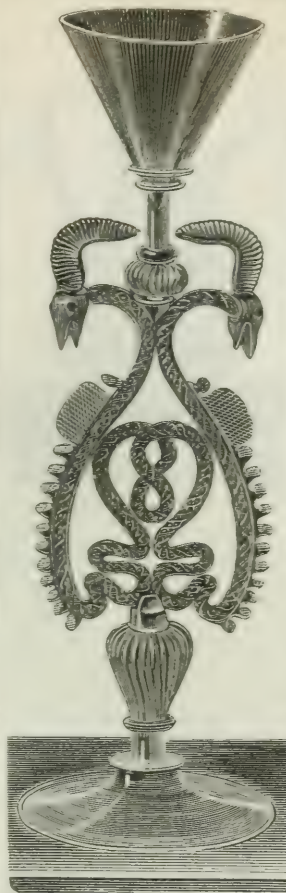
Glass [Sax. *glase*]. The name of glass is given to every transparent body which is brittle and sonorous at ordinary temperature, becomes soft and ductile, finally melting, under the influence of heat, and which presents when broken the peculiar appearance known as the vitreous fracture. G. in its simplest form is composed of silica and an alkali. An old story told by Pliny ascribes to the Phœnicians the invention of G. The Egyptians made G. at a very early period of their national existence. Paintings of the reign of Osirtasen I. at Beni-Hassan, representing G.-blowers making a very large vase, show that 3500 yrs. ago the Egyptians were far advanced in this art; and the fact that glazing was applied to many objects about the same time indicates great skill not only in combining the materials of G., but in its manipulation. The Egyptians surpassed the moderns in some respects in making G., and under the Rom. rule the Egyptians excelled in G.-making. The only color which the Egyptians certainly originated is the *bleu de Nil*, a rich blue, which has of late become the *mode* in Paris for G. beads. The Egyptian G. of other colors is supposed to have been derived from the Gers. and Romans. The art of depriving G. of color and making it like crystal was a very late invention, but it would appear to have been Egyptian. G. had been made in Rome 2 centuries B. C., but under Nero the natural intelligence of the Romans developed the industry to such an extent that in a short time the Rom. wares attained an elegance which is as yet one of the lost arts. Under Alexander Severus an entire and separate quarter of the city was filled with G.-makers (A. D. 210). From Rome the art spread to Gaul, Sp., and Brit. The Romans excelled in working G. within G.; they also made singular combinations of G. and terra-cotta, many of which would be almost impossible to workmen at present. But their skill was chiefly shown in the celebrated *diatreta* or bored work. This was done either by making a vase in 2 layers, the outer extremely thick, and then cutting away the latter in pat-

terns of very bold relief, frequently of network and flowers, or else by applying the patterns with the pouty or with the blowpipe and other instruments, and then cutting the work when cold.

After the fall of the Rom. empire G.-making declined, but not so rapidly as other arts. As the art declined in Rome it flourished in Constantinople, and there is every reason to believe that it was cultivated to a considerable extent among the pagan Sax., the Picts, and Irish, as all had their own peculiarly formed goblets and ornaments of G. Very little remains of early Byzantine art; but after the revival of Byzantine art which followed the decline caused by the Iconoclasts, G.-making produced a few beautiful works. The treatises of Heraclius, a Frenchman, and of the monk Theophilus, a Ger. of the 11th and 12th centuries, contain full details for making G. in great variety, both for windows and vessels. G.-making was never lost either in Fr. or Eng. G.-making in Venice is asserted to date from the 7th century. The immense labor of covering the interior of St. Mark's with G. mosaic in the 11th and 12th centuries probably attracted to Venice skilled Byzantine workmen, and G.-making soon became a national art. The taste for solid elegance had departed, but that for the light, flower-like, and even the frivolous, had increased; and in this direction Venice soon attained perfection. In the 15th century Venetian G. attained incredible popularity. At this time porcelain was almost unknown, and, with the exception of gold and silver, G. furnished the only material for elegant ornament to gratify the inordinate luxury of an age in which all genius was devoted to ornament. The govt. guarded the secrets of the art with great jealousy, and when 2 Venetian G.-workmen went to Ger., they were followed up and murdered. In the 16th century the glasses were generally made so thin as not to bear enamelling. *Avanturino*, or smalt speckled with gold, was invented in the 18th century.

About the yr. 1860 several persons interested in the development of the industries of the Venetian prov. attempted to revive the then dormant art of G.-making. The persons to whom the merit of this attempt is due were Murenese, and Dr. Antonio Salviati, a native of Verona, sought to give a commercial value to their product by establishing an emporium for its sale in Eng. By his influence a small private company was formed, and Eng. cap. and energy were called in. By perseverance under difficulties of no ordinary character they have succeeded in producing works which vie in beauty of form and material with the most renowned specimens of the best period of the Venetian G. manufacture.

G. was made during the Middle Ages, especially for windows, in all European countries. Fr. specimens indicating skill and taste are not rare. The Gers. produced an immense quantity of cylindrical drinking-cups, generally of greenish G. enamelled, called *Wieskerken* or "come again." In the beginning of the 17th



Venetian Drinking-Glass.



Venetian Drinking-Glass.

century the Bohemians began to produce fine crystal G., and developed the art of engraving on it. In elaborate work the Bohemians often equalled the Venetians. Bohemia has always been able to produce very cheap G., and even when coarse it has a certain odd character which commands a sale. In the 17th century the Fr. made vigorous efforts to excel in the art, and introduced Venetian workmen. At the present day Fr. plate-G. is the best known. In Eng. G.-painting was practised by one Bristol in 1338, and by John Thornton of Coventry. The splendid W. windows of York cathedral are by him. In 1485 Eng. window-G. cost much more than any other. Yet the art greatly declined until the middle of the 16th century, when a revival took place. At the present day perfectly pure G., free from specks or striae (lines), is made in Eng. better than in any other European country; and with all the elegance and originality of Venetian patterns, its finest work is inferior to the Eng. and Fr. as regards mechanical accuracy. The Fr. however, at an early date made plate-G. very large and of good quality. Soon after 1688 Thévart at Paris and at St. Gobain, Picardy, cast plates 60 inches by 40.



Engraved Flagon (Clichy Glass Works).

Optical glasses are probably as old as G., for it is not likely that men who worked in this material would not almost at once observe the magnifying properties inherent in every piece thicker in the middle than at the sides. A lens was found in Nineveh, and Chl. chronology states that the emperor Chan (283 B. C.) observed the planets through an optical G. A tombstone in Florence declares that spectacles were invented by Salvino d'Armato, who d. in 1317. Kepler (1571) is regarded as the modern inventor of the telescope, which was rediscovered in 1606 by Hans Lippershey of Hol. G. for optical instruments is the most difficult to make.

Qualities of Glass.—G. is a salt, every salt being the result of a combination of an acid with an alkaline base—i. e. an alkali or alkaloid of organic nature. In the case of G. the acid is silica or silicic acid, and the base a mixture of an alkaline with an earthy base, such as lime, or with the oxide of one of the heavy metals, such as lead.

Toughened Glass.—A very important invention was announced some yrs. ago. It consists of plunging hot G., manufactured in any form, into hot oil or a heated oleaginous compound. When cool it becomes—it was claimed—almost as tough as metal. When very violently broken it separates into granulated fragments, without sharp edges, so that the danger of being cut by it is much diminished. The process does not affect the transparency.

Coloring or Staining Glass.—This is a very important part of the manufacture, involving much skill. At one time dark massive-colored glasses were generally used. By color *en masse* we mean that which is tinted all through. At present hues are conveyed by covering a body of pure flint G. with one or more thin coatings of intensely colored G., whether of blue from cobalt, green from iron and copper, or ruby from gold. The more metallic coloring oxide is employed, the less lead must be used, so as to equalize the composition. Massive colors produce a shadowy blackness, which was, however, turned to account by the artists of the Middle Ages, by leading their tints of blue, red, yellow, amethyst, and green into windows, either thicker or thinner of solid or *cased* G. as the required effects suggested.

Manufacture.—There is perhaps no manufacture in which every successive stage requires so much care as G., and none in which results on so large a scale involve such delicate skill. A puff of smoke or a sudden draught of air, imperceptible to an invalid, may ruin an immense quantity of "metal," and when the wares are made they are, so to speak, in their infancy, and must be carefully conducted through the process of annealing or tempering by judicious cooling. There are 6 kinds of G., each requiring a peculiar fabrication and a peculiar building and furnace. These are bottle, crown, sheet-window, plate, flint, and colored G. As a rule, G.-houses are conical, and all the processes are conducted on one floor. All furnaces are buildings of circular or rectangular form, 4 different kinds being needed, which are built together or separately. Of these one is the main furnace, employed for supplying the melted G. from the pots in which it is contained; of the others, one is the annealing furnace, in which the wares are annealed or tempered when made or while making; and the other is employed for baking the raw materials combined, and called frit or batch. There is also the flashing-furnace, where articles being made are rewarmed or restored to sufficient softness as they cool. The furnace for baking and partly fusing the frit is called a calcar, and that for annealing, a lehr.

Annealing is an important process with G.-ware. If not well done, the articles will, it may be months afterward, break suddenly. This results from a different arrangement of the molecules, caused by sudden cooling.

Iridescent Glass.—Pieces or objects of anc. G. dug from the ground are often exquisitely beautiful. Sometimes they are like the richest and most varied wings of butterflies or

the feathers of peacocks, presenting every shade of every color known, and at other times they resemble metal.

Soluble or water-glass is a simple silicate of soda which is perfectly soluble in hot water, but which becomes hard when exposed to the air. It is used for many purposes—as a glazing which resists water and fire, as a cement for G., and as glue or isinglass in coloring. (See *Marvels of Glass-Making in all Ages*, by A. DE SAUZAY; *L'Histoire des Arts industriels au Moyen Age et à l'époque de la Renaissance*, by M. J. LABURTE.) [From orig. art. in *J.'s Univ. Cyc.*, by C. G. LELAND.]

Glass, American Manufacture of. The manufacture of coarse black G. for bottles was commenced in Va. as early as 1615, and before the close of that century there were G.-houses in various parts of the country; and the manufacture gradually extended. According to the census of 1870 there were 201 G.-works of all classes, employing 15,822 hands; value of products, \$19,235,862. According to the census of 1880 there were, exclusive of G.-cutting and G.-staining or decorative establishments, 219 G.-works (none of them idle), having a cap. of \$19,415,599, employing 23,822 persons; wages paid, \$9,112,301; materials used, \$7,991,803; value of products, \$21,013,464. There are 4 classes of G.: 1. Plate G.; 2. Window G.; 3. G.-ware, including blown and pressed G., lamp-chimneys, druggists' ware, etc.; 4. Green G., including all green and black hollow-ware, bottles, etc.

The processes for making most varieties of G. have varied very little for many centuries; the G. manufactured in Egypt, almost 2000 yrs. ago, and in Venice in the Middle Ages, was equal and in some respects superior to that of the same classes made now; in some varieties there has been an improvement. The earliest G. made in this country, as well as everywhere else, was the green, or, as the coarser varieties are often called, black G. At first it was made from very coarse materials, and its products were mainly coarse black bottles and other articles, blown in moulds, or without them, which supplied only a small part of the demand for G. wares. It has been of late yrs. so much improved, both in the material and the working processes, that not only all the articles of G. of a single color, as red, blue, purple, green, olive, yellow, etc., may be made from it, and can be cut so perfectly as to make the finest varieties of the colored cut goods, but it is also used by the Gers., and to some extent in this country, for making a slightly inferior grade of plating. It is also extensively employed, especially by the large N. J. manufacturers, for druggists' prescription bottles, fruit-cans, jars, etc.

Flint G. is made from other materials (feldspar, finely ground quartz, or the finest white sand for the silica, and for many yrs. carbonate of soda imported from Eng.); it often contains oxide of lead or zinc, and is very clear in color. It is largely used for table and hollow ware, for optical instruments, for the finest qualities of druggists' bottles, jars, etc. Most of the G. used for cutting and engraving is flint G., and the Pittsburgh and some other factories have introduced machinery by which they make pressed G. from it so perfectly that it requires a skilled expert to determine, in regard to some of the goods, whether they are pressed or cut. Window G. is of two kinds—crown and sheet, or cylinder G. It may be either of flint or green G.: if the latter, it is made of the best materials; Amer. cylinder G. is better than the foreign, being drawn out in larger and wider cylinders, of more uniform thickness, and less liable to devitrify, rot, or rust. Decorated or parti-colored G. is usually made from cylinder G. by different processes. Plate G. of the best qualities has not been successfully made here till within a few yrs. past, though the rough plate has been produced. It is now made of quality better than the Ger., fully equal to the Eng., and but slightly inferior to the best Fr. or Belg. It is cast, not blown nor moulded, and to be of the best quality must be of the finest materials and carefully manipulated. It is now applied to many purposes, which the sandblast has made possible, for which a few yrs. ago its employment would have been thought impracticable, such as dials and casings of clocks, change-counters in banks and insurance offices, parlor summer-pieces, library doors, aquaria, etc., and has been proposed for building purposes. The sandblast, a most remarkable discovery, has rendered a previously fragile and intractable material the most easily worked of all the materials of its class, and has rendered the decoration of articles of G. in designs of great beauty a very easy and inexpensive process. Another invention has also been of great interest in this manufacture—the toughening process—by which the most brittle of materials is said to be rendered completely infrangible. This was at first attempted by a process of sudden cooling without annealing, like the Prince Rupert's drops; but this was found to be somewhat dangerous, as even a slight blow from a sharp-pointed instrument would completely destroy the article, and with an explosion which might do serious injury. G. is now toughened by annealing in oil, though the details of the process are secret. Although our G. manufacture has greatly increased in the last 12 or 15 yrs., we are importing rather more than in 1869 or 1870. Our importation in 1870 was \$3,717,634; in 1879, \$3,212,469; but in 1880, \$5,133,272, and in 1881, \$5,878,025. This was almost wholly confined to 3 items—cylinder, crown, or common window G., largely from Belg., and a small amount from Eng.; plate G., rough or polished, from Eng., Fr., Belg. (called Fr.), and Ger.; and fancy G. of peculiar designs, ornamented, decorated, colored, etc., from Ger., Fr., Eng. and Belg. Our exports of G. 15 yrs. ago were very small; they have risen from \$350,654 in 1870 to \$869,682 in 1879, and \$756,022 in 1881. The exports are mainly of G.-ware from N. J. and Pa. L. P. BROCKETT.

Glass-Cloth and Glass-Paper are prepared by sprinkling powdered glass upon paper or cloth, one side being moistened with thin glue. Are used like sand-paper.

Glass Crab, the name of crustaceans of the order Stomatopoda. They are so transparent that as they float on the water only the eyes are visible.

Glass Slipper. The fairy tale of Cinderella is known

In all civilized countries. It is of Fr. origin. The prince presents Cinderella with a pair of slippers lined with miniver or petit ver, a fur which was the prerogative of royalty, as ermine was that of the highest officer of the law. The story was translated into Eng., and "petit ver" was rendered "little glass." It was afterward retranslated into Fr., and the "little glass" was retained. In the Ger. version it is only the small size of the slipper which serves as a means of recognition; the glass is left out. WILLIAM DETMOLD.

Glass Snake, *Ophisaurus ventralis*, a snake-like lizard of the U. S. It resembles a serpent, but has the anatomical peculiarities of the lizards. It is 2 or 3 ft. long, is harmless, and is found in the S. When smartly struck with a stick, it often breaks into several pieces, whence the name.

Glass, Soluble. See WATER GLASS.

Glass Sponge, a name of various sponges of the genera *Hyalonema*, *Euplectella*, etc., of which the typical forms have the silicious sponge-spicules prolonged into a flexible, loosely twisted cable of glassy threads.

Glauber's Salt [named from J. R. Glauber, its discoverer (1604-68), called formerly *sal mirabile*, the neutral sulphate of soda], a salt found native in sea-water, in mineral springs, and especially in the alkaline soils and waters of the W. plains and mts. of the U. S. It was formerly much used as a cathartic, but is now so employed chiefly in veterinary practice.

Glaucias [Γλαυκίας], a statuary of Ægina, flourished about 490-476 B. C., celebrated for his statues of combatants in the games.

Glaucias [Γλαυκίας], a distinguished phys. of the Empiric school, and one of the earliest interpreters of the writings of Hippocrates, to which he drew up a sort of lexicon of the difficult words in alphabetical order.

Glaucion [from the Gr. γλαυκός, "light-green," alluding to the greenish, bluish, or reddish tint sometimes seen upon the eye in this disease], a disease characterized by inflammatory action in the different parts of the eye, attended by increase in the bulk of the fluids contained, and marked by a gradual loss of sight and by pain. It is a disease of advanced life, and often leads to blindness.

Glaucius [Γλαυκίος], an artist of Chios, said to have invented the art of soldering metals. His most famous work was the celebrated iron base on which was placed a silver vase, dedicated by Alyattes II., king of Lydia (617-561), to the god at Delphi, and so superior in workmanship as to have given rise to the proverb Γλαυκίου τέχνη.

Glaucus [Γλαυκός], the name of several personages in Gr. heroic traditions. The most important was a Boeotian fisherman, who ate of a divine herb which made him immortal. He built the Argo, was helmsman for the Argonauts, and became a sea-god whose oracles were very famous.

Gleditschia [named from J. G. Gleditsch (1714-86)], a genus of trees of the order Leguminosae, represented in the U. S. by the honey-locust and the water-locust.

Gleet. See GONORRHEA.

Gleig, gleg (GEORGE ROBERT), M. A., b. at Stirling, Scot., Apr. 20, 1796, son of the bp. of Brechin, was ed. at Glasgow and Balliol Coll., Ox.; entered the army in 1812; served against Nap. and in the U. S.; took orders in the Ch., and after receiving several preferments was made chaplain-gen. of the Brit. army in 1846. In 1848 he became a prebendary of St. Paul's. Wrote *Life of Wellington*, etc.

Glen Allen, Va. See APPENDIX.

Glencoe, a valley of Scot., in the county of Argyll, famous both for its wild scenery and for the massacre of the Macdonalds which took place here in 1692.

Glencoe, cap. of McLeod co., Minn., on R. R. and Buffalo River, 60 m. W. of St. Paul. It has a sem., and there is an abundance of timber and water. Pop. 1880, 1078.

Glendale, Battle of. See FRAZIER'S FARM, BATTLE OF.

Glendive, Mont. See APPENDIX.

Glen-dower (Sir OWEN), (*Owain Glyndwr Du*), b. in Merionethshire, Wales, about 1350, great-grandson of Llewellyn, the last Welsh monarch; studied law, was made a barrister of Lond., became an esquire of Richard II.'s guard, and in 1387 was knighted. Suspected of disloyalty by Henry IV., a part of his estates were given to Lord Grey of Ruthin (1399), and having appealed in vain for redress to Parl., he in 1400 took arms, declared himself monarch of Wales, and carried on war with general success. He then entered into an alliance with the Percies, after whose final defeat he still carried on the war. Henry V. finally offered him full pardon, shortly after which he d., Sept. 20, 1415.

Glenroy, a valley of Scot., along the Roy, which runs into the Spean. On each side of this valley, and at exactly the same elevation, appear 3 roads or shelves running parallel with each other, the first at an elevation of 1139½ ft. above the sea, the second 80 ft. lower, and the third 2½ ft. lower than the second. This phenomenon was caused, it is said, either by the subsidence of a lake or by the rising of the land. The popular explanation declares the shelves to be the roads of the heroes of Ossian.

Glen's Falls, Warren co., N. Y., on R. R. 50 m. by rail N. of Albany, on the Hudson between Saratoga Springs and Lake George, 9 m. from the latter. It is noted for its cave, water-power, mills, lime, black marble, and canal. It has a ladies' sem. Pop. 1870, 4500; 1880, 4900.

Glenwood, city and cap. of Mills co., Ia., on R. R. 20 m. S. of Council Bluffs. Pop. 1870, 1291; 1880, 1793.

Gleyre, glär (GABRIEL CHARLES), a Fr. painter, b. at Chevilly, canton de Vaud, Switz., in 1807; studied at Lyons and at Paris under Hersent; went to It., and made close study of It. art; thence to the E., Egypt, Abyssinia, Tur., Gr. His pictures are not numerous. *St. John at Palmos*, *Evening*, *The Departure of the Apostles*, *The Nymph Echo*, *Bac-*

chantes, *Pentecost*, *The Execution of Major Duval*, are the best known; but all his work is remarkable for the combination of severe study with strong imagination.

Globe, Ari. See APPENDIX.

Globe, Artificial, a sphere on which is a map. G. set forth the earth or heavens, and are called terrestrial or celestial. On the latter the stars appear as they would if seen from the centre of the earth, while the former is a literal copy of the earth itself, with the addition of lines or circles to determine the position of places and the movements of the sun and planets. The G. is thus a spherical map, and superior to an ordinary plane chart by giving more readily an understanding of the relative distances of places, especially as regards their position on the ball. The oldest G. in existence is that in the Museum Borgia at Velletri, probably from the yr. 1225. Celestial G. of gold, on which the stars were represented by pearls, were made by the Arabs. Tycho Brahe also made many G.

Globe Amaranth, the *Gomphrena globosa*, a flowering plant known for its globose purple or white heads of imperishable flowers, known as *immortelles*. Many of the S. Amer. species are prized for their medicinal virtues.

Globe-Fish, a name applied to fishes, mostly of the family *Tetraodontidae*, having the power of puffing themselves up by swallowing air.

Globe Flower [so named from the almost spherical shape of the blossom], a genus (*Trolius*) of perennial herbs of the order Ranunculaceae. *T. Europæus* and *Asiaticus* are cultivated ornamental plants. *T. laccus* is a rather rare plant of the U. S., and the only Amer. species.

Globulin, (1) a semi-solid nitrogenous substance which constitutes a large proportion of the bulk of the red globules of the blood. It is coagulable by heat, insoluble in cold water, and is found intimately associated with a little fat and some inorganic salts. It is closely akin to albumen, and is called an albuminoid. Its composition is given in the article ALBUMINOIDS (which see). But some late authorities question its existence as a distinct principle. (2) *G.*, fibrinogen, myosin, and vitelline are collectively called *G.*—a name which is (3) also given to the granules (½ in. in diameter) found in the lymph of the animal absorbent system, and regarded by some as a variety of leucocytes.

Gloom'en, the largest river of Norway, rises at an elevation of 2419 ft. After joining the Vorma it is called the Stor-Elv, and falls into the Skagerack. Its course is about 400 m., and its vol. of water very considerable, but its navigation is much impeded by falls, of which the Sarp, 10 m. from its mouth and 70 ft. high, is the most remarkable.

Glonoine. See NITRO-GLYCERINE.

Gloriosa, a genus of liliaceous flowering plants (remarkable for having the leaves tipped with a short tendril or hook), of which the best known is the *G. superba*, with very fine red and yellow flowers.

Gloucester, glos'ter, on R. R., city and seaport of Essex co., Mass., near the extremity of Cape Ann, 28 m. N. E. of Boston. It received its name from Gloucester, Eng., whence many of its early settlers came. It was settled in 1623, incorporated a town in 1642, and became a city in 1874. It contains a public library. The business is mainly confined to the fisheries and the granite industry. It is also quite popular as a summer resort and has a very fine harbor. Pop. 1870, 15,389; 1880, 19,329.

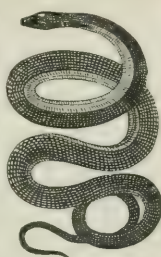
Gloves [A.-S. *glōf*, a covering for the hands, usually of leather or textile fabric, inclosing each digit separately, and sometimes extending up the arm] were worn in anc. times by the Pers. as a protection from cold, but in Gr. and Rome they were only used by husbandmen during the performance of certain kinds of field-labor as a protection from thorns. In the early Middle Ages knights, priests, and ladies used them, and they received different symbolical significations of love, challenge, submission, etc. It was not until the age of Louis XIV. that they became part of elegant dress in gen., but after that time their use has become more and more common. During the reign of Louis XIV. the gloves of Paris became a very important community; the king renewed their statutes, dating from 1190; in these they were styled marchands-maitres-gantiers-parfumeurs, and alone had the right to sell or prepare G. Between 1644 and 1680 Louis XIV. issued several edicts prohibiting the use of G. embroidered with gold or silver. Gentlemen's G. at this period were made with gauntlets; those worn by ladies covered the arm.

Glov'ersville, on R. R., Fulton co., N. Y., 44 m. N. W. of Albany and 9 m. N. of Fonda. It contains a public library. The prin. business is the manufacture of gloves. Pop. 1870, 4518; 1880, 7133.

Glow-worm, the wingless luminous female of *Lampyris noctiluca* and other fire-flies. The pale bluish and rather faint luminosity serves to attract the male.

Glucinum [Gr. γλαυκός, "sweet," from the taste of some of its salts], called also **Beryl'lum**, an artiad (dyad) earth-metal, whose oxide is known as glucina and is considered an earth. G. in nature is commonly a silicate of glucina, as in the beryl, of which gem this constituent constitutes 14 per cent.; or as an aluminate, as in the chrysoberyl.

Gluck, glook, von (CHRISTOPH WILHELM), an eminent composer, b. at Waidenwang, near the borders of Bohemia, July 2, 1714. His father was a huntsman and forester in the service of Bohemian nobles. Beside receiving a good school education and part of a course at the Univ. of Prague, the boy was well instructed in music under the direction of the Jesuits, who cultivated the art for religious purposes. At the age of 18, being forced to work for his support, he gave lessons in vocal and instrumental music, sang and played in ch., and in leisure time entertained villagers with his accomplishments. At the age of 22 his ability had attracted the attention of a noble patron, who gave him opportunity to study music at Vienna under the most favorable auspices. A Lombard prince, hearing him there at his patron's house, took him to Milan and placed him under the tuition of the



Glass Snake.

then celebrated Sammartini. He was but 26 yrs. old when he received an order to compose an opera for the court theatre. Full of new ideas, G. gave his whole mind to his new theory of opera, and after producing many pieces more or less significant at Paris, Vienna, Rome, Naples—2 of which, *Il trionfo di Camillo* and *Antigono*, won for him from Pope Clement XIII. the order of Knight of the Golden Spur—he returned to Vienna and established himself as Capellmeister of the imperial opera. He was 48 yrs. old when, from a libretto by a new author, Calzabigi, poet and statesman, he composed the *Orfeo ed Euridice*, which was first performed in Vienna Oct. 5, 1762. G., though possessing immense industry, energy, and determination, the mind of a critic and the soul of a reformer, lacked the affluence of genius that distinguished his immortal successors in operatic composition, Mozart and Beethoven. His greatest compositions were penetrated with a feeling religious in its character, yet his religious compositions are very few and of small account. D. Nov. 15, 1787. O. B. FROTHINGHAM.

Glucose. See APPENDIX.

Gluco-sides, a term applied to substances yielding when treated with dilute acids (or certain ferments) glucose or a sugar of similar composition, and another substance not belonging to the group of carbohydrates. They occur in various plants, most frequently in the bark. None have been formed artificially. A series of bodies, however, called artificial G., has been prepared by heating glucose with some organic acid for several hours, but these yield glucosan, and not glucose, on being decomposed. Alkalies and some organic ferments also decompose some G. to glucose and some other body. Among the most important G. are amygdalin from bitter almonds, chitin from the wing-cases of insects and from the carapaces of crustaceans, gallo-tannic acid from gall-nuts, myronic acid from the seed of black mustard, salicine from the leaves and bark of the willow and poplar, and solanin from the nightshade, tobacco, potato, tomato, and other plants of the family Solanaceae.

Glue [Lat. *glus*], a hard, brittle, glassy form of dried gelatine, containing impurities which give it a brownish color. It is usually obtained from the scraps of hides, the hoofs of animals, etc. Bone-G. (bone-gelatine) is prepared from fresh bones, either by digesting them with superheated steam, or with dilute hydrochloric acid, followed by boiling, the latter process affording the best results. "Fish-G." is an inferior isinglass made from the offal of the fisheries. For use as a cement, G. is generally dissolved. "Prepared" or liquid G. is the ordinary solution kept liquid by the addition of an acid. Six parts G., 16 parts water, 1 part hydrochloric acid, and 1½ parts sulphate of zinc give excellent results as an impregnable liquid G.

Glue, Marine, a cement formed by dissolving 1 lb. of India-rubber in 5 gals. of oil of turpentine, or preferably in coal-naphtha, and then adding after some days a quantity of shellac equal, or sometimes much exceeding, the previous solution in weight. The mixture is heated over a gentle fire and thoroughly mixed by stirring. It is then run into plates and dried. When used, it is melted by heating. It is insoluble in water, and will hold pieces of tough wood together so strongly that they may be broken across the grain sooner than parted at the place where glued. Glass and metals may also be glued with it.

Glümer, von (ADOLF), a Prus. Lieut.-gen., b. June 6, 1814; took part as maj.-gen. in the campaign of 1866 against Hesse, Hanover, and the S. Ger. States. At the beginning of the Franco-Ger. war of 1870-71 he received the command of the 13th division of inf., and he decided the battle of Saarbrücken; took part in battle of Metz, and received Sept. 30 command of the division of Baden.

Gluten [Lat. for "glue"], a nitrogenous and highly nutritive substance found in many of the cereal grains in variable proportions. It is generally regarded as a mixture of vegetable fibrine with a small proportion of a very adhesive principle called gliadine or glutine, which imparts to the G. some of its own adhesive quality; but the proportion of gliadine is extremely variable, it being almost entirely absent from rye-G. Caseine and a thick oil also exist in most G. in small proportions. The G. of wheat varies from 9 to more than 35 per cent. of the grain, according to the conditions of growth. (See FLOUR.)

Glutton, Wolverine, or Carcajou, *Gulo luscus*, the largest of the Mustelidae. In N. Amer. it is one of the greatest pests of the fur-regions, robbing the traps of the hunter with unceasing pertinacity.

Glycas [Γλυκας], MICHAEL, a Byzantine historian who lived after A. D. 1118, but the precise time is not known. Composed a hist. of the world (βίβλος χρονική), in 4 books, comprising the period from the Creation to the yr. 1118.

Glycerine, glis'e-rin [Gr. γλυκός, "sweet"], the propenyl alcohol, a sweet principle obtained by the action of alkalies upon fixed oils and fats, which are regarded as propenyl ethers of fatty acids. Pure G. is a colorless, syrupy liquid, unctuous to the touch, sweet to the taste, and without odor. It is very miscible with water (of which it always contains some). Treated with strong nitric and sulphuric acids, nitro-glycerine or glonoin is produced. In med., chem., and the arts G. has a wide range of uses. It is an important ingredient of cosmetics, toilet soaps, unguents, and pomades. Its solvent and antiseptic powers are great, and its non-drying quality adds much to its usefulness. It has nutrient qualities, and is useful in many diseases of the skin and the mouth. But its chief use in med. is as an excipient, solvent, and preservative for more active meds. It is used for filling gas-meters, for various purposes in brewing, calico-printing, photography, and in the preparation of objects for microscopic examination, and for innumerable purposes in chemical and pharmaceutical laboratories.

Glycogen ("sugar-producer"), a white, amorphous, starch-like, tasteless, odorless substance, found in the liver of man and the lower animals, and in other tissues, especially during fetal life.

Gly'con [Γλυκων], a statuary of Athens (date unknown, but probably under the early Rom. emps.), by whom the celebrated colossal statue of Hercules, known as the Farnese Hercules, was made. This was probably brought to Rome in the time of Caracalla, and placed in his baths, where it was found. The statue is supposed to be a copy of an original by Lysippus, and represents Hercules leaning on his club.

Glycyrrhiza. See LIQUORICE.

Glyoxiline was invented by Abel shortly after the introduction of dynamite. It consisted of a mixture of gun-cotton pulp and potassium nitrate, saturated with nitro-glycerine, and was made both in a granular and a cake form. It proved to be less troublesome in handling, owing to the granules being coated with an impermeable material which reduced the tendency to produce headache, but it was never largely introduced into practical use.

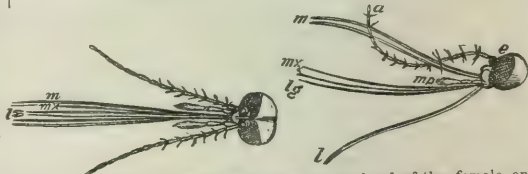
Glyptodontidae [Gr. γλυπτός, "carved," and δόντος, "a tooth"], a family of gigantic extinct armadillos living in the later Tertiary and Post-Tertiary epoch in S. Amer., distinguished by a dorsal shield or carapace of one piece instead of being divided.

Gmelin (JOHANN GEORG), b. at Tübingen, Ger., June 12, 1709; became prof. of chem. and natural science at St. Petersburg 1731; journeyed in Siberia 1733-43; was made prof. of bot. at Tübingen 1749; d. May 20, 1755. Author of *Travels in Siberia and Flora Sibirica*.—His nephew, JOHANN FRIEDRICH GMELIN, b. at Tübingen Aug. 8, 1746; became prof. of bot., etc. at Tübingen 1771, of med. 1775; prof. of med. at Göttingen 1778. Author of many works on bot., chem., and toxicology. D. Nov. 1, 1804.—SAMUEL GOTTLIEB GMELIN, also a nephew of J. G. Melin, b. at Tübingen June 23, 1745; became botanical prof. at St. Petersburg, and travelled (1768-74) in S. and S. E. Rus.; was taken prisoner in the Caucasus, and d. July 27, 1774, in consequence of the ill-treatment he received. His *Historia Furorum* and some vols. of travels have been pub.—LEOPOLD GMELIN (son of J. F. Gmelin), b. at Göttingen Aug. 2, 1788, was chemical and med. prof. at Heidelberg 1817-51. Author of *Handbuch der Theoretischen Chemie* and a *Lehrbuch der Chemie*. D. Apr. 13, 1853.—Other distinguished members of this family were JOHANN CONRAD (1707-59), a phys., author, and pharmacist of Tübingen, elder brother of J. G. Melin; and PHILIPP FRIEDRICH, younger brother of the same (1721-68); held professorships of bot., chem., and med. in Tübingen, and was author of many scientific monographs. The botanists of this name are commemorated by the Linnæan genus *Gmelina*, plants of the order Verbenaceae.

Gnat. The gnat or mosquito differs from other 2-winged flies by the long and slender mouth-parts (Figs. 1 and 2). These are adapted for puncturing the flesh of its victim.

FIG. 1.

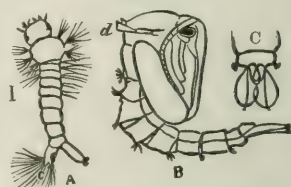
FIG. 2.



Dorsal (Fig. 1) and side (Fig. 2) view of the head of the female, enlarged: a, antennæ; m, mandibles; mx, maxillæ; g, lingua; l, labium, in which the other parts are ensheathed.

The larvæ (Fig. 3) are aquatic, living in pools. They are cylindrical, and breathe by means of a bunch of hairs radiating from a long tubercle situated at the end of the body. They remain most of the time at the bottom, feeding upon decaying matter, and are thus very beneficial as scavengers. In the pupa state they take no food, and breathe by a respiratory tube (Fig. 3, B, d) situated on the enlarged thorax. They are very active in this state, jerking up and down in the water, aided by a pair of broad caudal leaves (Fig. 3, C). The long cylindrical eggs are laid in little packets which float on the surface of standing water. In 4 weeks after hatching the insect passes through its transformations. The females alone bite. The males, which may be distinguished from the other sex by their bushy antennæ, seldom visit our houses, and do not bite. It is a question whether the bite of the mosquito is poisonous. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. A. S. PACKARD, JR., M. D.]

FIG. 3.



A, larva; c, respiratory tube and radiating hairs; B, pupa; d, thoracic respiratory tube; C, lamellæ at end of body of the pupa, enlarged.

sex by their bushy antennæ, seldom visit our houses, and do not bite. It is a question whether the bite of the mosquito is poisonous. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. A. S. PACKARD, JR., M. D.]

Gneiss, nls. a metamorphic, stratified rock, crystalline-granular in texture and foliated in structure, composed essentially of quartz, feldspar, and mica; the latter ingredient is often replaced by hornblende, thus giving rise to hornblende or syenitic G.

Gnome, nom [Gr. γνῶμων, "wise"], in the Rosicrucian

and cabalistic doctrine, a spiritual being residing within the bowels of the earth, guarding mines of precious metals, gems, and hidden treasures.

Gnom'ic Poets [Gr. γνῶμη, a "sentiment"], in Gr. lit., a name applied to those didactic poets whose compositions are characterized by aphorisms and short, proverb-like moral precepts (*gnomai*). Theognis, Solon the lawgiver, Phocylides, and Simonides of Amorgos, are noted G. P.

Gnostics, nos'tiks ("men of knowledge"; Gr. γνῶσις), a name applied to numerous schools of heretics in the early Chr. Ch. Of several noted classifications of the G., Niedner's is, perhaps, the best—(1) Those who gave Christianity at once a place, and the highest place, among the religions of the world: (a) in its original form, Basilides, the Ophites, and the closely allied Cainites and Sethites; (b) in its perfected form, Valentinus, Heracleon, Ptolemaeus, and Marcus; (2) those who separated Christianity from its historic connection, and made it the first true revelation of God: (a) Marcion and his school; (b) the Syrians, Saturninus, Bardesanes, Tatian, and Apelles; (3) those who identified Christianity (a) with heathenism, the Carpocratians, Antitactes, and Prodicians, all licentious; (b) with Judaism, the Pseudo-Clementines. In 4 points these systems all, or nearly all, agree: (1) God is incomprehensible. (2) Matter is eternal and antagonistic to God; or, as Basilides taught, if created by God, still conditions and limits the divine efficiency. (3) Creation is the work of the Demiurge; according to some, only subordinate; according to others, totally opposed to God. (4) The human nature of Christ was a mere deceptive appearance. Gnosticism reached its highest bloom about 150 A. D. In the 3d century its creative energy was gone. In the 4th century it was powerless. And in the 6th century only remnants of it remained.

Gnu [a Tottenot word], the *Connocochates gnu*, an antelope distinguished by a flowing mane and tail of white hair, resembling those of the horse, found in S. Afr. It has curved horns. The name *wilde-beest* is also given on account of its frantically rushing about in a most violent manner. It is very fleet and timid.

Goat (*Capra*), a genus including the goats proper. It is characterized by hollow, annulated horns, which are directed upward and backward. There are 8 cutting teeth in the lower jaw, and none in the upper. The chin is bearded in the male. This genus has no representative in Amer., though in the domestic state the G. is found in all parts of the world. The wild G. (*C. aegragus* Gm.) roams in extensive herds on the Per. and other mts. of the E. hemisphere; it is regarded as the parent stock from whence all the domestic varieties have sprung. The Cashmere G. of Tibet is the most valued; a delicate gray wool grows under the longer silky hair; about 2 ounces of this is obtained from one individual, and is the much prized material of the cashmere shawls. The milk of the G. is sweet, nutritive, and is also esteemed as medicinal. In anc. times the skin was valued for clothing; at present it is a favorite and familiar item in the manufacture of the best turkey or morocco leather, and, in the young state, of the better class of gloves.

Goat Island divides the current of the Niagara River at the Falls. Area, 70 acres. It is 900 ft. distant from the Amer. and 2000 from the Canadian shore.

Goat/sucker, or Night-jar (*Caprimulgus Europæus*), the type of the family Caprimulgidae, to which belong the whip-poor-will, the chuck-will's-widow, the night-hawk, and several other birds of the U. S., all of which are sometimes collectively called G.

Gobelins Tapestry, the most highly valued grade of carpet, manufactured only in the Gobelins factory, Paris. The carpets are all of rug-like make, and many of the designs are pictured scenes in colors. The colored silks and wools which are employed are passed into the work by means of wooden needles. Each artist averages less than 1¼ square yards per annum. Some G. carpets cost from \$30,000 to \$40,000, and require from 5 to 10 yrs. for their completion. Since 1791 none have been sold. They are mostly presented by the Fr. govt. to foreign courts.

Go'bi, Co'bi, or Sha'mo, a wide tract in Central Asia, between lat. 40° and 50° N. and lon. 90° and 120° E. It forms a table-land 3000 ft. above the sea. Its W. part is mostly covered with fine sand. The E. part is mostly naked rocks. The winter is 9 months long, but the heat is intense in the short summer. Extensive steppes afford pasture for the flocks of the nomadic Mongolians.

Go'by (*Gobius*), a name applied to fishes of the family Gobidae. The black G. (*Gobius niger*) is common.

God. In consequence of the predominance of Chr. ideas in the lit. of civilized nations for the last 1800 yrs., the word *God* has attained the permanent and definite sense of a self-existent, eternal, and absolutely perfect free personal Spirit, distinct from and sovereign over the world he created.

I. PROOFS OF HIS EXISTENCE.—The word nevertheless continues to be used with a wide lat. of meaning. The full conception associated with it by Chrs. is of course largely the product of revelation. On the other hand, the gen. idea of God as a being upon whom we depend, and to whom we are responsible, and for whose communion we long, is innate in human nature—i. e. it is universally generated and sustained in human consciousness by the laws of our nature.

A. The *Ontological Argument* has been presented in various forms: 1. Anselm, abp. of Canterbury (1093-1109), states it thus: We have an idea of an infinitely perfect being. But real existence is a necessary element of infinite perfection. Therefore, an infinitely perfect being exists, otherwise the infinitely perfect as we conceive it would lack an essential element of perfection. 2. Descartes states it thus: The idea of an infinitely perfect being which we possess could not have originated in a finite source, and therefore must have been communicated to us by an infinitely perfect being. 3. Dr. Samuel Clarke argues that time and space are infinite and necessarily existent, but not substances. Therefore, there must exist an eternal and infinite substance of

which they are properties. 4. Cousin maintained that the idea of the finite implies the idea of the infinite as inevitably as the idea of the "me" implies that of the "not-me."

B. The *Cosmological Argument* may be stated in the form of a syllogism: Every new thing and every change in a previously existing thing must have a cause sufficient and pre-existing. The universe consists of a system of changes. Therefore the universe must have a cause exterior and anterior to itself.

C. The *Theological Argument*, or argument from design or final causes, is as follows: Design, or the adaptation of means to effect an end, implies the exercise of intelligence and free choice. The universe is full of traces of design. Therefore, the "First Cause" must have been a Personal Spirit. This argument has been elaborated ever since the time of Socrates.

D. The *Moral Argument*, derived from the const. and hist. of man, and his relations to the universe: 1. All our knowledge rests upon consciousness. From knowledge of self we come to recognize the absolute cause discovered by the "cosmological" and "theological" arguments as a personal spirit. 2. The phenomena of conscience necessarily imply a sovereign personal will which binds ours. 3. Man is a religious being. The instinct of prayer and worship, the longing for and faith in divine love and help, are inseparable from human nature under normal conditions as known in hist. 4. The entire hist. of the race, as far as is known, discloses the presence and influence of a wise, righteous, and benevolent moral ruler and educator of men and nations. 5. The compact and mutually supporting system of divine interventions and culminating revelations recorded in the Chr. Script., reaching through 2000 yrs., is the true vertebrate column of human hist., upon which all human progress in civilization or science rests.

II. THE ATTRIBUTES OF GOD are the modes of existence and of action of his substance. They differ among themselves, not as distinct things, but as distinct tendencies and modes of existence and action of the same thing.

1. The *Divine Unity*.—Monotheism, the primitive religion, soon gave place through nature-worship to pantheism and polytheism. It has been recovered only imperfectly by philos. of the first rank like Plato, and established as a popular faith only through the Mosaic and Chr. revelations.

2. God is an *infinite* and *absolute* being. The true idea of the "absolute" is the finished, and that which exists in no relation to anything not determined by its own will. And the true idea of the "infinite" is that which admits of no increase after its kind.

3. God is an absolute, perfect, *personal* Spirit. This is the result of the whole convergent testimony which establishes the fact of his existence. If not this, we have no evidence that he is anything.

4. He is *eternal*. His existence exceeds all limits of time.

5. Absolutely, God is infinite in his *immensity*, transcending all the limits of space; relatively, he is *omnipresent* in his essence, as well as his knowledge and power to all his creatures.

6. He is *immutable*, in his essence, perfections, and will.

7. His *knowledge* has no limits. He knows all things in their essential being, and in all their relations, by one all-comprehensive, timeless intuition. Wisdom is the perfect use which he makes of his knowledge and his power to effect his ends.

8. He is *omnipotent*—i. e. the causal efficiency of his will has no limit other than his own perfections.

9. The *goodness* of God, existing in the forms (1) of benevolence to all sentient creatures, (2) love to persons, (3) mercy to the miserable, and (4) grace to the ill-deserving, has no limit outside of his own perfections. This is as good a world as was consistent with the end God had in view.

10. God is absolutely *true*—i. e. self-consistent and reliable.

11. He is absolutely *righteous*. This involves (1) holiness, or absolute subjective moral perfection; (2) justice, when he is regarded as standing to his intelligent creatures in the relation of moral governor.

12. God's *will* is the organ of his infinite perfections. It is free, in the sense of being a rational spontaneity. It is sovereign, inasmuch as it is conditioned upon nothing save his own all-perfect nature. His will is to his creatures an ultimate rule of right, in his "positive" commandments creating obligation, and with respect to essential morality expressing and giving effect to the law of absolute right resident in his own nature.

III. GOD'S RELATION TO THE WORLD.—The Chr. view of God's relation to the universe includes the following points:

1. That God is a free moral person, transcending the universe, and acting upon it *ab extra* in the exercise of his *potestas libera*. 2. God is nevertheless personally present to every atom of creation through each moment of duration, in his essence and in the free exercise of all his perfections, sustaining and co-working with every creature in every event in the exercise of his *potestas ordinata*. 3. The cap. distinction is made between the phys. and the moral order. The former, God administers in the mode of fixed laws and forces inherent in the things themselves. The latter he administers through ideas, motives, and other moral and spiritual influences, brought to bear on the moral natures and free wills of his subjects. 4. As an infinitely perfect intelligence, God has formed a plan from eternity, immutably determining in gen. and in particular the being, the attributes, and the relations of all creatures, and hence the fixed laws of the phys. order, and the course of events in the moral order, and his own actions concurrent therewith. In this universal plan he has established a fixed subordination of parts to the whole, and of order to order. The end of the whole he has placed in the manifestation of his own glory. The end of the natural order is the perfect development of the moral order. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. A. A. Hodge, D. D., LL. D.]

Goda'very, the largest river of the Deccan, rises from the W. Ghauts, within 50 m. from the Ar. Sea, and crosses the Deccan in a S. E. course of about 900 m. After passing through the E. Ghauts it separates into several arms, forms a delta, and falls into the Bay of Bengal.

Godet (FRÉDÉRIC L.), D. D., b. in Neuchâtel, Switz., in 1812. After having finished his coll. course and studied theol. in his native town, he continued the study of theol. and philos. in the Univ. of Berlin; was ordained minister in Neuchâtel; in 1838 was called by the prince royal of Prus., the present emp. of Ger., to the office of civil gov. or director of the education of his only son, Frederick William, now prince imperial of Ger.; became in 1850 one of the prin. pastors of the city of Neuchâtel and prof. in the theological school of the national Ch. of the canton, and subsequently in the theological school of the independent Ch. Wrote a *Commentary on the Gospel of John*, a *Commentary on the Gospel of Luke*, a *Commentary on the Epistle to the Romans*, and *Biblical Studies*. Author of the articles on the 4 Evangelists and on the book of Revelation in *J.'s Univ. Cyc.*

God'frey (THOMAS), b. in Phlla.; worked as a glazier in his native city, and studied math. About 1730 he made an improvement in Davis's quadrant. John Hadley also made a very similar invention. Each communicated his invention to the Royal Society of Lond.; after an investigation, this society declared that both claimants were entitled to the honor of invention, and awarded to each a prize of £200. The instrument is called either Godfrey's or Hadley's quadrant. D. 1747.

Godfrey of Bouillon, boo-yōn', king of Jerusalem and the sixth duke Godfrey of Brabant, or the Lower Lorraine, b. at Nivelles, Lorraine, in 1061; became gov. of Bouillon 1076; fought in Ger. and It. on behalf of Henry IV. against the pope; slew Rudolph, the rival emp., with his own hand, and was the first to mount the walls of Rome on Henry's successful attack 1084; succeeded as duke 1089; took the cross for the Holy Land 1095, in order to expiate his sin of fighting against the pope (first crusade); led 80,000 men to the E. by way of Constantinople; captured Nicea 1096; defeated Soliman at Dorylæum 1097; took Antioch 1098, and stormed and took Jerusalem July 15, 1099; was declared king of Jerusalem, but declined to wear a crown of gold where his Lord had worn a crown of thorns; defeated the Egyptians at Ascalon, conquered Galilee, promulgated the *Assize of Jerusalem*, a system of feudal law; d. at Jerusalem July 15, 1100, and was succeeded by Baldwin I.

God'va, The Lady, wife of Leofric, earl of Mercia and master of Coventry in Eng., who about 1040 imposed upon that town heavy exactions. The lady G. entreated her lord to spare the town; at last he consented on condition that she should ride naked by daylight through Coventry, to which proposal she agreed, notwithstanding her extreme modesty. The earl could do no less than order the people to keep within their houses and not look out. This they all did excepting one tailor, the Peeping Tom of Coventry, who looked out at a window as the lady rode by veiled with her hair only; but the tailor was at once struck blind, and was shortly after hanged by the earl. A yearly pageant, in which a young woman enacted the part of G., was long kept up at Coventry.

Godolphin (SIDNEY Godolphin), EARL OF, b. in Cornwall; became a sec. of state 1664, and first com. of the treas.; was envoy to the Netherlands 1678, a lord of the treas. and one of the chief ministers 1679, a sec. of state 1684, chamberlain to the queen 1685, com. of the treas. 1686-90, first lord of the treas. 1690-97, 1700-01, lord high treas. 1702-10; was made a baron 1684, K. G. 1704, Viscount Rialton and Earl Godolphin 1706. D. Sept. 15, 1712. He was a man of few words and decided talents for public business. Political or moral principles he had none. When chamberlain to James II.'s queen he conformed to the R. Cath. rites; was in turn Tory or Whig as best served his interest in times when these party names carried meaning with them.

Go'don (SYLVANUS W.), U. S. N., b. June 18, 1810, in Pa.; entered the navy as midm. Mar. 1, 1819; became a rear-admiral in 1866, retired in 1871. He commanded the Powhatan at the battle of Pt. Royal, and the Susquehanna in both the Ft. Fisher fights. D. May 17, 1879.

Godoy, de (MANUEL), duke of Alcudia, Albufera, and Soto-Roma, and Prince of the Peace, b. at Badajoz, Sp., May 12, 1767, of a noble but reduced family; entered the body-guard at Madrid; became major and adjutant-gen. and knight grand cross of Charles III. 1792. His beauty had by this time won him the favor of the queen and her ladies, and with the former he lived in most intimate relations under the very eyes of the king, who nevertheless loaded him with honors. In 1795 he was made a grandee of the first rank. His treaty of Bâle (1796) won him the title Prince of the Peace. In 1797 he married Maria Theresa, the king's niece, although he was already secretly married to another wife. In 1798 he was declared grand major-domo, and in 1799 grand admiral. In 1801 he reassumed the power which in 1798 the popular will had forced him to abdicate, and soon after, by the treaty of Badajoz, he agreed to divide Port. between Fr. and Sp., for which service he received a large sum from Fr. In 1804 he was declared generalissimo. He assisted Nap. in gaining possession of Sp., and Nap. in turn released him (1808) from the prison into which the nobles and people had thrown him. D. Oct. 4, 1851.

God Save the King! (*Domine salvum fac Regem*), a formula repeated upon occasions of solemnity and appended to state proclamations in G. Brit. The same words give name to a well known Brit. national air, the authorship of which was long ascribed to Dr. John Bull (1563-1622), but it is generally conceded that his "God save great James, our king!" was not the national anthem of the present day. The authorship of both words and music of this piece, nearly as it now stands, is now generally assigned to Henry Cary, who d. in 1743. The expression "God save the king" occurs several times in the historical books of the O. T.

God'win (MARY Wollstonecraft), b. at Beverley, Yorkshire, Eng., Apr. 27, 1759; started in 1783 a day-school at Islington, near Lond., on a more rational system of education than that then accepted; was subsequently governess to Lord Kingsborough's daughters, and pub. the famous *Vindication of the Rights of Woman* (1791), a presentation of the woman-suffrage ideas. From 1792 to 1795 she resided in Paris, where Gilbert Inlay, an Amer. author and merchant, espoused her according to the requirements of Fr. and Amer. law, but after the birth of a child left her in great distress. The marriage being invalid according to Eng. law, she married in 1797, in Lond., William Godwin, the novelist and political writer. D. Sept. 10, 1797.

Godwin (PARKER), b. at Paterson, N. J., Feb. 25, 1816, grad. at Princeton, N. J., 1834; was called to the bar in Ky. Since 1837 he has been for a great part of the time connected with the New York *Evening Post*, of which his father-in-law, Wm. C. Bryant, was so long the ed.-in-chief. Of the *Post*, Mr. G. was at first a contributor, and then managing ed.; was one of the eds. of *Putnam's Magazine*. Under Mr. Polk he was deputy collector in the New York custom-house; was an early member of the Rep. party, but always an advocate of free trade. Wrote *Popular View of the Doctrines of Fourier*; *Democracy, Pacific and Constructive*; *Hist. of Fr.*; *Vala*, a romance, etc.

Godwin (WILLIAM), b. at Wisbeach, Cambridgeshire, Eng., Mar. 3, 1756, was a dissenting minister at Stowmarket 1778-83, when his new religious and political views led him to leave his profession. His *Sketches of Hist.* was a pecuniary failure, but his *Political Justice*, with its eloquent language and its generous theory of universal benevolence, attracted wide attention, and was widely approved. The same doctrines are set forth in *Caleb Williams*, a novel, his most powerful work. In 1797 he married Mary Wollstonecraft, whose memoirs he pub. in 1798. His posthumous *Genius of Christianity Unveiled* and *Autobiography*, etc. have recently somewhat revived the public interest in him and his works. D. Apr. 7, 1836.

God'wit, a popular name for various wading birds of the genus *Limosa*, having long bills, like those of snipes. The great marbled G. and Hudsonian G. (*L. fedoa* and *hæmastica*) are N. Amer. species.

Goe'ben, von (AUGUST), Prus. gen. of inf., b. at Stade, Hanover, Dec. 10, 1816. Of an adventurous spirit, he went to Sp., where he took service with the Carlists. But he was wounded several times, taken prisoner, and treated so ill that his health suffered thereby. After the end of the Carlist war he returned to Ger., wrote a book on his Sp. experiences, and re-entered the Prus. army. He took part in 1849 in the campaign against the revolution in Baden; was attached to the staff of the prince of Prus., the present emp., and became in 1855 chief of the staff of the 6th army corps. In 1860 he was ordered to follow the army of the Sp. gen. O'Donnell in order to observe the campaign in Morocco, on which he pub. a work. In 1864 he took part in the war against Den. At the head of the 13th division he entered Hanover in 1866 and fought with distinction. In the Franco-Ger. war of 1870-71 he played an important part in the battles of Saarbrücken and Metz; became commander of army of the N. (Jan. 1871), and defeated Gen. Faidherbe in decisive battle of St. Quentin, Jan. 19.

Goess'mann (CHARLES ANTHONY), PH. D., b. at Naumburg, Hesse-Cassel, Ger., June 13, 1827, ed. at Fritzlar and Göttingen, where he grad. in 1852; came to the U. S. in 1858; in 1867 became prof. of chem. in the Mass. Agricultural Coll. at Amherst, and in 1873 was appointed chemist to the State board of agriculture. Author of numerous and valuable papers upon chemical subjects, among which his 9 articles upon salt and the chem. of natural brines, those upon sugar and the sugar manufacture, and his reports upon commercial fertilizers, have special interest.

Goethe, geh'ta, von (JOHANN WOLFGANG), was b. Aug. 28, 1749, at Frankfurt-on-the-Main, of a rich and highly respected family, and enjoyed a careful and very varied education. The father was a peremptory and somewhat pedantic character, proud of his family connections and personal acquirements; he held no office, but had an imperial title. The mother was a bright and quick-witted woman, with very decided opinions and vivid sympathies; she stood greatly in awe of her husband, and Wolfgang and she formed a little group of their own within the family. Under the father's superintendence the boy was taught drawing, music, gram., rhetoric, foreign langs.—Lat., It., Fr., Heb.,—and nat. hist.; from the mother he learned to judge characters as they presented themselves in social intercourse, to understand life as it appeared in the streets, and to make small excursions into Fairyland. During one period of the war Frankfurt was occupied by Fr. troops, and young G. learned to speak Fr., to look at pictures, and to feel the strange charm of theatrical representations. In 1768, in the 19th yr. of his age, he went to the Univ. of Leipzig, where he made the acquaintance of Gottsched and Gellert; in 1770 he moved to Strasburg, where he formed intimate friendships with Herder, Jung Stilling, and Lenz. After taking his degree in law at the latter univ., he returned in 1771 to Frankfurt and began to write lyrical poems and minor critical essays for periodicals, incited to do so by his intercourse with Merck. While in Leipzig he had written 2 dramas, *Die Lärne des Verliebten* and *Die Mischuldigen*, which were pub. then, but anonymously and without any effect. In the spring of 1772 he received a position at the imperial chancellery at Wetzlar, but returned home in the fall utterly disgusted with diplomatic affairs, and determined to concentrate himself on some poetical subject. Everybody expected that something great would come from him, and yet everybody was surprised when in 1773 he pub. his drama, *Götz von Berlichingen*, and in the following yr. his famous novel, *Werthers Leiden*.

In 1775 the duke of Saxe-Weimar, Charles Augustus, invited G. to take up his abode at his court. After some hesi-

tation the invitation was accepted, and from 1776 Weimar became his residence. A warm and noble friendship sprang up between the duke and the poet; and as G. possessed much practical administrative talent and great business tact, he occupied at different times many different positions in the ducal govt.: at last that of a minister of state, which he held from 1815 to the death of the duke in 1828, when he resigned all his offices and retired into private life. A house was built for him, small enough according to the ideas of our times, but magnificent for those days, and containing an excellent library, a fine collection of scientific instruments, and many precious objects of art. During the first 2 yrs. of his residence in Weimar the court-life seems to have occupied his whole time, but by degrees he began to take part in practical business and to engage in severe scientific studies of bot., comparative anat., mineralogy, and optics. Great men, such as Wieland, Herder, Fichte, Schelling, and Schlegel, gathered around the court of Weimar, and made it a *Ger. Athens*. And in spite of all its easy grace and its somewhat Epicurean aspect, G.'s life during this period contains both efforts and results. With respect to poetry, the results were small enough. For the 12 yrs. after the publication of *Werthers Leiden* nothing but *Stella* (1776), *Clavigo* (1778), and some other still less important works were produced. But much was prepared, and after his journey to It. (from 1786 to 1788) masterpiece followed after masterpiece in rapid succession: *Equano* (1785), *Iphigenia* (1786), *Römische Elegien* (1788), *Tasso* (1790), *Faust I.* (1790), *Wilhelm Meister* and *Hermann und Dorothea* (1796). The variety of these works is not more astonishing than their perfection. In 1794 the intimate and noble friendship began between G. and Schiller which lasted to the death of the latter. After the death of Schiller, on the day of the battle of Jena (Oct. 19, 1806), he married Christiane Vulpius, by whom he previously had a son.

The most remarkable of G.'s poetical productions during the last period of his life are: *Die Wahlverwandtschaften*, a romance; *West-östlicher Divan*, a collection of lyrical poems; *Faust II.*, and the exceedingly interesting autobiography, *Aus meinem Leben*, which he calls a blending of facts and fiction. Most of his time, however, was given to practical business and scientific researches. He d. in Weimar Mar. 22, 1832, and lies interred in the ducal burial-vault beside the duke, Charles Augustus, his friend through many yrs. The best biography of him is that by G. H. Lewes; the fullest impression of his personal character is given by the numerous collections of his correspondence with Schiller, Mme. von Stein, Lavater, Herder, Merck, Humboldt, and others.

CLEMENS PETERSEN.

Goet'tling (KARL WILHELM), b. at Jena in 1798; was appointed in 1832 prof. in the Univ. of Jena; became also univ. librarian, and later associate director of the Philological Sem. He wrote *Das Geschichtliche in Nibelungenliede* ("The Historical in the Nibelungenlied"), *Nibelungen u. Ghibellinen. Lehre von Griech. Accent, Geschichte der römischen Staatsverfassung* ("Hist. of the Rom. Const. from the Founding of the City to Cæsar's Death"), edited *Theodosii grammatica. Aristotelis Politica, Economica, Hesiodi Carmina*; pub. *Gesammelte Abhandlungen aus dem Classischen Alterthum*. His *Opuscula Academica* were collected and edited by Kuno Fischer after his death, which took place Jan. 20, 1869.

Goffe, *gof* (WILLIAM), b. in Eng. about 1605; was a devout Puritan and an able maj.-gen. in Cromwell's army, and with Whalley, his father-in-law, came to Boston, Mass., in 1660. Having been among the regicide judges, they were not included in the gen. amnesty at Charles II.'s restoration. From 1661 to 1664, while concealed near New Haven, Conn., they were several times in great danger of capture. In 1664 they went to Hadley, Mass., where, with Dixwell, another regicide, they long resided in the family of Rev. Mr. Russell. The narrative of G.'s taking command of the men of Hadley and repulsing the Indians in 1675 is now regarded as incorrect. D. 1679.

Gog and **Ma'gog** [of doubtful etymology, perhaps indicating something great or gigantic; in Arabic, *Yajuj and Majuj*]. In the Mosaic Table of Nations (Gen. x. 2), M. is the second of the 7 sons of Japhet, representing a people, probably the Scythians. In Ezek. (xxxviii. 2 and xxxix. 1) G. is the prince of the people M. In Rev. (xx. 8) both G. and M. are peoples, opposing, as in Ezek., the people of God, and doomed to destruction.—Gog and Magog are also 2 images of giants standing in the Guildhall, Lond. The present giants were made in 1708 by Richard Saunders, the old ones having been burned in the Great Fire. They are mentioned as early as 1415, and are probably much older. Many European towns have, or have had, their old corporation giants. The origin of the custom is obscure.

Goi'tre (*gutter*, the "throat"); synonyms, **Bronchocele**, **Derbyshire Neck**. This is an enlargement of the thyroid gland, which lies across the front of the windpipe. The disease has been supposed to be due to the drinking of snow-water, but it occurs where there is no snow. Although manifesting itself to a greater or less extent in all parts of the world, it is more prevalent in the chalky parts of Eng., especially Derbyshire and Nottingham, and in mountainous dists., among which may be named the Himalayas, Andes, Alps, the Tyrol, and the valley of the Rhone. It is seen upon almost all cretins. The treatment usually adopted is iodine, both applied externally and administered internally, to cause absorption. Extirpation is sometimes performed. In India powerful mercurial inunctions are successfully employed.

Goleon'da, town of Hindostan, in the dominion of the Nizam. It is famous for its diamonds, which, however, are only cut and polished here; but it was the treasury of the Nizam, and as such fortified and jealously guarded. In its neighborhood are the mausolea of its former sovereigns, stupendous buildings of granite, with roofs of porcelain tiles of the most brilliant blue color.

Gold, one of the heaviest, softest, and the most malleable of metals, is widely distributed, being found in the metallic state in nearly all of the great mt.-chains of the globe, and

in solution in minute quantity in sea-water. It is rarely found pure, being alloyed with silver in varying quantities in different regions. The silver ranges from 0.16 to 16 per cent. of the native metal. The ratio of the quantity of G. to the other metals, called the *fineness*, is usually expressed in "thousandths" or "carats." Pure G. is 1000 fine; half G. and half silver would be 500 fine. U. S. G. coin is 900 fine. Pure G. is said to be 24 carats fine. When there are equal parts of G. and of other metals the mixture is said to be 12 carats fine. Six parts of alloy give 18-carat G., and so on. Common G. jewelry is often 14 carats fine, but the superior qualities are 18 carats. In G. Brit. bullion accounts are rendered in carats, carat grains, and eighths or thirty-seconds of a carat, the carat being divided into 32 equal parts. One carat is equivalent to 41 $\frac{1}{2}$ thousandths. The U. S. standard G., 900 fine, is equivalent to 21.6 carats. The Brit. standard is 22 carats, equivalent to 916 $\frac{2}{3}$ thousandths. The specific gravity of native G. and of artificial alloys of the metal varies with the fineness. Native G. ranges from 15 to 19. When quite pure, and after pressure in a die, the gravity is 19.34. One cubic inch of pure G. weighs 10.12883 ounces troy, and is worth \$309.38. Its extreme malleability is best shown by the thinness of G.-leaf as used in gilding. One ounce of G. may be beaten out so as to cover 160 square ft. of surface, but the leaves are seldom made so thin, 100 square ft. to the ounce troy being the usual extent. The average thickness of common leaf is $\frac{1}{200,000}$ th of an inch; thus 282,000 sheets would be required to make a pile 1 inch in height.

The value of G. rests in great part upon its unalterability by any ordinary agencies. It cannot be easily rusted or dissolved, nor does it tarnish by exposure to the weather or to foul gases for ages. The proper solvent of G. is chlorine, and fluids containing free chlorine or evolving chlorine will dissolve it. The mixture of the 2 acids, nitric and hydrochloric, known as *aqua regia*, is commonly employed. Selenic acid acts upon it. In solidifying from fusion it contracts greatly. The presence of $\frac{1}{200,000}$ th part of lead, bismuth, or antimony destroys the ductility of G. It is also made brittle by sudden cooling. Its tenacity is next to that of silver. Atomic weight, 196.71.

G. occurs in formations of nearly all geological periods, from the earliest rocks to the latest Tertiary. It is chiefly, however, in the uplifted and partially altered slates and shales of the Middle Secondary and the Palæozoic periods that the great deposits occur. Quartz is the almost universal veinstone, but the metal is sometimes found penetrating seams of calc spar or dolomite in hornblende slates without much quartz. Very large irregular masses are sometimes taken from veins, but they are more common in placer-deposits, and are generally known as *nuggets*.

The value of G. relatively to silver has varied in time and in locality. In 1546 in Eng., and all countries where values have been more or less equalized by commerce, the ratio was as 10 to 1; in 1849, as 15.63 to 1; in 1874, as 15 to 1; but it is constantly changing, having increased in 1875 to nearly 16 to 1, from various causes. Enormous quantities of G. are consumed annually in the arts and are lost by wear of coin and jewelry. The consumption for gilding is very large, for although the films are exceedingly thin, they are spread upon a variety of manufactures. The greater part of the G. of the world is obtained by washing from detrital deposits in and along the beds of rivers. A smaller quantity is obtained from veins by crushing and washing the quartz. [From *orig. art. in J. Sci. Univ. Cyc.*, by PROF. W. P. BLAKE.]

Gold-Beating. The thin leaves of gold used in gilding and by dentists in filling teeth are prepared by beating thin sheets of the metal placed between the leaves of what is technically called a "book." The gold is cast in an ingot usually of about 1000 grains weight, and rolled to a ribbon a little more than $\frac{1}{16}$ inches wide, and so thin that about 700 would go to the inch. In this form it is delivered to the beater, who receives 50 pennyweights, which he cuts up, after annealing, into squares a little more than an inch wide. These are placed in a book called the "kutch."

Kutch is a kind of parchment-paper possessing great toughness combined with evenness of surface. The kutch is about $\frac{3}{4}$ inches square. One ribbon of 50 pennyweights weight makes about 170 squares, the number depending upon the thickness of the leaf which is to be made from it.

It is then placed on a solid stone anvil, and the workman beats it with a 16-pound round hammer, the blows being given in a regular manner. Every 3 minutes the book is taken out of its covers and "rified." Rifting consists in shaking up the leaves, so as to loosen the whole and prevent the gold from clinging to the parchment. The kutch is beaten about half an hour, and is then "skewed." This consists in taking out the gold, and lasts another half hour. The leaves are then cut into quarters and laid in a "shodar," a book made up of leaves prepared from the cæcum of the ox. It is then cut into leaves 5 inches square, and made up into moulds of 900 leaves. The cæca of nearly 600 oxen are required to form one mould, which is of course very expensive. The filling of the shodar requires 1 hour, and it is then beaten 2 hours with a lighter hammer, say 7 lbs. in weight.

The leaves of gold are then cut into quarters and transferred to the "mould," which is made of new membranes. The leaves have now only $\frac{1}{16}$ th the thickness of the ribbon, are partially transparent, and very fragile. The filling of the mould occupies 2 hours, and it is then beaten 1 hour with a 5-lb. hammer, after which it is annealed in a small screw-press of iron which is heated on a fire. After its removal from the fire the mould is placed between 2 plates, shoved into the hot press. The least excess of temperature will ruin the delicate membranes of the mould, and this is the most hazardous part of the beater's work, for the mould is far more costly than the gold it contains.

Beating, annealing, and cooling are performed 4 times. The whole operation of reducing 50 pennyweights of gold to leaf occupies 24–30 hours, average \$7, or nearly 3 working days. After the last beating the gold is taken from the

mould by girls and placed in books of tissue-paper, the leaves of which are rubbed with red ochre to keep the gold from sticking; and as the book contains 264 square inches of leaf, 1 grain of gold has been beaten out to a surface of 52 square inches.

Though G.-B. as an art remains almost as simple as it was centuries ago, the modern use of gold by dentists has given rise to a number of patented articles which are prepared by gold-beaters. Dentists' gold is known by the name of "foil," which is heavier than the leaf. Machines have been invented to take the gold-beater's place, but they have not come into use. [From orig. art. in *J's Univ. Cyc.*, by PROF. JOHN A. CHURCH, E. M.]

Gold Coast, a part of Upper Guinea, W. Afr. It receives its name from the gold sand which is found often in considerable quantities. The Brit. have a colony known as the G. C. Settlements, of which Cape Coast Castle is the cap. In 1872 Elmina and Dut. Guinea on the same coast were also transferred to the Brit. crown, the Dan. forts having been ceded in 1850. The area of the whole is said to be 16,626 sq. m., and the pop. 408,070, mostly uncivilized natives.

Gold-Crested Wren, a name given in G. Brit. to the *Regulus vulgaris*, and in the U. S. to the *R. satrapa*, very small green-colored birds with yellow feathers upon their crowns.

Golden, R. centre, cap. of Jefferson co., Col., 16 m. W. of Denver; has a coll. and a State school of mines. Pop. 1880, 2730.

Golden Age, in the traditions of many nations, the supposed period of primeval happiness and innocence, from which mankind have departed. The anc. referred this time to the reign of Saturn. The G. A. of Rom. lit. is reckoned from the time of Livius Andronicus, about 250 B. C., to the time of Augustus Caesar's death, A. D. 14.

Golden calf, a golden image of a bullock formed for idolatrous worship by the Israelites at Mt. Sinai. It was of cast metal, and was destroyed by Moses, but in later times G. C. were set up by King Jeroboam at Bethel and Dan, where they became favorite objects of popular worship.

Golden Eagle, the *Aquila chrysaetos* of Europe and Asia, and the *A. canadensis* of N. Amer., now regarded as forms of the same species. (See *Eagle*.)

Golden Eye, the *Clangula glaucum*, a wild duck of Europe and N. Amer. The male has the head dark green, with a round white spot in front of the eye.

Golden Fleece, in Gr. mythology, the golden wool produced by the ram Chrysomallus. The fleece was suspended in an oak tree in the grove of Ares in Colchis, and was guarded by a dragon. When the Argonauts came to Colchis for the fleece, Medea put the dragon to sleep, and Jason carried the fleece away. This legend probably arose from accounts of the commercial enterprises of the early Grs. on the coasts of the Black Sea.

Golden Fleece (*Toison d'Or*). **Order of the**, an order of knighthood, reckoned, next to that of the Garter, the most illustrious in Europe. It was founded in 1429 by Philip III. of Burgundy. Charles VI., emp. of Ger., as possessor of the Netherlands, transferred the seat of the order to Vienna, as the Sp. monarchs had already done to Madrid. Thus arose 2 branches, a Sp. and an Aus. Neither order recognizes the other's existence.

Golden Horde, a band of Tartars who in 1240 invaded Rus. and burned Moscow and Kiev, destroyed Lublin and Cracow 1240, burned Breslau in 1241, and defeated Henry, duke of Silesia, at Liegnitz; ravaged Moravia and Hungary, and massacred the Magyar army 1241. Their siege of Neustadt was unsuccessful; they crossed to the S. of the Danube 1242, marched E. in 1243, made Rus. tributary 1243-1477, made Alexander Newski grand duke in 1252, were attacked by Timour in 1392, and were overthrown by Ivan III. and the Nogay Tartars 1481. Their first leader, Batou, was a grandson of Genghis Khan.

Golden Number, the number of the yr. in the Metonic cycle, otherwise called the lunar cycle. (See *Cycle*.) As the times of holding the Gr. games were dependent on the state of the moon, this number was of prominent importance in the Gr. calendar, and hence is said by some to have been inscribed in characters of gold on the columns of the temple of Minerva at Athens; whence its name. Others say that it is thus called because it was written in gold in the calendar tables publicly suspended in the Gr. cities; and later in the portable calendars in use among the early Chrs. At present the G. N. is only useful in finding the day upon which Easter (and consequently the other movable feasts of the Ch.) will fall.

Golden Rod, a popular name originally belonging to the *Solidago Virga aurea* of N. Amer. and Europe. The name is in this country extended to numerous herbs of the same genus (order Composite), which are mostly tall, stiff annuals with yellow flowers. One species, the *S. odora*, is often fragrant. It has a limited use in med.

Golden Rose, a rose made of gold and set with precious stones which is blessed by the pope annually on the 4th Sunday in Lent, and then presented to some prince or other dignitary. The Golden Rose seems to refer to Christ, the "Rose of Sharon."

Gold Eye, a name of N. Amer. fresh-water fishes of the family Hyodontidae.

Goldfinch, the *Carduelis elegans*, a European song-bird, yellow, white, black, and red. The *Astragalinus tristis*, Amer. G. or yellow-bird, has more yellow in its plumage.

Goldfinny, or **Goldsinny**, *Cremilabrus cornubitus*, *Norvegicus*, etc., small European fishes of family Labridæ.

Gold-Fish, *Carassius auratus*, a Chi. fish, now naturalized in many streams and lakes of Europe and the U. S. Its orange color is the result of domestication.

Gold Hill, on R. R., Storey co., Nev., 328 m. by rail from San Francisco, Cal., and 1 m. S. of Virginia City, at the head of Gold Cañon, a large ravine 8 m. in length emptying into Carson River. The famous Comstock Lode, passing through Virginia City along the E. slope of Mt. Davidson,

passes also through G. H. Beneath the town lie some of the richest mines known, including the Belcher and Crown Point, which have yielded \$2,000,000 in silver and gold bullion monthly. Within the limits of the town are about a dozen large quartz mills. It received its name from a small rocky hill at that point rich in gold, which was soon discovered to be merely a prominent portion of the surface croppings of the Comstock Lode. The mines have been worked to a depth of 1900 ft. Mining is the chief occupation. Pop. 1870, 4311; 1880, 4531.

Gold-Mines and Mining. Gold-mines may be grouped in 2 divisions: vein mines, and placer mines. Gold-bearing veins are generally of quartz, and they penetrate solid rocks to considerable depths. Placer mines are the comparatively superficial deposits formed by the action of rivers and floods upon the veins. In veins the gold is firmly fixed in the gangue or veinstone, in irregular masses or crystalline particles, but in placers the gold is detached from the gangue, and is worn and rounded by attrition until all the asperities have been removed. The gold so broken out from veins, owing to its high specific gravity, gradually finds its way down to the lowest layers of gravel, and accumulates upon the surface of the underlying rock; while in veins the gold is distributed through a layer of quartz traversing the rocks in a vertical or nearly vertical plane to great depths.

Gold-bearing veins are found in rocks of various ages and kinds, varying in width from a few inches or less to several ft. There is a remarkable uniformity in the characteristics of gold-bearing veins all over the world, the veinstone being, however, much harder in some veins than in others. Many quartz veins exist even in gold regions without gold having been found in them; and in those known to be gold-bearing there are extensive portions without gold. Each vein has some distinctive peculiarity, which only becomes known to those who work it after long experience and observation. The extraction of gold from the quartz veinstone is in the main a mechanical operation, which consists in crushing the quartz to a fine powder, and in washing away the quartz with water, leaving the gold behind. Quicksilver is used to aid in arresting the fine particles of gold by uniting them in an amalgam, from which the quicksilver is afterward expelled by heating it in an iron retort.

In placer gold-washing, as in collecting the gold from crushed quartz, the separation from earthy substances is effected by a current of water flowing over inclined surfaces. The materials presenting the greatest surface and having the least gravity are swept forward most rapidly, while the heavier and smaller objects are left behind at or near the upper part of the incline. The great bulk of the gold of Cal. and Australia is now obtained from the deep placers worked by associated capital on a stupendous scale. In some cases the pay-gravel on the bed-rock is removed by mining, but the most economical method of excavation, when water can be had under pressure, is what is known as "hydraulic mining." Water is conveyed in ditches for many miles to the hills above the deposits, and is carried down in iron pipes and delivered in large streams, under a pressure of from 100 to 300 or even 500 ft. of height of column against the base of the gravel deposit to be washed. The operation of hydraulic washing is a continuous one, and requires very little manual labor compared with the amount of material disintegrated and moved. The washing continues for months, and no gold is seen until the cleaning-up, which in one of the large sluices is an operation of considerable magnitude. Some of the bed-rock tunnels are thousands of ft. in length, and require several yrs. for their completion. [From orig. art. in *J's Univ. Cyc.*, by PROF. W. P. BLAKE.]

Goldoni (CARLO), father of the modern It. comedy, b. at Venice in 1707. He had even commenced practising as a lawyer in his native city when the success of a play he wrote induced him to become a play-writer. In 1761 he went to Paris: was appointed teacher in the It. lang. to the 3 daughters of Louis XV., receiving a pension of 4000 francs yearly. He d. Feb. 6, 1793. He wrote about 200 comedies, of which a few are written in Fr.; the rest are written in It. The liveliness, gracefulness, and wit of his dialogue are still appreciated by his countrymen. From his time the *commedia dell'arte* disappeared from the stage, and as his observation of human character, such as reveals itself in everyday life, was as lively as his power of representing it in dialogues was charming, the transformation from the *commedia dell'arte* to the present form of modern comedy was happily achieved.

CLEMENS PETERSEN.

Gold-purple, the precipitate of Cassius, is used chiefly for giving a pink or violet color to glass and enamels. It is formed by adding a dilute mixture of protochloride and perchloride of tin, drop by drop, to a dilute neutral solution of terchloride of gold; a purple precipitate is formed.

Goldsboro', city and R. R. junc., cap. of Wayne co., N. C., 142 m. S. of Petersburg, Va. It has a female coll. Pop. 1870, 1134; 1880, 3286.

Goldsborough (LOUIS M.), b. Feb. 18, 1805, in Wash., D. C.; entered the navy as a mdpn. June 18, 1821, became a rear-admiral in 1862, retired in 1873. In 1827, while serving in the Mediterranean on board the schooner Porpoise, Lieut. G. was given the command of the boats of that vessel with orders to rescue an Eng. brig called the Comet, captured by Gr. pirates at night in the Doro Passage, while one of a convoy in charge of the Porpoise. The pirates numbered 200, while G.'s little band, all told, did not exceed 40; yet, notwithstanding this disparity of force, the Comet was boarded without hesitation, many of the pirates slain and the rest forced to take to their boats, and the Eng. restored to liberty. In Sept. 1861 he was given the command of the N. Atlantic blockading squadron; he then proposed a joint army and navy expedition for the capture of Roanoke Island; the "Burnside expedition" (as it was popularly styled) was soon in possession of not only Roanoke Island and the sounds, but of many important positions in N. C.

G. was now made a full rear-admiral, and received the thanks of Cong., and at the close of the c. war was complimented by the navy dept. with the command of the European squadron. D. Feb. 30, 1877.

Goldschmidt (HERMANN), b. of Jewish stock at Frankfurt, Ger., June 17, 1802; studied painting under Cornelius, and practised that art with some success at Paris 1836-47; then devoted himself to astron., and discovered (1852-61) 14 asteroids. He also detected thousands of stars, and announced the discovery of several new companion stars revolving around Sirius. D. Sept. 11, 1866.

Goldschmidt (JENNY), see LIND (JENNY).
Goldschmidt (JENNY AARON), an eminent Dan. novelist, b. at Vordingborg, Seeland, in 1819; studied at the Univ. of Copenhagen. In 1840 he founded a weekly journal, *The Corsair*. In 1848 he founded another weekly paper, *North and South*, which was well patronized on account of the criticism which it exercised both in the literary and the social and political fields. But it was as a novelist that G. became dear to his countrymen. Some of his novels are well known to Eng. readers—*A Jew*, *The Homeless One*, *The Bear*, and *The Raven*.

Goldsmith (OLIVER), b. at Pallas, co. Longford, Ire., Nov. 10, 1728, the son of a poor Anglican minister; grad. A. B. at Trinity Coll., Dublin, after 5 yrs. as a sizar, during which he was subject to most humiliating indignities, partly the result of his own improvidence. A rejected applicant for holy orders, he tried the study of law, but having wasted his scanty means in gaming, he spent 18 months as a med. student in Edinburgh, out of which town he was hunted by creditors; lived abroad 1754-56, chiefly at Leyden, and afterward wandered over a large part of Fr., Ger., and It., supporting himself by his musical talents and by the gratuities given by the univs. to wandering students. In 1756 he went to Lond., where, after some yrs. of hard experience as practitioner of med., he became a proof-reader for the novelist Richardson. The admirable *Citizen of the World* won him the friendship of Johnson and a membership in his Literary Club. *The Traveller* established his place as a poet. *The Vicar of Wakefield*, his only novel, is one of the choicest treasures of lit., followed by *The Deserted Village*, his best poem, and *She Stoops to Conquer*, his best comedy. The highest and emptiest of the honors received by G. was the professorship of anc. hist. in the Royal Acad., which brought him no pay. For style, his writings take place in the first rank, and their gentle humor wins the heart of every reader. D. Apr. 4, 1774.

Goldthwaite (GEORGE), b. at Boston, Mass., Dec. 10, 1809; removed to Ala. at an early age, and became a lawyer; was judge of circuit court and supreme court, and of the latter chief-justice; adjutant-gen. of Ala. during c. war; elected to U. S. Senate Dec. 7, 1870. D. Mar. 16, 1879.

Goldthwaite (HENRY), b. in Boston, Mass., was liberally ed., and became a law-partner of Gov. Fitzpatrick at Montgomery, Ala., a journalist, and a State legislator; became soon after the leader of the Mobile bar. He was for some 8 yrs. a judge of the supreme court of Ala. D. 1847.

Gol'fo Dul'ce, a lake of Central Amer., in Costa Rica, is 25 m. long, 10 m. broad, and communicates with the Gulf of Honduras by a small stream. The entrance into the river is impeded by sand-bars, but the river itself and the lake are deep.

Golovin, or **Golownin** (VASILI OF BASIL), b. in the Riazan govt., Rus., 1776; was sent in 1807 to survey the shores of Asiatic and Amer. Rus. in command of the Diana sloop of war; was engaged in this work until 1811, when, having been driven by lack of food and water to land upon the Japanese island of Kunashir, he was seized and imprisoned (1811-13), but finally set at liberty. He afterward led an exploring expedition around the world (1817-19). His *Observations upon Japan and Memoirs of a Captivity in Japan* have been translated into most modern langs., and were long the most valuable sources of knowledge regarding that country. D. 1832.

Go'marists, or **Contra-Remonstrants**, the followers of Francis Gomar (1563-1641), a former ultra-Calvinistic party in the Dut. national Ch., distinguished by their opposition to the Remonstrants or Arminian party.

Gomm (Field-Marshal Sir WILLIAM MAYNARD), b. about 1782, entered the Eng. army as ensign in 1794; served in Hol. in 1799; in the Peninsula; at the battle of Waterloo was quartermaster-gen. of a division. In 1842 he was appointed gov. and commander-in-chief of Mauritius, which post he held till 1851, when he succeeded Sir Charles Napier as commander-in-chief of India. In 1868 he was created a field-marshal. He held the colonelcy of the Coldstream Guards, and in 1872 he succeeded Field-Marshal Sir G. Pollock as constable of the Tower of Lond., a post of honor reserved for distinguished veteran soldiers. D. Mar. 15, 1875.

Gomu'ti Palm, the *Saguerus saccarifer*, a valuable palm tree of Anam and the Malay Islands. It produces sago, palm wine, palm cabbage, sugar, *baru* (a substance used in calking ships), and a large amount of coir, more durable than that of the cocoa-nut, but less flexible.

Gon'dar (properly *Guendar*), city of Abyssinia, situated on the ridge and slope of a S. spur of the Wogara Mts., at an elevation of about 7000 ft. above the sea and 1200 ft. above Lake Tsana. In the beginning of the 17th century G. was made the cap. It consists of several extensive quarters, separated from each other by barren commons and mounds of rubbish, but at a distance it presents an imposing and wonderful aspect, with its groups of trees, its chs., with their high conical roofs, and its royal palace, built, according to the Port. taste of the Middle Ages, with high walls, pinnacles, and towers, among miserable huts thatched with straw. Limpid mt.-streams flow down the slopes. The streets are narrow and crooked, partly paved with basalt, partly covered with dirt. The finer dwellings are low circular houses of 2 stories, built of unhewn stones, cemented with lime. The widely projecting, conical roof rests on a

wooden framework, and consists of thatch covered with a thick layer of long grass. The lower story is not inhabited, but serves as store-room; the upper story is entered by a flight of stairs on the outside. Except the bed, some drinking-horns, and wooden pegs on which to hang arms and saddles, no furniture is found in the interior. Leopards, hyenas, foxes, genets, and ichneumons appear not unfrequently in the city. At some distance several other interesting buildings are situated, as, for instance, the ch. Fasildas, a small temple with a cupola and a frieze, erected in the midst of a beautiful park, and a Port. ch. G. contains 44 chs. with 1200 ecclesiastics. Pop. about 7000.

Gonds [Gônd], a non-Aryan or Dravidian race of Central India, whose name is seen in Gundwana, the prin. dist. where they dwell. They are small, strong, hardy, and brave, totally distinct from the Hindoos in lang., religion, and habits. The name appears to be identical with that of the Khonds, a Dravidian people of Orissa.

Goniometer [from the Gr. *gonia*, an "angle," and *metron*, a "measure"] was originally the instrument for measuring angles. Its use is now almost restricted to instruments used in measuring the angles of crystals. G. are divided into 2 classes—G. of application and G. of reflection.

Gonorrhœa (Gr. *gonn*, "semen," and *rhoi*, to "flow," a misonomer), acute catarrh of the urethra, a disease which is usually of impure venereal origin. It is a painful disease, and may result in the chronic catarrh called *gleet*, or may lead to stricture, epididymitis, enlarged prostate, and other serious evils. The most efficacious remedies are copaiba, cubebæ, and sandalwood internally, and local injections of bismuth, sugar of lead, and sulphate of zinc in weak solution. (See STRICTURE.)

Gonsalvo de Córdova (Gonzalo Hernandez de Córdova y Aguilar), duke of St. Angelo and of Sessa, "the Great Captain," b. at Montilla, Sp., Mar. 16, 1453; became one of the brightest ornaments of the court of Ferdinand and Isabella; was distinguished in the Port. war of 1479 and the Moorish war in 1481-92; took command in It. 1495, drove the Fr. from Naples 1496, suppressed the Moorish rebellion 1500, commanded with success against the Turks 1500-01; was made lieut.-gen. of Calabria and Apulia 1501, served against the Fr. in It. 1502-07; was besieged by Bayard and the duke de Nemours at Barletta 1502-03, but destroyed the Fr. army in a great battle (Apr. 28, 1503); won the great victories on the Garigliano (Nov. 6, Dec. 28-29, 1503), soon after which Gaeta fell and the Fr. gave up their claim upon Naples. He was viceroy in It. until 1507; retired to his estates at Loxa, and lived in great state, venerated by the people but hated by the king, who was jealous of his fame. D. Dec. 2, 1515.

Gonza'ga, a famous It. family, to which belonged the captaincy of Mantua 1328-1433, the marquise of Mantua 1433-1590, the dukedom of the same city 1590-1708, the duchy of Gualtalla 1599-1729, the duchy of Montferrat 1536-1707, and that of Nevers 1565-1659; other honors held at various periods by the heads or cadet lines of the house being the duchy of Solferino, the duchy of Retzel, the co. of Torelli, the duchy of Sabbionetta, the principality of Bozello, the marquise of Medola, etc. Many noted gens., statesmen, churchmen, and men of letters sprang from this stock.

Gonza'les, cap. of Gonzales co., Tex., on R. R. and the Guadalupe River, 70 m. S. by E. of Austin. It is the seat of Guadalupe Coll., and is one of the oldest towns in the State. Pop. 1870, 1255; 1880, 1581.

Good (JOHN MASON), M. D., b. at Epping, Eng., May 25, 1764; was apprenticed to a surgeon of Gosport; began surgical practice at Sudbury in 1784, in Lond. 1793; received the med. degree from Aberdeen 1820. Dr. G. was an able and successful practitioner and an accomplished linguist and literary critic. His chief professional works were *Diseases of Prisons*, etc., a *Hist. of Med.*, etc., *System of Nosology*, *The Study of Med.* D. Jan. 1827.

Goodale (GEORGE LINCOLN), M. D., b. Aug. 3, 1839, at Saco, Me., grad. at Amherst Coll. in 1860, and at the Harvard Med. School in 1863; practised med. in Portland, and was a lecturer on anat. until 1869, when he was appointed lecturer on materia medica in the med. school of Me. and prof. of natural sciences in Bowdoin Coll. He is now prof. of botany in Harvard Univ.

Goode (GEORGE BROWN). See APPENDIX.

Goodell (WILLIAM), D. D., b. at Templeton, Mass., Feb. 14, 1792, grad. at Dartmouth in 1817 and at Andover Sem. 1820; in 1822 went to Syria as a missionary, having (1822) been ordained to the Congl. ministry; labored 1823-31 at Beyroot, Syria, and 1831-55 at Constantinople; returned in 1855 to the U. S., worn out. His great work was the translation of the entire Bible into Armeno-Tur. D. Feb. 18, 1867.

Good Friday, the Friday before Easter Sunday, celebrated as a fast in commemoration of the passion and death of our Lord. It is preceded by Holy Thursday and followed by Holy Saturday.

Goodrich (CHARLES AUGUSTUS), brother of S. G. Goodrich, b. at Ridgefield, Conn., 1790, grad. at Yale 1812; pastor of the First Congl. ch., Worcester, Mass., 1816-20, and afterward was settled in Berlin and Hartford, Conn. Chiefly known by his books: *Hist. of the U. S.*, *Lessons of the Scriptures*, *Universal Traveller*, and *Family Encyc.* D. Jan. 4, 1862.

Goodrich (CHAUNCEY ALLEN), D. D., b. at New Haven, Conn., Oct. 23, 1790, grad. at Yale in 1810; pastor of a Congl. ch. at Middletown, Conn., 1816-17; prof. of rhetoric at Yale 1817-39; became in 1839 prof. of the pastoral charge in Yale Divinity School. Pub. a Gr. gram. and Lat. and Gr. lessons; was editor of the *Quarterly Spectator*, and largely engaged from 1828 till his death upon the dict. of Noah Webster, his father-in-law. D. Feb. 25, 1860.

Goodrich (ELIZUR), LL.D., father of C. A. Goodrich, b. at Durham, Conn., Mar. 24, 1761, grad. at Yale in 1779; was tutor there 2 yrs.; became a lawyer 1783; was M. C. 1799-1801; was long a judge in the co. and probate courts, mayor of New Haven, and law-prof. in Yale Coll. D. Nov. 1, 1849.

Goodrich (SAMUEL GRISWOLD), the famous "Peter Par-

ley," a brother of Dr. C. A. Goodrich, b. at Ridgefield, Conn., Aug. 19, 1793; became in 1824 a book-pub. of Hartford, Conn.; removed to Boston, Mass., and edited 1828-42 *The Token*, and 1841-54 *Merry's Museum*; wrote, edited, or compiled 170 vols., which are mostly histories, geographies, and tales, of which 116 bear the name of "Peter Parley," was consul in Paris under Mr. Fillmore. Author of *Recollections of a Lifetime, Fireside Education, Sketches from a Student's Window*. The most extensive and valuable of all his writings is *Johnson's Nat. Hist.*, pub. by A. J. Johnson & Co., New York, in 2 vols. 8vo, finely illustrated. D. May 9, 1860.

Goods and Chattels, a comprehensive phrase used in law to designate every variety of personal property as distinguished from real estate, which is also often referred to by the corresponding phrase, *lands and tenements*. The expression is, in fact, tautological, since the single word "chattels" would denote everything indicated by both terms; but it is generally employed in legal instruments in preference to either word by itself. (See CHATTEL; PERSONAL PROPERTY.)

Good-will, the advantage which a business establishment engaged in a particular kind of trade or existing in a particular locality possesses, on account of the natural tendency of former customers to continue their dealings there. The probability is that former customers will continue to seek an accustomed place to make their purchases, and to deal under methods with which they are familiar; and from this circumstance the value of the business there established may be much enhanced. The G. of a trade therefore constitutes a valuable right of property, intangible, it is true, and depending largely upon mere expectancy, but capable of having its worth determined, at least approximately, upon the theory of probabilities. It is consequently often made the subject of bargain and sale, its value being usually estimated at so many yrs.' purchase upon the amount of the profits of the business. Questions concerning G. frequently arise in relation to partnerships. In adjudicating upon the opposing rights and mutual claims of partners when one or more separate from the others, or a controversy arises as to their respective interests, courts of equity will generally take into consideration the value of the G. GEORGE CHASE.

Goodwin (DANIEL RAYNES), D. D., LL.D., b. at N. Berwick, Me., Apr. 12, 1811, grad. at Bowdoin Coll. 1832; entered the P. E. ministry; was prof. of modern langs. in Bowdoin Coll. 1835-53, pres. of Trinity Coll., Conn., 1853-60, provost of Univ. of Pa. 1860-68, and prof. of systematic divinity in Divinity School of P. E. Ch., Phila., 1865.

Goodwin (ICHABOD), b. in Berwick, Me., Oct. 10, 1796; a successful merchant and ship-owner in Portsmouth, N. H.; Rep. gov. of N. H. through 2 terms, covering the breaking out of the late c. war. D. July 4, 1882.

Goodwin Sands, a range of very dangerous sand-banks in the Strait of Dover, 10 m. long and 5½ m. distant from the coast. The light-houses of N. and S. Foreland and light-ships stationed on the shoals guide passing ships, yet fearful wrecks often occur here.

Good-year (CHARLES), b. at New Haven, Conn., Dec. 29, 1800, became a partner with his father, a hardware manufacturer of Phila. After the failure of his firm in 1830, he began to experiment on the employment of gum-elastic or caoutchouc in the arts. His nitric-acid process (1836) was in a great degree successful in fitting this material for the manufacture of shoes; about 1839 he perfected the idea of vulcanizing or ebonizing India-rubber by means of sulphur. Others have claimed priority in this discovery, and his associate, Nathaniel Hayward, certainly shares the honor of the invention. Many other improvements followed, so that over 60 U. S. patents bore the name of G. He received numerous medals and distinctions, including the cross of the Legion of Honor. D. July 1, 1860.

Goor-khas, the race who with the Newars occupy the dominant place in Nepal. They are Mongols by blood, small in stature, full of courage, but not physically strong. In religion they are Hindoos.

Goosander, called also **Dun Diver**, **Buff-breasted Sheldrake**, and **Saw-Bill**, the *Merqus merganser*, a bird of the family Anatida; and common to both continents. The bill is furnished with numerous tooth-like processes in both mandibles.

Goose, the common name for lamelli-rostral birds belonging to the sub-family Anserinae, characterized by their unlobed hallux, moderate neck, feathered lores, and bill tapering gradually toward the tip. The wild-G., or the gray lag (*Anser cinereus*), as it is called in Europe, is the original of our domestic G. The Canada G. (*Branta Canadensis*) is confined to Amer. Like the gray lag, it is known as the "wild-G."

Goose-Fish. See ANGLER.

Goose-berry [probably from *gorse*, *goss*, a prickly shrub, and *berry*], the common name of those shrubs and their fruit which belong to the section Grossularia of the genus *Ribes* (order Saxifragaceae), distinguished from the currants by the presence of thorns and bristly prickles on the stalk, and especially near the bases of the leaf-stalks. Some G. have also prickly fruit, which currants never have, though a few species of currants have hairy fruit. N. Amer. has a number of wild species. Of these, *R. niveum* is worthy of attention for its fruit. In G. Brit. great attention is paid to their culture, and some of the sorts bear fruit of great size and excellence.

Gopher [Fr. *gaufre*, "honey-comb"], applied originally by Fr. settlers to animals burrowing into and "honey-combing," as it were, the earth; now the vernacular designation of various species of burrowing rodent mammals, land-tortoises, and a snake in different portions of the U. S.

Go'ral, the *Nemorhedus Goral*, a large, goat-like antelope of the Himalayas. It is a favorite game animal, and its flesh is excellent.

Gordianus Africa-nus (M. ANTONIUS), the elder Gordian, a Rom. emp., a descendant of the Gracchi and Trajan, b. 158 A. D., was consul 213 and 231, proconsul in Afr. 232, and when 80 yrs. old was invested with the purple at Tisdrus,

without his consent, but in less than 2 months was compelled by the victories of Capellianus to commit suicide (238 A. D.). He was a man of venerable character.—His son, M. ANTONIUS GORDIANUS (b. 192), was declared Augustus jointly with his father, and fell in battle just before his father's death. He was a man of loose morality, but was a popular favorite and an able magistrate.

Gordianus (M. ANTONIUS), a grandson of the elder Gordian, b. about 226, was declared emp. 238; in the E. he won important advantages over the Pers. and others, but in consequence of the machinations of Philip the Arab he was murdered by his own soldiers in Mesopotamia in 244 A. D. The younger Gordian was highly popular and possessed many engaging qualities.

Gordius (Γορδῖος), a half-mythical king of Phrygia, father of Midas, was a peasant upon whose oxen an eagle alighted as he was ploughing. He repaired to Telmissus to consult the soothsayers regarding the occurrence, and was instructed by a prophetess whom he took to wife. Years after the oracles told the Phrygians that they should find a king in a cart. Soon afterward G. rode up, drawn by oxen, and he was declared king. G.'s cart was placed in the acropolis of Gordium, a Phrygian city, and the oracle declared that he who was able to untie the knot ("Gordian knot") by which the yoke was tied to the pole of the cart should be master of all Asia. In 333 B. C. Alexander tried to untie the knot, and, failing, cut it with his sword.

Gordidae, a family of nematode worms of hair-like forms. They are popularly called hair-worms, hair-snakes, and hair-eels, and vulgarly regarded as transformed hairs.

Gordon (Lieut.-Col. CHARLES GEORGE), b. Jan. 28, 1833; served in the Crimean war; in surveying and settling the Tur. and Rus. frontier in Asia, and in the English expedition against Peking, remaining on service in Chi. after the termination of difficulties. Entering the service of the emp. of Chi., he was made in 1863 commander of the "ever victorious army," and was prominent in suppressing the Tai-Ping rebellion (1863-64). In Dec. 1864 he was nominated a Companion of the Bath, and was afterward appointed Brit. consul for the Danube delta; resigned 1874, and entered the service of the Khedive of Egypt; was gov.-gen. of Soudan till 1877; returned to Khartoum in 1884 as the representative of the English government, and was killed there Jan. 27, 1885.

Gordon (Lord GEORGE), third son of the duke of Gordon, was a lord by courtesy only. B. in Lond. Sept. 19, 1750, he entered Parl. in 1774; became distinguished as a noisy opponent of both Whigs and Tories; was made pres. of the Prot. Association 1779; became at once leader of the large and turbulent No-Popery party; presented a petition (signed by 120,000 persons) for the repeal of Saville's R. Cath. Relief bill 1780, arriving at the Parl. House at the head of 60,000 rioters, who sacked the R. Cath. chapels and the houses of papists and others, broke open the prisons, and fired Lond. in many places. The military finally dispersed the rioters, but not till 450 were killed and wounded. Many more were afterward hung. G. was tried for high treason and acquitted 1781; declared himself a Jew in religion 1786, but was without question insane; was fined and imprisoned for libel 1788, and d. in Newgate prison Nov. 1, 1793.

Gordon (GEORGE H.), b. in Charlestown, Mass., July 19, 1824, grad. at W. Pt. 1846; served in Mex., on frontier duty, and on U. S. Coast Survey; resigned from the army; entered Cambridge Law School; practised law 1857-61; appointed col. of 2d Mass. Vols. Apr. 1861; served in Shenandoah Valley, Va., 1861-62; brig.-gen. of vols. in 1862; engaged in battles of Cedar Mountain, second Bull Run, and Antietam; served with Gen. Dix in the Peninsula, with Gen. Meade, and in dept. of the S. In 1864 commanded U. S. forces in Fla.; was at capture of forts in Mobile Bay, and in command of dist. of E. Va.; Apr. 9, 1865, brevet maj.-gen. of vols.; in 1866 U. S. marshal for Mass.

Gordon (JOHN B.), b. Feb. 6, 1832, in Upson co., Ga., grad. at the State Univ.; was admitted to the bar; in 1861 entered the Confed. service as capt. of inf., and rose to the rank of major, lieut.-col., col., brig.-gen., maj.-gen., and lieut.-gen. At the surrender of Gen. Lee, G. commanded one wing of the army. During the war he was wounded 8 times in battle. In 1868 he was the Dem. candidate for gov. of his native State, and, as was believed, was elected by a large majority, but his opponent, Rufus B. Bullock, was awarded the office. He was a member of the national Dem. conventions in New York 1868 and at Baltimore 1872; was Presidential elector for the State at large at the elections in 1868 and 1872; was elected to the U. S. Senate in Jan. 1873 for 6 yrs., and took his seat in that body Mar. 4, 1873, where he was recognized as an eloquent and leading member of the Democratic party. Resigned May 20, 1880.

A. H. STEPHENS.

Gordonia [named from two James Gordons], a genus of beautiful trees and shrubs of the order Camelliales. The U. S. have 2 species. The G. *Lusitanus*, called loblolly bay, is a beautiful S. tree, from 50 to 70 ft. high (called a shrub in cultivation), growing in "bay swamps." Its bark is useful for tanning. The G. *pubescens* is cultivated as a garden-shrub.

Gordonsville, Va. See APPENDIX.

Gore (CHRISTOPHER), LL.D., b. in Boston, Mass., Sept. 21, 1758, grad. at Harvard 1776; appointed U. S. dist. atty. for Mass. 1789, the first to hold the office; was with W. Pinckney a com. to Eng. 1796-1804, *chargé d'affaires* at Lond. 1803-04, gov. of Mass. 1809, U. S. Senator 1814-17. D. Mar. 1, 1827. Left a legacy to Harvard Univ., and was one of the legal instructors of Daniel Webster.

Görgei (ARTHUR), GENERAL, b. at Topporez, in Hungary, Feb. 5, 1818, ed. at the military school of Tulu; resigned from the army to pursue the study of chem., but on the news of the rising in Hungary reaching him he hastened to place his services at the disposal of the Hungarian ministry. His conduct attracted the attention of Kossuth, and after the battle of Schwechat he assumed command of the Hungarian army. Unable to maintain himself at Raab, he was driven out by

Windischgrätz: was again repulsed at Windschacht, saving his army by a bold retreat over the Sturecz Mts. Difficulties arising between G. and the civil authorities, he was twice superseded in command. On the resignation of the gov. and council in 1849, Kossuth made G. dictator in his place. Soon after this the Hungarian forces laid down their arms. G. was stigmatized as a traitor for this, and in 1851 he pub. a vol. narrating his connection with the insurrection, entitled *My Life and Acts in Hungary*.

Gorges (Sir FERDINAND), a native of Somersetshire. Eng. was a fellow-conspirator with the Earl of Essex, against whom he was a witness, 1601; served in the Brit. navy, and in 1604 became gov. of Plymouth; was one of the leading spirits in the original Plymouth Co., sent a number of unsuccessful expeditions to the N. Eng. coast, and in 1620 obtained a charter "for the Pacific." He was also one of the original proprietors of Laconia, which was to extend from the Kennebec to the Merrimack, and in 1623 his son Robert was named general gov. for N. Eng. G. was soon after appointed lord-proprietary of Me., the office to be hereditary in his family, and in 1642 he chartered the city of Gorgiana (now York, Me.). G. served against the Puritan armies in Eng. D. 1647. His grandson, Ferdinando (1629-1718), sold his rights in Me. to Mass. (1677) for £1250, and was author of *Amer. Painted to Life*.

Gorgias, a Gr. orator, b. at Leontini, Sic., about 485 B. C.; in 427 was sent to Athens to invoke aid in repelling the Syracusans, but remained in Athens, and attained great fame as a rhetorician. Of his somewhat numerous writings fragments have been preserved, chiefly of the work on nature, in which he sets forth the dogma of the non-existence of things by arguments based upon the Eleatic philos. It is stated that he lived to be 103 yrs. old or more.

Gorgon [Γοργών], the common name of 3 monsters of the Gr. mythology, daughters of Phorcyas and Ceto. They had but one eye, which each employed in turn. They wore girdles of living serpents and had serpents in place of hair. Medusa, the only mortal one, had the power of turning into stone every mortal who beheld her, but Perseus cut off her head, which was thenceforth fastened to the agis of Pallas.

Gorgonia. See SEA-FANS.

Gorham, N. H. See APPENDIX.

Gorham Controversy, The. See APPENDIX.

Gorilla (*Gorilla Savagei*), a species of anthropoid ape which disputes with the chimpanzee a claim to rank next to and is most like man. Its hinder foot is characteristic. In the G. the great toe joint is marked by a considerable degree of mobility, and the foot resembles a hand. Although pre-



The plantar surfaces of the human and gorilla foot compared: 1, the human foot; 2, the foot of the gorilla *after them*.

viously known by vague report, in 1847 the G. was first made known to science, and its characteristics made out by Dr. Thomas Savage and Prof. Jeffries Wyman, the distinguished comparative anatomist. Its food consists of the fruit of several species of palm, the "cabbage" portion of the same, the banana, and other succulent vegetables of similar character. It forms for itself a sleeping-place not unlike the ordinary grass hammock. The young accompany the parents until they attain nearly adult size. THEODORE GILL.

Gör'itz, town of Prus., in the prov. of Silesia, on the Neisse, which here is crossed by a viaduct 1500 ft. long, 115 ft. high, and resting on 34 arches. It is fortified, and has large weaving and bleaching establishments and considerable manufactures of cloth and leather. Among its buildings is the ch. of St. Peter and St. Paul, built in the 15th century, a remarkable specimen of Gothic arch. It has 5 naves, the prin. one formed by 24 palm-shaped pillars 77 ft. high, and a bell weighing 12½ tons. Pop. 50,307.

Gorman (WILLIS A.), b. in Ky. Jan. 12, 1814; studied law and practised at Bloomington, Ind.; was member of the State legislature, major of Gen. Lane's regiment of Ind. volunteers in the Mex. war, subsequently in command of the 4th Ind. Volunteers; civil and military gov. of Puebla 1848, M. C. 1849-53, gov. of Minn. Terr. 1853-57. In the c. war, col. of the 1st Minn. Volunteers, and Sept. 1861 appointed brig.-gen. of U. S. volunteers; distinguished in the Peninsular campaign, at Antietam, etc. D. May 20, 1876.

Görres, von (JAKOB JOSEPH), was b. at Coblenz Jan. 25, 1776; founded in 1797 a periodical, *The Red Paper*, which in 1798 was succeeded by *Rubezahl in Blue Garment*, both of which were suppressed on account of their radical views. In 1806 he removed to Heidelberg, where he resided for 2 yrs. Here he made the acquaintance of Brentano and Achim von Arnim, and adopted all the Oriental and medi-

æval—that is, quietistic and reactionary—tendencies of the romantic school. In 1807 he pub. *Die deutschen Volksbücher*; in 1810, *Mythengeschichte der Asiatischen Welt*; in 1813, *Lohen-grin*. Once more he was allured back into politics. Under the gen. rising against Nap. which followed his disaster in Rus. and his defeat at Leipsic, G. established a new periodical, the *Rhenish Mercury*, whose success was so great that Nap. called it the fifth grand power. He was not radical now; nevertheless his book, *Deutschland und die Revolution* (1830), occasioned the Prus. king to order his imprisonment in some fortress. He fled to Switz., where he lived till 1827, when he was appointed prof. of hist. at the Univ. of Munich. During his residence in Switz. he pub. *Das Heldenbuch von Jean* (1820), *Erzählung und die Revolution* (1822), *Kunsmal, Seydenberg* (1827), etc. A new change took place with him, and he came to consider the Ch. the R. Cath. Ch., as the only means left of salvation. In this spirit are all his later books written: *Athanasius, Die christliche Mystik, Die Vulfahrt nach Trier*, etc. D. Jan. 27, 1848.

Gorton (SAMUEL), b. at Gorton, Eng. about 1600, was a linen-draper of Lond.; went in 1636 to Boston, Mass., whence he was soon expelled for heresy; was banished from Plymouth in the following winter; went to Aquidneck (now Newport, R. I.), where he was publicly whipped for saying that the magistrates were "just asses"; removed to Pawtuxet, R. I., and was involved in lawsuits about land; went (1642) to Shawomet (now Warwick, R. I.), whence he with 10 of his followers, "Gortonians," were abducted by 40 soldiers from Mass., and were tried at Boston as "damnable heretics," and sentenced to hard labor in irons, but in 1644 the sentence was commuted to banishment; returned to Warwick, R. I., and became a preacher, a magistrate, and a person of much consideration. Author of several religious works. His sect survived for many yrs., and his followers were called "Nothingarians," because they repudiated all religious forms and recognized no ministry. D. 1677.

Gort'schakoff (ALEXANDER MICHAELOWITSCH), PRINCE, one of the ablest statesmen of Europe, b. in 1799. He entered the diplomatic service in 1824 as sec. to the Rus. ambassador in Lond. In different diplomatic positions he showed considerable dexterity, but it was his eminent success in keeping Aus. neutral during the Oriental war which first made him conspicuous as a diplomat. In 1856 he succeeded Count Nesselrode as minister of foreign affairs, which office he held till Apr. 9, 1882, and his notes to the W. powers during the Polish insurrection in 1863 no doubt prevented foreign interference. Since 1863 he had the title of chancellor. D. Mar. 11, 1883.

Goruckpoor, town of Brit. India, in the presidency of Agra, cap. of a dist. of the same name. Pop. 57,922.

Go'ry Dew, a reddish slime sometimes seen on cellar-walls and in other dark places. It is caused by the growth of *Palmella cruenta* and other confervaceous plants.

Gösch'en (Rt. Hon. GEORGE JOACHIM), b. in Lond. in 1831, entered mercantile life in 1853; was returned to Parl. for Lond. (1863) as a Liberal; director of the Bank of Eng. 1865-66; was sworn of the privy council 1865, chancellor of the duchy of Lancaster 1866, pres. of the poor-law board 1868-71, first lord of the admiralty 1871-74.

Goshawk (i. e. "goose-hawk," properly, the *Astur palumbarius* of Europe, is represented in N. Amer. by the *Astur atricapillus*, which is bluish slate-color above, with the crown deep black.

Go'shen, the dist. of Lower Egypt in which Jacob and his family settled. The exact boundaries of the dist. cannot be determined. It is certain, however, that it lay between the E. branch of the Nile and the Red Sea.

Goshen, city and R. R. junc., cap. of Elkhart co., Ind., half way between Toledo and Chicago. The lumber-trade of the place is over 5,000,000 ft. annually. The water-power afforded by the Elkhart River is very great. Pop. 1870, 3133; 1880, 4123.

Goshen, R. R. junc., Orange co., N. Y., 60 m. from New York. It is half-shire town, with c-h., clerk's and surrogate's offices. First settled in 1772, and incorporated in 1809. Prin. business, dairying. Pop. 1870, 2205; 1880, 2557.

Gos'nold (BARTHOLOMEW), an Eng. mariner, who first appears as an associate of Raleigh in his unsuccessful attempt to found a colony in Va. In 1602 he sailed in a ship containing 20 colonists for N. Eng. He entered Mass. Bay, named Cape Cod, discovered No Man's Land, and named it Martha's Vineyard (a name since given to a much more important neighboring island), and planted his colony on Cuttyhunk (now in the tp. of Gosnold, Mass.); but the settlers became discouraged and soon returned. In 1606 he led another colony to Va., which settled at Jamestown. D. Aug. 22, 1607.

Gos'pel, Gospels [from "good-spell," the Eng. equivalent of the Gr. εὐαγγέλιον, and the Lat. *evangelium*], means (1) good tidings; (2) good tidings of salvation by Christ; (3) the record of these good tidings.

1. We have 4 canonical G.—MATTHEW, MARK, LUKE, and JOHN (which see).

2. There are a large number of *apocryphal G.*, written in the 2d, 3d and 4th centuries, partly to satisfy curiosity about those parts of Christ's life on which the canonical G. are silent, especially the infancy and the descent into Hades; partly to inculcate heretical views. They are religious novels, but full of unnatural marvels. They serve a good purpose in confirming the historical character of the canonical G., as the counterfeit presupposes the genuine coin, and the caricature the original picture. The prin. works of this kind are the G. of Nicodemus, the G. of James, the G. of the Infancy of Jesus, the Acts of Pontius Pilate, and his Letter to Tiberius on the death of Christ. PHILIP SCHAFF.

Gos'samer, the long light filaments spun by certain small spiders. Some of these float in the air and carry the spider with them. Others are stretched upon the ground, and are believed to serve to collect the dew, of which many spiders have been observed to drink.

Gossellin (PASCAL FRANÇOIS JOSEPH), b. at Lille, Fr., Dec. 6, 1751; made extensive journeys for the observation of facts regarding anc. geog. In 1790 he was chosen to the Acad. In 1799 he was made director and keeper of medals for the National Library. In 1816 he became one of the chief eds. of the *Journal des Savants*. Among his most important works are *Géographie des Grecs analysée*, *Recherches sur la géographie des anciens*. D. Feb. 7, 1830.

Göta [Swe. *Göta-elf*], a river in S. Swe., carrying the water from Lake Wener to the Cattegat. It is celebrated for its cataracts, of which Trollhätta ("the witch's cap") is one of the most imposing in the world. To make the river navigable, and to connect it with the Baltic through Lakes Wener and Wetter, an admirable system of locks and canals has been constructed.

Gothama. See GAUTAMA.

Götha, town of Ger., the cap. of the duchy of Saxe-Coburg-Götha, on the left bank of the Leine. Its old walls and fortifications have been transformed into boulevards and promenades, and the whole city has a modern and elegant appearance. The ducal palace, Friedenstein, is a considerable building, and contains, beside a library of 150,000 vols., a very fine collection of coins and medals. G. is the seat of much literary enterprise. Pop. 1880, 26,525.

Gotham (*Goteham*), a parish of Notts, Eng., whose people have been famous ever since King John's time for their stupidity; so that "a wise man of Gotham" became a synonym for a fool. Irving in his *Salmagundi* applied the name Gotham to New York, and the appellation is still a familiar one in the U. S.

Gothic Architecture, whose characteristics are the pointed arch, the free pillar, the flying buttress and arch, flourished from the middle of the 12th to the middle of the 14th century. The first fully developed example is the cathedral of St. Denis, near Paris, consecrated in 1144, but it was soon followed by others more magnificent and more characteristic. The cathedral of Notre Dame in Paris was begun in 1163, Pope Alexander III. laying the first stone. In 1182 the high altar was consecrated, in 1223 the W. front was finished, in 1257 the S. transept, in 1312 the N. The length of the interior is 390 ft.; the width of the transepts, 144 ft.; the height of the vaults, 105 ft., and of the towers, 224 ft. In both these buildings, however, as well as in the beautiful cathedral of Chartres, built 1195-1260, there are still some traces left of the Romanesque style, but in the cathedral of Rheims, begun in 1212, the G. style is carried through to the smallest detail, and the cathedral of Amiens, built 1220-88, is generally considered as representing the highest degree of perfection which the style ever reached. Its dimensions are—length of the whole edifice, 415 ft.; width of the transepts, 182 ft.; height of spire, 420 ft. But although it was impossible to attain any higher degree of refinement and elegance in the details without losing something of the nobleness of the gen. character, the Fr. archs., in their restless eagerness after progress and improvement, pushed the audacity of their constructions farther and farther. The breadth and height of the nave of the cathedral of Amiens are respectively 42 and 132 ft.; those of the cathedral of Beauvais were 45 and 146, but 12 yrs. after its erection (in 1284) it fell, and had to be rebuilt on another plan. Stopped in this line, and yet passionately fond of novelties, the archs. now subjected the details to arbitrary modifications, and the decay of the G. style began in Fr. with that style of decoration which is called *Flamboyant*, and which is most conspicuous in the tracework of the windows.

In Eng. the G. style was introduced by William of Sens, who built the cathedral of Canterbury in 1174. Then followed Westminster Abbey in Lond., built 1245-69, and the cathedral of Salisbury, built 1220-58, and generally considered the most perfect example of the *Early English* style. In the 14th century a movement took place somewhat similar to the Flamboyant, and the most celebrated of this, the *Decorated* style, are the cathedral of Exeter, built 1327-69, and that of York, built a little later. In the 15th century the Decorated style was succeeded by the *Perpendicular*; and with this movement begins the decline of the G. style. But G. A. in Eng. was by no means a repetition of Fr. models; it was an independent adoption and followed an independent course of development. Not only is the gen. character of the Fr. and Eng. buildings of this style very different, but also their plan and construction show striking differences. The Eng. cathedral is square-ended, the Fr. semicircular; the Eng. has large transepts, the Fr. almost none; the Eng. is long and low, the Fr. short and high. The cathedral of Salisbury is 430 ft. long, but its nave is only 33 ft. wide and 78 ft. high. Less original, and consequently less interesting, is the development of the G. style in Ger., though it is represented by several fine buildings, of which the cathedral of Cologne and the ch. of St. Stephen in Vienna are the most celebrated. The interior of the latter makes a somewhat peculiar impression, as the nave and the aisles are nearly equally high, and the nave without windows, but the exterior is very richly decorated, and the spire, 435 ft. high, magnificent; finished in 1433.

CLEMENS PETERSEN.

Gothic Language and Literature. See UPLILA.

Goths, The, occupied originally the regions along the N. and N.E. shores of the Black Sea, from the mouth of the Danube to that of the Don. Several centuries before our era one or more swarms of these G. crossed through Central and N. Europe, one portion of them invading and conquering Scandinavia, and the others settling S. of the Baltic, between the Oder and the Vistula. Here Pytheas from Marseilles, who calls them *Guttones*, visited them in the time of Alexander the Great; and they still lived here when Tacitus, who calls them *Gothones*, wrote his *Germania*. It was not until the 3d century of our era, however, that the original G. became known to the Romans. During the reign of Alexander Severus (232-235 A. D.) the G. began to invade the Rom. prov. of Dacia. In 250 they met and defeated the

emp. Decius at Philippopolis, and the following yr. they defeated him a second time, and killed him. In 258 they had procured a fleet and took Trebizond, and in 262 they came with 500 vessels before the Piræus, and took and plundered Athens. They now began to threaten It., but in 269 the emp. Claudius, the successor of Gallienus, defeated them, sunk their fleet, and pursued them into Mt. Hæmus, in whose ravines as many of them are said to have died of famine as had fallen in the battle. In spite of this heavy reverse, they compelled (in 272) the successor of Claudius, Aurelian, to give them the prov. of Dacia, where they settled, and where they kept comparatively quiet for nearly a century; indeed, one part of them, the so called Mœsogoths, who settled in Mœsia, gave up war altogether and became an agricultural people. During this period of quiet life the G. were converted to Christianity by Bp. Ulphilas, who translated the Bible into their lang., and it was also during this period that the division sprang up between the *Ostrogoths*, living along the shores of the Black Sea, and the *Visigoths*, on the banks of the Danube in the Dacian provs.—a division which maintained itself through the rest of their hist.

Götenburg [Swe. *Göteborg*], town of Swe., on the Göta, near its mouth. It has an excellent harbor and a considerable trade. Pop. 76,401.

Götteschalk, or **Godeseale** (*Götheschalch Fulgentius*), b. at Mentz, Ger., about 806; became a Benedictine of Fulda, where, wishing (829) to return to the world, he was restrained by the abbot Raban; studied at Paris and Orbais; devoted himself to the study of Augustine and the propagation of the predestinarian doctrine; was everywhere opposed; condemned by the Council of Mentz 848; tried by Hincmar of Rheims and Charles the Bald at Quiercy (849 A. D.); flogged in presence of the king and bps., and imprisoned for life in the abbey of Hautvilliers, where he d. Oct. 30, 867. Hincmar denying him the consolations of the Ch. in his last hours.

Göttingen, town of Pruss., on the Leine. It has some manufactures, but it depends chiefly on its univ., with which are connected a library of 400,000 vols., a museum, a botanical garden, an observatory, an anatomical theatre, a chemical laboratory, and other scientific insts. It was founded in 1737 by George II., king of Eng. and elector of Hanover, and the magnificent scale on which it was established and maintained made it soon one of the most celebrated univs. of Ger. In this century the univ. of Berlin, founded in 1810, has thrown it somewhat into the shade. Pop. 19,963.

Gottschalk (LOUIS MOREAU), pianist and composer, b. in New Orleans, La., May 18, 1829; d. at Tijuca, near Rio Janeiro, Dec. 18, 1869. When but 7 yrs. old he gave a concert. At 12 his father sent him to Paris, where he had instruction in the science and art of music from the best masters. He gave concerts in Fr., Switz., and Sp., and achieved a high reputation before his countrymen knew him. Afterward he was heard in the chief cities of the U., in Mex., S. Amer., and even in Australia. His pianoforte compositions, which are numerous and peculiar, are characterized by passion, often tumultuous, but often subtle, dreamy, and tender. His own style combined dash and pathos with brilliant effect. Among other decorations he received that of the Legion of Honor and the order of Isabella the Catholic.

Gough, gof (Rt. Hon. HUGH), Viscount, b. at Woodstown, Ire., Nov. 3, 1779; served with distinction at the Cape of Good Hope 1795, and in Sp. 1809-13; went to India 1837; led the land forces in the Chi. opium war 1841; was made a baronet and G. C. B. 1842, and commanded the Brit. forces against the Maharrattas 1843, and the Sikhs 1845; was made a baron 1846; commanded in the second Sikh war 1848-49, but in consequence of the terrible losses inflicted upon the Brit. by the Sikhs his generalship began to be criticised, and Sir Charles Napier in 1849 took his place. G. was created viscount and handsomely pensioned (1849), made col. of the horse-guards 1854, K. P. 1857, privy councillor 1859, G. C. S. I. 1861, field-marshal 1862. D. Mar. 2, 1869.

Gough (JOHN B.), b. at Sandgate, Kent, Eng., Aug. 22, 1817; came in 1829 to the U. S.; became a bookbinder, and after some yrs. of poverty, caused by intemperance, reformed, and in 1843 became a temperance lecturer, laboring with great zeal and success in the U. S. and in Eng. (1853); visited Eng. again in 1878. He also attained great reputation as an orator upon other themes. (See his *Autobiography*.)

Gould (AUGUSTUS ADDISON), M. D., son of N. D. Gould, a famous teacher of music and writing, b. at New Ipswich, N. H., Apr. 23, 1805, grad. at Harvard 1825; was for some time scientific instructor in Harvard Univ., and in 1856 became one of the phys. of the Mass. Gen. Hospital, Boston. Wrote *System of Nat. Hist.*, *Report on the Invertebrate Animals of Mass.*, and *Otha Conchologica*; with L. Agassiz pub. *Principles of Zoology*. D. Sept. 15, 1866.

Gould (BENJAMIN APTHORP), b. at Lancaster, Mass., June 15, 1787, was a son of Capt. Benjamin Gould, an officer in the war of Independence. After graduating at Harvard Coll. in 1814, he was appointed to the charge of the Public Lat. School of Boston, which soon assumed, and long maintained, the highest position of any inst. in the country for thoroughness in classical teaching. He was the first Amer. ed. of any classical author, and beside his improved and revised Lat. gram., which was a novelty in Amer., and long remained a text-book, he prepared critical editions of Horace, Ovid, and Virgil. He continued in charge of the Lat. School till 1828. D. Oct. 24, 1859.

Gould (BENJAMIN APTHORP), Ph. D., LL.D., son of the foregoing, b. in Boston Sept. 27, 1824. After graduating at Harvard Coll. in 1844, he devoted himself to the study of astron., prosecuting this at the observatories of Greenwich, Paris, Berlin, Göttingen, and Altona, and returning home in Dec. 1848. In 1849 he established at Cambridge the *Astronomical Journal*. In 1851 he took charge of the lon. operations of the Coast Survey, to which Bache and Walker had just begun the application of the electric telegraph. This method he extended and perfected, until in 1866 about 20 lons. had

been determined in the U. S. with the highest precision yet attainable by modern science. In 1855 the Dudley Observatory at Albany having been organized, its management was committed to a scientific council consisting of Messrs. Bache, Henry, Peirce, and Gould, and its directorship was confided to Dr. G., who accepted it without remuneration, planning the prin. instruments and superintending their construction. Here, for the first time, a normal clock, placed in a position as free as possible from atmospheric influences, gave its time telegraphically to dials in the observing-rooms. The conflict between the trustees of the institution and the scientific council belongs to the hist. of Amer. science. In 1863 the Sanitary Commission having requested Dr. G. to take charge of their statistics, he organized in connection with these an elaborate system of anthropological measurements, which were subsequently computed and tabulated. From the discussion of the ages of our soldiers in connection with the census, he deduced the curious formula which seems to control the distribution of a pop. according to ages, and which has been singularly verified by subsequent censuses of this and other countries. The law of growth in human stature was also elicited by these researches, as also the normal relation between height and weight, and the typical proportions of the human body. In 1870 he went to S. Amer. to establish a national observatory for the Argentine Republic at Cordova and complete the catalogue of the S. stars; in 1874 he had likewise organized a national meteorological office, and made various telegraphic determinations of lon., and also prepared for publication a uranometry and charts of the S. heavens.

Gould, (JAMES), LL.D., b. at Branford, Conn., 1770; grad. from Yale Coll. in 1791, and became justice of supreme court of Conn.; for 40 yrs. prof. in Litchfield Law School. Wrote *Principles of Pleading in Civil Actions*. D. May 11, 1838.

Gounod, goo-no' (CHARLES FRANÇOIS), b. in Paris June 17, 1818. His early passion was for sacred music; his first great success was a mass performed at the ch. of St. Eustache in 1849. He began to write for the operatic stage in 1850, and persevered in it, in spite of the unpopularity of much of his work and the impulses of a deeply religious temperament. His compositions show a mastery of musical science, uncommon resources of melody, and affluence of ideas. The best known of them all is *Faust*, which has been a gen. favorite. Other operas are: *La Reine de Saba* and *Romeo et Juliette*. G. has written a lyric drama (*Sappho*), 3 symphonies, and a cantata. He is a member of the Acad. of Fine Arts, was decorated with the Legion of Honor Aug. 15, 1857, and was made an officer Aug. 13, 1866. In May 1866 he was elected a member of the Fr. Inst.

Gou'ra, or Crowned Pigeon (*Goura coronata*), the largest living pigeon, is nearly the size of the turkey. It is a native of the E. Archipelago.

Gourami, or Goramy (*Ospromenus goramy*), a valuable fresh-water food-fish of the family Anabantidae, inhabiting E. Asia, but introduced in the island of Mauritius with great success.

Gourd [*Fr. gourde*, a "swelling"]. In G. Brit. this name is applied indiscriminately to any member of the natural order Cucurbitaceæ, but in Amer. it is restricted to the genus *Lagenaria*. This name is derived from the Lat. *lagena*, a "bottle," and refers to a frequent shape of the fruit, of which the shell is used not only for bottles, but for dishes, cups, and especially for dippers, for which the natural handles especially adapt it. The *Lagenaria* climbs over walls and shrubbery by means of its compound tendrils. It has rounded leaves, long-stalked flowers greenish-white in color, and fruit differing greatly in size and shape. The sterile flowers are on a long peduncle, the fertile on a short one, and are musk-scented like the leaves. Pumpkins, squashes, cucumbers, and melons belong to the order Cucurbitaceæ, and are valued for their fruit. The orange G. (*Cucurbita arifera*) grows wild in Tex., and is cultivated for its ornamental fruit.

Gout [*goutte*, a "drop"], an inflammation of the fibrous and ligamentous parts of the joints, dependent upon mal-assimilation. It derives its name from having been thought to be produced by a liquid falling (*goutte à goutte*), "drop by drop," into the joints, and although this theory has long since been proved to be erroneous, it still retains the name. We generally find an hereditary predisposition to this affection. It can be traced through many generations, and is found in about $\frac{3}{4}$ of the cases. Next frequently we find it in persons enjoying the luxuries of the table, drinking wine and beer, and taking but little exercise. It was formerly considered a disease of high life, but is now just as common among the poorest people in Eng. as among the rich. It was not so in Sydenham's time. The ballast-heavers of Lond. have more G. than any other class in the world. They work in the water, and drink large quantities of malt liquors daily. The prin. change observed in the blood is a great excess of uric acid, and the deposit in the affected joints is made up almost entirely of urates. After repeated attacks the disease may degenerate into chronic G., in which the attacks are quite frequent; there is a purplish appearance of the affected joints, and owing to synovial effusions and deposits of lithate of soda, they are oedematous and deformed. Abscesses frequently form in or about the joints, and concretions of urate of soda may escape from them when opened. Colchicum is the favorite drug used to cut short the attack of G. If the pain is excessive, it may be relieved by opiates. The bowels should be opened. Salicylic acid and salicylate of soda are beneficial. In the treatment during the interval between the paroxysms attention should be paid to the diet and regimen of the patient; he should take his meals regularly; should eat plenty of vegetables, meat but once a day, and should abstain from alcoholic drinks, especially ale and beer, and take a certain amount of exercise in the open air daily. The regular use of mild mineral waters, which are diuretic and laxative, tends to avert the attacks, and to lessen or remove the constitutional taint. Particu-

lar care should be taken to keep the bowels regular. [*From orig. art. in J.'s Univ. Cyc.*, by E. J. BIRMINGHAM, M. D.]

Gouverneur, goov-er-noor', St. Lawrence co., N. Y., 34 m. S. E. from Ogdensburg, on R. R. It has a sem. Pop. 1870, 1627; 1880, 2071.

Government. The first proper step in all philosophical inquiry, as well as in all discourse, of whatever character, undertaken for the elucidation of truth, is to set forth as clearly and distinctly as possible the meaning of the words and terms used in the expression of the views presented, from which successive conclusions are to be logically drawn. This is the work of definition, and it is no less essential in moral and political investigations than it is in mathematical. It is indeed the beginning of progress in every dept. of learning, whether moral, intellectual, or material. G. then, in its true and most comprehensive sense, may be said to be the operation of laws. Law, in its most gen. and comprehensive sense, according to very high authority (Blackstone), "signifies a rule of action, and is applied indiscriminately to all kinds of action, whether animate or inanimate, rational or irrational. Thus, we say the laws of motion, of gravitation, of optics or mechs., as well as the laws of nature and of nations."

In a like gen. sense, with equal correctness, we speak of the G. of the mind, of the passions, of a ch. or a state, as well as of the G. of the universe. It is in each case the operation of those laws by which action, in its every sphere, whether moral, intellectual, or material, is controlled. In the restricted sense in which it is proposed in this article to treat of G., and of the laws which shape its form as well as control its action, the term is intended to be applied only to the G. of men in their relations, conduct, and intercourse with each other in organized society. By G. in this restricted sense is meant the exercise of that inherent, absolute power existing in every distinct and separate organized society or state, of self-determination and self-control for self-preservation which springs by nature from its own social forces, and the laws which control their action.

Every single individual person is a complete living organism within itself, endowed by nature with vital functions and powers of self-determination for its own preservation. But man, by nature, is less capable of self-preservation singly, by himself, than jointly, with others. Mutual protection and mutual interests, therefore, form the natural and only just basis for all organized associations of individuals of the character named. An organization when so formed constitutes a separate community, properly denominated a state, nation, commonwealth, or kingdom. It is to all intents and purposes an organism composed of the individual organisms that enter into it. It becomes a political and moral person, subject not only to its own special laws, but also to the gen. moral law to which all human action is subject, and which prescribes the limitations of natural justice. As each single organism in its powers of self-determination is controlled by its own internal laws respectively, so the aggregate organism is controlled in its powers of self-determination by those social forces or laws which give existence and life to the separate commonwealth, state, or kingdom so constituted. The operation of these laws in such a political organism, in its origin as well as in its after-growth and development, physically, intellectually, and morally, is what is understood by the G. of such state. The controlling power—the paramount authority, the "*Jus summi imperii*"—in each state so organized, is what is known as the sovereignty thereof.

Sovereignty, then, may be defined to be that inherent, absolute power of self-determination in every distinct political body, commonwealth, state, or kingdom coming into existence by virtue of its own social forces, which, in pursuit of the well-being of its own organism, under the universal moral law, cannot be rightfully interfered with by any other similar body without its consent. Sovereignty, in every such body politic, organized society, or state, is that innate attribute of the commonwealth or aggregate organism which corresponds with the will and power of self-action in the personal organisms so constituting it, and by its very nature is indivisible: just as much so as the *mind* is in the individual organisms respectively. The limitations of natural justice prescribed by the universal moral law apply as well to the political persons of organized societies as to separate individuals in a supposed state of nature. In the organization of single societies, whatever may be the form assumed, the act itself is known as the social compact. The type or form of G. so instituted, at first and in its after developments, in all cases depends upon the nature and character and relative power of the social forces from which its existence springs. These forces are threefold—viz. moral (or religious), intellectual, and phys. As these forces relatively predominate in the formation of society, so will be the character of its organic structure. This organic structure is what in all cases is known as the *constitution* of each particular state or kingdom, whether it be written or unwritten; and the sovereign power is exercised through the channels established for it by this constitutional structure, which becomes the fundamental law of the organization until changed by the same social forces which brought it into existence. In the beginning, when the phys. predominates, a monarchical form of G. is almost the necessary development. When the intellectual and moral predominate or are equally balanced, mixed forms of G. of some sort are the consequent development. The study of these laws and the various forms of G. springing from them has occupied the attention of the profoundest thinkers from the earliest times. The subject constitutes a science of the utmost importance, as nothing of an earthly character more deeply involves the interests of every people than the G. under which they live. From this chiefly spring all those insts., moral, intellectual, and material, which mark the progress of their civilization. (For further information on G., see *J.'s Univ. Cyc.*)

ALEXANDER H. STEPHENS.

Governors. 1. *G.* [*Ger. der Regulator, der Gouvernator, der Moderator*; *Fr. moderateur, m., regulateur, m.*] are instruments attached to prime movers for the purpose of preserving regularity of motion by adjusting the amount of power exerted to the resistance to be overcome, where the latter is variable. They are a more economical class of regulators than brakes, which accomplish a similar result by absorbing and wasting an excess of power, which must always exist where the speed is intended to remain invariable under a variable load.

2. *G.* differ, as regulators, from fly-wheels in preserving uniformity of motion without necessarily permitting change of mean speed. The latter form of regulator necessarily permits variation, which becomes greater as the weight and speed of the wheel are smaller in proportion to the changes of energy, and rarely makes the *G.* unnecessary.

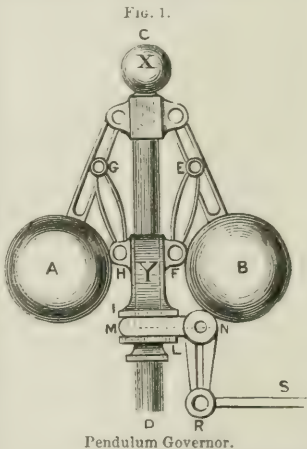
3. *G.* are usually intended to produce, as nearly as possible, absolutely uniform speed. None do so perfectly, but the approximation to uniformity is frequently very close. A good *G.* should not permit a variation of 5 per cent., even when the load is entirely thrown off, and 10 per cent. is generally considered the maximum range. Marine-engine *G.* are usually intended to prevent very sudden and very great fluctuations of velocity, rather than to preserve an exact rate of speed. Rankine designates the latter class "fly *G.*" to distinguish them from *G. proper*.

4. *G.* proper are divided into 3 classes—position *G.*, disengagement *G.*, and differential *G.* Position *G.* are those in which the position of the regulating valve or regulating piece is determined by rigid connection with the *G.*; as, for example, the common fly-ball *G.*, used upon the steam-engine. Disengagement *G.* are those which, when the speed rises above a certain fixed maximum, throw into gear a train of mechanism which shuts off the supply of impelling fluid, and causes a diminution of speed; and, when the speed falls below a stated minimum, it throws into gear another train producing the reverse effect. When at proper speed, neither train is in operation. The usual forms of water-wheel *G.* are examples of this class. Differential *G.* are those which move the regulating mechanisms with a speed proportional to the difference between the actual and the proper speed of the engine.

5. A second classification divides *G.* into gravity *G.*, in which gravity and centrifugal force are opposed, and balanced *G.*, in which centrifugal force is balanced by a spring or by other force than gravity.

6. Pendulum *G.* are the oldest and most common class of *G.* The conical pendulum, the centrifugal *G.*, or the fly-ball *G.*, as it is variously called, was invented by Huyghens about 1650, and applied by him to the regulation of horological mechanism. It was (1789) applied by Hooper to control the motion of windmills, and Watt about the same time (1784) applied it to the regulation of the steam-engine.

7. The pendulum *G.* consists of 2 heavy balls (A B, Fig. 1) suspended by short links from the spindle C D. Other links, E F and G H, connect with a sleeve H F in such a manner that any movement of the balls will produce a vertical movement of this sleeve, which is attached to an arm M N, forming part of the train of mechanism, M N R S, through which the adjustment of power is effected. In the case of the steam-engine the rod R S is attached to the "throttle-valve" or to the expansion gear; in the water-wheel it connects with the mechanism operating the "gate" by means of which the supply of water is adjusted; in the windmill this train of mechanism changes the pressure existing between the millstones, or it changes the position or the area of the "sails." [From orig. art. in *J. S. Univ. Cyc.* by PROF. R. H. THURSTON.]



Governor's Island, Boston harbor, near the city, is fortified.

Governor's Island, a small island in New York harbor, $\frac{3}{4}$ m. S. of S. extremity of New York city, separated from S. Brooklyn (L. I.) by a narrow (Buttermilk) channel. A mile and a half W. are the small islands Ellis's and Bedloe's, on the E. margin of the Jersey flats, which constitute the W. margin of the ship-channel to New York city, which passes between it and G. I. The prominent position of G. I. marked it out in early days as the key to the maritime defence, and it was occupied for such purposes by the Dut. In 1614 they built their first rude ft. on Manhattan Island, probably where the Battery now is, and doubtless, as their settlement increased, occupied G. I. The Eng. took possession in 1674, and under them the first regular ft., on the site of what is now Ft. Columbus, was built, and the island (probably through the residence of the early gov's., who were also military commanders) became known as G. I. The present Ft. Columbus (which has, however, since undergone extensive repairs and modifications), occupying the centre of the island, and Castle Williams, on the W. point, were built in 1807-10 (as also Ft. Clinton (Castle Garden) and Ft. Gansevoort, 3 m. higher up) by Col. Jon. Williams, the first chief engineer of the U. S. A.—an officer whose services

have since been in a measure lost sight of, but who has many claims to the title, since given to the late Gen. Thayer, "father of the U. S. Military Acad." Castle Williams was the first "casemated" battery erected in this country, and was planned after the system of Montalembert, with which Col. Williams had made himself acquainted in Fr. This and other works of Col. Williams, though they have been superficially and ignorantly criticised, were really meritorious, and do not suffer by comparison with European structures of the same or even much more recent dates. Beside the fortifications and small garrison, the ordnance dept. has one of its depots here, and the island is a rendezvous of the gen. recruiting service of the U. S. A. J. G. BARNARD.

Gowanda, N. Y. See APPENDIX.

Gower (JOHN), an Eng. poet, b. about 1327. He was probably a man of property, and it is said that he became chief-justice of the common pleas, and that he was knighted. He was a friend of Chaucer, who calls him "the moral Gower." His poetry was written in Eng., Fr., and Lat., the latter versified according to quantity. His prin. work was in 3 parts: the *Speculum Meditantis*, now lost; the *Vox Clamantis* (Lat.), existing in MS.; and the *Confessio Amantis*, completed 1394, best ed. by Pauli 1857. D. Oct. 1408.

Gozzi, got'see (CARLO), COUNT, It. dramatist and competitor of Goldoni, b. in Venice in Mar. 1732. It was his idea that improvisation is a natural talent with the Its., and for this reason he left open certain parts of his dramas, to be filled out by the momentary inspiration of the actors. *G.* did not succeed in his opposition to Goldoni. His dramas have disappeared from the stage, though they bear evidence of a talent of a higher and finer order than that of Goldoni. The best 2 of his dramas are *The Three Oranges* and *The Princess Turandot*. D. Apr. 4, 1806. CLEMENS PETERSEN.

Gozzoli (BENZOZZO). (BENZOZZO DI LESE DI SANDRO was his real name), an It. artist who lived between 1424 and 1496, a pupil of Fra Angelico, remarkable for his love of nature and the introduction of landscape, natural objects, animals, and picturesque beauty into his paintings. His most famous and best preserved work is in the Campo Santo at Pisa. His own tomb, directly under these frescoes, was presented to him by the Pisans. O. B. FROTHINGHAM.

Gracchanus (M. JUNIUS) lived in the time of C. Gracchus (b. c. 123). He was the author of a treatise *De Potestatis*, in which he gave a hist. of the const. and the great offices of state from the time of the kings. The original work is lost, but a portion of it is preserved in the Gr. treatise of Joannes Lydus (*De Magistratibus*).

Gracchus, grak'kus, the name of a family of illustrious Romans, plebeians of the gens Sempronius. The most noteworthy members were TIBERIUS SEMPRONIUS GRACCHUS, son of Tiberius Gracchus and the noble Cornelia, daughter of Scipio Africanus, b. 164 b. c.; went with the younger Scipio Africanus in 146 to the destruction of Carthage, and was the first Rom. to mount its wall; as quaestor (137) concluded an unpopular but highly advantageous treaty with the Numantines; became tribune of the people 134 b. c. At that time the Rom. people were enduring most grievous hardships, kept out of their lands and many lawful rights by the senatorial party, headed by the Scipios; and *G.*, with the advice of his mother Cornelia, his father-in-law Appius Claudius, and the wisest leaders of the patricians, decided to bring forward anew the Licinian law, which had never been repealed. The party which opposed him was small but influential, and he felt compelled to resort to measures which, though perfectly just, were impolitic; and some additional measures, by which he sought to improve the condition of the poor, were so artfully misrepresented that the ignorant rabble began to clamor against him, and a mob led by Scipio Nasica set upon him and his followers with sticks and stones, and murdered him 133 b. c.—CAIUS SEMPRONIUS GRACCHUS, his brother, 9 yrs. younger, was serving in Sp. at the time of his brother's murder; was quaestor in Sard. 126 b. c., where his valor, wisdom, and justice made him very popular, but caused him to be regarded with suspicion at Rome. In 124 he went without leave to Rome, but so defended himself before the censors that his conduct was declared justifiable. Filled with a noble but almost hopeless enthusiasm for Rom. liberty, now nearly extinct, he entered upon the tribuneship in 124 b. c., and was twice re-elected; renewed the Agrarian law in 123 b. c.; but, deserted by the ungrateful equites and by the misguided people, and a price having been put upon his head, thousands of his friends were killed in an insurrection 121 b. c., and *G.* himself was killed by his own slave, who thereupon killed himself. His greatest offence was the proposal to enfranchise the It. allies.

Grace [Gr. *xarís*; Lat. *gratia*]. 1. In general, is used (1) of external form, as elegance or gracefulness. But mainly (2) it involves an inward feeling or disposition. It may refer (a) to favor obtained from another. For the most part, however, (b) its reference is to favor cherished or bestowed; in Script., the Divine favor toward men.

II. **Evangelical Import.**—This, its most important significance, denoting God's favor manifest in Jesus Christ, is to be derived from the N. T., which warrants the following positions: 1. *G.* is a peculiar expression of the Divine Glory. 2. *G.*, though manifest in Chr., is attributed to the One God and to each of the Persons. 3. Men are saved by *G.* 4. *G.* is to the Ch. the source of peculiar gifts (*charisms*), and to believers of success in life and labor. 5. The gospel dispensation is one of *G.*, and to be carefully distinguished from the reign of mere law.

III. **Theological Terms.**—1. *Special or efficacious G.*, that divine influence which, in the soul, changes it from sin to holiness. 2. *Irresistible G.*, used to denote that *G.*, spite all opposition, realizes its purpose. 3. *Gratia antecedens*, the divine work prior to regeneration; *gratia operans*, the same in the soul's renewal; *gratia co-operans*, the Spirit's work subsequently, in which the creature-will, renewed, concurs. 4. *Sovereign G.*, *G.* provided when not deserved, and applied as God wills. 5. *Covenant of G.*, that the Father accepts the

mission and work of the Son, for satisfaction to himself and his law, on the one hand, and on the other, as pledge of salvation, through and in him, of all believers, or the elect. [From orig. art. in *J.'s Univ. Cyc.*, by J. R. HERRICK, D. D.]

Graces, The (*Charites, Grætiæ*), in Gr. and Rom. mythology, the female personifications of beauty and grace. Their names and number and their whole mythos are variously given. In art, they were once represented as draped, but afterward as nude figures, in the bloom of early youth.

Graduation is the art of accurate division as applied to instruments of a mathematical character or those used in all kinds of measurement, as in astron., or of indication, as the surveyor's or mariner's compass. In its most extended sense *G.* is the determination of equal distances as used in art or science.

Common G. consists in copying a scale already prepared by a higher process, and is only used where extreme correctness is not needed. It is effected by means of a *dividing-plate*, which is a disk of metal not more than 30 inches in diameter. Around its inner edge is a series of circles containing all the divisions and numbers requisite. In the centre is a pin or arbor. An index, a very straight, long, narrow plate of fine steel, passes to the centre, but so that one of its sides shall be in a line with the centre of the pin. If now a compass-plate, to be marked with the proper divisions, with a hole in its centre just fitted to receive the centre pin of the disk, be properly placed, we can easily mark the lines required, simply by moving the index from one to the other on the disk. As it moves it moves over the compass-plate also, and the lines are marked with a kind of knife made for the purpose.

Engine G.—Henry Hindley of York was the first inventor of a machine for graduating, and in 1768 the Duke de Chaulnes pub. 2 able works on the subject, which gave to Ramsden the basis for an engine which, though far from perfect, exceeded anything before known. Ramsden's engine, as Tomlinson suggests, has supplied the principle on which later and far more elaborate graduating machines have been constructed; and this is, in effect, simple enough. "A horizontal circle 4 ft. in diameter turns on a vertical axis, its outer edge being ratcheted by an endless screw, one revolution of which carries the circle round $10'$, the screw being worked by pressure with the foot." The circle to be divided is fixed upon the dividing engine, and made concentric with it, and a division is cut with each pressure of the foot.

Original G., as its name indicates, is the art of preparing the original standards by which *common* and *engine G.* are determined. Of the 2 gen. methods recognized in original *G.*, one, *dissection*, is effected by dividing a space into halves, and then again into halves, until the unit of measure is reached; the other, *stepping*, consists of several successive steps, in any of which errors may occur, although in the whole they generally balance each other. Among recent modern inventions is the *standard bar-measurer* of Mr. Whitworth, on which, by means of a metallic frame provided with 2 micrometers, and a simple combination of a screw, tangent screw, wheel, and circle, a division is reached on the circle which corresponds to the $\frac{1}{1,000,000}$ th of an inch. By this machine the distances are of course determined by touch, and not by sight. [From orig. art. in *J.'s Univ. Cyc.*, by CHARLES G. LELAND.]

Gräfe, grä'feh, von (ALBRECHT), M. D., b. in Berlin May 1828; became prof. of ophthalmology at Berlin 1856; acquired a world-wide fame as an operator upon the eye; author of many valuable papers upon his specialty, chiefly pub. in the *Archiv für Ophthalmologie*. D. July 18, 1870.

Gräfe, von (ALFRED KARL), nephew of Albrecht, b. Nov. 23, 1830, grad. at Halle 1858; became assistant to his uncle; founded a very successful ophthalmological inst. at Halle, and became to some extent heir to his uncle's fame.

Gräfe, von (KARL FERDINAND), M. D., b. at Warsaw, Poland, Mar. 8, 1787, grad. at Leipzig 1807; became prof. of surgery at Berlin 1811, a staff-surgeon of the army 1815; was one of the restorers of rhinoplasty and a famous eye-surgeon, in which branch of his profession his son Albrecht became even more famous. D. July 4, 1840.

Grafting. See ENGRAFTING.

Grafton, Dak. See APPENDIX.

Grafton, R. R. junr., cap. of Taylor co., W. Va., on Valley River, 100 m. from Wheeling and same distance from Cumberland, Md. Prin. business, lumber, coal, etc. Pop. of tp. 1870, 1987: 1880, 3030.

Graham (CHARLES K.), b. in New York in 1824; received a liberal education, and entered the U. S. N. as mdpn., and served with his vessel in the Mex. war. At its close he returned to New York, and after continuing his studies for several yrs. under the most competent engineers, commenced private practice. About 1857 he was appointed constructing engineer of the Brooklyn navy-yard, the dry dock and landing-ways being constructed under his supervision. On the outbreak of the c. war he was elected major of the Excelsior Guards, formed mostly of employés in the navy-yard. Throughout the early part of the war Col. G. was actively engaged with his command in the various contests of the Army of the Potomac. In 1864 he was assigned to the command of a gunboat flilla, with orders to proceed to Bermuda, up which he did. During the remainder of the war he was engaged in the field, having attained the rank of brig.-gen. and brevet maj.-gen. of volunteers. Soon after the war ended he returned to New York and resumed the practice of his profession; he has been engineer of the Beach Pneumatic Transit Co., and in 1873 became chief engineer of dept. of docks, in 1878 surveyor of the port of New York, and Mar. 1, 1883, naval officer of it.

Graham (JAMES D.), b. in Prince William co., Va., in 1799; grad. at the U. S. Military Acad., and entered the army as third lieut. of art. July 1817; promoted to be first lieut. Sept. 1819; adjutant at the Military Acad. till Feb. 1819; accompanied Major Long on his W. exploration 1819-

21; on topographical duty and R. R. and military surveys till 1838, when promoted to be major Topographical Engineers; from 1838 to 1850 engaged as astron. to determine the boundary between the U. S. and the republic of Texas; com. in survey of the N. E. boundary of the U. S.; head of the scientific corps and prin. astron. to determine the boundary between the U. S. and the Brit. provs.; on survey of "Mason and Dixon's line," and of the boundary between the U. S. and Mex. Promoted to be col. of engineers 1863, and engaged in survey of the lakes, and in charge of harbors on N. Atlantic coast. D. Dec. 28, 1865.

Graham (JOHN), VISCOUNT DUNDEE and LORD GRAHAM OF CLAVERTHOPE, b. near Dundee, Scot., in 1643; studied at the Univ. of St. Andrew's; served in the Fr. and Dut. armies 1670-77; was made capt. of dragoons by Charles II., and sent into the W. Lowlands against the Covenanters, and obtained a fearful notoriety by his atrocities. In 1688 he was ennobled by James II., whose cause he supported against William III. At Killiecrankie Pass he defeated William's troops, but fell himself July 17, 1689. (See Mark Napier, *Memorials and Letters illustrative of the Life and Times of John Graham of Claverhouse*.)

Graham (JOHN ANDREW), LL.D., b. at Southbury, Conn., June 16, 1764; was admitted to the Connecticut bar in 1785, and removed immediately to Rutland, Vt.; sent to Eng. as agent of the diocese to make application to the Eng. bps. for the consecration of the Rev. Samuel Peters; was unsuccessful. In 1797 he pub. his *Descriptive Sketch of the Present State of Vt.* D. Aug. 29, 1841.

Graham (SYLVESTER), an advocate of the vegetarian dietetic theory, b. in Suffield, Conn., in 1794; entered Amherst Coll. in 1823, to prepare for the ministry, but did not graduate. He began to preach in 1826, but soon left this for the work of temperance and dietetic reform. Wrote *Essay on Cholera, Bread and Bread-making*, etc. D. Sept. 11, 1851.

Graham (THOMAS), D. C. L., F. R. S., b. at Glasgow, Scot., Dec. 21, 1805; became prof. of chem. in the Lond. Univ. 1837-55. He first fully developed the theory of liquid diffusion; made numerous and important discoveries in theoretical and applied chem., and became widely known by his excellent *Elements of Chem.* D. Sept. 16, 1869.

Graham (WILLIAM ALEXANDER), b. in Lincoln co., N. C., Sept. 5, 1804; studied law; was a member of the U. S. Senate 1841-43, and gov. of the State 1845-49; was sec. of the navy under Pres. Fillmore until 1852; in 1852 candidate for V.-P. on the ticket with Gen. Scott; was a member of the Confed. Senate. D. Aug. 11, 1875.

Grahame (JAMES), LL.D., b. in Glasgow, Scot., Dec. 21, 1790; was admitted as advocate to the Scot. bar. Pub. in 1827 a hist. of the U. S., but its Amer. spirit prevented a large circulation. He subsequently brought out *Who is to Blame? or, Cursory Review of the Amer. Apology for Amer. Accession to Negro Slavery*. D. July 3, 1842.

Grain, the unit of the system of weights prevailing in the U. S. and G. Brit. A statute of Henry III. (1266) enacted that 32 G. of wheat from the middle of the ear, well dried, should weigh a pennyweight, of which 20 should go to the ounce; but finally the pennyweight came to be divided into 24 G. At present in the U. S. the troy and apothecaries' lb. each contain 5760 G., or 12 ounces of 480 G. each; while the avoirdupois lb. has 16 ounces of 437½ G. each, or 7000 G. to the lb. There are 15,432,487½ G. in the gramme of the Fr. or metric system of weights, according to Miller's determination made in 1844.

Grain Elevator, an Amer. invention by which grain is loaded in R. R. cars, ships, etc., at a very great saving of labor and cost. An endless belt carries up tin buckets or scoops, each containing a small quantity of grain, which is deposited in an elevated receptacle, whence it is discharged by spouts or chutes into the holds of vessels or into R. R. cars. Elevators for goods or persons, in the hoistways of warehouses, etc., are entirely different in principle and construction from *G. E.*

Grains of Paradise, the seeds of the Malaguetta pepper (*Anomum Meliaguetta*), a plant of W. Afr., cultivated to some extent in Guiana and Trinidad. They are used in giving apparent strength to watered spirits, beer, and wine.

Grackle, or Grack'le (*Gracula*), a genus of birds of the starling family. The paradise G. (*Gracula gryllivora*) is celebrated as a devourer of insects. The *Gracula religiosa* of the E. Archipelago is often trained to talk.

Grallat'ores [Lat. *grallæ*, "stilts"], the wading birds, a Cuvierian order of birds, embracing the orders Limicolæ, Herodiones, and Alektorides of modern systems.

Graminacæ. See GRASSES, by W. W. BAILEY.

Gram'mar (Gr. ἡ γραμματικὴ, from γραμμα, a "letter"), the science of lang., or the art of using words correctly for the expression of thought. As a science, *G.* investigates the relations between words and ideas, examines the structure of speech in gen., and treats of the essential principles common to all tongues. It also places side by side the words of different tongues, with their inflections, and, allowing for the changes of form due to phonetic corruption, seeks by the coincidences it detects to discover the genealogical relationship of langs. As an art, *G.* has to do with the words and structure of some particular tongue; analyzes its sentences into their elements in order to show how those elements may properly be put together; and, furnishing the principles which regulate its use, teaches how to speak and write it correctly. The *G.* of a lang. is generally considered under 4 heads: orthography, which considers letters, syllables, and spelling; etymology, which treats of the "parts of speech," and the changes of form that words undergo to express different relations; syntax, which deals with the relation, agreement, government, and arrangement of words in sentences; and prosody, which has for its province the accent and quantity of syllables and the laws of versification. To these is sometimes added a 5th division, orthoepy, which treats of pronunciation.

The labors of later grammarians have consisted chiefly in

simplifying, illustrating, adapting, and carrying out the work of their predecessors; as regards the great principles of the art, they have added little that was really new. What is today taught in our schools as G., whether Eng., Lat., or Gr., has substantially the same frame-work that was constructed centuries ago. There has been little change; from the very nature of things little could be expected. Much as our present systems of G. have been decried, much as has been said in favor of banishing them from the schools, and letting the young learn to speak and write by imitation or by so called natural processes, there yet remains to be found a royal road to the learning of lang., which can dispense with the classification of words, the formal array of declensions and conjugations, verbal and sentential analysis, and syntactical rules based on the usage of standard writers. [From orig. art. in *J. S. Univ. Cyc.*, by Prof. G. P. QUACKENBOS, LL.D.]

Gramme, commonly in Eng. written *gram* [Gr. *γρᾶμμα*, a letter], the unit of weight in the metric system of weights and measures. Theoretically it is the weight in vacuo of a cubic centimetre of distilled water at the temperature of maximum density, assumed to be 4° C. or 39.1° F. Practically it is the one thousandth part of the weight of the standard kilogramme in platinum, deposited June 22, 1799, in the Palace of the Archives in Paris, by the international commission appointed to fix the standards, who on that day completed their work. (See METRIC SYSTEM.) In Troy weight the G. is 15.43234 grains. Though the G. is the unit base of the system of metric weights, it is the practical unit only where small quantities are concerned, as in med., chem., coinage, etc. The usual commercial unit is the kilogramme = 2.20462 lbs. avoirdupois.

Grammont, Order of, called also **Grandmontains**, an order of monastics established at Muret, near Limoges, in Fr., in 1076, by Stephen of Thiers, who wore a shirt of steel rings and slept in a coffin. Gregory VII. imposed the rule of St. Benedict. In 1124, after Stephen's death, the order was removed to Grandmont, whence it took its name. The Grandmontains were at first allowed to hold no lands or chs. This was one of the orders whose members were known as Bons Hommes. The order perished at the Revolution, having at last become degenerated.

Grand plains, a range, or rather system of mts, which traverse Scot. from N. E. to S. W., from the Atlantic to the N. Sea. The highest point is Ben Nevis, 4408 ft.; the gen. height is from 2000 to 3000 ft. Toward the N. they send forth ranges forming extensive highlands; toward the S. they slope more gently.

Grampus [Fr. *grand poisson*, "great fish"], a name applied to various cetaceans of the family Delphinidae and of the genera *Grampus*, *Globicephalus*, *Orca*, etc.

Granada was one of the largest and richest kingdoms which the Moors established in Sp. It had an area of 11,063 sq. m. of diversified and fertile land, bordering S. on the Mediterranean, and traversed by the Sierra Nevada, from whose snow-clad peaks the ground gradually sinks into the low plain of Andalusia. In the time of the Romans this territory belonged to the prov. of Bætica. After the invasion of the Moors it formed part of the kingdom of Cordova until 1235, when it rose into an independent kingdom, with Granada as its cap. Here the genius of the Moorish people seems to have had its finest inspirations. The land was densely peopled, the soil excellently cultivated, and the kingdom covered with works of arch. and engineering. But in 1492 the kingdom of G. was conquered by Ferdinand and Isabella, and in 1510 the Moors were expelled from Sp. Pop. 477,719.

Granada, city of Sp., is built on 2 spurs of the N. range of the Sierra Nevada, at an elevation of 2445 ft. above the sea. G. is the see of an abp., has a univ. founded in 1531, and a large cathedral, most gorgeously decorated, and containing the monuments of Ferdinand and Isabella. But its chief interest is derived from its historical remains. It was founded by the Moors in the 8th century, and became in 1248 the cap. of the kingdom of Granada. It had 400,000 inhabs., and was surrounded by a strong wall crowned by 1030 towers; and in spite of centuries of decay, the Alhambra and many other buildings fascinate the traveller. Pop. 76,005.

Granadilla [Sp. dim. of *granada*, a pomegranate], the fruit of several tropical species of passion-flower. The great G. is the fragrant, sub-acid fruit of *Passiflora quadrangularis*, whose root is emetic and narcotic.

Granby (John Manners), MARQUIS OF, b. Jan. 2, 1721, commanded the Brit. troops in the Seven Years' war 1760-63; was distinguished at Warburg 1760, at Kirchdenken 1761, at Gräbenstein and Homburg 1762; master-gen. of ordnance 1763; commanded the Brit. army 1766-70. D. Oct. 19, 1770.

Grand Bank, the subaqueous plateau in the N. Atlantic which extends E. from Newfoundland toward Europe. It is believed that it is largely due to melting of icebergs by warm waters of Gulf Stream. The icebergs bring great amounts of gravel, earth, and stone, and as they melt this matter is deposited upon the sea-bottom. The G. B. is the most important of the known resorts of the cod-fish.

Grand Army of the Republic. See APPENDIX.

Grand Crossing, Ill. See APPENDIX.

Grand Forks, Dak. See APPENDIX.

Grand Haven, city and R. R. junc., cap. of Ottawa co., Mich., on Lake Michigan, opposite Milwaukee, Wis. It is connected with Milwaukee, Chicago, and ports N. and S. by daily lines of steamers. It has a public library and magnetic mineral springs, and is a summer resort. Pop. 1870, 3147; 1880, 4862; 1884, 5914.

Grand Island, city and R. R. junc., cap. of Hall co., Neb., situated in the Great Platte Valley, 153 m. W. of the Mo. River, on the Union Pacific R. R. Prin. business, handling and shipping grain. Pop. 1880, 2963.

Grand Junction, Col. See APPENDIX.

Grand Jury, a jury whose province it is to determine whether indictments shall be brought against alleged criminal offenders. In the U. S. provisions have been inserted in the national const., and for the most part in the State

consts. as well, prohibiting criminal prosecutions for all but an inferior class of offences, or such as occur among the military or naval forces, except upon the presentment or indictment of a G. J.

As constituted under the common law, a G. J. must consist of not more than 24 members nor less than 12, but in practice not more than 23 are ever sworn, in order that 12 may form a majority, for the concurrence of at least this number is always required that a bill of indictment may be found. The G. J. receives its name from its size, to distinguish it from the petit (i. e. "little") jury, which consists of only 12 men. There is also a diversity between them in another important respect, since it is a rule in regard to a petit jury that unanimity is required, instead of the agreement of a mere majority. In a few of the Amer. States the number of members composing a G. J. has been altered by statute. In N. Y., for example, it varies from 16 to 23, in Mass. from 12 to 23, but the rule that 12 only need concur seems to have been uniformly retained. In performing their duties of investigation they sit in secret, and may either consider and pass upon bills of indictment presented by the atty.-gen. or other officer representing the govt., or they may make presentments by themselves independently. Evidence is adduced before them in support of the prosecution. The decision of the jury that an indictment shall be brought against the accused merely indicates that in their opinion the evidence against him is of sufficient weight to justify his being brought to trial; the introduction of his defence ultimately before the petit jury may establish his perfect innocence. If the requisite number of members of a G. J. are satisfied, from the evidence presented to them, of the truth of the accusation, they write upon the back of the indictment the words, "A true bill," but if they are convinced of the groundlessness of the charge, the indorsement is "Not a true bill," or "Not found." Formerly they used in this latter case the word *Ignoramus*, "We are ignorant." After all the accusations laid before the jury are considered, and indictments found or denied, their labors are ended, and the causes are ready for trial before a petit jury.

Grand Ledge, on R. R., Easton co., Mich., 12½ m. from Lansing. It has a good improved water-power and 4 mineral wells, and is a resort for invalids. Pop. 1880, 1387.

Grand Manan [*manan*, signifies "island" in the Passamaquoddy lang.], an island in the Bay of Fundy, belonging to N. B. It is 32 m. long and from 3 to 6 m. in breadth. It is fertile and well timbered, and its coast abounds in good harbors. The herring, haddock, and cod fisheries are important. Pop. 2616.

Grand Monadnock, or **Monadnock**, an isolated mt.-peak in Jaffrey tp., N. H. It is 3718 ft. high, and is visible for many miles in every direction. It is regarded as an outlying member of the White Mt. group.

Grand Pensionary, in the former Dut. republic, the state sec. for the prov. of Hol. He was originally also advocate-gen. for the same prov. In later times he was, by virtue of his position, an official of the states-general, a kind of premier in that body, and a virtual minister of foreign affairs. His term of office was 5 yrs. The syndic or paid counsellor of any important Dut. town was called a pensionary.

Grand-Pierre (JEAN HENRI), D. D., b. at Neuchâtel, Switz., in 1799; was called to be an assistant pastor at Bâle, Switz., in 1823. Here his success was so remarkable that his reputation extended beyond his own country to Fr. In 1827 he was called to Paris to take charge of the House of Missions, a theological sem. for training young men for the work of foreign missions. He was not only pres. of this inst., but also prof. of theol., of langs., etc., and became known as one of the most eloquent and successful preachers in Paris. It was at the time of the revolution of July 1830 that a remarkable revival of religion occurred among the Prots. of Paris, and G.-P. was one of the most eminent ministers engaged in it. He did not join the movement for an independent ch., which was one of the results of this revival, but remained in connection with the national ch. After the death of his colleague, M. Adolphe Monod, he was the acknowledged leader of the orthodox party in the Reformed Ch. Under Louis Philippe the govt. gave him "grand letters of naturalization for his distinguished services to Fr." Under Nap. III. he was made a member of the Legion of Honor. In 1838 the Coll. of N. J. conferred upon him the degree of D. D. He twice visited Amer., publishing an account of his first visit in his *Glance at Amer.* in 1850. He was in this country in 1870, when the Franco-Ger. war broke out, but hastened home, and reached Paris just as the empire fell and the republic was proclaimed. With his wife he passed through the privations of the siege and the horrors of the Commune. He resigned his position in 1872, and retired to Lausanne in Switz. D. July 10, 1874.

Grand Pré, a v. on the Basin of Minas, Horton tp., N. S., on the Windsor and Annapolis R. R., 15 m. from Windsor, is the scene of Longfellow's *Evangeline*. It is the seat of a sem. It was settled by the Fr. under De Monts in 1604, but they were expelled by the Va. colonists in 1613. The Pré is a fertile tract of dyked land. Area, 10 sq. m. Pop. 1580.

Grand Rapids, city and important R. R. centre, cap. of Kent co., Mich., at the head of navigation on Grand River, 30 m. E. of Lake Michigan. It is an important distributing point for pine and hard-wood lumber. Extensive quarries of gypsum are operated near the city. It is the place for holding the U. S. circuit and dist. courts for the W. dist. of Mich. It has a public library of 7000 vols. Grand River at this point has a fall of 17 ft. in a distance of 2 m., affording excellent water-power, which is used for manufacturing and milling purposes. Pop. 1880, 32,016; 1884, 41,934.

Grand Rapids, Wis. See APPENDIX.

Grange [Lat. *grangium*; Sp. and Port. *granja*; Fr. *grange*], an old Eng. word, signifying primarily a granary; then the out-houses of the farm, its stables, etc.; also used to indicate an isolated farm-house of the better class, a sort of semi-castle, as The Grange, Suffolk Grange, La Grange. Since 1867 it

has been selected by the order of Patrons of Husbandry as the designation of their National, State, and subordinate organizations. The National G. is composed of masters and past-masters of State organizations and their wives, the founders of the order, and the present and past officers of the National G. itself. The State G. are composed of the masters and past-masters of the subordinate G. (in a State where there are many G. generally of the county officers only), with their wives, who are members of the order, and the deputies or organizing officers, as well as the present and past officers of the State G. itself. The subordinate G. are composed of the officers and lay members, male and female, within a given territory, or in a city those who from acquaintance or other causes most naturally affiliate with each other. All the members of the G. must be "interested in husbandry," and not connected with any interest which is in conflict with it. Every fully organized G., whether subordinate, State or National, should have 13 officers, 4 of whom are women. The room or hall in which the meetings of the G. are held is designated as the G.-room. The exercises at the meetings of the G., aside from those belonging to its secret work or ritual, are social, intellectual, politico-economic, and moral. Partisan politics may not be discussed; but in gen., especially in the agricultural dists., it is only a more effective farmers' club.

Granger (FRANCIS), b. at Suffield, Conn., Dec. 1, 1792, son of Gideon Granger; was member of gen. assembly of N. Y. 1826-31; M. C. 1835-37, 1839-40, from N. Y.; appointed in Mar. 1841 U. S. P. M.-gen.; delegate to peace convention Feb. 1861. D. Aug. 28, 1868.

Granger (GIDEON), b. in Suffield, Conn., July 19, 1767, grad. at Yale Coll. in 1787; became a lawyer; was a member of the Conn. legislature, one of the originators of the Conn. school fund, P. M.-gen. 1801-14; in the State senate 1819. D. Dec. 31, 1822.

Granger (GORDON), b. in New York in 1821, grad. at the U. S. Military Acad.; entered the army as brevet second lieutenant of inf. July 1845; served in the war with Mex.; promoted to be capt. May 1861. When the c. war commenced he was in June assigned to duty on the staff of Gen. Sturgis, and participated in the battles of Dug Spring and Wilson's Creek. In Sept. he was appointed col. 2d Mich. Cav., and in Mar. 1862 brig.-gen. U. S. volunteers, serving in Tenn. Promoted to be maj.-gen. of volunteers Sept. 1862, he commanded in Ky. and Tenn., and at the defence of Franklin successfully repulsed the attack of Gen. Van Dorn; at the battle of Chickamauga he drove back the columns of Longstreet; at the battle of Missionary Ridge he commanded the 4th army corps; in the S. W. the 13th corps, being engaged in the siege of Ft. Morgan and Spanish Ft., the storming and capture of Blakely, and final occupation of Mobile; subsequently commanded the dist. of Tex. and dept. of Ky.; received the successive brevets from major to that of maj.-gen. U. S. A. In July 1866 he was appointed col. 25th Inf.; transferred to 15th Inf. in 1870. D. Jan. 10, 1876.

Granger (ROBERT S.), b. in O. in 1816, grad. at the U. S. Military Acad.; entered the army as second lieutenant of inf. July 1838, promoted to be major 1861. His first service was in Fla., in the war against the Seminole Indians till 1841; was on frontier duty mostly up to 1861, at which date he was capt. 1st Inf., stationed in Tex., where he was captured Apr. 27. He was subsequently paroled, and not exchanged till Aug. 1862. In Sept. 1862 he was appointed brig.-gen. Ky. volunteers and acting brig.-gen. U. S. volunteers, serving in Ky. and Tenn. Brevetted maj.-gen.; mustered out of volunteer service Jan. 1866; was promoted to be col. 21st Inf. Aug. 1871. Retired Dec. 1873.

Granier de Cassagnac (ADOLPHE), b. at Bergelles in 1808; in 1832 became one of the eds. of the *Journal des Debats*; advocated the maintenance of slavery in the Fr. colonies; was chief ed. of *Le Pays*. D. Jan. 30, 1880.

Granier de Cassagnac (PAUL), son of Adolphe, b. about 1841; became assistant to his father on *Le Pays* 1866, and afterward chief ed.; he is the champion of imperialism, less by his pen than by his sword, and employed in numerous "affairs of honor;" served as a volunteer in the Franco-Ger. war, and was taken prisoner at Sedan.

Granite, a crystalline granular rock essentially composed of quartz, feldspar, and mica, but often containing other minerals, such as hornblende, talc, etc., in such quantities as to modify its structure and produce varieties which have received distinct names. G. is the most widely diffused of all known rocks, and as it is usually strong and durable, and may be quarried in blocks of any desired size or form, it has always been largely employed for architectural purposes. From its density and granular structure it works with difficulty under the chisel, and is rarely employed for ornamental work where elaborate carving is required, but it receives a high polish, and is therefore well adapted to the construction of columns, obelisks, etc. From the qualities mentioned, G. is more especially suited to the construction of docks, bridges, foundations, and the more massive kinds of buildings. The prevailing colors of G. are gray and red, a difference occasioned by the presence or absence of iron in the feldspar. This feldspar is usually orthoclase, in which the alkali is potash, but it is frequently albite—soda-feldspar. In strength G. exceeds all other building-stones in common use. Its resistance to a crushing force varies, according to trials reported, from 13,000 to 23,000 lbs. to the square inch. Its weight is about 166 lbs. to the cubic ft.; hence a cubic yard weighs about 2 tons. The specific gravity of ordinary granite is 2.66. It usually contains nearly 1 per cent. of water. G. has been largely employed for architectural purposes from the most anc. times. Many of the monuments of Egypt are constructed from syenitic G. quarried at Syene in Upper Egypt, and where not marred by violence some blocks of this stone which have been exposed to the action of the weather for more than 4000 yrs. show little deterioration. G. has, however, this peculiarity, that, owing to the unequal expansion of

its parts, it cracks, and sometimes explodes, when exposed to the action of fire, and is therefore more easily destroyed by this agent than sandstone, brick, or even marble.

The G. used in the U. S. are obtained from many sources, the larger part being derived from quarries on the coast of N. Eng. The islands off the coast of Me. are chiefly composed of G., and on Dix Island and Mt. Desert gray G. of excellent quality are found, which are extensively quarried to supply the demand in the cities on the Atlantic slope of the U. S. The gray G. quarried at Quincy, Mass., is one of the best known and highly esteemed varieties used in this country. A G. of similar quality but of lighter color is brought from Concord, N. H. The red G. now so much used for monumental purposes in this country is brought from Peterhead, near Aberdeen, Scot., and is justly esteemed for its beauty, closeness of texture, and homogeneity. A gray G. is also imported from Aberdeen. This also takes a high polish, and is much used for monuments and columns. A red G. resembling that brought from Scot. is found at St. George, N. B., on the Bay of Fundy. In beauty and durability it is scarcely inferior to its foreign rival. In all the mt.-chains of our country granitic rocks abound, and excellent stone of red or gray color may be obtained from a great number of localities. In the Laurentian area back of Marquette, Lake Superior, a red syenite occurs which is fully equal in beauty and durability to the Aberdeen G. In the Rocky Mts. both red and gray G. abound, and in the S. portion the G. which forms the core of many of the ranges is red, and resembles Scotch G. In the Sierra Nevada the G. are generally gray, and sometimes nearly white. J. S. NEWBERRY.

Granite Falls, Minn. See APPENDIX.

Grant. In its most comprehensive sense the term *grant* denotes a transfer of any kind of property from one person to another, but it acquired at common law a specific technical signification, being confined in its application to a conveyance of such intangible interests in real property as reversions, rents, franchises, and other kinds of incorporeal hereditaments. (See HEREDITAMENTS, INCORPOREAL.) In the early hist. of the Eng. law feoffment and G. constituted the only modes of conveyance unconnected with judicial proceedings, and corporeal hereditaments were said to "lie in livery"—those incorporeal to "lie in grant." The G. was evidenced by a deed containing appropriate words of transfer, as *dedi et concessi* ("I have given and granted"), and corresponding terms have been retained in conveyances by deed until the present day. But the old system of feoffment has gone out of use, and it has been declared by statute in Eng. that the distinction between corporeal and incorporeal forms of real property shall be abolished, and that transfer by G. shall be sufficient for both these classes of estates. In the U. S. also the anc. and distinctive meaning of the word has received important modifications. Still, in a majority of the States it would be generally employed, if used at all, with particular reference to the conveyance of incorporeal interests, as formerly. But in some States nearly every form of conveyance is denominated a "grant."

Beside "private G.," which is a transfer by a private person, there is a mode of conveyance known in law as "office G.," which consists in a transfer of land made by some officer of the law where the owner is either unwilling or unable to execute the necessary deeds to pass the title. An example would be the conveyance of lands sold by a govt. official for the payment of taxes. The phrase "public G." is employed to designate the mode of creating a title in an individual to lands which had previously belonged to the govt. Conveyances of this kind are also termed "letters-patent."

Grant (SIR ALEXANDER), BART., LL.D., 8th baronet of his line, b. 1826, was ed. at Harrow and Balliol Coll., Ox.; became a fellow of Oriel 1849, an examiner for the Indian civil service 1855, came to the baronetcy 1856; was a public examiner at Ox., appointed inspector of schools in the Madras presidency 1858, prof. of hist. and political economy in Elphinstone Coll., Madras, 1860, and its principal 1862; vice-chancellor of the Univ. of Bombay 1863; director of public instruction, Bombay presidency, 1865; vice-chancellor and prin. of the Univ. of Edinburgh 1868.

Grant (JAMES AUGUSTUS), b. at Nairn in 1827, ed. at the gram. school and at the Marischal Coll., Aberdeen. In 1845 he was appointed to the Indian army, and served at both sieges of Mooltan; was present at the battle of Gojerat, and did duty with the 78th Highlanders at the relief of Lucknow. In 1863 he accompanied the late Capt. Speke on his exploration of the source of the Nile, a joint account of their travels being pub. in 1864, and was made Companion of the Bath in 1866; accompanied the Abyssinian expedition under Lord Napier in 1868, and was nominated a companion of the order of the Star of India.

Grant (Gen. SIR JAMES HORE), b. in 1808; entered the army in 1826 as cornet in the 9th Lancers; served with distinction in Chi. as brigade major; served with his regiment at Sobraon, commanding it in the battles of Chillianwallah and Gojerat; in 1858 was made a maj.-gen. and nominated a Knight Commander of the Bath for his eminent services in command of the cav. division at the siege of Delhi, at the relief of Lucknow, and in subsequent operations at Cawnpore. In the campaign in Chi. terminating with the capture of Peking he commanded the Brit. forces throughout. Author of *Incidents of the Sepoy War*. D. Mar. 7, 1875.

Grant (Gen. SIR PATRICK), b. at Duthill, Elginshire, Scot., in 1804; served for many yrs. with distinction in India, and took part in the battles of Maharajpore, Moodkee, and Sobraon. In 1857 he was appointed commander-in-chief of the army in India at the period of the mutiny, and was gov. of Malta 1867-72.

Grant (ULYSSES S.), 18th Pres. of the U. S., was b. Apr. 27, 1822, at Point Pleasant, Clermont co., O. His father was of Scotch descent, and a dealer in leather. At the age of 17 he entered the Military Acad. at W. Pt., and at 21 grad. 21st in a class of 39, receiving the commission of brevet second lieutenant.

He was assigned to the 4th Inf., and remained in the army 11 yrs. & was engaged in every battle of the Mex. war except that of Buena Vista, and received 2 brevets for gallantry. In 1848 he married Julia, daughter of Frederick Dent, a merchant of St. Louis, and in 1854 resigned his commission of capt. in the army. For several yrs. he was engaged in farming near St. Louis, but met with small success, and in 1860 he entered the leather trade with his father at Galena, Ill. When the c. war broke out G. was entirely unknown to public men, and without any personal acquaintance with great affairs. Pres. Lincoln's first call for troops was made on the 15th of Apr., and on the 19th G. was drilling a company of volunteers at Galena. Then the gov. of Ill. employed him in the organization of volunteer troops, and at the end of 5 weeks he was appointed col. of the 21st Ill. Inf. He reported first to Gen. Pope, in Mo. On Aug. 7 he was commissioned a brig.-gen. of volunteers. On Sept. 1 he was placed in command of the dist. of S. E. Mo., with headquarters at Cairo, and on the 6th, without orders, he seized Paducah, at the mouth of the Tenn. River, and commanding the navigation both of that stream and of the Ohio. This stroke secured Ky. to the U. Early in Nov. he was ordered to make a demonstration in the direction of Belmont, a point on the W. bank of the Miss. about 18 m. below Cairo. On the 7th he landed at Belmont, broke up and destroyed the Confed. camp under a heavy fire from Columbus, and was returning to his transports when large reinforcements arrived from the E. bank to intercept him. G. cut his way out, with 3000 men against 7000.

Early in Feb. 1862 he was allowed to move up the Tenn. River against Ft. Henry, in conjunction with a naval force. The gunboats silenced the fort, which surrendered on the 4th, before the troops arrived. On the 12th, with 15,000 men, he began the siege of Ft. Donelson, about 12 m. off, on the Cumberland River. On the 16th the Confeds. surrendered unconditionally 65 cannon, 17,600 small-arms, and 14,623 soldiers. About 4000 more had escaped in the night, and 2500 were killed or wounded. G.'s entire loss was less than 2000. On the last day of fighting his numbers amounted to 21,000. He was made a maj.-gen. of volunteers, and placed in command of the dist. of W. Tenn. In Mar. he was ordered to move up the Tenn. River toward Corinth. His forces, numbering 38,000, were accordingly encamped near Shiloh, or Pittsburg Landing, on the W. bank of the Tenn., waiting the arrival of Gen. Buell with 40,000 more; but on Apr. 6 the Confeds. came out from Corinth, 50,000 strong, and attacked G. violently, hoping to overwhelm him before Buell could arrive; 5000 of his troops were beyond supporting distance, so that he was largely outnumbered, and the national forces were pushed back to the river. There, however, G. held out till dark, when the head of Buell's column came upon the field. On the 7th the combined national armies attacked and drove the hostile force, who retreated as far as Corinth, 19 m. G. was senior in rank to Buell, and commanded on both days. His entire loss was 12,217; that of Beauregard, the Confed. commander, was 10,617. Two days afterward Halleck arrived at the front and assumed command of the army, G. remaining at the head of the right wing and the reserve. On May 30 Corinth was evacuated. In July Halleck was made gen.-in-chief, and G. succeeded him in command of the dept. of the Tenn. On Sept. 19 he fought the battle of Iuka, gaining an incomplete victory. Subsequently he fortified Corinth, and directed the operations which resulted in the repulse of the Confeds. from that place on the 3d and 4th of Oct. and in the battle of the Hatchie on the 5th. On Nov. 2 G. began a movement into the interior of Miss. While he threatened Vicksburg from the rear with 30,000 men, Sherman was sent by way of the Miss. River with 40,000 to attack it in front. G. advanced without opposition as far as Oxford, 50 m., when Holly Springs, his prin. base of supplies, was surrendered by Col. Murphy, who was dismissed from the army in consequence. This compelled the abandonment of the campaign, and G. returned to the neighborhood of Corinth. Sherman's assault on Vicksburg failed at about the same time. In Jan. 1863 G. took command in person of all the troops in the Miss. Valley, and moved by the river to a point opposite Vicksburg; in Apr. following he marched his army through the swamps on the W. bank to a place below Vicksburg, while the gunboats and the transport fleet ran the batteries under a terrific fire. On Apr. 30 he crossed the river, and landed at Bruinsburg, 30 m. S. of Vicksburg. There were now 2 armies opposed to him. Pemberton, with 52,000 men, defended Vicksburg, and Johnston, with a smaller but rapidly increasing force, was at Jackson, 50 m. farther E. G.'s column was 43,000 strong. He at once abandoned all communication with the river, and pushed into the interior between the 2 hostile armies. On the 1st of May he met and defeated a portion of Pemberton's command at Pt. Gibson; then advancing eastward, on the 12th he fell upon and destroyed a force coming out from Jackson to resist him; on the 14th he captured Jackson and scattered Johnston's army. Turning the same day to the Miss., on the 16th he utterly routed Pemberton's entire force at Champion's Hill; on the 17th, pursuing hotly, he came up with the enemy and beat him again at Black River Bridge, and on the 18th drove him into Vicksburg, encamping in its rear, with his own base once more on the Miss. On the 19th and 22d he made unsuccessful assaults, and on the 23d began a regular siege. On the 4th of July the place surrendered with 31,600 men and 172 cannon, at that time the largest capture of men and material ever made in war. During the entire campaign the Confeds. lost 60,000 men. G.'s entire loss was 8873. The Miss. River was thus opened to the sea. He was now made a maj.-gen. in the regular army. On Oct. 16 he was placed in command of the military division of the Miss., which included the armies of the Ohio and the Cumberland, as well as that of the Tennessee, with which he had been so long associated. On Oct. 23 G. reached Chattanooga, and on the 27th the battle of Lookout Valley,

fought under his direction, relieved the Army of the Cumberland. On Nov. 23, 24, and 25 he fought the battle of Chattanooga, utterly defeating Bragg, driving him from positions that seemed impregnable. G. lost 6616; the Confeds. reported 2500 killed and wounded and lost 5000 prisoners. G.'s force was 60,000; that of Bragg, 45,000.

In Feb. 1864 the rank of lieutenant-gen. was created for him by Cong., and on Mar. 17 he assumed command of the armies of the U. S. He now prepared to encounter in person the Army of Northern Virginia, under Lee, and at the same time, by his subordinates, to occupy all the remaining forces of the enemy, so that no Confed. army could in any emergency or by any possibility support another. Accordingly, while he sent Sherman into Ga., and directed Sigel to penetrate the Valley of Va., and Butler to capture Richmond, he fought his own way from the Rapidan to the James. On May 4 he could put into battle 110,000 soldiers; Lee confronted him with 75,000, while 30,000 under Butler were opposed by the same number at Richmond, and Sigel with 7000 fought Breckenridge with 5000 or 6000. Before G. reached the James he had lost 6000 men killed, 26,000 wounded, and nearly 7000 missing. The losses of Lee's troops can never be known, as their records were destroyed by their own hands; but G. captured in this period 10,000 men (4000 more than Lee), and it is probable that the entire loss of the enemy was little if any less than his, although Lee fought constantly on the defensive. The battles of the Wilderness, Spotsylvania, North Anna, and Cold Harbor were the hardest G. ever fought. He was more anxious to annihilate Lee's army than to effect any purely strategic result, or even to capture Richmond, for he believed that only by the annihilation of Lee could the Confederacy be overthrown. With this view and for this purpose the campaign of the Wilderness was planned and fought. When G. arrived in front of Richmond he crossed the James, in pursuance of the design formed months before. Butler had failed to take the city, and his army was now joined to that which had fought its way from the Rapidan; and in June the siege of Richmond was begun. Sherman, meanwhile, was advancing toward Atlanta; but Sigel had been defeated in the Valley of Va., and was superseded by Hunter, who made his way as far as Lynchburg, and was then in his turn repelled. Hunter's retreat left open a road to Wash., and Lee sent Early to threaten the national cap.; whereupon G. gathered up a force which he placed under Sheridan, and that commander rapidly drove Early, in a succession of battles, through the Valley of Va., and destroyed his army as an organized force. But the siege of Richmond still went on. The Confeds. were gallant and stubborn, and though G. made numerous attacks, he was only partially successful. By Sept. Sherman had fought his way to Atlanta, and G. then sent him on his famous march to the sea. He made Sherman's success possible, not only by holding Lee in front of Richmond, but by sending reinforcements to Thomas, who then drew off and defeated the only army which could have confronted Sherman. Sherman by this strategy was left unopposed, and finally reached Savannah; Schofield beat the enemy at Franklin, Thomas at Nashville, and Sheridan wherever he met him. Schofield was now brought from the W. and Ft. Fisher and Wilmington on the seacoast were captured, so as to afford him a foothold; from here he was sent into the interior of N. C., and Sherman was ordered northward to join him. When all this was effected, and Sheridan could find no one else to fight in the Valley, G. brought the great cav. leader to the army in front of Richmond. When the final campaign began, Lee had collected 73,000 fighting men in the lines at Richmond, beside the local militia and the gunboat crews, amounting to 5000 more. Including Sheridan's force, G. had 110,000 men in the works before Petersburg and Richmond. Petersburg fell Apr. 2, Richmond on the 3d, and Lee fled in the direction of Lynchburg. G. pursued with remorseless energy, only stopping to strike fresh blows, and Lee at last found himself completely surrounded, and on Apr. 9, 1865, he surrendered at Appomattox C.-H., in the open field, 27,000 men, all that remained of his army. During the yr. G.'s entire loss among the troops immediately under his command, including those in Butler's army, amounted to 12,663 killed, 49,559 wounded, and 20,498 missing; total, 82,720. He captured in the same time 66,512 soldiers; of the Confed. killed and wounded no return was ever made. His forces had never been more than $\frac{1}{4}$ greater than those of his antagonist, and he had constantly fought on the offensive. The terms granted to Lee at Appomattox were so magnanimous that the whole pop. of the S. at once sought to share their benefits. All the other Confed. armies surrendered, and the greatest c. war in hist. was at an end.

G. returned at once to Wash. to superintend the disbandment of his armies. This work was scarcely begun when Pres. Lincoln was assassinated. This event made Andrew Johnson Pres., but left G. by far the most conspicuous figure in the public life of the country. In July 1866 he was made gen. of the U. S. A., a rank created for him. Cong. passed laws to restrain the Pres. and giving G. an amount of power unknown before to any subordinate. His position was extremely delicate. He was a soldier, and it was his duty to be subordinate to the Pres. Yet the Pres. was in direct opposition to Cong. G., however, for a long time was able to comply with the directions of Cong. without offending the Pres. Johnson, indeed, sought to obtain the sanction of G.'s name for his policy. He suspended the sec. of war, and placed G. in his stead, and the soldier for some months (Aug. 1867 to Jan. 1868) was a member of Mr. Johnson's cabinet. Finally, however, it became necessary for him either to break with the Pres. or by compliance, as he thought, to disobey the law, and he refused to do the latter. From this time Pres. Johnson was his political and personal enemy. In 1868 G. was elected Pres. by large majorities. He was inaugurated Mar. 4, 1869. In 1872 he was re-elected by a larger vote and majority than any candidate

Granular Lids.

See (OPHTHALMIA.

Gran'ville, N. Y. See APPENDIX.

Grape-Sugar. See GLUCOSE

Orimetes sold at \$40 the lb. The Siberian Gf from the Almet mine is used in the same way for the manufacture of pencils, the monopoly of which has been enjoyed by A. W. Faber of Stein, Ger. This house has consumed nearly 100 tons of Siberian G., brought by a long and expensive overland route from the frontier of Chi. Although the pencils made from the purest natural G. are most highly esteemed, nearly all those used at the present day are manufactured from G. which is washed free from its impurities, ground to an impalpable powder, and then consolidated by pressure, with or without cement. For the harder pencils a considerable quantity of fine clay is mixed with the powdered G. The great source of supply of G. at the present time is Ceylon. G. is also produced in considerable abundance at Harnon, Swe.; at Passau, Bavaria; Schwarzbach, Bohemia; Stiermark, Austria, and has been recently discovered in New Zealand. The U. S. Sec. has secured a considerable local supply named only at Sturbridge, Mass., Ticonderoga, and Fishkill, N. Y., Brandon, Vt., Wake, N. C., and at the Eureka mine, Sonora, Cal.; the latter, it is said, can yield 1000 tons per month. Important deposits of G. are also known to exist in Canada, the most considerable of which is perhaps that of Buckingham on the Ottawa River. J. S. NEWBERRY.

J. S. NEWBERRY.

Phleum pratense, a detached spikelet, magnified, showing the base with its pappus raised above the glumes.



Phlox polystachya, a detached spikelet, magnified, showing the with its pedicels raised above the calyxes, to the midrib. The flowers are arranged in spikes, as in the timothy (*Phlox pratensis*), or in panicles, as in the bent-grass (*Agrostis*). The flowers are inclosed by 3-ranked, imbricated bracts. The outer ones are called *glumes*, and the inner ones, or *paleas*, are known as *lemmae*. The *crystalline* fruit, in which the seed completely fills the cell and adheres to the pericarp. Embryo small, on the outside and at the base of the floury albumen. [From orig. art. in J. L. Carr. Can. by W. W. BAILEY.]

Grasshopper, a term popularly and very loosely applied in Amer. to all sorts of saltatorial Orthoptera, of which there are 3 prin. divisions: CRICKETS are distinguishable from the others by having the wing-covers placed horizontally on the back. They have but 3 joints to the tarsi or feet, and their organs of hearing and feeling, the antennæ, are very long, while those of sight are generally small. GRASSHOPPERS may be distinguished by having 4 joints to the feet. The wing-covers are roofed, and slope downward at the sides of the body: they are long and wide, and those of the male are furnished at the base with a talo-like plate which produces the usual chirrup as the wings are rubbed sharply over one another. The female is distinguished by having an exerted or sabre-shaped ovipositor. Most grasshoppers are green, and their legs, though longer, are not so muscular as those of locusts. They are mostly nocturnal insects, and their antennæ are consequently long and tapering. They are also more solitary, never migrating in multitudes, like locusts. Locusts are distinguished from the

above insects by having much shorter, thread-shaped antennae, which terminate abruptly, or are sometimes even club-shaped. The feet appear on the under side 5-jointed, but are in reality only 3-jointed, the basal joint being long, with 2 impressions underneath. They nearly all agree in having straight, narrow wing-covers, lapping over and forming a ridge on the back. The female has, instead of the projecting piercer of the G., 4 short horny, cuneiform projections, placed in pairs, and opening and shutting opposite to each other. Their stridulation is produced by rubbing the posterior femora or thighs against the prominent nerves of the wings while resting on the fore legs. They are more robust, more muscular than grasshoppers, being so much narrower, do not so impede their passage through the air. [From orig. art. in *J's Univ. Cyc.*, by C. V. RILEY, M. D.]

Grassmann, HERMANN GENTHER, b. at Stettin, Pruss., Apr. 15, 1809; was an instructor in Stettin 1834-52; took his father's professorship of math. in the gymnasium of Stettin 1852. He pub. philological works of importance, but was chiefly noted for his profound treatises upon the theory of math. D. Sept. 26, 1877.

Grass-moth, a name applied to the lepidopterous insects of the genus *Crumbus* and family Pyralidae. They are extremely abundant in this country in the summer in pastures and hay-fields. *C. mutabilis* is a common species.

Grass of Parnassus, the popular title of the genus *Parnassia* of smooth herbs, now generally referred to the order Saxifragaceae, growing mostly in cold regions of both continents. The U. S. has 5 or 6 species, of which one, *P. palustris*, rare in this country, is the common grass of Parnassus of Europe.

Grass Oil, a volatile oil distilled in the E. I. from *Andropogon Schoenanthus*, *A. nardifolius*, *A. nardus*, *A. turanicus*, and other grasses. It is used in scenting honey soap and in adulterating oils of geranium and roses; in perfumery it is called oil of citronella.

Grass Tree [so called from the long grass-like leaves], a genus (*Xanthorrhoea*) of long-lived, tree-like, liliaceous plants, somewhat resembling the *Yucca* in habit, growing in Tasmania and Australia. Their leaves are gathered as food for cattle. The tree abounds in a balsamic gum which has been used in med. There are several species, of which *X. hastilis* and *humilis* are best known. The "grass tree gum" is obtainable in inexhaustible quantities, and has been recommended as a source of illuminating gas and of picric acid.

Grass Valley, on R. R., Nevada co., Cal., is the centre of the chief gold quartz-mining dist. of the State, from which source it derives the prin. part of its business. It has 2 orphan asylums and is the seat of a R. Cath. bp. Pop. tp. 1870, 7063; 1880, 6688.

Grass-wrack, called *Eel-grass* in the U. S., the *Zostera marina*, a salt-water plant of the order Naiadaceae, growing always under water. It is used to weave into the coverings of flasks, as a material for stuffing cushions, and as packing for glass and queensware. In the U. S. it is gathered like sea-weed, chiefly as a manure.

Gratian (GRATIANS AUGUSTUS), Rom. emp., b. at Sirmium, in Pannonia, Apr. 19, 359 A. D.; declared consul 366, Augustus in 367; ed. by Ansonius the poet; succeeded his father in 375, jointly with Valentinian II., his half-brother, his uncle Valens also reigning in the E. until 378, when G. succeeded him, but in 379 gave the dominion of the E. to Theodosius I. He was a Chr., and a man of justice and virtue, but of somewhat feeble and luxurious character. His wars against the barbarians were measurably successful. He lived chiefly at Treves, and was murdered Aug. 23, 383 A. D., by Andragathius, who succeeded him as emp.

Gratian, or Gratianus (FRANCISCUS), the founder of the science of canon law, b. in the latter part of the 11th century, and entered the convent of Classe, near Ravenna, whence he removed to that of St. Felix de Boiogna. Here he wrote his *Decretum*, and sent it to the pope, Alexander III., who in reward appointed him bp. of Chiusti. The *Decretum* is a systematized collection of all the canons issued by the popes and councils, and as it was used for more than 3 centuries it contributed to the establishment of the pope's authority as above the canon law, and to the exemption of the clergy from the secular jurisdiction.

Gratiola (once called *Gratia Dei*, "God's grace," from its supposed medicinal virtues), a genus of herbs of the order Scrophulariaceae. The U. S. have numerous species, none of them important. The hedge hyssop (*G. officinalis*) of Europe and some S. A. species have been used in med.

Grattan (HENRY), b. at Dublin, Ire., July 3, 1746; was a member of the Irish Parl. in 1775 from Charlton; brought forward in 1780 and 1782 the famous Bill of Rights, asserting the right of Ire. to self-government; was in 1790 returned from Dublin; opposed alike the rebellious schemes of the United Irishmen and the union with G. Brit.; entered the imperial Parl. in 1805. D. May 14, 1820.

Grätz, city of Aus., the cap. of Styria, on both sides of the Mur at an elevation of 1047 ft. above the sea, and forming the prin. station on the route from Vienna to Trieste. It is an old town, with narrow and crooked streets, but it contains many interesting buildings. The cathedral of St. Agidi was built in 1462, the ch. of St. Leonhard in 1883, the mausoleum of Ferdinand II. in 1615; the old ducal palace is a structure of great interest. G. has a univ. and many educational insts. Pop. 97,791.

Gravel. See URINARY CALCULI AND DEPOSITS.

Gravelotte, Battle of, Aug. 18, 1870, was the greatest and bloodiest battle of the Franco-Ger. war; in consequence of which the Fr. army was shut up in Metz.

Gravel Walls are composed of a mortar of cement or lime filled in with gravel, stones, pieces of slag, and the like. The mass is laid up in a casing of boards, kept from spreading by means of slips of wood passing from the inside to the outside tier of boards. The material should be well rammed, and kept covered from rain until dry.

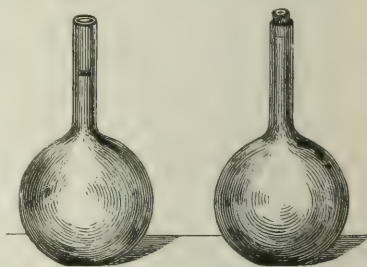
Gravitation is, in its widest sense, the tendency which all bodies exhibit to approach each other with a force directly as their masses, and inversely proportional to the square of the distance between them. Two misapprehensions respecting this force are prevalent. They are (1) that gravitation was first discovered by Sir Isaac Newton, and (2) that it is simply a theory to account for the celestial motions, which may be hereafter disproved and superseded by some other theory. That bodies in gen. tend to fall toward the earth is known to all even from earliest infancy; and as this tendency is G., G. has been known to all men in all times. What Newton did was to show that the same force extends to the entire solar system. He showed that the planets tend to fall toward the earth, the satellites toward the planets, and the moon toward the earth, according to the same law by which an apple falls to the ground. Now the correction of the second misapprehension becomes easy. If G. is to be entirely disproved, we must begin by disproving the theory that heavy bodies tend to fall; and this no one thinks of doing. If any one supposes that the gen. fact that it extends to the heavens may, at some time, be disproved, we have to say that the G. of the satellites to their planets and of the planets toward the sun is seen by the astron. as clearly as the falling of raindrops is seen by the ordinary spectator. [From orig. art. in *J's Univ. Cyc.*, by PROF. S. NEWCOMB, LL.D.]

Gravity, Specific—relative weight. Absolute weight is the weight of a body as measured by the units of ordinary metrology. Relative weight is the weight of a body as measured by the absolute weight of some other body equal to it in bulk taken as unity. S. G. is such relative weight when the measure is one which has been adopted by common consent to be a standard of comparison. Water is the universally accepted standard for all solids and liquids; air, for all gases and vapors. But as the dimensions of bodies change with temperature, and in some cases with pressure also, and as the buoyant power of the air depends on the same conditions, it is necessary that comparisons for determining S. G. should be made at certain determinate temperatures and states of barometric pressure, or that the results should be reduced to such. In regard to the standard temperature there has been no gen. agreement. In Eng. 62° F. has been used by many experimenters. Others, both in Eng. and the U. S., have used 60° F. Of recent yrs. there has been a tendency to adopt the freezing-point of water = 32° F. = 0° C. or the temperature of the maximum density of water, which is 4° C. = 39.1° F. Every table of S. G. should state the temperature to which the determinations have been referred. As to the standard pressure, no such difference of usage has prevailed. This is always taken at 30 inches of mercury, or 760 millimetres.

To ascertain the S. G. of a liquid, the expedient which naturally suggests itself is to fill with water any convenient vessel up to a certain point and weigh it, and afterward to weigh the same vessel filled to the same point with the liquid. The weight of the vessel having been deducted in both cases, the S. G. is equal to the second weight divided by the first; and it will be greater or less than unity according as the liquid is more or less dense than water. For convenience in actual practice, a light vessel is constructed for these determinations, in the form of a bottle with a narrow neck (Fig. 1) capable of containing 1000 grains or 100 grammes

FIG. 1.

FIG. 2.



of water at the standard temperature. The weight of the liquid in grains or grammes then directly expresses the S. G., the decimal point being suitably placed. A mark on the neck shows exactly to what point the bottle is to be filled. Two marks are sometimes made to indicate the ends and the middle point of the curve in the surface of the fluid, produced by capillarity. In some instances also the bottle is made with a perforated stopper (Fig. 2), and after being entirely filled to the lip, is closed by putting in the stopper, the excess of fluid overflowing. The exterior must then be carefully dried before weighing. With every S. G. bottle a counterpoise weight is furnished by the maker, which exactly balances the weight of the bottle when empty. Placing this in the opposite scale, the additional weight necessary will be only the weight of the contents. The S. G. of liquids may also be determined expeditiously by instruments constructed expressly for the purpose, called generally hydrometers, but variously named according to the nature of the liquid for which they are specially intended.

The S. G. of a solid is ascertained as follows: The solid is first carefully weighed in the air, and then, being suspended by a slender thread, is immersed in water and weighed again. The difference between these 2 weights is made the divisor, and the total weight of the solid the dividend, the quotient being the S. G. sought. If the temperature and pressure at the time of making the determination are not those adapted as standard, the result must be corrected, or reduced to standard; a process for which rules will be found in systematic treatises on physics. Should the solid be too light to sink, a sinker is attached to it, and the water-weight

[weight of equal bulk of water] of the 2 together is ascertained as above. From this is deducted the water-weight of the sinker alone, and the remainder is the water-weight of the solid itself, which is to be used as the divisor.

TABLE OF SPECIFIC GRAVITIES.

	Specific gravity.	Weight per cubic inch in lbs.		Specific gravity.	Weight per cubic inch in lbs.	
Metals.						
Platinum.....	21.150	.775	Beech.....	0.696	.025	
Gold.....	19.258	.697	Ash.....	0.690	.025	
Mercury, solid.....	14.391	.566	Maple.....	0.675	.025	
" liquid.....	13.588	.489	Pine, red.....	0.657	.024	
Lead.....	11.330	.408	" white.....	0.553	.020	
Silver.....	10.472	.377	Chestnut.....	0.606	.022	
Bismuth.....	9.822	.353	Cedar, Amer.....	0.554	.020	
Copper.....	8.875	.316	Elm, Eng.....	0.553	.020	
Iron.....	7.778	.280	Fir, spruce.....	0.512	.018	
Tin.....	7.291	.262	Cork.....	0.240	.008	
Zinc.....	6.982	.252	Miscellaneous.			
Antimony.....	6.712	.242	Acid, phosphoric.....	1.880	.056	
Arsenic.....	5.763	.208	" sulphuric.....	1.842	.056	
Aluminum.....	2.670	.096	" nitric.....	1.552	.044	
Rocks and Minerals.						
Topaz, Oriental.....	4.011	.145	" hydrochlor.....	1.270	.043	
Emery.....	4.000	.144	" acetic.....	1.062	.038	
Diamond.....	3.520	.127	Asphalt.....	2.500	.090	
Limestone, white.....	3.156	.114	Ivory.....	1.822	.065	
Glass, flint.....	3.075	.111	Sugar.....	1.605	.058	
" crown.....	2.520	.091	Blood.....	1.054	.038	
" com. green.....	2.520	.091	Beer, lager.....	1.034	.037	
" plate.....	2.760	.099	Milk.....	1.032	.037	
Alabaster.....	2.730	.098	Cider.....	1.018	.036	
Marble, statuary.....	2.718	.098	Water.....	1.000	.036	
Clay.....	2.700	.097	Camphor.....	0.988	.035	
Slate.....	2.672	.096	Beeswax.....	0.965	.034	
Chalk.....	2.620	.094	Lard.....	0.947	.034	
Granite, Ab. red.....	2.620	.095	Butter.....	0.942	.034	
Gypsum.....	2.286	.082	Oil, linseed.....	0.940	.034	
Salt.....	2.130	.077	" whale.....	0.923	.033	
Clay.....	1.900	.068	Tallow.....	0.934	.034	
Sand, River.....	1.850	.067	India-rubber.....	0.933	.033	
" quartz.....	2.750	.099	Alcohol, absolute.....	0.792	.028	
Coal, anthracite.....	1.530	.055	Ether.....	0.916	.033	
" bituminous.....	1.270	.046	" proof.....	0.716	.026	
Woods.						
Lignumvite.....	1.333	.048	Gases and Vapors.			
Box.....	1.280	.046	Steam.....	0.00880	.000317	
Ebony.....	1.187	.043	Carb. acid.....	0.00197	.000071	
Mahogany, Spanish.....	0.852	.031	Oxygen.....	0.00143	.000051	
Oak, Am. white.....	0.779	.028	Atmos. air.....	0.00129	.000046	
" Eng.....	0.777	.028	Oil, gas.....	0.00127	.000046	
			Nitrogen.....	0.00125	.000045	
			Hydrogen.....	0.000895	.000032	

F. A. P. BARNARD.

Gray (ALONZO), LL.D., b. at Townsend, Windham co., Vt., in 1808, grad. from Amherst Coll. in 1834; prof. of chem. and natural philos. at Andover Acad. 1837-43, prof. of chem. in Md. Coll., prin. of Brooklyn Sem. Wrote *Elements of Chem., Elements of Natural Philos.*, etc. D. Mar. 10, 1860.

Gray (ASA), M. D., LL.D., b. at Paris, Oneida co., N. Y., Nov. 18, 1810; received in 1831 his med. degree at the Fairfield Coll. of Phys. and Surgeons, Herkimer co., N. Y.; studied bot. with the late Prof. Torrey of New York; was appointed in 1834 botanist to the Wilkes expedition, but declined the post; became in 1842 Fisher prof. of nat. hist. in Harvard Univ., from the more active duties of which position he retired in 1873; became in 1874 a regent of the Smithsonian Inst. Dr. G. has long been recognized throughout the scientific world as one of the ablest and most philosophic of botanists. Among his writings are *Elements of Bot., Manual of Bot., Bot. of the U. S. Pacific Exploring Expedition*, numerous elaborate papers on the bot. of the W. and S. W., pub. in the *Smithsonian Contributions, Memoirs*, etc. of the Amer. Acad. of Arts and Sciences, of which he was for 10 yrs. pres., and in various govt. reports; also *How Plants Grow, Lessons in Bot.*, and other works, forming a series of admirable text-books upon this subject. In 1861 appeared his *Free Examination of Darwin's Treatise*. He is editorially connected with the *Amer. Journal of Science and Arts*, and is a frequent contributor to that and other scientific journals in Europe and the U. S. Elected member of Inst. of Fr. Acad. of Sciences, July 29, 1878. He was one of the associate eds. of *J. S. Univ. Cyc.*

Gray (FRANCIS CALLEY), LL.D., son of lieut.-gov. William Gray, b. at Salem, Essex co., Mass., Sept. 19, 1790, grad. from Harvard Univ. in 1809; was bred a lawyer; was private sec. to J. Q. Adams while U. S. minister to Rus.; was often in the legislature; was corresponding sec. of the Acad. of Arts and Sciences and author of *Prison Discipline*. He bequeathed \$50,000 for the establishment and maintenance of a museum of comparative zoology in connection with Harvard Univ.; and also a collection of engravings made during his life, probably the largest and most valuable of any in the U. S. He left, in addition, a sum of money the int. of which is to be expended for the increase and care of the collection, and provided for the publication of a catalogue of the engravings. Dec. 29, 1866.

Gray (GEORGE ROBERT), F. R. S., a brother of J. E. Gray, was b. at Little Chelsea, Eng., July 8, 1808. From 1821 till his death was connected with the Brit. Museum, and gave especial attention to entomology and ornithology. Author of *Genera of Birds, Hand List of the Species of Birds*, etc. D. May 6, 1872.

Gray (HENRY PETERS), b. in New York city June 23, 1819; began his art-studies with Daniel Huntington in 1838, but after a yr.'s practice he went to Europe to study the masterpieces of foreign art. In 1843 he returned to New York, but for a short time. In 1846 he went abroad again for a few months, after which he lived in New York till the winter of 1872, when he went to It. and stayed 2 yrs. His portraits number some 300. But his reputation rests mainly on his composition pictures, the subjects of which are biblical, classical, and romantic. As a draughtsman and a colorist he stands high. Mr. G. was pres. of the National Acad. of Design. D. Nov. 12, 1877. O. B. FROTHINGHAM.

Gray (HORACE), b. in Boston, Mass., 1829; grad. at Harvard in 1845 and afterward at Harvard Law School, admitted to the bar in Boston 1851; in 1854 was appointed reporter of supreme judicial court of Mass., where he served 7 yrs.; Aug. 23, 1864, became associate justice of that court, and chief justice of it Sept. 5, 1873; was confirmed as associate justice of U. S. supreme court Dec. 20, 1881.

Gray (ISAAC). See APPENDIX.

Gray (JOHN EDWARD), PH. D., F. R. S. (the son of S. F. Gray, a savant and author), b. in 1800 at Walsall, Eng., and ed. as a phys. His father's *Arrangement of Brit. Plants*, a valuable treatise, was mainly the work of J. E. Gray. From 1824 to 1875 he was prominently connected with the Brit. Museum; was one of the most laborious of naturalists, and the author of hundreds of scientific papers and of many valuable catalogues. He pub. zoological reports of the expeditions of many historic Brit. exploring ships; wrote *Illustrations of Indian Zoology*, etc. D. Mar. 7, 1875.

Gray (THOMAS), LL.B., b. in Cornhill, Lond., Dec. 26, 1716, was ed. at Eton and the Peterhouse, Cambridge; was appointed in 1768 prof. of modern hist. at the univ. of Cambridge; G.'s fame rests almost entirely upon his *Elegy written in a Country Churchyard*, which has given him a high position in Eng. lit. D. July 24, 1771.

Grayling (Thymallus), a genus of fishes of the family Salmonidae, distinguished by the enlarged dorsal fin and



Michigan Grayling.

weakly toothed mouth. The *T. vulgaris* is the common G. of Europe. The *T. tricolor* is found in some streams of Mich. and in the head-waters of the Yellowstone.

Grayson (JOHN BRECKENRIDGE), b. in Ky. in 1806, grad. from W. Pt., and was appointed second lieut. of artill. July 1826, first lieut. 1834; transferred to the subsistence dept. in 1838, with the rank of capt., and became major 1852; served in garrison and on special duty until 1836, except (1835) when on active duty in the field in Fla. against the Seminole Indians; he served throughout the Mex. war as Gen. Scott's chief commissary, and for gallant conduct at Contreras, Churubusco, and Chapultepec was brevetted major and lieut.-col. On the outbreak of the c. war he resigned his commission and was appointed a brig.-gen. in the Confed. service. D. 1861.

Grayson (WILLIAM), b. in Md. 1786; served with distinction in both houses of the Md. Assembly; also took an eminent part in the struggle to acquire a new and more liberal const. for the State in 1838; was gov. 1838-41. D. July 9, 1868.

Grayson (WILLIAM), b. in Prince William co., Va., grad. at the Univ. of Ox.; studied law, and settled at Dumfries. He was chosen as aide-de-camp to Washington in 1776, also as col. of a Va. regiment in 1777. He was eminent throughout the Revolution as an officer of intrinsic worth and undaunted courage. Was one of the first U. S. Senators from Va. in 1789. D. Mar. 12, 1790.

Grayson (WILLIAM J.), b. at Beaufort, S. C., in Nov. 1788, grad. at S. C. Coll. in 1809; was ed. for the law; was com. in equity of S. C., member of the State legislature (1813), a State Senator (1831), M. C. 1833-37, and in 1841 was appointed collector of customs at Charleston, S. C., by Pres. Taylor. Wrote *The Herding and the Slave and Chincora*. D. Oct. 4, 1863.

Grease-Wood, the *Sarcobatus vermiculatus*, a plant of the order Chenopodiaceæ, is a characteristic plant of the Far West in barren places charged with alkaline salts.

Great Barrington, Berkshire co., Mass., on R. R. and the Housatonic River. It is a popular resort in summer. The town was settled in 1730, incorporated in 1761, and until 1787 was the co.-seat. The terr. was purchased from the Indians, and originally bore the name of the Housatonic Propriety. Pop. of tp. 1870, 4220; 1880, 4653.

Great Basin, or Fremont's Basin, the great area extending W. from the Wahsatch Mts. to the Sierra Nevada, measuring some 300 m. N. and S., and 350 E. and W., and including nearly all of Nev., a great part of U., a large area in Cal., and small parts of Wyo., Id., and Or. It is, however, in reality, a series of basins, lying between rugged mt.-ranges. Across these ridges and valleys the valley of the Humboldt River strikes diagonally, affording the only practicable R. R. route from E. to W.—the route of the Central Pacific R. R. The climate is very dry, and agriculture is not practicable without irrigation. The streams are small, and important only for irrigation and mining purposes. The Humboldt, Carson, Bear, Jordan, Provo, Beaver, Sevier, and Weber rivers are the largest. Great Salt Lake is the largest body of water, and Utah Lake is the prin. fresh-water lake. The climate is generally healthful. "White pine" timber is cut on some of the mts. There is a considerable grazing industry. Gold, silver, lead, borax, salt, sulphur, and soda-salts are abundant, and the mining interest is important. The basin is peculiarly exposed to the ravages of the "hateful grasshopper" (*Uadophorus spectans*).

Great Bear Lake, in Brit. Amer., under the Arctic Circle. It has an irregular outline, is very deep and clear, abounds in fish, and is frozen over for half the yr. Area, 14,000 sq. m.

Great Bend, city, on R. R., cap. of Barton co., Kan., on the Arkansas River, near the centre of the State, 220 m. S. W. of Topeka. Pop. 1880, 1071.

Great Britain [Gr. Ἀλβιωνή νῆσος, Βρεταννική νῆσος; Lat. *Albion, Anglia, Britannia*], thus called to distinguish it from Lesser Britain or the Bretagne, is the largest island in Europe, and, next to Greenland, New Guinea, Borneo, Madagascar, and Sumatra, the largest in the world. It is separated from the continent by the Brit. Channel, the narrowest portion of which is called the Strait of Dover, and by the Ger. Ocean or N. Sea, and from Ire. by the Irish Channel or Sea, which communicates with the open Atlantic through the North and St. George's channels. The island of G. B. comprises Eng., Wales, and Scot. Its most southerly point is Lizard Point; its most northerly, Dunnet Head; its most easterly, Lowestoft Ness, and its most westerly, Ardnamurchan Point. Its greatest length is 608 m., its greatest breadth 325. The area of G. B. is 84,392 sq. m., and that of the 931 smaller islands along its coasts (224 of which are inhabited) 4614 sq. m. The "United Kingdom" includes G. B. and Ire., but neither the Isle of Man nor the Channel Islands near the Fr. coast, which are not represented in Parl. These islands are in the enjoyment of anc. insts., and are merely Brit. dependencies. The area of the whole Brit. empire, including colonies, dependencies, etc., is as follows:

	Area, sq. m.	Population.
Europe	121,985	35,262,762
Asia	1,171,694	210,366,343
Africa	264,658	1,865,648
Australia	3,086,274	2,383,751
America	3,670,986	5,185,189
Total	8,315,597	255,063,683

Physical Geography.—The Brit. islands rise on a submarine plateau joined to Den., Ger., the Netherlands, and Fr., but separated from Nor. by a deep channel exceeding 200 fathoms in depth.

Coast-line.—The coast-line of G. B. has a development of 2900 m.; that of Ire. of 1400 m. The E. coast of G. B. is unbroken, with only a few natural harbors and some estuaries of rivers, such as the Thames and Humber in Eng. and the Forth and Tay in Scot. The safest harbor along the whole of this coast is that formed by the Cromarty Frith, one of the 2 arms of the Moray Frith. A considerable portion of the coast is flat. The N. coast of Scot. is steep. The W. coast, as far S. as the mouth of the Clyde, is intersected by numerous narrow sea-lochs bounded by steep hills and of considerable depth. Narrow "sounds" separate the mainland from islands, and numerous peninsulas form a part of this coast. The E. portion of the Irish Sea forms a vast bay, bounded on the N. by Galloway, on the E. by the Eng. counties of Cumberland and Lancashire, and on the S. by Wales. Its centre is occupied by the Isle of Man. Three bays open into it—Solway Frith, Morecambe Bay, and Liverpool Bay. They all abound in sand-banks, which render navigation exceedingly intricate. The peninsula of Wales has generally rugged coasts. The wide sweep of Cardigan Bay opens here toward the W., and Milford Haven is one of the most secure harbors of the Brit. islands. Bristol Channel and the estuary of the Severn separate S. Wales from the counties of Somerset and Devon. Devon and Cornwall form a peninsula, the coasts of which are generally steep, and terminating in the Land's End, the most W. point of Eng. The Scilly Islands lie off this cape. There are several excellent harbors, among which we may mention Mount's Bay, the harbor of Falmouth, and that of Plymouth, with the Eddystone light-house. The remainder of the S. coast of Eng. is generally level. The only other secure harbors on the S. coast are those of Southampton, and Portsmouth, opposite the Isle of Wight, the latter the most important naval station of G. B. The estuary of the Thames is bounded by low coasts, and sand-banks render its navigation exceedingly intricate. The estuary of the Medway, which opens into it, is one of the most secure harbors, and strongly fortified (Chatham).

Relief.—Eng. is a level country, especially toward the E., but it is traversed by ridges of varying elevations, which in the N. rise to veritable mts. Wales and Scot. are mountainous countries, while Ire. is a vast lowland dotted over by mt. groups. The culminating point of the whole country, Ben Nevis, attains 4406 ft., and its mean height is about 700 ft. The Highlands of Scot. are intersected by a long and narrow valley, the Great Glen (Glenmore). The mt. region to the N. of it consists of irregular groups, for the most part thinly populated. The mt. region to the S. is known as the Grampians, hardly inferior to the N. Highlands in sterility, and moors abound, but there are likewise excellent pastures in the valleys. The W. coast of the highlands is generally steep and rugged, and sea-lochs penetrate far into the land; their interior abounds in picturesque lakes. Strathmore (the great vale) extends along the foot of the Highlands from Loch Lomond to Stonehaven. S. Scot. consists of an extensive hilly region. The hills of S. Scot. are generally broad and flattened; they are intersected by deep pastoral glens, which open out into fertile valleys and plains.

N. Eng. is intersected by a range of mts. forming the water-parting between the Ger. Ocean and the Irish Sea. To googs, these mts. are known as the Pennine chain, the S. group of which is far less elevated than the N. (the Peak of Derbyshire 1981 ft.). In the rest of Eng. there are no hill-ranges equal in importance with the Pennine chain, and the gen. level of the central portions of the country even but rarely exceeds 500 ft. in height. The valley of the Thames is bounded on the N. and S. by chalk hills, affording generally excellent pasturage. The S. chalk hills are known as the Downs, and attain nowhere an elevation of 1000 ft. The N. Downs extend from it to the coast of Kent, at Dover, where they form white cliffs. These 2 ranges bound a fertile dist. called the Weald, formerly a forest of oak, at present one of the most productive agricultural dists. of the country. The

mt. region of Wales is next to Scot. the most considerable in the Brit. islands. The highest summit is the Snowdon (3590 ft.), close to Menai Strait. A natural depression at the head of the Severn divides N. from S. Wales, and the hills of the latter are particularly distinguished by their barrenness, their highest range being known as Black Mts. (Brecknock Beacon, 2863 ft.), from the color of the heather which covers them. The Isle of Man, in the Irish Sea, rises to a height of 2024 ft. The W. islands of Scot. are generally of considerable height; the Orkneys and Shetlands only rise to a height of 1556 and 1476 ft. respectively.

Hydrography.—The rivers of the Brit. islands are small, but as many of them are navigable for considerable distances, they are of importance to commerce and industry. The Thames rises at Thameshead, 376 ft. above the sea, and enters the Ger. Ocean at the Nore Light; width at its mouth, 5 m.; at Lond. bridge, 46 m. above it, 692 ft. Its most important tributary is the Medway, which forms an excellent harbor. The Ouse rises in Northamptonshire, and is navigable from Retford, 46 m. above its mouth. The Humber is an arm of the sea, into which the Trent and Yorkshire Ouse pour their waters. Kingston-upon-Hull is situated on its N. coast. The Tweed is a rapid stream, forming, in its lower course, the boundary between Eng. and Scot. The Forth is mentioned because Edinburgh (Leith) lies near its frith. The Tay is the most important river of Scot. It rises to the N. of Loch Lomond, flows through Loch Tay, and enters the Frith of Tay. The remaining rivers of Scot., with the exception of the Clyde, are of little use to navigation. The Clyde rises in a small lake on the S. confines of Lanarkshire, and enters the Frith of Clyde below Glasgow. Like other Scotch rivers, its current is very rapid, and it forms several waterfalls, but at a vast expense for dredging it has been made navigable for large vessels as far as Glasgow. The Mersey forms a wide estuary at its mouth, on which is situated Liverpool, the first shipping-port of the world. The Severn becomes navigable 170 m. above its mouth. It traverses the fertile plain of Shrewsbury and the vale of Gloucester, and enters the Bristol Channel. The tides at its mouth are of tremendous height (60-70 ft.), and the country is protected against them by embankments. Its most important tributaries are the Wye and the Avon. Bristol is situated on the latter. Scot. abounds in lakes, in most of which productive fisheries are carried on. They are, almost without exception, in the Highlands. The most considerable is Loch Lomond (45 sq. m.).

Climate.—The climate of G. B. is determined by its insular position, to which it owes its mildness and equability. The Gulf Stream, above all, by sending its warm waters toward the Brit. islands, influences their temperature, which it raises above that of the sea-board countries on the W. shores of the Atlantic having the same lat. S. W. winds are the most prevalent throughout the yr., and are generally attended with rain. The greater portion of the country lies within the region of winter rains. Snow falls but rarely, except in the hills, where it often remains on the ground 3 months.

Geology.—The Palaeozoic strata occupy about $\frac{1}{3}$ of the entire superficies. Their comparative sterility is compensated for by the existence of mineral treasures, one of the prin. sources of G. B.'s eminence as a manufacturing country. The oldest rocks of this series are met with in the Outer Hebrides and on the coast of Ross and Sutherland. They consist principally of crystalline gneiss. The *Cambrian rocks* of N. Scot., Cumberland, and N. Wales are superimposed upon them. In Scot. they consist of red sandstone and conglomerate, in Eng. and Wales of sandstone, gritstone, and slates. To these succeed the *Silurian rocks* in S. Wales, in the Cumbrian Mts., and in Scot., being occupied by members of the Devonian and Carboniferous series. The *Devonian* is most fully developed in Devonshire, but also occurs in Central Scot. The *Carboniferous series* occupies a broad tract extending from the Bristol Channel into Scot. Within these limits there are no less than 14 detached coal-fields. The *Permian strata*, consisting of magnesian limestone and red sandstone, occupy a considerable area. Fine marbles, tin, and lead, are found in it. The *Triassic measures* are represented by sandstones and variegated marls. Beds of rock-salt occur in them. The *Lias* extends from Yorkshire to the Dorset coast, and detached tracts of it are met to the W. of this line and in Scot. Jet and alum are found in the rocks near Whitby, on the coast of Yorkshire. The *Oolites* constitute one of the most important among the geological formations, for they yield the best of all building materials. The *Cretaceous rocks*, principally chalk with intercalated sands and clays, exceedingly rich in fossils, occupy a considerable portion of Eng. The *Tertiary formations* consist of Eocene clays, sands, and marls, of Pliocene ferruginous sands and marl, and of Pleistocene deposits. *Eruptive rocks* consist of granites, porphyries, syenite, and basalt. There are several hot springs in Eng., and cold mineral waters occur all over.

The *Natural History* of G. B. corresponds generally with that of continental Europe, and there are only a few species which are peculiar to it. The flora is represented by only one species of fir (*Pinus sylvestris*) which together with the yew and juniper is the only representative of the coniferous family. Of other trees there are the oak, elm, beech, birch, poplar, willow, ash, alder, hornbeam, and hazelnut, but numerous others have been acclimated, such as the cedar, maple, sycamore, and chestnut. The indigenous fruit trees yield plums, cherries, apples, sloes, pears, medlars, and nuts. There is likewise a great variety of edible berries. Wheat, oats, barley, and rye are the cereals which are cultivated. With respect to the animal world, bones of elephants, tigers, rhinoceroses, hippopotamuses, and alligators have been discovered. The hyena disappeared more recently, and wild oxen (the urus), wild boars, bears, beavers, and wolves were numerous in early times. Irrespective of domesticated animals, there are 52 species of mammals and 274 species of birds. There are about 170 salt and fresh water fish. The number of reptiles is exceedingly small. The Amphibia are

represented by the frog, toad, and natterjack, all harmless. There are perhaps 500 species of Testacea, among which are the oyster and the mussel. Scot. in former times was celebrated for its pearl fishery.

Population.—Taken as a whole, the pop. of the United Kingdom, which at the last census, taken Apr. 4, 1881, was 35,262,762, has not retrograded during any period for which we possess trustworthy census returns. Its increase between 1801 and 1871 amounted to 96.12 per cent., or 0.97 per cent. annually. But while the pop. of the kingdom increased as a whole, that of particular dists. has exhibited a decrease, and the increase in the remainder has been most considerable in the manufacturing dists., the large towns of which absorb an increasing proportion of the rural pop., very much to the detriment of the *physique* of the people. In Ire. the decrease has been almost universal, extending even to the large towns, Belfast alone excepted. In Scot. a considerable decrease took place in the N. and S. counties, but was more than compensated for by an increase in the pop. of the central manufacturing dists. Emigration has at all times, and particularly since 1840, considerably interfered with the increase of the pop. Some idea of the extent of this emigration may be gathered from the fact that from the beginning of 1825 to the close of 1873 no less than 7,505,781 persons left the United Kingdom in order to seek a home elsewhere. Taken as a whole, the United Kingdom is one of the most densely populated countries of the world, though there are extensive mtr. tracts and waste lands which support only a small pop. A remarkable feature in the distribution of the pop. consists in the large number of populous towns. The following are the towns having more than 100,000 inhabs, arranged according to magnitude: London, 4,764,319; Liverpool 552,508; Glasgow, 511,532; Birmingham, 400,774; Dublin, 349,648; Manchester, 341,414; Leeds, 309,119; Sheffield, 284,508; Edinburgh, 238,199; Belfast, 208,192; Bristol, 206,874; Nottingham, 186,575; Bradford, 183,032; Hull, 154,240; Stoke-upon-Trent, 152,304; Newcastle, 145,359; Dundee, 142,454; Portsmouth, 127,989; Leicester, 122,376; Sunderland, 116,542; Oldham, 111,343; Brighton, 107,546; Bolton, 105,414; Aberdeen, 105,054; Blackburn, 104,014.

Nationalities.—Eng. is spoken by the educated classes throughout the Brit. islands. Cymric has maintained itself in Wales, Gaelic in the Highlands of Scot., on the Isle of Man, and in Ire. These Celtic dialects, however, are gradually dying out.

Agriculture.—The soil of G. B. is almost exclusively devoted to the production of breadstuffs and of grasses, roots, etc., as food for cattle. The prin. cereals cultivated are wheat, barley, and oats. Beans and peas are of some importance; turnips and swedes are the prin. green crops. Potatoes are most extensively cultivated in Ire., where they constitute the prin. food of the laboring pop. The cultivation of hops (64,000 acres) is confined to Eng., that of flax almost entirely to Ire. Orchards are most extensive in the S. W. and S. of Eng. Among other objects of cultivation may be mentioned rape, saffron, coriander, caraway, teasel, madder and woad, mustard, liquorice, chamomile, peppermint, and other medicinal plants. The beet is used in G. B. as food for cattle. The land of the United Kingdom available for agricultural purposes is in the hands of a small number of landed proprietors, from whom it is leased by the actual cultivators of the soil. Until quite recently the latter were at the mercy of their landlords; their tenure was of a very uncertain nature, and they could claim nothing for permanent improvements. In this respect a change for the better has taken place, particularly in Ire.

Fisheries.—The rivers and seas abound in fish, and the fisheries give occupation to a large number of the pop. Salmon are caught almost exclusively in the rivers of Scot. and Ire.; the herring fisheries are carried on principally from the Scotch ports; the pilchard is caught on the coasts of Cornwall and Devonshire, and Eng. rejoices in the possession of the best oysters.

Mining and Metallurgical Industries.—Among the valuable minerals coal occupies the foremost rank. The coal-basins cover about 12,000 sq. m., and if worked to the depth of 4000 ft. they will be exhausted in the course of 700 yrs. if the present rate of consumption continues. The iron industry is the most important next to that of coal. It has assumed gigantic proportions since 1740, when coal was first used for smelting the ore. Copper is raised principally in Cornwall and Devon, as well as in Scot. and Ire. Lead has been worked in Derbyshire from the time of the Romans, but has since been discovered in other parts of the island, including Cornwall and Devon, the only counties furnishing tin. All other ores are less important. They include zinc, arsenic, manganese, antimony, nickel, silver, gold, etc.

Manufactures.—Among the great textile industries of the country, that of woollens is the oldest. Eng. broadcloth enjoys a deserved reputation. The cotton industry has been of some importance since the invention of the spinning-jenny in 1767, and has since assumed astounding proportions. The linen manufacture has only recently become of importance. The manufacture of silk was introduced in the 14th century, and was subsequently much improved by Huguenot Fr. emigrants (1665). Next to the textile industries the most important are the metal manufactures, ranging from the production of rails to that of steam-engines, iron ships, and of the finest cutlery and silversmith's work. The Eng. potteries supply goods appreciated throughout the civilized world. The breweries are of great importance, for beer is the national beverage of Eng., while spirits are more highly prized by the Scotch and Irish.

Transportation.—The roads of the United Kingdom have been constructed to a small extent only by govt. The majority of them are maintained from local rates and managed by highway boards. The old turnpike roads, which were constructed by private speculators on condition of their being permitted to levy a toll, are gradually passing into the

hands of the local authorities, their builders in many instances having suffered serious losses. We have already alluded to the importance of the rivers as navigable highways. They are connected with each other by an extensive system of canals, the whole of them being constructed since 1755, for the greater part by private cos. The railways have to a great extent superseded canals and roads. Tramways have been in use in some of the mining districts since 1797, but the first locomotive railway was opened in 1830, and since that time they have rapidly increased in extent. They are without exception the property of private cos. The shipping of the United Kingdom holds the first rank among the commercial marines of the world, 57 per cent. of all steam-vessels and 37 per cent. of all sailing-vessels belonging to it. In the foreign as well as home trade of the United Kingdom the Brit. flag by far exceeds the flags of all other nations combined, and this result is achieved without differential duties, for even the coasting trade is open to foreigners on equal terms with the natives. The post-office in Eng., as in most other states, enjoys the monopoly of carrying letters, and since 1870 it has managed the telegraph-lines. It likewise manages numerous savings banks, and grants life annuities in behalf of the state.

Commerce.—There are neither export nor protective duties. Commercial activity has assumed now most gigantic proportions, for Eng. not only exchanges her own products for those of foreign countries, but likewise acts as the agent for continental and other foreign markets. Manufactured goods only constitute about 9 per cent. of the total imports. The exports of Brit. produce, on the other hand, include 82 per cent. of manufactured goods.

Religion, and Provision for its Support.—G. B. is a Prot. country, but all other religions, as long as they do not offend against public or private morals, may be practised. In Eng. and Scot. there are established chs., that of the former being Episcopal, that of the latter Presbyterian. Ire. has no longer an established ch. The established chs. of Eng. and Scot., and particularly the former, are in possession of valuable endowments. All other denominations are dependent upon voluntary contributions, and several among them have succeeded in accumulating large funds.

Education.—Scot. already had a school law since 1696; in Ire. a system of national education was inaugurated in 1845; but in Eng. govt. contented itself with making *pro rata* allowances to such among the schools as chose to submit to certain regulations. A further step in advance was taken in 1870, when the formation of school boards was sanctioned in all places not sufficiently provided with schools; 15.7 per cent. of the total pop. attend school, and this proportion is satisfactory, for in Ger. only 14.5 per cent. go to school. There are undoubtedly many excellent private schools and educational establishments supported by private associations, who claim no govt. subsidy, and do not therefore admit govt. inspectors; but it is nevertheless satisfactory to know that the school boards are making rapid progress throughout the country. Among the higher educational establishments, the univs. of Ox., Cambridge, Durham, and Lond., the Scotch univs. of Edinburgh, Glasgow, Aberdeen, and St. Andrew's, and the Irish Trinity Coll. and Queen's Univ., occupy the first rank. There are numerous med. schools in connection with the leading hospitals throughout the kingdom, and the establishment of a law school by the inns of court has been advocated. Comparatively little has been done hitherto for systematic and technical education, considering the industrial character of the country, and neither the School of Mines nor the schools of design and "science" can rival similar continental insts. Art is promoted by a Royal Acad. and by numerous art unions. A musical education may be obtained at the Royal Acad. of Music and the recently established National School of Music. Scientific societies cultivate every branch of science. The newspaper press occupies a prominent and respected position, and its influence upon public opinion is undoubted.

Political Institutions and Government.—The govt. of G. B. is that of a so called constitutional monarchy. The sovereign represents the executive, while the legislative is exercised by the imperial Parl. The "act of settlement" settles the succession upon the descendants of Sophia of Brunswick, and no change in the act can be made except by consent of Parl. The heir-apparent assumes the title of prince of Wales. Parl. consists of the sovereign, the House of Lords, and the House of Commons, and no act obtains the force of law until it has been passed by all three. The House of Lords (537 members) is hereditary, and the lord chancellor presides over its sessions. The House of Commons in the session of 1881 consisted of 652 members, 6 being vacant by disfranchisement. In boroughs the right of voting is restricted to householders and to lodgers paying a rent of £20 a yr.; in cos., to householders paying £10 rent. Members of Parl. are not paid for their services, nor are they able to compensate themselves by an exercise of patronage, as all govt. appointments in Eng. are made for life. The king appoints the members of the privy council, the lord mayor of Lond. being the only *ex-officio* member, but public business is in reality conducted by a cabinet council, whose members are likewise appointed by the king, but are responsible to Parl. Their appointment is consequently virtually made by the party enjoying the majority. The members of the cabinet are the first lord of the treas. (generally prime minister), the lord high chancellor (the highest legal official and pres. of the House of Lords), the chancellor of the exchequer, secs. of state for the home dept., foreign affairs, the colonies, war, and India, a first lord of the admiralty, the postmaster-gen., and 2 others. There are likewise a pres. of the board of trade, a chief sec. for Ire., a pres. of the local govt. board, a v.-p. of the council of education, and a chancellor of the duchy of Lancaster. The legal advisers of the Crown are an atty.-gen. and a solicitor-gen., who both go out with the cabinet. In Ire. the Crown is represented by a lord lieut. For purposes of local govt.

the United Kingdom is divided into a great variety of divisions which are puzzling even to the inhabs. of the country. The total revenue for the financial yr. ending Mar. 31, 1881, amounted to £84,041,288, and the total expenditure of the yr. to £83,107,924. The largest branch of national expenditure is that for the int. and management of the national debt, which has rapidly increased after each war, and not very much has been done hitherto toward its redemption. It has now, however, been proposed to devote annually £28,000,000 a yr. to the payment of int. and reduction of the debt, as well as any surplus that may arise; and it is hoped by these means to reduce the debt in the course of 40 yrs. to the extent of £232,000,000.

Administration of Justice.—The judicial system of Eng. resembles that of the U. S. The courts of justice may be classified into those of common law and those of equity. The former include the courts of queen's bench, common pleas, and exchequer, and the courts of probate, divorce, and matrimonial causes; and the latter those of the lord chancellor, the lords justices of appeal, the master of the rolls, and the 3 vice-chancellors, and the court of appeal in chancery of the county palatine of Lancaster. The new Judicature Act (1874) combines these courts into a "high court of justice," from which an appeal lies to a newly constituted "court of appeal." The House of Lords and the judicial committee of the privy council retain their appellate jurisdiction as regards Scotch, Irish, colonial, ecclesiastical, and admiralty cases. In addition to the above there are courts of bankruptcy, 3 ecclesiastical courts, the lord mayor's court, the sheriffs' courts, and 60 co. courts. The inferior jurisdiction is carried on by justices of the peace in petty and quarter sessions, and by stipendiary magistrates in the larger towns. In Scot. the court of sessions is the highest court for civil, the court of justiciary for criminal cases. The Irish courts resemble those of Eng., and there is in addition a landed estates court. The police are maintained by the local authorities, excepting that of the metropolis, which depends upon the home sec.

Army.—There is a law which renders service in the militia compulsory, but this law is at present in abeyance, and the whole of the military forces of the United Kingdom are at present recruited by voluntary enlistment. These forces include the following categories: (1) A regular standing army, consisting of men who enlist for at least 3 yrs. (2) The militia, which is trained annually during 4 weeks and is recruited by enlistment. (3) Enrolled pensioners and the army reserve force, consisting of old soldiers, who are trained annually for 12 to 14 days. (4) Yeomanry cavalry and volunteer corps. (5) The Irish police force, organized and armed as a military body. (6) Local troops in India and colonial militia and volunteer corps. The regular army in 1883 consisted of 137,626 men.

Navy.—The navy has at all times been the pet of the nation, which looks upon it as the chief bulwark against foreign invasion. It is, comparatively speaking, a creation of modern times. The most important division of the navy, the iron-clad war fleet, consisted, in 1883, of 63 vessels, including 11 on the stocks. The largest iron-clad, the *Inflexible*, is 11,800 tonnage, armor from 16 to 24 in. thick. The efficient strength of the navy, Nov. 1, 1882, afloat and in commission was 246—72 sailing vessels and 174 steamers.

History.—On the 1st of May, 1707, the union between Eng. and Scot. was finally established. For yrs. after the union intrigues for the restoration of the Pretender (the rep. of the Stuarts) disturbed the peace. Queen Anne was succeeded in 1713 by the elector of Hanover, who took the title of George I. The Whigs, led by Walpole, now regained the ascendancy, and a rising in favor of the Pretender was speedily crushed (1715). Five yrs. later a commercial crisis wrought ruin in thousands of households. George II. succeeded in 1727, Walpole continuing in power as prime minister. He was forced into a war with Sp. (1739). This war terminated ingloriously. Soon afterward Eng. became involved in the Aus. war of succession. The Peace of Aix-la-Chapelle (1748) left both nations, as far as terms were concerned, in the position they held before the war. Meanwhile a second attempt by Prince Charles Edward Stuart was crushed at Culloden (1746). During the Seven Years' war Eng. sided with Prus. George III. reigned 1760-1820, a most eventful period. A war with Fr. and Sp. largely added to the extent of the colonial empire (1783). The govt. of the Tories caused much dissatisfaction, but it was allayed by the appointment of Pitt, earl of Chatham, as prime minister. An attempt to tax the Amers. drove them into rebellion, and led to the formation of the U. S. (1783). Fox, Burke, and Sheridan were the leading Whig statesmen during this epoch, but the foremost position must be assigned to the younger Pitt, who held office until his death in 1806. In 1793 war against Fr. terminated only with the battle of Waterloo (1815). An Irish rebellion was one of the incidents of these wars, but G. B. finally proved victorious. These wars had increased the Eng. national debt to an immense amount, and led to great distress among the working classes, whose discontent it was endeavored to suppress by severe measures. With George IV. an era of reform set in. Commercial reforms were introduced, an act emancipating the Irish Catholics was passed in 1829. After the accession of William IV. (1830), a Whig ministry under Earl Grey again came into office. This ministry passed the first Parliamentary reform bill, decreed the abolition of slavery (1834), and reformed the poor law. William IV. died in 1837, and was succeeded by Queen Victoria. Among her statesmen are Sir Robert Peel, Lord John Russell, the earl of Derby, Lord Palmerston, Gladstone, and Disraeli. The principles of free trade had their advocates in Cobden and Bright. Among the more recent acts of Parl. the Irish land act (1870), the act destituting the P. E. Ch. in Ire. (1874), and that creating school boards are the most important. In 1854-55 war with Rus. (siege of Sevastopol), in order to stop Rus. encroachments in the E.;

in 1857 an Indian mutiny was suppressed, and there have been minor wars in Chi., Abyssinia, Ashantee, etc. (See ENGLAND, IRELAND, SCOTLAND, WALES, CHANNEL ISLANDS, and ISLE OF MAN.) [From orig. art. in *J.'s Univ. Cyc.*, by E. G. RAVENSTEIN, F. R. G. S.]

Great Circle Sailing. A great circle is one the plane of which, extended through the globe, passes through its centre, dividing it into equal sections or hemispheres. The equator and the meridian are such circles. To sail on an arc or part of a G. C. which joins any 2 points on the earth's surface is to sail on the shortest possible line between them. This might be demonstrated on mathematical principles. It may be made apparent by measurement on a globe; for any one may satisfy himself of its truth by stretching a thread between 2 places in nearly the same lat. and considerably distant in lon. Theoretically, then, this is the true line of sailing for ships. The foundation of their course must be the track which the spherical nature of the globe points out as the shortest distance between 2 given harbors. But a mere inspection of the globe shows at once that this rule, based on its spherical form, is modified by geographical considerations—by the natural projections of the continents and by islands and rocks which lie across or near the G. C. arcs. The experience of the navigator has further taught him the prevalence in different quarters of the world of constant and powerful winds and currents, by making use of which on one course, or avoiding them on another, he gains more than by following rigorously the G. C. arc. The navigator's rule, therefore, must be that he sail his vessel on a G. C. wherever the land, rocks, or shoals do not intervene, or where the prevalence of powerful currents or adverse winds will not lessen his speed more than the difference between the distance on a G. C. and that of another route more favored in these respects. When compelled to deviate from a rigorous following of this shortest line, he may gain time by resorting to composite sailing; that is to say, to sailing on successive arcs of G. C. between intermediate points selected to suit the winds, currents, and projections of land. His inquiry will be which course will be the shortest, taking into view all the impediments in his way. [From orig. art. in *J.'s Univ. Cyc.*, by REAR-ADMIRAL CHARLES H. DAVIS, LL.D.]

Great Eastern, the largest ship in the world, was built at Millwall on the Thames, from plans by Mr. I. K. Brunel. Her construction commenced May 1, 1854. Owing to the flat pitch of her ways, the launching process lasted from Nov. 3, 1857, to Jan. 31, 1858, at a cost of £60,000. Her extreme length is 680 ft., breadth (exclusive of paddle-boxes), 82½ ft.; inclusive, 118 ft.; height, 58 ft., or 70 to top of bulwarks. In 1860-61 she made several trips to New York at great loss. In 1861 she was sent with troops to Canada. She was sold in 1864 for £25,000, and was employed with good success in 1864-66 as a cable-laying vessel. In 1867 she made a trip to New York and Havre with passengers, running at a heavy pecuniary loss.

Great Falls, R. R. June., Stafford co., N. H., 74 m. from Boston. Pop. 1880, 859.

Great Kanawha River, in W. Va., is formed by the junction of Gauley and New rivers. It is navigable from its mouth on the O. River to the Falls, 2 m. below its origin, but only for narrow vessels.

Great Pedee River is formed in N. C. by the union of the Rocky and the Yadkin rivers. It flows S. S. E. into S. C., and reaches Winyaw Bay. In its lower course it is often called the *Waccamaw*. The prin. tributary is the Little Pedee. It is navigable 150 m. to the falls at Cheraw.

Great Salt Lake, in N. Utah, the prin. body of water in the Great Fremont Basin, and one of the most remarkable lakes on the globe. It is 70 m. long, 45 m. broad, 4250 ft. above the sea-level, and is slowly rising. Its maximum depth is 60 ft.; mean depth, 12 ft. Its water contains 20.196 per cent. of common salt, 1.834 of sodic sulphate, 0.252 of magnesium chloride, and a trace of calcium-chloride. Its specific gravity is 1.170, almost exactly that of the Dead Sea; but, unlike that sea, it abounds in animal life. Hence the probable success of the attempts of the U. S. fish commission to stock the lake with food-fishes. Its area is 1900 sq. m. Bear River is its prin. tributary; the Weber, the Jordan, and several small creeks also discharge their waters into the lake. Antelope Island, its largest island, is 15 m. long.

Great Slave Lake, in Brit. Amer., lies between 60° 40' and 63° N. lat. It is 300 m. in greatest length, 5 m. in breadth, abounds in islands, is frozen over for half the yr. The rivers Hay, Peace, Athabaska, English, Slave, Linah, and other large streams swell its waters, which are discharged into the Mackenzie River. The Great Slave River flows 300 m. from Lake Athabaska to G. S. L. Its upper course has rapids.

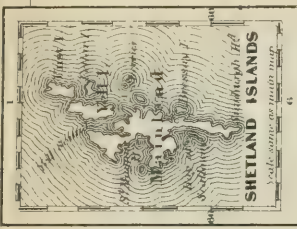
Greaves (JOHN), M. A. (*Gravius*), b. at Collmore, Hants, Eng., in 1602; was prof. of geom. in Gresham Coll., Lond., 1630-43; travelled extensively in the E., making scientific collections, 1637-40; was Savilian prof. of astron. at Ox. 1643-48, but was ejected by the Puritans. Wrote *Pyramidologia*. Discourse on the Rom. Foot and Denarius, etc. D. Oct. 8, 1652.

Grebe, or **Dipper**, a name applied to various aquatic birds of the family *Columbidae*. The U. S. have 7 species. The smaller species are called dabchicks. They are expert divers, having the power of remaining long under water.

Grecian Architecture. See ARCHITECTURE.
Grecian Games. Games were celebrated in Gr. at different localities and under different names, but they were very much alike in their gen. character. They present themselves under the 4 grand divisions of the Olympic, the Pythian, the Isthmian, and the Nemean.

The Olympic Games.—These were, in several respects, the most important, and may be considered as typical of all. Olympia in Elis, where they were celebrated every 4th yr., was not a city or a town, but a small plain nearly surrounded by lofty hills, and bounded on the S. by the river Alpheus. On this plain was the sacred grove, called Altis, adorned with divers beautiful structures and works of art. Within

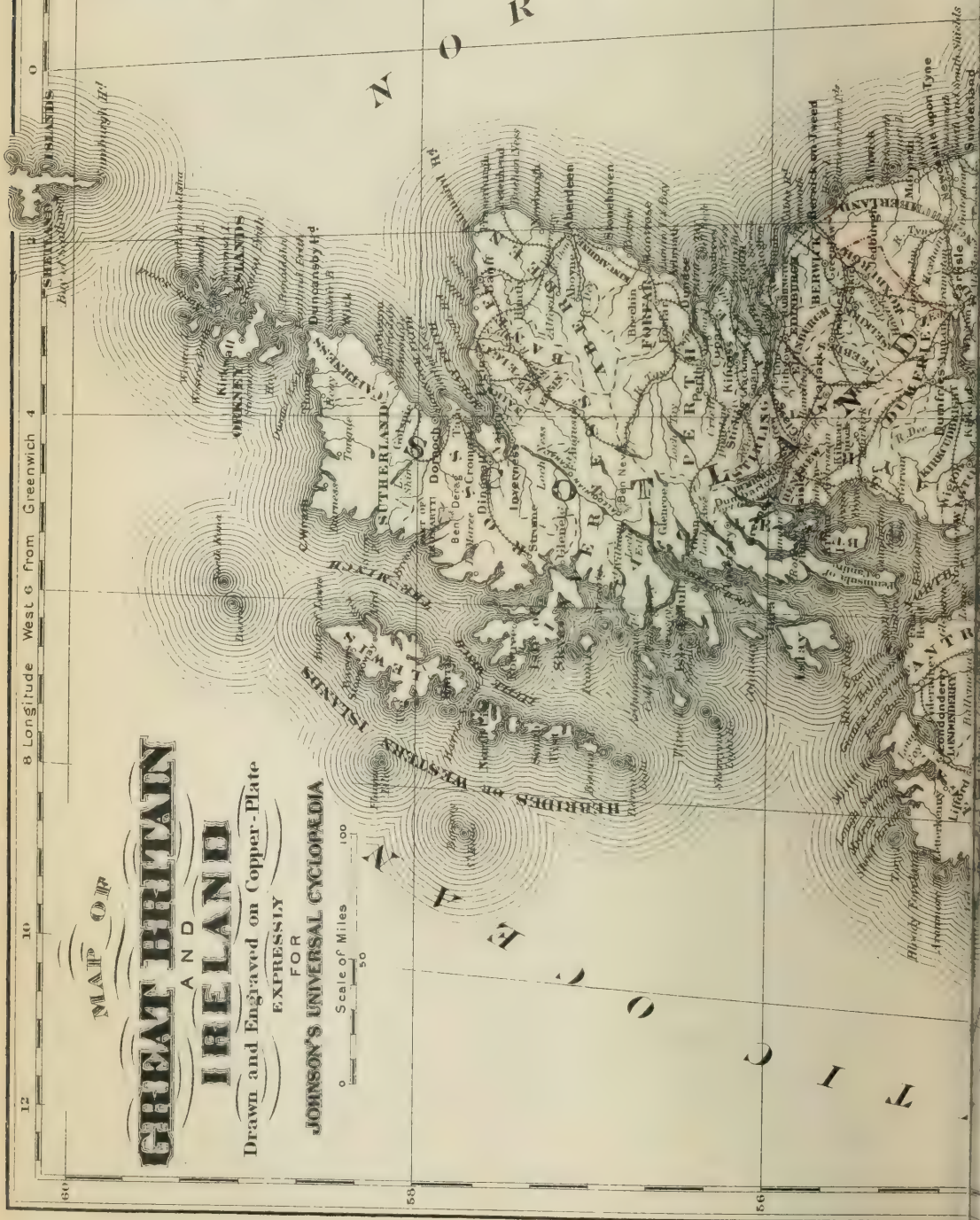
12 10 8 Longitude West of Greenwich 4 2 0



MAP OF
**GREAT BRITAIN
AND
IRELAND**
Drawn and Engraved on Copper-Plate
EXPRESSLY
FOR
JOHNSON'S UNIVERSAL CYCLOPEDIA

Scale of Miles
0 50 100

N O R T H S E
T I C





it grew many wild olive trees, among which was that which furnished the wreaths or crowns for the victors in the various contests. The list of the Olympic games must be divided into the pre-historic or mythical, and into the historic or authentic, which begins with Iphitus and his associate Lycurgus. When Hellas was distracted by the dissensions of its tribes and states, Iphitus, a noble Elean, called king of Elis, inquired of the Delphic oracle how this could be remedied. The response was that he should, in conjunction with the Eleans, revive the Olympic games. His most important enactment was that for the cessation of all hostilities throughout Gr. during these festivities.

The Contests.—For a long time after their reinstitution by Iphitus there was no other contest beside the single foot-race; but the double foot-race was introduced in the 14th Olympiad, the Dolichos (the long course) in the 15th, wrestling and the Pentathlon, which consisted of 5 exercises, in the 18th, and in the 25th the chariot-race with 4 horses was revived. In the 33d Olympiad followed the Pancration, an athletic game which exercised all the powers of the combatant, as it combined all the arts of boxing and wrestling. Various other additions were subsequently made.

Qualifications.—From these games all persons punished with civil degradation, all persons notoriously impious, all persons polluted, especially blood-guilty, were strictly excluded. Hence, all applicants were subjected, before the commencement of the exercises, to a rigorous examination. To those who proved to be in all respects duly qualified the judges administered an oath which bound them to act honorably; they arranged all the details of the contests, and took care that all the regulations of the games were enforced.

Rewards of the Victors.—At Olympia the prize bestowed upon the victors in the contests consisted of a wreath or crown made of twigs taken from the wild olive tree which grew in the Altis. At the Pythian games the chaplet was made of laurel; at the Isthmian, of twigs of the pine tree; at the Nemean, of ivy or parsley. But the distinctions and material advantages which were conferred upon the victor in the Olympic games in his native country or throughout Hellas were very great. Statues were erected in honor of him in his native city, and sometimes in other cities where he had friends, or to which he had rendered some important service. In later times he was, at Athens, maintained in the Prytaneum at the public expense.

Discourses, Recitations, Etc.—From the 80th Olympiad it became customary at Olympia to engage in sundry intellectual exercises, to perform dramatic pieces, to deliver discourses, to make recitations, and to read poetic productions. Artists also exhibited their works here. Here Herodotus read his great historical work; and this is said to have inspired Thucydides, who was present, with that enthusiasm which afterward made of him also an eminent historian; but the tradition that he read his admirable narrative of the Peloponnesian war at Olympia is doubtful.

Minor Olympic games were celebrated, in imitation of the greater, in several Hellenic states and foreign cities, which cannot, however, be described here. The Pythian, Isthmian and Nemean games had characteristics very similar to the Olympic, though differing in certain respects. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. H. I. SCHMIDT, D. D.]

Gre'cian Mythology was so closely interwoven with Gr. civilization in gen. that there is hardly any Gr. author from whose writings something may not be learned concerning the Gr. gods. Another source, as important and almost as rich, is the Gr. art. It is hardly too much to say that without the aid of the Gr. sculptors we should never have arrived at a true appreciation of the manner in which the Grs. conceived of their gods. A more direct source of information are the writings of the old Gr. and Lat. mythographers who collected, systematized, and interpreted the myths. The most important among the Grs. are Apollodorus, *Bibliotheca*; Conon, *Narrationes*, an epitome of which is preserved by Photius; Ptolemaeus, *Novæ historia*; Parthenius, *Narrationes Amatoria*; Antoninus Liberalis, *Transformaciones*; Joannes Pseudiasius, *De Heraculis laboribus*; and Nicetas, *Deorum cognomina*; among the Lats., Hyginus, *Fabulae*; Fulgentius, *Mythologiarum Libri Tres*. The origin of G. M. is Oriental, and dates in some cases back to India. With Hesiod and Homer the formation of the myths is finished; the ideas are individualized into perfectly plastic figures and perfectly epic actions. With Euripides and Plato the dissolution of the myths has begun; the forms are broken asunder and considered only as symbols of the ideas. On being transferred from Athens to Rome the Gr. myths hardly underwent any other changes than that of names: Cronos was called Saturnus; Zeus, Jupiter; Poseidon, Neptuneus; Ares, Mars; Hephaestus, Vulcanus; Hermes, Mercurius; Hera, Juno; Athene, Minerva; Artemis, Diana; Aphrodite, Venus; Hestia, Vesta; Demeter, Ceres; Dionysus, Bacchus; Leto, Latona; Persephone, Proserpina; Selene, Luna; Eros, Amor, etc. The ideas which the Gr. mythology contains of the origin of the world are remarkable. Uranos (heaven) and Gaia (earth) arose out of chaos, and their children were the wild powers of nature, the Titans. One of the Titans, Cronos (time), who eats his own children, slew his father and ruled the world for some time. But Uranos had cursed his sons, and the curse was fulfilled. Zeus, a son of Cronos, rose against his father, and confined him and the other Titans in Tartaros, and raised his throne in Olympus, in the light-region above the sky. Much weaker are the ideas of the Gr. mythology concerning that which will take place after death. When the deceased had paid his obolos, a small coin which his children or friends had placed in his mouth, Charon would ferry him over the Styx, which flowed between life and death and surrounded Hades. Arrived at the other side of the Styx, he had to pass by Cerberus in order to gain the large plain where Minos sat to judge the coming. According as the judgment read, he then turned either to the left into Tartaros, or to the right into the Elysian Fields.

CLEMENS PETERSEN.

Greece. Greece is the S. part of the most E. of the 3 peninsulas of Europe which project into the Mediterranean Sea. The anc. Grs. called their country *Hellas*, and styled themselves *Hellenes*. The Romans gave the name *Græcia* to the country, and *Græci* to its inhabs.

Modern G. is more limited in extent than anc. G. By the arrangement of the 21st of July, 1832, the great powers of Europe left to Tur. not only Epirus and Macedonia, but Thessaly and a part of Acarnania, and fixed the N. boundary of G. at a line running from the Gulf of Arta to the Gulf of Volo, keeping along the crest of the Othrys mt.-range. The Ionian Islands were placed under the protection of G. Brit. In 1864 the Ionian Islands were annexed to G., and on the 24th of May, 1881, parts of Thessaly and Epirus were given to it. Including the new territories the area of G. is 25,041 sq. m. G. is triangular in shape, and is almost surrounded by water. It is divided near the middle by the Corinthian and the Saronic gulfs, which are separated by the Isthmus of Corinth.

The total pop. of G., including 299,953 in new terr. (parts of Thessaly and Epirus) acquired from Tur. by convention of May 24, 1881, is 1,979,423. By a law passed in the session of 1879 universal liability to arms was introduced; the numerical strength of the army on the peace-footing was fixed at 24,076 men, on the war-footing at 35,188. The navy consists of 14 vessels. G. is now divided into nomes, which correspond in names, and often in extent, to the states of anc. G. These nomes are divided into eparchies, which are subdivided into demes.

G. is exceedingly irregular in form. Its surface is diversified by mts., and its coast-line extensive in comparison with its surface. Its mt.-system divided the country like a checker-board, and gave character to its people and their civilization. The Cambunian Mts. were the boundary between Macedonia and G.; Pindus separated Thessaly from Epirus, and sent off Othrys and Ceta, which ran S. E., and reached the sea at the pass of Thermopylæ; Pelion and Ossa are on the E. coast of Thessaly. The main chain, under the names of Parnassus, Helicon, Cithæron, and Hymettus, runs S. E. through Phocis, Bœotia, and Attica to Sunium, and Parnes separates Bœotia from Attica. Joins Cithæron, and the united range extends nearly to the isthmus. The mts. of the Peloponnesus are sent forth from the central state, Arcadia. The highest are Cyllene and Taygetus (rising to 7902 ft.), which separates Laconia and Messenia, and extends to Tanarum (*Matapan*). The Geranean Mts. are in Megaris; the other states and the islands are mountainous. The valleys are generally very narrow. The plains are mostly small, and situated on the sea-shore and at the mouths of rivers or inclosed by mts. Numerous lakes form in the spring, but dry up in the summer. Copais in Bœotia is the largest of the permanent lakes. There are no navigable rivers in G.; the numerous gulfs running into the land supply the place of rivers. The hard gray limestone is the characteristic rock of G., and it often assumes the form of the most beautiful marble (white marble in Mt. Pentelicus, green and red marbles in the Peloponnesus and on some of the islands). There are no volcanoes, but traces of volcanic action are found everywhere. The hot springs of Thermopylæ and the mephitic vapors that inspired the priestess of Delphi are famous in hist.

The climate of G. was more salubrious in anc. than in modern times. It varies according to location. Near the coast snow is rare; on some of the mts. it lies nearly the entire yr. Even in the rainy seasons the atmosphere is fresh and clear, except in Bœotia, the land of fogs and malaria, which affect body and mind. Attica has a pure, dry atmosphere, a sky of deep and beautiful blue. In anc. as in modern times the domestic animals of G. were the horse, ass, mule, ox, sheep, goat, hog, and dog. The bear, wolf, boar, lynx, wild-cat, jackal, deer, etc. are found in the mts.; eagles, vultures, hawks, owls, etc. are numerous, and game is abundant. Many of the mts. have been stripped of their forests, so that the fertility of the soil and the climate have been unfavorably affected. The pine is the most common tree; the beech, chestnut, cypress, and oak are found. The soil is thin, and agriculture is backward. Wheat, barley, maize and rice, cotton and tobacco are raised. Vineyards are numerous, and the mulberry is cultivated for the sake of the silkworm. Almonds, figs, oranges, lemons, and other fruits abound. Olives are produced in all parts of G. The currant is raised in large quantities. The figs of Attica and the honey of Hymettus are proverbially excellent. The position of G., the conformation of the country, its numerous bays and islands, all tend to make the Grs. a seafaring people. For centuries it was in the pathway of commerce. Its exports have always been the simple products of the country. The imports are manufactured goods from W. Europe, such as cloths, hardware, and fancy articles; coffee, rice, drugs and spices from Tur. The grain-trade of the Black and the Mediterranean seas is almost exclusively in the hands of Gr. merchants. In 1881 the debt of G. was 400,407,300 drachmas. Revenue estimated at 49,051,560 drachmas, expenditure at 124,155,139 drachmas. The value of a drachma is a little less than 20 cents.

Government.—The const. of G. vests the legislative power in a single chamber of reps. (the Boulé), elected by manhood suffrage for the term of 4 yrs. The elections take place by ballot, and each candidate must be put in nomination by the requisition of at least one thirtieth of the votes of an electoral dist. The Boulé meets annually for not less than 3 nor more than 6 months. The executive is vested in the king and his responsible ministers, the heads of 8 depts.

Administration of Justice.—The supreme court of G. is called the Areopagus. The kingdom is divided into 4 judicial dists., each having a royal court of appeal. The judicial legislation is excellent, and is based mainly on the Code Napoléon. Criminal cases and offences of the press are tried by jury. Brigandage is only too common, and murder not infrequent.

The religion established is the Holy Orthodox Catholic and Apostolical Ch., to which nearly all the pop. belong. Its supreme council is the Holy Synod of 5 members, appointed annually by the king. The metropolitan abp. of Athens is *ex officio* the pres.; majority must be abps. or bps.

Army and Navy.—The nominal strength of the army in 1879 was 14,061. The navy consists of 18 vessels.

Popular education is widely diffused in G.; the press is free, but only since her regeneration G. could cultivate lit.; art is not much cultivated. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. H. C. CAMERON, D. D.]

Greece, Ancient History of. The earliest inhabs. of Gr. were probably the Pelagi, an Aryan nation who came from the high table-land of Asia, passed around the Caspian Sea into Europe, and settled in Gr. and It. They were composed of various tribes, among whom the Hellenes were the most powerful, and before whom the others disappeared. Their original seat was near Dodona in Epirus, but they first appear in the S. part of Thessaly about b. c. 1384. They were divided into Dorians, Æolians, Ionians, and Achæans. The phys. features of the country exerted a powerful influence upon the people, determining their character, giving form to their political insts., and assisting in the development of a peculiar type of civilization. There are traces of Oriental influence in Gr., and tradition attributes the first elements of civilization to colonies from the E. From the appearance of the Hellenes in Gr., about b. c. 1384, to the siege of Troy, b. c. 1184, is called the *heroic age* (Hercules, Theseus, Minos, Jason and the Argonauts, the Trojan war). Although the Grs. were divided into many small communities, yet there were bonds of union in their community of blood and lang., of religious rites and festivals, of manners and character. The state of society in Gr. in the earlier ages was not unlike that of the feudal ages in Europe. Each state had its own king, whose authority was not limited by laws, but was partially restrained by the council of chiefs, or *boule*. There were three classes of persons—the nobles, powerful and wealthy; the freemen, some of whom possessed estates; and the slaves. Thucydides speaks of the migrations that occurred among the Grs. The Dorians overran the Peloponnesus b. c. 1104. The country was divided among the leaders, and the defeated Achæans drove out the Ionians from the N. coast of the Peloponnesus, which portion was henceforth called Achæia. The Ionians went to Attica, and thence to Asia Minor. The earliest migration from Gr. was in b. c. 1124, and Gr. colonization became very important. Colonies were planted everywhere; the most numerous and important were in S. It. (Magna Græcia). The two most important states of Gr. were Attica and Laconia, generally designated as Athens and Sparta from the names of their cap. Sparta owed her supremacy to the military and political insts. of Lycurgus. Sparta was nominally a monarchy under two kings, but was really an oligarchy in the hands of 5 ephori. The other states or cities of Gr. became democratic. The change from monarchy to democracy usually pursued a regular course. An oligarchy of nobles would overthrow the monarchy, and then some one of the nobles would espouse the cause of the people and overthrow the oligarchy. He was styled a *tyrannus*—in allusion to his mode of obtaining power, and not to his manner of exercising it. Sparta was the type of an oligarchy; Athens, her great rival, the example of a democracy.

The lawgivers of Athens were Draco (612), whose laws were so severe that they were said to have been written in blood, and Solon (594) whose legislation repealed the laws of Draco. He bound the Athenians by an oath to observe his laws, and set out upon his travels. In his absence the old local dissensions broke out, and the result was the triumph of Pisistratus (560). Twice driven out, he became tyrannus again, and at his death left his power to his sons, Hippias and Hipparchus. He did much for the culture of art and lit. at Athens. In consequence of a private quarrel, Harmodius and Aristogiton slew Hipparchus, and the character of Hippias was completely changed. Clisthenes secured the Delphic oracle, which induced the Spartans to overthrow Hippias. Clisthenes returned, but controlled the state only by making the const. more democratic. Athens now entered upon her glorious career. The Gr. settlements in Asia Minor were conquered by Cressus, king of Lydia, who ascended the throne 560. Cyrus, king of Pers., overthrew him 546, and also subdued the Gr. cities. The Ionians revolted against the Pers. 500, and the Athenians sent 20 ships and the Eretrians sent 5 to assist them. The combined forces entered, plundered, and accidentally burned Sardis. The Athenians returned home, and the enraged Darius, king of Pers., vowed vengeance upon them. He crushed the rebellion, and sent Datis and Artaphernes to punish the Athenians and Eretrians. Under the skillful leadership of Miltiades the Athenians gained a most brilliant victory on the plain of Marathon. Athens had saved Gr., and the Pers. sailed back to Asia. In 490 Xerxes, the son of Darius, led an immense army against Gr. After the battle at Thermopylae the Gr. fleet retreated to Salamis, and in the narrow strait between Attica and this island the Pers. fleet was defeated; the king returned to Asia, but again invaded Attica, until the Grs. had defeated the Pers. army at Platea, and the Pers. fleet at Mycale in Asia. From the battle of Marathon (490) to the beginning of the Peloponnesian war (431) was the most brilliant period of Athenian hist. Themistocles had created her navy, Aristides had conciliated her allies, Cimon increased her reputation, and Pericles enlarged her resources. He erected the Propylæa, the Parthenon, and the temple of Victory on the Acropolis, the Theseum and other buildings in the city. He built the long walls to the Piræus, and sent out colonies. Athens became the centre of art and lit. Arch. and sculpture culminated. The greatest names in Gr. lit. adorn this century: in tragedy, Æschylus, Sophocles, and Euripides; in comedy, Aristophanes; in hist., Herodotus and Thucydides.

Athens exercised the hegemony or leadership of G., and

but for her arrogance and unwise conduct she might have exercised it much longer. But the Peloponnesian war broke out, and in this Athens was completely humbled. This war was one of races and of principles: Athens represented the Ionian tribes, democracy, and progress; Sparta, the Dorians, aristocracy, and conservatism. Athens was a maritime power, and controlled E. and Asiatic G. and most of the islands; Sparta was a land power, and controlled W. G., S. It., and Sic. The states with Athens were mainly subject allies; those with Sparta constituted a voluntary confederacy. Athens had great financial resources; Sparta depended upon occasional contributions. After three different periods—(1) from its beginning to the Peace of Nicias (b. c. 431–421); (2) from the peace to its rupture by the Spartans (421–413); (3) from this rupture to the capture of Athens (413–404)—the war was finally closed. The walls of Athens were demolished to the music of the flute, her ships were surrendered, and she was stripped of all her foreign possessions. Oligarchical principles triumphed with Sparta, and decarchies with a Spartan harmost were appointed in the Athenian cities. At Athens a committee of 30, known as the Thirty Tyrants, supported by a Lacedæmonian garrison, supplanted the democracy, and a reign of terror ensued. Throughout G. the rule of Sparta became more cruel than that of Athens had ever been, and a revulsion of feeling occurred in reference to Sparta and Lysander. Thrasybulus and other exiles took the Piræus, defeated the force of the Thirty, and killed their leader, Critias. The Thirty were deposed and a committee of 10 was appointed. Matters were finally arranged; a gen. amnesty was proclaimed, the obnoxious laws were changed, Thrasybulus and the exiles entered Athens, and the democracy was restored (b. c. 403). It was at this time that Socrates, the wisest and best of the Grs., a martyr for the truth, was put to death upon the false charge of infidelity and corrupting the youth.

During an expedition of Cyrus the Younger to dethrone his brother Artaxerxes, the weakness of Pers. was revealed to the Grs., and a war ensued between Sparta and Pers. The Thebans defeated the Spartans, and Athens, Corinth, Argos, and other states formed an alliance with Thebes against Sparta. The allies were defeated at Coronea (394), but the Lacedæmonian fleet was destroyed at Ænidus, and the Spartans lost their maritime supremacy. But the war continued with varying success, and in the yr. 379 Sparta's power on land and her unpopularity were at their height. The following period is the hegemony of Thebes, the greatness of which began and ended with Epaminondas. He gained a decisive victory over the combined force of his enemies at Mantinea (b. c. 362), but himself fell mortally wounded. Peace was made according to his dying advice. By these struggles G. was completely exhausted, and a new power was rising in its neighborhood. As in the yr. 359 Philip became king of Macedonia, the way for his supremacy was prepared through the Sacred War between Thebes and Phocis. In this Philip appeared as champion of the Delphic god, who had been violated by the Phocians. He soon became master of Thessaly. An Athenian army prevented him from passing Thermopylae, and Demosthenes, the great Athenian orator, appeared as the opponent of Philip. When Philip threatened Olynthus, Demosthenes infused more energy into the Athenians. His *Olynthiæes* and his *Philippiæes* are among his most celebrated orations, but Olynthus was taken 347, and by deceit and bribery Philip gained as much as by war. He induced the Athenians to make peace, but at last they united with the Thebans, and a. c. 335 was fought the battle of Chaeronea, which crushed the liberties of G. Philip treated Thebes with severity, but offered advantageous terms of peace to Athens. Congress of G. states, except Sparta, met at Corinth, declared war against Pers., and appointed Philip commander-in-chief. While making preparations for the expedition he was assassinated, and his son Alexander, then 20 yrs. old, succeeded him. Alexander was thoroughly educated; courage and energy secured his appointment as leader of the expedition against Pers. Thebes revolted, but it was utterly destroyed, and the inhabs. reduced to slavery. In 30 months Alexander conquered Phœnicia and Egypt, in 3 yrs. the N. E. provs. of the Pers. empire. He advanced into India, and overran what is now called the Punjab. But at the height of his power, and meditating the conquest of Arabia, he was seized with a fever and d. (323). His plans perished with him, and his empire was divided among his generals. Philip Arrhidæus, his half-brother, was proclaimed king. Perdicas eventually became the guardian of Philip, but was murdered in Egypt, and Antipater now became regent; Ptolemy defeated Egypt; Seleucus took the satrapy of Babylonia; and Antigonus had Susiana, Phrygia, Lycia, and Pamphylia. Antipater d. leaving the regency to Polyperchon, and not to his son Cassander. He shortly became regent. After the death of Cassander, Macedonia changed rulers repeatedly and rapidly, until Antigonus Gonatas controlled nearly all G.

At the close of the second Punic war the Romans declared war against Philip, king of Macedonia, who had sided with Carthage in her struggle. Philip was defeated at Cynoscephalæ (197), and his supremacy was destroyed. Perseus succeeded Philip. War broke out, and L. Æmilius Paulus defeated Perseus at Pydna (168), and led him to Rome to adorn his triumph. Thus ended the Macedonian empire, and Macedon became a Rom. prov. During the following struggles Sparta appealed to Rome; riots ensued in Corinth, and the commissioners barely escaped. A second embassy was insulted, and Rome declared war. Metellus defeated the Corinthian leader, and the inhabs. of the city were reduced to slavery, its priceless treasures of art were carried away, and the city was consigned to the flames. G. perished a. c. 146, and henceforth was only a prov. of the Rom. empire under the name of *Achæia*. G. was conquered, but her civilization and culture conquered Rome. [From orig. art. in *J.'s Univ. Cyc.*, by Prof. HENRY C. CAMERON, D. D.]

Greece, Modern, continued to form a part of the Byzantine Empire until the time of the fourth crusade (A. D. 1203). The old empire was then broken up, and its provs. divided among the Frankish princes. The dukedom of Athens belonged successively to several different families, to 1453, when, on the fall of Constantinople, G. came under the Moslem yoke. After the signal defeat of the Turks at Vienna (A. D. 1684) the Venetians invaded G., conquered the Peloponnesus, and took possession of Athens (A. D. 1687). But it was scarcely a dozen yrs. ere they abandoned Athens, and by A. D. 1718 the whole of G. was again in the power of the Turks. For a century longer the Grs. groaned under this cruel despotism. But in the spring of 1821 the war of independence began. The first battle was disastrous for the Grs., but in Jan. 1822 the first national assembly met at Epidaurus and framed a provisional const. In the same yr. occurred the terrible massacre in Scio, by which the pop. of this island was reduced from 120,000 to not more than 16,000 souls. This yr. was also marked especially by the burning of the flagship of the Tur. commander by the fireships of Admiral Canares. The next yr. (1823) witnessed the bold and successful midnight attack upon the Tur. camp at Carpenesio. It was in this yr. also that Lord Byron arrived in G., or rather in the Ionian Islands, where he spent 5 or 6 months in correspondence and preparations. He arrived in Missolonghi on Jan. 5, 1824, and d. there on the 19th of the following Apr. In Apr. 1825 this important fortress fell before the army of Ibrahim Pasha, and nearly the whole of G. was now at the mercy of the Turks. In July of this yr. they laid siege to Athens, which after an obstinate resistance fell into their hands in June of the following yr. After many unsuccessful embassies on the part of G. and much fruitless correspondence between the courts of Eng., Fr., and Rus., a treaty was at last signed in Lond., on July 6, 1827, providing that an immediate armistice should be established between Tur. and G., and proposing to place G. on the footing of a tributary prov., with the right to choose her own govts. G. was in no condition to reject these humiliating terms; but, happily for her, the Porte was too proud or too obstinate to accede to them. The allied powers then augmented their fleets in the Mediterranean, and instructed Admiral Codrington, who was chief in command, to prevent the landing of any more hostile troops upon the soil of G. Ibrahim Pasha, the commander of the Turco-Egyptian fleet, refused to comply with this demand. His force was lying in the harbor of Navarino. On Oct. 20 the allied fleets entered the harbor. After a bloody action of 3 or 4 hours the allies gained a complete victory. The Tur. squadron was almost annihilated. This was a decisive blow; the freedom of G. was now secure. It was nearly 2 yrs., however, before hostilities entirely ceased, the last battle having been fought in Boeotia on Oct. 7, 1829. In this engagement Prince Demetrius Ypsilantis gained a brilliant victory.

At the close of the war the govt. was in the hands of the Count Capo d'Istria, who had left the Rus. service and assumed the presidency of G. at the beginning of the yr. 1832. In Oct. of the following yr. the pres., Capo d'Istria, was assassinated at Nauplia. This event accelerated the negotiations of the protecting powers, and their choice fell on Otho, second son of Louis, king of Bavaria. This choice was solemnly ratified by the national assembly of the Gr. people, and in Feb. 1833 the young prince arrived at Nauplia, then the seat of govt. For 10 yrs. G. was governed by the house of Bavaria without a const. After much discontent and several unsuccessful insurrections the will of the people at last expressed itself in a manner not to be resisted. On the night of Sept. 14, 1843, the palace of Otho was surrounded by the entire garrison of the cap. and a crowd of excited citizens. There was no alternative; the king promised to call a national assembly at once to frame a const. The national assembly met on Nov. 20; its discussions on the articles of the const. continued until Mar. 14, 1844, and on the 16th of the same month the const. was definitively adopted and received the royal signature. Amid frequent complaints and several conspiracies Otho administered the govt. under this const. for 20 yrs. longer. But in Oct. 1862, while the king and queen were indulging themselves in a short excursion in the royal yacht among the beautiful islands of the Ægean, G. decided to change her master, and when the king and queen, after a short excursion, returned, they were met by a deputation who informed them that the throne of G. had been declared vacant. On Dec. 1 the provisional govt. issued a decree ordering the election, by universal suffrage, of a new constitutional king. The vote resulted in the choice of Prince Alfred, second son of Victoria, queen of Eng. But former treaty stipulations between the 3 protecting powers forbade that any member of the royal family of either should ever wear the crown of Gr. A joint protocol of the 3 powers declared the throne of G. still vacant, and on June 5 another similar protocol offered the crown to Prince George of Den., second son of King Christian IX. He accepted the offer on condition that the Ionian Islands should be annexed to the kingdom of G. The protecting powers assented to this condition, and near the end of Oct. 1863 King George I. arrived in Athens and took possession of his throne. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. A. N. ARNOLD, D. D.]

Greek Church, one of the 3 great branches into which Christendom is divided, the other 2 being the R. Cath. and the Prot. Its proper name is the Holy Eastern Orthodox Church. It numbers in all about 100,000,000 nominal members. It includes the following divisions: the Orthodox Ch. in the Tur. empire and those European provs. which formerly belonged to it; the national Ch. of the kingdom of Gr.; the national Ch. of the empire of Rus. The G. C. in Tur. and Egypt is governed by 4 patriarchs of Constantinople, Antioch, Alexandria, and Jerusalem. The Ch. in Gr. is ruled by a Holy Synod. The Ch. of Rus. was formerly governed by a patriarch of Moscow, but since 1723 by the Holy Synod which sits at St. Petersburg, and is presided over by the czar or his commissioners. In doctrine the G. C. closely resem-

bles the R. Cath., and differs from it chiefly in rejecting the authority of the pope, the *Filioque* in the Nicene Creed, and some minor ceremonies. The lower clergy are allowed to marry, but second marriage is prohibited. (See fuller article in *J.'s Univ. Cyc.*)

Greek Fire, a highly inflammable compound, probably made of naphtha, saltpetre, and sulphur; but there is much doubt as to its composition. It was thrown by means of a copper tube upon the enemy, or pledgets of tow were dipped in it and attached to arrows, which were discharged at hostile ships or towns. Its invention was ascribed to Callinicus of Heliopolis, in Egypt, in 688 A. D., and it was first used by Constantine Pogonatus against the fleet of the caliph Moawia at the siege of Constantinople in 673, with the most complete success. It is, however, generally considered an Ar. or an E. I. invention.

Greek Language. The G. belongs to the S. European branch of the Indo-European family of langs. The genius of the Grs. built up their lang. to a surprising degree of perfection, its chief excellences being copiousness of inflection and vocabulary, and consequent capacity for fine distinctions. Most noteworthy is it that the development is hardly at all the result of literary culture; it was unconsciously formed in the mouths of a people, gifted, but utterly ignorant of the art of writing.

PERIODS.—We may distinguish 2 chief periods in the hist. of anc. Gr.: (1) The period of growth, from the earliest times to 330 B. C.; (2) the period of decay, from this date to about 800 A. D.; with the end of the 8th century begins (3) the modern Gr. period.

DIALECTS.—There must have been a time when the Grs. spoke exactly the same lang. But the time and place of this unity is matter of conjecture. In historic times the lang. was by no means uniform. Though all Grs. seem to have understood one another without difficulty, yet the dialectic variations were considerable. Unfortunately our knowledge of them is incomplete. Only 2, Ionic and Attic, do we know through copious literary monuments. The primary division of the dialects, as of the people itself, is a twofold one—into an E. (Ionic) and a W. (Æolo-Doric) branch. The W. branch divides itself into Æolic and Doric; so arises the threefold division into Ionic, Doric, and Æolic. The W. dialects are more conservative than the Ionic.

A. Æolic.—The dialects classed as Æolic lack that unity which the Doric have; the tribes speaking them seem to have been early dispersed all over Gr. There are 2 groups of Æolic dialects: the first includes Asiatic Æolian of Lesbos and the neighboring coast, Arcadian, and Cyprian; the second group comprises Thessalian, Bœotian, and Elean.

B. Doric.—The Doric dialects divide themselves into strict and mild. Strict Doric, spoken in Crete, Magna Græcia, Laconia, Cyrene; best known from the celebrated Heracleian tables, showing the dialect of Heraclea in It. Mild Doric, spoken in Rhodes, Melos, and some other islands, in Megara, Argos, Corinth, Corcyra, and Sic. A special group is the N. Doric of Phocis, Locris, etc.; this, though counted among the mild dialects, approaches the strict in some points.

C. Ionic, including Attic, which is but a branch of Ionic. Attic, the chief literary dialect. Ionic of the Asiatic coast, often called simply Ionic (Old Ionic of the Homeric poems and all later epics, a partly conventional and artificial lang., containing much that is extremely anc., side by side with forms of a later stage; the so called New Ionic, the spoken lang. of the Asiatic Ionians; its local variations no longer traceable, known to us by the writings of Herodotus and Hippocrates).

ALPHABET.—The Grs. received their letters from the Phœnicians, at what time is uncertain, but our earliest, very rude, and primitive inscriptions are not older than 650 B. C., and the Homeric poems make no mention of writing. The original forms of the letters were by no means those familiar to us; they varied much with times and places, and became fixed about as we know them in the 4th century B. C. The letters at first were turned (ε. γ.), and the writing proceeded from right to left; this was early reversed. The complete Ionic alphabet became gen. about 400 B. C., superseding the older alphabets. Breathings and accents were unused till long afterward. Capitals only were known to the anc.; the cursive letters familiar to us developed themselves in the mediæval period.

INFLECTION.—1. *Of Nouns*.—The 8 cases of the Indo-European lang. are in G. reduced to 5 (nominative, accusative, genitive, dative, vocative). The lost ones, ablative, locative, and instrumental, are preserved only in adverbial forms. The case-endings show the closest relation to those of the Sanskrit and the parent lang. The G. has retained the dual number more fully than most of the related langs., though only in 2 case forms. Vocative cases proper have no ending.

2. *Of Pronouns*.—The flexion of pronouns differs in many points from that of nouns, and is too complicated to be discussed here. 3. *Of Verbs*.—In no respect can the lang. claim greater pre-eminence than in the structure of the verb. First, in copiousness of significant variations of form. Secondly, the G. alone of all Indo-European langs. has preserved intact the original distinction of the tenses. It never allows the perfect to become a mere preterite, and it has, in its use of present and aorist, carefully kept up the distinction between continued and momentary action. The G. finite verb has 3 voices; beside the active and the passive, the *middle voice*, representing the subject as acting upon, for, or with himself. Beside the indicative and imperative moods, there are 2 oblique moods—subjunctive (conjunctive) and optative. The tenses fall into 3 groups, representing continued, momentary, and completed action.

ACCENT.—The accent of the Grs. was not a stress on a particular syllable so much as an elevation in pitch. It is confined to the last 3 syllables of words. The ordinary tone of accented syllables is called *acute*, and when it falls on long vowels extends to the end of the same. But long vowels in either of the 2 final syllables have sometimes the

high tone restricted to the first half, the voice descending on the last half; this kind of accent is called *circumflex*. If the final syllable of a word be long, the tone can in no case stand farther back than the end of the penultimate vowel; that is, the circumflex cannot stand on the penult nor the acute on the antepenult. The accent of most words is *recessive*, going as far back as this rule will allow; but in some words it adheres to the ultimate or penult. An acute at the end of a word is lowered in pitch if other words follow in close connection; so arises a third variety of tone called *grave*. Some short words have no accent of their own, leaning on the preceding or following word.

SYNTAX.—The structure of G. sentences is natural and unfettered, giving rise to many colloquial idioms, and admitting many slight inconsistencies which are not looked upon as blemishes. The rules are singularly flexible, the variety of constructions very great. The G. is the only lang. of the Indo-European family which, retaining both the subjunctive and optative formations, has kept them distinct, and made them the basis of different shades of modality.

LATER HISTORY OF THE LANGUAGE.—From the time of Alexander (330 B. C.) on, literary and political influences gave the Attic dialect ascendancy over all others; it became the lang. of the whole Gr. world. The national dialects gradually disappear, first in public life and ed. circles, last of all among the masses. The new universal speech takes the name of *common dialect*. It is a slightly modified Attic. Outside of Gr., in Syria, Macedonia, Alexandria, the lang. was spoken with less purity, and many corruptions crept in, the blunders of foreigners using the G. lang. The lang. of the N. T. and the Septuagint is tinged with such peculiarities. So arose, beside the common of the ed., many vulgar dialects. The literary lang. resisted these vulgarisms and kept itself comparatively pure. In the first centuries of the Chr. era the same corrupting influences are yet more actively at work. The cleft between the vulgar tongue and the lang. of the *literati* widens. The Attic revival of the time of Hadrian affected of course very few. Rom. words are largely adopted. The process of decay went rapidly on after Byzantium was made the head of the Hellenic world. The written lang., though clinging stoutly to anc. models, cannot hold its own, and the spoken tongue verges gradually toward the Romaic or modern G. The completest G. gram. is that of Kühner. The works of Krüger, Madvig, and Goodwin are important for the syntax. [From *orig. art. in J.'s Univ. Cyc.*, by PROF. F. D. ALLEN, PH. D.]

Greek Language, Modern. The lang. of Gr. has undergone no *revolution* since the time of the Attic historians, philoss., orators, and poets. In times of ignorance the lang. suffered, indeed, much corruption, in its syntax and its vocabulary, and many foreign words were introduced. But there has never been a period when there were not some who wrote G. with a fair approach to Attic purity. Since the time of Homer the G. has never been a dead lang. If there has been a time when even Athenians spoke a wretched patois, there were ed. men in Constantinople who spoke the lang. in a style which would have been intelligible to Pericles and Plato. There was never any extensive introduction of foreign elements into the lang. of the ed. Gr.; its vocabulary was always essentially that of the anc. lang. But its grammatical forms became vulgarized, and its syntactical construction was still more extensively modified. Toward the close of the last century there commenced a systematic attempt to purify the G. lang., to recall the anc. forms of words and the anc. syntax, and to restore the obsolete words of the classic G. The leading spirit in this patriotic enterprise was Adamantios Korais. From that time there has been a constant and rapid improvement in the G. lang., which has been accelerated since the independence of Gr. was established. The style of the best writers is such as to justify their claim that there is but *one* G. lang. This fact would soon be universally admitted if we would concede to the Grs. the right to regulate the pronunciation of their own lang. When this educational reform shall have been accomplished, the ed. foreigner who visits Gr. will be able to converse with the people in their own still beautiful tongue. [From *orig. art. in J.'s Univ. Cyc.*, by PROF. A. N. ARNOLD, D. D.]

Greek Literature. The lit. of the Grs. is distinguished for originality and perfection of form. While itself a national outgrowth, independent of outside influences, it furnished an impulse which spread to other people, and of which modern European lit. is the result. G. lit. has no period of unsatisfactory first efforts; each new type appears at once in full vigor. We distinguish 4 periods: (1) The anc. or classical lit., ending with Aristotle at the time of Alexander the Great; (2) the Alexandrian period, till the subjection of Egypt to Rome, 30 B. C.; (3) the Rom. period, till the division of the empire, 330 A. D.; (4) the Byzantine period, till the capture of Constantinople, 1453.

I. THE NATIONAL CLASSICAL LITERATURE.—1. *Epic Poetry.*—Before Homer, the Grs. must have had popular poetry; the hymn, the epic song, the dirge, the bridal-song must all have existed in these early days. But of this period we have no direct knowledge; even the names (Orpheus, etc.) referred to are certainly mythical. G. lit. begins with the Homeric poems, the *Iliad* and *Odyssey*, in which are found the vividest word-painting, most musical flow of lang., great wealth of expression, with an inimitable childlike simplicity. The *Iliad*, Achilles its central figure, describes portions of the siege of Troy; the *Odyssey*, the adventures of Odysseus on his return home from the siege. The origin of these poems has lately been the subject of sharp controversy.

2. Hesiod, author of *Works and Days*, a didactic poem on husbandry and the calendar, is the first undoubted personality in G. lit.; he lived at Ascra in Boeotia, at what time is uncertain.

3. *Elegiac and Iambic Poetry.*—During the decline of epic poetry these 2 new creations appeared simultaneously. Like the epics, the new forms have their rise among the Ionians.

From 700 to 500 B. C. is the flourishing period for these types. The elegy is of a serious, reflective, but by no means always mournful tone. The iambic verse, at first the medium of personal invective, is lively and epigrammatic in style. Archilochus of Paros (about 700) was at once the inventor and the most famous author of iambi; some represent him as the earliest elegiac poet, while others assign that honor to Callinus the Ephesian. Distinguished as authors of elegies are Tyrtaeus the Athenian and adopted Spartan, Mimnermus of Colophon, the famous Solon, and Theognis the Megarian. As iambic poets next to Archilochus, Simonides of Amorgus and Hipponax are distinguished, the latter the inventor of the choliamb.

4. *The Subjective Lyric.*—Hitherto every fresh impulse had come from the Ionians of Asia Minor. Now the Æolians of Lesbos took the initiative in the cultivation of the *melos*, or song inseparable from music. The way was prepared for it by the Lesbian composer Terpander, about 700. Alcæus and the poetess Sappho, both Lesbians (about 600), the Rhegian Ibycus and Anacreon of Teos became eminent in this style of composition.

5. *The Choral Lyric* was first brought to perfection among the Dorians, hence the dialect of choral poetry was always Doric. Choral poetry existed in a great variety of forms, all of which combined voices with instrumental music and orchestric action. Important among the many forms was the dithyramb, a feature of Bacchic worship, performed by 50 singers round an altar, and early admitting a mimetic element which was the germ of the future tragedy. Arion was especially famous as the perfecter of this style. The earliest names of importance are Alcman and Stesichorus. Later Simonides of Ceos attained the highest distinction. The list of famous choral poets closes with Pindar, the only one from whom any complete poems have come down to us.

6. *Tragedy.*—The dithyramb contained a mimetic trait, which was little by little developed, first by introducing a disguised personage who narrated in the first person and sustained a dialogue with the chorus; then by introducing this action at intervals in different characters by erecting at first a platform, and then a regular theatre for the spectacles, and improving the costumes and masks; lastly, by increasing the number of actors to 2, and then to 3. This took place at Athens, and Athens remained the home of the tragedy; it was exotic elsewhere. The 5th century B. C. is the flourishing period of tragedy, marked by the 3 great names of Æschylus, Sophocles, and Euripides.

7. *Comedy* arose, like tragedy, from the Bacchic festivities; not from the dithyramb, but from the *comos* or procession of licensed revellers at the country Dionysia, which mingled invocations of the deity with gibes at the bystanders. It passed through 3 phases, known as Old, Middle, and New Comedy. Old Comedy flourished from 450 to 400; the chief poets were Cratinus, Crates, Eupolis, and Aristophanes. In the *Parabasis*, a part where the action stopped and the chorus addressed the audience directly, the Old Comedy preserved the image of the original *Comos*. The Middle Comedy (400–338) was a transitional stage. The latest piece of Aristophanes, *Plutus*, properly belongs to it. The chief poet was Antiphanes. The New Comedy has no chorus, its characters are types of every-day society; it stands very near the modern comedy. Menander (342–290) has the first place among the authors of New Comedy; others were Philemon, Diphilus, Posidippus. Separate from the Athenian comedy was the Sicilian, which attained some eminence in the hands of Epicharmus and Sophron.

8. *History.*—Prose began long after poetry. The first beginnings were made by the Asiatic Ionians, and early prose-writers were Cadmus and Hecataeus of Miletus, Hellanicus of Mitylene, and others. The chief of these Ionic historians, and the only one whose works have come down to us, is Herodotus of Halicarnassus (b. 484), who undertook extensive journeys, and embodied the results of his inquiries in 9 books of hist. Thucydides, the greatest historian of Gr., was an Athenian (470–396). His work in 8 books, treating of the Peloponnesian war down to 410, is a model of impartiality and conscientious research. A continuation of Thucydides' hist. is furnished by Xenophon (about 444–355), whose 7 books of Gr. hist. (*Hellenica*) extend to 362 B. C. Superior to this work in style is his *Anabasis*, and his literary labors not being confined to hist., we possess the *Cyropædia* and the *Memorabilia* of Socrates, a collection of personal reminiscences of the great teacher.

9. *Philosophy.*—The first beginnings of philos. are contemporary with those of hist., and the Ionians took the initiative. The Ionic philos. occupied themselves with speculations on the phys. universe (Thales, Anaximander, Anaximenes). A little apart from these stood Heraclitus (500), and later Anaxagoras of Clazomenæ (500–428), the most advanced philosophic thinker before Socrates. Special schools were formed by Pythagoras at Croton in It., and Xenophanes of Colophon, the founder of the Eleatic school in Elea. The former, though eminent in math., did not get beyond a vague mysticism in speculation. The Eleatics pursued the metaphysical tendency (Xenophanes, Parmenides, and Empedocles). Entirely new ground was obtained by Socrates (d. 399), whose speculation resulted in several schools. The first of these, the Acad., was founded by the celebrated Plato (429–347) of Athens. His works are in the dialogue form, and as works of art they are unsurpassed. The founders of the other Socratic schools are Euclid (Megarian school), Aristippus (Cyrenian school), and Antisthenes (Cynic school). Aristotle (384–322), the founder of the Peripatetic school in the Lyceum, was a pupil of Plato, but very unlike him. His eagerness for knowledge extended into every part of the phys. and metaphysical universe. It may be said of Aristotle that he embraced in himself all the science of his age.

10. *Rhetoric and Oratory.*—The nursery of Gr. eloquence was Athens, and its flourishing period the 4th century. The study of rhetoric had been pursued during the period of the Peloponnesian war, under the influence of the Sophists. The

Sophists were a peculiar product of that age, rhetoricians rather than philols, loose thinkers, though professedly teachers of philols and morals. The principal Sophists were Gorgias a Sicilian, Hippias of Elis, Protagoras of Abdera, Polus of Argimuntum, and Prodicus the Cean. Famous Attic orators are Antiphon (479-411) and Andocides. To a somewhat later period belong Lysias and Isocrates; a little later flourished Iseus and Lycurgus. With Demosthenes (384-322) is reached the highest point in oratory. He is the greatest orator of all times. His contemporaries, Æschines, Hyperides, and Dinarchus, are his inferiors in power.

1. *Medicine*.—Hippocrates of Cos (460-370) is the founder of the science of med. His works are in the Ionic dialect, brief and plain in lang.

II. ALEXANDRIAN PERIOD (330-30 B. C.).—Its characteristics are great diminution of originality, the cultivation of science at the expense of lit., the study and dissemination of previous works.

1. *Poetry* became secondary to prose. The only new type produced is the bucolic, artistically developed by Theocritus, Bion, and Moschus. These poems, called *idyls*, were primarily pictures of rural life. The remaining poetry of this period is artificial in the extreme. Epic compositions are the *Argonautica* of Apollonius, the didactic poems of Aratus and Nicander. The epigram is cultivated with more success; Callimachus, the first Alexandrine librarian, distinguished himself in this style. Both the elegy and the tragedy received some attention. The *sillos*, or satiric poem, came also into vogue.

2. *Philosophy* was chiefly pursued at Athens, where the Epicurean and Stoic schools flourished. Of the teachers the most important are Theophrastus, a man of most varied learning, and Chrysippus and Panetius the Stoics.

3. *Grammar* and the study of lit. were pursued, especially at Alexandria under the Ptolemies. The famous libraries there collected, and the Museum, a kind of acad. of sciences, were important means.

4. *Other sciences* are astron., math., and geog. In math. were distinguished Euclid, and later Archimedes of Syracuse and Apollonius; of others, Eratosthenes, the first scientific geog. (d. 194), and Hipparchus, the astron.

5. *History* is neglected; the only name of importance is Polybius (204-122).

III. ROMAN PERIOD (30 B. C.-330 A. D.).—Lit. centres at Rome, the anc. seats of learning losing their importance. The scientific spirit decreases, but there is returning taste for rhetoric and regard for form and style in composition; so results a remarkable revival of Attic prose. To the 1st century of this period belong Diodorus Siculus, Plutarch, Flavius Josephus, and Strabo, the rhetorician Dionysius of Halicarnassus, and later, Arrian, Appian, Herodian, Dio Cassius, and Pausanias. Of rhetoricians, Dio Chrysostom, and later Longinus, deserve mention, but especially the witty satirist Lucian. Less valuable are the writings of the 2 Philostrati and those of Ælian; the *Deipnosophista* of Athenæus consists of table conversation. The grammarians of this time are divided into Technicians and Atticists. Of the former were Apollonius Dyscolus and his son Herodian; of the latter, Phrynichus and Julius Pollux. The astron. and geog. Ptolemy and the phys. Galen are the chief names in phys. science. The study of philols. languished; Epictetus the Stoic is the most eminent teacher. Philols. degenerated on the one hand into Neo-Platonism (Plotinus), on the other into Scepticism (Sextus Empiricus). From Diogenes Laertius (about 200) we have a hist. of philols. In poetry this period is utterly barren.

IV. BYZANTINE PERIOD (330-1453 A. D.).—The literary centre is Constantinople. A brief renaissance in poetry and rhetoric is followed by a long decline, in which every spark of good taste and originality dies out. Learning grows less and less. The writers of this period are for the most part of no importance except as sources of contemporary hist., or from the fragments of older monuments which they contain. [From *orig. art. in J's Univ. Cyc.*, by PROF. F. D. ALLEN, Ph. D.]

Greek Literature, Modern. The Byzantine Period is to be divided into 3 epochs: the first 330-622; the second 622-1099; the third 1099-1453. Only the writers of the last belong to modern Gr. lit. Nicephorus Bryennius was the author of a hist. of the empire in 4 books, entitled *Materials for Hist.*, left unfinished at his death (1137). His widow, the beautiful Anna Comnena, daughter of the emp. Alexis I., wrote a biography of her father, entitled *Alexiad*, a work of great historic value. George Gemistus, surnamed by himself *Plethon*, was one of the most remarkable men of his age. A passionate admirer of Plato, he formed the bold design of establishing the supremacy of his philols., thereby supplanting not only the system of Aristotle but also the religion of Christ. Visiting Florence, he lectured on the Platonic philols. before Cosimo de' Medici the Elder, and he was so confident of the speedy success of his scheme of enthroning Plato as the sovereign of human thought that he is said to have predicted that not many yrs. would elapse before all the world would be of one religion; and that not Mohammedanism, not Christianity, but Platonism. George Scholarius (1400-60), who took part in the Council of Florence, and was made the first patriarch of Constantinople after its conquest by the Turks, was the author of between 60 and 70 theological works. Laonicus Chalcondylas (or Chalcocondylas), an eminent statesman and historian in the last half of the 15th century, wrote a hist. of the Turks in 10 books, from their origin to the yr. 1463, which is regarded as high authority. Theodore Gazes (1370-1478) was one of the earliest and most influential of those Gr. scholars who did so much to revive in W. Europe the study of the anc. G. lit. Constantine Lascaris, descended from a royal race, and b. in Constantinople near the beginning of the 15th century, is the author of between 30 and 40 different works, and his Gr. gram., pub. in 1476, is said to have been the first book printed in Gr. letters.

The Gr. writers thus far mentioned wrote in the scholastic style, and not in the common lang., and their works therefore had only an indirect influence upon the development of the modern G. lang. We must now go back a little, to notice the earliest writers who composed their works in the popular dialect. Theodore Prodromos, a learned monk of the 12th century (1143-80), is regarded as the father of modern Gr. as preserved in lit. He wrote some popular verses on the poverty of learned men. There appeared in the 14th century a remarkable poetical romance, entitled *Bethandros and Chrysantza*. Its author is unknown, but good judges have assigned it a place in the highest order of poetry, not unworthy to be compared with the productions of Dante and Goethe. Leo Allatius (1586-1669), the Sciote scholar and poet, was one of the greatest scholars of the 17th century, and was in regular correspondence with most of the distinguished literary men of his time. George Chortakes, a Cretan poet of the 17th century, was the author of a tragedy entitled *Erophile*, chiefly remarkable for the abundance and vividness of its imagery. Elias Meniates (1669-1714), a Cephalonite, combined in himself the qualities of a teacher, a preacher, and a diplomatist. He wrote *The Rock of Offence*, an exposition of the causes of the breach between the E. and W. chs. Vincentius Kornaros (b. 1620) wrote *Erotocritos*, and has been called the Homer of modern Gr. Kosmas the Ætolian (1714-79) was renowned for his bold earnestness as a preacher, whereby he made many enemies among the aristocracy; and for his zeal in the cause of popular education, whereby he made many friends among the common people. As the founder of more than 200 schools in various parts of Gr. he is reckoned among the prominent harbingers of Gr. independence. Accused by his enemies of seditious plots, he at last suffered martyrdom at the hands of the Tur. authorities in Epirus. Still more prominent in the list of those who prepared the way for the national regeneration was Rhegas Pherraios. Born about the middle of the 18th century, he early devoted his life to the liberation of his country from Tur. oppression. By his patriotic songs he kindled the love of country in the hearts of the Grs., and earned the name of the modern Tyrtaeus. Arrested by the Aus. authorities at Trieste in 1798, and delivered up to the Turks, he d. a martyr to liberty. No one did so much to improve and enrich the Gr. language or to elevate the Gr. race, and make it free and worthy of freedom, as Adamantios Korais. Born in Smyrna in 1748, he removed to Paris 1788, and remained there for nearly half a century, until his death in 1833. Patriotism was his ruling passion. Three things seemed to him indispensable to the liberation of his countrymen: first, to make known to all Europe their oppressed condition; secondly, to keep before their minds the glorious achievements of their ancestors; and thirdly, to purify and elevate their language. From these aims he never swerved. To the *Fatherly Advice* of the patriarch of Constantinople, exhorting the Grs. to bear meekly the Tur. yoke, he replied by his *Brotherly Advice*, summoning them to break that yoke. In 1803 he pub. his *Salpisma Polemistikon*, which was indeed a trumpet battle-call to every true Gr. About this time also he began that series of editions of the classics, to which he prefixed soul-stirring prefaces, which had great effect in developing the passion for freedom. Demetrius Galanos (1760-1833), an Athenian by birth, went to Calcutta in 1786. Here he studied Eng., Sans., Per., and several other Oriental langs., and acquired great reputation for learning and wisdom. Having determined to devote the remainder of his life to the study of philols., he betook himself to Benares, the sacred city of the Brahmans. Assuming their dress and mode of life, he, without renouncing the Chr. faith, became distinguished among the Brahmans and the people of India as not inferior to their most illustrious doctors. He undertook the Herculean task of translating the selectest works of the Indian philols. and poets into Gr. After his death (1833) 7 vols. of his translations were pub. (1845-1853), including the *Mahabharata* and the *Gita Gorindia*; beside these he translated the *Thyagarata*, and compiled a Brahmanic lexicon and 2 triglott lexicons. Anthimos Gazes (1764-1837) edited a scientific periodical entitled *Logios Hermes*; was active in the cause of his country during the war of independence, being a member of nearly all the successive cong. and national assemblies of that period. Athanasius Christopolus (1772-1847) is best known as a lyric poet. He has been called the modern Anacreon, and his *Nightingale* is believed to have suggested Tennyson's *Swallow*. Theoclytus Pharmakides (1784-1862) was an active participant in the revolutionary struggle, and prominently connected with several educational enterprises. For 2 yrs. (1825-27) he held the office of supt. of the govt. press. In 1833 he was intrusted with the ecclesiastical organization of the new kingdom, and was appointed sec. of the Holy Synod in 1833. Pharmakides was one of the most vigorous of the modern Gr. writers, formidable as a polemic and wielding a sarcastic pen.

We have now brought down these notices of the leading scholars and authors of modern G. to our own times. We barely refer to such historians as Trikoupes and Papparepoulos, to such metaphysicians as Damalas and Braila, such philologists as Asopius, such antiquarians as Mustoxidi, and such poets as Salomos and the brothers Soutsos, among the lately deceased, and Rangabes, Zampelios, Zalcostas, and Valaorites among the living. (See SOPHOCLES' *Gr. Lexicon of the Rom. and Byzantine Periods*, (GEBHART'S *Modern Gr. Lang.*) [From *orig. art. in J's Univ. Cyc.*, by PROF. A. N. ARNOLD, D. D.]

Greeley, R. R. junc., cap. of Weld co. Col., half way between Denver and Cheyenne, on the Cache la Poudre, above its junction with the Platte, and 20 m. from the Rocky Mts. Founded in 1870. In all deeds there is a forfeit clause in case liquor is sold or given away, and one fence 45 m. long incloses the town and 50,000 acres of farming land (made legal by the legislature). Pop. 1870, 480; 1880, 1207.

Greeley (HORACE, LL.D., b. in Amherst, N. H., Feb. 3, 1811. His father was a farmer in humble circumstances, and while yet a child Horace took an active part in the labors of the farm. He could read before he was 2 yrs. old, and had scarcely reached the age of 10 before he had devoured every book that he could borrow within 7 m. of his father's house. As soon as he was up in the morning he rushed to his book, and devoted to it every minute of the day which he could snatch from the work of the farm. His third winter was spent at the house of his maternal grandfather in Londonderry, where he attended a dist. school for the first time. He at once attracted notice by the excellence of his recitations, and especially by his skill in spelling. When he was about 10 yrs. old his father removed with the family to Westhaven, Vt., where for about 5 yrs. he was assisted by Horace. At the end of that time in the spring of 1826, he became an apprentice to the printer of a weekly newspaper in E. Poultney, Vt. He soon learned the art of setting type. After remaining in this situation about 4 yrs. he had become master of the trade, and rendered valuable assistance in conducting the newspaper. In June 1830 the paper was discontinued, and young G., after spending a few weeks with his parents, who had removed to Erie co., Pa., obtained employment in some of the printing offices in that vicinity. At length he made up his mind to seek his fortune in New York, where he arrived on Aug. 17, 1831, with only \$10 in his pocket and a scanty stock of clothing in his bundle. He worked as a journeyman printer in several different offices until Jan. 1, 1833, when he entered into a partnership with Francis Story, and commenced the publication of the *Morning Post*, the first daily penny paper ever printed. The paper failed in about 3 weeks. The partnership, however, went on in the job-printing business until July, when it was dissolved by the sudden death of Mr. Story. His place was supplied by Mr. Jonas Winchester, and on Mar. 22, 1834, the new firm issued the first number of the *New Yorker*, a weekly journal devoted to lit., politics, and news. This was edited almost exclusively by Mr. G. It was considered at that time the best newspaper of its kind ever attempted in this country. In spite of its high character, it never gained financial success, and Mr. G. was obliged to engage in editorial labor upon other papers. In May 1840 Mr. G. devoted himself to the editorship of the *Log Cabin*, a campaign journal established in the interest of Gen. W. H. Harrison, the Whig candidate for the Presidency. It obtained a large circulation, but in the autumn of 1841 was merged, together with the *New Yorker*, in the *Tribune*, with which Mr. G.'s name is completely identified, and for which his previous newspaper enterprises had served as preparation. The first number of this celebrated journal was issued on Apr. 10, 1841. It was a small sheet, retailing for one cent. In the course of 6 months it was established on a sound financial basis, when Mr. Thomas McClure became a partner and undertook the sole charge of the business of publication, leaving Mr. G. the exclusive care of the editorial dept. In 1848 Mr. G. was elected to fill a vacancy as a member of the House of Reps. in Cong., and served from Dec. 1 of that yr. to Mar. 4, 1849. In 1851 he visited Europe, and served as one of the jurors of the World's Fair in the Crystal Palace in Lond. His letters during his absence are among his most interesting productions. In 1855 he made a second visit to Europe, chiefly for the purpose of attending the Fr. exhibition. In 1859 he made a journey across the Plains to Cal., and was honored with a public reception at Sacramento and San Francisco. After having exerted himself for the prevention of c. war between the S. and the N., he took a decided stand in favor of its vigorous prosecution subsequent to the actual commencement of hostilities. In 1864 he made an attempt at reconciliation on a plan of adjustment proposed to Pres. Lincoln, which proved unsuccessful. In the same yr. Mr. G. was a presidential elector for the State of N. Y. Upon the close of the war in the spring of 1865 Mr. G. became a strenuous advocate for complete pacification based on the conditions of impartial suffrage and universal amnesty. In pursuance of this end he consented to be one of the bondsmen for Mr. Jefferson Davis, the late Pres. of the Confederacy, who was imprisoned by the Federal govt. on the charge of treason. In 1867 Mr. G. was a delegate to the N. Y. State convention for the revision of the const., and in 1869 was brought forward as a candidate for the office of State comptroller, but was defeated in the canvass. In 1870 he stood for Cong. as a candidate for the 6th N. Y. dist., and was again defeated, though receiving an exceptionally large number of votes. The Liberal convention for the nomination of a candidate for the Presidency, which met in Cin., on May 1, 1872, after the 5th ballot gave a majority of votes for Mr. G. He accepted the nomination, and in the month of July following was nominated for the same office by the Dem. convention at Baltimore. He was thus presented to the country as the candidate of two great parties, but he lost the election by a large majority. During the canvass Mr. G. constantly spoke, and in all parts of the country, to numerous and eager audiences, frankly discussing the great question at issue. His strong constitution at length became impaired by excessive toil and intense excitement. The loss of his wife, who had been a hopeless invalid for many yrs., and upon whose death-bed he attended during the last weeks of the canvass, served to complete the fatal work. D. Nov. 29, 1872.

Mr. G. was the author of several works, the prin. of which are the following: *Hints toward Reform, Glances at Europe, Hist. of the Struggle for Slavery Extension, The Amer. Conflict, and Recollections of a Busy Life*. Mr. G. also planned and was one of the eds. of *J's Univ. Cyc.* (See his *Life*, by JAMES PARTON, and a *Memorial by the Tribune Association*). [From orig. art. in *J's Univ. Cyc.*, by Geo. Ripley, LL.D.]

Greely (A. W.). See **APPENDIX**.

Green (ALEXANDER L. P.), D. D., b. in Sevier co., Tenn., June 26, 1807. He filled with success many of the most im-

portant offices of the M. E. Ch. He took a prominent part in the Gen. Conference in New York in 1844, where measures were adopted for the division of the Ch., and in the organization of the M. E. Ch. S.; was one of the coms. in the adjustment of the Ch. property question consequent upon the division; was one of the prin. originators of the publishing house at Nashville and of the Vanderbilt Univ.; joined Tenn. conference in 1824. He was noted as a preacher and platform speaker. D. July 15, 1874.

Green (ASHBEL), D. D., LL.D., b. at Hanover, Morris co., N. J., July 6, 1762; entered the Revolutionary army 1778; grad. from N. J. Coll. in 1783; in 1785 was chosen prof. of math. and natural philos. in N. J. Coll.; commenced preaching in 1786; was elected a member of the Amer. Philosophical Society in 1787; pastor of the Second Presb. ch., Phila., 1787-1812; became pres. of Princeton Coll. in 1812. Wrote *A Hist. of Presb. Missions and Lectures on the Shorter Catechism*. Edited and largely wrote the *Christian Advocate* (1822-34), a periodical of great influence; was one of the leaders of Old School Presbyterianism. D. May 19, 1848.

Green (BARTHOLOMEW), b. at Cambridge, Mass., Oct. 12, 1666; was the first newspaper printer in S. Amer. In the spring of 1704 he printed the first number of the *Boston News-letter*, which he edited until his death. D. Dec. 28, 1732.

Green (HENRY WOODHULL), LL.D., a jurist, b. at Malden-head (now Lawrence), N. J., Sept. 20, 1804, grad. at the Coll. of N. J. in 1820; was admitted to the bar in 1825, and practised law at Trenton, N. J., until 1846, when he was appointed chief-justice of the supreme court of the State, which office (after reappointment in 1853) he resigned in 1860 to accept the appointment of chancellor. This office he resigned in 1866 on account of impaired health, and travelled in Europe. In 1867 he was one of a commission to revise the laws of the State relative to taxation; pres. of the board of trustees of Princeton Theological Sem. 1860-75, and took an active part in the religious and educational movements of the day. D. Dec. 19, 1876.

Green (HORACE), M. D., LL.D., b. at Chittenden, Vt., Dec. 24, 1802, grad. at the Univ. of Pa. and at Middlebury Coll., studying med. afterward in Paris. He was prof. in the med. coll. at Castleton, Vt., 1840-43; was instrumental in starting the *New York Med. Coll.* (1850), in which he was afterward chosen pres. of the faculty and prof. of the theory and practice of med. Wrote *Treatise on the Diseases of the Air-passages*, also *Pathology and Treatment of Croup*. D. Nov. 29, 1866.

Green (JACOB), b. at Malden, Mass., Jan. 22, 1722, grad. from Harvard Univ. 1744, and from N. J. Coll. in 1749; was ordained at Hanover, Mass.; appointed v.-p. of N. J. Coll. in 1757; was M. C. from Providence, R. I., in 1775; also chairman of the committee which drafted the State const. Wrote *A View of a Chr. Ch. and Ch. Govt.* D. May 24, 1790.

Green (LEWIS WARNER), D. D., b. 1806, grad. from Transylvania Univ.; commenced preaching about 1825; became pres. of Centre Coll. and of Hanover and Aeghany sems., also pres. of Wash. Coll. and Transylvania Coll. at Lexington, Ky., from 1857 to his demise. D. May 26, 1863.

Green (SETH), b. in Rochester, N. Y., Mar. 19, 1817. He early manifested a taste for hunting, fishing, and woodcraft. In 1838, being in Canada, his attention was arrested by the appearance of a number of salmon, and from their movements he judged that they were about to prepare a nest for their spawn, and watched them continuously for 48 hours. He became convinced that fish could be artificially hatched. From this time he devoted his attention to methods of improving the yield of fish from spawn. He found that 25 per cent. was the largest product of trout or salmon attained by artificial means, and he determined to increase this by avoiding defects which existed in the system then in vogue. He began in 1864 by gradually diminishing the proportion of water to milk, until, by using the least possible quantity, he had raised the product to 95 per cent. In 1867, by invitation of the fish coms. of 4 of the N. Eng. States, he experimented in the hatching of shad on the Conn. River, and ascertained the precise position in the stream which the hatching-boxes invented by him should preserve in order to secure the largest result. He thus reduced the loss to a merely nominal amount, and in a fortnight hatched at this time 15,000,000, the next yr. 40,000,000. Similar results have since been reached by him in the Hudson, Potomac, Susquehanna, and other rivers, where he has succeeded in artificially propagating 15 of the more common species, and in introducing a largely increased product. In 1868 he was appointed one of the fish coms. of N. Y., but afterward resigning, was made supt. of its fisheries. [From orig. art. in *J's Univ. Cyc.*, by FRED. A. WHITTESEY.]

Green (WILLIAM HENRY), D. D., LL.D., b. at Groverville, Burlington co., N. J., Jan. 27, 1825, grad. at Lafayette Coll., Easton, Pa., 1840; studied at the Princeton Theological Sem.; was ordained to the Presb. ministry 1848; became pastor of the Central Presb. ch., Phila., 1849; has held the professorship of Heb. and O. T. lit. in Princeton Sem. since 1851; has taken a prominent part in the work of revising the authorized version of the Bible; is chairman of the "Old Testament Co.," one of the two sections of the Amer. committee of revision; declined the presidency of the Coll. of N. J. 1868. Author of a *Heb. Gram.*, *Heb. Chrestomathy*, and *The Pentateuch vindicated*.

Green (WILLIAM MERCER), D. D., LL.D., b. in Wilmington, N. C., May 2, 1798, grad. at the Univ. of that State June 3, 1818; was ordained deacon in the P. E. Ch. in 1820, and priest in 1821. He was the first pastor of St. John's ch., Williamsborough, and afterward of St. Matthew's ch., Hillsborough. In 1837 he was called to the chair of Eng. lit. in his alma mater, and in 1849 was elected the first bp. of Miss. Wrote *Memories of Bp. Ravenscroft*.

Greenback, a popular name designating the paper money of the U. S. first issued by the treas. dept. in 1862; sometimes used also to include the national bank-notes.

Green Bay, in the N. W. part of Lake Mich., extends

140 m. from N. N. E. to S. S. W., and is nearly 30 m. in average breadth. Its waters are about 500 ft. deep, and of a green color. To the N. E. the Great and Little Bays de Noquet are its continuations.

Green Bay, R. R. centre, city, and cap. of Brown co., Wis., on the E. bank of Fox River, about 1 m. from the mouth, and therefore at the terminus of the proposed navigable connection between the lakes and the Miss. by the Fox and Wis. rivers. It has shipping and lake steamers. It is one of the largest primary shingle-markets in the country, also a large exporter of staves, heading, and other hard-wood products. It is largely engaged in the fisheries, principally of white-fish and trout. It is becoming a place of summer resort. Pop. 1870, 4666; 1880, 7464.

Green castle, R. R. centre, city, and cap. of Putnam co., Ind. Eight m. to the W. is the celebrated block-coal region of Ind. Adjacent to the city are fine bodies of timber, with sandstone and limestone, and some iron ore; Ind. Asbury Univ. is located here, also the Ind. Female Coll., a Presb. inst. Pop. 1870, 3227; 1880, 3644.

Greencastle, Pa. See APPENDIX.

Greene, Iowa. See APPENDIX.

Greene, Chenango co., N. Y., 19 m. from Binghamton, on R. R. and Chenango River. Pop. 1870, 1025; 1880, 476.

Greene (ALBERT COLLINS), b. at E. Greenwich, R. I., 1792; became a member of the R. I. assembly in 1815; was maj.-gen. of the State militia 2 yrs.; became atty.-gen. 1825-43, and U. S. Senator 1845-51. D. Jan. 8, 1863.

Greene (CHARLES GORDON), b. at Boscawen, N. H., July 1, 1804, ed. at Bradford Acad., Mass.; he was subsequently apprenticed in the printing office of his brother, who was manager of the *Patriot* at Haverhill, Mass.; in 1822 he removed to Boston and entered the office of the *Boston Statesman*; in 1825 he undertook the management of the *Free Press* at Taunton, and was for a portion of the time its ed. Returning to Boston, he pub. *The Spectator*, which, however, he soon abandoned, and resumed his place in the *Statesman* office; in 1827 he removed to Phila. and pub. the *National Palladium*, which advocated the election of Andrew Jackson to the Presidency, and in 1828 went to Wash. and was engaged upon the *U. S. Telegraph*; returned to Boston, and became sole owner of *Statesman*. In 1831 he established *Boston Post*; naval officer of port of Boston 1833-57.

Greene (CHARLES WARREN), M. D., b. at Belchertown, Mass., Aug. 17, 1840, ed. at Phillips Acad., Andover, Water-ville Coll. (Me.), and Brown Univ.; studied med. at Harvard Med. School, Berkshire Med. Coll., Pittsfield, and the med. dept. of Dartmouth Coll., where he grad. M. D. in 1867; entered the U. S. volunteer service by enlistment July 19, 1862, and served in the army 3 yrs., attaining the rank of capt. of volunteers; practised his profession in Mass. 1868-72; in 1872 devoted himself to literary pursuits, having already been a contributor to periodicals.

Greene (GEORGE S.), b. at Warwick, R. I., May 6, 1803, grad. at the U. S. Military Acad., second in his class, and entered the army as second lieut. of artil. in 1823; from this date he was on duty at W. P., as prof. of math., in garrison, and on ordnance duty till 1836, when he resigned from the army; was employed as C. E. on public works in different parts of the U. S. till 1860, when he was appointed engineer of Croton water-works and of Croton reservoir; on the outbreak of the c. war was appointed col. 60th N. Y. Volunteers, and brig.-gen. of volunteers in the following Apr., participating in the battles of Cedar Mountain and Antietam, the defence of Harper's Ferry, and the battles of Chancellorsville and Gettysburg; in 1863 he was severely wounded at Wauhatchie, and disabled from duty in the field till 1865, when he joined the army of Gen. Sherman, and was engaged at Kinston, Goldsboro', etc., N. C. In Apr. 1865 he was mustered out of the volunteer service and resumed charge of the Croton water-works, N. Y.

Greene (GEORGE WASHINGTON), b. in E. Greenwich, R. I., Apr. 8, 1811, a grandson of Gen. Nathaniel Greene; ed. at Brown Univ.; lived in Europe 1827-47; U. S. consul at Rome 1837-45; became in 1872 prof. of hist. (non-resident) at Cornell Univ. Wrote *Historical View of the Amer. Revolution, Life of Nathaniel Greene*, etc. D. Feb. 2, 1883.

Greene (NATHANIEL), b. at Warwick, R. I., of Quaker parents, May 27, 1742. In early youth, chiefly by his own perseverance, he acquired a more than ordinary knowledge of many branches of education, the perusal of military hist. occupying much of his attention. In 1770 he was chosen a member of the assembly of R. I., and from this date took an active part in the affairs of his country till the close of the war. The battle of Lexington excited his military ardor, and on receiving (in May 1775) the appointment of brig.-gen. and the command of the R. I. contingent army, he led them to Cambridge; for this he was formally excommunicated from the religious body of which he was a member. On the arrival of Washington at Cambridge, G. soon won his confidence and esteem. In Aug. 1776 he was appointed by Cong. a maj.-gen. He participated in the battles of Trenton and Princeton, and at the Brandywine, where he commanded a division, he contributed largely toward saving the army from destruction by a rapid march and the firm stand he made against the enemy. At the battle of Germantown he commanded the left wing. In Mar. 1778 he was appointed quartermaster-gen., which office he accepted, at the urgent solicitation of Washington, on condition that his rank in the army should not be affected and that in time of action he should retain his command. This right he exercised at Monmouth, where he commanded the right wing, as also at the battle of Tiverton Heights. During Gen. Washington's visit to Hartford in 1780 G. was in command of the army. He was pres. of the court of inquiry upon Major André. On superseding Gen. Gates in the southern dept. he found the army reduced by defeat and desertion, and greatly disorganized and in want. Having recruited it and supplied its wants, he sent out a detachment under Gen. Morgan, which gained the victory of the Cowpens, Jan. 17, 1781. He then effected a

junction with Morgan Feb. 7, and on Mar. 15 fought the battle of Guilford C.-H. in which, though G. was defeated, the loss of the Brit. was the greater, and in a few days Cornwallis began a retreat toward Wilmington. Soon after G. marched to S. C., where on Apr. 25 he engaged Lord Rawdon at Hobkirk's Hill, near Camden, and was defeated, but again with the results of success; on May 22 he commenced the siege of Ft. Ninety-six, which was raised by the approach of Lord Rawdon. To the suggestion now made, that he might better retire to Va., G. replied, "I will recover South Carolina or die in the attempt." Awaiting a favorable opportunity, he in turn pursued the forces of Lord Rawdon, resulting in the battle of Eutaw Springs, Sept. 8, the hardest fought battle of the war, and the advance upon Dorchester. For his conduct at Eutaw Springs Cong. presented him with a gold medal and a Brit. standard. During the remainder of his command he struggled successfully against the greatest difficulties in suppressing mutiny among his troops, who were insufficiently fed and clothed. N. C., S. C., and Ga. made him valuable grants of property, and after spending a yr. in R. I. upon the return of peace, he sailed with his family to his estate near Savannah, where he d. June 19, 1786. [From orig. art. in *J. S. Univ. Cyc.*, by GEO. C. SIMMONS.]

Greene (NATHANIEL), b. at Boscawen, N. H., May 20, 1797. Left dependent upon his own resources at an early age, he entered the office of the *N. H. Patriot* at Concord in 1809, and in 1812 became ed. of the *Concord Gazette*; removed to Portsmouth in 1814, and for a yr. managed the *N. H. Gazette*; thence he removed to Haverhill, Mass., where for 2 yrs. he conducted the *Haverhill Gazette*; in 1817 he started the *Essex Patriot*, which he continued until 1821, when he removed to Boston and established the *Boston Statesman*; in 1829-40 was P. M. of Boston, and again 1845-49. Translated *Tales and Sketches from the Ger. Lit.*, and *Fr.* D. Nov. 29, 1877.

Greene (S. DANA), b. Feb. 11, 1840, in Cumberland, Md., grad. at the Naval Acad. in 1859; became a lieut. in 1861, and a commander in 1872. In Jan. 1862 Lieut. G. volunteered to serve as the executive officer of the Monitor (the first of an untried type of vessels), which the majority of seamen believed to be utterly unseaworthy. Accordingly, at the request of Commander Worden, he was then ordered to go in her, and from the date of his orders he applied himself unremittingly and intelligently to the study of her peculiar qualities, and to her fitting and equipment; was made executive officer, and had charge in the turret, and handled the guns with great courage, coolness, and skill, in the engagement with the Merrimack. Toward the close of this action a shell, striking the pilot-house of the Monitor, near the "lookout hole," through which Capt. Worden was then looking, exploded, "filling his face and eyes with powder, utterly blinding, and in a degree stunning him." Lieut. G. became the commanding officer of the vessel, and gave orders to turn her head in the direction of the Merrimack, with the design of coming to close quarters. She declined the combat, and, "crippled and discomfited," retired to Norfolk. Lieut. G. remained in the Monitor until she foundered off Hatteras on Dec. 31, 1862, with a loss of 4 officers and 12 men. G. was saved.

Greene (SAMUEL STILLMAN), LL.D., b. at Belchertown, Mass., May 3, 1810, grad. at Brown Univ. 1837; supt. of schools Springfield, Mass., 1840-42; instructor in the gram. and Eng. high schools, Boston, 1842-49; agent for the Mass. board of education 1849-51; supt. of public schools Providence, R. I., 1851-53, and prof. of didactics in Brown Univ.; prof. of math. and civil engineering in Brown Univ. 1855-64, of mechanics and astron. since 1864; was pres. of R. I. State Inst., of Amer. Inst. of Instruction, etc. Author of *Analysis of Sentences* and of Eng. grams. D. Jan. 24, 1883.

Greene (WILLIAM), b. in 1732; was chief justice of R. I., gov. of the State 1778-86, and d. Nov. 30, 1809.—Another WILLIAM GREENE became deputy gov. of R. I. in 1740, was gov. 1743-58, and was for many yrs. clerk of the co. court at Providence. D. Feb. 23, 1758.

Green Ebony (*Jacaranda ovalifolia*), a S. Amer. tree of the order Bignoniaceae. Its wood is quite hard and is olive-green in color. It is used by dyers, and gives yellows, browns, and greenish tints. Other species of the genus yield medicinal agents.

Greenfield, cap. of Hancock co., Ind., on R. R., 21 m. E. of Indianapolis. Pop. 1870, 1203; 1880, 2013.

Greenfield, Iowa. See APPENDIX.

Greenfield, R. R. centre, cap. of Franklin co., Mass., 36 m. N. of Springfield, in the valley of the Conn. River. It has a young ladies' sem., a large library, and a beautiful soldiers' monument. Pop. tp. 1870, 3589; 1880, 3903.

Greenfield, R. R. junc., Highland co., O., 74 m. E. by N. of Cin. Pop. 1870, 1712; 1880, 2104.

Green Finch, or **Green Linnet**, the *Chlorospiza chloris*, an Old World bird of the family Fringillidae.

Green heart, the timber of the *Yucca radiata* (order Lauraceae), the tree which yields the beebum bark, a valuable med. The timber is imported from Guiana. It is very heavy and durable, takes a high polish, and is used in turnery. It resembles lignumvitæ.

Green Island, R. R. junc., Albany co., N. Y., on an island in the Hudson River, between Troy and W. Troy, connected with them by bridges. Pop. 1870, 3135; 1880, 4160.

Greenland [Dan. *Grønland*], an island of vast but unknown extent, stretching from Cape Farewell, its S. extremity, in lat. 59° 49' N. toward the N. pole, separated by Davis's Strait, Baffin's Bay, and Smith's Sound from continental Amer. on the W. and bounded on the S. and E. by the Atlantic and Arctic oceans. In lat. 60° N. the mean temperature is lower than that of Lapland in lat. 72° N. In the 2 summer months, June and July, during which the sun is always above the horizon, the temperature rises to 53°. The pine in Greenland never becomes a tree; it remains a shrub, and the blubber of the whale and the oil of the seal must be used for fuel. Potatoes and a few other vegetables may be raised. A few herbs, flowers, and berries will grow;

but the prin. plant is the moss, which lives under the snow, and on which the reindeer feeds. During the winter the temperature sinks to -69° F. The E. coast presents a range of precipitous cliffs from 2000 to 3000 ft. high, covered with eternal snow and ice, over which the huge glaciers of the much higher mts. of the interior descend to the ocean. Along the W. coast most of the settlements have been made. Though vegetation is feeble in this climate, animal life is quite vigorous. The dog is the only domesticated animal, but reindeer, bears, foxes, and wild-fowl—among which is the eider-duck—whales, seals, and cod-fish abound. Great quantities of fish-oil, fur, and eider-down are exported, and lately cryolite and other minerals have become important items of exportation. Miocene lignitic coal of good quality exists. But the seal is the chief resource of the Greenlanders' life. Its skin is his dress, his boat, his bed; its oil is his lamp and his stove during the long winter when the sun never rises; its flesh is almost his only kind of meat. The Lutherans and Moravians each maintain missions in G. The prin. settlements are Godthaab, Julianeshaab and Upernavik. In 1878 there were 9600 persons gathered in those settlements—300 Danes and the rest Esquimaux.

(CLEMENS PETERSEN.)

Green'leaf (BENJAMIN), b. at Haverhill, Mass., Sept. 25, 1786, grad. at Dartmouth Coll. 1813; prin. of Bradford Acad. 1814-36, and of the Bradford Teachers' Sem. 1839-48; represented Bradford in the legislature of Mass. in 1837-39. Author of a series of *Arithmetics*, an *Algebra*, and a *System of Practical Surveying*. D. Oct. 29, 1864.

Greenleaf (SIMON), LL.D., b. at Newburyport, Mass., Dec. 5, 1783; studied law, and commenced practice at Standish, Me., in 1806, removing to Gray soon after, and in 1818 to Portland. From 1820 to 1832 he was reporter of the supreme court in Me., and pub. 9 vols. of reports. In 1833 was appointed Royall prof. of law at Harvard Univ., through the influence of Judge Story, whom he succeeded as Dane prof. of law in 1846. Having resigned in 1848 his professorship, he was made emeritus prof. He was for many yrs. pres. of the Mass. Bible Society. His most important work was a *Treatise on the Law of Evidence*. D. Oct. 6, 1853.

Green Mountains, a part of the Appalachian system in Vt. and Mass., and continued S. in the hills of W. Conn. and the Highlands of N. Y. The Taconic range of Mass., N. Y., and Conn. is an outlying W. parallel range. N. E. the G. M. pass into the Notre Dame Hills of Canada, and are traceable at least as far as the Gulf of St. Lawrence. The highest points are Mt. Mansfield, 4389 ft.; Camel's Hump, 4188 ft., and Killington Peak, 4221 ft. The range contains marble, iron, slate, and some copper and gold.

Greenock, a town of Scot. on the Frith of Clyde; has excellent harbors and docks, extensive industries, and a brisk trade with N. Amer. and the W. and E. I. Pop. 64,722.

Greenough (HORATIO), b. in Boston, Mass., Sept. 6, 1805. He received the best education the times afforded at public and private schools, and enjoyed early the society of cultivated people. At the age of 16 he entered Harvard Coll. At Cambridge he found in Washington Allston a stimulating and wise friend. Young G. was too much interested in studies connected with his chosen art to strive after academic honors; still he was a faithful scholar, if not distinguished. His sonnets, written while an undergraduate, sketches with the pencil, plaster casts, models, and designs—particularly one for a monument on Bunker Hill—attest a remarkable creative power. G. took up his residence in Florence as a sculptor. He was the pioneer of the great company who since have found fortune there. Cooper the novelist gave him a commission which proved to be the beginning of his larger renown. The group came to Boston, and excited great admiration in influential quarters just at the time when the govt. was thinking of a statue to George Washington. The poet Dana, his friend Mr. Cooper, Allston, then at the summit of his fame, Edward Everett, who had known the artist in It., spoke effective words for him, and secured for him the commission. The statue is well known to all the visitors at the national capital. It was a work of great study, labor, and feeling, wrought in the poetical, not the historical spirit, and by those who thus approached it it was greatly admired. The work was not designed for the open air, and the placing of it was a disappointment to the artist, who was in consequence of that exposed to what he considered unjust criticism. G. loved ideal work. He made a bust of the Christ which was greatly praised. One of his earliest works was a statue of Abel. One of his latest, *The Rescue*, representing, under the design of an Amer. settler grappling an Indian, the superiority of the Anglo-Amer. to the savage, was executed between 1837 and 1851 on an order from the govt. G. excelled in small pieces of sentiment and fancy—groups of children at play, portraits of children. His literary talent was remarkable. He passed his last yrs. in the U. S. D. Dec. 18, 1852. Among his best known works are the *Genius Victoria*, the *Angel Abdiel*, and the *Medora*. His smaller but most attractive pieces were numerous.

O. B. FROTHINGHAM.

Greenough (RICHARD S.), brother of the preceding, b. at Jamaica Plain, Mass., Apr. 27, 1819, and ed. at the Boston Lat. School 1829-32. The habit of drawing acquired in childhood took a decided bent from the sculptor Clevenger, under whose eye he finished a small bust, which gave so much promise that friends decided he should go to Florence and work with his brother. The winter of 1840-41 was spent in It., but ill-health compelled him to return to Boston. A portrait-bust of William H. Prescott, executed in 1843, brought him orders for similar work, which kept him occupied till 1850, when he returned to It. and worked, chiefly in Rome, on imaginative subjects. His best known work of this period is the bronze group, *The Shepherd Boy and the Eagle*, now in the Boston Athenaeum. The bronze statue of Franklin in School st., Boston, and the marble statue of Gov. Winthrop in the chapel at Mt. Auburn Cemetery, are the best known of his works. The period from 1856-68,

spent in Paris, was full of industry, the busts, bas-reliefs, and imaginative pieces indicating much poetic feeling. He subsequently took up his residence at Newport, R. I., where he executed *Victory*, a memorial statue in honor of the Boston Lat. School graduates who fell in the c. war, and a colossal statue of Gov. Winthrop, ordered by the State of Mass. for the capitol at Wash.

O. B. FROTHINGHAM.

Green'port, on R. R., Suffolk co., N. Y., on Shelter Island Sound, L. I., between Peconic and Gardiner's bays, 95 m. E. of Brooklyn. Prin. business, coasting and fishing. Pop. 1870, 1819; 1880, 2370.

Green River, in Ky., pursues a devious N. W. course, uniting with the O. 6 m. above Evansville, Ind. It is navigable at high water 200 m. by locks and dams. The mouth of the Mammoth Cave, at an elevation of 225 ft. above, is about $\frac{1}{4}$ m. from this river, a subterranean communication from which forms the famous "river" of that cave.

Green River, of Mass., rises in Vt. and joins the Deerfield River at Greenfield. It affords good water-power.—Another Green River flows from Hancock, Mass., through Williamstown into the Hoosac.—Still a third rises on the borders of Mass. and N. Y., flows S., and joins the Housatonic. It is this which forms the theme of Bryant's lines "To Green River."

Green'sand, **The**, a term applied to subdivisions of the Cretaceous series of rocks. The (Cretaceous) G. of Amer. belongs to the Upper Cretaceous series, while the G. of Europe is divisible into the Upper G., belonging to the Upper Cretaceous, and the Lower G., belonging to the Lower Cretaceous or Neocomian period.

Greens'boro', on R. R., cap. of Hale co., Ala., a few m. N. of the canebrake-region, which was famous before the war for its productiveness. The Southern Univ., under the auspices of the Ala. Conference of the M. E. Ch. S., is located here. Pop. 1870, 1760; 1880, 1833.

Greensboro', city and R. R. junc., cap. of Guilford co., N. C., on R. R., 82 m. from Raleigh and 188 m. from Richmond. It has a Meth. female coll. Large quantities of fruit are dried and shipped S. Its mineral products are copper and iron. Pop. 1870, 497; 1880, 2105.

Greensburg, city and R. R. junc., cap. of Decatur co., Ind., 47 m. S. E. of Indianapolis. It contains fine stone-quarries, and extensive shipments of stone for business purposes are made. Pop. 1880, 3138.

Greensburg, R. R. junc., cap. of Westmoreland co., Pa., 31 m. E. of Pittsburgh. Pop. 1870, 1642; 1880, 2500.

Green'shank, *Totanus canescens*, a wading bird of the group (tattlers), found in Asia, Europe, and N. Amer.

Green Snake, a name applied to harmless serpents of the U. S. of the genus *Cyclophis*.

Green'stone (*diorite*), a granitoid rock of the hornblende series. In appearance and texture it is much like syenite. It is very tough and of a greenish hue. It is composed of hornblende, mixed with albite or with oligoclase, which are varieties of feldspar.

Green'sville, city, cap. of Butler co., Ala., on R. R., 45 m. S. of Montgomery. It has 2 colls. (male and female). Prin. business, cotton and timber. Pop. 1870, 2856; 1880, 2471.

Greenville, on R. R. and Quinebaug River, New London co., Conn., 2 m. N. E. of Norwich. Pop. not given in census of 1880.

Greenville, city, cap. of Bond co., Ill., 50 m. N. E. of St. Louis, Mo., on R. R. Almira Female Coll. is located here. Pop. 1880, 1886.

Greenville, on R. R., city of Montcalm co., Mich., 142 m. N. W. of Detroit. It has excellent water-power. There is a public library. It is a base of supplies for the Flat River lumbering. Pop. 1870, 1807; 1880, 3144; 1884, 3084.

Greenville, on R. R., cap. of Washington co., Miss., 100 m. N. N. W. of Jackson, and on the Miss. River. Pop. 1870, 890; 1880, 2191.

Greenville, R. R. junc., cap. of Darke co., O., on the E. bank of the Greenville Creek. G. was built as a fort in 1738 by Gen. Wayne, who concluded an important treaty with the Indians here, Aug. 3, 1795. Pop. 1870, 2520; 1880, 3535.

Greenville, R. R. junc., Mercer co., Pa. It is at the head of the Shenango Valley. Thiel Coll. of the Evangelical Lutheran Ch. is located here. The town lies on both sides of the Shenango River, which affords abundant water-power. Pop. 1870, 1848; 1880, 3007.

Greenville (C. H.), city and R. R. centre, cap. of Greenville co., S. C. It is seat of S. Bap. Theological Sem., Furman Univ., and a female coll. Pop. 1870, 2757; 1880, 6160.

Greenville, Tex. See APPENDIX.

Green'wich, parliamentary borough of Eng., on right bank of Thames. The 2 objects of greatest interest are the Royal Observatory, from which lon. is reckoned on all Eng. charts, and the Royal Naval Coll., formerly known as Greenwich Hospital. Pop. 207,028.

Greenwich, on R. R., Fairfield co., Conn. The town is finely situated on L. I. Sound, 31 m. N. E. of New York. It is a favorite locality for country residences. Gen. Putnam's daring ride at Horseneck in 1779 took place in this tp. Pop. 1870, 7644; 1880, 7892.

Greenwich, on R. R., Washington co., N. Y., on the Battenkill River, about 30 m. N. E. of Troy. Pop. tp. 1870, 4030; 1880, 3860; v. (included in tp.) 1231.

Greenwich Observatory. See OBSERVATORY.

Green'wood (FRANCIS WILLIAM PITT), D. D., b. in Boston Feb. 5, 1797, grad. at Harvard in 1814; studied theol. with Dr. Henry Ware, and after finishing his studies began his ministry in the New S. ch. in Boston, but remained in it but a single yr., a pulmonary attack forcing him to desist. The yr. of 1820-21 was passed abroad, chiefly in Eng. Two yrs. after his return were passed in Baltimore. In 1824 he became colleague pastor with Dr. Freeman of King's Chapel. In 1827 Dr. Freeman retiring from the active ministry, G. became sole pastor. In 1837 an attack of hemorrhage compelled him to make a voyage to Cuba, but his strength

was never restored. He had a strong love for the natural sciences, was one of the earliest members of the Boston Society of Nat. Hist., and a frequent writer for magazines. His religious writings were pervaded by a spirit of deep piety. Among them are *Sermons of Consolation and Sermons to Children, Lives of the Twelve Apostles, and a Hist. of King's Chapel*. D. Aug. 2, 1843. O. B. FROTHINGHAM.

Greenwood Cemetery, in the S. part of Brooklyn, N. Y. (partly in Flatbush), comprises nearly 600 acres, having a surface varied with valleys, lakes, and hills, and is in large part covered with forest trees of natural growth. It was incorporated in 1838. Few inclosures of this kind excel G. in size or natural beauty; and landscape-gardening, floral decoration, and monumental structures combine to render it one of the most beautiful cemeteries in the world.

Greer (JAMES A.), b. in O., entered the navy as a mdpn. Jan. 10, 1848; became a commander in 1866; afterward capt. He commanded the iron-clad Benton at the passage of the Vicksburg batteries Apr. 16, 1863, where "the squadron was under fire two hours and thirty minutes;" was in all the succeeding operations on the Miss. River until the fall of Vicksburg, July 4, 1863, and in 1873 commanded the Tigress in the search for the missing Polaris.

Gregg (ANDREW), b. at Carlisle, Pa., June 10, 1755; obtained a classical education; became M. C. 1791-1807, and U. S. Senator 1807-13; was sec. of state of Pa. in 1820. D. May 20, 1835.

Gregg (DAVID McM.), b. in Pa. 1833. grad. at the U. S. Military Acad., and entered the army as brevet second lieut. of dragoons July 1855; engaged in frontier duty against hostile Indians up to the outbreak of the c. war. In May 1861 made capt. 6th Cav. In Jan. 1862 was appointed col. 8th Pa. Cav., which command he led in the Va. Peninsular campaign (1862), being engaged at Fair Oaks, Seven Pines, and the "Seven Days" fight. Appointed brig.-gen. U. S. volunteers Nov. 1862, he commanded a division of cav. in the raid toward Richmond under Gen. Stoneman; participated in the battle of Gettysburg and subsequent pursuit of Lee's army; was in command of the cav. corps of the Army of the Potomac from Aug. 1864 till Feb. 1865, when he resigned. Brevetted maj.-gen. of volunteers.

Gregg (JOHN I.), b. in Pa.; entered the U. S. A. as first lieut. 11th Inf. 1847; promoted to be capt., and served during the Mex. war; disbanded Aug. 1848. On the outbreak of the c. war he was chosen col. of the 5th Pa. Volunteers, which commission he resigned May 1861 to accept a captaincy in the 6th U. S. Cav.; was engaged in various actions in the Va. Peninsular campaign 1862; appointed col. 16th Pa. Volunteers Oct. 1862, and in command of a cav. brigade 1863-65, during which time he was engaged in the battles of Gettysburg, Cold Harbor, Deep Bottom, and the various actions of Army of Potomac up to final surrender of Lee. Brevetted brig.-gen. U. S. A. July 1866. Retired 1869.

Gregg (MAXWELL), b. at Columbia, S. C., 1814; admitted to the bar in 1839; served in Mex. war; was a member of the S. C. State convention in 1860, and of the committee to prepare the ordinance of secession. In the c. war he commanded the 1st S. C. Volunteers; was subsequently made brig.-gen. Killed at Fredericksburg, Va., Dec. 1862. At the time of his death was gov.-elect of S. C.

Gregoras Nicéphorus, b. at Heraclea, in Pontus, about 1295; priest in Constantinople; in 1336 ambassador to the kral (the king of Serbia), proposed the reform of the calendar in a treatise (*Paschaliu correctum*); pronounced the eloquent funeral oration of Andronicus I. 1332; opposed Barlaam's theories and Pope John XXII.'s plan of uniting the E. and W. chs. Wrote *Historia Byzantina*. D. after 1359.

Gregorian Calendar. See CALENDAR.

Gregorian Music, the customary designation of the anc. music of the Ch. as regulated and improved by St. Gregory the Great, bp. of Rome, in the latter part of the 6th century and the beginning of the 7th. St. Ambrose, bp. of Milan in the 4th century, found music in so confused a condition as to render his interference desirable in the capacity of a musical reformer. Ambrose retained and made use of the 4 original Gr. modes or scales—viz. the Dorian, or scale of D, the Phrygian, or scale of E, the Lydian, or scale of F, and the Mixolydian, or scale of G (all formed of the natural notes as they stand, without flats or sharps). The ecclesiastical music thus systematized in the Ch. of Milan obtained the name of the "Ambrosian" chant. Two centuries later St. Gregory, who then occupied the papal throne, entered upon a further reform in the music of the Ch. The greatest improvement made by Gregory was the addition of 4 new modes or scales to those already in use. The old modes were called the authentic modes, and those now derived from or added to them received the name of *plagal*. Each *plagal* scale was formed by commencing on the fourth degree below the lowest note of the corresponding authentic. Thus, as the first authentic mode or scale consisted of D, E, F, G, A, B, C, and D, the octave, its *plagal* mode would be formed of A, B, C, D, E, F, G, and A. Melodies written on such scales differ considerably in their fitness to express various shades of feeling and sentiment. The Phrygian, *e. g.*, so far resembles our modern minor mode as to possess a certain plaintive and mournful character; the Dorian, though strongly minor in its gen. cast, is expressive of dignity, grandeur, and solemnity; the Mixolydian, closely approaching our G major, suggests peace, serenity, and joy; while the Lydian has the gentle and soothing tranquillity of many modern pieces in F major.

The music of the Ch., as thus settled by St. Gregory, came into gen. use in the W. Ch., and is known as the "Gregorian." In each of the scales melodies for the psalms were prepared. These are styled *Gregorian tones*, and are distinguished as the first, second, or third tone, etc. These psalm-chants consist of 2 strains each; and the latter of these strains has frequently several "endings." Hence, in designating a psalm-chant we say, *e. g.*, "First tone, third end-

ing," etc. In each of these tones or chants a certain note called the *dominant* is more frequently used than the others, and is the reciting note in chanting. Preceding the dominant are 2 or more short introductory notes called the *intonation*, to be sung by the minister or precentor with the first division of the first verse of a psalm or hymn. The other portions of each strain are the *recitation, meditation, and cadence*.

G. M. is still frequently written or printed in anc. character on the old stave of only 4 lines. Two *clefs* are used—viz. the F clef and the C clef. These are placed on such lines as will bring the notes of the melody within the compass of the stave, and thus avoid the resort to ledger lines. The notes in use are chiefly 3: 1st, the long, a black square with a stem; 2d, the breve, a black square without a stem; 3d, the semibreve, a black diamond-shaped note. These notes are dependent for their times on the sentiment and accent of the words sung. In an adapted form the psalm-chants or tones are in common use in the Anglican Ch., modernized by the addition of harmony and rhythmical order. [From orig. art. in *J.'s Univ. Cyc.*, by REV. WILLIAM STAUNTON, D. D.]

Gregory I., POPE, called GREGORY THE GREAT, was b. at Rome about 540; became a senator, and in 573 a prætor; went as nuncio to Constantinople, reconciled the emp. to the pope, and in 590 became pope himself; sent missionaries to Sic., Sard., Lombardy, Eng., etc.; attempted the union of the E. and W. chs., strengthened and reformed the papal see, confirmed the celibacy of the clergy, extended greatly the monastic system, was confirmed in his primacy over the other patriarchs by the emperor Phocas, and reformed the liturgy. He has been called the father of the mediæval Ch., the inventor of the mass and of the doctrines of purgatory and transubstantiation. Author of *Magna Moralia, Homilies, Pastoral*, and liturgical treatises. D. Mar. 12, 604.—**GREGORY II.**, SAINT, in 715 became pope; sent Corbinian and Boniface as missionaries to Ger.; assumed the gov. of Rome in 726, and did much to establish the temporal power of the popes; engaged in a famous contest with Leo the Isaurian and the Iconoclasts, whom he anathematized. D. Feb. 10, 731.—**GREGORY III.**, a Syrian, became pope in 731; opposed the Iconoclasts and the Byzantine emps., assumed the rulership of the exarchate of Ravenna, exacted homage from Charles Martel, and contended with the Lombards. D. Nov. 28, 741.—**GREGORY IV.**, a Rom., became pope in 827; was a tyrannical prelate; made the feast of All Saints a gen. one. D. Jan. 27, 844.—**GREGORY V.**, a Ger. and nephew of King Otto III.; became pope in 996; treated with great brutality the anti-pope John XVI.; put Robert, king of Fr., under interdict for marrying within the forbidden degrees of consanguinity. D. Feb. 18, 999.—**GREGORY VI.**, ANTIPOPE, assumed the papal title in June 1012; expelled Benedict VIII., and was himself expelled (1012) by the emp. Henry II.—**GREGORY VII.**, POPE, purchased the papal chair in 1044 of Benedict IX., but the latter revived his claim, and Sylvester III. and John XX. were also elected (1044); but Henry III., the emp., caused all to be deposed, and Clement II. to be elected, 1046. D. 1048.—**GREGORY VII.** (*Hildebrand*) was b. in Tuscany, a carpenter's son; became a monk at Cluny; was called to the priory of St. Paul, *extra muros*, at Rome; Leo IX. made him cardinal. Hildebrand assumed at once a commanding position in the affairs of It. and the Ch., and in 1073 succeeded Alexander II. as pope; forbade in 1074 all marriage and concubinage in the clerical ranks; in 1075 summoned a council at Rome which prohibited all lay investitures. Thus, G., by one of the boldest strokes recorded in hist., attempted to cut the Ch. free from the domination of the Ger. emps. Henry IV. called a diet at Worms, and declared the pope deposed, and in 1076 G. retaliated by excommunicating and deposing Henry. Henry humiliated himself to the earth, and received the papal absolution at Canossa (1077). But when the emp. had recovered sufficient strength he shut up the pope in the castle of St. Angelo, whence he was released by Robert Guiscard; and G., having for the fourth time excommunicated the emp., retired to Salerno, where he d. May 25, 1085.

—**GREGORY VIII.**, ANTIPOPE, 1118-1122.—**GREGORY VIII.**, POPE (*Alberto de Mora*), was b. at Benevento; pope Oct. 21-Dec. 17, 1118.—**GREGORY IX.** (*Count Ugolino of Legni*), POPE, 1227. His reign is remarkable for his long and bloody wars with Frederick II. of Ger., whom he 4 times excommunicated. D. Aug. 21, 1241.—**GREGORY X.** (*Tebaldo Visconti* of Piacenza), chosen pope in 1271; promoted the Crusades and reformed the conclave. D. Jan. 10, 1276.—**GREGORY XI.** (*Pierre Roger de Montroux*), b. 1329; became pope at Avignon 1370, removed to Rome in 1377. D. Mar. 28, 1378.—**GREGORY XII.** (*Angelo Orsini*), b. 1325; pope in opposition to Benedict XIII. 1406; deposed by the Council of Pisa 1409; abdicated his claim at the Council of Constance 1415. D. Oct. 10, 1417.—**GREGORY XIII.** (*Ugo Buoncompagni*), b. 1502; succeeded Pius V. May 13, 1572. The great events of this pontificate were the reform of the calendar, the *Te Deum* sung and medal struck in honor of the massacre of St. Bartholomew, the efforts made to spread the Ch. by missionary operations, and the publication of the *Decretum Gratiani*, with notes by the pope. D. Apr. 10, 1585.—**GREGORY XIV.** (*Niccolò Sfondrate*), b. at Cremona 1535; pope 1590-91.—**GREGORY XV.** (*Alessandro Ludovisi*), b. at Bologna Jan. 9, 1554; pope 1621-23. D. July 8, 1623.—**GREGORY XVI.** (*Mario di Eudossio*), b. at Capri, b. at Belluno Sept. 18, 1765; succeeded Pius VIII. Feb. 2, 1831; extended the sway of his Ch. and promulgated Ultramontane principles. D. at Rome June 1, 1846, and was succeeded by Pius IX. [From orig. art. in *J.'s Univ. Cyc.*, by C. W. GREENE, M. D.]

Gregory (FRANCIS H.), b. at Norwalk, Conn., Oct. 9, 1789; became a mariner, and in 1809 a mdpn. U. S. N., and in 1862 was retired with the rank of rear-admiral. He served under Chauncey in 1812-14 on the lakes; was distinguished in contests with pirates in the Gulf and in the W. I.; commanded the frigate *Raritan* during the Mex. war, and was engaged in constructing iron-clads 1861-65. D. Oct. 4, 1866.

Gregory (JAMES), F. R. S., b. at Drumook, Aberdeenshire,

Scotland, 1638; invented the Gregorian reflecting telescope when 24 yrs. old; was prof. of math. at St. Andrew's and at Edinburgh, where he d. Oct. 1675, at the age of 36. He invented many new and important mathematical processes.

Gregory Nazianzen, SAINT (*Gregorius Nazianzenus*), one of the Gr. Fathers and a doctor of both the E. and W. chs., b. at Nazianzus, in Cappadocia, about 325-29 A. D.; was a son of Gregory, bp. of Nazianzus, and of the devout St. Nonna; completed his school-studies at Athens. In 361 A. D. he was ordained a presbyter. After 9 yrs. of labor at Nazianzus, varied by retreats to the desert and by contests with the Arians and with Julian the emp., he accepted in 372 A. D. the bishopric of Sasima. He lived (375-379) in retirement at Seleucia, and then went to Constantinople to contend with the Arians and other heretics. In 380 A. D. Theodosius made him bp. of Constantinople, but translations from one see to another being then uncanonical he soon resigned. D. 389 or 390.

Gregory Nysse, SAINT, b. at Cæsarea, in Cappadocia, about 335 or 336 A. D., a younger brother of St. Basil the Great; was teacher of rhetoric, but a letter (*Epist.* 43) from Gregory Nazianzen caused his return to a clerical life, and in 372 he was consecrated bp. of Nyssa in Cappadocia. D. after 394 A. D. He was one of the most learned of the Gr. Fathers.

Gregory of Tours [originally *Georgius Florentius*], SAINT, b. at Arvern (now Clermont), Fr., about 540, of a noble Rom. family, and after his conversion took the name of Gregory out of regard to his mother's grandfather, the bp. of Langres. About 573 he became bp. of Tours. His prin. work is *A Hist. of the Franks*. D. Nov. 17, 594 or 595.

Gregory Thaumaturgus, SAINT, and "wonder-worker," of heathen parentage, and originally called Thaumopore, was b. at Neocæsarea, in Pontus, about 210 A. D.; when 14 yrs. of age lost his father, and became a Chr.; in 231 fell under the influence of Origen at Cæsarea, in Pa., and in 235 went with him to Alexandria; was made bp. of Neocæsarea in 244, where there were only 17 Chrs. in the place, and d. there 270, when, as it was said, there were only 17 persons in the place who were not Chrs. His prin. literary work is *A Pastoral Instruction on Origen*. Also wrote *A Metaphrase on the Book of Ecclesiastes*, an important *Confession of Faith*, etc.

Gregory the Illuminator, SAINT, an apostle of Armenia. The story is, that he belonged to the royal family of the Arsacids, who nominally ruled Armenia from 149 B. C. to 428 A. D.; that he was b. about 258 A. D.; that his father having assassinated the king, Chosroes I., was put to death with all his family except G., who when 2 yrs. old was taken to Cæsarea, in Cappadocia, whence he returned as a missionary to Armenia about 286 A. D.; that he baptized the king, Tridates, in 289; that in 302 Leontius of Cæsarea ordained him patriarch of the Armenian Ch.; that in 337, he retired to a cave, and lived on some yrs. longer, perhaps till 342 A. D. His *Homilies* were pub. at Constantinople and at Venice. Many *Prayers* in the Armenian liturgy and 30 *Cantons* are also ascribed to him.

Grenada, city and R. R. junc., cap. of Grenada co., Miss., at the former head of navigation of the Yalabusha River. Pop. 1870, 1887; 1880, 1914.

Grenell (GEORGE), LL.D., b. at Greenfield, Mass., Dec. 25, 1796, grad. at Dartmouth 1808; became a lawyer 1811; prosecuting-atty. of Franklin co., Mass., 1820-28; State senator 1824-27; M. C. 1829-39; probate judge 1849-53, and afterward clerk of the courts at Greenfield. D. Nov. 20, 1877.

Grenville (GEORGE), b. Oct. 14, 1712; went first to Parl. in 1741; treas. of the navy 1754; was a sec. of state 1762, first lord of the admiralty 1762, first lord of the treas. and chancellor of the exchequer 1763-65; introduced the plan for taxing the colonies, and is reputed the author of the Stamp Act; was an able statesman. Author of *Considerations on Commerce and Finance* and other writings. D. Nov. 24, 1770.

Grenville, or Granville (SIR RICHARD), a relative of Sir W. Raleigh, b. 1540; went in 1556 to fight the Turks in Hungary; entered Parl.; was knighted, and made high sheriff of Cornwall 1571; assisted Raleigh in planting the Roanoke colony 1585; vice-admiral 1591; attacked a Sp. fleet of 53 vessels with only 5 ships; sunk 4 ships, and after being twice wounded was taken prisoner, and d. soon after (1591).

Gresham (SIR THOMAS), b. in Lond. 1519; was apprenticed to his uncle, a wealthy mercer, and then studied at Gonville Hall, Cambridge; succeeded his father as manager of Henry VIII.'s finances; became king's factor at Antwerp 1552; was knighted 1559; founded the Royal Exchange, Lond. (opened 1570), and the Gresham Coll., Lond.; founded 8 almshouses and many other charities. D. Nov. 21, 1579.

Gresham, WALTER Q. See APPENDIX.

Gretna Green, a v., or rather a farmstead, in Scot., near the Eng. frontier. The Eng. law acknowledges the validity of a marriage if it is contracted in accordance with the laws of the country in which it has taken place. The Scotch law simply demanded that the mutual declaration of marriage shall be exchanged in presence of a witness, and thus it became fashionable for young couples in Eng., to whom it was not convenient to await the consent of their parents, the publication of banns, etc., to run away to G. G. and declare their marriage in the presence of the owner of the farm. On account of later changes in the Eng. and Scotch marriage laws, this custom has now died out.

Greuze (JEAN BAPTISTE), b. at Tournus, Fr., Aug. 21, 1725; was a genre-painter of domestic scenes, and became an associate of the Fr. Acad. in 1755; but being elected a member in 1769 as a genre-painter his single historical piece, *Severus Repriming his son Caracalla*, being disregarded, he resented the insult and retired from the Acad. The best known works of G. are *The Village Bride*, *The Broken Pitcher*, *The Little Girl with the Dog*. D. Mar. 21, 1815.

Grévy (FRANÇOIS PAUL JULES), b. at Mont-sous-Vaudrez, dept. of Jura, Aug. 15, 1813; took an active part in the 3 days' fight of the revolution in 1830. During the reign of Louis Philippe he often pleaded in political cases. G. was

elected rep. to the national assembly in 1848, and, without acting with the ultra-radicals, still sat on the benches of the Montagne. Under the empire he was sent as deputy to the Corps Législatif by dept. of Jura. He was a moderate republican, which character he maintained after revolution of 1870. Elected Pres. of Fr. Jan. 30, 1879.

Grey (CHARLES), second earl, b. at Fallowden, Northumberland, Eng., Mar. 13, 1764; entered Parl. as a Whig 1789; was an early friend of parliamentary reform; opposed the Irish union 1799; became (as Lord Howick) first lord of the admiralty 1806, and sec. of foreign affairs; carried the bill for abolishing the slave-trade 1806, and being defeated in the measure for abolishing the oath which kept R. Caths. from the holding of commissions in the army and navy, he dissolved the cabinet; took the title of Earl Grey 1807; long led the Reform party; was again premier in 1830-32 and 1832-34. The great event of his last administration was the passage of the Reform Bill of 1832. D. July 17, 1845.

Grey (SIR GEORGE), D. C. L., LL.D., K. C. B., b. at Lisburn, Ire., in 1812; ed. at Sandhurst Military Coll., and entered the army, from which he soon after retired, and in 1839 accompanied an exploring expedition to Australia, receiving the appointment of gov. of S. Australia in 1841, which position he held till appointed gov. of New Zealand in 1846, and of the Cape of Good Hope in 1854, returning, however, at the request of his govt. to New Zealand in 1861, where he contributed to the suppression of the insurrection. In 1867 he returned to Eng. Among his pub. works are *Journals of Discovery in Australia and Polynesian Mythology and Traditions of New Zealand*.

Grey (SIR GEORGE), BART., G. C. B., M. A., b. at Gibraltar May 11, 1799, grad. with honors at Oriel, Ox., was called to the bar at Lincoln's Inn 1826, and came to the baronetcy 1828; entered Parl. 1832, under sec. for the colonies 1834 and 1835-39, judge-advocate-gen. 1839-41, chancellor of the duchy of Lancaster 1841 and 1859-61, home sec. 1846-52, 1855-58, and 1861-66; colonial sec. 1854-55; was made privy councillor 1839, and G. C. B. 1849.

Grey (HENRY GEORGE), third earl, b. Dec. 28, 1802, ed. at Cambridge; entered Parl. 1826, and in the same yr. was called to the bar; was under-sec. for the colonies 1830-33, under-sec. for the home dept. 1834, was sworn of the privy council 1835, sec. at war 1835-39, came to his title 1845, colonial sec. 1846-52; has been lord lieut. of Northumberland since 1847; received the Garter in 1863, and the grand cross of Sts. Michael and George 1869. Author of *The Colonial Policy of Russell's Administration*.

Grey (LADY JANE), daughter of Henry Grey, duke of Suffolk, and great-granddaughter of Henry VII., b. at Bradgate, Leicestershire, 1537; married Lord Guildford Dudley, son of the duke of Northumberland, in 1553, having already, under the tutelage of Ascham and Aylmer, bp. of Lond., acquired a good knowledge of Gr., Lat., Fr. It., and Oriental langs. Edward VI., persuaded by Lady Jane's father and father-in-law, had set aside the claims of his sisters and declared Lady Jane his successor. She reluctantly assented, and was proclaimed queen July 10, 1553. Ten days later Queen Mary was proclaimed, and Lady Jane and her husband were confined in the Tower. Nov. 30 she was tried for treason at the Guildhall, and pleaded guilty, and on Feb. 12, 1554, she and her husband were beheaded.

Grey (ZACHARY), LL.D., b. in Yorkshire, Eng., 1687, ed. at Jesus Coll. and Trinity Hall, Cambridge; became an Anglican clergyman. Chiefly remembered for his ed. of *Hudibras* and his valuable *Examination of Neal's Hist. of the Puritans*. D. Nov. 25, 1766.

Greyfriars. See FRANCISCANS.

Greyhound, a remarkable group of dogs, distinguished chiefly by slender, graceful build, quick sight, and great speed in the chase.

Greylock, the highest point of land in Mass., is in the town of Adams, Berkshire co. It is the prin. eminence of Saddle Mt. Its height is 3505 ft.

Grey Nuns. See CHARITY, SISTERS OF.

Gridley (MAJ.-GEN. RICHARD), b. at Canton, Mass., 1711. He was chief of the corps of engineers in the reduction of Louisiana in 1745, col. of inf. in 1755. In compensation for his services rendered at the taking of Que., the Brit. govt. presented him Magdalen Island, with half-pay, which remained permanent through life; was wounded at Bunker Hill and appointed maj.-gen. by the provincial Cong. Sept. 20, 1775. D. June 20, 1796.

Grieg (EDWARD HAGERUP). See APPENDIX.

Grier, greer (ROBERT), b. in Columbia co., Ga., 1779, was famous in Ga., S. C., N. C., and Ala. as an almanac-maker for nearly half a century. D. May 4, 1848.

Grier (ROBERT DOOPER), b. in Cumberland co., Pa., Mar. 5, 1794, grad. from Dickinson Coll. in 1812; commenced the study of law in 1815; in 1846 Pres. Polk appointed him one of the justices of the U. S. supreme court. D. Sept. 26, 1870.

Grierson (BENJAMIN H.), b. at Pittsburg, Pa., July, 1837; removed at an early age to O., and subsequently to Ill. During the c. war he served on the staff of Gen. Prentiss; was major, subsequently col., 6th Ill. Cav.; appointed brig.-gen. of volunteers in 1863, and maj.-gen. 1865. His services as a cav. leader were conspicuous, as such conducting many important and successful operations, raids, expeditions, etc. In July 1866 he became col. of the 10th U. S. Cav., which position he still retains.

Griesbach (JOHANN JAKOB), b. at Butzbach Jan. 4, 1745; was appointed prof. in theol. at the Univ. of Jena in 1776, which office he held till his death, Mar. 24, 1812. He devoted himself to critical research concerning the texts of the books of the N. T., the result of which was his ed. of the N. T. (Halle, 1775-77), the first critical ed.

Griffenfeld (PETER), b. at Copenhagen 1635; entered the govt. service; rose rapidly; wrote the *Lex Regia Danica*; was made minister of state 1673, but his policy not agreeing with that of the court, he fell in disgrace 1676, and was imprisoned for the rest of his life. D. May 11, 1699.

Griffin (Gr. gōr), a fabulous monster, having the body and legs of a lion, joined to the back, wings, and often the feet of the eagle. It was believed to be the offspring of the eagle and the lion.

Griffin, city and R. R. jun., cap. of Spalding co., Ga., 40 m. S. of Atlanta. It has male and female colls. A mineral spring of sulphur water has recently been discovered. It is a summer resort for planters of S. W. Ga. Prin. business, cotton. Pop. of dist. 1870, 3421; 1880, 3620.

Griffin (CHARLES), b. in O. 1826, grad. at W. Pt. 1847; entered the army as brevet second lieut. of artill., and served in the war with Mex. 1847-48; became a second lieut. in Oct. 1847, and first lieut. June 1849, serving on frontier duty. Appointed capt. in 1861, he served during the c. war at the first battle of Bull Run, being brevetted major for gallant conduct. Promoted to be brig.-gen. of volunteers June 1862, he commanded a brigade in the Va. Peninsular campaign, and distinguished himself at Yorktown, Gaines's Mill, Malvern Hill, etc., and subsequently in the second battle of Bull Run and at Antietam. In the Rappahannock campaign he commanded a division at the battle of Fredericksburg Dec. 1862, at Chancellorsville May 1863, and at Spotsylvania, assault and siege of Petersburg, and the various battles of the final campaign, 1864-65. For conspicuous gallantry in this latter campaign he was brevetted maj.-gen. of volunteers. Placed in command of the 5th army corps Apr. 1, 1865, he was appointed one of the coms. to carry out the terms of the surrender of Gen. Lee at Appomattox C.-H. Apr. 9, 1865; was in July 1866 appointed col. 35th Inf., and commanded military dists. in Tex. and La. D. Sept. 15, 1867.

Griffin (CYRUS), b. in Va. 1749, ed. in Eng., and became connected with a noble family there by marriage; a member of Va. legislature; member of old Cong. in 1778-81 and 1787-88, and became its pres. in 1788; elected pres. of supreme court of admiralty; held office of judge of U. S. dist. court for Va. from 1789 until his death, Dec. 14, 1810.

Griffin (EDWARD DORR), D. D., b. at E. Haddam, Conn., Jan. 6, 1770, grad. at Yale 1790; was settled at New Hartford, Conn., from 1795 to 1801; at Newark, N. J., from 1801 to 1809; was prof. of sacred rhetoric in Andover Sem. from 1809 to 1811; settled in Boston, Mass. (Park st. ch.), from 1811 to 1815; at Newark again from 1815 to 1821; pres. of Williams Coll. from 1821 to 1836. He wrote several works, the most noted of which is a *Course of Lectures in Park St. Ch.* Sixty of his sermons, with a biography prefixed, were pub. by Dr. William B. Sprague. D. Nov. 8, 1837. R. D. HITCHCOCK.

Griggsville, city, Pike co., Ill., 37 m. E. of Hannibal, 4 m. W. of Ill. River, on R. R. It has a public library. Pop. 1870, 1456; 1880, 1515.

Grigsby (HUGH BLAIR), LL.D., b. at Norfolk, Va., 1806; became chancellor of William and Mary Coll. in 1871. Was a member of the Va. Convention of 1829-30, respecting which he delivered an address in 1833 before the Va. Historical Society. D. Apr. 29, 1881.

Grillparzer (FRANZ), b. at Vienna Jan. 15, 1791; spent his life in his native city. In 1816 he brought his tragedy *Die Ahnfrau* on the stage, one of the wildest productions of the romantic school. But in all his chief works, *Suppho*, *Medea*, *Des Meeres und der Liebe Wellen*, and *Eschere*, he pursued an almost opposite direction. D. Jan. 20, 1872.

Grimes (JAMES WILSON), LL.D., b. in Deering, Hillsborough co., N. H., Oct. 20, 1816. The youngest of 8 children, and of Scotch-Irish extraction, he entered Dartmouth Coll. Aug. 1832; commenced the study of law in Feb. 1835; settled at Burlington (now in Ia., then in the "Black Hawk Purchase," which was attached to the Terr. of Mich.) May 1836, and engaged in the practice of law. His first public service was as sec. to an Indian com. held at Rock Island Sept. 27, 1836, at which the Sacs and Foxes relinquished by treaty to the U. S. the lands lying between the then W. boundary-line of the State of Mo. and the Mo. River, which were subsequently added to that State; was a rep. in 1838 and in 1843 in the legislative assembly of the Terr. of Ia., and in 1852 in the gen. assembly of the State. He earnestly opposed the repeal of the Mo. Compromise, and was one of the founders of the Rep. party; was chosen gov. Aug. 1854, for 4 yrs. Was U. S. Senator 1859-71. In the impeachment trial of Pres. Johnson he regarded himself as acting, not in a representative capacity but as a judge, and gave his opinion that the Pres. was not guilty of an impeachable offence by reason of anything alleged in the articles preferred against him. D. Feb. 7, 1872.

Grinké (FREDERICK), b. at Charleston, S. C., Sept. 1, 1791, grad. at Yale Coll. 1810; judge of Ohio supreme court 1836-41. Author of *Nature and Tendencies of Free Insts.* and an essay on *Anc. and Modern Lit.* D. Mar. 8, 1863.

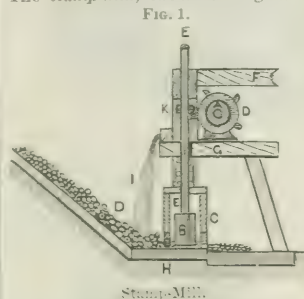
Grinké (JOHN FAUCHEREAU), LL.D., a judge, of the supreme court of S. C.; was col. in the Revolutionary war. Author of a *Revised Edition of the Laws of S. C. in 1790*, a *Probate Directory*, etc. D. in 1819.

Grinké (THOMAS SMITH), LL.D., b. at Charleston, S. C., Sept. 26, 1786, grad. from Yale Coll. 1807, and studied law in Charleston, S. C. In 1828 he delivered a speech in the State senate on the tariff question in favor of the gen. govt., and an argument on the constitutionality of the S. C. Test act of 1834. Wrote *Reflections on the Character and Objects of all Science and Lit.* D. Oct. 11, 1834.

Grinm (JAKOB LEONWIC), a celebrated Ger. philologist and archaeologist, b. at Hanau Jan. 4, 1785; studied law at Marburg 1802; received in 1805 an office in the war dept. of Hesse; accompanied in 1814 the Hessian ambassador to the Cong. of Vienna; went in 1815, under Prus. authority, to Paris to reclaim such MSS. as Nap. had carried away from Ger. libraries; became in 1816 librarian at Cassel, and in 1820 prof. at Göttingen. When in 1837 the Hanoverian king abolished arbitrarily the const. G. signed a protest against the measure, and was dismissed, but in 1841 received a chair at the Univ. of Berlin, which he filled till his death. Wrote *Deutsche grammatische unvollständ. Geschichte der Deutschen Sprache*, and *Deutsches Wörterbuch*. D. Sept. 20, 1863.

Grimm (KARL WILHELM), brother of the preceding, b. at Hanau, Feb. 24, 1786, studied law at Marburg, and followed his elder brother as librarian and professor at Cassel, Göttingen, and Berlin, where he d. Dec. 16, 1859. Although a philologist and archaeologist like his brother, and taking part with him in all his studies and labors, he seems to have been more attracted to the poetical side of the questions treated by them in common. In connection with his brother he edited *Kinder- und Hausmärchen* (1812), one of the loveliest collections of fairy tales ever made. Among his independent works are *Altdeutsche Heldenlieder* (1811), *Die Deutschen Heldensagen* (1829).

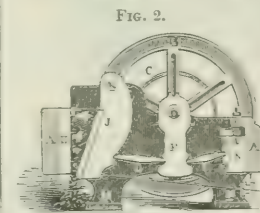
Grind'ing and Crush'ing Machinery. The reduction of large masses to the state of powder usually involves the use both of crushing and of grinding apparatus. C. M. usually reduces the size of masses or breaks up fragments by simple pressure. G. M. acts by compression, combined with a lateral action. Such attrition is better adapted to produce extreme fineness of division than simple crushing. The stamp-mill, shown in Fig. 1, is one of the oldest and



most generally known forms of crushing apparatus. A heavy mass of chilled cast iron B is secured upon the lower end of a strong vertical beam E, which also carries, near the upper extremity, a bracket K, which is engaged by a cam D, which lifts it to the required height. This beam is guided by a suitable frame F G, and the lifting is done by a cam or by a series of cams which are keved upon and revolve with a horizontal

shaft A, driven by a steam-engine. A shield C of wood or metal protects the workmen against injury by flying fragments. D represents the ore flowing under the stamp-heads, which crush it against the floor H. A stream of water I usually flows over the minerals.

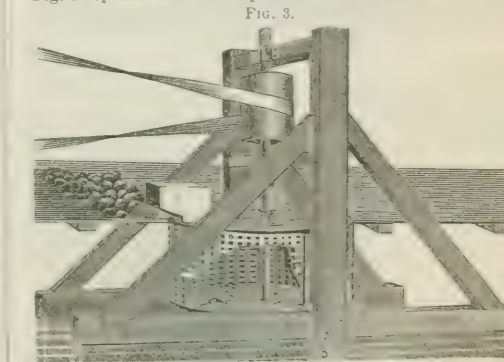
Fig. 2 represents the Blake stone-crusher. The circle at



Blake Stone-breaker.

above. N is a wedge which by means of the screw attached can be raised or lowered to diminish or to increase the size of product. B represents the fly-wheel, and C the driving-pulley. The faces of the jaws are protected by removable plates, which sustain all of the wear produced by abrasion. A spring of rubber, L, withdraws the swinging jaw when it has made its forward movement, and the toggle releases it. The action of the machine is as follows: The material, being already broken to a size which admits of its being placed between the jaws, is thrown into the machine, and the movable jaw, swinging through a small arc at each revolution of the fly-wheel shaft, fractures the pieces, and they drop until caught in the narrower space below, and the next approach of the pendent jaw produces new fractures, and again it releases them. The pieces finally become sufficiently small to fall out through the opening at the bottom, which is adjusted by the wedge O to the proper width.

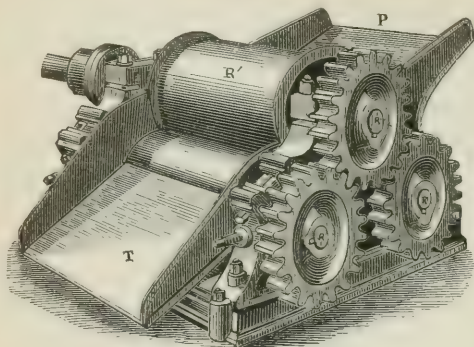
Fig. 3 represents an example of that class of machinery in



which crushing is produced by percussive action—the Whelpy & Storer crusher. For simply crushing sugar-cane and similar substances, where the cellular or porous mass is to be compressed and broken to expel the contained liquid, a set of rolls such as are shown in Fig. 4 is used. The cane is fed between the rolls R R' from an apron P. Passing under

the rolls, it is guided by a plate arranged for that purpose, between R and R', and then, the juice being thoroughly expressed, the crushed cane falls clear, led by the tail-trough T. The effect of the action of the first pair of rolls R R' is to crush the cane, and the succeeding heavy pressure exerted

FIG. 4.



Rolls for crushing sugar-cane.

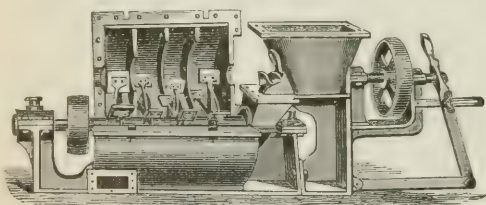
by R' and R' expresses the juice very completely. The juice falls into a trough below, which leads it to a reservoir conveniently situated to receive it.

Fig. 5 represents a form of mill which is also used principally for crushing organic materials. A and B are 2 millstones revolving on horizontal axes a b.

The vertical shaft C revolves in bearings steadied by the frame-work above, and its weight, with that of its appurtenances, is carried by a step at its lower end. Keyed upon this shaft is a strong cast-iron disk, having a high flange around its edge. Fitted to this disk, and well bedded upon it, is a thick stone E E, upon which the millstones A B rest. The vertical shaft C is driven by a bevel-wheel at its lower extremity, and carries with it the horizontal table E E. The material to be crushed is thrown upon the table, and as the latter revolves the former is carried under the millstones, which revolve by contact, and is crushed and ground by the weight of the stones.

When a thorough pulverization of materials is desired mills of various kinds, in which the action is purely that of grinding, are generally used. An exception to the gen. rule exists in the pulverizer of Whelpley & Storer, shown in Fig. 6. This machine is only intended for the reduction to fine powder or to dust of such materials as sand, gravel, or crushed ore. The material is fed regularly and automatically into the machine from the hopper above, and, entering

FIG. 6.



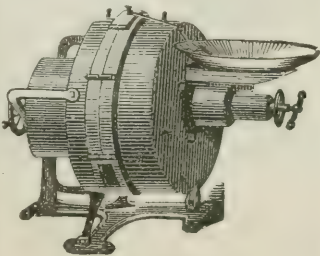
Whelpley & Storer Pulverizer.

the cylinder, encounters the swiftly revolving "paddles," and, becoming entangled among the accompanying and surrounding eddies and whirlwinds of air, the particles are, by mutual attrition and collision, ground into sometimes impalpable powder.

For grinding coffee and spices, dry paints, soft ores, solid chemicals, and easily crushed substances in gen., mills with grinding surfaces of cast iron are commonly used. In these mills the rubbing faces of the metal are usually corrugated or ribbed in a manner and to a degree which is determined by the nature of the work to be done.

Many other forms of mill are in use. In some cases, as shown in Fig. 7, mills are constructed having the stones set with their axes horizontal, the special advantages being the convenience with which pressure may be ad-

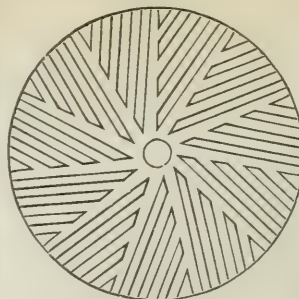
FIG. 7.



Forsman Vertical Mill.

justed, and the more rapid feed and delivery secured, which

FIG. 8.



Plan of Millstone.

are cut, as shown in Fig. 8, with straight grooves, of wedge-formed section. [From orig. art. in *J. s. Univ. Cyc.*, by PROF. R. H. THURSTON.]

Grindstone, a thick circular disk of stone used for bringing cutting instruments to an edge, the blade being applied to the edge of the stone, which revolves around a central axis. The best G. in the U. S. are brought from Berea, O., and from N. S. Various forms and materials are also used for cutting glass, gems, etc.

Grinnell, city and R. R. junc., Poweshiek co., Ia., 120 m. W. of the Mississippi River. It is the seat of Ia. Coll. Pop. 1870, 1882: 1880, 2415.

Grinnell (HENRY), b. at New Bedford, Mass., Feb. 13, 1799, son of Cornelius Grinnell and brother of M. H. Grinnell; was a partner in the firm of Grinnell, Minturn & Co., whale-oil shippers of New York, 1819-49, and after that time retired from business; fitted out the "Grinnell expeditions" (1850, 1854, etc.) in search of Sir John Franklin, and was throughout life a most generous advocate of the interests of sailors; was the first pres. of the Amer. Geographical Society. D. June 1874.

Grinnell (MOSES H.), b. at New Bedford, Mass., Mar. 3, 1803; obtained his early education at private schools and Friends' acad.; M. C. 1839-41. He was influential in sending out Dr. Kane upon his Arctic expedition (1853-55); collector of the port of New York 1869-71. D. Nov. 24, 1877.

Grinnell Land, in the Arctic Ocean, the northernmost land hitherto discovered, was first seen in 1850, and mapped in 1854 as far as lat. 82° 30' N. in lon. 76° W. An open polar sea, entirely free of ice and abounding in animal life, is reported to extend 125 m. N. of its shores. High mts. were seen in the interior.

Grippe. See INFLUENZA.

Griquas (called BASTAARDS by the Boers), a mixed race in S. Afr., the offspring of Hottentot and Bush women by the Boers, or colonists of Dut. descent. Many of them have adopted the habits and religion of Europeans. A large part of their terr. (Griqualand) was in 1874 annexed to the Cape Colony against the wish of the people.

Griscom (JOHN), LL.D., b. at Hancock's Bridge, N. J., Sept. 27, 1774; was prin. of the Friends' monthly meeting school in Burlington, N. J., 13 yrs.; in 1806 became prof. of chem. in Rutgers Coll., N. J. Wrote *A Year in Europe*. D. Feb. 26, 1852.

Grisi, gree'see (GIULIA), daughter of a topographical officer of the Fr. empire, b. at Milan May 22, 1812. She studied at Milan and Bologna, where at the age of 16 she made her first public appearance as Zelmira, and carried the audience away by the charm of her voice, manner, and person. Subsequently she achieved triumphs at Florence, Pisa, and Milan. At the Scala she first appeared as Norma. Her efforts to overcome defects of training were so successful that she ranked with Pasta and Malibran. The opera *Puritani* was written for her. In 1836 G. married a Frenchman, M. Gérard de Melcy, but the union was unhappy and was legally dissolved. She was afterward united to Signor Mario, the tenor. In Aug. 1854 they visited the U. S. together and sang in the prin. cities. In later yrs. she resided in Eng. She appeared at Covent Garden as late as 1864. D. Nov. 29, 1869.

Griswold (ALEXANDER VIETS), D. D., b. at Simsbury, Conn., Apr. 22, 1766; appointed rector of St. Michael's ch. at Bristol, R. I.; in May 1811 became first bp. of the E. diocese of the P. E. Ch., which was organized in 1810. Soon after he was elected chancellor of Brown Univ. Wrote *On the Reformation and the Apostolic Office*. D. Feb. 15, 1843.

Griswold (JOHN A.), b. at Nassau, in Rensselaer co., N. Y., in 1822; was M. C. from N. Y. 1863-69, and mayor of Troy 1856. It was through his efforts that Ericsson's famous Monitor was built. He was an iron manufacturer; was Rep. candidate for gov. of N. Y. 1868. D. Oct. 31, 1872.

Griswold (MATTHEW), LL.D., b. at Lyme, Conn., 1716; held the office of lieut.-gov. of Conn.; gov. 1784-85; also judge of the supreme court; pres. of the convention which ratified the Federal const. 1788. D. Apr. 1799.

Griswold (ROGER), LL.D., b. at Lyme, Conn., May 21, 1762, grad. from Yale Coll. in 1780; was admitted to the bar in 1783; M. C. 1795 to 1805; appointed judge of the supreme court of Conn. in 1807, and was lieut.-gov. 1809-11; gov. 1811-13. D. Oct. 25, 1812.

Griswold (RUFUS WILMOT), D. D., b. at Benson, Vt., Feb. 15, 1815; spent much of his early life in travel, in U. S. and Europe; became a printer, then a Bap. preacher, and afterward a journalist. In 1841 he brought out an anonymous vol. of poems. Became chief ed. of *Graham's Magazine* in 1842-43, and of the *International Magazine* of New York in 1850-52. Wrote *Poets and Poetry of Amer.*, *Curiosities of Amer. Lit.*, and *Prose Writers of Amer.* D. Aug. 27, 1857.

Griswold (STANLEY, b. at Torrington, Conn., Nov. 14, 1793, grad. from Yale Coll. in 1796; studied theol., and was settled to preach at New Milford, Conn., 1799-1802, but resigned. In 1804 he edited a Dem. paper at Walpole, N. H.; was appointed sec. of Mich. Terr. by Jefferson in 1805; became U. S. Senator in 1809 from O., and afterward U. S. judge for the N. W. Terr. D. Aug. 21, 1815.

Groningen, town of the Netherlands, on the Hunse, which here forms a good port, accessible for large vessels, and communicating by canals with the Dollart and the Zuyder-Zee. It is fortified, has a univ., a public library, and a botanic garden. Pop. 1882, 48,806.

Gronovius, or **Gronov**, the name of a distinguished Dut. family which produced many learned men. **JOHAN** **FREDERIK** **GRONOVIVS**, b. in Hamburg, Ger., Sept. 8, 1611, was ed. at Leipsic, Jena, and Altorf, and in 1643 became prof. of hist. and eloquence at Deventer; in 1658 prof. of the Gr. lang. and hist. at Leyden; pub. texts of anc. authors with notes. D. Dec. 28, 1671.—His son, **JACOBUS**, b. at Deventer Oct. 30, 1645, went in 1668 to study in the Eng. univ.; was attached in 1672 to the Dut. embassy at Madrid; was prof. of polite lit. at Pisa, and in 1673 took the corresponding chair at Leyden. Pub. annotated texts, and wrote *Theaurus Antiquitatum Græcarum*. D. Oct. 21, 1716.—His son, **ABRAHAM** (1694-1775), a distinguished phys., was ed. of several anc. authors and author of learned works.—His brother, **JOHANN** **FREDERIK** (1690-1762), was a distinguished jurist, botanist, and author.—**LAURENTIUS** **THEODORUS** (1730-78), a learned zoologist and author.—His grand-uncle of the same name was a noted student of the civil law, and author.

Groome (JAMES BLACK), b. in Elkton, Cecil co., Md., Apr. 4, 1838; studied law, and was admitted to the bar in 1861; joined the Dem. party; member of the convention in 1867 that formed the present const. of Md.; in 1871 and 1873 member of the house of delegates, taking a leading place in that body until, on the election of Gov. Whyte to the U. S. Senate in 1874, he succeeded him as gov.; at the end of the term he returned to Elkton, Md., and resumed the practice of law; U. S. Senator for Md. 1879-85.

Gros (ANTOINE JEAN), b. at Paris in 1771. He was a pupil in the school of David; was patronized by Nap., whose portrait, full length, he painted in it, and the most impressive events in whose career—the battles of Aboukir, of the Pyramids, of Eylau, Nap. visiting the sick at Jaffa, among them—he depicted by order of the govt. These pieces are strong, but coarse. His miniature portraits are delicate and beautiful. The cupola of St. Genevieve at Paris shows his skill as a decorator. G. was a member of the Legion of Honor and the order of St. Michael, and prof. at the Inst. and the School of Fine Arts. D. 1835.

Grosbeak, a popular name of several birds belonging to the family Fringillidae. The U. S. have the evening G. (*Hesperiphona vespertina*), the pine G. (*Pinicola enucleator*), the rose-breasted G. (*Zamelodia ludoviciana*), the blue G. (*Guiraca caerulea*), and others.

Gross (SAMUEL D.), M. D., LL.D., D. C. L., b. in Pa. July 8, 1805; grad. at the Jefferson Med. Coll., Phila., 1828; in 1835 was elected prof. in the med. dept. of Cin. Coll., O., and in 1840 to the professorship of surgery in the Univ. of Louisville, Ky. In 1850 was selected to become Dr. Mott's successor in the Univ. of New York, and in 1856 he succeeded Dr. Mütter in his alma mater. (Resigned Mar. 28, 1882.) In 1867 he was elected pres. of the Amer. Med. Association. Author of *System of Surgery*.

Grosseteste (ROBERT), bp. of Lincoln (probably named *Grosseteste*, "great head," from his learning and ability), was b. at Stradbroke, Suffolk, about 1175; is reputed to have held a professorship at Paris; was made archdeacon of Wilts in 1214; received other preferments, and in 1214 received the doctorate of theol. and became *magister scholarum* at Ox.; defended (1232) the Jews against the king and people; became bp. of Lincoln 1235; opposed successfully alike the intrusions of king, nobles, and the pope in localecclesiastical affairs; was involved in a long controversy with Innocent IV., who excommunicated him. D. Oct. 9, 1253.

Grote (GEORGE), D. C. L., F. R. S., b. at Clayhill, Kent, Nov. 17, 1794, of Ger. ancestry; became a liberal political writer, and sat in Parl. for Lond. 1832-41, and was distinguished by efforts in favor of the use of the ballot in elections. His *Hist. of Gr.* (1846-56) is written from a democratic standpoint, and enriched with the products of novel and important researches. His other prin. works are *Plato and the other Compositions of Socrates*, *Aristotle*, and *Minor Works*. In 1860 he became vice-chancellor of the Lond. Univ., and in 1869 pres. of Univ. Coll. D. June 18, 1871.

Grootius, or **De Groot** (HUGO), son of a burgo-master and curator of the Univ. of Leyden, b. at Delft Apr. 10, 1583; placed at Leyden when very young; was in the train of the states-general's ambassadors to Fr., where his wonderful learning excited great attention. Admitted to the bar at the Hague, he soon commenced his literary career; received several appointments, and in 1610 the office of pensioner (or paid counsellor) of Rotterdam. In 1608 he wrote his *Mare liberum*, on the freedom of the seas, against the claims of Eng. and Port. Joining John of Barneveldt, the grand pensionary of Hol., the head of the states' rights party and of the Arminians, he shared the fortunes of Barneveldt, excepting that his leader was put to death, while he lay in prison until his wife rescued him by a stratagem in 1624. From this time he lived first in Fr., then at Hamburg, and then in the service of Queen Christina of Swe., especially as her ambassador at Paris. Being recalled at his request in 1645, he d. from the fatigues of a sea-voyage Aug. 28, 1645.

G. was a universal and one of the greatest of Chr. scholars. His notes on the N. T., purely philological and entirely free from theological bias, have a very high value. His *De jure belli et pacis* is in one sense the foundation of modern international law. His mild Christian humanity led him to attempt to bring better principles than those of his age into the intercourse of nations, into the laws of war, and his

thorough knowledge of Roman law and history furnished him with a systematic basis and copious illustrations.

THEODORE D. WOOLSEY.

Groton, Dak. See APPENDIX.

Groton, N. Y. See APPENDIX.

Grot'ta del Ca'ne ("Grotto of the Dog"), a cave 10 ft. deep, 4 ft. wide, and 7 ft. high, in S. It., between Naples and Pozzuoli, remarkable for its exhalations of carbonic acid gas, in which a candle is instantaneously extinguished and small animals stifled.

Grouchy, groo-she', de (EMMANUEL), MARQUIS, marshal and peer of Fr., was b. at Paris Oct. 23, 1766, and entered the artill. in 1781. In 1793 he was col. of a regiment of dragoons, advanced to brig.-gen., and fought in 1794 in La Vendee, but was discharged. After the fall of Robespierre he was reinstated in his former place, and fought under Joubert and Moreau in It. and on the Rhine in 1799 and 1800, but was treated coldly by Nap. on account of his sympathy for Moreau. On Oct. 26, 1806, he defeated the Prus. cav. at Zehdenik, and after that time he was employed in the campaigns in Prus., Sp., Aus., and Rus.; on the retreat from Moscow he led the body-guard of the emp., a legion consisting of officers only. On the restoration of the Bourbons in 1814 he was banished from Fr., allowed to return in 1815, but treated with suspicion. He joined Nap. on his return from Elba, received command, fought in N. Fr., was made a marshal of Fr. After the battle of June 17, 1815, he was ordered to pursue Blücher, and although, on the 18th, he heard the cannonade from Waterloo, he adhered to his orders and pushed forward toward Wavre. After the battle he led the remnants of the army back to Fr. The Bourbons banished him a second time, but after residing for 5 yrs. in the U. S. he was permitted to return. After the revolution of 1830 his rank of marshal was acknowledged, and he was created a peer of Fr. D. May 29, 1847.

Ground Dove, a gen. name for those species of pigeon which seldom fly, but walk upon the ground.

Ground Ice, or **Anchor Ice** (called *ground gru* in parts of Eng.), is the ice which forms in crystals at the bottom of streams. Its formation is probably due (1) to the current of the stream, which mixes the lighter cold water of the surface with the rest of the water, and brings the whole down nearly to the freezing-point; (2) to the asperities at the bottom, which favor the forming of crystals; and (3) to the comparative stillness at the bottom.

Ground-nut, or **Peanut**, the fruit of the *Arachis hypogæa*, an annual plant of the order Leguminosæ, a native of Afr. or of S. Amer. In the U. S. it is cultivated for its oil also. The pods generally have 2 seeds, and have the habit of thrusting themselves under the soil and there ripening. The seeds ("nuts") when roasted are extensively eaten. The oil is made by grinding, heating, and pressing the kernels, which yield over 20 per cent. of oil. In lamps it is better than sperm oil, except in cold weather, when it thickens. When deodorized it is used for adulterating olive oil.

Ground Parakeet, a name applied to several Australian parrots, which live almost entirely upon the ground—such as the *Pezoparus forbesi* and the *Nymphicus nova Hollandiæ*. The latter is of a yellow color.

Ground Squirrel, a name applied to various rodents intermediate in character between the true squirrels and the marmots. They are of the genus *Tamias*, *Spermophilus*, etc. (See CHIPMUNK and GOPHER.)

Groundsel Tree, a name given in the U. S. to *Baccharis halimifolia*, *angustifolia*, and *glomeruliflora*, resinous shrubs of the order Compositæ; are chiefly near sea-coast.

Grouse, the common name for birds of the family Tetraonidae, many of which are Amer., as the spruce partridge or Canada G. (*Canace Canadensis*), ruffed G. (*Bonasa umbellus*), and others.

Grove (Sir WILLIAM ROBERT), Q. C., F. R. S., b. at Swansea July 14, 1811; ed. at Brasenose, Ox., and at Lincoln's Inn, and came to the bar in 1835; gave special attention to experimental physics, and invented valuable electrical appliances; was one of the first to advance as a hypothesis the doctrine of the correlation of forces; prof. of experimental philos. in the Lond. Inst. 1840-47; became Queen's Counsel 1853. pres. of the Brit. Association 1866, a justice of the common pleas 1871. Wrote *On the Correlation of the Phys. Forces*.

Gro'ver (CUTLER), b. in Bethel, Me., July 24, 1829, grad. at the U. S. Military Acad. July 1850, and entered the army as brevet second lieut. of artill.; became second lieut. Sept. 1850, first lieut. of inf. Mar. 1855, capt. Sept. 1858, major Aug. 1863, lieut.-col. July 1866. His services prior to the c. war were principally on the frontier. On the outbreak of that war he was a capt. of the 10th Inf., and with his command in N. M. Returning E. he was (Apr. 1862) appointed a brig.-gen. of volunteers, and assigned to duty with the Army of the Potomac, participating in the various battles of the Peninsular campaign in Va. and in the second battle of Bull Run. In Dec. 1862 he was in command of a division of the 19th corps in the dept. of the Gulf. In Aug. 1864 he was raised to the command of the 19th corps, and in the Shenandoah campaign was engaged in the battles of Opequan, Fisher's Hill, and Cedar Creek; he subsequently commanded the dist. of Savannah, Ga., and was mustered out of the volunteer service Aug. 1865. Made brevet maj.-gen. U. S. A.; in 1875 became col. 1st Cav.

Grow (GALUSHA AARON), LL.D., b. at Ashford, Conn., Aug. 31, 1823, grad. from Amherst Coll., 1844; admitted to the bar in 1847; M. C. from Pa. in 1851-53, 1855-57, and 1859-63; was speaker of the House of Reps. in the 37th Cong. (1861-63), and was appointed delegate to Baltimore convention in 1864. In 1875 was pres. of a R. R. in Tex.

Gruber (JOHANN GOTTFRIED), a Ger. writer of some note, b. at Naumburg, Prus. Sax., Nov. 29, 1774, and made from 1792 to 1797 extensive studies at the Univ. of Leipsic. From 1803 to 1810 he resided in Weimar, where he became intimate with Wieland, of whom he wrote a biography. In

1815 he was appointed prof. of philos. at the Univ. of Halle, and in 1818 he began, together with Ersch, the publication of the great *Allgemeine Encyclopädie der Wissenschaften und Künste*, D. Aug. 7, 1851.

Grundtvig (NICOLAI FREDERIK SEVERIN), b. Sept. 8, 1783, at Udby parsonage, in the island of Seeland, and studied lang., hist., and theol. at the Univ. of Copenhagen. In 1808 he attracted attention by his book on the Scandinavian mythology, and still more in 1812 by a powerful picture in dramatic form of the contest between Christianity and heathenism in Den. His *World's Chronicle* was written from a positive Chr. standpoint. His first large religious work was *Kirkens Gjenstand* (1825), in which he attacked the rationalistic views then reigning in the Dan. Ch. His *True Christianity*, his *Sunday-book*, and many minor essays are principally of practical tendency. He possessed eminent gifts as a preacher, and filled the office of a minister in Copenhagen from 1838 till his death; and he deeply touched the hearts of his countrymen by his hymns and patriotic ballads. His party developed gradually into a school, and his school became a reform of the whole Dan. civilization. D. Sept. 2, 1872. CLEMENS PETERSEN.

Grundy Centre, on R. R., cap. of Grundy co., Ia. Pop. 1880, 950.

Grundy (FELIX), b. in Berkeley co., Va., Sept. 11, 1777, ed. at the Bardtown Acad. by Priestley; studied law and became famous in criminal cases; was chosen a member of the convention to revise the const. in 1799; upon the resignation of Judge Todd was appointed chief justice of Ky. Removed to Nashville, Tenn.; was in Cong. 1811-15, U. S. Senator 1829-38. Pres. Van Buren, in 1838 selected him as atty.-gen. of the U. S.; in 1840 he resigned his office, and was re-elected to the Senate. D. Dec. 19, 1840.

Gruppe (OTTO FRIEDRICH), a Ger. philos., archæologist, and poet of some note, b. at Dantzig Apr. 15, 1804. In 1830 he became a contributor to the *Allgemeine Preussische Staatszeitung*, and his *Ankens* (1831), containing an attack on the philos. of Hegel, attracted some attention. In 1844 he was appointed extraordinary prof. of philos. at the Univ. of Berlin. His most noted poetical works are his tragedies, *Otto von Wittelsbach* and *Demetrius*. D. Jan. 7, 1876.

Grymes (JOHN R.), b. in Orange co., Va., 1786. He served as U. S. dist. atty. and atty.-gen., also in the State legislature and constitutional convention of La. D. Dec. 4, 1854.

Grys-bok [Dut. for "gray buck"], the *Calotragus melanotis*, a small reddish-gray antelope of the mts. of S. Afr.

Gua'ca, or **Hua'ca** [according to Herrera, an anc. Peruvian word meaning "temple"]. The word is now in common use in Central and S. Amer. to designate an Indian grave, and from it comes *huacal*, an Indian cemetery. In 1859 great excitement was produced in the U. S. and Europe by the announcement that several *huacas* had been discovered at Chiriqui in the state of Panama, from which a number of golden images, etc. had been extracted, and it was generally believed that the unearthed treasures were the works of a people who preceded the Indians, and whose civilization greatly exceeded theirs.

Guacharo Bird [so called from the Guacharo cave, near Cumana, one of its chief abodes], the *Steatornis Caripensis*, called also **Oil-Bird** and **Trinidad Goat-sucker**, the only species of the family *Steatornithidae*. It feeds on fruits and becomes excessively fat.

Gua'chos, or **Gau'chos**, a class of mestizoes descending from the earliest Sp. colonists and native Indians, and inhabiting the pampas of S. Amer., chiefly in the Argentine Republic. Their skill in riding on horseback and catching wild cattle is marvellous.

Guadalajara, or **Guadalaxara**, city of Mex., cap. of the state of Jalisco, near the river Santiago. It has 14 public squares, and 12 large fountains provided with water by an aqueduct 3 m. long. Its cathedral is a magnificent building, though its appearance has been impaired by the destruction of the cupolas of its 2 towers by the earthquake in 1818. Pop. 78,600.

Guadalquivir, gaw-dal-kwiv'er [Arab. *Wad-al-Kebir*, "the great river"], a river of Sp., rises in the Sierra de Cazorla, and after a S. W. course of 260 m. falls into the Atlantic 18 m. N. of Cadiz. It is navigable to Seville, 12 m. below which it separates and forms 2 islands.

Guadeloupe, gaw-da-loop', one of the Lesser Antilles, in the W. I., belonging to Fr. By Salt River, a narrow strait, it is divided into 2 parts. The W. G. proper, is of volcanic origin and mountainous, its highest peak, La Soufriere, an active volcano, being 5108 ft. high. The E. part, called Grande Terre, is a coral formation, low and flat. Cap. Basse-Terre. Area, 534 sq. m. Pop., including the little island of St. Bartholomew, 185,460.

Guadiana, a river of Sp., rises in the Sierra Alcaraz, runs 30 m. under ground, enters Port., and falls into the Atlantic after a course of 420 m. It is navigable only 35 m.

Guaiacum, gwe-ä-kum, a genus of trees, natural order Zygophyllaceæ, of which the important species are *G. officinale* and *G. sanctum*, small evergreen trees, growing in the W. I. and adjacent mainland. The wood, commonly called *lipumville*, is exceedingly hard and heavy, sinking in water, and is much used for ship-blocks, ten-pin balls, etc. It has a peculiar odor when rubbed or heated. *G. resin*, or *G.*, is the concrete juice obtained from the wood; it is of feeble fragrant odor, and, after melting in the mouth, of a hot, pungent taste. *G.* is useful for detection of blood in stains. It is used sometimes in med., but its virtues are very feeble. *G. sanctum* grows in Fla.

Gu'an, a name applied to various gallinaceous birds of the family *Cathartidae*, natives of warm parts of Amer. The Tex. G. is the *Ortalis Macalli*, a large bird, the only one of the family reported in the U. S.

Guana'co (*Aschenia Guanaco*), a S. Amer. animal of the camel family, regarded by many as a wild variety of the llama (*Aschenia glama*). It is especially abundant in Patagonia and Chili.

Guanaha'ni, Cat Island, or **San Salva'dor**, one of the Bahamas, is a small island with 2378 inhabs. It was formerly believed to be identical with Columbus's San Salvador, but recent criticism seems to point out Watling's Island as his first discovery, and the latter has now received the official name San Salvador.

Guanajuato, or **Guanaxuato**, a state of Mex., between lat. 20° and 22° N. and lon. 99° 40' and 102° 40' W. It is very high, partly a lofty plateau 6000 ft. above the sea, partly traversed by chains of mts. whose peaks reach a height of more than 11,000 ft. It is very fertile, but most important among its products are its minerals—gold, silver, copper, and lead; its silver-mines are considered the richest in the world. Area, 12,619 sq. m. Pop. 788,202.

Guanajuato, or **Guanaxuato**, town of Mex. and cap. of the state of the same name. Its chief importance is derived from the silver-mines in its vicinity. It is at an elevation of 6017 ft. above the sea, and curiously built with steep and tortuous streets. Pop. 55,000.

Guan'ches, the aboriginal race of the Canary Islands, now extinct, though the chief families of the group boast of their G. blood. Conquered by Bethencourt (1402-05), they were compelled to embrace Christianity. A short vocabulary of their words indicates a Berber origin, but this has been questioned. Catacombs where they placed the embalmed and dried bodies of their dead are still shown.

Gua'nine. This substance was discovered in guano by Unger in 1844; it does not occur in fresh excrement of birds. It is found in excrements of garden spiders, in the green organ of the river-crab, in the Bojanian organ of the pond-mussel, in the pancreas of horses, in the scales of the bleak, and in concretions of pork diseased with the G. gout. G. is a white, amorphous powder, insoluble in water, alcohol, and ether. It combines with acids, bases, and salts, forming well crystallized compounds. By digestion with hydrochloric acid and chlorate of potassa it yields guanidine and parabanic acid, with some other substances in lesser quantities. Guanidine is crystalline and alkaline, with a caustic taste. It combines with acids, forming crystalline salts.

Guano, gwah'no [from the Peruvian word *huano*, "dung"]. One of the oldest mentions of the word "guano" occurs in *The Natural and Moral Hist. of Indies*, written by Father Acosta, a Jesuit priest, and pub. in Seville in 1590. The passage reads as follows: "On some islands near the coast of Peru may be seen, from a great distance, large hills of a white color, which look as if covered with snow; yet are they nothing but heaps of sea-fowls' dung, in so great a quantity that it rises yards and even lances in height, to an extent that would seem fabulous. Vessels go to these islands for no other purpose than to load this dung, for no other kind of produce is found on them. This dung is so efficient that the land manured with it will yield an abundant return of grain and fruit. This dung is called guano." About 30 yrs. ago a quantity of G. was sent to Eng. from Peru to test its worth as a merchantable article. It was consigned to a commission-merchant, by whom it was placed in the care of a broker, who advertised it and put it up at auction. Being unknown in the market, it found no bidders, and the commission-merchant, acting in the int. of his consignor, ordered the entire lot to be thrown into the Thames to avoid storage and other expenses. Another sample of G. was sent to Eng. On this occasion, however, it was not offered for sale, but was placed in the hands of agriculturists to test its merits as a manure. The result may be easily imagined. Wherever used it gave the most ample proofs of its fertilizing qualities, and a demand immediately sprung up, purchasers being found to take it at £20 (or \$100 gold) per ton. Quite recently attention has been called to extensive cave-deposits of "bat-guano," consisting of the dung of bats and birds. This substance is formed in the caves of many warm countries, and may yet become important. The so-called "fish-guano" is the refuse of fishes caught for their oil.

Origin of Guano.—G. is the accumulated droppings of birds, which in numberless flocks frequent at the present time secluded localities. The phosphatic character of these deposits is due to the fact that these animals feed largely upon fish. The ammoniacal compounds are most abundant in the G. found in situations where the rainfall is very light and the subsoil of a compact, clayey nature. When the rainfall is abundant these substances are decomposed and leached out, and the earthy constituents remain.

Adulteration of Guano.—This practice is by no means uncommon, and consists in adding to a genuine G. of established reputation earth which resembles the original G. in appearance. Sophistication of Peruvian G. is frequent, this article being the best-reputed article in the market.

Application of Guano.—No definite rules can be given for G. as to what soils will be most benefited, or the necessary quantity. This must be determined by experiment. Peruvian G. should not be applied to crops in its pure state, but should be previously mixed with 4 times its weight of good soil, thus avoiding the danger of injury to the seed.

The Guano Trade.—The exportation of Chincha Island G. to Europe commenced in 1841, and has mounted some yrs. to nearly 500,000 tons, of which G. Brit. was the largest consumer. At the present time the consumption in the U. S. of this quality of G. is about 35,000 tons. The Chincha Islands, after yielding from 12,000,000 to 15,000,000 tons of G. are now quite exhausted. In 1868, when the exportation from the Guanape Islands began, the amount of G. upon these and the other Peruvian islands was estimated at 5,000,000 tons. In various localities upon the W. coast of S. Amer., in Bolivia and Chili, there are extensive deposits of G., but of a quality inferior to that obtained from the Peruvian islands. In 1870 there were exported from the Peruvian islands 461,299 tons. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. W. H. CHANDLER, Phil. D.]

Guano Islands of the Pacific Ocean, those small islands of the far W. Pacific upon which within 25 yrs. guano

has been discovered and worked. They lie between lat. 0° 23' and 5° 35' S. and lon. 155° and 176° 40' W., and must not be confounded with the Chinchá and other guano islands upon the coast of Peru. They are 10 in number, of which, in 1874, McKean and Phoenix islands had been worked out and abandoned; Jarvis, Baker, Howland, Enderbury, Starbuck, and Malden islands were worked; Christmas island was occupied but not worked; and Canton or Mary island had not been occupied, the guano being inferior. The 2 latter are large atolls; the others are about 3 m. long. None are less than 8 or more than 28 ft. above the sea, and there is no anchorage except at Christmas and Canton islands.

The discovery of the guano or phosphate on Baker Island was the result of an accident: a sailor from a whale-ship, dying in the vicinity of the island, was buried upon it: the upturning of the soil to make the grave revealed the presence of the guano. In 1856 Cong. passed an act, in consequence of which Commander (afterward Rear-Admiral) C. H. Davis took formal possession of Jarvis and Baker islands, Aug. 1857. This was the virtual commencement of the guano enterprises in the W. Pacific. The guano from these islands is free from odor, and resembles brown dust in appearance, presenting a strong contrast to the whitish Peruvian and Afr. guano, which has been produced almost wholly by sea-fowl, while in these islands the gradual evaporation in the lagoon and the slow decomposition of the coral rock has had as much to do with the formation of the phosphate as the excrement of birds. An analysis of 9 specimens of this guano, made at the Smithsonian Inst., gave an average of 27.87 per cent. of water, 6.744 of organic matter, and 65.41 of residue of fixed salts. [From orig. art. *Anal. & Util. of Guano*, by Com. RICHARD W. MEADE, U. S. N.]

Guara'na, a substance prepared from the seeds of *Paulinia sorbilis*, a climbing shrub of Brazil, order Sapindaceae. The seeds are dried, powdered, then moistened and made into a paste, which on drying forms a strong, hard, mottled, reddish-brown mass. The essential ingredient is a crystallizable principle apparently identical with caffeine. G. is habitually consumed by the S. Amer. Indians, mixed with their food or made into a drink, and has been introduced into med. principally as a remedy for "sick headache." Like all remedies for neuralgic diseases, it often cures and often fails utterly. EDWARD CURTIS.

Guaranty, gar'ran-tye [O. Fr. *garantie*], a special promise to be responsible for the payment of some debt or the performance of some obligation or duty in case of the failure of another person, who is primarily liable to such payment or performance. It requires all the elements essential to give contracts validity. The party promising must labor under no legal disability, and there must not only be a proposal upon his part, but a sufficient acceptance of the offer by the promisee. (See CONTRACT.) The promise must also be founded upon a valid and sufficient consideration. If indebtedness had already been incurred, an engagement to pay it in case it were not satisfied by the one primarily liable would be nugatory, on account of the lack of consideration. In such a case as this a new and independent consideration would be necessary. If the giving of the G. were contemporaneous with the formation of the contract for which the guarantor proposed to be answerable, the consideration which supported the prin. agreement would support the collateral one also. It is not requisite that any benefit be received by the party giving the G. It is sufficient that the person in whose favor it is given receive a benefit, or if the person to whom it is given put himself to some inconvenience, or part with some property, or undertake some obligation on the faith of the guarantor's promise. After a valid G. has been given the rights and obligations of the guarantor are determined upon somewhat peculiar principles. As his engagement is undertaken for the benefit of others rather than his own, the law is scrupulous in protecting his interests. Hence, if any attempt be made to materially change the nature or extent of his liability by subsequent agreement between his principal and the party to whom the G. was given, he is, in gen., relieved from liability. The contract of G. does not impose a primary, but only a secondary liability; and it is a just and reasonable requirement that diligent efforts be made to collect the sum due of the prin. debtor. A mere delay or indulgence to his prin. would not necessarily be sufficient for the guarantor's discharge, since he might not be injuriously affected in consequence. He might, if he desired, discharge the debt himself, and bring an action against the debtor at any time. But if there should be in any case a valid agreement, without the guarantor's assent, between the creditor and the debtor for indulgence, preventing a resort to legal proceedings for a certain length of time, the guarantor would be discharged. If a guarantor should at any time pay the debt, he would be entitled to be substituted in the creditor's place as to the right to retain any property which the latter held in pledge to secure the claim. This is called in law the doctrine of subrogation.

The Eng. Statute of Frauds, which has been substantially re-enacted throughout the U. S., requires a contract of G. to be in writing to be of any legal validity. But in the determination of the question whether certain promises are to be deemed G. or original engagements, which might be enforced even though made orally, very nice distinctions have been taken. The form of the undertaking here becomes important. There must of necessity be 2 promises—one, of the prin. debtor; the other, of the guarantor. If the transaction results in only one promise, the apparent guarantor will be in fact the true debtor, and no writing will be necessary. If A should say to B, "Let C have so many goods, and I will pay you," there will be but one promise (that of A), and writing will not be required. If A had said, "Charge the goods to C, and if he does not pay you I will," his promise would be void, as it would be collateral to that of C, who would be the true debtor, and would need to be in writing.

GEORGE CHASE.

Guaranty, in international law, is security given by a third nation for the fulfilment of a treaty concluded between two, and more specially implies the aid of such a third power, if certain specific promises are violated. A G., according to Vattel, implies less than a *surety*. The *surety* must pay or perform what the promisee failed to do.

THEODORE D. WOOLSEY.

Guardian, gar'de-an [O. Fr. *guardain*]. The custodian of any one who is unable to take care of himself is sometimes called a G., but the term as usually employed designates a person who has the care and control of the person, property, or both, of a minor child during either a portion or the whole of his minority. G. are of various kinds, and may be divided into 2 gen. classes: I. Those who become so by operation of law, without the need of any specific appointment. II. Those who are appointed by courts or by a parent, either in pursuance of some inherent power residing in the appointing tribunal or in accordance with the provisions of particular statutes.

I. The first class includes those kinds of G. existing at common law, which were 4 in number: (1) G. by nature: (2) G. by nurture: (3) G. in socage: (4) G. by estoppel. (1) *A G. by nature*, by the Eng. law, was originally one who had charge of the person, but not of the property, of an heir-apparent until he became 21 yrs. of age. This authority was vested primarily in the father, but in case of his death could be exercised by the mother. (See HEIR.) (2) *A guardian by nurture* had charge of the persons of the younger children, who were not heirs-apparent, but his authority terminated when a child reached the age of 14. In this country all the children of a family inherit equally, and these 2 kinds of guardianship are substantially equivalent to the relation of parent and child. (3) *A guardian in socage* had custody not only of an infant's person, but also of his lands. Whenever a child under the age of 14 acquired socage lands by descent, that one of his relatives who could by no possibility inherit the estate had the right to undertake the control of his person and the management of his inheritance until that age was reached. In the U. S. this form of guardianship is generally superseded by the appointment of G. by will or action of the courts, though in default of such appointment it is sometimes retained, with important modifications. (4) *Guardianship by estoppel* takes place when a stranger or a wrong-doer interferes with the management or disposition of a minor's property, as by receiving to himself the rents and profits of land. He will then be compelled in a court of equity to account as a G., and will be *estopped* from denying a fiduciary relation to the minor's estate.

II. G. who are appointed by courts or parents are much more frequently met with than those just described. Such are (1) G. in chancery, (2) G. *ad litem*, (3) G. appointed by probate or surrogate courts, or (4) those appointed by other courts under special statutes. Statutory G. appointed by parents are termed (5) testamentary G.

(1) The Eng. court of chancery assumed the power to appoint G. as incidental to its gen. jurisdiction over minors and their estates. In the U. S., courts exercising equity powers have generally retained the same authority. The guardianship continues until the ward reaches the age of 21. The G. is required to give bonds for the faithful management of the ward's estate. (2) Every court in which an infant is one of the parties to a particular suit has power to appoint a G. *ad litem* (i. e., "for the litigation"), to protect the infant's interest during the course of the proceeding. An attorney-at-law is frequently selected. (3) The ecclesiastical courts of Eng., which correspond with the probate or surrogate courts of this country, had no inherent power to appoint gen. G., and it was therefore necessary for the authority to be conferred by statute. Powers of this kind have been quite generally created throughout this country. (4) In some States statutes have been passed giving particular courts designated the power to appoint G. in special instances. Reference must be made to the statutes themselves. (5) Testamentary guardianships are created by the last will of a father, and give the appointee rights superior to the claims of other G., and continue until the ward arrives at majority. They are, however, under the control of the court of chancery, may be held to account there, and may be removed if unfaithful. They were introduced by statute in the reign of Charles II. Statutes have been generally enacted in this country containing substantially the same provisions. Testamentary G. are under the control of courts of chancery the same as other G.

The authority of a G. over the person of his ward is in many respects the same as that which a parent possesses. He has a right to direct the child's education, both in the common branches of learning and in religious training. In the management and disposal of personal property a G. has very extensive powers, but his only right in the control of a ward's real estate is to receive the rents and profits accruing, and to place the land upon lease so that it may continue profitable. All additions to the infant's personal property pass into the G.'s control, and he possesses power to sell chattels without obtaining the consent of the court, but must at the same time exercise prudence and a wise discretion. At common law there was no power to sell the infant's land. A special act of Parl. was necessary. But by statute enacted generally in this country, authority has been conferred upon the proper court to grant permission of sale upon petition when it appears by judicial investigation that the ward's interests demand such a course.

The duties of a G. are the same in nature as those of all trustees, since guardianship is in reality a personal trust. His action must be guided by a constant purpose to subserve the interests of his ward, and not to promote his own advantage. He cannot act for his own benefit in any proceedings which he undertakes to enforce his ward's rights or to increase the value of his ward's property, and if he should, in such cases, receive personal emolument, it would

enure entirely to the advantage of the infant. Property must be kept in a productive condition, and if money is received it must not be suffered to lie idle, but should be profitably invested. Rules of court are sometimes established or statutes enacted pointing out the kinds of securities in which a ward's money may be invested, and these requirements must be strictly followed. The court of chancery has power to enforce an accounting by a G. at reasonable intervals in order to exhibit the condition of the estate, and he may also be called to account by the ward when the latter deems it necessary or when he attains majority. The amount of compensation which a G. shall receive for his services is usually determined by statute, and is estimated at a certain percentage upon moneys received and paid out.

GEORGE CHASE.

Guatemala, raw-te-mah'la, or **Guatimala**, republic of Central Amer., between lat. 13° 45' and 17° 45' N., and between lon. 88° 10' and 93° 12' W., bounded by the Pacific, Mex., the Caribbean Sea, Honduras, and San Salvador. The country is high and the surface very varied, the Andes traversing it in its whole extension. The main range runs along the Pacific, containing many active volcanoes (Sapotitlan 13,050, and Atitlan 12,500 ft. high), and sending out branches toward the Caribbean Sea which form plateaus and valleys. The climate, different according to the differing elevation, is generally healthful and beautiful, and the soil exceedingly fertile. The govt. is an oligarchy, in which a few leading families are in possession of the whole power. The pres. is chosen for 4 yrs. The R. Cath. religion is the only one tolerated, but since 1872 Jesuits have been excluded. Liberty of the press is also established. Area, 44,800 sq. m. Pop. 1,252,497.

Guatemala (New), the cap. of the republic of Guatemala, at an elevation of 4961 ft. above the sea, on a rich and spacious plain. The houses are generally only 1 story high, on account of the frequent earthquakes. Pop. 57,728.

Guatemala (Old), formerly cap. of Guatemala, stands about 80 m. W. of the new town. Founded by the Sp. in 1524, its frequent calamities from earthquakes and the eruptions of the neighboring volcanoes have from time to time almost depopulated it; but its beautiful site and the fitness of its vicinage for the production of cochineal has caused it to be rebuilt. Pop. 20,000.

Guava, gwah'va, the fruits of *Psidium pyrifera*, *pomiferum*, *Cattleyanum*, *pygmaeum*, *albidum*, and other species of the genus, which consists of trees and shrubs of both Indies, mostly natives of the New World, though cultivated in nearly all warm climates, where they yield important dessert fruits, that of *P. pyrifera* (white G.) being the best. From this the G. jelly is made. It is cultivated to a considerable extent in Fla. The G. belong to the Myrtaceae.

Guayaquil, gwí-ah-keel', city of Ecuador, S. Amer., cap. of the dept. of the same name, at the mouth of the river Guayaquil, which is navigable here, and forms the best port on the W. coast of S. Amer. The city is not healthy, as it lies very low, and is not well provided with good drinking-water; most of its buildings, with the exception of the cathedral, the 2 hospitals, and the 2 colls., are insignificant wooden structures. Pop. 20,000.

Gubbio [anc. *Iguvium*], town of It., about 27 m. from Urbino. It was an Umbrian city anterior to Rome, by which it was ultimately conquered. During the Middle Ages it was for a time an independent republic of 50,000 inhabs., then fell into the hands of the dukes of Urbino. Interesting remains of the anc. fortress, of the theatre, and of Etruscan tombs still exist. There are some remarkable old chs., and the municipal palace, of the 14th century, is one of the finest existing examples of Renaissance arch. This palace contains the famous *Tavole Eugubine*, consisting of 7 bronze tablets covered with inscriptions in a very anc. Umbrian character. They were found in a temple of Jupiter not far from G., and their interpretation has been the subject of much discussion among archaeologists. In the same building are a valuable library and many fine pictures, including examples of almost every great master from Giotto to Titian; also a collection of antique vases, coins, etc., together with specimens of the beautiful ware known to connoisseurs as the "Gubbio majolica." Pop. 24,086.

Gubernatis, de (ANGELO), b. in Turin, Apr. 7, 1840, appointed prof. extraordinary of Sanskrit in the superior inst. at Florence (1863), and in 1869 to a full professorship of Sanskrit. Having edited the *Rivista Contemporanea* of Turin during the previous yr., he now purchased it and founded the *Rivista Europea*. Prof. de G. is the It. correspondent of many foreign literary journals, e. g. of the *London Athenæum*, the *New York International Review*, etc. Wrote *Life of Santoro Santarosa*, *Il Re Nala* (Trilogia drammatica in versi), *Zoological Mythology* (in Eng.), *Lecture sopra la Mitologia Vedica*, etc.

Gudgeon, gud'jun, the *Gobio auratilis*, a common freshwater fish of Europe of the carp family.

Guebres. See PARSEES.

Guelder Rose. See SNOWBALL.

Guelph (gwelf) and **Ghibelline**. These distinctive appellations were first employed in the 12th century, and in the contest between the empire and the Ch. the name of Guelph was equivalent to a partisan of the Ch., and the name of Ghibelline to a partisan of the empire. The vulgar tradition says that Guelph and Gibel were 2 brothers who lived in Pistoia, one of whom took the side of the pope, the other that of the emp., and that hence were formed 2 great parties in It. which assumed the names of their separate founders. But this tradition has no historical value. Another states that in the battle near Weinsberg, fought in Ger. in 1140 between the troops of Conrad III. of Suabia and those of the duke of Bavaria, Welf VI. (Guefuf), the former took for their war-cry *Hie Gieblingen* (Gieblingen or Waiblingen was a Suabian fortress, and the Hohenstaufens and their followers were called Waiblingen); and the latter, on the other hand, had for their cry, *Hie Welf!* It is probable,

then, that these 2 designations may have passed into It., or at least made their way toward it, with the Hohenstaufen Suabians, or Waiblingen. The Ger. followers of the Suabians, Waiblingen or Ghibellini, having come into It., may themselves have given the name of Guelphs to their new enemies. The fury of partisanship was such that simply to call one's self Guelph or Ghibelline became perilous, and Pope Benedict XII. in 1334 found it necessary to prohibit, under pain of banishment, the employment of these epithets. The Guelphs took for their device an eagle tearing a blue dragon, which, in place of a crown, wore upon its head a red or yellow lily, the badge of the Ghibellines; this lily was sometimes exchanged for the red rose. The towers of a palace indicated the party of the owner: if a Guelph, the battlements were square; if a Ghibelline, they were swallow-tailed. Even in Tuscany the factions of the Guelphs and Ghibellines became very violent. In Florence the Bianchi united themselves with the Guelph party, and the Neri with the Ghibellines; notwithstanding this, the Neri repossessed themselves of Florence by the aid of Pope Boniface VIII., and the Bianchi, being driven out of Florence, became Ghibellines. The names Guelph and Ghibelline were afterward generally used to indicate 2 hostile factions in whose mutual quarrels the person of the pope or the emp. had little concern. It would be difficult to show which of the 2 factions caused the most mischief to It. and to civilization; both were certainly very fatal. The Guelphs formed the first *Company of the People* to oppose the tyranny of the Ghibellines; but when the Guelph party had obtained the ascendancy it showed itself even worse than the Ghibellines. Dante Alighieri, himself in his youth first with the Guelphs and afterward with the Ghibellines, when verging upon old age boasts in his *Paradiso* "that he had made a party for himself," and declares "the Guelphs and the Ghibellines to be the cause of all the miseries of Italy." F. A. P. BARNARD.

Guelphs, Order of (usually but incorrectly called the **Guelphic Order**), an order of knighthood founded in 1815 by George IV. of Eng., as regent of Hanover, for his Ger. subjects, but conferred upon many Brit. subjects by George IV. and William IV. Its members are not reckoned as knights in G. Brit., and since the extinction of Hanover the Prus. govt. does not recognize its existence.

Guemal, the *Furcifer Huamel*, a deer found in Chili and related to the N. Amer. cariaci.

Guercino (GIOVANNI FRANCESCO BARBIER), called GUERCINO from a squint he had, an It. painter, b. at Cento, near Bologna, in 1590; d. 1666. His finest works, the *S. Petronilla*, the *Aurora*, the *St. Philip Neri*, are in Rome. His style varied much at different periods. His best pictures are distinguished by dignity of design and striking effects of color. His large pictures numbered 250; of smaller works in oil and frescoes he painted very many, and he left a vast collection of drawings. O. B. FROTHINGHAM.

Guericke, ger'ik-ke (HEINRICH ERNST FERDINAND), Ph. D., D. D., a staunch champion of old Lutheranism, b. at Wettin, Prus., Feb. 23, 1803, and after 1829, with an intermission of 5 yrs. (1835-40), was a professor in the Univ. of Halle. Wrote *Handbuch der Kirchengeschichte* (translated by Prof. Shedd), *Historisch-kritische Einleitung in das Neue Testament*, *Lehrbuch der christlichen Archäologie*, etc. D. Feb. 4, 1878.

Guericke, von (ORRÖ), b. at Magdeburg, Ger., Nov. 20, 1602; invented the air-pump 1650; first constructed the "Magdeburg hemispheres," and made a rude barometer. His prin. works are upon physics, etc. The *Experimenta Nova* (1672) is the chief. D. May 11, 1686.

Guérin, de (EUGÉNIE), sister of Maurice, b. in 1805 at Cayla, Languedoc; devoted her life mainly to the care of her brother. Her *Journal and Letters* are remarkable. D. May 31, 1848.

Guérin, gâ-ran', de (MAURICE DU CAYLA), b. in 1810 in Languedoc, Fr., and d. in 1839, was a poet of great original talent. His *Reliquia* (with a life by Sainte-Beuve) contain his poetical fragments, etc.

Guernsey, ghem'ze, the westernmost and (except Jersey) the largest of the Channel Islands. It has a varied, fertile surface, a fine, healthful climate, and a thrifty population, who speak a Norman-Fr. dialect, and, though subject to G. Brit., have their own legislature. Pop. (including the isles of Herm and Jethou) 1881, 32,659.

Guernsey (ALFRED H.), Ph. D., b. at Brandon, Vt., May 12, 1825; studied at Oneida Inst., N. Y., and at the Union Theological Sem., New York, where he grad. in 1849; engaged in lit., especially in connection with *Harper's Magazine* and other periodicals; wrote a portion of *Harper's Pictorial Hist. of the Rebellion*, *Thomas Carlyle, The World's Opportunities and how to use them* (1884), etc.

Guerrazzi, goo-ah-rah'tsee (FRANCESCO DOMENICO), was b. at Leghorn in 1804. While studying law at Pisa he made the acquaintance of Byron, who produced a strong impression upon him. His eulogy of *Cosimo del Fante* showed the lion's claws, and the police restricted G. to Montepulciano, where Giuseppe Mazzini went to visit him and gave him a new political impulse, as Byron had already given him a poetical one. At the age of 22 G. pub. his *Battaglia di Benevento*, an imaginative romance glowing with a sinister light, and filled with protests against tyranny. His turbulent restlessness kept the eyes of the police upon him; he was imprisoned in 1831, and banished to Portoferraio, in the island of Elba in 1834. There he wrote his masterpiece, *L'Assedio di Firenze*, which reveals in a remarkable degree all the good and all the bad qualities of G.'s genius. It is written as if in the heat of battle, and it powerfully incited the It. youth to rise against the foreigner. *Isabella Orsini*, *Veronica Cybo*, and the *Nuove Tartari* followed; then his *Autobiographical Letter* to Giuseppe Mazzini. In 1848 he was elected deputy, and finally, on the overthrow of the Capponi ministry, he was chosen triumvir with Giuseppe Montanelli and Giuseppe Mazzini; afterward on the flight of the grand duke he was proclaimed republican dictator. As a statesman he failed; his violence irritated the people, who on the restoration of the

grand duke turned against the ex-dictator. He was illegally arrested, iniquitously prosecuted, and, in spite of his admirable *Apology*, was finally condemned to perpetual exile. He went first to Corsica, where, in a state of hypochondria, he wrote the terrible *Beatrice Cenci*; afterward followed the *Torre di Nonza* and *Fides*. After some time he returned to Genoa, where he wrote *Il Buco nel Muro*, a most graceful and humorous little work, the *Asino*, a bitter political and social satire, and several other smaller stories. After the proclamation of the kingdom of I. G. was several times elected to Parl., and he had just finished his romance entitled *Il secolo che muore*, when he d. suddenly, Sept. 25, 1873. The city of Leghorn decreed him a magnificent funeral and a monument in his honor. F. A. P. BARNARD.

Guerrero, gher-rä-ro, a state of Mex., organized in 1849. It borders on the Pacific, and its S. part consists of the declivities of the Mex. plateau, well watered, but only in the deep valleys, but mostly covered with primitive forests. Its N. part belongs to the Sierra Madre and is a wild, mountainous region. The soil is described as very fertile, but the land is very thinly peopled. Mining, which formerly was prosperous in these regions, has now nearly ceased, though the country abounds in useful metals, and there are silver-mines of some importance. Area, 32,000 sq. m. Pop. 308,716.

Guerrero (VICENTE), b. at Guerrero, Mex., of mixed negro and Sp. stock, was a slave; took part in an insurrection 1809; became in 1818 leader of patriotic troops, and in 1827 was candidate of the Yorkino or liberal party for pres., but was not elected. C. war thereupon broke out, but Mr. Poinsett, the U. S. minister, succeeded in effecting a compromise, by which in 1829 G. was declared pres. The Sp. troops soon invaded Mex., and G. was declared dictator. The invaders were totally defeated and slavery abolished, but Bustamente, the v.-p., marched against G. with an army because he was regarded as not disposed to give up the dictatorship. Accordingly (1830) G. resigned his office, which Bustamente assumed. After an unsuccessful attempt at revolution, G. was captured and shot at Callapa Feb. 14, 1831.

Guerrilla, gher-ri-lä [Sp. "a little war"], properly the name of partisan warfare, but now applied to men serving in a war in an irregular, unauthorized manner. The name was first given to an irregular partisan soldiery of Sp., especially to that which opposed Nap.'s armies between 1808 and 1815. From Sp. the name was brought to Sp. Amer., and thence to the U. S. In the c. war G.-parties were common at various times and places in the Border States.

Guerrilla-Party [Sp. *guerra*, "war"; *guerrilla*, "a little war"]. In military law this is defined as a self-constituted set of armed men in time of war, who form no part of the organized army, take up arms and lay them down at their own will, and carry on an independent, irregular, unauthorized warfare. If guerrilla-men are taken captive in open warfare, they should be treated with the privileges of war, unless they are proved guilty of such special crimes as murder, or the killing of prisoners, or the sacking of places, in which cases they have forfeited such privilege.

Guess (GEORGE or **Sequoyah**), a Cherokee half-breed, inventor of the syllabic Cherokee alphabet, b. about 1770; was known as an ingenious silversmith previous to his invention of this alphabet in 1826. It contains 85 characters, all of which are applied to writing and printing with complete success. D. Aug. 1843.

Guest, in law, a transient lodger at an inn or hotel. It frequently becomes important in legal practice to determine whether a person remaining at an inn is a G. or a boarder, as the legal rights of the parties are not the same. Thus, a G. may insist that as to him the innkeeper is an insurer, while the boarder can only claim that he is to exercise ordinary care. So the innkeeper has a lien for his compensation upon the goods of a G., but has no such lien, except by statute, upon the effects of a boarder.

Gue'vél, a name applied to quite a number of Afr. antelopes, mostly of the genus *Cephalophus*.

Guiana, ghe-ah-'nah [Fr. *Guayane*; Sp. *Guayana*], is the name of a large tract, of the N. E. part of S. Amer., situated between lat. 8° 40' N. and 3° 30' S., and between lon. 50° and 68° W., and bounded by the Atlantic and the rivers Amazon and Orinoco. This terr. is divided between Brazil, Venezuela, G. Brit., Fr., and the Netherlands, of which powers the 2 former have incorporated their portions as provs., while the 3 latter keep theirs as colonial dependencies.

British G. occupies the westernmost part of G., between Venezuela and Dut. G., from which it is separated by the river Corentin. Its boundaries are not well defined. Its area is about 76,000 sq. m., with 193,491 inhabs., of whom 11,488 are white, about 10,000 aboriginal Indians, and the rest negroes, Chl., and E. I. coolies, and persons of numerous mixed races. It is divided into 3 counties—Essequibo, Demerara, and Berbice. The prin. towns are Georgetown and New Amsterdam.

Dutch G., or **Surinam**, lies between Brit. and Fr. G., and between the rivers Corentin and Maroni. It is called Surinam after the main river flowing through it. Area, 45,000 sq. m. Pop. 50,310, of whom 6000 or 7000 are white, and about 40,000 negroes, without reckoning the 1000 aborigines and the Maroons, descendants of runaway slaves, 7500 in number. Cap. Paramaribo.

French G. lies between Dut. G. and Brazil, and between the rivers Maroni and Oyapok. Area, 18,000 sq. m. Pop. 25,151. On the island of Cayenne, just off the coast, lies the cap. of the colony, of the same name as the island. Fr. uses this colony as a penal settlement. C. PETERSEN.

Guib, or **Harnessed Antelope**, *Tragelaphus scriptus*, a fine antelope of W. Afr. Its reddish sides are marked with white stripes, which make it appear as if harnessed.

Guicciardini (FRANCESCO), b. at Florence, I. G., Mar. 6, 1482; became prof. of jurisprudence there in 1505, ambassador to Sp. 1512, to Leo X. 1513, gov. of Modena 1518; defended Parma, as the pope's lieut.-gen., against the Fr. 1521; was made pres. of the Romagna 1523, gov. of Bologna

1531-34; was a partisan of the Medici family. D. May 1540. He is chiefly memorable for his *Hist. of It.*, which occupies the first place among It. hist.

Guido Reni, goo-ee-'dō rā'nee, b. at Bologna in 1575. He was the son of a musician, who finding him uninterested in his own art, placed him in the school of Denis Calvart, whom he left to become a pupil of the Caracci. Here, in opposition to Caravaggio, G. learned the gentle, sweet, harmonious style to which he owes his reputation. G. was an artist of immense productiveness, but of unequal merit. The productions of his pencil are found in all the prin. collections in Europe. There are several in the Eng. National Gallery. In the latter portion of his life his popularity was such that even his fertility could not meet the orders that came in. He excelled in the treatment of pathetic and devout subjects, and in treating others brought their more gracious aspects into prominence. G., beside painting on canvas and in fresco, modelled in clay, and is said to have executed statues. He amused himself also with making etchings, of which a considerable number remain. Many of his pictures are familiar in engravings. The portrait of Beatrice Cenci, one of the most remarkable of his paintings, must be seen to be appreciated, the so called copies of it having hardly the faintest semblance to the original. D. 1642.

Guild, gild [A.-S. *gild*, "tribute," since the members contributed to the common fund], among the Eng. Sax., appears to have been a mutual-relief society, or an association to meet the expense of the frank-pledge system. Religious G., similar to the modern R. Cath. confraternities and sodalities, were organized at an early date. The laws of Athelstane mention trade-G. as early as 939. The Steelyard Merchants' G. dates from before 967, and the Saddlers' from about that time. Trade-G. were early called livery companies. Mercantile G. followed soon after. The G. were unions of master craftsmen who carried on business for themselves. As the G. grew in importance they were frequently united into one gen. G. or corporation. Many of the old G. still exist, as in Lond., but their old exclusive privileges have been abolished.

Guild (REUBEN ALDRIDGE), LL.D., b. at W. Dedham, Mass., May 4, 1822, grad. at Brown Univ. 1847, and became its librarian in 1848. Wrote *The Librarian's Manual*, *A Biographical Introduction to the Writings of Roger Williams*, and *Hist. of Brown Univ.*

Gulf'ord, New Haven co., Conn., on R. R., 16 m. E. of New Haven, and on L. I. Sound. Pop. 1880, 1540.

Guilford Court-house, N. C., some 5 m. from Greensboro', the locality of a battle fought between the armies of Gen. Greene and Lord Cornwallis. The army of Greene numbered nearly 4500 men, of whom nearly 3000 were militia. With this force he started in pursuit of Cornwallis, whose army comprised some 2500 veteran Brit. troops, and whom he came up with in the vicinity of G. C.-H., where, on Mar. 15, 1781, the battle was fought. The N. C. and Va. troops, forming the first and second lines, gave way before the Brit., who were repulsed by the Md. troops, forming the third line, and by a cav. charge. Not wishing to risk another attack, Greene withdrew; but the Brit. suffered such damage that Cornwallis fell back upon Wilmington.

Guil'lemot, a name applied to various sea-birds of the sub-family Urine, common to both shores of the N. Atlantic and the N. Pacific. The foolish G. (*Uria troile*) and the black G. (*Cephus grylle*) are among the best known.

Guillotine, gil-lo-teen' [Fr. from Dr. J. I. Guillotin (1738-1814), its reputed inventor], a machine for inflicting capital punishment by decapitation, which acquired a terrible fame during the first Fr. revolution. A similar instrument had, however, been employed at times in various parts of Europe for more than 500 yrs. In Scot. it was called the "maiden," in Fr. the "demoiselle." In this machine a heavy blade of steel falls in a grooved frame upon the neck of the victim. The inclined edge of the blade constitutes mainly the superiority of the G. over its predecessors.

Guinand, ge-non' (FRANÇOIS), a noted mech., b. in Neuchâtel, Switz., in 1745; distinguished as the inventor of the best known process for preparing glass for telescopic lenses, which is still a secret one. D. about 1840.

Guinea, ghin'e, a former coin of G. Brit., originally coined of gold brought from the Gold Coast of Guinea, whence the name. It was first struck in 1664, and in 1817 it ceased to be coined. Subscriptions, professional fees, and the like are still estimated in G. It was coined for 20 shillings, but passed for 21 up to 28 shillings, the value varying considerably.

Guinea, the common name of a large tract of coast-country of W. Afr., from lat. 10° 18' N. to lat. 15° 45' S., along the Atlantic and the Gulf of Guinea. The coasts are low, forming a belt of well watered and fertile land of varying breadth. In the interior rise lofty ranges of mts., among which the Kong Mts. in the N. are the best known. It is very unhealthy, and its relations with the civilized world are comparatively small. It is divided into Upper and Lower G. The former lies N., the latter E., of the Gulf of Guinea. Upper G. contains a number of native states, among which are Ashantee, Dahomey, and Benin, and the prin. European settlements. It is divided, in commercial lang., into the Grain Coast (*Liberia*), Ivory Coast, Gold Coast, Slave Coast, and Calabar Coast. The prin. states of Lower G. are Loango, Congo, Angola, and Benguela.

Guinea-Fowl (*Nyctea meleagris*), a gallinaceous bird of Afr., of a blue-gray color dotted with white. It is well known as a domestic fowl.

Guinea, Gulf of, a part of the Atlantic, washing the W. coast of Afr. between lat. 4° N. and 1° S.

Guinea-Pig, the "restless cavy," the domesticated variety of the same species, known to some systematists as *C. cobaya*. It is a rodent, and has no affinity with the pig, which it very faintly resembles in its grunting voice. Neither is it a native of Guinea, but is found wild only in S. Amer. It is bred

for its gentleness and for the pretty coloring of some examples. It is quite defenceless, but its unpleasant odor may protect it to some slight degree, although its chief defence against extermination lies in its marvellous fecundity. Its flesh and fur are useless. It is extensively used for vivisection, being cheap and non-resistant, and after extensive mutilation commonly gives little evidence of pain.

Guinea-Worm (*Dracunculus*), the female of *Filaria medinensis*, a nematode entozoic worm inhabiting the flesh of men and other animals, as dogs and horses. It is from 6 inches to 4 ft. in length, and about $\frac{1}{9}$ of an inch in diameter. It is found to prevail in many parts of Afr., India, Sumatra, Per., Ar., and the island of Curaçoa. It is believed to enter the flesh through the skin, and there live till its young are matured, which takes from 8 weeks to 2 yrs. Then it appears to approach the surface, causing a small ulcer, from which, if let alone, it will eject its young; after which it is quite easily drawn out. As many as 50 have been reported in a single person. In some cases they cause much pain and inconvenience, in others none. Death has sometimes resulted from them. The little tank-worm of E. I. fresh waters and of wet soils is believed to be the larval form of the G. W.

Guiscard, gēs-kar' (ROBERT), sixth son of Tancred of Hauteville, b. 1015; went 1053 to Apulia in It.; captured Pope Leo IX., and in 1057 succeeded his brother Humphrey as count. In 1059 his title of duke of Apulia and Calabria was confirmed by Pope Nicholas II., who appointed him gonfalonier of the Ch. He assisted his brother Roger (1031-1101), afterward grand count of Sic., in his conquests. In 1074 Gregory VII. excommunicated him for trespassing upon the papal rights in Benevento, but in 1080 the pope was reconciled. He next (1081-82) gained a series of victories in the Epirus over the Byzantines, but led the forces by which (1082-84) the pope resisted Henry IV.; delivered the pope from the castle of St. Angelo and sacked Rome 1084; carried the pope to Salerno 1084; defeated the combined Gr. and Venetian fleet and raised the siege of Corfu 1084. D. July 17, 1085. Robert and his brother Roger were the founders of the kingdoms of Naples and Sic. Their most important part in hist. was their share in the expulsion of the Saracens from It.

Guise, gweez, CARDINALS OF, or **Cardinals of Lorraine**. CHARLES OF GUISE, b. at Joinville Feb. 17, 1524, became abp. of Rheims in 1538, and cardinal in 1547; went to the Council of Trent in 1562. He founded the Univ. of Rheims, and d. Dec. 26, 1574.—JEAN OF GUISE, b. in 1498, was made cardinal in 1518, and d. May 18, 1550. He held 3 archbishoprics, 6 bishoprics, and many abbeys, and was famous for large charities and many amours.—LOUIS I., brother of Cardinal Charles, b. Oct. 21, 1527, d. Mar. 24, 1578; became cardinal in 1553; was chiefly noted for convivial habits.—LOUIS II., brother of the third duke, b. at Dampierre July 6, 1555; became abp. of Rheims in 1574 and cardinal in 1578; was put to death by order of Henry III. on the same day that the duke of G., his brother, was murdered, Dec. 24, 1588.—LOUIS III., brother of the fourth duke, b. Jan. 22, 1575, became duke-abp. of Rheims, and was made a cardinal in 1615; was fond of military pursuits. D. June 21, 1621.

Guise, DUKES OF, a cadet branch of the house of Lorraine. The first duke was CHARLES, duke of Aumale, b. Oct. 20, 1496; married Antoinette de Bourbon 1513; wounded at Marignano 1515; became count of Guise 1520; fought the Gers, under Charles V., and became duke of G. 1528; conquered Luxembourg in 1542; d. Apr. 14, 1550.—FRANCIS, second duke, b. Feb. 17, 1519, at Bar, became lieutenant-gen. in 1552; won renown by his defence of Metz 1552-53, and by his conduct at Renti 1554; commanded in It. 1557; served brilliantly against the Eng. and Gers. 1557-58; exercised the chief power under Francis II.; renewed the war with the Prot. by the massacre of Vassy, Mar. 1, 1562; defeated and captured Condé at Dreux Dec. 19, 1562; assassinated Feb. 24, 1563.—HENRY (Le Balafre), third duke and prince de Joinville, b. Dec. 31, 1550, was the leading spirit in the massacre of St. Bartholomew, and afterward "head and soul" of the League; was forbidden to come to Paris by Henry III., but entered Paris in triumph, imprisoned the king in the Louvre, and demanded of the states-general the office of constable; was assassinated by order of the king Dec. 23, 1588.—CHARLES, the fourth duke, b. Aug. 20, 1571, was an able gen.; banished by Richelieu in 1631; d. 1640.—HENRY, fifth duke, b. at Blois Apr. 4, 1614, became abp. of Rheims when 15 yrs. old; abandoned in 1640 the Ch., and in 1641 was banished by Richelieu; became a soldier of fortune. In 1647 he made himself generalissimo of Naples, but was given up to the Spaniards, and kept a prisoner 4 yrs.; in 1655 he became grand chamberlain of Fr. D. June 2, 1664.—LOUIS JOSEPH, sixth duke, b. Aug. 7, 1630, d. July 30, 1671.—FRANCIS JOSEPH, seventh and last duke, b. Aug. 28, 1670, d. Mar. 16, 1675.

Guiteau (CHARLES J.). See GARFIELD (JAMES A.).
Guizot, gē-zō' (ELISABETH CHARLOTTE PAULINE DE MEULAN), b. in Paris Nov. 2, 1773. Thrown upon her own resources by the death of her father, she developed considerable literary ability. She pub. in 1800 a popular novel entitled *The Contradictions*, and subsequently became ed. of Suard's journal called *Le Publiciste*, and gained distinction as a critic and moralist; was married to M. Guizot 1812. She subsequently gave assistance to her husband in his historical labors, and pub. several works for the moral improvement of the young. Her book on domestic education won a prize from the Acad., and is esteemed her best work. D. Aug. 1, 1827.

Guizot (FRANÇOIS PIERRE GUILLAUME), a Fr. scholar and statesman, b. at Nîmes Oct. 4, 1787, ed. in the Prot. faith at Geneva, his father having fallen a victim of the revolution in 1794; appointed prof. of hist. at the Sorbonne in 1812; commenced his political career as sec. of the interior on the fall of Nap. in 1814; councillor of state in 1817, representing the constitutional party and the views of the doctrinaires. Losing his place in 1820, he resumed lectures at the Sor-

bonne, but 2 yrs. later his lectures were suppressed on account of their liberal views. In 1828, restored to his chair at the Sorbonne, he gave his most distinguished lectures during the next 2 yrs. In 1830, a member of the chamber of deputies, he aided in setting Louis Philippe on the throne and took a place in his first cabinet. Subsequently, in charge of the dept. of instruction, he did much to organize the system of primary education. In 1840 he was ambassador to Eng.; on his return he became minister of foreign affairs, and for more than 7 yrs. was the head of the govt. When the revolution of 1848 drove Louis Philippe from the throne, G. took refuge in Eng. for a yr. The remainder of his life was passed in Fr., aloof from politics, but his pen was busy with writing on religious and historical subjects. He d. at his villa in Valricher, near Paris, Sept. 13, 1874. He was twice married; his first wife (Pauline de Meulan) attained some literary distinction as a critic and a moralist; his second wife, a niece of the first, was also an authoress; by her he had a son, who survived him. G. must be ranked among the great and good statesmen of Fr.; but his highest and most enduring reputation rests on his historical writings, prominent among which are his *Hist. of the Eng. Revolution*, *Hist. of Civilization in Europe*, *Hist. of Civilization in Fr.*, and *Hist. of Fr.*

A. L. CHAPIN.

Gulf Stream, The. The great current of the Atlantic Ocean known as the Gulf Stream issues from the Gulf of Mex., through the narrow strait between the mainland of Fla. and the Bahama Banks, and extends in a N. and E. course, parallel to the coast of the U. S., to the vicinity of Nantucket Shoals. Here its course changes still more to the E., extending quite across the N. Atlantic in the direction of the Brit. Islands, a portion of the stream penetrating far into the Arctic seas of N. Europe. The edge of the stream next to the Atlantic coast is well defined, the separation of the warm waters of the stream from the cool waters of the counter-current from Baffin's Bay, which skirts the coast of N. Amer., being well marked. The outer edge, on the other hand, is not so well defined, on account of the overflow or dispersion of the waters along the E. limits. The width of the stream between Cape Fla. and the island of Bimini is less than 40 m., but its breadth gradually increases as it flows onward, being estimated at 300 to 400 m. on a line from the island of Bermuda to Halifax.

This great ocean-current forms but a part of the gen. system of circulation of the waters of the globe, although it is induced chiefly, without doubt, by the trade-winds of the equatorial regions of the Atlantic, which blow continually toward the shores of the continent of Amer. While, therefore, the rapidity of the current in the narrow Strait of Fla. gives rise to the impression that this point is the origin of the stream, these local features of narrow breadth and great velocity are to a great extent accidental, and are due to the configuration of the coast and the outlying ranges of islands of the Caribbean Sea. The great circuit of motion given to the waters along the shores of the W. continent would doubtless still exist were a barrier to be thrown across the Strait of Fla., although the stream would be greatly modified in its gen. characteristics. The waters which now are driven into the Caribbean Sea and Gulf of Mex. through the passages between the Windward Islands find an outlet mainly through the Strait of Fla., where, according to well known laws of hydraulics, the channel being contracted, increased velocity is required to preserve continuity of flow.

The G. S., on account of its influences on the climates of the countries of the Old World, to the shores of which its warm waters find their way, and its effects on the meteorology of the N. Atlantic, as well as on the commerce between the E. and W. continents, may be regarded as one of the most important phenomena connected with the phys. geog. of the globe. In this connection may be included what are known as its counter-currents, the most noted of which is that which comes from Baffin's Bay and continues along the coast of Amer., depositing cooler water along the coast even as far S. as the Fla. Strait. This cool water, skirting the coast, modifies in a remarkable degree the climates of the shores along which it passes. It is hardly possible to conceive the effects which would be produced along the temperate regions of the coast of the U. S. were the hot waters of the G. S. to be thrown directly on our shores. They are now kept at a distance by the inner cool counter-current, which gives a well-defined inner wall or bank at a distance of 20 to 100 m.; and the influences of the G. S. are felt more through the medium of the atmosphere than through direct contact of its waters.

Such being the gen. facts in regard to the G. S. and its important influences, a brief hist. of exploration and discovery in connection with it may not be without some interest. Its influences were detected and observed along the coast of Europe many yrs. before the discovery of Amer., and, according to some historians, it is apparently well authenticated that the discovery of objects from some unknown land cast ashore on the Azores, or floating in the sea to the westward, furnished evidence which was eagerly seized upon by Columbus as proof of his theory of the existence of a W. continent; and while he was lingering in Sp., disappointed and almost discouraged in his efforts to obtain assistance in his great undertaking, the intelligence of this character that reached him from time to time served to renew his courage and strengthen his belief in the correctness of his views. A venturesome Port. pilot, Martin Vicenzo, who had sailed far out to sea, had seen floating upon the waves a piece of wood ingeniously carved with some rude instrument; another pilot, Pietro Correa, found a similar piece of carved wood on the island of Porto Santo. Stalks of cane, "each joint of which would hold several quarts," were found on the same shores; and some of the inhabs. of the islands reported that pine trees not belonging there had been driven ashore by the W. winds; at Cape de Verde 2 large canoes had been found which were supposed to have been forced to sea while going from one island to another;

and finally the bodies of 2 men, differing in their features and color from the Chrs., were cast upon the island of Flores. These floating objects were supposed to have been driven about by the winds and waves until they were thrown by chance upon the coast of Europe; and this idea seems to have impressed Columbus with the belief that the new continent was much nearer to that of Europe than it is; and in his voyage he was obliged to conceal from his companions what surprised himself—the great distance which he found separating him from the Old World, without any signs of the New. The continual discovery of trees, fruits, seeds, and other objects on the coasts of Nor. Ire., and Scot., yrs. after the continent of Amer. had become known, led to the conjecture that these objects were brought from other lands by the more rapid agency of currents; and these conjectures have finally been confirmed by closer observations and by actual experiments upon the drifting of bodies thrown into the G. S. The molucca-beans found on the shores of the Hebrides, and regarded by the common people as curious productions of the sea, were pronounced by Sir George Mackenzie in the year 1675 to belong to a tropical climate, and he indulges in some speculations with regard to their having been brought through the N. W. passage. In 1696 these beans were identified by another observer as belonging to the island of Jamaica, where he had seen and described them in a work on the nat. hist. of that island. On the coast of Nor. similar curiosities were found; and the fishermen of the W. coast of Ire. and Scot. often discovered trees of cottonwood and other unknown productions of the tropical forests. The exact route by which the seed or tree was carried was in a great degree conjectural until the gen. course of the G. S. became known. Later evidences of the flow of this great current from the Gulf of Mex. to the coasts of Europe have been derived from numerous observations on the drifting of bottles and pieces of wrecks, which have been carried in a few months from the W. to the E. continent; and also in the higher temperature of the W. coast of Ire., caused by the waters of the stream, which retain sufficient warmth to reproduce there some of the Aglae of the Fla. coast.

It is difficult to assign a precise date to the discovery of the G. S. as a continuous current of the ocean. The early Sp. navigators did not fail to notice those currents of the Caribbean and Mex. seas in which the G. S. current has its origin. In his last voyage Columbus sailed from the Canary Islands to Hispaniola in 16 days, "with prosperous wind, and by the swift fall of the ocean from the E. to the W.;" and in his voyage from Paria along the coast of S. Amer. toward Carthage, it is stated that the "swift course of the water deceived both Johannes Sarranus, the chief pilot of the gov.'s ship, and all others, although they made their boast that they knew the nature thereof;" "for they affirm that in one night they were carried 50 leagues beyond their estimations." "The Strait of Fla. was discovered in 1512 by Ponce de Leon. He first came upon the island of Bimini, and soon afterward discovered the mainland, which he called Fla. To find a haven he kept sight of the shore, but his ships met with so strong a current that notwithstanding they were favored by a fresh gale of wind, yet they could not stem it, and one of the vessels was carried out to sea out of sight." In 1519 Cortez, after having been 3 months in Mex., sent messengers to inform the king of Sp. of his conquests; he selected for their pilot Antonio Alaminos, who was already famous for the boldness of his navigation in the waters of the New World and familiar with the coast of Fla. and the adjacent islands. Alaminos resolved to sail through the Strait of Fla. and take his course thence to Sp. He "took this resolution, concluding that those currents must lead somewhere," "and accordingly stood northward; and it proved well, for being got safe out of the channel, he came into the open sea, and arrived safe at San Lucar in Oct., having sailed from Mex. on the 26th of July." Thus, Alaminos was the first navigator who followed the G. S. to Europe; whether he recognized its influence throughout his entire voyage or not, it is impossible to determine.

Curious and interesting speculations on the currents of the Caribbean Sea and Gulf of Mexico, written by Peter Martyr, in his *Decades of the Ocean*, were translated into Eng., and pub. in Hakluyt's *Collection of Voyages*. It appears from these historical accounts that not only were the early Sp. navigators acquainted to some extent with the currents of the W. I. seas, but Sebastian Cabot discovered the counter-current which flows from the Arctic seas southward along the coast of Amer. From the accounts of these navigators Peter Martyr concluded that the waters of the globe were "driven about by the incessant moving and impulsion of the heavens, and were not swallowed up and cast out again by the breathing of Demogorgon, as some imagined because they saw the seas increase and decrease, flow and reflow." The first delineation of the G. S. on a chart of the Atlantic of which we have any knowledge was made by Dr. Franklin in 1769-70, from information by Capt. Folger of Nantucket, commanding a whaling vessel from that port.

When first turned from the coast of N. Amer., the central part of the stream takes a direct eastward course, and finally to the S. of E., at the same time expanding to a vast breadth. After passing the Banks of Nantucket and St. George it continues through the Atlantic in an E. northerly course to the distance of 1500 m., or to lon. 43°-44°, lat. 41°-44°. From this point its course changes from E., northerly, to E. and S. E., and finally S. This latter part of its course embraces about 570 m., completing a course of 3060 m. from the Gulf of Mex. No trace of the current S. of the Azores has been found, but the observations of Franklin and others show the existence at times of warm water which may be traced to the G. S. A part of the G. S. 500 m. in extent, between 50° and 61° lon., is almost wholly unknown, neither its direction, velocity, nor temperature having been observed. The width of the stream at any point is variable; on a line from Bermuda to Halifax the variation

is from 140 to 320 m., according to numerous surface observations made by Mr. Napier and others in the passage along this line. These variations appear also to be sudden.

The observations of the U. S. Coast Survey having furnished the means of calculating not only the vol. of warm water which is carried by the G. S. from the tropics to the N. Atlantic and Arctic regions, but also the amount of heat which is thereby transferred, Mr. James Roll estimates that 133,816,320,000,000 cubic ft. of water are daily conveyed, and the quantity of heat in ft.-lbs. transferred amounts *per day* to 154,959,300,000,000,000—a quantity of heat sufficient to melt daily a mass of cast iron as large as Mt. Washington. This heat is distributed over W. Europe and a portion of the Arctic regions, producing the marked differences in climate and temperature which are there observed as compared with points of the same lats. on the Amer. continent.

A notice of the G. S. would be incomplete without some reference to its meteorological characteristics. The effect of the transfer of warm water in a continuous stream from the tropics to the poles makes its path a region of violent storms. It may indeed be said that there is an aerial band of cloud and mist continually overhanging the stream, in which the electric and other changes due to the changes of heat play a conspicuous part, making it a region of violent gales and heavy seas, from which ships seldom escape without damage, and in which many annually founder, while others are driven far from their courses. Its influences in modifying the climate of the W. coast of Europe are in marked contrast with the effects on the N. E. coast of Amer. of the cold current from the Arctic regions which flows from Baffin's Bay.

W. P. TROWBRIDGE.

Gulf-weed (*Sargassum vulgare* and *bacciferum*), seaweeds found floating in various parts of the ocean, especially in what are called the Sargasso seas, of which the most extensive is near the Azores. It is also found in the Gulf Stream, whence the popular name.

Gull, the common name for sea-birds of the sub-family Larinae. The herring G. (*Larus argentatus*) is one of the most common species.

Gull (Sir WILLIAM WITHEY, BART., b. in Thorpe-le-Soken, Essex, Eng., Dec. 31, 1816; was prof. of physiology at the Royal Inst. 1847-49, and for many yrs. a lecturer at Guy's Hospital; won a baronetcy by his skill in attending the prince of Wales in a fever.

Guliver (JOHN PUTNAM), D. D., b. in Boston, Mass., May 12, 1819, grad. at Yale in 1840; pastor of Congl. ch., Norwich, Conn., 1846-65, and of N. Eng. ch., Chicago, 1865-68; pres. of Knox Coll., Galesburg, Ill., 1868-72; pastor of First Presb. ch., Binghamton, N. Y., 1872, and in 1878 prof. at Andover.

Gum [Lat. *gummi*], a name applied to many concrete vegetable juices, chiefly to such as are neither oily nor resinous. The G. proper consist of arabin, of cerasin, and of bassorin. *Arabin* has mildly acid properties, is soluble in hot or cold water, forming mucilage. *Bassorin* swells, but does not perfectly dissolve, in water, with which, however, it may be rubbed into a very adhesive paste. *Cerasin* resembles it, but has somewhat different chemical reactions. The prin. G. are: G. ARABIC, mainly the product of *Acacia Verek*, is in part the product of *A. Nilotica* and of other thorny trees and shrubs of the genus, found throughout a large part of Afr. and in portions of Asia. G. SENEAL, closely allied in character to the above, is identical in its uses, and is the product of several trees of the genus *Acacia*, growing in W. Afr. G. MEZQUITE, from *Algarobia glandulosa*, a thorny leguminous shrub of the dry regions of Mex. and the adjacent parts of the U. S., is closely analogous to G. arabic, but its principle is not precipitated by borax. TRAGACANTH is the gummy exudation which appears spontaneously or upon the incised bark of *Astragalus verus* and other species of that genus, order Leguminosae. BASSORA G., from Per., combines the principles arabin and bassorin. The plant which produces it is supposed to be an *Astragalus*. Beside the true G., many other somewhat similar products are popularly known as G.

Gum'bo (*Gombaud, Okra*), the *Hibiscus esculentus*, a plant of the order Malvaceae, native of the W. I., and largely cultivated in the S. States and in most warm countries for its pods, which are excellent in soup, and are often cooked and served up with butter or pickled. The *Gombo musqué* is the *Hibiscus moschatus*, prized for its reputed med. virtues. Its seed, known as ambrette, is employed by perfumers.

Gum-lac. See LAC, by PROF. C. F. CHANDLER, LL.D.

Gum-Resins, a class of vegetable products long recognized in pharmacy, obtained by drying the milky juice which exudes from incisions made in the stems, branches, or roots of some plants. These juices consist chiefly of a resin and an essential oil, held in suspension in water, containing considerable quantities of gum or mucilage. The G.-R. are opaque, brittle solids, heavier than water, generally possessing a bitter taste and a strong smell, and more or less colored. The resinous portion is soluble in alcohol, the gum in water. They are principally used in med. The prin. G.-R. are gamboge, frankincense, scammony, asafoetida, aloes, euphorbium, galbanum, myrrh, olibanum, opopanax, gum-ammoniac, sagapenum, and bdellium.

Gum Tree, a name given in the U. S. to several trees: (1) The black or sour gum, pepperidge, or tupelo (*Nyssa multiflora*), growing in most of the States E. of the Miss., produces a firm timber, used for bowls, hat-blocks, hubs, etc. *Nyssa uniflora* and *aquatica*, the water-tupelos of the S., have soft light wood, and their roots have been recommended as substitutes for corks. The *Nyssa capitata* of the Gulf States bears a sour edible fruit, the Ogeechee lime. The above trees belong to the order Cornaceae. (2) The sweet gum, bilsted, or liquidambar (*Liquidambar styraciflua*), of the order Hamamelidaceae, grows from N. Eng. to Mex. Its wood is soft, but firm and fine-grained. In the warmer lats. it yields an abundant balsamic resin, called Amer. storax. Its bark is useful in diarrhoea and dysentery. L.

orientale of the Levant yields STYAX or STORAX, and so does *L. Altingia*, a lofty tree of Farther India, having a hard, heavy, fragrant red timber. (3) Very different from the foregoing are the *Eucalyptus*, or G. T. of Australia. (4) In different Brit. colonies other trees with gummy or viscid juice are called by this name.

Gun. See ARTILLERY and SMALL-ARMS.

Gun-Cotton. In 1832 Braconnet discovered that by dissolving starch in nitric acid, and adding water, a white explosive substance was precipitated, to which the name xyloidine was given. Shortly after Pelouse obtained a similar compound by treating paper, or cotton or linen fabrics, with nitric acid, and named it pyroxiline. These were the precursors of G.-C., which was discovered by Schönbein in 1846, and at once excited much attention as a possible substitute for gunpowder. Adverse official reports were soon made in Fr., the U. S., Ger., Eng., and Aus., and the explosive fell into gen. disfavor on account of its liability to spontaneous explosion, its corroding residua, and its excessively violent and irregular character, all of which unfitted it for most military uses. Baron von Lenk, a member of the Aus. commission, continued a series of experiments for several yrs., which ultimately led to so great improvements in manufacture that in 1853 he was able to construct a successful 12-pounder battery employing G.-C. This led to its temporary introduction into the Aus. military service, and again attracted the attention of foreign nations to the new explosive. In 1863 Mr. Abel, as a member of a committee appointed by the Brit. war office, undertook an experimental investigation into the merits of this system, and succeeded in materially improving it. This system of manufacture is the best now known, and yields a product so uniform and safe as to be employed in Eng. almost to the exclusion of all the other modern explosives.

In appearance Abel G.-C. consists of regular cylinders, of dimensions varying with the use proposed. It is white in color, hard to the touch, and sinks readily in water. Ignited, unconfined, by a flame, it burns with a strong blaze. Fired by a detonating fuse, or raised to a temperature of about 340° F. in a strong case, it explodes with great violence—a single ounce being sufficient to indent a plate of iron or disrupt a thin slab of stone upon which it is loosely laid. G.-C. produces little smoke, and leaves a very small residuum of solid matter, the chief products of combustion being carbonic oxide, carbonic acid, water, and nitrogen. It is unalterable in water, no matter how long submerged. It contains about 2 per cent. of moisture in its normal condition. Chemically, the purest G.-C. may be regarded as cellulose, in which 3 atoms of hydrogen are replaced by 3 molecules of peroxide of nitrogen. Thus constituted, it is insoluble in mixtures of ether and alcohol. Quite recently Punshon has succeeded in so reducing the quickness of action of G.-C. by mixing with it nitre and crystals of cane-sugar as to make it well suited for use in small-arms. For chemical properties, see PYROXILINE. [From orig. art. EXPLOSIVES, in *J.'s Univ. Cyc.*, by GEN. H. L. ABBOT.]

Gun'nel, or **But'terfish**, a name given to certain small eel-like fishes of the blenny group, found often in tide-pools and under sea-weed along the shore. Among the species are *Muraenoides mucronatus* of the Atlantic coast of the U. S. and the *Muraenoides Gunnellus* of Europe.

Gunnison, Col. See APPENDIX.

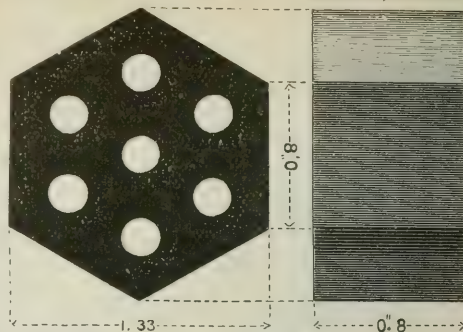
Gunny [Bengalee] **Bag**, a sack made of jute, and used for covering cotton-bales and as bags. Gunny cloth is manufactured chiefly in Bengal. When worn out, the material makes a good stock for wrapping-paper.

Gun'powder, which was first employed in war about 1350, is the oldest and most generally useful of these agents. It is a mechanical mixture of potassium nitrate, carbon, and sulphur, in proportions usually varying but little from 75, 13, and 12 respectively. Purity is essential to excellence. The manipulations of manufacture consist, in gen. terms, in very finely pulverizing the ingredients, thoroughly incorporating them, compressing them into a cake, granulating it, separating the different sizes of grain by sieves, glazing, drying, and removing all dust by use of fine sieves.

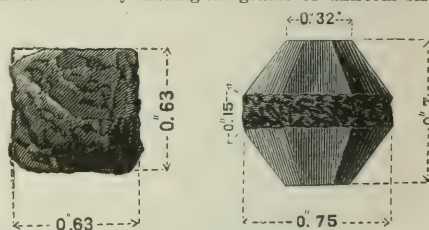
In the storage of G. special precautions against fire and moisture are needed. A spark, friction between hard bodies, or a temperature raised suddenly to 572° F. determines an explosion; while slight moisture, which may readily be absorbed from damp air, produces caking and deterioration. A wetting is permanently destructive to the compound. Frost produces no injurious effects, either temporary or permanent. Being a simple mechanical mixture, the properties of G. may readily be varied to suit the requirements of a quick-burning or a slow-burning explosive. Its expansive power is due to 2 distinct causes—the sudden transformation from a solid to a gaseous form of vastly greater vol., and the heat developed by the chemical change which induces enormous tension. It is apparent, therefore, that a variation in the relative proportions and condition of the ingredients, by changing the chemical products of the explosion, must affect the expansive force, and also that a similar result may be obtained by mechanical means directed to modifying the duration of the time required for combustion.

Gen. Rodman, late of the U. S. ordnance dept., was the first person to suggest the idea that the most suitable powder for any firearm would be one in which the grain burned from the centre to the surface, developing gas in increasing amount with the space behind the projectile as it moved along the bore. It being impracticable to carry out this idea fully with ordinary grains, he proposed instead cakes with holes running through them, for the spread of the flame. That the cakes might fit each other in the charge without loss of space, he proposed to make them of hexagonal form. Prism powder, as the foregoing is now called, was first made on a large scale in Rus., and in the form and dimensions given in the accompanying figure. The powder now used in Eng. for heavy guns is known as "pebble powder." Its nor-

mal shape is that of a cube about 0.63" on the side. In breaking down the cake to form the grains the edges of the cube are left in a more or less broken condition, as shown in



the accompanying figure. The large grain powder heretofore employed in this country for heavy guns is known as mammoth powder. Lately a very great improvement has been made in it by making the grains of uniform size. In



shape they are composed of the frustra of 2 hexagonal pyramids, separated at their bases by a prismatic space 0.15" high. See cut (full size). [From orig. articles in *J.'s Univ. Cyc.*, by COL. J. G. BENTON and GEN. H. L. ABBOT.]

Gunpowder Plot, a conspiracy entered upon in 1604 by several R. Caths. to blow up King James I. of G. Brit., the ministers, and the houses of Parl. by gunpowder, which was stored by them in the vaults under the Parl. House. The plot was to be executed Nov. 5, 1605, but was detected on the preceding day. Guy Fawkes was to be the immediate agent of the conspirators. The 5th of Nov. is celebrated in many Eng. towns by the burning in effigy of Fawkes.

Gun'shot Wounds differ in some essential points from other wounds; they are generally accompanied by shock, and complicated by the presence of foreign bodies in the wound, such as the ball or projectile itself and pieces of clothing or accoutrements which the ball has carried with it and before it. Another element of their danger consists in the fact that they generally occur in large numbers—i. e. in war—when the accumulation of a large number of suppurating wounds gives rise to dangerous complications, such as erysipelas, pyæmia, and hospital gangrene; add to that, that in protracted wars the constitution of the men has already suffered by camp-life, bad diet, and exposure, producing typhus, dysentery, scurvy, etc. At the present day the treatment of G. W. has become simple and rational; even the extraction of the ball is not looked upon as of such absolute necessity as formerly. Taking a statistical view of G. W. and their fatality on a large scale, on an average the number of those killed outright on the field of battle to those wounded is about in the proportion of 1 to 5, and that of the wounded about 14 to 15 per cent. will die of their wounds. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. WILLIAM DETMOLD, M. D.]

Gun'ter (EDMUND), b. in 1581 in Herts, Eng.; invented the sector, and in 1619 became prof. of astron. in Gresham Coll., Lond.; made use of a logarithmic scale before 1624. Is best known by the chain, scale, line, and quadrant which bear his name. D. Dec. 10, 1626.

Gun'ter's Chain, the invention of Edmund Gunter, is 66 ft. in length, and is used in land-measuring. It is composed of 100 links; consequently, 10 square chains, or 100,000 square links, are contained in an acre.

Gunter's Scale. See GUNTER (E.).

Gur'ley (JOHN A.), b. at E. Hartford, Conn., Dec. 9, 1813; was a Unit. minister of Methuen, Mass., 1834-37, and for 15 yrs. edited the *Star of the West* in Cin., O. He was M. C. from O. 1858-62, and was the first gov. of Ari. (1862-63). D. Aug. 19, 1863.

Gur'nard, a name given to marine fishes of the family Triglidae and of the genera *Trigla*, *Prionotus*, etc. Several species, called grunthers, sea-robins, sea-swallows, cuckoos, etc., are found in Amer. waters.

Gur'ney (SIR GOLDSWORTHY), KNT., b. in Eng. in 1793; was the inventor of the "lime light," the "magnesium light," the Bude and the oil-gas lights; also of the high-pressure steam-jet and the tubular boiler; in 1829 drove a steam carriage from Lond. to Bath over the turnpike road at a speed of 14 m. per hour. He claimed to have been the first to observe the deflection of the magnetic needle, the basis of the electric telegraph. Knighted in 1863. D. Mar. 1875.

Gurney (JOSEPH JOHN), b. at Earham, near Norwich, Eng., Aug. 2, 1788; became a preacher of the Society of Friends; was distinguished for labors in behalf of prisoners and of the abolition of slavery. His wealth was freely used in benevolent causes. He travelled in the U. S., the W. I., continental Europe, etc., prosecuting his charitable enterprises. D. Jan. 4, 1847. His biography was written by Ber-

nard Barton (*Memorial*, etc., 1847) and by J. B. Braithwaite. Wrote *Notes on Prison Discipline, A Winter in the W. I.*, etc. His doctrinal views led to the separation of the party called Wilburites from the Orthodox Friends in 1843.

Gurowski, goo-rov'skee, de (ADAM), COUNT, b. at Kalisz, the old Polish town, Sept. 10, 1805; was on several occasions imprisoned for his sympathy with the opponents of Rus. He was an instigator of the revolution of 1830, and remained in exile in Fr. after the insurrection was suppressed. In 1835 he pub. a work advocating Pan Slavism, and was in consequence recalled to Rus. and employed in the service of the emp. Here he remained till 1844, when he left Rus. on account of troubles at court, and went to Berlin; in the meantime he lectured at the Univ. of Berne, Switz., on political economy. In 1849 he came to U. S., and was a translator in dept. of state at Wash. 1861-63. D. May 4, 1866.

Gustavus I. Va'sa, b. at Lindholm May 12, 1496; entered the public service (1514) at a time of discontent with the Dan. domination; was one of the hostages sent in 1518 to warrant the safety of the Dan. king, and was treacherously sent in irons to Den.; escaped in 1519; listened to Luther's preaching, and became his correspondent; returned to Swe., where his father was killed in 1520; headed an insurrection of Dalecarlians in 1521; gained the battle of Westeraas (1521); was made administrator of Swe., of which he became king in 1523; openly professed Lutheranism in 1527, and in 1528 made it the state religion. His reign was a blessing to Swe. D. Sept. 29, 1560.

Gustavus III. Adolphus, b. at Stockholm Dec. 9, 1594 (O. S.); succeeded Charles IX., his father, Nov. 8, 1611; found the nation at war with Den., Poland, and Rus., the king of Poland, the lawful heir of the Swe. crown, having been set aside for being a R. Cath.; detached Den. from the alliance by a treaty in 1613; gained advantages over Rus., and forced the czar to a peace in 1617; overran Polish Prus., and was wounded at Dantzic; and though the Poles were sustained by the emp. Ferdinand, who let loose Wallenstein upon him, he made an advantageous truce of 6 yrs.; landed again at Usedom in 1630, and attacked the emp. in the Thirty Years' war. The battle of Leipzic, Sept. 7, 1631, Tilly's first defeat, the victories of Würzburg and the Lech (Apr. 10, 1632), where Tilly received his death-wound, established his fame. Wallenstein drew him into Sax., and the foes met at Lützen Nov. 16, 1632, where Wallenstein was defeated and G. was killed.

Gustavus III., of Swe., b. at Stockholm Jan. 24, 1746, succeeded his father, Adolphus Frederick, in 1771. His reign was disturbed by conspiracies, the machinations of the Hat and Cap factions, and wars with Den. and Rus.; he was a man of ability, but his disregard of the constitutional limits of his power bred discontent, and he was shot by Ankarstroem Mar. 29, 1792.—His son and successor, GUSTAVUS IV., b. Nov. 1, 1778, was robbed of Pomerania by Nap. and of Finland by the czar Alexander; was forced to abdicate in 1809, was succeeded by Bernadotte (Charles XIV.), and d. Feb. 7, 1837.

Gutenberg (HENNE OF JOHANN), b. at Mainz, Ger., about 1400; removed to Strasburg, where in 1436 he took several partners for the practice of secret arts by him invented. Of these arts, that of printing with movable types was the most important. No books were printed until after his partnership with Faust and Schöffer at Mainz in 1450. In 1465 he left the business and entered the court of the elector of Nassau. D. Feb. 24, 1468.

Guthrie (JAMES), LL.D., b. near Bardstown, Ky., Dec. 5, 1792, of Scotch origin; ed. at acad. at Bardstown; admitted to the bar in Louisville, Ky., where he soon built up a lucrative practice; represented Louisville several times in the legislature; was presiding officer of the convention which formed new const. of Ky. 1850; appointed sec. of the treas. by Pres. Pierce 1853-57; elected to the U. S. Senate 1865, but resigned on account of ill-health. D. Mar. 13, 1869.

Guthrie (THOMAS), D. D., b. at Brechin, Forfarshire, Scot., July 12, 1803, grad. at the Univ. of Edinburgh; studied med. in Paris; was settled at Arbirlot, in his native county, in 1830; in 1837 removed to Old Grey Friars ch. in Edinburgh, and in 1840 to St. John's, a new ch. built for him in the same city; in 1843 took a prominent part in the establishment of the Free Ch.; inaugurated in 1847 the Ragged School system; was moderator of the Gen. Assembly in 1862; was compelled to give up public speaking in 1864, when he began to edit the *Sunday Magazine*. He was an ardent Chr., an earnest philan. and social reformer, and a very brilliant orator. Among his humanitarian works are *A Plea for Drunkards* and *The City, its Sins and Sorrows*. He pub. also *Christ and the Inheritance of the Saints* and *The Way to Life*. D. Feb. 24, 1873. R. D. HITCHCOCK.

Guthrie Centre, Iowa. See APPENDIX.

Gut'ta-Per'cha the hardened milky juice of the *Isanodora Percha* or *I. Gutta*, a large tree, which grows in Malacca, Borneo, and other islands of the Indian Archipelago. The purified G.-P. has a brownish-red color and a specific gravity of 0.979. It becomes electrical by friction, and is a very poor conductor of electricity; hence it is used for forming insulating supports for electrical apparatus and for covering telegraph-wires which are to be immersed in water. At about 115° F. it softens and becomes pasty, without losing its tenacity. At 104° F. it may be easily spread out in sheets, drawn into tubes, applied to any surface, or worked into any desired form. It will take the finest impressions from a mould. It is used for water-pipes, mouldings, and, mixed with linseed oil, for the moulds employed in making electrotypes. It is insoluble in water, and but slightly soluble in alcohol and ether. Boiling olive oil dissolves a little of it, but deposits it again on cooling. It is readily soluble in bisulphide of carbon, benzol, chloroform, and oil of turpentine, especially when heat is applied. Alkalies and hydrofluoric acid have no action upon it. Bottles and other vessels for the latter acid are made from it. Oil of vitriol carbonizes it, and strong nitric acid converts it into a yel-

low resin. G.-P. is strongly attacked by ozonized oxygen and by strong hydrochloric acid. It rapidly deteriorates by oxidation when exposed to the air, especially in warm climates. It loses its flexibility, tenacity, and extensibility, and becomes very brittle and entirely useless for industrial purposes. Mixed with sulphur or certain sulphides, and heated to 260° or 300° F., the G.-P. undergoes a change similar to that which occurs during the vulcanizing of caoutchouc. (See INDIA RUBBER.) G.-P. is chiefly employed for coating submarine telegraph-wires. For this purpose it will probably be replaced by *kerite*, a preparation of India rubber which is not affected by the air. (See URE'S *Dict.* and MUSPRATT'S *Chem.*) C. F. CHANDLER.

Gut'ta Ro'sea ("rosy drop"), a name applied to skin diseases in which some of the sebaceous glands of the nose and face become the seat of inflammatory action. The name includes often those cases of *acne*, common among young persons as they are coming to yrs. of maturity. The wheals or tubercles which appear upon the faces of hard drinkers come under the same gen. name.

Guttif'era, a synonym for the Clusiaceae, a natural order of exogenous trees and shrubs, all tropical or sub-tropical, and sometimes epiphytic. Many of them have resinous and balsamic juices, and the fruits of some species are prized as food. Gamboge and tacamahac are products of the order, which has one representative species in Fla.

Gutzkow, goots'ko (KARL FERDINAND), b. in Berlin, Ger., Mar. 17, 1811; became an acknowledged head of the "Young Germany" party. His *Wally die Zweiflerin* (a novel, 1835) caused his imprisonment, its tendency being considered atheistical and destructive to social order. He afterward attained popularity as a novelist, dramatist, and journalist, but has been subject to occasional attacks of insanity. Wrote *Zur Philosophie der Geschichte*, *Uriel Acosta* (a tragedy), and *Die Ritter vom Geiste*. D. Dec. 10, 1878.

Gütz'laß (KARL FRIEDRICH AUGUST), b. near Stettin July 8, 1803; went in 1823 as a missionary to Singapore, and showed proficiency in the acquisition of langs.; went to Java, to Siam, and to Chi.; became interpreter of the Brit. legation; sustained himself without connection with any missionary society, and was beloved by the Chi., among whom he practised med. Among his works is a translation of the N. T. into Chi. D. Aug. 9, 1851.

Guyon, ge-on' (Mme. JEANNE MARIE BOUVIER DE LA MOTHE), b. at Montargis, Fr., Apr. 13, 1648. Severe penances, labors for the spiritual good of others, the abandonment of her property for the use of her children, led her to a state in which she believed herself to be the bride of Christ, united in soul with God, having daily and hourly communication with Heaven. She was much with one Lacombe, a Barnabite of mystical views, who was long her confessor, and who d. insane. She was (1688-89) confined as a Quietist in the Visitation convent of Paris, for the pope had condemned Quietism; was liberated through the agency of Mme. de Maintenon, and for a time lived at the Fr. court. She was (1695-1700) confined at Vincennes and in the Bastille, where she suffered many indignities. D. June 9, 1717. She left a considerable number of vols., some of them of a highly mystical character. (See *Life* by L'ham.)

Guyon (RICHARD DEBAUFFE), a gen. in the Hungarian army during the revolution of 1848-49, b. at Wolcott, near Bath, in Eng., Mar. 3, 1813. As soon as the revolution broke out he offered his services to the national govt., and accompanied Görgei as a brig.-gen. on his victorious march to Buda and on his unfortunate retreat to Temeswar. After this battle he escaped to Tur. Under the name of Kourschid Pasha he was gov. of Damascus, and during the Crimean war he organized the army of Anatolia. D. 1856.

Guyot, ge-ō' (ARNOLD HENRY), Ph. D., LL.D., b. near Neuchâtel, Switz., Sept. 28, 1807, ed. at Neuchâtel, Stuttgart, Karlsruhe, and the Univ. of Berlin, where he grad. Ph. D. in 1835; continued his studies in Paris 1835-39. Though at first a student of theol., he gave especial attention to the natural and phys. sciences. With Agassiz, his early associate, he accepted 1839 a professorship in the Acad. of Neuchâtel, and filled the chair of universal hist. and phys. geog. 1839-48; discovered the laminated character of the ice of glaciers, and the fact that the movement of the glacier is due to molecular displacement, mainly under the action of gravity. He then investigated the transportation of Alpine boulders around the Central Alps, determined for the first time the real limits of each erratic region in Switz., Savoy, and Lombardy, as well as the vertical limits of the phenomenon, and demonstrated the identity of the laws of the distribution of erratic debris with those of moraines of glaciers. He removed in 1848 to the U. S.; delivered (1849) the lectures pub. as the *Earth and Man*, which inaugurated the movement of reform in geographical teaching which has been since going on; became in 1855 prof. of geol. and phys. geog. in the Coll. of N. J., Princeton; is author of treatise on phys. geog. in *Johnson's Family Atlas of the World*. In 1873 his geographical works received medal of progress at Vienna Exposition, also a gold medal at Paris Exposition in 1878; was one of the eds.-in-chief of *J's Univ. Cyc.*, and finished his *Creation*, an elaborate representation of his philosophic views, shortly before his death, Feb. 8, 1884.

Guyton-Morveau (LOUIS BERNARD), b. at Dijon Jan. 4, 1737; devoted himself exclusively to the study of natural science, especially chem. During the Revolution he voted for the immediate execution of Louis XVI. D. Jan. 2, 1816. His chief merits as a chemist are his discovery of the disinfecting qualities of chlorine, made in 1773, and his establishment of a new and simpler chemical terminology. But his experiments and researches have also been of great influence in practical application of chemical science. Wrote *Méthode d'une Nomenclature chimique*, *Traité des moyens de désinfecter l'air*, etc.

Gwin (WILLIAM MCKENDRY), b. in Sumner co., Tenn., Oct. 9, 1805, ed. at Transylvania Univ.; studied med., and removed to Vicksburg, Miss.; became U. S. marshal 1833;

M. C. 1841-43; as com. of public buildings supervised the construction of the New Orleans custom-house 1847; went in 1848 to Cal.; was in the constitutional convention 1849; U. S. Senator 1859-61; was imprisoned for disloyalty 1861-63; took part in a scheme for colonizing Sonora with people of S. birth 1864-65.

Gwin'iad (Welsh, "white fish"), the *Coregonus fora*, a lake-fish of N. Europe, closely resembling the white-fish of the Amer. lakes.

Gwynnett' (BURTON), b. in Eng. about 1732; emigrated to Charleston, S. C. in 1770, and became engaged in agriculture (1772). He took an active part in the political questions of the time during the Revolution, was elected by the gen. assembly of the province a rep. to the gen. Cong., and was a signer of the Dec. of Ind. He was killed in a duel by Gen. McIntosh, May 27, 1777.

Gwynn (NELL). See APPENDIX.

Gyges, g'jēz, the founder of the dynasty of the Mermnadae in Lydia about 716 B. C., was the favorite of King Candaules. Urged by the king, who boasted of the beauty of his wife, G. concealed himself in the bed-chamber of the queen in order to see her naked, but was discovered. The queen, indignant at the affront offered her, gave him the choice of being put to death himself or of killing her husband. He chose the last, and became king. D. 678 B. C.

Gymnasium [Gr. γυμνάσιον, from γυμνός, "naked"], properly designates a place for athletic exercise, but in anc. Gr. the gymnastic schools became also places for lounging, for study, and for oral instruction. Thus, the G. finally became a school. But except in Ger. and some other European countries the name has reverted to its original sense. In Ger. the gymnasia are the schools where young men are fitted for the univs.

Gymnastics [Gr. ἡ γυμναστική (τέχνη), from γυμνός, "naked"], the systematic exercise of the muscles for the preservation or restoration of health and the development of the phys. powers. Hardly any other nation ever put the gymnastic art so thoroughly in practice as did the anc. Grs. All free-born youths were exercised systematically in the gymnasium; in the Doric states even young women took part in the exercises. Rome borrowed the Gr. phys. culture, but only in her later days. In the Middle Ages knightly and rustic pastimes, tournaments, wrestling, boxing, archery, etc., took, to some extent, the place of the old phys. culture. Modern G. originated early in the 19th century in Prus. Ger., Scandinavia, and Fr. adopted them for schools and for the soldiery, and in all these countries private enthusiasm did much for the cause. The upper and middle classes of G. Brit. have given a place to G. In the U. S. there is an awakening of interest in the subject.

Gymnocladus [γυμνός, "naked," and κλάδος, a "branch," referring to the absence of small boughs], a genus of the order Leguminosae, of a single species, the *G. Canadensis*, called coffee tree, stump tree, and chicot. In winter it appears as if dead, from the absence of small branches. Its wood is valuable to the joiner and furniture-maker, and the seeds have been used for coffee.

Gymnosophists [Gr. γυμνοσοφισταί, "naked philosophers"], a name given by the Grs. of Alexander's time to the Fakirs of India.

Gymnotus Electricus. See ELECTRICAL FISHES.

Gypsies. It has been assumed that the G. first appeared near the N. Sea in 1417, but recent research indicates that small bands of them had long before this date been found in Europe, and that great numbers of them had been living in Gr. in all probability as early as the 11th century. In 1417 hordes of them suddenly appeared in Ger. In 1422 they appeared in Bologna, headed by a "duke of Egypt," declaring that Hungary was their original country, the king of which having conquered them in battle had sent them on a 7 years' penitential pilgrimage. From a description of their hair, color, and ornaments they were evidently low-caste Hindoos. The first G. did not profess to come from Egypt, but the name Egyptian having been applied to them, it was soon corrupted to G. But from the beginning they were universally called Gingari or Chingani, varied in It. to Zingari, in Sp. to Zincali, in Ger. to Zigeuner. Among themselves they never say gypsy, but always *Rommany*. There exist in India several kinds of wandering pariahs or outcasts, which are identical in all respects with G.

It is said that the G. began to gather in Eng. about 1512. In 1549 they were included in a search made through Sussex for all "vagabonds, gypsies, conspirators, prophesiers, players, and such like." During the reign of Henry VIII. a fine of £40 was imposed on every G. entering Eng. Acts for their suppression being useless, it was made felony without benefit of clergy for any person above 14 yrs. of age to keep company with them. There are now but a few hundred full-blooded *tent-gypsy* persons in Eng., but of *káirengroes*, or house-dwellers, who keep their G. blood a secret, and of half-breeds (*churedi* or *posh an posh*), there are perhaps 20,000. It has been asserted that there are no G. in Amer., but there are in reality more than in G. Brit., and in fact those of other countries are here in great numbers. Many peddlers and a very large proportion of the itinerant cutlers and tinkers in Amer. cities are Ger., Hungarian, or Fr. G. Many of the fortune-telling women in our cities are half-blood G. Within a few yrs. the number of wandering *tent-G.* has largely increased in Amer., many of whom roam from Canada to Tex. [From *orig. art. in J's Univ. Cyc.*, by CHARLES G. LELAND.]

Gyp'sum [from the Gr. γύψος] is a mineral, the natural bihydrated calcium sulphate, crystallizing in the monoclinic system. The translucent crystalline varieties are known as selenite; the ordinary massive forms and opaque crystals, as G.; the finer granular sub-translucent massive kinds, as alabaster, and fibrous varieties, as satin-spar. Heated, it gives off its contained water, and becoming opaque falls to a powder, which has the power, if moistened, of rapidly "setting" or assuming again the solid form. Upon this

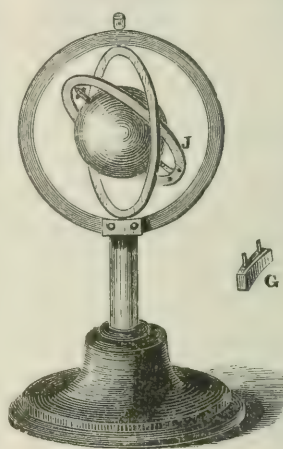
property depends the most extensive application of this mineral in the arts. It is also used as a fertilizer and in the manufacture of glass and porcelain. Alabaster, being of great beauty and easily carved, is extensively used for ornamental purposes. In the U. S., G. is recorded from a great number of localities, more or less extensive beds having been met with in Va., Tenn., Mich., etc., and it constitutes one of the wonders of the Mammoth Cave, Ky. Perhaps the most celebrated G.-beds in the world are those of Montmartre, near Paris, which have given rise to the name "plaster of Paris." These quarries furnished to Cuvier the materials upon which he based his observations on the philosophic hist. of life on the earth.

Gyr'falcon, the most highly esteemed of the noble falcons used in hawking. The name is also spelled *gerfalcon* and *jerfalcon*. Several races of the *Hierofalco gyr'falcon* occur in the arctic region of both hemispheres.

Gyro-Pigeon. See PIGEON, GYRO.

Gyroscope, jī'ro-skōp [Gr. γύρος, a "ring" or "circle," and σκοπεῖν, to "view"], a word first applied, as is believed, by Foucault to that form of the instrument designed by him to show ocularly the rotation of the earth; it became thereafter the received name for the curious instrument sometimes known as the "mechanical paradox." It illustrates "a particular case of the rotational motion of ponderable bodies"—viz. that case in which such a body is a rapidly rotating solid of revolution, held by, but free to move about, a fixed point in its axis of figure and rotation. Poisson (*Mé. Analytique* and *Journal de l'école Polytechnique*, cah. 16), at the conclusion of his analytical investigation of this "particular case," remarks: "There is to be seen in many philosophical cabinets a machine of Bohnenberger which exhibits with fidelity all the circumstances of this rotational motion, just as Atwood's machine gives ocular illustration

FIG. 1.



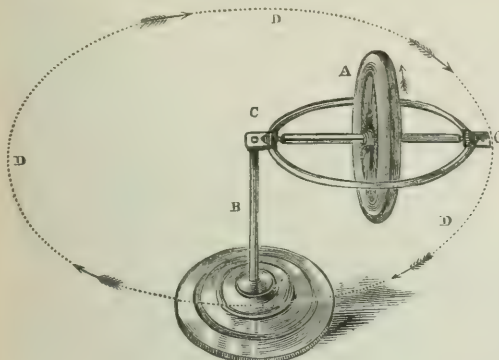
Bohnenberger Machine.

of all the circumstances of the motion of falling bodies." This (Bohnenberger) machine (Fig. 1) was first described in the *Völkungen blätter für Naturwissenschaft*, etc., 1817, and also in Gilbert's *Annalen*, vol. 1x., p. 60, and is the oldest, the prototype, of gyroscopic instruments. Designed, probably, to illustrate the precession of the equinoxes, and consisting merely of a spherical or spheroidal body so balanced in gimbals that its axis is free to take any direction, it is well fitted to illustrate—first, the stability of direction of the axis of rotation of a solid of revolution possessing high rotary velocity (this may be done by placing the instrument on the revolving disk of a centrifugal machine; the axis of the rotating sphere will continue invariable, or nearly so, in direction); second, by attaching the small weight G. to the inner ring J near one of the extremities of the axis of the rotating spheroid, a preponderance is established tending to tilt (or pull down) that extremity, but actually causing a slow horizontal gyration or precessional motion.

In 1831 (see *Am. Jour. Sci.*, vol. xxi. 1832), Prof. Walter R. Johnson of the Univ. of Pa. invented a machine to which he gave the name of "rotascope," and which, possessing all the qualities comprised within the narrow scope of the Bohnenberger machine, afforded the means for curiously illustrative experiments in which it has not really been equalled in any subsequent invention. It is not within the compass of this paper to enumerate these experiments, or even minutely to describe the instrument. Reference must be made to the vol. just cited, and to an interesting lecture by Prof. Snell printed in the *Annual Report of the Regents of the Smithsonian Inst.* for 1855. It is sufficient to remark that with the combined wheel and inner ring, disconnected from the other parts, all the characteristic experiments of the common and popularly known "gyroscope" were exhibited by Prof. Johnson. By this latter instrument (Fig. 2) we have the phenomena which, "though so directly due to the fundamental laws of mechanics, seem to exhibit so utter a violation of them," presented in their paradoxical form; whereas there is in the exactly balanced or slightly overpoised spheroid of the Bohnenberger machine nothing of this apparent violation of fundamental laws—nothing which so perplexes, and even to scientific observers, seems at first sight to invoke "some new and hitherto unknown mechanical principle, or some modification of those already admitted." The rotascope of Prof. Johnson seems to have remained for many yrs. as little known as had been the Bohnenberger machine; something was needed to make it an object of gen. attention, which seems to have been found in the novel and startling applications, by Foucault, of the Bohnenberger machine and the pendulum, to the ocular exhibition of the diurnal rotation of the earth. Neither Poisson, who, in his solution, already referred to, of "a particular case of rotational motion, etc.," prepared the way to a complete analysis of the G., and who in reference to the pendulum investigated the motions of bodies near the surface of the rotating earth; nor Laplace, who, in the remarkable words, "Though the rotation of the earth is now established with all the certainty that belongs to the phys.

sciences, nevertheless a *direct proof* of the phenomena could not fail to be highly interesting to geometricians and astronomers," seemed to desiderate some ocular demonstration—neither of these great analysts caught the clew which their own researches offer to the invention of such an ocular exhibition. It was reserved for the greatest genius in this sphere of invention of modern times, the late Léon Foucault, to furnish to the eye the "direct proof" desiderated by Laplace, by means of the "freely suspended" pendulum, and again, and independently, by means of the G.

FIG. 2.



Gyroscope.

The G. in its common form, and the phenomena which it exhibits (Fig. 2), are now so familiar to every one as to need but few descriptive words. The wheel or circular disk A of the instrument having, by well known means, been put in motion with very great velocity, the bearing-point C of the ring in which the disk and axis are mounted is placed on the point of an upright support B. Not only does the rotating disk (with its ring) *not* fall, as would happen were there no rotation, but, preserving the angular elevation of its axis, it takes up a slow horizontal angular motion (gyration) in the reverse direction to that in which, by rotating, the upper periphery of the disk is moving—*e. g.* the disk in the figure revolves as marked by the arrow near its top; its *gyration* is as the arrows along the indicated horizontal circle D. If the direction of disk-rotation be reversed, so will be that of the gyration. It will be found also that the *rate of gyration* is the same for all elevations of the axis, and that the greater the rotating velocity of A the *slower* will be the gyration—that as (by friction and the resistance of the air) rotatory velocity is lost, the *gyratory* velocity increases simultaneously, with a gradual drooping of the outer extremity of the axis, which, with continually accelerated gyratory velocity, falls in a descending spiral (or helix), until finally the bearing C, if not prevented, escapes (slips off) from its point of support. Still more puzzling and paradoxical is that phase presented by placing the wheel (rotating with *very* great velocity) on the point of support with axis considerably elevated. Instead of falling (as it gyrates) the axis will *rise*. A full analytical exposition of these phenomena cannot be attempted here. They will be found discussed with sufficient fullness under the same title in *J.'s Univ. Cyc.*

J. G. BARNARD.

H.

H, a consonant, the 8th in order of the letters of our alphabet. Ordinarily, it is a simple aspiration or rough breathing in our lang. In some words it is silent. With *t* it forms 2 digraphs, *th* soft and hard. With *c* it forms 3 such digraphs, and with *g* 1; *gh* being, however, in Eng. ordinarily a *g* pronounced as if hard, when from position, without the *h*, it would be soft. **H** in chem. stands for hydrogen.

Haarlem, city of the Netherlands, on the Spaarne. It is well built, with several interesting buildings, as St. Bavon's Kerk, with its famous organ. It has many collections of consequence to science and art, considerable manufactures, and is the centre of the trade in flowers, bulbs, and flower-seeds. Close by is the beautiful Haarlem-Hout, with the royal palace, Welgeleue, a summer resort for people from H. and Amsterdam. It has a R. Cath. and a Jansenist bp. Pop. 42,083.

Haarlem Lake, Hol. (no longer existing), was contiguous to the city of that name. A map of the date of 1531 shows within the area afterward covered by it 4 small lakes and 3 v.; the combined area of the lakes was about 15,000 acres. In 1591 one of these v. had disappeared, and in 1647 the other 2 and the 4 lakes had united into one. Its dimensions continued to increase by encroachment on the bordering land, and in the early part of the century had acquired an area of 45,000 acres. With such an area, and a perimeter of more than 30 m., every tempest caused new encroachments, and the danger to some of the adjacent regions became very great. In 1839 the Dut. govt. inaugurated the great work, finally completed in 1852, of draining the lake, the hist. of which forms one of the most interesting narratives of engineering works of that kind. J. G. BARNARD.

Habakkuk [Heb. "loving embrace" or "embracer"], the 8th of the 12 minor prophets of the O. T. Apparently he was a Levite, and he is thought to have prophesied during the reign of Josiah (639-609 B. C.), Delitzsch supposes about the yr. 630 or 629 B. C. As Nahum denounces the Assyrians, who had already crushed the kingdom of Israel, so H. denounces the Chaldeans, who are about to crush the kingdom

of Judah. The 3d chap. is one of the sublimest compositions ever penned. *The Hist. of Bel and the Dragon*, an apocryphal addition to the book of Dan., is, in the Septuagint, ascribed to "Habakkuk, the son of Joshua, of the tribe of Levi," thought by some to be identical with the prophet.

Habeas Corpus [Lat. "You may have the body"], in law, a writ issuing out of a court of justice, or awarded by a judge in vacation, with the view of bringing a person before the court or judge to be dealt with according to law. There are several writs passing by this name with words added, more specifically to denote their application, such as: (1) *Habeas corpus ad faciendum et recipiendum*; (2) *ad prosecutendum*; (3) *ad respondendum*; (4) *ad satisfaciendum*; (5) *ad subjiciendum*; (6) *ad testificandum*. The office of the first of these is to remove, on the application of a defendant, a cause from an inferior to a superior court; of the second, to remove a prisoner to be tried within the jurisdiction where an alleged act was committed; of the third, on the part of a suitor, to remove a cause of action to a higher court; of the fourth, after judgment, to charge a person in a superior court, with process of execution; of the fifth, to bring up a person detained by another, with a view of inquiring into the cause of detention; and of the sixth, to bring a witness who is in custody at the time of a trial into court. Of these the last two are much the most important. The fifth, as above enumerated, is the great writ of *habeas corpus*, of so much importance to the liberty of the individual both in Eng. and in this country. The residue of this article will be confined to this writ, with the exception of a few words as to the *habeas corpus ad testificandum*.

The writ of H. C. is called in the Eng. law a "writ of right." By this is meant that the party in confinement, on making a proper case, is entitled to it. It is, accordingly, only issued on a proper foundation of proof. It is necessary that there should be an affidavit and motion for an allowance of the writ. When these steps are taken, the right of the prisoner is fixed. The writ is said to be based on the well known clause in Magna Charta that "no freeman is to be deprived of his life, liberty, and property except by the judgment of his peers and the law of the land."

I. At the common law the writ issued from the court of king's (or queen's) bench, not only while the court was in session (or in "term-time"), but also in the vacation, by an order from one of the justices. In the latter case it was made returnable either before the judge who issued it or before the full court. The other great common-law courts (*viz.* the common pleas and exchequer) did not originally have gen. power to issue the writ, but only in special cases. It was supposed at one time that the lord chancellor had no power to grant the writ in vacation, though the law is now settled to the contrary. For the purpose of furnishing a more complete remedy, the famous H. C. act was passed (31 Car. II. c. 2). This act is frequently termed "Lord Shaftesbury's act," its enactment having been due largely to the exertions of that distinguished statesman. Legislation in gen. in the U. S., while following the spirit of the Eng. act, is not confined to commitments on criminal charges, but is more comprehensive in its character, and extends beneficial provisions to all arrests and detentions on any grounds or pretenses whatsoever. There is a clause in the U. S. const. and in State const. to the effect that "the privilege of the writ of *habeas corpus* shall not be suspended unless when, in cases of rebellion or invasion, the public safety may require it."

II. The gen. scope and office of the writ is to bring before a court or judge the question whether the person in whose behalf it is issued is lawfully detained. The cases coming before the court, etc. will be divisible into 2 prin. classes, one where the person is simply detained without any legal process, and the other where he is in custody under such process. The first class of cases is illustrated by that of a contest between a father and a mother as to the custody of a child. There being no legal process in such a case, there must be an inquiry embracing the merits of the whole controversy for the sake of determining to whom the custody of the child shall be awarded. Wholly different considerations occur when the detention is upon legal process.

III. *Procedure*.—Application for the writ must be made by petition signed by the party or some one in his behalf. In the well known case of *Ashby v. White*, in Parl. it was resolved "that every Englishman who is imprisoned by any authority whatsoever has an undoubted right, by his agents or friends, to apply for and obtain a writ of *habeas corpus* in order to procure his liberty by due course of law." A father claiming the custody of an infant child may himself apply for the writ. Statutory provisions in some States lead to the view that if the petition is properly drawn, the writ must be granted, even though there is good reason to believe that it would be without practical effect; in other words, it must be granted where there is but slight apparent ground for asking for it. The form of petition is also in some States prescribed by statute. It may be directed to any one who has the prisoner in custody or who has participated in the illegal detention. The writ is made returnable at a specified time and place, either before the officer who issues it, at chambers, or to the court as such. On the hearing of the case, the prisoner, if the circumstances require it, may be discharged, or may be remanded to the original custody. The decision does not, as it would seem, necessarily prevent the hearing of the matter again upon a new writ, particularly where the circumstances of the case have changed.

IV. Conflicts of jurisdiction have arisen frequently in executing writs of H. C. between the State and the Federal courts. The principles that should apply to the subject have recently been expounded by the final interpreter of the U. S. const. the supreme court (*Twiss's Case*, 13 Wallace Reports, 397). It is there said that no State judge has a right to issue a writ of H. C. for the discharge of a person held under the authority of the Federal govt. If it do not appear, upon application for such a writ, that the person is

so held, the State judge may inquire into the circumstances of the case as to how the prisoner is held, and the marshal in whose custody the party is should give the requisite information. The proper course in such a case is that the U. S. officer upon whom the writ is served should produce the body of the prisoner before the State court and set forth in what manner he holds him under the authority of the U. S. The State court or judge should go no farther.

V. The power of the U. S. courts to issue the writ is more limited than that of the State courts, being confined to the exercise of such authority as is either expressly or by implication conferred by the U. S. const. and the laws made under its provisions. The courts and judges of the U. S. are authorized to issue the writ in cases coming within Federal jurisdiction.

A word is added as to the writ *ad testificandum*. This is resorted to for the purpose of bringing up a person who is in custody to testify in some cause or other matter pending judicially. When his testimony is given in, he is returned to the custody from which he is taken. The writ is obtained upon motion based upon an affidavit setting forth the facts upon which the application is founded. A legislative body, e. g. the House of Reps., desiring the attendance of a witness at the time in custody, simply executes its will by the warrant of its speaker, giving authority to its sergeant-at-arms to produce the prisoner. The writ of *habeas corpus ad testificandum* cannot in such case be used. T. W. DWIGHT.

Habersham (COL. JOSEPH), b. at Savannah, Ga., July 28, 1751; was eminent throughout the Revolutionary war, and at its close held the rank of lieutenant. He became speaker of assembly in 1785, and again in 1790; was appointed P. M. gen. by Washington in 1795. D. Nov. 17, 1815.

Habersham (RICHARD W.), b. in Savannah, Ga., in 1786, grad. at Princeton, N. J., in 1805; rose to distinction at the bar in his native city; was M. C. 1839-43; was greatly lauded for resigning the office of U. S. dist. atty. in 1825, when there was a threatened collision between the Federal administration of John Quincy Adams and the State administration of George M. Troup. D. Dec. 2, 1846.

Hackberry, Sugar-berry, or Nettle Tree, the *Celtis occidentalis*, a N. Amer. tree, singularly variable in its mode of growth. Its wood is tough, makes good charcoal, and when young is used for barrel hoops, and sometimes called hoop-ash. The genus (*Celtis*, order Ulmaceæ) contains several foreign trees of considerable importance.

Hackel or Haeckel (ERNST HEINRICH), b. at Potsdam, Ger., Feb. 16, 1834; devoted much attention to biological questions, and in 1865 received the regular professorship of zoology at Jena, which he has since retained, his lectures having rendered that univ. a famous school for biological science. H. was one of the first Ger. savants to recognize and accept Darwinism, a theory toward which his own researches had long been leading him. Among his prin. works are *Generelle Morphologie der Organismen*, *Natürliche Schöpfungsgeschichte*, *Biologische Studien*, and *Die Kalkschnecken*.

Hackensack, R. R. centre, cap. of Bergen co., N. J., on the Hackensack River, 13 m. from New York and 6 m. from Paterson; has gas and water-works and several factories. Pop. 1870, 4929; 1880, 4248.

Hackett (HORATIO BALCH), D. D., LL.D., b. at Salisbury, Mass., Dec. 27, 1808, grad. from Amherst Coll. in 1830; studied theol. at the Andover Sem. until 1834; prof. of Lat. in Brown Univ. 4 yrs.; was elected to the chair of biblical lit. in the Newton Theological Institution (Bap.) in 1839; prof. of N. T. Gr. in Rochester Theological Sem. 1870; translated and enlarged Winer's Chaldaic gram.; pub. a Heb. gram. and reader, *Commentary on Acts*, and *Chr. Men in the War*; edited also Rawlinson's *Historical Illustrations of the O. T.* (Amer. reprint). D. Nov. 2, 1875.

Hackett (JAMES HENRY), b. in New York Mar. 15, 1800; d. at Jamaica, L. I., Dec. 28, 1871; studied a yr. at Columbia Coll. and studied law for a short time; tried business without success, and in 1826 attempted the stage, appearing first at the Park Theatre. For 25 yrs. he was popular in Eng. and the U. S. In 1849 he was joint manager with William Niblo of the Astor Place opera-house, and in 1854 took part in the management of the Grisi and Mario opera troupe in their visit to Amer. Mr. H. was a comedian of much versatility. He introduced Yankee characters with great effect, but his highest excellence was shown in the humorous characters of Shakespeare, especially in Falstaff, which he made his own. His talent, however, was not for comic parts exclusively, as his admirable performance of King Lear proved. In his later yrs. Mr. H. seldom appeared before the public.

O. B. FROTHINGHAM.

Hackettstown, R. R. junc., Warren co., N. J., on the Musconetcong River, $\frac{1}{2}$ m. from the highest point in N. J. The Morris Canal passes through it. It contains the Newark M. E. Conference Sem. Pop. 1870, 2202; 1880, 2502.

Hackländer, von (FRIEDRICH WILHELM), b. at Bertscheid, near Aix-la-Chapelle, Nov. 1, 1816. In 1841 pub. *Bildern aus dem Soldatenleben*, and shortly after *Wachstumbenabenteuer*. He then accompanied Baron von Taubenheim on a trip to Ar. to buy horses, and pub. in 1842 *Daguerreotypes taken in the Orient*, which recommended him to the crown prince of Württemberg, whom he accompanied through It., Fr., and Rus. In 1850 he pub. a large novel or romance, *Handel und Wandel*, and in 1854 another, *Europäisches Sklavenleben*. In 1857 he founded, in connection with Zoller, *Feber Land und Meer*. D. July 5, 1877.

Hackley (CHARLES W.), math. and astron., b. in Herkimer co., N. Y., Mar. 9, 1809, grad. at U. S. Military Acad.; prof. of math. in Columbia Coll. 1843-57, and prof. of astron. in same from 1857 till his death. Author of several mathematical works. D. Jan. 10, 1861.

Hackmatack, Tam-arack, or American Larch (*Larix Americana*), a forest tree of the U. S., growing frequently in wet places, and attaining a noble size, except in the far N., where it is a stunted shrub. It is our only native

coniferous tree whose leaves fall off in winter. Its wood is prized in the W. for poles and rafters; in ship-building it is used for ship's knees, top-timbers, and spars; if fastened with square iron is far better than oak for such uses.

Had'dock, *Melanogrammus aeglefinus*, a fish of the cod family, captured in large quantities on both sides of the Atlantic for food. It resembles the cod, but is easily distinguished by the black line along its side, that of the cod being white.

Haddock (CHARLES BRICKETT), D. D., b. at Franklin, N. H., June 20, 1796, grad. from Dartmouth Coll. in 1816 and from Andover Sem. in 1819. Prof. of rhetoric and belles-lettres at Dartmouth Coll. 1819-38, also of intellectual philos. and political economy at same coll. 1838-54. Was *chargé d'affaires* to Port. 1851-55; was a member of the N. H. legislature 4 yrs., where he introduced and carried through the present common-school system of the State; was the originator of the R. R. system in N. H. D. Jan. 15, 1861.

Ha'des [Gr. Ἅδης, ἄδης], in the Homeric writings (as in *Il.* xv. 188), is used as the name of the god of the lower or invisible world, and is the equivalent of Pluto. In later Gr. writings it is used to designate the place of departed spirits. The corresponding Heb. word is *Sheol*, which in our Eng. version is sometimes rendered "grave," sometimes "pit," and sometimes "hell." *Hades* is almost always employed by the LXX. in translating *Sheol*. It occurs 11 times in the N. T., and in our authorized Eng. version is rendered "hell," except in 1 Cor. xv. 55, where it is rendered "grave."

Hadj [Ar. "pilgrimage"], the pilgrimage to Mecca which every Mohammedan is under obligation to perform at least once, unless poverty or sickness forbid. The hadji or pilgrims often perform a great part of the journey by ship; others travel in great caravans, of which there are 4 regular ones—one from Cairo, consisting largely of Berbers; one of Turks from Damascus; one of Pers. from Babylon; and a fourth of Indians, Arabs, and others from Zibith. Arrived at Mecca, a routine of ceremonies is performed. These ceremonies, and the pilgrimage itself, were adopted by Mohammed from the old Ar. customs, which had become thoroughly established ages before his time.

Hadley (JAMES), LL.D., b. at Fairfield, Herkimer co., N. Y., Mar. 30, 1821. His father was prof. of chem. in a med. inst. established there. Entering the junior class in Yale Coll., he grad. in 1842. From 1843 to 1845 he was a theological student in New Haven, serving as tutor in Middlebury Coll. meanwhile (from Sept. 1844 to Apr. 1845); was tutor at Yale from 1845 to 1848, when he was appointed associate prof. of Gr.; succeeded Dr. Woolsey as full prof. in 1851. In addition to his mastery of the Gr. lang., he was well versed in Heb., Arabic, Armenian, Sans., Welsh, Gaelic, Irish, and the prin. modern langs., including Swe. His *Gr. Gram.*, based on that of Curtius, was pub. in 1860. In 1873 a posthumous vol. of 12 lectures on *Rom. Law* was edited by Ex-Pres. Woolsey, and in the same yr. another vol. of 20 *Philological and Critical Essays* was edited by Prof. Whitney. D. Nov. 14, 1872.

Hadramaut [the *Aframita* of Strabo], in a narrow sense designates the S. W. portion of Ar. Felix, but in a large sense it includes nearly all that part of Ar. S. and S. E. of the central desert of the peninsula. The coast-land is low, the interior dry, and broken with ranges of mts. and hills. In the valleys there are some torrents, which are often dry. Its people are of many tribes.

Hadrian, or Adrian (PUBLIUS ÆLIUS HADRIANUS), Rom. emp., b. at Rome Jan. 24, 76 A. D.; was proclaimed emp. after Trajan's death 117; gave up the country E. of the Euphrates to the Parthians, and made Armenia independent; appeased the discontent of the people consequent upon the suppression of a conspiracy by the remission of all arrears in taxes and debts due the state, and by large gifts of money to the people; passed a large part of his reign in travels throughout the empire, redressing wrongs, confirming disputed privileges, inspecting the troops and the fortifications. During one of these progresses the wall of Hadrian from the Tyne to the Solway was constructed (119 A. D.). In 132 the revolt of the Jews broke out, which was not ended till Pal. was almost depopulated. Athens was a favorite residence of the emp. He rebuilt Jerusalem (134), returned finally to Rome in 135, spending a great part of his declining yrs. in his splendid villa near Tibur. He d. at Baïæ July 10, 138 A. D. H.'s name is one of the most illustrious in the imperial annals.

Hadrosau'idæ [Gr. ἄδρως, "thick," "stout," and σαύρος, a "lizard"], a family of fossil reptiles from the Amer. Cretaceous, belonging to the order Dinosauria. The fore limbs were small, the hind ones much larger, and supporting the body. The feet were digitate, the anterior 5-toed, the posterior 3-toed; the teeth were in several rows on the sides of the jaws, and formed with use a tessellated grinding surface, but were absent in front. The genus *Hadrosaurus* is the prin. Amer. rep. It was first made known in 1858 by Dr. Leidy, who described portions of a skeleton found at Hadronfield, N. J., under the name of *Hadrosaurus Foulkii*.

Hæmatemesis [Gr. αἷμα, "blood," and ἐμεῖν, to "vomit"]. Vomiting of blood or hæmorrhage from the stomach is the result chiefly of ulcer of the stomach, cancer of the stomach, or extreme inflammation or congestion of the stomach, as when caused by corrosive irritants, excess of alcoholic drinks, or the presence of serious disease of the liver. Hæmorrhage from the stomach is treated by perfect rest on the back, cold packs over the stomach, bits of ice swallowed, preventing the swallowing of food or drink for some time, feeding by the rectum or cautiously by the mouth. Opiates or other anodynes may be given by the rectum or hypodermically to check the tendency to vomit.

Hæmatite, or Specular Iron Ore, one of the most common ores of iron, distinguished by its color into red and brown H. It does not attract the magnet. These ores are composed chiefly of peroxide of iron, and are very important sources of metallic iron.

Hemoptysis (Gr. *haima*, "blood," and *πναισις*, "spitting"), the expectoration of blood from the vessels of the lungs or from the mucous membrane of the thoracic air-passages. H. occurs in pulmonary consumption, in heart disease, etc. It is sometimes vicarious in cases of suppressed menses. The significance of H. in any case can only be estimated by the trained diagnostician. A distinction is to be observed between H. from the congested mucous membrane of the air-passages (the blood issuing from many points in the congested surface, which is not lacerated) and the far more formidable *pneumorrhagia*, when the flow is from a vessel opened in the course of pulmonary disease. It is believed by some good observers that cases of consumption which are characterized by a decided tendency to H. are as a rule slower in progress and less rapidly fatal than other cases are. The remedies usually administered for H. are dilute sulphuric acid, ergot, gallic acid, lead-acetate, opium, turpentine, common salt, and other hæmостatics. Perfect quiet of mind and body is to be sought. Sometimes obstinate hæmorrhage is stayed by the free opening of a vein in the arm, which seems marvellously to divert the flow from its former course. Ice to the chest and the swallowing of lumps of ice is often effective. WILLARD PARKER.

Hæmorrhage. See BLEEDING.

Hæmorrhage from the Lungs. See HEMOPTYSIS.

Hæmorrhage from Stomach. See HEMATEMESIS.

Hæmorrhoids. See PILES.

Hâfiz, *hâfiz* SHEMS-UD-DIN MOHAMMED, was born at Sheeraz in the beginning of the 14th century. The historical notices of his life are very scanty. When the Timur Lang (Tamerlane) had subjugated the prov. of Fars he sent for the poet, and called him to account for having made free with his (the conqueror's) dominions in a well known verse which says, "For the black mole on thy cheek I would give Samar-cand and Bokhara." H. replied, "Yes, sire, and it is such reckless extravagance that has made me poor as I am." Tamerlane was so pleased with his ready wit that he bestowed on him a magnificent mark of his favor. Here and there a few records of his life may be extracted from passages in his works; as, for instance, the tragical end of Abu Ishak, the usurping prince of Sheeraz. H. d. 1389, and was buried in a garden near Sheeraz; a white marble monument was erected over the tomb, which is still an object of veneration to numerous pilgrims. The free-thinking expressions in his poems brought him into disfavor with the clerical party, who hesitated about according him Moslem burial. The poems of H. consist for the most part of *ghazals*, short odes consisting of from 5 to 15 verses each, with the same rhyme throughout. Such a collection of poems is called a *Diwân*, and the *Diwân* of Hâfiz is the name under which his works are known. H. is esteemed the greatest lyrical poet of Pers. He belonged to the religious order of dervishes called Sûfis, the cult of which is a religion of beauty, where heavenly perfection is considered under the imperfect type of earthly loveliness. He aims at elevating mankind by the contemplation of spiritual things through the medium of the most impressionable feelings. The charms of visible objects are enthusiastically described by him, but as he refers all love and beauty to the Deity, it is easy to extract an allegorical meaning from the most passionate of his utterances. *From orig. art. in J. S. Univ. Cyc.* by PROF. E. H. PALMER.

Hag, a name for species of myxine, lamprey-like fishes, without eyes, and with an opening upon ventral aspect.

Hagenbach (KARL RUDOLPH), D. D., the son of a prof. in the Univ. of Bâle, b. May 4, 1801; studied at Bâle, Bonn, and Berlin; in 1823 became adjunct prof. of theol., and in 1828 full prof. at Bâle. He was a firm Prof., but a man of catholic temper. His most important works are *Encyclopædie und Methodologie der theologischen Wissenschaften*, *Lehrbuch der Dogmengeschichte*, translated by BRUNN, revised and enlarged by PROF. HENRY B. SMITH, and *Vorlesungen über die Kirchengeschichte von der ältesten Zeit bis zum 19. Jahrhundert*. *Ger. Rationalism* is a translation by GAGE and STUCKENBURG. D. June 7, 1874.—His father and his 2 brothers, JOHANN JAKOB and EDUARD, were distinguished naturalists.

Hagerstown, R. R. centre, city, and cap. of Washington co., Md., 20 m. N. W. of Harper's Ferry and 6 m. N. of the Potomac River. Pop. 1870, 5779; 1880, 6927.

Haggada (Heb. "narration"), a name applied to the great body of Heb. and Chaldee legends, often poetical, and designed to be expository of the Scriptures, or of human duty. The Haggadoth are not regarded as authoritative in their teachings. Their total amount is very great, and they have never been entirely printed.

Hag'gai (Heb. *Chaggai*, "the festal one," from *chag*, "festival"), in the Apocrypha and Vulgate AGEES, the 10th of the 12 minor prophets of the O. T., and the first after the Babylonian captivity. Chronologically, he follows Jer., Ezek., and Dan. The rebuilding of the temple, which began under Zerubbabel in 535 B. C., had been arrested by the hostility of the Samaritans. In 520 B. C., the second yr. of Darius Hystaspis (521-486 B. C.), H. roused his disheartened and sluggish countrymen to a resumption of the work. His 3 messages were delivered in the 6th, 7th, and 9th months (Sept., Oct., and Dec.) of that yr. His 3d message contains a striking Messianic prediction, which is referred to in Heb. xii. 26. H. is supposed by some critics to have written also a part of the book of Ezra. In the Rom. martyrology Hosea and H. are reckoned among the saints. R. D. HIRCHCOCK.

Hag'ner (PETER V.), b. Aug. 1815, at Wash., D. C., grad. at the Military Acad. in 1836, and was assigned to the 1st Artill. He served in the Fla. war 1836-37, and on the Niagara frontier until July 1838; in the war with Mex. he was attached to the "siege-train company of ordnance" of Gen. Scott's army; visited European arsenals and laboratories, under orders of the sec. of war, 1848-49 (report pub. with Ex. Doc. 1850); member of ordnance board from 1854 to 1860; in May 1861 was assigned to the duty of ordering, inspecting, and purchasing arms and ordnance stores, and in Mar. 1862 was appointed by Sec. Stanton member of commission on ord-

nance and ordnance stores; was inspector of all factories making small-arms for the govt. under contract from July 1862 to Dec. 1863; was placed in command of Watervliet Arsenal. Member of ordnance boards in 1863, 1868, and 1870, of board for the trial of breech-loading small-arms in 1866, and of the board for selecting a breech-system for muskets and carbines 1872-73; became col. of ordnance Mar. 7, 1867; brevet brig.-gen. Mar. 13, 1865. Retired June 1, 1881.

Hague, *bag*, *at The Hague* (Dut. *de Gravenhage*), city of the Netherlands, cap. of the prov. of S. Hol., and the residence of the king and seat of the states-general. It is a handsome city, but has no trade and no manufactures of consequence. Many of its streets are intersected by canals, with rows of linden trees on both sides, and spanned by elegant bridges. Among its notable buildings are the ch. of St. James, built in 1308, famous for its hexagonal tower with a chime of 38 bells; the national museum and the palace of the prince of Orange, containing large collections of works of the Dut. school of painting; the Gevangenpoort, the Binnenhof, and the Buitenhof, old places of striking arch., and interesting on account of their connection with the hist. of the country. A short distance from the city lies, to the N., the Huis in 't Bosch, a royal summer-palace, containing some of the finest frescoes and paintings by Rubens, and to the S., the castle of Tyswyck, where the treaty was signed in 1697. Pop. 127,331.

Hahn (MICHAEL), LL.B., b. in Bavaria, Ger., Nov. 1830; obtained his education at New Orleans; he studied law, was M. C. 1862-64, and gov. of La. 1864-68; received the degree of LL.B. from the Univ. of La.

Hahnemann SAMUEL CHRISTIAN FREDERIC, M. D., b. at Meissen, Sax., Apr. 10, 1755, the inventor of homœopathic med., when 20 yrs. old, went to Leipzig to enter the Univ. Being compelled to support himself, he became a teacher in Eng., Fr., and It., and was making translations from those langs. Among the Eng. works he was engaged in translating was Cullen's *Materia Medica*. The explanation proposed by that author of the action of Peruvian bark in certain fevers induced H. to undertake a series of experiments with that drug. The result of these trials was the confirmation of an opinion which previous observations had already led him to entertain of the existence of a gen. law of drug-action, which would give a scientific basis for therapeutics. This principle is expressed by the maxim *Similia similibus curantur* (or similars are cured by similars), and constitutes the fundamental doctrine of the homœopathic method. No public declaration was made by H. of his new views until 3 or 4 yrs. later, the interval being occupied with his investigations. In 1796 he pub. in *Hufeland's Journal* the first partial exposition of his doctrine, in an essay "On a New Principle for ascertaining the Remedial Powers of Medicinal Substances." The nature of these opinions attracted hostile criticism from the profession. Several phys. of repute, however, adopted his views, and assisted him in his experiments and by collecting the results of homœopathic clinical experience. In 1810 H. pub. an exposition of his system (*Organon of Homœopathic Medicine*), of which numerous eds. in various langs. have since appeared. In 1821 H. accepted the protection of the duke of Anhalt-Cöthen, who made him state councillor and court phys. In 1835, when 80 yrs. of age, he married his second wife, a Fr. lady, Mlle. d'Hervilly, and by her persuasion he was induced to remove to Paris. In that cap. he met with great success, and for 8 yrs. practised his profession. D. July 2, 1843. *From orig. art. in J. S. Univ. Cyc.* by H. D. PAINE, M. D.

Hai'duk, Hajduk, or Hayduk, the Magyar inhabs. of the dist. of Hajdu Kerület in E. Hungary. They are Calvinists, and descendants of Bockskay's soldiers. From 1605 to about 1700 they were free from taxation and had the privileges of nobles. They are chiefly agriculturists, and are estimated to number 70,000. The name signifies "shepherds;" sometimes designates the militia of the country, and not unfrequently is incorrectly applied to menial attendants at Ger. courts.

Haight (REV. BENJAMIN I.), S. T. D., LL.D., b. in New York Oct. 16, 1809, grad. at Columbia Coll. 1838, and at the Gen. Theological Sem. 1831; ordained same yr., and became first rector of St. Peter's ch., New York; was rector of St. Paul's ch., Cin., 1834-37; in 1837 accepted the rectorship of All Saints' ch., New York, which he retained for nearly 9 yrs.; acted as prof. of pastoral theol. and pulpit eloquence in the Gen. Theological Sem. 1837-55. His connection with Trinity parish commenced in 1855, and in 1874 he was elected assistant rector. He was appointed a delegate from the diocese of N. Y. to the Gen. Conventions of 1868, 1871, and 1874. In 1873 he was elected bp. of the diocese of Mass., but was obliged, from failing health, to decline that high honor. He was sec. of the diocese of N. Y. for 20 yrs., and for more than 10 yrs. a member of the standing committee of that diocese. He held the office of trustee of Columbia Coll. from 1843. D. Feb. 21, 1879.

Haight (HENRY HUNTLEY), gov. of Cal. 1867-71, b. at Rochester, Monroe co., N. Y., May 20, 1825; grad. from Yale Coll. in 1844; studied law, was admitted to the bar in St. Louis Oct. 1846, and afterward settled in San Francisco, Cal., 1850. D. Sept. 2, 1878.

Hail. The precipitation of the vapor in the atmosphere, when it occurs at a low temperature, takes place in a solid form, as snow, sleet, or hail. The word sleet is applied to the smallest hailstones, comparable in size to drops of water, and falling at the close of a rain or snow storm. While snow descends in crystalline flakes whose weight is but a few grains, H. frequently occurs weighing an ounce, and in exceptional cases 1 or 2 lbs. Such hailstones are formed of crystalline and amorphous masses of ice, the latter generally of lenticular or spherical shape. Their structure suggests that they have been formed by a process of rapid crystallization and accretion at temperatures a little below the freezing-point, and as snowflakes are smallest when formed slowly at low temperatures, and largest when formed

rapidly at temperatures near the freezing-point, so hailstones are largest when formed most rapidly, and have in gen. as their origin large snowflakes or snowballs; these latter being carried upward by the violent ascending currents attending summer thunder-storms (and to whose mechanical cooling the precipitation is originally due), begin their fall, in the course of which the snowball is converted into a semi-crystalline mass of ice inclosing many air-bubbles, and, rotating rapidly, grow by the addition of such particles of vapor as lie near their path. [From orig. art. in *J. s. Univ. Cyc.* by PROF. CLEVELAND ABBE.]

Hailes (Sir DAVID DALRYMPLE), LORD, b. at Edinburgh Oct. 28, 1726, grandson of Viscount Stair; became a Scot. advocate 1748, a judge of the court of session 1766, and as such assumed the title of Lord Hailes, but was never a peer; became a lord of justiciary 1776. D. Nov. 29, 1792. Author of *Canons of the Scot. Ch.*, *Annals of Scot.*, *Remains of Chr. Antiquity*, etc.

Hailes (JOHN) of Eton. See HALES (JOHN).

Hailey, Id. See APPENDIX.

Haimu'ra, an excellent food-fish of the upper parts of the rivers of Guiana, the *Erythrinus macrodon*.

Hainan, hi-nahn', island of Chi., in the Chi. Sea, just outside the Gulf of Tonquin. Its area is estimated at 12,000 sq. m., its pop. at 1,500,000 Chi., beside wild tribes in the interior. The W. coast is low and surrounded by shoals and banks, but fertile and productive. The interior is mountainous, mostly covered with forests. The coast is rocky, but has good harbors. Here is situated Kiang-Choo, the southernmost Chi. port open to foreigners. It is said to have 200,000 inhabs.

Haines (DANIEL), b. in New York Jan. 6, 1801, grad. at Princeton 1820; was admitted to the bar 1823, and settled at Hamburg, Sussex co., N. J.; in 1837 entered public life as a member of the council (now called senate); in 1843 the legislature made him gov. and chancellor for the usual term of 1 yr.; was re-elected gov. in 1847 for a term of 3 yrs.; in 1852 was appointed one of the judges of the supreme court, and served for 14 yrs.; was also, *ex officio*, a member of the court of error and appeals. From 1870 to 1876 was a member of several judicial commissions relating to State boundaries and municipal affairs of Jersey City and Paterson; was influential in establishment of insane asylum at Trenton, home for disabled soldiers at Newark, and reform school for juvenile delinquents at Jamesburg; was a com. to National Prison Reform Cong. at Cin. in 1870. At time of death he was the oldest trustee of Princeton Coll. D. Jan. 26, 1877.

Hair, Diseases of. See BALDNESS; BARBER'S ITCH.

Hair-Worm. See GORDIIDE.

Haji. See HADJ.

Hake, a name applied to the species of *Mertucius*. *M. biliniaris* is caught along the N. Amer. Atlantic coast, and *M. vulgaris* in Europe. The name is more generally given in the U. S. to species of *Phycis*, or fork-beard.

Hakim Ben-Ali'ah, or Ben-Hash'em, an Ar. impostor of the 8th century, also known under the name of MOKANNA ("the veiled") and SEGENDÉ NAH (the "moon-maker"). The former of these surnames he received from his wearing a veil before his face in order to hide his ugliness, or, as he said himself, in order to conceal the radiance of his eyes; the latter from a trick of legerdemain he once performed, causing a moon to issue from a well and remain visible for a week. He succeeded in gathering a number of adherents, with whom he seized several strong places. The caliph Mahadi marched against him, and soon all his strongholds were taken. Shut up in the last of his fortresses, he poisoned his soldiers by wine at a banquet, and burned himself up, in order to make people believe that he had ascended bodily to heaven. Moore has used the story of his life for "The Veiled Prophet of Khorassan" in *Lalla Rookh*.

Hakluyt, hak'loot (RICHARD), b. in Lond. in 1553, studied at Ox. He was master of arts and prof. of divinity when in 1584 he accompanied the Eng. ambassador to Paris, and he pub. an account of a voyage to Fla. by Laudonniere, which he found in the library, and also Peter Martyr's work, *De Novo Orbe*. But the greater part of his reputation he owes to his *Prin. Navigations, Voyages, Traffiques, and Discoveries of the Eng. Nation*, in which are found accounts of 220 voyages. D. 1616.

Hakoda'di, town of Japan, on the island of Jesso, at the foot of the southernmost promontory Tzagar. It has a good harbor, and has become important as one of the Japanese ports open to foreigners. Pop. 28,825.

Hal'acha [Heb. the "rule"], the Heb. oral and traditional law, handed down, as Jews conceive, from Moses and other eminent teachers of antiquity, and first reduced to writing in the early centuries of the Chr. era. The gen. code is called Mishna, but the H. is much more extensive.

Halberstadt, town of Pruss., on the Holzemme. Its cathedral, built in the 13th century, is in the finest Gothic style; the ch. of Our Lady, built in the 11th century, is in the Byzantine style. Pop. 1881, 31,260.

Halcyon. See KINGFISHER.

Hal'dane (JAMES ALEXANDER), brother of Robert, b. at Dundee, Scot., July 14, 1768; became a mariner, and master in 1793 of an E. I. Co.'s ship; retired in 1794 from business; was for more than 50 yrs. minister of the Tabernacle, a Bap. chapel, Leith Walk, Edinburgh; travelled in Scot., and engaged in religious labors. Wrote *The Social Worship of the First Chrs. and Inspiration of the Scriptures*. D. Feb. 8, 1851.

Haldane (ROBERT), D. of Scot. parents in Lond. Feb. 28, 1764; served 1780-83 in the royal navy; was converted to Christianity, of the divine origin of which he had entertained doubts, and devoted his life and large fortune thenceforth to missionary work. His field preaching aroused great religious feeling in Scot., but in 1800 the Gen. Assembly interfered with his work, and H. in consequence joined the Baps. He built many "tabernacles," did much for the Afr. and Fr. missions, and for Bible and continental societies. Wrote *Evidence and Authority of Revelation*. D. Dec. 12, 1842.

Hal'deman (SAMUEL STEHMAN), LL.D., b. near Columbia, Pa., in 1812, pursued his studies at Dickinson Coll. until 1830; was assistant in the N. J. geological survey (1836), and the ensuing yr. in the Pa. geological survey. He discovered there the oldest fossil known at that time—viz. *Scodithus linearis*; prof. of nat. hist. in the Univ. of Pa. 1851-55, and in Del. Coll. 1855, and in the same yr. became prof. of geol. and chem. at the Agricultural Coll. of Pa.; then prof. of comparative philology in Univ. of Pa. Wrote numerous articles on conchology, entomology, and palæontology. His *Analytic Orthography*, which consists of investigations into the philos. of lang., obtained for him in Eng. the highest Trevelyan prize over 18 competitors (1858). He was one of the associate eds. of *J. s. Univ. Cyc.* D. Sept. 10, 1880.

Hale (BENJAMIN), D. D., b. at Newbury, Mass., Nov. 23, 1797, grad. from Bowdoin Coll. 1818; studied theol. at Andover Sem., and began preaching in 1822; was elected prin. of the Gardiner Lyceum 1822-27; became prof. of chem. and mineralogy at Dartmouth Coll., Hanover, N. H., 1827-35; took orders in the P. E. Ch.; was chosen pres. of Geneva (now Hobart Free) Coll. in 1837. Author of *Scriptural Illustrations of the Liturgy*. D. July 15, 1863.

Hale (DAVID), b. at Lisbon, Conn., Apr. 25, 1791; went to Boston in 1809, and engaged in mercantile business in 1815; in 1827 became associate ed. of the New York *Journal of Commerce*, and in 1828 became associated with Gerard Hallowell as proprietor of that journal. He was a prominent Dem. politician. D. Jan. 20, 1849.

Hale (EDWARD EVERETT), D. D., b. in Boston, Mass., Apr. 3, 1822, ed. at the Boston Lat. School and at Harvard Coll.; studied divinity in private; entered the ministry of the Unit. sect.; was settled at Worcester, Mass., in 1846; became minister of the S. Congl. ch. of Boston in 1856. Wrote *Sketches of Chr. Hist.*, *In His Name, Our New Crusade*, etc. He was ed. of the *Chr. Examiner*, the organ of the Unit. body, and founded in 1869 *Old and New*, a monthly semi-theological magazine whereof he was sole ed.

Hale (EUGENE), b. at Turner, Me., June 9, 1836; was admitted to the bar in 1857; was 9 yrs. atty. for Hancock co., Me.; was in the legislature 1867-68; elected to Cong. 1868, and thrice re-elected; has taken a prominent part in national affairs, and in 1874 declined the P. M.-generalship. He was elected U. S. Senator Jan. 19, 1881.

Hale (JOHN PARKER), b. at Rochester, N. H., Mar. 31, 1806, grad. from Bowdoin Coll. Me., 1827; was admitted to the bar in 1830; became a member of the N. H. legislature 1832, M. C. 1843-45, U. S. Senator 1847-53 and 1855-65, and U. S. minister to Sp. 1865-69. Candidate of the Free-Soil party for Pres. in 1852, receiving 157,680 votes. D. Nov. 19, 1873.

Hale (Sir MATTHEW), b. at Alderley, Gloucestershire, Eng., Nov. 1, 1609; read law 1629-36, and was called to the bar at Lincoln's Inn; entered Parl. 1654, and was 1654-58 a judge of common pleas under Cromwell; was in the Convention Parl. 1660; was knighted and made chief baron of the exchequer 1660; was chief-justice of the king's bench 1671-76. Wrote *Hist. of the Pleas of the Crown*, *An Abstract of the Chr. Religion*, and *The Knowledge of Christ*. He was the last Eng. judge who condemned persons accused of witchcraft. D. Dec. 25, 1676.

Hale (NATHAN), b. in Coventry, Conn., June 6, 1755, grad. at Yale Coll. 1773; intended for the ministry, he yet devoted a time to teaching at E. Haddam and at New London; after the battle of Lexington he joined the army as lieut., and was soon after appointed capt. Among his exploits was the capture of a Brit. sloop, in Sept. 1776, loaded with provisions, from under the guns of a frigate in New York harbor. After the defeat of our army on L. I. and its subsequent retreat therefrom, Washington was extremely anxious to obtain information of the strength, plans, and situation of the enemy, and H. volunteered to undertake the perilous task. He possessed himself of full knowledge of the situation, but on returning was discovered by the enemy, with his notes upon his person, and being recognized was hanged as a spy, by order of Sir William Howe, on the morning of Sept. 22, 1776. His Life was pub. by Stuart.

Hale (NATHAN), LL.D., b. at Westhampton, Mass., Aug. 16, 1784, grad. at Williams Coll. 1804; removed to Boston, and in 1810 was admitted to the bar; purchased (Mar. 1814) Boston *Daily Advertiser*, the pioneer daily in N. Eng.; was one of the founders of the *N. Amer. Review*, also of *Chr. Examiner*; often member Mass. legislature. D. Feb. 9, 1863.

Hale (SALMA), b. at Alstead, N. H., Mar. 7, 1787; studied law, and was clerk of the superior and co. courts of Cheshire for 22 yrs.; was M. C. in 1817-19, and a member of the legislature 1823-25. Wrote *Hist. of the U. S.*, *Annals of Keene*, etc. D. Nov. 19, 1866.

Hale (SARAH JOSEPHA BUELL), b. at Newport, N. H., Oct. 24, 1790. She issued in 1823 her first work, *Genius of Oblivion*, and *Other Original Poems*. She became editress of the *Ladies' Magazine* (1828), which was united with *Godey's Lady's Book* in 1837. Wrote *Dict. of Poetical Quotations*; *Woman's Record*, or *Biographical Sketches of all Distinguished Women from the Creation to the Present Time*, and *New Household Receipt Book*. D. Apr. 30, 1879.

Hales (ALEXANDER OF), surnamed *Doctor Irrefragabilis*, b. probably (date not known) at Hales, in Gloucestershire, Eng. Hence his name, Alexander *Halenensis*. After studying a while at Ox., he went to Paris in 1222, and joined the Franciscans. In 1230 he was made prof. in the Univ. He was the first of the Schoolmen to make a thorough use of Aristotle. Very shortly Aristotle supplanted Plato. A. of H. commented on Aristotle, as also on the Ps. and the Apocalypse. His great work was *Summa Universæ Theologiæ*, in 4 books (God, Creation, Redemption, Sacraments), based on the *Sentences* of Lombard. He first developed the doctrine of a *Thesaurum Meritorum*. D. Aug. 27, 1245.

Hales (JOHN), M. A., "the ever-memorable" b. at Bath, Eng., Apr. 19, 1584; entered of Corpus Christi Coll. Ox. 1597; became a fellow of Merton 1606, of Eton 1613; prof. of Gr. at

Ox. 1612; went to the Synod of Dort 1618; converted to Arminianism; canon of Windsor 1630; was an irenic or latitudinarian, and one of the oldest of the Broad Ch. school, hence denounced as a trimmer; chiefly remembered for his *Golden Remains*, written in a vigorous style, but hardly worthy of his fame for ability. D. May 19, 1656.

Hales (WILLIAM, D. D.), an Irish divine, who became fellow of Trinity, Dublin, in 1769; prof. of Oriental langs. 1782; rector of Killesandra 1787. Wrote *New Analysis of Chronology*, *Prophecies regarding our Lord*, *Primitive Brit. Ch.*, etc. D. Jan. 30, 1831.

Halevy, ah-lä'v, JACQUES FRANÇOIS ÉLIE FROMENTAL, b. in Paris May 27, 1799, of Jewish parentage; studied successfully at the Conservatoire, and was a favorite pupil of Cherubini; was enabled to spend 2 yrs. in It., having won a first prize for composition. There his opera *Pygmalion* was written; this was followed by others (*Phidias*, *The Artisan*), which had a local reputation. The opera *La Juive* was the foundation of his fame; it was first produced in 1835. Other well known works are *The Queen of Cyprus*, (*Charles V.*), *The Queen's Musketeers*, *The Wandering Jew*, *The Tempest*, *Valentine d'Aubigny*, and *The Sorceress*. He produced some 30 operas in all, tragic and comic. He was a talented and cultivated composer, also a writer on musical topics. Louis Philippe and his family conferred distinction on him; he was made "professeur de haute composition" at the Conservatoire, member and perpetual sec. of the Acad. of Fine Arts, officer of the Legion of Honor. D. Mar. 17, 1862.

O. B. FROTHINGHAM.

Halevy, (LÉON), son of Jacques Fromental Halevy, b. in Paris Jan. 14, 1832, author of many works on lit., philos., hist., foreign langs., etc. Wrote *Literary, Philosophical, and Industrial Opinions*; *Summary of the Hist. of Fr. Lit.*, and many plays.

Halevy (LÉONOVIC), son of Jacques Fromental Halevy, b. in Paris in 1834, one of the most popular authors of light plays of the Fr. stage. He has written nearly all the librettos of Offenbach. Among the works of H. the following are the best known: *Opheé and Entend*, *La Belle Hélène*, *Blue Beard*, *La Vie Parisienne*, *La Grande Duchesse de Gérolstein*, *Frou-frou*. His collaborator is H. Meilhac.

Halford (Sir HENRY), BART., M. D., b. at Leicester, Eng., Oct. 2, 1766 (named VAGHAN in youth); was made a baronet 1800; was a court-phys., and one of the most popular phys. in Lond.; was made knight commander of the order of Guelphs 1825. Among his works are *Essays and Orations*, *The Death of Some Eminent Persons*, and *Naga Metrice*. D. Mar. 9, 1844.

Haliburton (THOMAS CHANDLER), D. C. L., b. at Windsor, Hants co., N. S., in 1797, ed. at King's Coll., Windsor; was called to the bar in 1820; practised for a number of yrs. in N. S., and became subsequently judge of the court of common pleas. Wrote *The Clockmaker*, or *Sayings and Doings of Samuel Slick of Slickville*; also pub. *Trails of Amer. Humor*. D. Aug. 27, 1865.

Halibut, the *Hippoglossus vulgaris*, a large fish of the family Pleuronectidae, sometimes found to weigh more than 600 lbs. It inhabits the N. Atlantic and Pacific oceans. The Amer. fishermen catch it especially on the Banks of Newfoundland in the winter season.

Halicarnassus (Ἀλικαρνασσός, now *Bodrum*), a Gr. city of Caria, on the Ceramian Gulf, once belonged to the Dorian Hexapolis, but afterward became the great centre of Per. influence, and fell under the power of a line of Carian princes, vassals of the Pers., of whom Mausolus was the most celebrated. Though Gr. in lang. and culture, it was Per. in politics. Alexander was unable to take its citadel, but destroyed the rest of the town. It never regained its greatness. The village of *Bodrum* occupies its site, and former excavations have revealed abundant relics of its former splendor.

Halifax, town of Eng. on the Hebble. Its carpet-works are the largest in the world, and its manufactures of woolen and worsted rank next to those of Leeds and Bradford. Pop. 1881, 73,630.

Halifax, the metropolis of N. S. and the prin. naval station and arsenal in Brit. Amer., was founded in 1749. It is on the W. side of Chebucto Bay, one of the best harbors in the world, and easily accessible by R. R. Commanded by a hill on which is a strong fort, the town is protected seaward by many batteries armed with guns of the newest pattern and heaviest calibre. It has an Anglican bp. and a R. Cath. abp. Pop. 1881, 36,100.

Halifax (CHARLES MONTAGUE), EARL OF, b. Apr. 16, 1661, at Horton, Northamptonshire, and ed. at Cambridge; entered the House of Commons during the Convention Parl., and was appointed first lord of the treas. in 1698. His 2 most famous measures were the foundation of the Eng. national debt in 1694 and the establishment of the Bank of Eng. in 1695. In 1699 he was made Baron H., but was impeached by the House of Commons, and escaped only by the protection of the House of Lords. During the reign of Queen Anne he took part in the negotiations for the union between Scot. and Eng. and for the succession of the house of Brunswick. On the accession of George I. he was made premier, but d. soon after (May 19, 1715).

Hall (BASIL), b. in Edinburgh, Scot., 1788; entered the royal navy 1802, became post-capt. 1817. His prin. works are *A Voyage to the W. Coast of Corea and the Great Loo-Choo Island*, *Travels in N. Amer.*, etc. D. Sept. 11, 1844.

Hall (CHARLES FRANCIS), b. in 1821 at Rochester, N. H.; became a blacksmith, but removed to Cin., where he was a stationer and journalist. Becoming deeply interested in the fate of Sir John Franklin, he sailed in 1860 from New London, Conn., in ship George Henry, Capt. James Buddington, the expedition being fitted out chiefly at expense of Henry Grinnell of New York; in 1862 he returned; after publishing his *Arctic Researches* in 1864, he sailed again for the N. in the Monticello, Capt. James Buddington, again at the expense of Mr. Grinnell; returned in 1869, bringing

many undoubted relics of the Franklin party. In 1871 he sailed on his third expedition in the steamer *Polaris*, fitted up by the U. S. govt. for polar exploration, but d. Oct. 10, 1871, in Greenland. After great privations and many dangers the *Polaris* was abandoned; a portion of her crew under Capt. Tyson drifted away on floating ice, from which they were rescued by the steamer *Tigress* Apr. 30, 1873, after floating 195 days; the remainder constructed boats, put to sea, and were picked up, June 23, 1873, by a whaler, and carried to Dundee, Scot.

Hall (FREDERICK), M. D., LL.D., b. at Grafton, Vt., 1780, grad. at Middlebury 1803; tutor in Middlebury Coll. 1805-06, prof. of natural philos. and math. 1806-24; prof. of chem. in Trinity Coll., Conn., and Columbian Coll., D. C., and pres. of Mt. Hope Coll., Md. D. July 27, 1843.

Hall (GORDON), one of the first missionaries of the A. B. C. F. M., b. in Tolland, Hampden co., Mass., Apr. 8, 1784, and grad. at Williams Coll. in 1808. He studied theol. at Andover; was ordained, and set apart to the foreign missionary work with his brethren and colleagues, Messrs. Nott, Rice, Judson, and Newell, Feb. 6, 1812, at Salem, and in the same month sailed on his mission to India. He reached Calcutta in Aug., but the E. I. Co. refused to allow him and his fellow-missionaries to remain. He then succeeded in getting a foothold in Bombay, where he labored with absorbing devotion and great success. He revised the *Mahratta N. T.* D. Mar. 20, 1826.

Hall (HILAND), LL.D., b. at Bennington, Vt., July 20, 1795, the son of a farmer; was admitted to the bar in 1819; served in the Vt. legislature, and became State's attorney; was M. C. 1833-43, a judge of the supreme court of Vt. 4 yrs., 2d comptroller of the U. S. treas. 1850, land com. of Cal. 1851-54, gov. of Vt. 1858-60. Wrote *Hist. of Vt.*

Hall (JAMES), LL.D., b. at Hingham, Mass., Sept. 12, 1811, studied under Amos Eaton in the Polytechnic Inst. of Troy, N. Y., 1831-36; became in 1837 one of the State geologists of N. Y., and in 1843 was appointed State palæontologist; became prof. of geol. in the Polytechnic Inst. of Troy. Author of the *Nat. Hist. of N. Y.* and of the *Palæontology of N. Y.*; became in 1855 State geologist of Ia., and afterward served upon the State survey of Wis., and has done much work upon the U. S. surveys in the far West.

Hall (JOHN), D. D., of Scot. descent, b. in the co. of Armagh, Ire., July 31, 1829; entered Belfast Coll. at the age of 13; repeatedly won the Heb. prize; was licensed to preach in 1849, going as a missionary into the W. of Ire.; in 1852 became pastor of the First Presb. ch. in Armagh, and in 1858 was called to the ch. of St. Mary's Abbey, now Rutland Square, in Dublin. By royal appointment he was com. of education for Ire. In 1867 he came as a delegate from the Presb. Ch. in Ire. to the Presb. chs. in the U. S., and soon after returning to his native land was summoned to take charge of the Fifth Avenue (19th st.) Presb. ch. in New York, over which he was installed Nov. 3, 1867. In 1875 a splendid ch. edifice was erected for him on the corner of Fifth Avenue and 55th st. As a clergyman he magnifies his office and emphasizes the great facts and doctrines of the gospel. He has pub. *Family Prayers for Four Weeks*, *Questions of the Day*, and *God's Word through Preaching*; the latter comprises the lectures delivered before the students in the theological dept. of Yale Coll.

R. D. HITCHCOCK.

Hall (JOSEPH), D. D., "the Christian Seneca," b. at Ashby-de-la-Zouch, Leicestershire, July 1, 1574; became dean of Worcester 1617; went in 1618 to the Synod of Dort; was consecrated bp. of Exeter 1627; translated to Norwich 1641; was imprisoned for 6 months in the Tower by the Puritans 1642. Wrote *Mundus alter et idem*, *Contemplations* (on the O. and N. T.), *Virgilemianum Liber* (a collection of satires), *Epistles*. D. Sept. 8, 1656.

Hall (Dr. LYMAN), a signer of the Dec. of Ind., b. in Conn. 1725, grad. at Yale Coll. 1747; settled near Sunbury, Ga., in 1752; was elected to Cong. from Ga. 1775-79, and in 1783 made gov. of that State. D. Oct. 19, 1790.

Hall (MARSHALL), M. D., b. at Basford, Notts, in 1790; passed M. D. at Edinburgh in 1812. Dr. H.'s observations in clinical med. and the physiology of the nervous system, and his well known method for the restoration of asphyxiated patients, placed him in the front rank of the med. men of his century. Author of *The Circulation of the Blood*, *The Nervous System*, and *Therapeutic Principles of Med.* D. Aug. 11, 1857.

Hall (NATHANIEL), b. in Medford, Mass., Aug. 13, 1805; was destined for a business-life; entered a store in Boston at the age of 16, then an insurance office as sec.; at 24 devoted 2 yrs. to preparation for the study of divinity; entered the school at Cambridge 1831, grad. in 1834, and was ordained Unit. minister of the First parish in Dorchester 1835. Mr. H. was the author of about 30 published discourses. He was an earnest abolitionist, a warm philan., a broad thinker, and a devoted pastor. He received from Harvard Coll. the honorary degree of A. M. D. Oct. 19, 1875. O. B. FROTHINGHAM.

Hall (NATHAN K.), b. at Marcellus, Onondaga co., N. Y., Mar. 28, 1810; studied law with Millard Fillmore, and in 1832 became his partner at Buffalo, N. Y.; was M. C. 1847-49, U. S. P. M.-gen. 1850-54, and a judge of the U. S. dist. court for W. N. Y. D. Mar. 2, 1874.

Hall (Rev. NEWMAN), LL.B., b. May 22, 1816, grad. at Univ. of Lond.; was 1842-54 a Congl. pastor in Hull, and in 1854 became minister of Surrey chapel, Lond.; after the war of 1861-65 visited the U. S. to allay the popular bitterness toward G. Brit. Wrote *Thousandth Annual*, *Notes of a Journey from Liverpool to St. Louis*, etc.

Hall (ROBERT), b. at Arnsby, Leicestershire, Eng., May 2, 1764, ed. at the Bristol Coll. and at King's Coll., Aberdeen, where he passed with first honors 1784. He served as a tutor in the Bristol Acad., and was also assistant pastor of the Broadmead Bap. chapel; took a pastorate at Cambridge 1791; was pastor of a ch. in Leicester 1807-26, and then again pastor of the Broadmead chapel, Bristol, until his death, Feb. 21, 1831. Mr. H. was one of the first of Eng. preachers. (See his *Works*, with a memoir by OLINTHUS GREGORY.)

Hall (SAMUEL CARTER), b. at Topsham, Devonshire, in 1802; entered upon his literary career as a parliamentary reporter for the *London Times*. In 1824 he established the *Amulet*, an illustrated annual, and has since edited many illustrated books, as *Book of Gems*, *Brit. Ballads*, *Baronial Halls*, *Ivry*, etc. He has been the ed. of the *London Art Journal* since 1839. His *Trials of Sir Jasper*, a temperance poem, proved very popular. In 1824 he married ANNA MARIA FIELDING, b. at Dublin in 1805, who has achieved a literary name of her own by her *Sketches of Irish Character, Lights and Shadows of Irish Character, Stories of Irish Peasantry*, etc. She d. Jan. 30, 1881.

Hall (WILLIAM W.), M. D. b. at Paris, Ky., in 1810, grad. at Centre Coll. 1830, and took his med. degree at Transylvania Univ. 1836; practised med. 15 yrs. in the South; removed to New York; began in 1854 to publish *Hall's Journal of Health*. Author of *Health by Good Living*, *Cholera, Bronchitis and Kindred Diseases*, etc. D. May 10, 1876.

Hallam (HENRY), LL.D., D. C. L., F. R. S., b. at Windser, Eng., in 1777. His early contributions to the *Edinburgh Review* gave him a wide fame as a liberal thinker. Wrote *Europe during the Middle Ages*, *Constitutional Hist. of Eng.*, and *Introduction to the Lit. of Europe*. D. Jan. 21, 1859.

Halle, town of Prus., on the Saale. The vicinity is rich in salt-springs, and the inhabs. around these springs form a peculiar race in features, character, and customs; they are supposed to be of Wendish or Celtic origin. The univ. (founded in 1694), with which that of Wittenberg (founded in 1502) was united in 1817, has ranked high, especially in theol. Pop. 1880, 71,484.

Hallack (FITZGEREENE), a poet, b. at Guilford, Conn., July 8, 1790. His mother was a descendant of the missionary John Eliot. He studied in the acad. of his native town, and in 1811 became and long remained a clerk in the house of Jacob Barker of New York. Was afterward (1824-49) employed by J. J. Astor, who named him a trustee of the Astor Library. In 1849 returned to Guilford, Conn., where he d. Nov. 19, 1867. *Twilight*, *Fanny*, and *Marco Bozzaris* are among his poems. (See his *Life* by J. G. Wilson.)

Halleck (HENRY WAGER), LL.D., b. at Waterville, Oneida co., N. Y., Jan. 16, 1815, grad. at W. Pt. July 1, 1839; entered the army as second lieutenant of engineers, and retained at W. Pt. as assistant prof. of engineering till June 1840, and for a yr. subsequently was assistant to a board of engineers at Wash., D. C. From Wash. he was transferred as assistant in charge of the construction of fortifications in New York harbor, where he remained till 1846, except while absent in 1845 on a tour of examination of public works in Europe. On his return he delivered a course of 12 lectures on the science of war before the Lowell Institute at Boston, which were pub. under the title of *Elements of Military Art and Science*, a second ed. of which, with large additions, including notes on the Mex. and Crimean wars, was issued in 1861, and largely used as a manual during the c. war. Early in the Mex. war he was sent to the Pacific coast, where he bore an influential part up to the time that Cal. was admitted as a State. Resigned in Aug. 1854, and devoted himself to the practice of law in Cal., continuing as director-gen. of the New Almaden quicksilver-mine, which position he had held since 1850. Early in 1861, at the solicitation of Lieut.-Gen. Scott, H. was appointed maj.-gen. of the regular army, and assigned to the command of the dept. of the Mo. In Mar. 1862 the depts. of Kan. and O. were added to his command, the whole constituting the dept. of the Miss., including the terr. between the Alleghany and the Rocky Mts. After the battle of Shiloh, H. took the field and moved on Corinth, and on May 27 appeared before that fortified city. Preparations were made on the 28th and 29th for an attack, but on the morning of the 30th it was found that Beauregard had evacuated this stronghold during the previous night. After the campaign of Corinth, H. was called to Wash. as gen.-in-chief, and exercised that command until the grade of lieutenant was revived. He then continued under assignment as chief of staff of the army until transferred to the command of the military division of the James in Apr. 1865. Upon the termination of the war he was ordered to the military division of the Pacific, assuming command Aug. 1865, and Mar. 1869 was transferred to that of the South, which he retained till his death. Among the more important of his works may be mentioned his great treatise on *International Law, or Rules Regulating the Intercourse of States in Peace and War*, and a translation of Jomini's *Vie Politique et Militaire de Napoleon*. D. Jan. 9, 1872. [From orig. art. in *J's Univ. Cyc.*, by G. C. SIMMONS.]

Haller, or **Haller** (ALBRECHT), M. D., F. R. S., the father of the science of physiology, b. at Berne Oct. 18, 1708; studied divinity at Tübingen, med. under Boerhaave at Leyden, and math. with the Bernoulli family at Bale; made a botanical exploration of the Alps with Gesner; practised med. with great applause at Berne 1729-36; held important professorships at Göttingen 1736-53; became phys. to the king of Eng. 1729; retired to private life in Berne 1753. He was a voluminous writer on physiology, anat., bot., surgery, and practical med.; author of several romances and poems, and of many reviews and scientific papers. D. Dec. 12, 1774.

Halley (EDMUND), LL.D., F. R. S., an eminent astron., b. at Haggerston, near Lond., Nov. 8, 1656, ed. at Queen's Coll., Ox.; pub. in 1675 a method for finding aphelia and planetary eccentricities; was in St. Helena 1676-78, cataloguing the S. stars; discovered in 1680 the great comet which bears his name; became a capt. in the R. N. 1699, and conducted expeditions to observe the variations of the magnetic needle; Savilian prof. at Ox. 1703; sec. of the Royal Society 1713, and astron. royal 1720. D. Jan. 25, 1742.

Hallock (GERARD), a son of Rev. Moses Hallock, b. at Plainfield, Mass., Mar. 18, 1800, and grad. in 1819 at Williams Coll. In 1824 he founded the *Boston Telegraph*, in 1827 became one of the proprietors of the New York *Observer*, and from 1828 to 1861 was one of the owners and eds. of the New York *Journal of Commerce*. D. Jan. 4, 1866.

Hallock (WILLIAM ALLEN), D. D., b. June 2, 1794, at Plainfield, Mass., a son of Rev. Moses Hallock; grad. at Williams Coll. in 1819, studied theol. at Andover. In 1822 he became agent for the N. Eng. Tract Society, and in 1825, when the Amer. Tract Society of New York was organized, he became its corresponding sec. His life-work has been that of the society itself, thousands of whose publications he has carried through the press, a work of peculiarly arduous character from the varied theological opinions of the supporters of the society. In addition, he pub. *Lives of Harlan Page*, *Justin Edwards*, and *Moses Hallock*; also the *Mountain Miller*. D. Oct. 2, 1880.

Halloween', or All Hallow's Eve, the night of Oct. 31—i. e. the eve of All Saints' or All Hallow's Day, which is the 1st day of Nov. The word *hallow* is the A.-S. *halig* and the Ger. *heilige* "holy," "sacred," etc., nearly equivalent to the Lat. *saculus*, whence Eng. *saint*. First celebrated on the 1st of May, the date was subsequently changed to Nov. 1st, and under the designation of "Feast of All Saints" set apart as a gen. commemoration in their honor, and as such retained by the Anglican and Amer. Epis. chs., the collect for which supplicates for "grace so to follow Thy blessed saints in all virtuous and godly living," etc. But the "Halloween" has nothing churchly about it, and seems to be a relic of pagan times, or perhaps of mediæval superstitions. On this mystic evening it was believed that even the human spirit might detach itself from the body and wander abroad. H. seems clearly allied to the "Walpurgis Night" of the Gers., the witch-festival or assembling of evil spirits on the summit of the Brocken in the Hartz Mts. Practically, so far as recognized, it is devoted to sports and practical jokes. Nuts and apples are in requisition, the former giving the name "Nutcack Night" to H. in the S. of Eng. They are not only cracked and eaten, but are made the means of vaticination in love-affairs. J. G. BARNARD.

Hallowell, on R. R., city, Kennebec co., Me., on the W. bank of the navigable Kennebec River, 2 m. below Augusta, 58 from Portland. It was formerly distinguished for its ship-building. It has an active trade in granite of superior quality, which is here extensively quarried. Steamers run to Boston and the ports on the Kennebec. Pop. 1870, 3,007; 1880, 3,154.

Halluc, a small river of N. Fr., which enters the Somme from the right above Amiens, is noticeable on account of the battle which took place here, Dec. 23, 1870, between the Ger. gen. Von Manteuffel and the Fr. gen. Faidherbe.

Hallucination, a pseudonym.

Halm (FRIEDRICH), a pseudonym of ELIUS FRANZ JOSEPH, Baron von Münch-Bellinghausen, b. at Cracow Apr. 2, 1806; studied law, and held different govt. offices in Vienna. In 1834 his first drama, *Griseldis*, was performed with great success. Then followed *The Adept*, *Campes*, *Imelda Lambertazzi*, *Der Sohn der Wildniss* ("Ingomar"), *Sampiero*, *María de Molina*, *Gladiator from Ravenna*, etc.

Halm (NICOLAS), ABBÉ, b. Dec. 31, 1755, at Sedan; studied theol., lang., math., and geog. at the colls. of Le-moine and Sainte-Barbe in Paris; took holy orders, and was in 1791 appointed director of the Coll. of Sedan; was sec. at the École Polytechnique and teacher in the engineering school in Paris; served for a time as an army-surgeon. He wrote many hand-books and essays on math., geog., education, archaeology, and chronology, but his prin. work is his translation of Ptolemy's *Almagest*. D. June 4, 1828.

Ha'lo, the popular term applied to bright circles and attendant optical phenomena seen when the sun or moon shines upon fog, haze, or cloud. H. are classified as greater or lesser H.: the former are the H. proper; under the lesser H. are included the small rings, aureole, or glories known as coronæ and anthelia.

(1) A *corona* is a simple ring or concentric rings of light surrounding the sun or other luminary. These rings are generally tinged with colors, the inner being blue or purple, and the outer red; several series of such rings, separated by white spaces, are included within a distance of from 1 to 5 degrees from the sun.

(2) *Aureolas* or *Glories*.—This term includes the bows, circles, etc. surrounding the shadow of the observer when it is projected upon a cloud or fog-bank or dew-covered grass. These colored rings are observed upon the upper surface of clouds by aéronauts.

(3) *Halos proper* consist of more or less complicated arrangements of arcs and circles of light surrounding the sun or moon, accompanied by others tangent to or intersecting them; near the points of tangency and intersection there appear spots of special brightness, known as parhelia, paraselenæ, sun-dogs, etc. Of these arcs of light, some are colorless, while others are composed of parallel colored bands; the light of some arcs is polarized, while that of others is not. The rainbow may be properly considered as a H. due to the action upon the sun's light of large drops of water, instead of smaller drops or of crystals of ice, and differs from a corona in that it is not due to diffraction. [From orig. art. in *J's Univ. Cyc.*, by PROF. CLEVELAND ABBE.]

Halogen ("salt-producer"), a name given to those elementary substances which by combination with a metal produce haloid salts. The H. are chlorine, bromine, iodine, and fluorine, while cyanogen was called a compound H.

Ha'loid Salts (i. e., "salt," so called because they are analogous in composition to common salt), a name given to compounds of some halogen with a metal. Common salt and iodide of potassium are familiar examples. The metallic chlorides, iodides, bromides, and fluorides are H. S., and to these the metallic cyanides have a close relationship.

Halpin (CHARLES G.), b. at Oldcastle, co. Meath, Ire., Nov. 1829, grad. at the Univ. of Dublin in 1846. His father was a Prot. clergyman and ed. of the Dublin *Evening Mail*. In 1847 came with his wife to New York, without money or friends; became connected with the New York *Herald*, *Times*, and other papers. For the *Tribune* he wrote that famous piece, "Tear Down the Flaunting Lie." In 1861 he

enlisted in the U. army, in which he speedily rose, reaching in 1864 a brigadier-generalship of volunteers. He was also a major in the regular army and brevet maj.-gen. He resigned his army commissions in 1864. It was while in the army that he wrote the humorous pieces in prose and verse, under the name of "Private Miles O'Reilly." In 1864 he became ed. and then proprietor of the *Citizen* newspaper. He was register of New York co. D. Aug. 3, 1868.

Halys. See KIZIL-IRMAK.

Ham, a son of Noah and the brother of Shem and Japheth, was, according to Gen., the father of those nations which inhabited the S. countries, Egypt, Libya, etc. The Coptic or native name of Egypt is *Kem*, *Χημη* with Plutarch, *Chemé* in the Rosetta inscription, which signifies "hot" or "burnt." The descendants of H. were not all Afr. The Canaanites and Phœnicians, the Cushites of the Euphrates Valley, a S. Ar. race, all were Hamitic. Some of these peoples were closely associated with the Semitic races.

Ham. See APPENDIX.

Hamadryads [Gr. *ἡμαδρύαις*, *ἡμαδρύαδες*, from *δρῦς*, an "oak" or any lofty tree], in Gr. mythology, the nymphs who were attached to particular trees, with which they came into existence and died. (See DRYAD.)

Hamann (JOHANN GEORG), b. at Königsberg Aug. 27, 1730; studied theol., law, philos., poetry, and philology; entered in 1755 into the service of a commercial house in Riga, and visited on business Berlin, Lübeck, Hol., and Eng., in which latter country he spent about a yr. After 1759 he lived for several yrs. in his father's house in Königsberg, studying theol. and philos.; from 1763 to 1787 held various small offices in the tax dept. in his native city. He then lived alternately in Düsseldorf and Münster. In some of his writings, which consisted of small pamphlets or essays, he calls himself the "Northern magian," and this has now generally become his title. The depth of his religious intuitions, the eccentricity of his humor, and the numerous allusions which crowd his pages made him unintelligible to the gen. reader, but upon men like Herder, Goethe, and Jacobi he exercised great attraction. D. June 11, 1788.

Hamath [the *Epiphania* of the Grs. and Roms., now called *Hamah*], in Upper Syria, about half way between Baalbek and Antioch, one of the oldest cities in the world, founded by the youngest (or last-named) of the 11 sons of Canaan (Gen. x. 18). The "entrance of Hamath" (Num. xxxiv. 8), named at first as the N. boundary of the Promised Land, was probably the low screen of hills between the sources of the Leontes (*Litany*) and the sources of the Orontes. The city now has some 40,000 inhabs., $\frac{1}{4}$ of whom are Gr. and Jacobite Chrs., and the rest Mohammedans, noted for their bigotry and fanaticism. Plaster casts of the famous inscriptions found there in 1870 are now in the Museum of the Union Theological Sem. of New York city.

Hamburg, a free city, one of the prin. members of the old Hanseatic League, and the most important commercial port of the Ger. empire, is situated on the Elbe, near its entrance into the N. Sea. With its dist., it comprises an area of 158 sq. m. with 453,869 inhabs., of whom 410,127 live in the city and suburbs. Its revised const. dates from Oct. 13, 1879. The legislative power rests with a senate of 18 members and a municipal council of 160 members; the executive power with the senate alone. The state of finances is as follows (budget 1883): Revenues, 35,291,300 marks; expenses, 35,788,300 marks; public debt, 143,826,050 marks (Jan. 1, 1882). The total value of importations amounted in 1882 to 2,084,000,000 marks. The total number of vessels which entered the port of H. in 1882 was 6189 with an aggregate tonnage of 3,030,909; total number of sea-going vessels belonging to the port, 487, of 287,724 tons burden. A large part of the Ger. emigration to Amer. goes through H. In 1882 the number of emigrants was 113,221.

The city stands in a semicircle on the right bank of the Elbe, and consists of the old and the new city. Beside the Elbe, it has another small river, the Alster, which forms within the city a small basin, called Binnen-Alster, and outside of it a larger one, called Aussen-Alster; it traverses the city by 2 main branches, which communicate by canals with the numerous branches of the Elbe. The harbor presents an interesting aspect. It has recently been considerably enlarged, and is now affording room for 400 sea-going vessels and 400 large and several hundreds of small river-craft. The best view of the city and the river is from the Elbe Hill, near the harbor. The finest part of the city is the Alster Basin, and its quays, Jungfernstieg and Alsterdamm. Boats and small steamers cover the water, and all around is stirring with life. On the Alster Hill is the art gallery; the fortifications have been transformed into promenades; the botanical garden is one of the richest in Ger., and the zoological garden also is a magnificent inst. Other remarkable buildings are the new Zollverein depot, the Bourse, the Bank, the Nicolai ch. (1842), the Catharine ch., the Grosse Michaelis ch., the Johanneum, and the Thalia theatre (1842). The vicinity of H. is covered with charming villages, such as Blankenese, Flottbeck, and others.

It is probable that H. originated from one of the castles which Charlemagne built against the Slavi (the so called Gamberburg). In 831 it was made a bishopric, and in 834 an archbishopric. In 980 it was destroyed by the Obotrites. In 1215 it was made a free city by the emp. Otto IV., but in 1223 it was taken by the Dan. king Knut VI. His son Waldemar sold it for 700 marks silver to the count of Schaumburg-Orlamunde, and he sold it again for 1500 marks silver to the citizens. Thus H. again became a free city. In 1242 it made a covenant with Lübeck, by which the foundation was laid for the Hanseatic League. After a series of internal disturbances, caused by the jealousy between the senate and the citizens, it formed a new const. in 1712, and in 1770 it acquired a vote in the Ger. diet. Its commerce increased immensely during the N. Amer. war of independence. On Dec. 13, 1810, it was incorporated into Fr., and suffered very much during the sieges of 1813 and 1814. In

1867 H. became a member of the N. Ger. Confederation, and in 1871 of the Ger. empire. [From orig. art. in *J.'s Univ. Cyc.*, by CAPT. AUGUST NIEMANN.]

Hamburg, R. R. June, Fremont co., Ia. Pop. 1870, 1431; 1880, 2036.

Hamilear was the name of several Carthaginian gens., but the most celebrated of them was Hamilear Barca ("lightning"), the father of Hannibal. He was appointed commander of the Carthaginian army in Sic. (247 B. C.) during the first Punic war. From the points where he took up his position he steadily extended his sway. But in 241 B. C. the Carthaginian fleet was totally defeated off the Ægates Islands. H. was called back to Afr., and Carthage lost Sard. and Sic. He had brought the S. and E. part of Sp. under Carthaginian rule when he was killed in a battle 228 B. C.

Ham'ilton, a city and port of entry, Ontario, Canada, on the Great Western R. R., 40 m. S. W. of Toronto and 43 m. W. N. W. of the Suspension Bridge, on Burlington Bay, the W. extremity of Lake Ontario. The bay constitutes a capacious harbor, connected with the lake by Burlington Bay Canal; has a R. Cath. bp. Pop. 1881, 35,961.

Hamilton, Mo. See APPENDIX.

Hamilton, cap. of White Pine co., Nev., 120 m. S. of Palisade, which is on the Central Pacific R. R. Prin. business, quartz silver-mining. In the immediate vicinity are numerous "ranches" or farms, which produce hay and grain. Immense herds of live-stock are dispersed over the valleys during summer and winter. Pop. 1880, 203.

Hamilton, Madison co., N. Y., about 30 m. from Utica, on R. R. and the Chenango Canal. It is the seat of Madison Univ., Hamilton Theological Sem. (Bap.), Colgate Acad., and Hamilton Female Sem. Pop. 1870, 1529; 1880, 1638.

Hamilton, important R. R. centre, city, cap. of Butler co., O., on either bank of the Great Miami River, 25 m. N. of Cin. The Miami and Erie Canal passes through it. The river and canal afford unlimited water-power for manufacturing purposes. Pop. 1870, 11,081; 1880, 12,122.

Hamilton (ALEXANDER), b. in Nevis, an island of the W. I., Jan. 11, 1757. His father was from Scot.; his mother, whose maiden name was Faucette, was of Huguenot stock. He was sent to Santa Cruz, where in 1769 he became a counting-house clerk of Mr. Nicholas Cruger, but on his discovering some literary taste he was sent in 1772 to a gram. school at Elizabethtown, N. J. In 1773 he entered King's (now Columbia) Coll. In 1774 his speeches, pamphlets, and newspaper articles on political affairs of the day won the applause of the people. In 1776 he received a capt.'s commission in the artill., and served in the army of Washington, whose aide-de-camp he became in 1777 with the rank of lieutenant-col. In this capacity he was employed by the commander in the most delicate and important trusts. In 1781 he resigned his commission in consequence of a rebuke received from Gen. Washington. He next received command of a New York battalion of light inf., of which he was lieutenant-col., and at the siege of Yorktown he served at its head with much distinction. He afterward studied law, was M. C. (1782-83 and 1787-88), and served in the convention which drew up the Federal const. He was the prin. author of the papers afterward called collectively *The Federalist*; was (1789-95) the first sec. of the U. S. treas., and as such was the author of the funding system, the founder of the U. S. bank, and restorer of public credit. When the House of Reps. was called upon to choose between Jefferson and Burr for the Presidency, he used his powerful influence for the former. In 1798, during the troubles with Fr., he was made inspector-gen. of the army with the rank of maj.-gen., and was for a short time in 1799 commander-in-chief. In 1800 he was chosen pres.-gen. of the Cincinnati. He declined the chief-justiceship of the U. S. In 1804, when Aaron Burr unsuccessfully sought the governorship of N. Y., he was opposed earnestly, though not actively, by H., to whose influence Burr ascribed his defeat. Burr challenged H., and the latter, though repudiating the code as barbarous and wrong in principle, accepted the challenge. The parties met at Weehawken, N. J., July 11, 1804. H. declined to fire at his adversary, but at Burr's first fire was mortally wounded, and died on the following day. Exceedingly able and industrious in public affairs, his share in the settlement of the financial and other difficulties which early beset the republic was great and important. (See his *Life*, by his son, JOHN C. HAMILTON; Hamilton's complete works.) [From orig. art. in *J.'s Univ. Cyc.*, by CHARLES W. GREENE, M. D.]

Hamilton (ANDREW), a merchant of Edinburgh; became deputy-gov. of N. J. in 1686; was taken prisoner by the Fr. in 1689; became deputy P. M. for the colonies in 1692, gov. of East and West Jersey 1692-98 and 1699-1701, deputy gov. of Pa. 1701-03. He was one of the proprietors of East Jersey. D. Apr. 20, 1703.

Hamilton (ANDREW JACKSON), b. in Madison co., Ala., Jan. 23, 1815, the son of a farmer. He became clerk of the circuit court for the co., subsequently merchant, and then a lawyer. In 1846 he removed to Tex., where he was made atty.-gen. He was M. C. 1859-61; during the c. war actively supported the Federal govt., and was made a brig.-gen. of volunteers; was military gov. of Tex. 1862-65, provisional gov. 1865-66, and afterward one of the associate justices of the State supreme court. D. Apr. 11, 1857.

Hamilton (JAMES), b. at Charleston, S. C., May 8, 1786, was the son of Major James Hamilton of Washington's staff; received a good education, became a lawyer, served as a major in the war of 1812, and was for some yrs. mayor of Charleston. In 1822 he detected the conspiracy of Denmark Vesey. As M. C. (1822-29) he earnestly advocated State rights, free trade, direct taxes, and armed resistance to the tariff of 1828. As gov. of S. C. (1830-32) he recommended the passage of the Nullification act. He was afterward made maj.-gen. commanding the State troops, and was later the minister plenipotentiary from Tex. to the European powers. He was in 1857 elected from Tex. to the U. S. Senate. D. Oct. 15, 1857.

Hamilton (JOHN CHURCH), b. in Phila. in 1792, was a son of Alexander Hamilton; grad. at Columbia Coll.; became a lawyer; was an aide on the staff of Gen. Harrison in the war of 1812-15. Author of *Memoirs of Alexander Hamilton, Hist. of the Republic as traced in the Writings of Alexander Hamilton*, and edited his father's Works. D. July 25, 1882.

Hamilton (SCHUTLER), a son of John Church Hamilton and a grandson of Gen. Alexander Hamilton, b. at New York July 25, 1822, and grad. at W. Pt. in 1841; served in the Mex. war, and was an officer on the staff of Gen. Scott (1847-54). In 1861 he enlisted as a private in the 7th N. Y., but soon received a commission; became in 1862 maj.-gen. of volunteers. He took a prominent part in the actions at New Madrid, Mo., and Island No. 10; resigned in 1863. Wrote *a Hist. of the National Flag*.

Hamilton (SIR WILLIAM), BART., b. in Glasgow, Scot., Mar. 8, 1788. He was the elder of two sons of Dr. William Hamilton, prof. of anat. and bot. in the Univ. of Glasgow. Sir William Hamilton belonged to an anc. Scotch family, several members of which are distinguished either in Ch. or State. In 1603 the head of the family was made a baronet, but the family estate having been lost, the title had been in abeyance for nearly a century before Sir William's time, no one caring to claim the title. In 1816 Sir William made good his claim to it in the Scottish courts. H. grad. at Ox. in 1810 with unprecedented honor, both for the extent of his reading and the difficulty of the authors which he presented for examination. He studied law, but was not successful as an advocate, and in 1820 he became a candidate for the chair of moral philos. in the Univ. of Edinburgh, made vacant by the death of Dr. Thomas Brown. The rival candidate of H. was John Wilson, ed. of *Blackwood's Magazine*. There was no question of the immense superiority of H.'s learning and philosophical capacity, but the town council had a Tory majority and Wilson was elected. Mar. 7, 1821, H. was elected prof. of civil hist. in the Univ. of Edinburgh. He prepared a course of lectures on the modern hist. of Europe down to the period of the Fr. Revolution, and secured classes from 30 to 50 in number. The topics which he discussed are strikingly analogous to those selected by Guizot in his lectures on European civilization. In Oct. 1829 he wrote for the *Edinburgh Review* his celebrated criticism of Cousin's *Cours de Philosophie*, under the gen. title of the "Philosophy of the Unconditioned." This was followed in 1830 by his criticism of Brown, in 1831 by his discussion of the authorship of the *Epistole Oeconomicorum Virorum*, and by 2 articles on the state of the Eng. univ. In 1832 he wrote his articles on the revolutions of med. and on Johnson's translation of Tennemann. From 1833 to 1836 he wrote 5 articles upon gen. and professional education. In 1836 the chair of logic in the Univ. of Edinburgh became vacant, and H. presented himself as a candidate. After an exciting canvass he was elected. In 1846 he pub. his edition of the works of Reid. In 1856 he completed his edition of the works of Dugald Stewart. It was his intention to add to this edition a memoir of Stewart, but he did not live to complete it. He continued to lecture till Apr. 1856. Although he had been struck by paralysis in 1844, his intellectual capacity continued unabated to the last. D. May 6, 1856.

H.'s influence on the thought of his age was felt in the allied depts. of logic and psychology. His review articles and lectures to his classes created a new epoch in the study of logic in G. Brit. The publication of his lectures since his death opened up an immense range of logical lit., illustrated the hist. of the science, and vindicated its uses as a means of academic discipline and as a test of right thinking in all depts. of human inquiry. The actual advances in logical science due to H. are not easily estimated. He never fully developed the doctrines which he claimed as new, and possibly overrated their importance. It may be safely said, however, that in knowledge of the lit. of the subject, in grasp of its principles, and in the impulse which his instructions gave to its study, H. stands without a peer in the lit. of G. Brit., and possibly in that of modern Europe. His relations to psychology also are not easily defined. In his lectures and in the supplementary dissertations to his edition of Reid and his review articles he has left on record a great amount of acute discussion and profound remark, illustrated by an immense range of philosophical learning. These hold a distinguished place among the contributions which the present century has made to psychological science. But he has left no logically developed and coherent system. He commenced his philosophical career as a critic of the fundamental principles of Schelling so far as they had been expounded and adopted by Cousin. For the purposes of this discussion he availed himself of the methods and formulas of Kant. In his anxiety for a victory that should be complete he denied to man all knowledge of the infinite whatever, and set aside as unworthy those facts in the human consciousness which impose upon us the belief in an infinity of real existence, which quantitatively the same consciousness affirms itself unable to define and measure. In his anxiety to show the inability of our powers to comprehend or "go around" the infinite in the form of time, space, or power, he was led to a positive denial of the existence of the notion as an ineradicable element in the human consciousness. All that was demanded of H. in his controversy with Cousin and the absolutists was to show the impotence of the human mind to comprehend or measure the infinite. But he went farther, and denied the existence of a notorious psychological fact.

H. sought also, through his doctrine of the Unconditioned, to explain the origin and nature of the causal judgment. He makes the causal judgment the mere inability to think an absolute beginning. This statement is purely negative. The causal judgment comes into the mind in the presence of a change in what already exists. It is a change, a manifestation of power. No new existence appears. It affirms the event or the change to have had a cause. This affirmation is positive, both as a law of thought and a law of the ob-

jective change which calls out the affirmation from the mind of the observer. This effort on the part of H. to account for the positive causal judgment by referring it to the impotence of the human mind, purely negative in its character, must be admitted to be a failure. The causal judgment is in the most emphatic sense positive, and no acuteness of psychological analysis can resolve it into a "fasciculus of negations." In like manner, the doctrine of the "relativity of knowledge" which plays so large a part in H.'s discussions is a distinctly Kantian doctrine, and entirely foreign from the teachings, spirit, and aims of Scot. philos. properly so called. It is equally irreconcilable with that doctrine of "natural realism" which, in his lectures and his criticism of Brown, H. so emphatically taught.

H.'s effort to clarify, supplement, and give systematic form to the doctrine of immediate perception, somewhat vaguely set forth by Reid, is a clear contribution to psychological science. For this purpose he revived and defended that doctrine of the relation of the soul to the body which the mediæval philos. adopted from Aristotle, and which has since then been adopted by Stahl and Berard, and is now known under the designation of Animism. In vindicating the doctrine of synchronous perception, and making clear the analysis of the formula of consciousness, as a condition of all forms of perception, H.'s labors are beyond all praise. It is true that he has limited the application of this formula to the case of perception of what he calls the primary qualities of body. In this limited range of application he has discussed it with great clearness and power. It is a fruitful principle, and we believe that it is capable of application in all forms of perception and in all processes of thought.

In respect to the doctrine of consciousness, H. departed somewhat from his immediate Scotch predecessors. With him consciousness is not a distinct faculty of the soul, but that fundamental fact of which all powers of the mind are so many different modifications. For the hist. of philosophical opinions H.'s labors are invaluable. He made it clear to the careful student of his writings that, after making full allowance for all the vagaries of philosophical thought, there has been from the dawn of speculation a steady though not uniform progress toward truth—that there is a great body of philosophical doctrine which has been under various forms and disguises accepted and held for true by the ablest philos. among all cultivated nations. There may be comparatively little of addition to the sum-total of philosophical thought which will be left after H.'s works have been subjected to the winnowing processes of time, but that little will be sufficient to place him among the foremost scholars and thinkers of his time. In the impulse which his vast learning, his intense nature, and his mastery of expression gave to the thinking of his time, he can hardly be overrated. Whether we accept or reject his doctrines, there is no better gymnastic for the mind than the best discussions of Sir William Hamilton. (See VEITCH'S *Memoir of Hamilton*; *Ed. Essays Art.*, by T. S. BAYNES.) M. B. ANDERSON.

Hamilton (SIR WILLIAM ROWAN), LL.D., b. in Dublin Aug. 5, 1805, grad. at Dublin Univ.; became prof. of astron. and astron.-royal for Ire. in 1827; knighted in 1835, became pres. of the Royal Irish Acad. in 1837. D. Sept. 2, 1865. His fame rests upon his great invention, the calculus of quaternions. His prin. works are *Lectures on Quaternions* and *Elements of Quaternions*.

Ham'ilton College, an inst. of learning situated in Clinton, Oneida co., N. Y. It grew out of the Hamilton Oneida Acad., which was established in the same place in 1793 by the energy and liberality of Rev. Samuel Kirkland, for many yrs. a missionary to the Indians of Central N. Y. The coll. received its charter from the State in 1812. The first class grad. in 1814. A law school has been connected with the coll. since 1854. The observatory was endowed by Edwin C. Litchfield of New York, and bears his name.

Ham'let, the hero of Shakspeare's tragedy, was a prince who belonged to the mythical period of Dan. hist., but who, for many centuries, was the subject of tradition among the Dan. people; his grave is still shown near Elsinore, and the part of Jütland's Heath where was fought the battle between him and Vileg is still called Hamlet's Heath. His life has been told by Saxo Grammaticus, a Dan. historian of the 12th century, but there is no direct connection between Saxo's story and Shakspeare's tragedy.

Ham'lin (HANNIBAL), LL.D., b. at Paris, Me., Aug. 27, 1809. He was for a time a printer; was admitted to the bar in 1833, and several times was speaker of the Me. house of reps. He was (1843-47) a Dem. M. C.; U. S. Senator 1848-57, 1857-61; gov. of Me. in 1857, to which position he was chosen as a Rep., but resigned on his re-election to the U. S. Senate. He was (1861-64) V.-P. of the U. S. during Mr. Lincoln's first term, and in 1865 was made collector of the port of Boston. Again elected to the U. S. Senate 1869, and re-elected 1875; appointed U. S. minister to Sp. July 1, 1881.

Ham'mer Head, a name given to sharks of the family Sphyrnidae, genus *Sphyrna*, the adult of which have the head produced laterally in the shape of a double-headed hammer, with the eyes on the ends. The *S. malleus* inhabits both sides of the N. Atlantic as well as the Pacific. They are very voracious.

Ham'mond (JABEZ D.), LL.D., b. at New Bedford, Mass., Aug. 2, 1778. In 1799 he was a practising phys. at Reading, Vt. In 1805 he became a lawyer at Cherry Valley, N. Y.; was a Dem. M. C. 1815-17, a State senator 1817-21, a com. to settle State claims against the U. S. 1825-26, a co. judge in 1838, and one of the regents of the univ. 1845-55. Wrote *Political Hist. of N. Y.* and *Life of Silas Wright*. D. Aug. 18, 1855.

Hammond (JAMES HAMILTON), b. in Newbury dist., S. C., Nov. 15, 1807, was a son of Prof. Elisha Hammond of S. C. Coll., at which the son grad. in 1825. In 1828 he became a lawyer and an ed., and as an advocate of State Rights served on the gov.'s staff as an officer of the nullification forces raised in 1833; was M. C. 1835-37, a gen. of State mi-

litia 1841, gov. of S. C. 1842-44, U. S. Senator 1857-60. His papers on slavery were republished in a vol. as *The Pro-slavery Argument*. D. Nov. 13, 1864.

Hammond (SAMUEL), b. in Richmond co., Va., Sept. 11, 1757; was well ed. and served in his youth in the Indian wars. During the Revolution he served as an officer, mostly of cav., finally holding a col.'s commission under Greene. He was present upon nearly every battle-field in the S.; removed after the war to Savannah, Ga.; became surveyor-gen. and was at one time gov. of the State; fought in the Creek war of 1793; was M. C. from Ga. 1803-05, civil and military commandant of Upper La. 1805-24, also receiver of public moneys. In 1827 he became surveyor-gen. of S. C., and 1831-35 sec. of state. D. Sept. 11, 1842.

Hammond (WILLIAM A.), M. D., b. at Annapolis, Md., Aug. 28, 1828, grad. M. D. at the New York Univ. in 1848, and entered the U. S. A. as assistant surgeon in 1849, in which he remained till Oct. 1860, when he resigned and accepted the appointment of prof. of anat. and physiology in the Univ. of Md. at Baltimore. At the outbreak of the c. war he offered his services to the govt., and was reappointed assistant surgeon May 1861; on the reorganization of the med. dept. in 1862 he was appointed surgeon-gen. of the army. Leaving the service, he became a prof. in Bellevue Hospital Med. Coll., New York. Wrote *Military Hygiene*, *A Treatise on Diseases of the Nervous System*, *Dr. Gratton*, and *Lal.*

Hammondsport, N. Y. See APPENDIX.

Hammontron, N. J. See APPENDIX.

Hamon (JEAN LOUIS), b. at Plouha May 5, 1821; studied in Paris under Paul Delaroché, and afterward with G. C. Gleyre; exhibited first in 1848. He worked in the porcelain manufactory at Sèvres, and distinguished himself by designs for vases. An enamelled casket of his gained a medal at the Lond. Exposition of 1851. The following yr. he returned to his painting, and produced rapidly pictures, since familiar through engravings, of an idyllic character, representing classical fancies—*Love and his College*, *The Cupid and Psyche*, *Aurora*, *The Muses at Pompeii*, and many others. He has received third and second medals for his work, and in 1855 was created chevalier of Legion of Honor. D. May 29, 1874.

O. B. FROTHINGHAM.

Hampden (JOHN), b. in Lond. in 1594; entered the Univ. of Ox. in 1609, and in 1613 the Inner Temple. His life in Lond. was gay, but in 1619 he married Elizabeth Symeon and retired to his estates. In Jan. 1621 he took his seat in the House of Commons as member for Grampound. He sat for Wendover in the first three Parls. of Charles I. (June 1625, Feb. 1626, and Mar. 1628), and for Buckingham in the last 2 (Apr. 1640 and Nov. 1640, the Long Parl.). He allied himself with the party in opposition, and took part, under James I., in the protest against the marriage of Prince Charles with a Sp. princess, in the impeachment of Bacon, etc., and under Charles I. in all the measures which Parl. took against the encroachments and arbitrary rule of the Crown. In 1636 the king arbitrarily extended the so called ship-money to the inland counties and to times of peace. H. was taxed 20 shillings, but refused to pay, and asked for a decision by the courts. In May 1637 process was opened, and lasted for 13 days; but although H. was condemned to pay, the impression which the procedure produced on the Eng. people was fatal to the king. In the Parl. of May 1640, and in the Long Parl. of Nov. of the same yr., he stands as one of the most prominent leaders of the opposition, and he was one of the 5 members of the House of Commons whom the king accused of high treason (Jan. 3, 1642), but whom the House refused to deliver up for imprisonment. The king gave order to break by force into the House of Commons and arrest the 5 members in their seats, but they were warned by the Fr. ambassador and the countess of Carlisle, and they kept themselves concealed. Meanwhile insurrection arose in Lond., and the king was compelled to leave the city. Several months were spent in negotiations between the king and Parl., but in Aug. both parties took up arms, and the c. war began. H. now developed the greatest energy and activity in raising the militia and organizing an army, and after the brilliant success of the encounters at Edgehill and Brentford, in which he took part as leader of the cav., the House of Commons thought of making him commander-in-chief of the whole army, instead of the slow and hesitating Essex. But on June 17, 1643, in an encounter at Chalgrove Field between the royal cav. under Prince Rupert and that of Parl. under H., the latter was mortally wounded, and d. 6 days after (June 24, 1643).

CLEMENS PETERSEN.

Hampden (RENN DICKSON), D. D., b. 1793 in Barbadoes, grad. at Oriel Coll., Ox., 1813; became prof. of moral philos. 1834; regius prof. of divinity 1836, to the discontent of the Anglo-Catholic party, the convocation of which in the same yr. passed a vote of censure upon him. High and Low Ch. parties uniting in the vote; but in 1842 he was unanimously chosen to the theological examining board, and in 1847, after a bitter controversy, consecrated bp. of Hereford. He contributed to the *Encyclopædia Britannica*; was author of *Philosophical Evidence of Christianity* and *Lectures on Moral Philos.* D. Apr. 23, 1868.

Hampden-Sidney College is in Prince Edward co., Va., 7 m. from Farmville. It was founded in 1775. The spirit of its founders is exhibited in the very name of the coll., and still more significant is the following provision of its charter (1784): "In order to preserve in the minds of the students that sacred love and attachment which they should ever bear to the principles of the present glorious Revolution, the greatest care and caution shall be used in electing professors and masters, to the end that no person shall be so elected unless the uniform tenor of his conduct manifest to the world a sincere affection for the liberty and independence of the U. S. of America." In the list of the first trustees appointed under this charter occur the names of James Madison and Patrick Henry. It is strictly a coll., sharply distinguished on the one hand from the univ., and on the other from the mere classical school. It retains the old cur-

riculum, and gives no diploma to any who have not passed through the full course of study prescribed. It includes no professional school, the Union Theological Sem., though only a few hundred yards distant, being governed by a different corporation.

Hamp'ton, R. R. junc., cap. of Franklin co., Ia. Pop. 1870, 588; 1880, 1508.

Hampton, cap. of Elizabeth City co., Va., on R. R., 3 m. from Fortress Monroe and 18 m. from Norfolk. Has normal and agricultural inst. for colored youth, a good harbor for small craft opening into Hampton Roads, a national cemetery and asylum for disabled soldiers in the suburbs. Pop. 1870, 2300; 1880, 2684.

Hampton (WADE), b. in S. C. in 1754; served under Sumter and Marion; was M. C. 1795-97 and 1803-05; became a col. U. S. A. in 1808, and maj.-gen. 1813-14; commanded (1809-12) at New Orleans, and (1813-14) on the Canadian frontier. He resigned in 1814. D. Feb. 4, 1835.

Hampton (WADE), grandson of the preceding, b. at Columbia, S. C., 1818, grad. at S. C. Coll.; has served as member of both houses of the legislature of S. C. Commanded the Hampton Legion at the first battle of Bull Run, July 1861; promoted to be brig.-gen., and in command of a brigade at Seven Pines, May 31, 1862; engaged at the battle of Antietam, Sept. 1862, and upon the raid into Pa. the following month; at Gettysburg, July 1863; promoted to be lieut.-gen., and in command of body of cav. in Lee's army during campaign of 1864; subsequently transferred to S. C., where in 1865 he commanded cav. forming rear-guard of the Confed. army retiring before Gen. Sherman's advance northward. Gov. S. C. 1878; U. S. Senator 1879-91.

Hamp'ton Roads, the broad and deep channel leading from Chesapeake Bay into the James, Nansemond, and Elizabeth rivers. Fts. Monroe and Wool serve for defence. H. R. was, Mar. 8 and 9, 1862, the scene of important naval operations—the sinking of U. S. frigates Congress and Cumberland, and the contest between the iron-clads Monitor and Virginia.

Ham'ster, a name applied to certain rat-like mammals of Europe and Asia of the genus *Cricetus*. They have large cheek-pouches, and are very destructive to grain, which they store away in great quantities in their holes. They are vigorously hunted for their skins, which are valuable, and for the grain they have buried. *C. frumentarius* is the best known. The full grown H. has a body 9 inches long.

Han'cock, on R. R. Houghton co., Mich., in the Lake Superior copper region, is on Portage Lake, opposite Houghton. Pop. 1880, 1783.

Hancock (JOHN), LL.D., b. at Quincy, Mass., Jan. 12, 1737, was the son of the Rev. John Hancock; grad. at Harvard in 1754, and in 1764 inherited the business and the greater part of the large fortune of Thomas, his uncle, in whose counting-house he had been trained to business. In 1768 his sloop Liberty was seized for evading the laws of commerce, and a riot followed, and in 1770 he delivered a fearless and eloquent address at the funeral of those slain at the Boston massacre. In 1774 he was pres. of the Provincial Cong.; from 1775 to 1777 was pres. of the Gen. Cong. at Phila. He was the first of the signers of the Dec. of Ind. He was made in 1778 maj.-gen. of militia, and served in R. I. under Sullivan; was gov. of Mass. 1780-85, M. C. 1785-86, again gov. 1787-93. D. Oct. 8, 1793.

Hancock (WINFIELD SCOTT), b. in Montgomery co., Pa., Feb. 14, 1824; received his early education at the Norristown (Pa.) Acad.; grad. at the U. S. Military Acad., and made brevet second lieut. of inf. July 1, 1844; served on frontier duty, and in the war with Mex. (1847-48), and was engaged with his regiment at San Antonio, Churubusco, Molino del Rey, and the assault and capture of the city of Mexico; in 1855 was transferred to the quartermaster's dept., on which duty he served in Fla. during the Seminole hostilities, in Kan. during the disturbances of 1857, and in Cal., at Los Angeles, as chief quartermaster of the S. dist., where we find him at the outbreak of the c. war in 1861, and where he exerted a powerful influence during that eventful period. Relieved from duty in Cal. at his own request, he was assigned to Ky. as chief quartermaster of Gen. Anderson's command, but before entering on that duty was (Sept. 23, 1861) appointed a brig.-gen. of volunteers; his subsequent hist. during the war is substantially that of the Army of the Potomac. During the fall and winter of 1861-62 he commanded a brigade at Lewinsville, Va.; in Mar. 1862 he accompanied Gen. McClellan's army to the Peninsula. Here his services in different battles were conspicuous and valuable, and he was recommended by Gen. McClellan for promotion to maj.-gen. He took part in the movement to Centerville, Va., Aug.-Sept. 1862; in the Md. campaign he led his brigade at Crampton's Pass, S. Mountain, and at Antietam, where he was placed in command of the 1st division 2d corps on the death of Gen. Richardson. Promoted to be maj.-gen. of volunteers Nov. 29, 1862, he continued in command of 1st division 2d corps, which he led at Fredericksburg, Dec. 1862, in the assault on Marye's Heights, and at Chancellorsville, May 1863; in the following month he was placed in command of the 2d corps. At Gettysburg (July 1, 1863), after Reynolds had fallen, H. was sent forward from Taneytown by Gen. Meade to assume command; arriving on the field just as the rear of the beaten U. army was coming through Gettysburg, he at once made his presence felt, and after staying the retreat, extended the U. lines to Culp's Hill, when it was enabled to check the enemy's further advance. Perceiving its advantages, Gen. H. sent Gen. Meade such a report of the nature of the vicinity of Gettysburg as determined him to fight his battle there. On the following days (July 2-3) H. commanded the left centre, repulsing the grand final assault of Lee's army July 3, himself falling severely wounded at the moment of victory. For his services at Gettysburg Gen. H. received the thanks of Cong. In Dec. 1863 he returned to the command of his corps; the army, however, being in winter quarters and inactive, Gen. H. was requested to pro-

ceed to the North for the purpose of stimulating the recruiting of volunteers, much needed to fill the diminished ranks of his corps. His mission was successful, and at New York, Phila., Boston, Albany, and other places visited he was tendered public receptions and the freedom of the cities. In Mar. 1864 he returned to his command, and in the campaign of that yr. he bore a prominent part, participating in the battles of the Wilderness (May 5-7), the Po (May 10), Spottsylvania C.-H., Cold Harbor, and the assault of the lines before Petersburg. On Aug. 12 he was appointed a brig.-gen. in the regular army. During the months of July and Aug. the battles of Deep Bottom and Ream's Station, and of Boydton Plank Road (Oct. 27) were fought under his direction and command. In Nov. 1864 he was selected to organize the 1st army corps of veterans, remaining in Wash. on that duty until Feb. 1865, when he was assigned to the command of the middle military division, and in July to that of the middle dept., which latter he held until Aug. 1866, when he was transferred to the command of the dept. of Mo., having in the mean time (July 26) relinquished his volunteer commission and been promoted to be maj.-gen. in the regular army. From Sept. 1867 to Mar. 1868 he commanded the dept. of the Gulf, the military division of the Atlantic Mar. 1868 to Mar. 1869, the dept. of Dakota 1869-72, when he was assigned the command of the division of the Atlantic, which he holds at this date. June 24, 1880, he was nominated at Cin., O., by national convention of Dem. party as its candidate for the Presidency, but was not elected. [From orig. art. in *J.'s Univ. Cyc.*, by Geo. C. SIMMONS.]

Händel (GEORG FRIEDRICH) was b. in Halle, Sax., Feb. 23, 1685. As his father forbade him any instrument, for the purpose of suppressing his love of music, he secretly taught himself to play on an old spinet hidden in his garret. At 8 yrs. he was so proficient that the duke of Saxe-Weissenfels exacted from the father a promise that he should be educated as a musician. He commenced his studies at Halle, and in 1699 was sent to study the operatic school in Berlin; he next entered as a violinist the opera-house in Hamburg; at 19 he one day assumed the direction of the orchestra during the absence of the leader, and displayed such ability that he was at once advanced to that position. He now determined to visit It., and at 21 (1706) he came to Florence. At this age he was eminent as an organist and learned in the severe, scientific style of composition. But his early works are somewhat dull, lacking melody and sentiment. Failing to obtain an engagement in It. he returned to Ger. At 25 (1710) he was made chapel-master to the elector of Hanover—afterward King George I. of Eng.—and given a salary of \$1500. While there he gained in grace and melody. The elector twice gave him leave to visit Lond. On his second visit (1712) he received a pension of \$1000 from Queen Anne, and unceremoniously prolonged his absence to a permanent residence. In 1714 the elector ascended the throne of Eng., and being angry with H., forbade him the court. But Lond. was full of H.'s music, and it was not easy to ignore him. He wrote his *Water Music* for a royal festival on the Thames, and it so charmed the king that he forgave his truant chapel-master and raised his pension to \$2000. At 35 (1720) he was appointed director of the Royal Acad. of Music at the Haymarket Theatre. Then commenced a period of 20 yrs. in which he passed through the severest trials of party warfare. His irritable manner soon created enemies among his singers, who formed a rival opera-troupe. He poured from his fertile brain scores of mediocre It. operas, generally lacking the charming qualities of the It. school. An occasional performance of an oratorio brought the people eagerly about him, but notwithstanding this hint he continued to follow opera. He lost his noble patrons, social position, health, fortune, passed twice through bankruptcy, and sank into neglect, almost oblivion. Not till he was 55 yrs. old (1741) did H. give himself entirely to oratorio, his true work. He had written up to this time about 100 large works, only a few of which are now alive, and he wrote afterward but a few, each of which is now a familiar masterpiece. The people of Dublin, for whom he wrote his greatest work, *The Messiah*, were the first to believe and prove the full height of his genius. By this and other oratorios he suddenly rose to the pinnacle of fame, and before his death became the idol of the Eng. He became blind in 1751. He was buried in Westminster Abbey with grandest ceremonies that could be devised.

The prominent characteristics of H.'s music are sublimity and strength. He excelled all other composers in writing choruses, in which vigor of thought and clearness of form unite to carry the interest in crescendo through the most colossal effects. His most remarkable works are the oratorios *The Messiah*, *Judas Maccabæus*, *Israel in Egypt*, and *Samson*. D. Apr. 14, 1759. [From orig. art. in *J.'s Univ. Cyc.*, by C. H. FARNHAM.]

Handley (GEORGE), b. near Sheffield, Eng., Feb. 9, 1752; emigrated to Savannah, Ga., in 1775; served actively throughout Revolutionary war as an officer on side of colonies; afterward held many public offices; was gov. of Ga. 1788, and collector of port of Brunswick 1789-93. D. Sept. 17, 1793.

Hand Tree [*Sp. manita*], the *Cheirostemon platanoïdes*, a tree of Central Amer., rarely found in Mex., where it was anciently worshipped. It is one of the order Sterculiaceæ. It resembles the plane and buttonwood tree in appearance. Its flower has no corolla, but its large calyx has 5 curved anthers, bearing some resemblance to a hand.

Hanford, Cal. See APPENDIX.

Hang-Chow-Foo, city of Chi., on the Tsien-Tang-Kiang, 20 m. from its mouth in the bay of Hang-Chow-Foo, at the beginning of the Great Canal. It is one of the largest cities of Chi., with narrow streets and only 1-story houses, but with many magnificent temples and other public buildings. Pop. estimated at 800,000.

Hanging Gardens of Babylon, one of the Seven Wonders of the World (according to an anc. estimate), consisting of a succession of terraces supported by columns, and containing an area of about 4 acres, covered with groves,

gardens, and fountains, and having a great reservoir at the top, supplied with water from the Euphrates. The mound El Kasr in the ruins of Babylon is thought to represent them. The H. G. were ascribed variously to Nebuchadnezzar, Semiramis, and others.

Han-Keoo, or **Han-Kow**, city of Chi. in the centre of Chi. proper, at the confluence of the Han and the Yangtze-Kiang, which here is navigable for large vessels. It has recently been opened to foreigners. Properly, it consists of several cities, Han-Yong and Woo-Chang, on opposite sides of the Han River. Pop. estimated at 600,000.

Hannibal, city, and R. R. and commercial centre, Marion co., Mo., on the W. bank of the Miss. River, 150 m. above St. Louis (by river). It has a coll. A R. R. crosses the Miss. River at this point upon an iron bridge built in 1872. It has a very large lumber trade with Mo., Kan., and Tex. Pop. 1870, 10,125; 1880, 11,074.

Hannibal, one of the greatest gens. of antiquity, b. at Carthage 247 B. C. He grew up in his father's camp in Sp., but when Hamilcar d. (in 229) he returned to Carthage, where he lived for 4 yrs. In 224 he returned to the army, and by Hasdrubal, his brother-in-law, was appointed commander of the cav. In 221 Hasdrubal was killed, and by acclamation the army chose the young H. for its commander-in-chief. He immediately broke up with his army, crossed the Pyrenees, the Rhone, and the Alps, and stood, after a march of 5 months, in the middle of Nov. 218, on the plains of Lombardy, at the Ticinus. Here stood Scipio, who waited for them. He was defeated, however, in the battle of the Ticinus, and shortly after Sempronius was totally routed in the battle of the Trebia; thus the first yr. of the campaign ended. Next yr. (217) 2 new Rom. armies, under the 2 consuls Servilius and Flaminius, stood ready to take up the contest with the invader; but H., after a long and perilous march through the marshy regions of the upper Arno, succeeded in bringing the army of Flaminius in such a position between Cortona and Lake Trasymenus that he could attack it at once in the front and in the rear. The victory was complete; half of the Rom. army perished, and the rest were taken prisoners; even a part of Servilius's army, which was sent to the support of Flaminius, was lost. In this emergency Rome proclaimed Q. Fabius Maximus dictator, and the manner in which this prudent and sagacious man carried on the war contributed very much to save the republic. He never gave battle, but he followed H. from place to place like his shadow. In Rome, however, this manner of carrying on the war was not much appreciated. Fabius received the surname *Cunctator*, and the 2 consuls of the next yr. (216), C. Terentius Varro and L. Æmilius Paulus, felt themselves obliged to give battle. They commanded an army of 80,000 men, while that of the enemy numbered hardly 50,000, and in courage, fortitude, and military training the Rom. soldiers were second to none. But the talents of the respective commanders were so unequal that in the battle of Cannæ H. completely destroyed the Rom. army; between 40,000 and 50,000 men were killed. Meanwhile H.'s own soldiers began to grow tired of the war, and during a few months' rest in Capua they lost their discipline. Reverses followed—not many nor great, but still reverses. He lost Capua (212), Tarentum (210), etc.; and when at last his brother Hasdrubal was sent with an army to his support, this army was surprised, defeated, and destroyed on the Metaurus (207). In 208 he was recalled, after maintaining himself in It. for 16 yrs. Scipio had landed in Afr., Masinissa, king of Numidia, had allied himself with Rome, and the situation of Carthage was extremely hazardous. In a short time H. organized a new army and defeated Masinissa, but he saw the danger of encountering Scipio with his young, inexperienced force, and tried to avoid him. Pressed, however, by his countrymen, he had to give battle, and was defeated at Zama (202). Peace was now necessary, and although the Rom. demands were heavy and humiliating, Carthage had to submit. But H. did not give up the aim of his life. Rome demanded his surrender, and the enmity which his reforms had created against him in Carthage was so great that he had to flee. He succeeded in instigating Antiochus, king of Syria, to begin a war with Rome. Antiochus was defeated, however, and the Roms. demanded the surrender of H. H. fled, and was received by Prusias, king of Bithynia. Shortly after Bithynia began war against Rome. But Prusias was defeated, and the Roms. again demanded the surrender of H. There was now not one more point along the whole horizon from which an operation against Rome could be started with any prospect of success. H. gave up; he opened the bead on his ring and swallowed the poison it contained (183 B. C.).

CLEMENS PETERSEN.

Han'no, a Carthaginian navigator who (570 B. C.) coasted southward along the shores of the Afr. continent, founding several towns on the way. On his return he set up in a temple a tablet containing an account of his voyage. Of this tablet a Gr. version is still extant.—HANNO THE GREAT, in the 3d century B. C., was the leader of the aristocratic party and the chief opponent of Hamilcar Barca and of Hannibal. He was himself an able gen.

Han'over, formerly an independent kingdom, since 1866 a prov. of Prus., bounded N. by the Ger. Ocean and the Elbe, E. by Mecklenburg and Prus. Sax., S. by Hesse-Cassel and Westphalia, and W. by the Netherlands. The terr. which forms the present prov. of H. belonged from anc. times to the family of Brunswick-Lüneburg, though it at some times was divided up between the different lines of the family. In 1692 it was made an electorate, and when in 1714 its elector, George Lewis, came to the Eng. throne as George I., it began to play a conspicuous part in the hist. of Europe. In 1814 it was made a kingdom by the Cong. of Vienna, and in 1837, at the death of William IV., it fell to Ernest August, duke of Cumberland, as the Salic law, which excludes heirs female, prevented Queen Victoria from inheriting it. In 1866 it was conquered by Prus. and incorporated by that kingdom as a prov. Area, 14,672 sq. m.; pop. 1880, 2,120,168.

Hanover, cap. of the Prus. prov. of Hanover, contains, together with the suburb Linden, 1881, 143,742 inhabs. The old city, irregular and partly old-fashioned, is surrounded by new and elegant quarters which have arisen since 1840. Magnificent promenades, due to the sovereign, who formerly resided here, extend throughout the city, and a large forest, the Elleriiede, surrounds it in a semicircle. The new quarters are distinguished by the original arch, of many of their buildings, of which the style is consistent, grave, and dignified. A row of interesting villas in pure Pompeian style has recently arisen on the Schiffgraben. The most remarkable public places are the Bahnhofsplatz, the Theatre Platz, the Georgs Platz, the Markt, and the Waterloo Platz. The most remarkable buildings are the Museum, the Polytechnic School, the Lyceum, the former town-house, a Gothic structure of the middle of the 15th century; the royal palace, an extensive building of the 18th century, overlooking the Waterloo Platz. A monument to Leibnitz, consisting of a circular temple containing his bust, stands on a hill on the Waterloo Platz. The most remarkable chs. are the Market ch. and Christ ch. In the vicinity of H. stands the palace, Herrenhausen. It is situated in an extensive park laid out in Fr. style by Le Nôtre; an avenue of linden trees, one of the most beautiful avenues in the world, stretches from H. to Herrenhausen, and is on both sides surrounded with magnificent promenades. To the E. of the avenue the colossal Welfenschloss arises, in the round style, with 5 towers. The Eilenriede contains a zoological garden. H. is first mentioned in hist. in 1163 as the residence of Henry the Lion. In 1481 it entered the Hanseatic League. It suffered much from internal disturbances, brought on by the introduction of the Ref. In 1837 it became the residence of the king of Hanover; since its annexation to Prus. it has increased both in size and splendor. [From orig. art. in *J.'s Univ. Cyc.*, by CAPT. AUGUST NIEMANN, *Sac.*]

Hanover, Grafton co., N. H., on the Conn. River, 73 m. from Portsmouth and 59 from Concord by R. R. It is also the seat of Dartmouth Coll. Lumber is manufactured to a considerable extent. Pop. tp. 1870, 2085; 1880, 2147.

Hanover, R. R. junc., York co., Pa., 18 m. S. W. of York, 42 m. N. W. Baltimore, Md. It has 2 acads. The vicinity abounds in iron ore. Pop. 1870, 1839; 1880, 2317.

Hanseatic League, or **Hanse Towns** [Old Ger. *Hansa*, a "union"], an association of free cities of N. Europe formed in the 13th century to protect their common commercial interests. When the feudal principle that "might makes right" prevailed, the cities were subject to heavy exactions from their feudal lords; the avenues to each city were beset by armed bands, watching to plunder the passing merchant-trains; piracy was considered a legitimate business, and the seas were covered with the cruisers of the bold vikings of the N. Trade was altogether insecure, and the accumulating wealth of the cities was constantly exposed to pillage. One effect of the crusades was to expand the sphere of trade, especially by sea, but piracy and systematic robbery were at the same time extended. Sovereigns saw no benefit from commerce beyond the opportunity it offered for levying revenues for themselves; petty lords for nominal protection made severe exactions; swarms of pirates watched the straits into the Baltic Sea and the mouths of the Rhine, the Elbe, and the Trave. This condition of things gave rise to the H. L. There are traces of some joint defensive action of the cities as early as the middle of the 12th century. The date of the organization of the league is, however, usually stated at 1241, when Lübeck and Hamburg entered into a formal treaty to make trade secure. Others gradually joined the association, till at its height it embraced 85 cities. In 1260 its affairs were regulated by a convention which ordained a diet of delegates to assemble triennially, and an extraordinary meeting every 10 yrs. to renew the league. Lübeck was made the cap. of the Hansa and the depository of its treas. and archives. The meetings were generally held at Lübeck, but occasionally at Hamburg, Cologne, and other places. The 4 prin. factories of the league, at Lond., Bruges, Bergen, and Novgorod, were endowed by the sovereigns of those cities with special privileges, to which every merchant belonging to a Hanseatic town was entitled. The power of the league reached its culmination in the latter half of the 14th century. But it abused the power gained for the maintenance of separate interests of its own, and the exercise of sovereign authority to perpetuate an oppressive monopoly. Through the 15th century it thus maintained its power with growing haughtiness and arrogance, till it became intolerable, and declined as rapidly as it rose. In 1630 a last gen. assembly was summoned to meet at Lübeck, but the deputies from the remaining towns came only to notify their withdrawal. After nearly 400 yrs., this confederacy was dissolved. The term Hansa Towns is perpetuated as applied to the 3 independent cities, Bremen, Hamburg, and Lübeck.

Hansteen (Hansström), b. at Christiania, Nor., Sept. 25, 1784, studied math. at the Univ. of Copenhagen. In 1814 became prof. of math. at the Univ. of Christiania. His *Researches concerning the Terrestrial Magnetism* attracted much attention, and after a journey to Lond., Paris, and Berlin, he travelled from 1828 to 1830 through W. Siberia. He pub. in 1863 *Magnetical, Astronomical, and Meteorological Observations on a Journey through Siberia*. D. 1873.

Hapsburg, or **Habsburg**, **House of**, named from the old castle of Habsburg (Habichtsburg), near Brugg, in Aargau, Switz., erected by Count Radbod von Altenburg about 1020 A. D. The castle is now in ruins, only the walls of the tower remaining. The first Ger. emp. of this family was Rudolph I., who founded the Aus. house, which from 1438 to 1806 held the Ger. imperial crown, and since that time has held that of Aus. In Sp., Burgundy, Tuscany, and Modena, H. monarchs have also borne sway.

Haralson (Hugh A.), b. Nov. 13, 1805, in Greene co., Ga., grad. at the State Univ. in 1825; was admitted to the bar and rose rapidly in the legal profession; was many yrs.

a member of the State legislature, and was M. C. from Ga. 1843-51; was a maj.-gen. in the State militia. D. Oct. 1854.

Harbaugh (HENRY), D. D., a divine of the (Ger.) Reformed Ch. in Amer., b. near Waynesborough, Pa., Oct. 24, 1817. He was the descendant of a Swiss immigrant named Herbach, who came to this country in 1736. Young H. worked upon a farm, then became a carpenter, then a mill-operative, and next a teacher. In 1840 he entered Marshall Coll. at Mercersburg, Pa., and after a partial course in academical and theological studies was ordained in 1843. He held pastorates in Lewisburg, Lancaster, and Lebanon, Pa., and in 1864 became prof. of theol. at Mercersburg; was also ed. of the *Guardian*; pub. some excellent poems in the so called "Pennsylvania Dutch" dialect of the Ger. lang. Wrote *The Fathers of the Ger. Reformed Ch.* and an illustrated work on the *Birds of the Bible*. D. Dec. 28, 1867.

Har'bor. The word is by Webster derived from the O. H. Ger. *heriberga* (here, "host," "army;" *bergan*, to "shelter," to "protect," and allied with the Fr. *aberge*, an "inn"), and in its naval signification is defined "a refuge for ships; a port or haven."

A natural H. may be more precisely defined as "a bay, recess, or inlet of the sea, or the mouth of a river, which affords good anchorage and a safe station for ships." The 2 great requisites (adequate depth both of entrance and interior area being assumed) are *shelter* from wave-violence and *accessibility*. That there should be shelter it is necessary that the communication with the ocean should be as nearly as possible reduced to a channel of entrance of adequate width—i. e. that the waters of the H. be, in expressive nautical phrase, "landlocked," and that the entrance should be, from the configuration and character of the adjacent coast, considered in conjunction with prevailing winds, safely and easily accessible. Natural H. are ranked according as they possess more or less perfectly the combination of these qualities. Sea-waves owe their origin to the wind, and their most violent line of action is that of its direction. Hence, a mere indentation in the shore-line may afford a quite adequate H. if it be in a windward shore, but in gen. the quality of being "landlocked" is essential. The H. of Queenstown (Ire.), of Portland, Me., of New York, may be mentioned as possessing in a high degree the essentials. The qualities of a natural H. are easily recognized; as well, also, as lack of these qualities. As an engineering prob., it is the supplying to natural H. of such essentials as may be lacking, or the creation of a H. where all essentials are absent, that is to be solved. The violence of the ocean waves being that against which protection is needed, it becomes important, especially in considering the strength of works erected to protect against their violence, to have some measure of its action. The pressure of waves against engineering structures varies from a few lbs. to 3½ tons per square foot, and this action has a range from about 20 ft. below low water to about 30 ft. above high water.

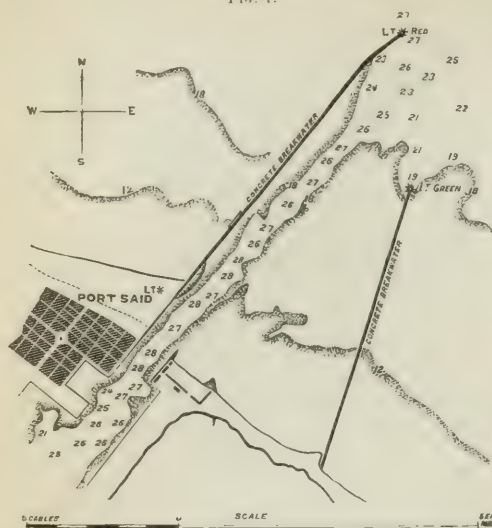
The element most influential in developing wave-force (the generative winds supposed the same) is the line of maximum exposure, or, in other words, the greatest reach of open sea. According to Mr. Thomas Stevenson, the limited observations as to this matter seem to indicate that the height of waves increases in the ratio of the square root of their distances from the windward shore. Another circumstance affecting the exposure of any marine work is the depth of water in front of it. The great mountainous billows so commonly met with in the Atlantic Ocean cannot be generated in shallow seas. It becomes, therefore, of great consequence to ascertain the maximum possible wave in a given depth of water. Mr. Scott Russell has stated that if waves be propagated in a channel whose depth diminishes uniformly, the waves will break when their height above the surface of the level fluid becomes equal to the depth of the bottom below the surface.

In the providing of H. of refuge, and more especially in the improvement of ports, the prob. usually is to supply some lacking element. Thus a natural bay or deep indentation in the coast may, by artificial construction partially closing its mouth, be made to possess the qualities of a landlocked H. It is thus that at Cherbourg and Plymouth and (with some modification of phraseology) at Portland, Holyhead, etc. (Eng.), and at our own Del. breakwater, H. of refuge have been formed. But it sometimes happens that the creation of a H. is needed where no natural element of one is found in the configuration of the shore. The most important examples are the H. of Pt. Said to the Suez Canal, and that where the N. Sea Canal of Hol. connects with the N. Sea. In both cases the coast and sea-bottom are of sand, and the shore-lines rectilinear and wholly destitute of H. qualities. Pt. Said, though affording sufficiently good anchorage for small vessels, cannot be considered a H., either in respect of extent or depth, for vessels of large tonnage and great draught of water. It is formed by 2 rough, narrow, and low breakwaters of unfinished appearance, inclosing an area of some 450 acres, with an average depth of only 13 or 14 ft. of water, except in the ship-channel leading to the inner basins, where the depth is from 25 to 28 ft.

The canal now completed, furnishing to the pt. of Amsterdam direct communication with the N. Sea, has its sea-entrance and artificial H. on a coast of sand "dunes," the trend of which is about N. by E. The axis of the H. projected from the coast into the N. Sea is nearly normal to the coast-line. The width of this entrance is 260 metres. The 2 piers are to be extended to the depth of 8 metres below the level of low water, corresponding with about 9.50 metres below daily high water, and 8.50 metres below A. P. (i. e. the established Amsterdam level). The roots of these piers, at the foot of the downs on the beach, are 1200 metres distant one from another. Their directions converge, so as to make an angle of about 77° with their base-line. At 1200 metres from their origin the piers, distant 660 metres from one another, commence to converge more rapidly; so that, with an increment of length of 345 metres (1645 in all), they ter-

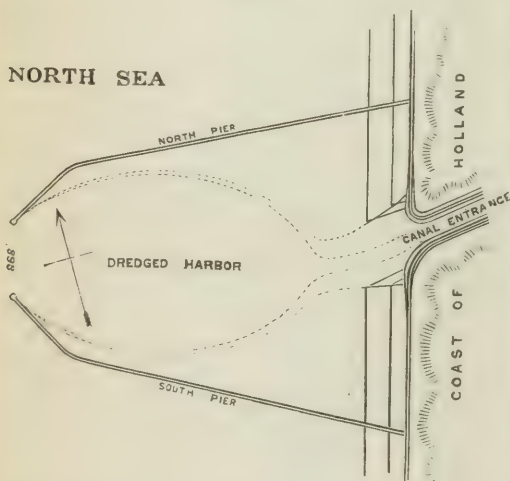
minate 260 metres (868 ft.) apart at the H.-mouth. To obtain the requisite depth the area between these piers is to be dredged to an elliptic form for a width of 650 metres, and to a depth of 8.50 metres below A. P. at the entrance, 7.50 metres on the land side, the H. area being 55 hectares (135 acres); while the total area inclosed by the piers is fully 100

FIG. 1.



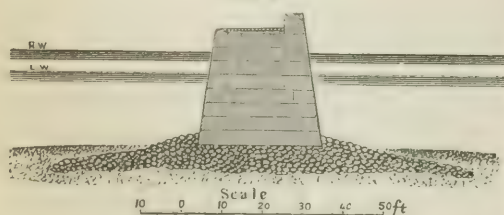
hectares. The method of construction in this case is, forming on the sand a "rip-rap" foundation of small stone, and to lay regularly, from a huge derrick working from the built-up end of the pier itself, a wall of concrete blocks as represented in the section (Fig. 3). (For a more detailed account see *Prof. Papers, Corps of Engrs.*, No. 22.)

FIG. 2.



The subject of "tidal H.," so important in Eng., is of slight importance in this country, natural H. of superabundant depth being superfluously numerous in the limited portions of the N. Amer. continent where the range of tide is great; and space will not allow more ample description than has been given of artificial H.-construction. Of recent

FIG. 3.



and interesting works not described reference may be made to the following: that of Oamara, New Zealand, *Engineering*, Apr. 25, 1873; of Kurrachee, India, *Engineering*, June 6, 1873; Holyhead, *Engineering*, Sept. 26, 1873; Alexandria (new harbor), *Van Nostrand's Eng. Mag.*, Feb. 1873. In *Engineering*, Mar. 1873, will be found a novel project for an "island harbor," at Boulogne, by Col. A. Clarke, Royal Engineers.

J. G. BARNARD.

Harbors of American Lakes. The great lakes of N. Amer., discharging their waters into the Atlantic by the St. Lawrence River, constitute one of the most important features in the geog. of the continent. Owing to their great size, navigation on them is almost as dangerous as on the high seas, rendering good H. as necessary as on the sea-coasts. The prin. natural H. are formed by islands, by indentations in the coast, or by the straits connecting the great lakes; but, with the exception of Detroit, there is no port of importance which possesses a harbor that is not to a great extent artificial. The watershed of these lakes is comparatively small, and we find no large streams emptying into them. Most of the cities and towns are located at the mouths of small streams, and for many yrs. the commerce at large cities, like Chicago and Milwaukee, was carried on at open piers built out into the lake on piles.

The prin. port on the lakes is Chicago, Ill. The Chicago River was originally an insignificant stream, with but a few ft. of water on the bar, and wholly unsuited for commercial purposes. Most of the H. improvements on the lakes are of the same gen. character as those at Chicago. It is generally found that immediately inside of the mouth these streams have considerable depth, but this is separated from the deep water of the lake by what is known as the bar, composed generally of sand or shingle, which is not caused by the river, but is the material composing the natural bottom of the lake or sea, which the river-current in its diminished force is unable to disturb.

The depth and width of the channel over the bar depend on the strength of the current. What natural channels do exist are crooked and changing by the action of storms; and it is evident that if a channel were dredged through the bar it would speedily fill up unless some means were taken to prevent it. This is done by revetting the banks of the channel, and extending the revetment out to a depth of water beyond which the waves will not disturb the bottom. This depth may be practically assumed at from 18 to 24 ft. in Lake Mich.

In making the channel through the bar we are to consider, first, its width and depth; second, its direction; third, the character of the works for its maintenance. The piers and breakwaters in the lakes are constructed either of cribs of timber and iron filled with stone, or of pile-work; but they are in a certain sense temporary structures, requiring frequent repairs. The work under water, if put together so as to resist the forces to which it is subjected, may be considered permanent, as timber under fresh water will last indefinitely. Above water the timber-work will last from 10 to 15 yrs., when it must be renewed. There are 2 essential differences in the problem of H. improvements on the lakes and on the sea-shore. First, the fresh water of the lakes, which permits the use of timber for permanent work under water; second, the absence of the tides. There are about 70 H. on the great lakes, wholly or in part artificial, and examinations have been made at many other points for the purpose of making plans and estimates for improvements. [From orig. art. in *J. S. Univ. Cyc.*, by D. C. HOUSTON, Col. U. S. Engrs.]

Harcourt (SIR WILLIAM GEORGE GRANVILLE VENABLES VERNON), LL.D., Q.C., known as SIR VERNON HARCOURT, b. Oct. 14, 1827; prof. of international law at Cambridge 1869, knight bachelor 1873, solicitor-gen. 1873-74; entered Parl. for Ox. city 1868. Author of pamphlets and papers in the *Saturday Review* and *Lond. Times*, signed "Historicus," etc.; sec. of state for home dept., Eng., 1880.

Hardee (WILLIAM J.), b. in Ga. about 1819, grad. at W. Pt. 1838, and appointed a second lieu. of dragoons; served in the Mex. war; major of 2d Cav. 1855; in 1856 was appointed commandant of cadets at W. Pt., with local rank of lieu.-col., performing at the same time the duties of instructor in cav., inf., and artil. tactics; lieu.-col. of cav. in 1860; resigned his commission Jan. 31, 1861, and joined the Confed. cause; appointed brig.-gen. C. S. A. the following June; engaged in the battles of Shiloh, Chaplin's Hills (Perryville), Murfreesboro', and Chattanooga Nov. 23-25, 1863, and subsequent operations, up to and including siege and fall of Atlanta, when he was transferred to the command at Savannah, Ga., which place he evacuated Dec. 20, 1864, as he did Charleston Feb. 17, 1865, finally surrendering with Johnston's army at Durham Station, N. C., Apr. 26, 1865. Had become a lieu.-gen. Author of *Hardee's Tactics*. D. Nov. 6, 1873.

Har'denberg, von (KARL AUGUST), PRINCE, b. at Essenroda, Hanover, May 31, 1750; studied law at Leipsic and Göttingen, and held various positions in the service of the king of Hanover, the duke of Brunswick, and the margrave of Anspach, until he became Prus. minister of state in 1791. He was made chancellor in 1810, and carried out the plans of Stein for the reorganization of the Prus. state. He signed the Treaty of Paris, was made a prince, received a great dotation, and sat in the cons. of Vienna, Aix-la-Chapelle, and Verona. D. Nov. 26, 1822.

Hardicanute (*Harthaenub*), king of Eng., was a son of Canute by Emma, widow of Ethelred II.; was chosen king of the W. Sax. in 1035, while Harold, his reputed half-brother, ruled the rest of Eng. In 1036 he became king of Den.; was deposed as king of Wessex 1037; made preparations for invading Eng., when he heard of Harold's death; was unanimously chosen king of Eng. at the Witenagemote. His reign was short, but stained with dreadful crimes. D. June 8, 1042.

Hardie (JAMES ALLEN), b. in New York May 5, 1823, grad. from the U. S. Military Acad. July 1, 1843, entering the army in the artil. service; served as assistant prof. at W. Pt., and as company officer in garrison, frontier, and Indian service till 1861, being, during a portion of the time, aide-de-camp to Gen. Wool. Served during the c. war as aide-de-camp to Maj.-Gen. McClellan during his campaigns with the Army of the Potomac, before Richmond, in Md., etc.; on the staff of Maj.-Gen. Burnside in the Rappahan-

noek campaign; judge-advocate-gen. of the Army of the Potomac, staff of Maj.-Gen. Hooker; brig.-gen. of volunteers Nov. 20, 1862; assigned to special duty in the war dept. till 1866; assistant to Sec. Stanton until he vacated office; thereafter with Gens. Grant, Schofield, and Rawlins, as acting sec. of war; appointed inspector-gen. (rank of col.) Mar. 24, 1864; brevet brig.-gen. and brevet maj.-gen. U. S. A. Mar. 13, 1865. D. Dec. 14, 1876.

Hardin (MARTIN D.), b. June 21, 1780, in W. Pa., was a son of Col. John Hardin (1753-92), a famous Indian fighter and Revolutionary patriot of Va. and Ky.; settled with his father in Ky. in 1786; became a lawyer; was sec. of state for Ky. 1812; served with distinction under Harrison as major in that yr.; U. S. Senator 1816-17. Author of a vol. of legal reports. D. Oct. 8, 1823.

Harding (CHESTER), b. in Conway, Mass., Sept. 1, 1793; d. in Boston Apr. 1, 1866; began his art-life as a sign-painter; had his enthusiasm for higher art awakened by a man of no repute, who painted likenesses of himself and his wife. Without instruction or encouragement, he took up the profession, painted a hundred portraits in 6 months at \$25 each; went to Phila. to study, thence to St. Louis; then established himself in Boston and became at once the fashion. In 1823 H. went to Liverpool, and remained abroad 3 yrs., studying and painting. The dukes of Sussex, Hamilton, and Norfolk, the historian Alison, and the poet Rogers sat to him. On his return home success awaited him. Among the eminent persons who sat to him were Daniel Webster, Madison, Monroe, J. Q. Adams, Chief-Justice Marshall, Henry Clay, and J. C. Calhoun. To his personal qualities he probably owed much of his extraordinary popularity, for though sometimes excellent as likenesses, his portraits lacked the accuracy of drawing and the color that distinguish the best works of art. O. B. FROTHINGHAM.

Hardinge (HENRY), VISCOUNT, b. at Wrotham, Kent, Eng., Mar. 30, 1785; entered the army 1798, made lieutenant, 1802, served in the Peninsula 1808-14; entered Parli. for Durham 1820; married a daughter of Lord Castlereagh 1821; privy councillor, sec. at war 1828; chief sec. for Ire. 1830, 1834-35, and 1841-44; gov.-gen. of India 1844-48; in 1845 gained a victory over the Sikhs at Ferozeshah, and fought in that campaign, chiefly as a volunteer under Gough; Viscount Hardinge in 1846, master-gen. of ordnance 1852, commander-in-chief 1852, field marshal 1855. D. Sept. 24, 1856.

Hardouin, ar-doo-an' (JEAN), b. at Quimper, Brittany, 1646; was appointed in 1683 librarian of the Collège Louis-le-Grand; devoted himself to the study of Gr. and Lat., philos., theol., and numismatology. H. was one of the eds. of the *Scriptores Latini in usum Delphinum*, for which collection he prepared, with valuable notes and a copious index, *Plinii Historia Naturalis*. He also pub. a *Cocclitarum Collectio*, which was suppressed by Parli. D. Sept. 3, 1729.

Hardwick (CHARLES), b. at Slingsby, Yorkshire, Sept. 22, 1821; lost his life by a fall in climbing the Pyrenees Aug. 19, 1859, and was buried in the Prot. cemetery of Luchon. Apparently of humble parentage, he made his way at the Univ. of Cambridge by his talents and industry. In 1853 he was appointed prof. of divinity in Queen's Coll., Birmingham, and in 1855 lecturer on divinity in King's Coll., Cambridge. He had been ordained deacon in 1846 and priest in 1847, and only a few months before his untimely death was made archdeacon of Ely. His scholarship was both broad and accurate, and he was a versatile and rapid worker. He pub. other books, but his fame will rest on these 4: *Hist. of the Articles of Religion*, *Hist. of the Middle Age of the Ch. Hist. of the Ref.*, and *Christ and Other Masters*. R. D. HITCHCOCK.

Hardy (JAMES WARD), a minister of the M. E. Ch. S., b. in Ga. Jan. 19, 1815, grad. at Randolph-Macon Coll., Va., in 1837, and was elected in 1838 to the chair of natural science in that inst.; prof. of math. and afterward pres. of La Grange Coll., Ala. D. Aug. 14, 1853.

Hardy (ROBERT SPENCE), b. at Preston, Lancashire, Eng., July 1, 1803; joined the Wesleyan conference in 1825, and went as missionary to Ceylon, laboring there for 23 yrs., and then returning to Eng. Pub. *Eastern Monachism* and *A Manual of Buddhism in its Modern Developments*, translated from Singhalese MSS. D. Apr. 16, 1868.

Hardy (Sir THOMAS DUFFUS), D. C. L., b. in 1804 at Pt. Royal, Jamaica; became in 1819 a clerk in the Tower of London, and in 1861 deputy keeper of the public records; won great distinction by his eds. of anc. MSS. D. June 15, 1878.

Hare, a name applied to many species of Leporidae, but primitively to the European *Lepus timidus*. It contrasts with the rabbit in its solitary habits, not burrowing, and the blindness of the young at birth.

Hare (GEORGE EMLÉN), D. D., LL.D., b. at Phila. Sept. 4, 1808, grad. at Union Coll. 1825; entered the P. E. ministry; rector of St. John's, Carlisle, Pa., 1830-34; of Trinity ch., Princeton, N. J., 1834-43; became in 1844 rector of St. Matthew's, Phila.; prof. of biblical learning in Divinity School, Phila., 1858. Wrote *Christ to Return*.

Hare (ROBERT), A. M., M. D., b. in Phila., Pa., Jan. 17, 1781, was the son of an Eng. brewer, and early turned his attention to scientific experiments. In 1802 he invented the oxyhydrogen blow-pipe, which won for him the Rumford medal of the Amer. Acad.; in 1816 brought forward the calorimeter, a form of galvanic battery by which intense heat may be generated; in 1831 made successful experiments in subaqueous blasting by means of the galvanic current. Among his other inventions are the gallows-screw. In 1818 he was called to the chair of chem. in William and Mary Coll., and he held the chem. professorship in the Univ. of Pa. from 1818 to 1847. Late in life he became a believer in Spiritualism. Wrote *Brief Views of the Policy of the U. S.*, *Chemical Apparatus*, *Spiritual Manifestations Scientifically Demonstrated*. His excellent and ingenious apparatus he gave to the Smithsonian Institution, in which he felt a deep interest. Dr. H. excelled as an instructor in his favorite sciences. D. May 15, 1848.

Harebell. See BLUEBELL.

Hare'lip, a congenital deformity of the human upper lip, characterized by a fissure (rarely median, like that normal in the hare or the cat), usually a little to one side, and more frequently on the left, but sometimes occurring on both sides at once. When simple and uncomplicated with cleft palate (a frequent accompaniment), a simple surgical operation will commonly cure it perfectly, and infancy is the proper time for operation; but the operation for cleft palate (staphyloplasty) should usually be deferred to a mature age. The fissure itself normally exists in the fetal state; by arrest of development it remains open after birth. When 2 fissures exist, it is not unusual to find the incisive segment (intermaxillary bone) of the upper jaw detached from or rather united to the jaw, and the deformity may amount to a double cleft palate. The rare case of median H. is quite analogous to *spina bifida*, for the intermaxillary bone is the representative of the spinous process of the first cephalic vertebra. WILLARD PARKER.

Har'graves (EDMUND HAMMOND), b. at Gosport, Eng., about 1815; went to sea, and for a time was settled in Australia; embarked for Cal. (1849), and upon his arrival at the gold-fields was so impressed with the similarity of the country to that he had just left that on his return he entered upon explorations which resulted in the discovery of the gold-fields of Australia. Disclosing his discovery to the colonial sec. at Sydney, he was appointed com. of crown-lands; received many testimonials, among which was a grant of £10,000 by authorities of New S. Wales; in 1854 returned to Eng., and pub. *Australia and its Gold-Fields*.

Har'greaves (JAMES), inventor of a carding-machine (1760), and of the spinning-jenny (1764, 1767), b. at Stanhill, near Blackburn, Eng. He had tried in vain to spin several cotton threads at one and the same time. One day his little child overturned his spinning-wheel, and as he saw the spindle revolving vertically, he resolved to construct a machine with several vertical spindles. This proved a success, and was kept a secret; but his neighbors, seeing how much yarn he produced, broke into the house and destroyed the machine. He got a patent on his invention, but it was set aside by the courts, and he d. (a poor man) Apr. 1778.

Har'i-ka'ri [Chi. for "happy despatch"], a form of suicide performed in Japan by cutting open the abdomen. Officials who are guilty of misdemeanors are often commanded to perform H.-K. If they comply, their children inherit the father's property and position, but not so if the suicide has taken place unbidden. Persons who have suffered unendurable affront sometimes accomplish suicide thus.

Hariri, Al [Ar. "the silk-mercer"], a name of ABU MOHAMMED AL KASIM, b. at Bassora in 1054. Author of *Makamat* ("The Assemblies"), an Ar. classic of the first importance, written in prose and verse. D. 1121. The best and completest Eng. version is by Prof. Thomas Chenery of Ox.

Har'ker (CHARLES G.), b. in N. J., Dec. 2, 1837; grad. at the U. S. Military Acad. July 1858, and entered the army as brevet second lieutenant of inf.; capt. Oct. 1861. Prior to the c. war he served on frontier duty; in Nov. 1861 was appointed col. 65th O. Volunteers, and led his regiment in the battle of Shiloh; commanded a brigade in the battles of Stone River and Chickamauga; appointed brig.-gen. of volunteers Sept. 20, 1863, and engaged at the battles of Missionary Ridge, Resaca, Dallas, and Kennesaw Mountain. In the latter engagement he fell, June 27, 1864.

Hark'ness (WILLIAM), A. M., LL.D., b. at Ecclefechan, Dumfriesshire, Scot., Dec. 17, 1837; grad. at Rochester Univ., N. Y., 1858, and was appointed prof. of math. U. S. N. Aug. 24, 1863. Author of several astronomical and phys. papers. Was in charge of U. S. Transit of Venus expedition in 1874, at Hobart Town, Tasmania.

Har'lan, on R. R., cap. of Shelby co., Ia., in the valley of the Nishnabotona, 40 m. N. E. of Council Bluffs. Pop. 1870, 128; 1880, 1304.

Harlan (JAMES), b. in Clarke co., Ill., Aug. 25, 1820, grad. at Ind. Asbury Univ. 1845; became a lawyer, supt. of public instruction in Ia. 1847, pres. of Ia. Wesleyan Univ. 1853, U. S. Senator from Ia. 1855-65, sec. of the interior 1865-66, again U. S. Senator 1866-73.

Harlan (JOHN M.). See APPENDIX.

Harlay, de (ACHILLE), b. at Paris Mar. 7, 1536; d. there Oct. 21, 1616. Appointed first pres. of Parli. by Henry III. 1582; remained faithful to him during c. war of the League; was thrown afterward into the Bastille, after the surrender of Paris to Henry IV., who maintained H. at the head of Parli. He used his power to counteract the manoeuvres of the Ultramontanes. Author of *La Coutume d'Orléans*, 1583.

Harlay de Sancy (NICOLAS), b. in 1546, d. in 1629, is principally known as having been the owner of the celebrated Sancy diamond, the largest in Europe, and which belonged afterward to the crown of Fr. H. de S. was ambassador and supt. of finances under Henry III. and Henry IV. He was a free-thinker, and he changed his creed so often that the Prot. writer D'Aubigné pub. about him a satire: *Catholic Confession of Sancy*.

Harlem River, the channel which extends N. from the E. River at Hell Gate, forming a portion of the E. boundary of Manhattan Island, upon which New York city is mainly situated. H. R. is, throughout a large part of its extent, navigable for large vessels. It is connected with the Hudson River to the N. by the Spuyten Duyvil Creek, a shallow and tortuous passage.

Harless (GOTTLIEB CHRISTOPH ADOLPH), b. at Nuremberg, Bavaria, Nov. 21, 1806; studied theol. and philos. in the univs. of Erlangen and Halle, held for some years, 1829-45, a theological professorship in the former univ., but was driven away by the fanaticism of the Roman Catholic clergy, was appointed prof. in Leipzig, and became, 1852, an ecclesiastical councillor to the Bavarian govt. and pres. of the superior consistory in Munich, where he d. Sept. 5, 1879. He pub. a commentary on *Apocrypha* (1834, 2d ed. 1858), *Theological Encyclopedia*, and *Methodology* (1837), *Joseph Richter and the Alchemists* (1870), etc., but his chief work is his *Christian*

Ethics (1842; 7th ed., 1875), whose first part contains a very able survey of the hist. of ethics.

Harley (ROBERT). See OXFORD, EARL OF.

Har'mar (Gen. JOSIAH), b. at Phila. in 1753, and ed. there; in 1776 he was made capt. 1st Pa. regiment, and lieut.-col. in 1777; served with Gen. Washington in his campaigns 1778-80, in the S. with Gen. Greene 1781-82; brevet col. 1st U. S. regiment 1783; in 1784 was selected to hear the ratification of the definitive treaty to Fr., appointed (Aug. 1784) lieut.-col. of inf. under the Confederation; brevet brig.-gen. by resolution of Cong. 1787, and gen.-in-chief of the army Sept. 29, 1789, which post he held until 1792, when he resigned. Adjutant-gen. of Pa. 1793-99. D. Aug. 20, 1813.

Harmat'an [Arabic], a hot, dry wind which blows westward from the Great Desert of Afr. It is of the same character with the sirocco of the Mediterranean, but is represented as more severe in its effects upon the human system. It prevails in the winter months.

Harmo'nia, the fabled daughter of Ares and Aphrodite, or of Zeus and Electra, and wife of Cadmus. She is chiefly remembered for the fatal necklace which her husband bestowed upon her on her wedding-day. This necklace brought bad luck to all its owners, and after several generations of heirs had been cursed with it, it was dedicated to Athena in her temple at Delphi.

Harmonic Motion, in mechanics. If a point move uniformly in a circle, its projection on any diameter changes by a simple harmonic motion. If a planet or satellite, moving uniformly in a circular orbit about its primary, be viewed from a very distant position in the plane of its orbit, it will appear to move backward and forward in a straight line with a simple H. M.—e. g. the satellites of Jupiter seen from the earth. Such motion as we describe is approximately that of the simplest species of vibrations of a sounding body, a tuning-fork or pianoforte wire, whence the name; it is also that of the various media in which waves of sound, light, heat, etc. are propagated, and it enters extensively into the theories of these phenomena, as well as into those of astron. and mechanics.

Harmonics, in music, certain secondary or accessory sounds which are given out by sonorous bodies, beside the prin. sound, and different from it, but bearing also to such sound a determinate harmonic relation. It is probable that no musical sound is absolutely pure and simple, but that every well defined sound is the generator of several other sounds audible to our ears. A single string produces not only its own proper sound, but also its octave, twelfth, fifteenth, seventeenth, nineteenth, etc., or the sounds belonging to one half, one third, one fourth, one fifth, one sixth, etc. of its length. These secondary sounds, in combination with the prin. one, are found to be the elements of the perfect major-triad—i. e. the root or fundamental tone—with its third and fifth, or their octaves and double octaves. A musical ear readily detects several of these in the sound of a large ch.-bell, and these H. are perfect in proportion as the bell is regularly formed, well cast, free from cracks, and of uniform density. A long continued note on an open string of a violin will cause vibrations in the corresponding string of another violin hanging against the wall. A tuning-fork forcibly struck and set on the sounding-board of a pianoforte will occasion all the strings in harmonic relation with it to vibrate in sympathy. These derived or sympathetic vibrations are, in large strings, sensible to the touch, and may even be visible to the eye (especially when aided by a magnifying-glass), though the sounds produced are so faint to be appreciated by the ear. [From orig. art. in J.'s Univ. Cyc., by REV. WILLIAM STAUNTON, D. D.]

Harmonists, the followers of George Rapp (1770-1847), a Ger. of Württemberg, who organized a community which held their goods in common. Disturbed by the authorities, they removed in 1803 to the U. S.; settled in 1805 at Harmony, Pa., and removed in 1815 to New Harmony, Ind., which in 1824 they sold to Robert Owen. They then removed to Economy, Pa., 17 m. N. W. of Pittsburgh. They own 3500 acres of land, and have important manufactures. They do not marry, and lead strictly moral lives.

Harmony [Gr. ἀρμονία, a "fitting" together, from ἀρμόζειν, to "join"]. Music consists of melody and harmony, the former being a varied succession of single or simple tones, and the latter the combination of several tones in one simultaneous utterance in accordance with certain regulating principles. H. is a science of modern times, having risen from its rudest form to its present perfection within the last 3 or 4 centuries. Even as late as the 11th century we find that the music of the Ch.—chiefly Gregorian plain-song—was but a simple melody without any accompanying H., except such as might be supplied by a rude and arbitrary use of occasional octaves, fifths, and fourths. It is questionable, indeed, whether even the term "melody," as now understood, can with justice be applied to those successions of notes which seem to us so bald and unmeaning, but which constituted what our forefathers regarded as "music."

The first attempts at H. seem to have been in the line of extemporizing a secondary part to any well known melody, by running under it a parallel train of notes in fourths, fifths, or octaves. For the sake of variety the accompanying part would sometimes form a kind of ground-bass, not following the movement of the melody, and ending with a clumsily formed cadence. This two-part or "double singing," as it was called, was common in the 12th century, and even earlier. The constant hearing of the ecclesiastical chant rendered that chant familiar to the people, and its scales and inflections had a gen. influence over the style even of the secular songs of that day. This part-singing was also much favored and promoted in and after the 12th century by the facility which the organs then coming into use afforded for sounding two or more notes at once. The ear was thus in some degree trained to perceive the effect of perfect and imperfect intervals, and very gradually some rules were arrived at to regulate their succession. By the

end of the 14th century the organs had reached a far higher degree of perfection. In consequence of this, a new stimulus was given to the study of harmonious combinations and progressions, but still the advance in this direction continued to be slow and uncertain. Even as late as the middle of the 14th century the rules in use were of the rudest kind. From this to the time when Palestrina flourished (b. 1529, d. 1594) was a period when counterpoint was first successfully developed, its true principles discovered, carefully applied, and cast into a scientific form. The works of that renowned writer, though deficient in the elegance and refined sentiment of modern music, abound with proofs of a profound acquaintance with counterpoint, even in its most subtle and intricate depts., and of wonderful skill in the most elaborate kinds of composition.

The masters of the 16th and 17th centuries appear to little advantage as originators or students of melody, but their devotion to harmony was all-absorbing, and almost marvellous in its results. Their successors, with less pedantry and more regard for the beautiful and imaginative, advanced the art by adding to their studies the cultivation of this further dept. of melody. And thus was completed the labor of centuries, by bringing into combination all the resources of pure harmony, and the beauty and expressiveness of its melodious counterpoint. [From orig. art. in J.'s Univ. Cyc., by REV. WILLIAM STAUNTON, D. D.]

Harmony of the Gospels. There being 4 separate narratives of the life of our Lord, Chrs. from the earliest times have attempted to arrange them in such a way as to present at once view all their facts and teachings. The earliest of these attempts have perished, but since Eusebius every age has abounded in harmonies constructed on a variety of principles. On the most cursory examination of the Gospel it is plain that the same events are not related in them all in the same order. Some of them, at least, must have arranged the details of the narrative on some other principle than that of chronological sequence. It is generally agreed that St. John has carefully observed the chronological order of the hist. Among the debated questions which somewhat affect the structure of a harmony, is the length of our Lord's public ministry. Three theories have been proposed, severally known as the *Bi-paschal*, the *Tri-paschal*, and the *Quadri-paschal* schemes, according as they suppose that ministry to have included 2, 3, or 4 Passovers, and thus to have continued, in addition to the first half yr., 1, 2, or 3 yrs. Eusebius investigated the subject, and decided in favor of the quadri-paschal scheme. In Ger., Eng., and Amer. the tri-paschal found eminent advocates, but the balance of opinion is decidedly in favor of the quadri-paschal. When all doubtful questions have been determined, there will still remain a certain number of passages whose chronological position cannot be fixed with certainty, because they contain no notes of time. These are comparatively few and of secondary importance. [From orig. art. in J.'s Univ. Cyc., by PROF. FREDERIC GARDNER, D. D.]

Harms (HILF), (Pastor Harms), b. May 5, 1809, at Hermannsburg, on the Lüneberger Heath, in Hanover, was the son of a Lutheran parish minister; was ed. at Celle and Göttingen, became awakened to a new religious life, and in 1844 became assistant pastor in his native village. Here he built a large missionary coll., trusting to Providence for funds; organized his great parish into a home and foreign missionary society; founded in 1854 an extensive printing establishment, where he pub. a missionary journal and many books. Pastor H. was a prodigiously active man, and an admirable manager of the business affairs of his vast enterprises, for he supported missionaries in Afr., Asia, Amer., and Australia at an expense of not less than \$40,000 per annum. D. Nov. 14, 1866.

Har'nett (CORNELIUS), b. in Eng. Apr. 30, 1723; became owner of a large estate near Wilmington, N. C., and was early interested in the cause of Amer. liberty. He was (1770-71) a member of the provincial assembly, in 1775 pres. of the provincial council, and afterward acting gov.; in 1776 a member of the provincial Cong. at Halifax, and was one of a committee to draft a State const. and bill of rights, in which he procured the insertion of the clause declaring for religious freedom. In 1777-80 he was in Cong. and signed the Articles of Confederation. D. Apr. 20, 1781.

Har'ney (WILLIAM SELBY), b. in La. in 1798; appointed second lieut. of inf. U. S. A. Feb. 1818; took an active part in the Fla. war against the Indians; col. 1846; served with distinction in the war with Mex.; brig.-gen. 1858. In the early days of the c. war he commanded in Mo., but for an unauthorized truce with Gen. Price was soon relieved, and in 1863 retired from active service.

Har'old I. (HAREFOOT, so named from his swiftness), king of Eng., was the reputed son of Canute by Elgifa of Northampton. In 1035 H. was chosen as Canute's successor by the Dan. party, and began to reign N. of the Thames; but Hardicanute (*Harthacnut*), the late king's recognized heir, was preferred by the Eng. party. Hardicanute was chosen king of Wessex, and Emma, his mother, was his regent, he being then absent in Den. H. soon rid the kingdom of the A.-S. princes (*Ethelings*), and in 1037 he was chosen king of all Eng. He banished Queen Emma, and d. Mar. 17, 1040. The hist. of his reign is obscure.

Harold II., king of Eng., the last sovereign of the A.-S. race, was second son of Godwin, the great earl of the W. Sax., by Gytha, a Dan. lady; assisted his father in his quarrels with Edward the Confessor, with whom he became reconciled 1052; with Tostig, his brother, conquered Wales 1063; was shipwrecked at the mouth of the Somme, Normandy, made prisoner, and compelled to swear to give support to Duke William's claim to the Eng. crown 1065; caused himself to be proclaimed king, and was crowned Jan. 10, 1066; defeated and slew Harold Hardrada, who supported the claims of Tostig, Harold's brother, 1066; fought William the Conqueror at the battle of Hastings, and was killed there Oct. 14, 1066.

Har'old (or **Har'ald**, **L. Haar'fager** (the "fair-haired"), first king of Nor. in the historic period. He loved Gyfa, a jarl's daughter, who refused to marry him until he had conquered all Nor.; and accordingly in 865 he took a vow never to comb or cut his hair till all the jarls submitted to his sway. His great sea-fight at Hafursford (985) released him from his 20 yrs.' vow. D. at Trondjem 985.

Harold (or **Harold** **III. Hardra'da** (**HARDRADE**, "hard ruler"), king of Nor., b. about 1016; served in the Byzantine armies 1038-40; and was distinguished by his exploits in Sic. and at Jerusalem; became sole king of Nor. 1047; invaded Eng. 1066 to avenge the supposed wrongs of Tostig, brother to Harold II. of Eng.; gained the battle of Fulford, but was defeated and killed in the battle of Stamford Bridge, Sept. 25, 1066.

Haroun' al Rasch'id (*Arroun the Just*), caliph of Bagdad, the fifth of the Abbasides, was b. at Rei in 765 A. D.; invaded the Gr. empire 781, and compelled the empress Irene to pay yearly 70,000 dinars in gold; succeeded his brother in 786; raised the caliphate to its greatest pitch of splendor, chiefly by the aid of Jahia and Jiafar the Barmecides, whom he treacherously murdered (803); sent an embassy with presents to Charlemagne; was with almost uniform success engaged in wars with the Byzantines; made Bagdad a centre of learning, commerce, and industry. D. Apr. 2, 809.

Harper, **Ran.** See **APPENDIX**.

Harper (**ROBERT GOODLOE**), **LL.D.**, b. in 1765 near Fredericksburg, Va., and while young removed with his parents to Granville, N. C. He joined the Revolutionary army when 15 yrs. old. Grad. at Princeton in 1785, and was (1794-1801) a Federalist M. C. from S. C. He married a daughter of Charles Carroll of Carrollton, and became a leading lawyer of Baltimore; was (1815-16) U. S. Senator from Md., and a maj.-gen. of militia in war of 1812; was an active supporter of the Colonization Society, and the town of Harper, near Cape Palmas, was named in his honor. D. Jan. 15, 1825.

Harper (**WILLIAM**), b. in Antigua Jan. 17, 1790; studied at Baltimore, and in 1802 settled with his father in Columbia, S. C. Grad. at S. C. Coll. in 1808, and became a lawyer; in 1818 removed to Mo.; in 1823 he returned to Columbia, where he pub. a vol. of legal reports. He was (1826) a U. S. Senator; in 1828 speaker of the S. C. house of reps.; became in 1831 judge of the court of appeals, and was (1834-47) chancellor of the State. D. Oct. 10, 1847.

Harper's Ferry, **R. R. Junc.**, W. Va., at the confluence of the Potomac and Shenandoah rivers, and in the basin formed by Maryland, Loudoun, and Bolivar Heights. It is the seat of Stover Coll. In Oct. 1859 the place was entered by John Brown and his followers, and the U. S. arsenal and national armory seized and held for upward of 24 hours. In Apr. 1861 the small party of regulars guarding the public buildings evacuated the place, which was occupied and held by the Confeds., until the following June, when it was evacuated by them, after destroying the arsenal and armory and the bridge across the Potomac. In Sept. 1862 it was invested by the Confeds., and was surrendered with 12,000 prisoners, 73 guns, upward of 13,000 small-arms, and a large quantity of stores. It was recaptured by Gen. McClellan after the battle of Antietam, and was not again out of possession of the U. S. Pop. 1880, 764.

Har'pies (**Gr.** *ἁρπυγῖαι*, the "swift spoilers"), in Gr. mythology, certain monsters of the female sex, often described as birds with the heads of women and having huge claws. Their number and all the circumstances of their myths are variously related. They were said to reside at the isles called Strophades. Some writers make them symbolical of storm winds; others, of the forms of death.

Harpo'crites (**Egyptian**, *Harpa Khrut*, "Horus the child"), the Younger Horus, a divinity of the anc. Egyptians, son of Osiris and Isis, worshipped in later times in Gr. and Rome as the god of silence, but not so esteemed by the Egyptians. His sculptures show him as a child placing his finger upon his lips, and he seems to have originally symbolized the feeble vegetal life of the winter months.

Harporcation (*Ἀρποκρίσιον*), with the Rom. surname **VALERIUS**, a Gr. rhetorician and lexicographer who flourished at Alexandria, but of whose life no particulars are preserved. Even the period when he flourished is uncertain. An important work for the explanation of legal and political terms is ascribed to him, entitled *Ἀετικὸν τῶν ὅρων*.

Harp Seal, the *Pagophilus granlandicus*, commercially the most important of the seal family. It inhabits the coasts of the polar seas, and is the most extensively caught of all the seals sought in the Newfoundland fisheries. It is named from rudely harp-shaped markings on its back.

Harpy Eagle. See **EAGLE**.

Har'rier, a small fox-hound, bred and trained to follow the hare. It is chiefly used in the Brit. Islands, where several breeds are distinguished. Also a kind of hawk.

Har'riman (**WALTER**), b. in Warner, N. H., about 1817. As a teacher, Univ. preacher, Dem. politician, and orator, he won much renown; was 1862-65 the commander of the 11th N. H. Volunteers in the c. war; sec. of state in N. H. 1865-67, Rep. gov. of N. H. 1867-69, and was then appointed naval officer of the port of Boston, Mass. D. July 25, 1884.

Har'rington (**SAMUEL MAXWELL**), **LL.D.**, b. at Dover, Del., Feb. 5, 1803, grad. at Washington Coll., Md., 1823; sec. of state for Del. in 1829, chief-justice of the State supreme court 1831, and afterward an associate judge of the superior court; again chief-justice 1855; chancellor of Del. 1857-65. Wrote law reports, and was at the head of commission of 1849 for codifying the laws of his State. D. Nov. 28, 1865.

Har'riott (**THOMAS**), b. at Ox., Eng., 1560; went with his patron, Raleigh, to Va. 1584-85; pub. a *Briefe and True Report of the New Found Land of Virginia* (1588); became a pensioner of the earl of Northumberland; simplified the theory of equations, and was the first to conceive the possibility of putting all the terms of the equation into the same side. *Artis analytica Praxis nova ad equationes resolvendas* is his most important work. D. July 2, 1621.

Har'ris (**CHAPIN A.**), **M. D.**, **D. D.**, s. b. in Pompey, N. Y., 1806. He organized the Baltimore Dental Coll. in 1839—the first of the kind. He established *Amer. Journal and Library of Dental Science*; author of *Dental Dict.* D. 1860.

Harris (**CHARLES**), b. in Eng. in 1772, ed. in Fr., migrated to Ga. 1788; was admitted to the bar in Savannah, and rose to the highest distinction in his profession; was twice elected to the judgeship of his circuit, and twice declined; on the retirement of Gov. Milledge from U. S. Senate (1809), the position was tendered him by both parties, but declined. Harris co., Ga., was named in honor of him. D. Mar. 1827.

Harris (**DAVID BUTLOCK**), b. at Frederick's Hall, Louisa co., Va., Sept. 28, 1814, grad. at the U. S. Military Acad. at W. Pt. in 1833, and entered the army as a brevet second lieut. of the 1st Artill.; served a yr. with that regiment in the field, and was assigned to duty as assistant prof. of engineering at W. Pt., a position which he filled until Aug. 30, 1835, when he resigned from the army. Was subsequently employed as a civil engineer, and then became an exporting merchant and Va. planter; in Apr. 1861 he re-entered the military career as a capt. of engineers of the Va. forces, and was at once put on duty at Culpeper C. H. It was Capt. H. who first reconnoitered the line of Bull Run and determined its defensive and strategic value. Having soon acquired the complete confidence of Gen. Beauregard, he was ever after associated with that commander, and he accompanied Beauregard early in 1862 to the West, and there planned and constructed the works at Island 10 and Ft. Pillow on the Miss. River, and subsequently the river-defences at Vicksburg. Capt. H. was also charged with the direction of the engineer operations in the defence of Charleston. In 1864 was promoted to the grade of col. of engineers, and served as an engineer on the Confed. lines before Petersburg. D. Oct. 10, 1864, just as he had been commissioned a brig.-gen.

Harris (**HOWELL**), b. at Trevecca, Wales, in 1714; studied at Ox., and took the field in Wales as an evangelist and open-air preacher, founding societies and awakening the whole principality by his zealous labors. Though, like Wesley and Whitefield, a churchman, he received little or no sympathy from the clergy, but the 2 great evangelists heartily recognized him. In a few yrs. he had formed no less than 300 societies. He may be considered the chief founder of "Calvinistic Methodism," now the most prevalent form of dissent in Wales. H. raised and commanded a regiment, mostly of his own people, during the Fr. war, when the invasion of Eng. was expected. D. July 21, 1773.

Harris (**IRA**), b. in Charleston, Montgomery co., N. Y., May 31, 1802, grad. at Union Coll. 1824; became a lawyer in Albany; served in the constitutional conventions of 1845 and 1867; was a judge of the State supreme court 1847-60, U. S. Senator 1862-68. D. Dec. 2, 1875.

Harris (**ISHAM G.**), **M. C.** from Tenn. 1849-53, was gov. of the State 1857-61; was an ardent advocate of secession, and after the war became a merchant of Liverpool, Eng. U. S. Senator 1877-83, and re-elected.

Harris (**IVERSON L.**), b. at Watkinsville, Ga., Jan. 7, 1805, grad. at State Univ. 1823; studied law, admitted to the bar, settled in Milledgeville; was elevated to the circuit and then to the supreme court bench of the State, retiring in 1868; was trustee of the State Univ.

Harris (**JAMES**), nephew of Lord Shaftesbury, b. at Salisbury July 20, 1709; entered Parl. for Christchurch 1761; a lord of the admiralty 1762, a lord of the treas. 1763, sec. and comptroller to the queen 1774. D. Dec. 22, 1780. Author of *Hermes*, a work on lang. and gen. gram.; *Spring, Philosophical Arrangements, and Philological Inquiries*.—His son, **JAMES** (1746-1820), in 1800 became earl of Malmesbury.

Harris (**SAMUEL**), **D. D.**, **LL.D.**, b. in E. Machias, Me., June 14, 1814, grad. at Bowdoin Coll. in 1833 and at Andover Theological Sem. in 1838. He was a teacher at Limerick, Me., 1833-34, and at E. Machias 1834-35 and 1838-41. He was pastor of the Congl. ch. in Conway, Mass., 1841-51, and of the S. Congl. ch. in Pittsfield, Mass., 1851-55; prof. of systematic theol. in the Theological Sem. in Bangor, Me., 1855-67, pres. of Bowdoin Coll. 1867-71, and in 1871 took the chair of systematic theol. in the theological dept. of Yale Coll. Wrote *Zaccheus, or the Scriptural Plan of Benevolence, Christ's Prayer for His Redeemed*, etc.

Harris (**THADDEUS WILLIAM**), **M. D.**, b. at Dorchester, Mass., Nov. 12, 1795; grad. at Harvard in 1815, and studied med., which he practised at Milton, Mass. He was (1831-56) librarian of Harvard Coll., and for a time was instructor in bot. and nat. hist., and won especial distinction as an entomologist, being one of the pioneers of that science in N. Amer. His most important works are a *Systematic Catalogue of the Insects of Mass.* and *On Insects Injurious to Vegetation*. D. Jan. 16, 1856.—His sons, **WILLIAM THADDEUS** (1826-54) and **EDWARD D. HARRIS**, have attained distinction as genealogists and historical students.

Harris (**THOMAS LAKE**), **B. M.** May 15, 1823, at Fenny Stratford, Eng., and when 4 yrs. old came to Amer. with his parents, who settled at Utica, N. Y.; became a minister of the Univ. faith in New York city and elsewhere; also an earnest believer in Spiritualism; preached in G. Brit. 1858-61, winning many followers to his system, which appears to combine the Swedenborgian theol. and the Platonic philos. with some of the doctrines of Fourier. His followers, "The Brotherhood of the New Life," are found in G. Brit., the U. S., India, and Japan. Their chief establishment, co-operative, but not communistic, is at Brocton, N. Y. The Scripts, and the marriage relation are held sacred by them, proselytism is repudiated, and self-renunciation is regarded as one of the supreme duties.

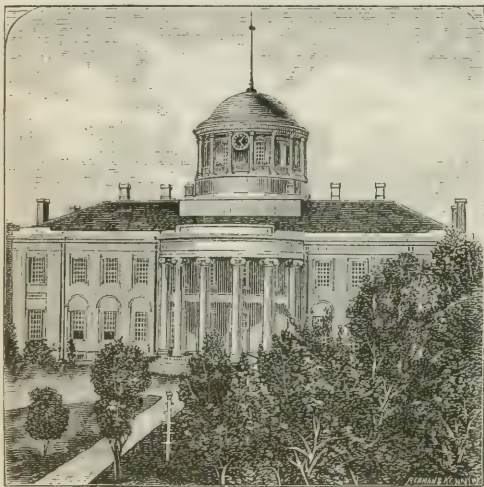
Harris (**WILLIAM**), **S. T. D.**, b. at Springfield, Mass., Apr. 29, 1765, grad. at Harvard in 1786; was rector of an Epis. ch. in Marblehead, Mass., rector of St. Mark's, New York, 1802-16, and the founder of an excellent classical school. Pres. of Columbia Coll. 1811-29. D. Oct. 18, 1829.

Harris (**WILLIAM L.**), **D. D.**, b. Nov. 4, 1817, in O.; he

joined the Mich. conference in 1837, and after travelling some 10 yrs. as an itinerant preacher was elected prin. of the Baldwin Inst.; he subsequently served some 10 yrs. as prof. in the O. Wesleyan Univ. In 1860 he was elected assistant sec. to the Missionary Society of the M. E. Ch. At the Gen. Conference of his Ch. in 1872 he was elected bp. He has been energetically devoted to his denomination in her greatest enterprises, and was especially eminent in her anti-slavery struggle.

Harris (WILLIAM TORREY), LL.D., b. at Killingly, Conn., Sept. 10, 1835; entered Yale Coll. in 1854; became a teacher in St. Louis, Mo., 1857, and supt. of public schools there 1867; was in 1866 one of the founders of the Philosophical Society at St. Louis; founded the *Journal of Speculative Philos.* 1867, which he has since edited, and in which he has pub. many translations and original articles upon philosophical questions. His school reports are widely sought for and read both in this country and Europe, and large extracts from them have been republished in Eng. and Ger. He was one of the associate eds. of *J.'s Univ. Cyc.*

Harrisburg, city and important R. R. centre, cap. of Pa. and of Dauphin co., on the E. bank of the Susquehanna River, 60 m. from its mouth. It is 106 m. from Phila. and 121 m. from Wash.; lat. 40° 15' N., lon. 76° 12' W., and stands chiefly on a plateau from 26 to 50 ft. above low water in the river. The Pa. Canal, with its outlets and feeders, adds much to its facilities for trade. It is an extensive depot for lumber *via* the Susquehanna River. The State capitol build-



State Capitol (Harrisburg, Pa.).

ings, embracing offices for the different depts. of the State govt., are located in the midst of a beautiful park of 10 acres on a gentle rise of ground. They are plain brick edifices. The State Library comprises 40,000 vols., and a monument erected to the memory of the soldiers who fell in the Mex. war adorns the Capitol park. It has the Harrisburg Acad. and Inst., St. Genevieve's Acad., and a young ladies' sem. The prosperity of H. does not depend upon its being the cap. of the State, but upon its railway and canal communication with the coal and iron resources of the State; and it is these remarkable resources that have invited the large manufacturing establishments of iron, steel, boilers, galvanized iron cornices, brick, and tile. It is the seat of a R. Cath. bp. Pop. 1870, 23,104; 1880, 30,762; 1885, about 36,000.

Harrison, Mich. See APPENDIX.

Harrison (BENJAMIN), one of the signers of the Dec. of Ind., b. about 1740 at Berkeley, Charles co., Va., ed. at William and Mary Coll.; in 1764 was speaker of the house of burgesses, and again 1777-82; was a member of Gen. Cong. 1774-77, and gov. of Va. 1782-85; was brother of Gen. CHARLES HARRISON, Revolutionary officer, and Pres. W. H. HARRISON was son of Gov. Harrison, who d. in Apr. 1791.

Harrison (JOHN), b. at Faulby, Yorkshire, Eng., 1693; produced a new escapement for clocks and watches and a compensation (gridiron) pendulum 1725; went to Lond. 1735; invented the nautical chronometer 1736, and perfected it in 1759; received in consequence (1767) a prize of £20,000 offered for the invention of means by which mariners could tell their lon. within 30 m. D. in Mar. 1776.

Harrison (WILLIAM HENRY), the 9th Pres. of the U. S., b. Feb. 9, 1773, in Charles co., Va., at Berkeley, the residence of his father, Gov. Benjamin Harrison; studied at Hampden-Sidney Coll. with a view to entering the profession of med. In 1791 he became an ensign in the army, and in 1792 a lieut. on Wayne's staff; in 1795 was made capt. and commandant of Ft. Washington, now Cin., O.; in 1797-98 he was sec. of the N. W. Terr., and in 1799-1800 its delegate in Cong. He was (1801-13) gov. of Indiana Terr. and supt. of Indian affairs, and as such concluded 13 important treaties and gained the battle of Tippecanoe Nov. 7, 1811. In 1812 he was made maj.-gen. of Ky. militia and brig.-gen. in the army, with the command of the N. W. frontier. In 1813 he was made maj.-gen., and as such won much renown by the defence of Ft. Meigs and the battle of the Thames, Oct. 5, 1813. In 1814 he left the army and was employed in Indian affairs by the govt.; was M. C. from O. 1816-19, State senator 1819-21, U. S. Senator 1825-28, Presidential elector 1821 and 1825, U. S. minister to Colombia 1828-29, after which he retired to his farm at N. Bend, Hamilton co., O., 16 m. below Cin.,

where for 12 yrs. he was clerk of the co. court. In 1839 he was nominated for the Presidency by the Whigs at Harrisburg, Pa., Mr. Van Buren being the Dem. candidate, and Gen. H. received 234 electoral votes against 60 for his opponent. This election is memorable chiefly for the then extraordinary means employed during the canvass for popular votes. Mass meetings and processions were introduced, and the watchwords "log cabin" and "hard cider" (referring to statements of his political adversaries as to the gen.'s habitation and his favorite drink) were effectively used by the Whigs, and aroused a wonderful popular enthusiasm. D. Apr. 4, 1841, just 31 days after his inauguration. (See his *Life* by MOSES DAWSON, 1824; by S. J. BURR, 1840.)

Harrisonburg, on R. R., cap. of Rockingham co., Va., in the Shenandoah Valley. Rawley Springs are 12 m. E. of H. Pop. 1870, 2036; 1880, 2831.

Harrisonville, R. R. junc., cap. of Cass co., Mo., 45 m. S. S. E. of Kansas City. Pop. 1870, 1032; 1880, 1113.

Hartrodsburg, on R. R., cap. of Mercer co., Ky. Daughters' Coll. is located here. It has good mineral waters. Pop. 1870, 2205; 1880, 2202.

Hart (JAMES McDUGAL), b. at Kilmarnock, Scot., in 1828; came when a child to Amer., and lived at Albany, N. Y.; went to Düsseldorf, Ger., in 1851, and studied landscape-painting about a yr.; returned to Albany in 1852, removed to New York in 1856, was made an academicien in 1859. His pictures are admired for their harmony of color and the quiet peacefulness of their tone.

Hart (JOEL T.), b. in Clarke co., Ky., 1810; was bred a mason, and learned to read by the light of a wood-fire. While working in 1830 at Lexington, Ky., as a stone-cutter, he began modelling in clay, and soon won reputation. The *Angelina*, *Woman Triumphant*, and *Il Penseroso* are among his best works. He excelled in portrait-busts, and had much facility and taste as a poet. D. Mar. 2, 1877.

Hart (JOHN), one of the signers of the Dec. of Ind., b. at Hopewell, N. J., in 1708. He was a farmer, often sent to the provincial legislature, and known as "honest John Hart;" was in the Continental Cong. 1774-77, and was until after the battle of Trenton much persecuted by the Tories, who hunted their patriotic neighbor for a long time from place to place. D. in 1780.

Hart (JOHN SEELY), LL.D., b. in Stockbridge, Mass., Jan. 28, 1810, and in 1812 removed with his family to Luzerne co., Pa. He grad. in 1830 at Princeton with the first honors; was prin. of Natchez Acad., Miss., 1830-31; became in 1832 tutor, and in 1834 adjunct prof. of anc. langs. at Princeton; taught in the Edgehill School, Princeton, 1836-41; was prin. of the Phila. High School 1842-59; teacher and prin. of the N. J. Normal School, Trenton, 1862-71, and in 1872 became prof. of rhetoric and the Eng. lang. and lit. in Princeton Coll. Author of a large number of educational and religious works. Has been editorially connected with a number of periodicals, and an active promoter of the Sunday-school cause. D. Mar. 26, 1877.

Hart (NANCY), a heroine of Revolutionary fame in the annals of Ga. Though ignorant of letters and the civilities of life, yet she was a lover of liberty and the "Liberty boys," as she called the Whigs, and did many valorous acts in support of their cause. On one occasion, by her own prowess and strategy, she overcame a party of 5 of the enemy who came to her humble cabin for the purpose of insult, outrage, and plunder; one she killed outright, another she put *hors de combat*, and compelled the other 3 to surrender as prisoners at her discretion to avoid a similar fate. (See Mrs. ELLET'S *Heroic Women of the Amer. Revolution*.) In her honor the co. of Hart, Ga., embracing the place of her residence, was named.

Hart (Col. OSSIAN B.), a native of Fla., fought during the c. war on the side of the U., became a judge of the supreme court of the State. In 1870 was sent to the U. S. Senate by the Reps., but rejected by the Senate. In 1872 was chosen gov. of Fla. D. May 18, 1874.

Hart (WILLIAM), elder brother of J. M. Hart, b. at Paisley, Scot., in 1823; came to the U. S. in 1831; was bred a mechanic, and apprenticed to a coach-maker at Albany, but, exhibiting talent and taste for art, left the ornamental painting of carriages for the painting of canvas. His first publicly exhibited landscape picture in 1848 gained favorable notice. In 1850 he revisited his native land, and 3 yrs. spent abroad in study advanced him greatly in his art. He became an academicien in 1858. Is a very good water-color artist. The Water-Color Society owed its existence in large measure to him; for 3 yrs. he was its pres.

Harte (FRANCIS BRET), b. Aug. 25, 1839, at Albany, N. Y. In 1854 he went to Cal., digged gold, taught school, engaged in the express business, set type in the office of the *Golden Era*, became ed. of the *Californian*, a literary weekly, and was appointed sec. of the U. S. branch mint in San Francisco in 1864. Some of the poems which he pub. in San Francisco papers during the following yrs.—*The Society upon the Stanislar*, *The Phoenix Skull*, *John Burns of Gettysburg*, etc.—attracted great attention, and in 1868 he started a new magazine, the *Oregonian Monthly*. *The Luck of Roaring Camp* and *The Outcasts of Poker Flat* made quite a sensation, and with the publication in 1870 of *The Heathen Chinese* his popularity culminated. In the same yr. he was appointed prof. in modern lit. at the Univ. of Cal., but in 1871 he resigned his chair and settled in the city of New York. He has a decided talent for the description of life as it appears when for some reason or other it falls outside of civilized society and has to start anew.

Harte-beest [Dut.], or *Caama*, *Acclaphus caama*, a large antelope of S. Afr., which goes in great herds, is extremely swift, and is hunted for its flesh, which resembles beef. It is often domesticated.

Hartford, important R. R. and commercial centre, cap. of Conn. and of Hartford co., on W. side of Conn. River, 50 m. from its mouth, and head of navigation except for small boats; lat. 41° 45' 59" N., lon. 72° 40' 45" W.; 111 m. from New

York and 124 from Boston. It has a daily steamboat line to New York, and freight lines to Phila., Baltimore, and Albany. H. was settled in 1635 by emigrants from Newtown (now Cambridge) Mass. The Indian name for the locality was *Suckiaug*, and the settlers secured a deed in 1636 from Suckiaugassen (or Sequassen), chief of the Suckiaug tribe, but to secure a certain title the lands were repurchased in 1670. The settlement was first named Newtown, but changed to Hartford, after Hertford, Eng., said to have been the birthplace of Rev. Samuel Stone, teacher of the ch. The Dut. built a fort on the river in 1633, but were dispossessed by the gen. court in 1654. Among the early settlers were men who had been eminent in Eng. and in the Mass. colony. Emigrants from H. settled Farmington in 1645, Middletown and Norwalk in 1650, and Hadley, Mass., in 1659. In 1637, 42 of its 90 men went to the Pequot war. In 1775 a small committee of gentlemen met in H. and made arrangements for men and money which resulted in the memorable capture of Ticonderoga by Col. Ethan Allen. The first school was established in 1698, and the same yr. Ludlow, Haynes, Wolcott, Hopkins, and Hooker formed a written constitution, completed in 1639, which was the first framed in Amer., and embodied the main points of all subsequent State const. and of the Federal const. The first code of laws was drawn up by Ludlow in 1650, reducing the capital offences from 160 (in Eng.) to 15. The first mission was started in 1650 for the Christianization of the Indians. A prominent event in the hist. of the town was the effort of Sir Edmund Andros, gov.-gen. of N. Eng. in 1687, to secure the charter granted to the colonists in 1662 by King Charles II. Andros made formal demand for the instrument in the gen. court, and while discussion was in progress Capt. Joseph Wadsworth carried off the charter and secreted it in the famous "charter oak," or perhaps the original charter was secreted in the oak in June 1687, and Wadsworth carried off the duplicate. The historic tree survived till 1856, when it was blown down. It was an object of interest to every visitor to the city, and gave the name "Charter Oak City," as also a name to a street and to numerous societies and business corporations, and furnishes a "trade-mark" for many industrial productions. Its wood has been worked and carved into innumerable relics. A young tree from the old oak is growing in Bushnell park. The charter remained concealed until 1689. It is now preserved in the State-house, framed in wood of the "charter oak." The remains of the duplicate are held by the Conn. Historical Society. The State-house also contains a full-length portrait of Washington by Stuart, and portraits of most of the gov. of the colony and State to the present time. H. was the sole cap. of the Conn. colony until 1701, made so by the vote of the freemen. In 1701 the Oct. sessions of the gen. court were, by legislative act, ordered to be held at New Haven, while the May session was held at H. The adoption of the const. of 1818, though it did away with the Oct. session, legally established the double-capital system. In 1873, after yrs. of controversy, a constitutional amendment was adopted making H. again the sole cap. The State had previously appropriated \$500,000, and H. \$500,000, for the erection of a new State-house. H. purchased the Trinity Coll. grounds for \$600,000, and presented the site to the State, and in 1873 the State appropriated \$500,000 more toward the edifice. Subsequent appropriations make the entire cost about \$2,500,000. It is of white marble, and occupies a commanding position in the West Park. Bushnell Park, with the State-house grounds,



New State Capitol (Hartford, Conn.).

contains 46 acres. Charter Oak Park and fair-grounds border on the railroad S. of the city. A prominent business interest of the city is insurance. It is the seat of a R. Cath. bp. The first ch. organization was brought from Cambridge by the settlers, with their ministers, Rev. Thomas Hooker, pastor, Rev. Samuel Stone, reader, and William Goodwin, ruling elder, and is now the First or Centre Congl. ch. The Second or South Congl. ch. was organized in 1669-70. The first ch. edifice was built in 1638. The educational insts. are Trinity Coll. (Epis.), founded in 1823 as Washington Coll.; Hartford Theological Inst.; Hartford High and Gram. School, a thorough system of public schools; Hartford Female Sem.; "Woodside," a school for young ladies; 2 nurseries, etc. Its libraries are the Watkinson Library of reference, Hartford Library, Trinity College, Theological Institute, the Historical Society's library, and the State law library, which is very complete. In this library are preserved many letters

from Eng. kings to the colonial gov. Wadsworth Athenaeum contains the Watkinson, Young Men's Inst., and Historical libraries; the rooms of the Historical Society, filled with relics and records covering the whole hist. of the country, open to the public free; a statuary-room, and a picture-gallery. The State arsenal, and also the Colt Firearms Co.'s works are located here; an artesian well 1584 ft. deep upon the Colt estate supplies 50 gals. a minute. H. is a central market for Conn. seed-leaf tobacco. The first printing-office in the city was started in 1764 by Thomas Green, who the same yr. established the *Connecticut Courant*, which has been pub. regularly to the present time. The Amer. Asylum for Deaf and Dumb, started here by Rev. Thomas H. Gallaudet 1816, is the oldest inst. of the kind in the country. There are a retreat for the insane, the H. Hospital, and the H. Orphan Asylum. Pop. 1870, 37,180; 1880, 42,015. [From orig. art. in *J.'s Univ. Cyc.*, by S. A. HUBBARD, ED. "COURANT."]

Hartford City, Ind. See APPENDIX.

Hartford Convention. This body, so called from its place of meeting, was composed of 12 delegates from Mass., 7 from Conn., 3 from R. I., appointed by the legislatures of those States, and of 2 from parts of N. H. and 1 from Windham co., Vt. It met Dec. 15, 1814, and adjourned Jan. 5, 1815, *sine die*. George Cabot of Mass. was the pres. and Theodore Dwight of Conn. was the sec. Its object in gen. was to consider the grievances of the N. Eng. States, then controlled by the Federal party, against the Dem. administration of the U. S. The Federal party, out of N. Eng., gave no decided approval of the convention. It was falsely charged that the meeting was a step preparatory to a separation of the States represented in it from the U. S. Soon after it met, the repulse of the Brit. army at New Orleans and the treaty of Ghent in Feb. took away all influence from it, and it only accelerated the downfall of the pure and able Federal party.

In 1833 the journal was pub., and enables us to affirm that complaint was made (1) that the administration left N. Eng. defenceless; (2) that the powers of the gen. gov. needed to have some check put upon them by new guaranties to the States; but (3) it was said in the acts of the 3 States calling the convention that the means of defense which might be devised in the convention were not to be repugnant to their obligations as members of the U. Three measures proposed protection against forcible drafts of militia, and assuming, on the part of these States, with consent of the U. S. gov., the defense of their coasts. They also proposed certain amendments of the Federal const., such as that representatives and direct taxes should be in proportion to the number of free persons in the States; that admission of new States should require a vote of $\frac{2}{3}$ of both houses of Cong.; that embargoes on vessels of citizens should last not more than 60 days; that war should not be declared without a $\frac{2}{3}$ vote of Cong.; that a naturalized person should be incapable of being made Pres., and the same person not be chosen to that office a second time, nor the same State furnish a Pres. twice in succession.

THEODORE D. WOOLSEY.

Hartley (Sir CHARLES AUGUSTUS), F. R. S. E., b. at Heworth, Durham, in 1825; at the age of 20 he became engaged in the construction of railways in Scot.; was appointed in 1848 resident engineer on harbor works at Plymouth and Devon, under the late Joseph Locke, M. P. C. E. On June 22, 1855, he received the queen's commission as capt. in the Tur. contingent engineers, and served at Kerch with that force until the conclusion of the Crimean war. He was appointed, Jan. 1, 1857, engineer-in-chief to the European commission of the Danube, and received in 1862 the honor of knighthood. He has been employed by the Aus., Tur., Rus., Brit., Indian, and Roumanian govts. to report on various schemes for improving ports, docks, etc., and has received many orders, prizes, medals, and premiums. He is a member of the Inst. of Civil Engineers, Lond., a F. R. S. of Edinburgh, and consulting engineer to the European commission of the Danube.

J. G. BARNARD.

Hartmann, von (EDUARD), b. in Berlin Feb. 23, 1840. He was ed. at the School of Artill., and became an officer in 1861. Devoted himself to philosophical studies. His prin. work is his *Philosophie des Unbewussten* (1869). His idea is to connect the results of the abstract philos. with those of the concrete inductions of natural science. The point in which these 2 lines of research meet each other and prove each other is the unconscious. The unconscious in nature has a will—not a merely blind, irrational will, but one which can determine itself to prototypal ideas; and an idea—not a merely logical idea, but one which can reach reality by will. In the mind this will and this idea become conscious by means of brain and nerves, but the unconscious is still at work in the instincts, in love, in the formation of lang., etc., and in the unconscious the "first principles" are to be found.

Hartmann, von (JACOB), BARON, was b. a Fr. citizen Feb. 4, 1795, in the Bavarian palatinate; entered 1811 as a lieut. the 1st regiment of the grand duchy of Berg. He fought 1813-15 under Fr. colors. At Waterloo he saved the eagle of the regiment. After the peace of Paris (1815) he left the Fr. service and entered the 10th Bavarian regiment of inf. In 1842 he was appointed adjutant to the crown prince Maximilian, and in 1848 he became maj.-gen. and adjutant to the king. In 1854 he visited Fr., and pub. later an excellent military work on the It. war in 1859. In 1861 he became lieut.-gen. and commander of the 4th division of inf., and as such he took part in the war of 1866. In 1869 he became a gen. of inf., and led the 2d Bavarian army corps against Fr. in 1870 and 1871. He took part in the encounter at Weissenburg, contributed to the victory in the battle of Wörth, took the fortress of Marsal, fought at Sedan, and kept, during the siege of Paris, the plateau of Chatillon occupied. D. Feb. 22, 1873.

Hartmann, von (JULIUS), was b. Mar. 2, 1817, at Hanover; entered the 10th Prus. regiment of hussars 1834, and in 1848 was attached to the staff; was often employed in diplomatic missions; was sent in 1850 to Schleswig-Hol-

stein, and later to Aus. and Sax.; was made a maj.-gen. in 1865, and commander of Coblenz. In 1866 he took part in the encounters of Zwithau, Tobitschau, and Rokeinitz. In 1867 he was given the difficult task of reorganizing the Bavarian army in harmony with the army organization of Prus.; in the Franco-Ger. war he received the command of the 1st division of cav., and fought at Courcelles and Gravelotte. Jan. 6, 1871, was appointed commander of a larger detachment, comprising all arms, with which he operated in the region between the Loire and the Loir, and took Tours Jan. 13. After peace he became gov. of Strasbourg, and in 1874 was made a gen. of cav. D. Apr. 30, 1878.

Hartranft (JOHN FREDERIC), b. in New Hanover tp., Montgomery co., Pa., Dec. 16, 1830; grad. at Union Coll., N. Y., 1853; admitted to the bar of Montgomery co., Pa., 1859. At the outbreak of the c. war he was col. of militia, and among the first to tender his services to the gov. As commander of the 4th Pa. he served during the 3 months' term, and as volunteer aide to Gen. Franklin in the first battle of Bull Run. Commissioned col. 51st Pa. Volunteers July 27, 1861, and with it accompanied the "Burnside expedition," leading it in the attack on Roanoke Island, Feb. 7, and in the battle near Newberne, N. C., Mar. 13, 1862; was engaged in the second battle of Bull Run and Chantilly, and in the Md. campaign at S. Mountain and Antietam, and with Burnside's transfer to the dept. of the O. was ordered to Ky. In June 1863 he commanded a brigade before Vicksburg. In command of a division at battle of Campbell's Station, Nov. 1863, and participated in the repulse of Longstreet from before Knoxville. In the Richmond campaign of 1864 he commanded a brigade in the battles of the Wilderness and Spottsylvania; commissioned brig.-gen. May 12, 1864, and engaged in all army movements to and before Petersburg, and brevetted maj.-gen. for gallantry in recapturing Ft. Steadman, Mar. 25, 1865. In Oct. 1865 was elected auditor-gen. of Pa., and re-elected in 1868; gov. of Pa. 1873-79, collector of port of Phila. in 1880.

Hart's Falls, or Schaghticoke Point, on R. R., Rensselaer co., N. Y. Pop. 1870, 1111; 1880, 1275.

Hartshorn. See AMMONIA, by PROF. C. F. CHANDLER.

Hartshorne (EDWARD), M. D., son of Dr. Joseph Hartshorne, b. in Phila. in 1818; grad. at Princeton in 1837, and M. D. at the Univ. of Pa. 1840; was elected resident surgeon to the Pa. Hospital in Apr. 1841, and after 2 yrs.' service there was elected phys. to the E. State Penitentiary of Pa. A residence of 15 months in the med. charge of this penitentiary and constant observation of the working of the "separate system of prison discipline," led him to prepare 2 reports (1843 and 1844) in favor of the innocuous sanitary influence of the system when properly administered, which attracted much attention as the first evidence of the kind derived from practical experience upon the spot. He engaged in gen. practice in Phila. after more than 2 yrs. travel and study among the hospitals, asylums, and prisons of Europe, and subsequently among those of the N. Atlantic States of this country; served throughout the c. war as consulting surgeon and in other professional capacities in the U. S. army med. service, chiefly in Phila. U. S. army hospitals; also as active member and sec. of the executive committee of the U. S. Sanitary Commission in Phila. During many yrs. he has been an active member of the board of managers of the Epis. Hospital of Phila. He served as sec. to the first prison discipline convention in Phila. (1847), and to the first sanitary convention in the U. S. (Phila. 1857); also as sec. for several yrs. of the Coll. of Phys. of Phila., and subsequently one of the censors of the coll.; was pres. of the Pathological Society of Phila. and chairman of the committee of arrangements for the meeting of the Amer. Med. Association at Phila. in 1872. During many yrs. he was a frequent contributor to med. papers, and took part in editing 2 successive eds. of Taylor's *Manual of Med. Jurisprudence*, with Amer. notes and references.

Hartshorne (HENRY), M. D., son of Dr. Joseph Hartshorne, b. in Phila. in 1823; grad. B. A. at Haverford Coll. in 1839, and M. D. in the med. dept. of the Univ. of Pa. in 1845; was appointed in 1859 prof. of the practice of med. in the med. dept. of Pa. Coll. In 1865 he was elected the first prof. of hygiene in the Univ. of Pa.; has held also professorships at Haverford Coll. and in the Woman's Med. Coll. of Pa.; author of a *Monograph on Glycerine, Essay on Cholera, Guide to the Med.-Chest, and Essentials of the Principles and Practice of Med.*, and became ed. of the *Friends' Review* in 1874. Wrote *Evolution in J.'s Univ. Cyc.*

Hartshorne (JOSEPH), M. D., b. near Alexandria, Va., in 1779; became a med. student in the Univ. of Pa. in 1800, and grad. M. D. in 1805, after a 5 yrs.' training under Rush, Wistar, Physick, and others. After 2 voyages to the E. I. and a 3 months' residence in Batavia, he settled in Phila. and engaged in practice. He was elected a colleague of Physick as one of the attending surgeons of the Pa. Hospital, and continued in active private and consulting practice until broken down by the fatigues of the cholera epidemic of 1849. Wrote an appendix, with illustrations, to an Amer. ed. of a Lond. translation of Boyer's work on *Diseases and Injuries of the Bones*. D. Aug. 1850.

Hart'suff (GEORGE L.), b. at Tyre, Seneca co., N. Y., May 28, 1830; grad. at the U. S. Military Acad., and entered the army as brevet second lieutenant July 1, 1852; did duty in garrison; on the Tex. frontier and in Fla. From 1856 to 1859 he was on duty at W. Pt. as assistant instructor of artil. tactics; then on frontier duty again. In Mar. 1861 he was appointed a capt. and assistant adjutant-gen., and in Apr. sent to Ft. Pickens with the secret expedition under Gen. Brown; in July he became chief of staff to Gen. Rosecrans in W. Va., participating in the action at Carnifex Ferry, Sept. 10; in Apr. 1862 he was appointed a brig.-gen. of volunteers, and assigned to special duty in the war dept. In May he took command of a brigade, and was engaged at the battles of Cedar Mountain and Manassas, also at S. Mountain and Antietam. Having been promoted to be

maj.-gen. of volunteers Nov. 1862, he commanded the 23d army corps in the West from Apr. to Nov. 1863; was employed on bureau duty till Mar. 1865, when he commanded the Bermuda front of the siege-works before Petersburg, assuming command of that city on its capture; was mustered out of the volunteer service Aug. 1865. Afterward resumed duty in the adjutant-gen.'s dept., with the rank of lieutenant-col. He was retired in June 1871, on the full rank of maj.-gen. U. S. A. D. May 16, 1874.

Hartz, or Harz, an insulated group of mts. in N. W. Ger., or, rather, an elevated plateau, intersected with deep valleys and rising in different places into high peaks. These mts., which cover an area of about 800 sq. m., occupying Brunswick and parts of Hanover and Prus. Sax., are covered with forests, and are exceedingly rich in minerals—gold, silver, lead, iron, marble, and alabaster. The highest peak is the Brocken, 3740 ft. high, which is the birthplace of numerous superstitions and fairy-tales.

Harvard, R. R. junct., McHenry co., Ill., 63 m. N. W. of Chicago. Pop. 1870, 1120; 1880, 1607.

Harvard, Clay co., Neb., on R. R., 81 m. W. of Lincoln, the State cap. Pop. 1880, 768.

Harvard (JOHN), M. A., the founder of Harvard Coll., b. in Eng. about 1608, probably in Middlesex, ed. at Emanuel Coll., Cambridge. He came to N. Eng., and in 1637 became a freeman of the Mass. colony. In 1638 some land was set off for him in Charlestown, where he performed the duties of minister. In that yr. he was one of a committee to consider matters "tending toward a body of laws." D. Sept. 14, 1638, and left half his estate, or £779 17s. 2d., toward the founding of a coll., beside more than 300 vols. of books from his library. Mr. Everett delivered the address at the dedication of his monument at Charlestown in 1828.

Harvard University. In 1636 the gen. court of the colony of Mass. Bay voted to give £400 toward a school or coll., and steps were taken the following yr. for such a coll. at Newtown (afterward Cambridge). In 1638 John Harvard left his library (over 300 vols.) and half his property to the inst. The value of this bequest was over double the sum voted by the court, and it was resolved to open the coll. at once, and to give it the name of Harvard. The first class, 9 in number, grad. in 1642. Its form of govt. has been greatly modified at various times. At the outset the magistrates of the colony and certain preachers formed, *ex officio*, the board, and it was not until 1810 that steps were taken to make a part of the number elective. The State govt. retained a more or less direct control over the const. of this board until 1865, when all official connection between the coll. and the State was broken by the passage of a legislative act, according to which vacancies in the board of overseers were to be filled thereafter by the alumni of the coll. The property of the univ. is managed by the corporation, but in all matters relating to the internal administration of coll. affairs, the consent of the overseers is necessary. The central dept. is H. Coll. Every student is not required to pursue the same course of study and pass the same examinations. After the freshman yr., in which the studies are all prescribed, the student is practically at liberty to choose his course of study. About 1/2 part of the instruction provided is all that it is possible for any one student to pursue during his whole residence. The elective courses are classified under the heads of anc. langs., classics, modern langs., philos., hist., math., physics, chem., nat. hist., music, and the fine arts. In 1782 the first steps were taken by the corporation toward the establishment of professional schools in connection with the coll. by the appointment of profs. in med. subjects, but it was not till about 30 yrs. later that a separate coll. was built for the med. dept. Until 1812 the coll. govt. and students had united in public worship with the first parish in Cambridge, but in that yr. the opinion was expressed by the overseers that religious instruction should be given on the Sabbath within the univ. The discussions thus begun led in a few yrs. to the founding of a theological school, the essential feature of which is, "that no assent to the peculiarities of any denomination of Christians shall be required either of the instructors or students." The law school was established in 1817, but the number of students was small until after the reorganization of the school in 1829. Since that time it has been one of the most flourishing depts. of the univ. The Lawrence Scientific School was established in 1847, "for the purpose of teaching the practical sciences." Connected with this is the School of Mining and Practical Geol., founded in 1865. The Museum of Comparative Zoology, more popularly known as the Agassiz Museum, is not a constituent part of the univ., although it is directed by a faculty appointed by the corporation. There is, however, such an intimate connection between the museum and the coll. that a large part of the coll. instruction in nat. hist. is given at the museum. The Botanic Garden and the Herbarium afford facilities for the study of bot. which are unsurpassed in Amer. The Astronomical Observatory, erected in 1846, is equipped with the best of instruments. The Bussey Inst. is a school of agriculture and horticulture, established as a dept. of the univ. The Peabody Museum of Amer. Archaeology and Ethnology possesses a rapidly accumulating collection of objects illustrating the habits and customs of the early races inhabiting this country. Beside the large libraries of the professional schools, there is the gen. library, containing 210,000 vols., beside about 200,000 pamphlets. The invested funds of the univ. amount to about \$3,000,000, exclusive of grounds, libraries, and buildings used for instruction. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. W. H. PETTEE.]

Harvel, on R. R., Montgomery co., Ill. Pop. tp. 1880, 670.

Harvest Moon, the full moon nearest the autumnal equinox. In G. Brit. and N. Europe the moon rises for several evenings in succession near the time of sunset, an irregularity which is less observable in the U. S., on account of our lower lat. At the equator no such anomaly is observable. The S. hemisphere has a H. M. in Mar. The name is

given from the fact that it enables farmers to lengthen the day's work during the harvest.

Harvey (Sir JOHN), K. C. B. b. in 1778; entered the Brit. army in 1794; served in the wars against Nap., and in S. Afr., India, and Canada, and was distinguished at Stony Creek, Chrysler's Farm, Lundy's Lane, and Ft. Erie; was aide-de-camp to Wellington in the Waterloo campaign; was gov. of N. B. 1835-41, of Newfoundland 1841-46, and of N. S. 1846-52; became lieut.-gen. D. Mar. 22, 1853.

Harvey (Louis P.), b. at E. Haddam, Conn., July 22, 1820; removed at the age of 8 with his parents to O.; ed. at Western Reserve Coll.; removed to Kenosha, Wis., in 1840, and devoted himself for a time as teacher, subsequently as ed. of the Whig paper of that city; was a member of the State senate from 1855 to 1857, when he was elected sec. of state, and gov. Nov. 1861. D. Apr. 19, 1862.

Harvey (MATTHEW), LL.D., b. at Sutton, N. H., June 21, 1781, grad. at Dartmouth in 1806; became a lawyer 1809; was a prominent State legislator, speaker of the N. H. house 1818-20, pres. of N. H. senate 1824-28, State councillor 1828-30; in Cong. 1821-25, gov. 1830-31, a justice of the U. S. dist. court 1831-66. D. Apr. 7, 1866.

Harvey (WILLIAM), M. D., b. at Folkestone, Kent, Apr. 1, 1878, was ed. at Calus Coll., Cambridge, and at Padua, where he took his doctor's degree; returned to Eng. in 1902; became phys. to Bartholomew's Hospital, Lond.; Lumsien lecturer on anat. and surgery 1915; was phys. to James I. and Charles I.; was attached to the court of the latter, followed his fortunes in the c. war, and became warden of Merton Coll., Ox., probably in 1643. Harvey's great discovery of the circulation of the blood seems to have been suggested by him in 1616, announced in 1619, and pub. in *Exercitatio de motu cordis et sanguinis* (1628). D. June 3, 1658.

Hasdrubal, or **Asdrubal** (Baal is his help), (1) a son-in-law of Hamilcar Barca, went to Sp., and there founded New Carthage (242 B. C.); brought nearly all Sp. under the rule of Carthage; was murdered by a slave 221 B. C. (2) Son of Hamilcar Barca and brother of Hannibal; defeated by the Scipios in a battle on the Iberus, 216 B. C.; reduced the Numidians to quietness 213 B. C.; defeated Cn. Scipio in Sp. 212 B. C.; was defeated by P. Scipio the Younger at Bæcula 209; invaded It., and was defeated on the Metaurus by Livius and Nero, 207 B. C. (3) A son of Gisco, served in Sp. in the second Punic war; was defeated by Scipio at Silipta 206 B. C.; was twice defeated before Carthage by Scipio 204 B. C.; committed suicide by poison. (4) A gen. in the last Punic war; defeated by Masinissa and forced to capitulate 150 B. C.; served against the Roms. before Carthage 149-147; commanded against Scipio in the defence of Carthage (147-146 B. C.) and after the destruction of that town lived a captive in It.

Hasse (KARL AUGUST), b. at Stienbach, Sax., Aug. 25, 1800; became in 1829 prof. of philos. at Leipzig; prof. of theol. at Jena 1830; has long been a prominent rationalist, and in 1844 became an ed. of the *Protestantische Kirchenzeitung*. Author of *Huttenus Redivivus, Leben Jesu, Kirchengeschichte, Neue Propheten, Das geistliche Schauspiel*, etc.

Hasse (KARL BENEDICT), b. May 11, 1780, at Sulza, in Sax.; prof. of modern Gr. and of palæography in the School of Oriental Langs. in Paris, afterward director of the same; prof. of Ger. lang. and lit. in the Polytechnic 1830, prof. of comparative gram. at the Sorbonne 1852, beside other honorable appointments. Contributed many valuable articles on philology to the *Journal des Savants*, *Journal Asiatique*, *Revue Archéologique*, etc. Edited *Laurentius Lydus de Osiensis et Leo Diaconus* (in Byz. Script.), was prin. ed. of the new edition of *Stephani Thesaurus Lingue Græcæ*. D. Mar. 21, 1864.

Hashish [Ar.], a variety of *Cannabis sativa* (hemp), is cultivated in dists. N. of Calcutta for the production of (1) *bhong* (Hindustani), *hashish* (Ar.), the dark-green stalks and green leaves used in smoking or as a constituent of a sweet-meat (*majun*); (2) *ganja*, the flowering shoots brought into the Lond. drug-market under the name of *quaza*; (3) *charas* or *churris*, the resin which exudes from the branches and leaves of the plant. H. has long been employed in med. in Asia. Arabs, Pers., Indians, Chi., and S. Afrs. esteem it for its intoxicating powers, but many people of European race are scarcely influenced by it, and upon those who are intoxicated by its use the effects are extremely varied.

Hasssaurek (FRIEDRICH), b. at Vienna Oct. 9, 1832; served in the student legion in the revolution of 1848; came in 1849 to the U. S., and became a journalist and lawyer of Cin.; was U. S. minister to Ecuador 1861-65, and in the latter yr. became ed. of the Cin. *Volksblatt*. Author of *Four Years among the Sp. Amers.*

Hassler (FERDINAND RUDOLPH), a Swiss math., b. Oct. 6, 1770; was prof. of math. at W. Pt. 1807-10; supt. of U. S. Coast Survey 1816-18 and 1832-43. Author of several mathematical works. D. Nov. 20, 1843.

Hassler Expedition. The U. S. Coast Survey having found it necessary to provide a new steamer for hydrographic purposes on the Pacific coast, the Hassler, an iron screw vessel of about 350 tons, was built, and placed under the orders of Com. P. C. Johnson, U. S. N. Prof. Peirce, the supt., offered to Prof. Agassiz the privilege of making the voyage in her with a limited number of assistants. The steamer sailed from Boston Dec. 4, 1871. Only surface observations were made on the passage to St. Thomas. At Barbadoes very rich dredgings were made in 100 to 120 fathoms. The rough sea prevented any work being done from that port to Pernambuco, but along the coast of Brazil the dredge was used whenever the weather permitted. Rio Janeiro was reached Jan. 23, 1872, where 3 weeks were spent for various repairs to the vessel. Montevideo was next visited for coaling, but the ship was placed under quarantine. The next halting-place was San Matias Bay, Patagonia. In the Straits of Magellan stoppages were made every night, and occasionally a day or two spent in interesting localities, where abundant collections were made and interesting observations on the former and present state of the glaciers recorded by

Prof. Agassiz. On the coast of Chili, San Carlos, Lota, and Talcahuano were visited. The steamer went from the latter place to Juan Fernandez, while Prof. Agassiz went by land to Valparaiso. Some deep soundings were taken in the neighborhood of that island, but the dredging-rope, having been injured by dampness in the hold, failed to give the results which were expected from it. Valparaiso, Callao, and other places were visited, and finally San Francisco was reached Aug. 1872, after touching at Panama and elsewhere. Some of the zoological results of the expedition have been pub. by Messrs. A. Agassiz, Lyman, and Pourtales, but the death of Prof. Agassiz prevented the publication of his numerous observations, except in the preliminary form of letters to Prof. Peirce.

Hastings, town of Eng. on the Eng. Channel. Here William the Conqueror landed, and the decisive battle was fought in 1066 in the vicinity. The harbor was ruined in the time of Elizabeth by a storm, and H. is now best known as a bathing-place. Pop. 42,258.

Hastings, city, on R. R., cap. of Barry co., Mich., on the Thornapple River, 30 m. from its junction with the Grand River and 32 m. S. E. of Grand Rapids. Pop. 1870, 1793; 1880, 2531; 1884, 2694.

Hastings, R. R. jun., city, cap. of Dakota co., Minn., on the W. bank of the Miss. River, opposite the mouth of St. Croix Lake, 30 m. below St. Paul. It is a wheat and lumber market. It has a public library and an acad. for ladies. Pop. 1870, 3458; 1880, 3809.

Hastings, R. K. jun., city, cap. of Adams co., Neb. Pop. 1880, 2817.

Hastings (THOMAS), MRS. DR., b. in Washington, Conn., in 1784; removed to Clinton, N. Y., with his father when 12 yrs. of age; was ed. of a religious journal of Utica, N. Y., 1824-32; became a musical instructor and composer of sacred music in New York city. Author of *Spiritual Songs*, *Chor. Psalmist*, poems, hymns, etc., and compiler of ch. music. Many of his compositions are widely known, and have attained enduring popularity.

Hastings (WARREN), LL.D., b. at Daylesford, Worcestershire, Dec. 6, 1732; went to Bengal in 1750, taken prisoner by Surajah Dowlah in 1756, served under Clive 1757, resident at the court of Meer Jafar 1757-61, member of the council at Calcutta 1761; returned to Eng. 1764; returned 1769 to India, was second in the Madras council 1769, pres. of the supreme council of Bengal 1772; assisted the nabob of Oude against the Rohillas 1773-74; first gov.-gen. of India 1774-85; quarrelled with the councillors 1774; procured the execution of his enemy Nuncomar 1776; received notice in 1778 that his resignation was accepted, but disavowed the resignation; married the divorced baroness Imhoff 1778, sent an expedition against the Fr. in 1778, fought a duel with Philip Francis 1780, accepted bribes from the rajah of Benares 1780, made Sir Elijah Impey judge of the court of appeal 1781, compelled the Madras govt. to give up the revenues of the Carnatic to the nabob 1783, in disobedience of the orders of the directors; made the conquest of Benares 1784, and concluded the treaty of Chunar; resigned and went to Eng. 1785. Articles of impeachment for high crimes and misdemeanors were presented by Burke against Mr. H. in Feb. 1786. In his famous trial the eloquence of Burke, Sheridan, and Fox failed to convict him, it having been shown that India had improved greatly under his rule, and that H. was extremely popular with the natives and with the majority of the Europeans of his govt. D. Aug. 22, 1818.

Hatch (EDWARD), b. in Me.; removed to Ia., and became capt. 2d Ia. Cav. Sept. 1861, rising to be col. of the regiment June 1862, and in command at New Madrid, Island No. 10, and Corinth; commanded a brigade at Iuka, and subsequently a division of cav. in the Army of the Tenn. Appointed brig.-gen. of volunteers May 30, 1864, and commanded a cav. division at the battles of Franklin and Nashville; made brevet brig.- and maj.-gen. In July 1866 was appointed col. of the 9th U. S. Cav.

Hatch (JOHN P.), b. in New York in 1822, grad. from the U. S. Military Acad., and appointed brevet second lieut. of inf. July 1, 1845, rising through successive grades to be lieut.-col. of cav. 1873; in the Mex. war took part in various engagements from Palo Alto to the capture of city of Mexico; subsequently in garrison and on frontier duty; in the c. war was appointed brig.-gen. of volunteers Sept. 1861, and commanded a cav. brigade in the Shenandoah Valley and N. Va.; at the battle of S. Mountain, Sept. 14, 1862, commanded a division; subsequently commanded various dists. in the South; brevetted maj.-gen.

Hatching, the development of the young of an oviparous animal from the egg. A few reptiles perform a kind of incubation, but they probably do this only to guard their eggs. A few birds, like the ostrich, leave the eggs in the hot sand during the heat of the day, the heat of the mother's body not being necessary. Other birds, like the Megapodidae, place their eggs in heaps of rotting organic matter, the heat of which hatches out the young. In Egypt and Chi. eggs are hatched by artificial heat, and a machine called Eccealeobion has been employed for the same purpose.

Hatfield (EDWIN FRANCIS), D. D., b. in Elizabethtown, N. J., Jan. 9, 1807, grad. at Middlebury Coll., Vt., in 1829; spent 2 yrs. (1829-31) in Andover Theological Sem.; was ordained by the third Presbytery of New York May 14, 1832; pastor of the Second Presb. ch. of St. Louis, Mo., 1832-35, of the Seventh Presb. ch. of New York City 1835-56, and of the N. Presb. ch. 1856-63, when he was compelled by loss of health to give up pastoral work. After resting a yr. he became special agent of the Union Theological Sem. in New York 1864-66, and again 1870-73, raising a large sum of money for its endowment. Since 1846 he has been stated clerk of the Gen. Assembly. Wrote *Universalism as it is*, *Memoir of Elihu W. Baldwin*, D. D., *St. Helena and the Cape of Good Hope*, *The Hist. of Elizabeth, N. J.*, *The Church History Book*, *with Figures*, etc.; also edited *The New York Observer Year-Book* for 1871, 1872, and 1873. D. Sept. 22, 1883.

R. D. HITCHCOCK.

Hauch, howk (JOHAN CARSTEN), b. at Frederikshald, Nor., May 12, 1790, and studied at the Univ. of Copenhagen, where in 1821 he took the degree of Ph. D.; 1846-48 held the professorship of Scandinavian lit. and lang. at the Univ. of Kiel, but on the outbreak of the rebellion he returned to Den., and became (1851) Ehlerslæger's successor as prof. of aesthetics at the Univ. of Copenhagen. Wrote dramas, such as *The Two Sisters from Kinneliff*, *Tiberius*, *Sevend Grathe*, *Mark Skig*, and others; lyrical poems, and novels, such as *Wilhelm Zabern*, *A Polish Family*, *Robert Fulton*, etc. D. Mar. 4, 1872.

Hauglands, the followers of Hans Nielsen Hauge (1771-1824), a reformer, b. in Nor. He opposed the Creeds, advocated the idea that all should share in the work of the ministry, and laid great stress upon faith and upon strict ch. discipline. His labors led to a great religious revival, but he was imprisoned, heavily fined, and compelled to cease from his labors.

Haupt, howpt (MORITZ), a distinguished philologist, b. in Zittau July 27, 1806; prof. of the Ger. lang. and lit. 1843 in Leipsic; in consequence of his participation in the political movements of 1848-49 was removed; called, however, in 1853 to take Lachmann's place in the Univ. of Berlin as prof. of classical lit. He edited with Hoffmann *Alteutsche Blätter*; founded in 1841 *Zeitschrift für deutsches Alterthum* (Leipsic); pub. poems of *Walthar von der Vogelweide*, *Armen Heinrich*, and other old Ger. works; edited *Caullus Tibullus* and *Propertius*, Ovid's *Halieutica* and *Metamorphoses*, and other minor works. D. 1874.

Hauran [Heb. *Hauran*, from *hur*, "cave"], the present Arabic as well as Eng. name of a dist. in Syria S. of Damascus and E. of the Jordan, mentioned by Ezek. (xlvi. 16, 18), and nowhere else in the O. T., as the appointed N. E. boundary of the Holy Land after the captivity in Babylon. In the Gr. and Rom. period, H. (Gr. *Aupaviris*) was one of the 4 provs. of Bashan. The Ar. *geups*, make it embrace the greater part of anc. Bashan; and so do some modern travellers, who say the natives regard it as consisting of 3 parts—*en-Nikrah*, *el-Lejah*, and *Jebel Hauran*. This whole region is volcanic, very fertile, and contains hundreds of deserted or ruined towns, with many Gr. inscriptions, referred mostly to the Rom. period. Druses, Bedouin, and a few Chrs. now inhabit the region. Others restrict the application of name to the more level part of the dist. (the anc. *Auranitis*).

Haureau, o-râ-ô' (JEAN BARTHÉLEMY), b. in Paris Nov. 9, 1812; began as a journalist in the provs., and was sent to the constituent assembly of 1848. Under the empire he resigned his functions of keeper of the MSS. at the National Library, but was chosen librarian for the lawyers' corporation of Paris. He was elected member of the Acad. of Inscriptions and Belles-Lettres. H. pub. many works of erudition and contributed largely, in Louis Philippe's reign, to *Le Droit*, *Le Journal du Peuple*, *Le National*, etc. He has written a *Hist. of Poland*, *Criticism of Palaeus's Metaphysical Hypothesis*, the 14th, 15th, and 16th vols. of the great compilation *Gallia Christiana*, *Francis I. and his Court*, *Charlemagne and his Court*, etc.

Hauser, how'zer (KASPAR), b. Oct. 7, 1812, at some unknown place, and kept for 16 yrs. in some other place in a dark cellar, fed upon bread and water, and learning nothing, not even to walk. On May 26, 1828, he was found in the streets of Nuremberg. His helplessness excited sympathy, the more so as he was a fine-looking youth, and the mystery which surrounded him made him the subject of curiosity. He was placed under good circumstances, and his education began, but attempts to assassinate him were made in a mysterious manner, and at last he was stabbed in the royal garden at Anspach, and d. Dec. 17, 1833. Very different views have been propounded in explanation of this story.

Hautpoul, o-pool', the name of an anc. family of Languedoc, which since the 8th century has produced many eminent men. JEAN JOSEPH D'HAUTPOUL SALETTE (1754-1807) was a brilliant gen. of cav., who fell at Eylau.—MARIE-CONSTANT FIDÈLE HENRI AMAND, MARQUIS D'HAUTPOUL (1780-1854), a distinguished officer of Nap.'s horse artil. and cav.; was made a field-marshal in 1819, and gov. to the young duke of Bordeaux.—ALPHONSE HENRI, MARQUIS D', brother of the preceding, b. at Versailles Jan. 4, 1789; officer of the 59th inf. 1806; was badly wounded at Arapiles 1812; col. 1815, brevet field-marshal 1829, minister of war 1830, lieutenant-gen. 1841, peer of Fr. 1846; commander-in-chief of the army at Rome and minister to the Holy See, and, later, minister of war 1849; gov.-gen. of Algeria 1850, senator 1852; became marquis in 1854. D. July 28, 1865.

Haüy, ah-we' (RENÉ JUST), ABBÉ, b. at St. Just, Picardy, Feb. 28, 1743; laid before the Acad. of Sciences in 1781 his discovery of the geometrical law of crystallization; was chosen to the Acad. 1793; took orders in the Ch.; was imprisoned in 1792, and escaped death at the hands of the revolutionists through the exertions of Geoffroy St.-Hilaire, his pupil; became keeper of the cabinet in the School of Mines 1794, a member of the Inst. 1795, prof. of mineralogy in the Museum of Nat. Hist. in 1802. His prin. works are an *Exposition de la théorie de l'électricité et du magnétisme* and *Traité de cristallographie*. D. June 3, 1822.

Haüy (VALENTIN), ABBÉ, a brother of the mineralogist Haüy, b. at St. Just Nov. 13, 1745. Becoming acquainted with Mlle. Paradis, a blind pianist, he resolved to devote his time to the instruction of the blind, and invented the art of printing with raised letters for the blind. The schools of this philan. were everywhere failures, owing to his lack of judgment, yet he is universally recognized as the "apostle of the blind." Wrote *Essai sur l'éducation des aveugles* and *Mémoire historique sur les télégraphes*. D. Mar. 19, 1822.

Havana, hah-vah'na (Sp. *La Habana*), cap. of Cuba, on the N. shore of the island, on an inlet of the Gulf of Mex. Its harbor is entered through a narrow, strongly fortified channel, $\frac{3}{4}$ m. long, and then opening into a large basin, capable of accommodating 1000 vessels of any size. The arch. is mostly that of S. Sp.—the houses low, 1 or 2 stories,

with flat roofs, the large windows provided with iron shutters and wooden blinds, but not glazed. Among the public buildings are the opera-house, the cathedral, built in 1724, and containing the ashes of Christopher Columbus, and the palace of the gov.-gen. Among the public places are the Plaza de Armas, in front of the gov.'s palace; the Alameda de Paula, along the bay; the Parque de Isabel; the Paseo de Tacon, with double rows of trees. It has a univ., a botanical garden, many scientific, educational, and benevolent insts., and is the seat of the gov. of Cuba and of a R. Cath. bp. H. is connected by regular lines of steamers with Sp., Fr., Eng., and the U. S.; by telegraph with Key West, Kingston, and Aspinwall. Pop. 230,000.

Havana, R. R. junc., cap. of Mason co., Ill., on the E. bank of the Ill. River, opposite the mouth of Spoon River. Pop. 1870, 1785; 1880, 2118.

Havana, Schuyler co., N. Y., 3 m. from the head of Seneca Lake, 18 m. from Elmira, on R. R. and the Chemung Canal. It is in close proximity to Havana Glen and about $\frac{3}{4}$ m. from Watkins Glen. Pop. 1870, 1273; 1880, 1274.

Havelock, Ill. See APPENDIX.

Havelock (SIR HENRY), BART., K. C. B., b. at Bishop-Wearmouth, Eng., Apr. 5, 1795; entered the army in 1815; went to India in 1823; met with a great change in his religious views on the voyage; became a preacher of the Bap. denomination; served with distinction in Burmah 1824-26, in Afghanistan 1839 *seq.*; became adjutant-gen. for the queen's troops in India 1851; served in Per. 1856-57; became a brigadier 1857; gained over Nana Sahib the victories of Cawnpore, Bithoor, etc.; relieved and reinforced Lucknow Sept. 25, 1857. D. Nov. 25, 1857.

Haven (ERASTUS OTIS), D. D., LL. D., b. at Boston, Mass., Nov. 1, 1820, grad. at Wesleyan Univ. 1842; was prin. (1846-48) of the Amenia Sem., N. Y.; entered the M. E. ministry 1848; stationed in New York until 1853, when he became prof. of Lat. in the Univ. of Mich.; in 1854 took the professorship of Eng. lang., lit., and hist.; ed. of *Zion's Herald*, Boston, 1856-63; member of the State senate 1862-63; pres. of the Univ. of Mich. 1863-69; pres. of N. W. Univ., Evanston, Ill., 1869-72; became chancellor of the Syracuse Univ. 1874. Wrote *Young Man Advised* and *Rhetoric*. Was elected bp. in M. E. Ch. May 12, 1880. D. Aug. 3, 1881.

Haven (GILBERT), D. D., b. in Malden, Mass., Sept. 21, 1821, grad. at Wesleyan Univ., Conn., in 1846; was appointed the same yr. prof. of Gr. and Lat. in Amenia Sem., N. Y., and prin. of the same inst. in 1848. In 1851 he joined the N. Eng. conference of the M. E. Ch., and occupied several important pulpits. In the c. war he was the first commissioned chaplain (Apr. 18, 1861), and served in Butler's regiment. In 1862 he travelled in Europe. In 1865 he was appointed to special service in Miss.; was afterward ed. of *Zion's Herald*, Boston, and in 1872 was elected bp. Author of the *Pilgrim's Walle*, a sketch of his travels in Europe, and of a vol. of sermons, chiefly relating to slavery and the war. D. Jan. 3, 1880.

Haven (JOSEPH), D. D., LL. D., b. in Dennis, Mass., Jan. 4, 1816, grad. at Amherst Coll. 1835; ordained pastor of the Congl. ch. in Ashland, Mass., 1840; pastor at Brookline, Mass., 1846-50; prof. of mental and moral philos. in Amherst Coll. 1850-58; prof. of systematic theol. in Chicago Theological Sem. 1858-70; resigned on account of ill-health in 1870, and after a tour in Europe and the E. devoted himself to preaching and lecturing upon anc. and modern philos. and the Eng. classics. In 1873 he became acting prof. of mental and moral philos. in the Chicago Univ. In addition to numerous sermons and articles in the religious journals and reviews, Dr. H. pub. *Mental Philos.*, *Moral Philos.*, and *Studies in Philos. and Theol.* D. May 23, 1874. J. H. SEELYE.

Havercamp (SIEGEBERT), b. at Utrecht in Dec. 1683; was appointed to the chair of Gr. in Univ. of Leyden, afterward to that of hist. He pub. new eds. of Josephus, Sallust, Terullian, and Lucretius; wrote *Introductio in Antiquitates Romanas* (1730), *Introductio in Historiam Patria* (1739), etc.; distinguished as numismatist; pub. *De Numismate Alexandri Magni* (1722); *Thesaurus Morellianus, sive familiarum Romanorum numismata omnia*, and other minor essays and criticisms. D. Apr. 23, 1742.

Haverford College, in Delaware co., Pa., was founded in 1832, by members of the religious Society of Friends, under the name of "Haverford School," and was made a coll., with authority to grant degrees, in 1856. The plan of the inst. limits the number of resident students to 60. Since 1849 others beside the sons of Friends have been admitted. H. C. was the first collegiate inst. founded and conducted entirely within the Society of Friends.

Haverhill, city of Essex co., Mass., on the Merrimack at the head of tidewater and navigation, 18 m. from its mouth, and distant 32 m. from Boston by R. R. Settled in 1640, incorporated as a town 1645, and as a city 1870. For many yrs. a frontier town, suffering much from the incursions of the savages. Prominent in the Revolution, furnishing 74 of the 1000 men at Bunker Hill. The manufacture of fine boots and shoes is the prin. industry. It has a public library, also a fine soldiers' monument in marble. Ayer's and Rocks villages are within the city limits. Iron bridges connect H. with the towns of Bradford and Groveland. Feb. 18, 1882, a large part of the business portion of the city was destroyed by fire—loss about \$2,000,000; rebuilding was commenced at once. Pop. 1870, 13,092; 1880, 18,472.

Haverstraw, R. R. junc., Rockland co., N. Y., on the Hudson River, 38 m. from New York. Prin. business, brick-making. Pop. 1880, 3506.

Havre, or **Havre de Grâce**, town of Fr., at the mouth of the Seine and at the foot of a range of hills. The new city-hall and barracks are magnificent buildings. The harbor, consisting of 7 spacious basins, capable of accommodating 600 vessels, is one of the best of Fr.; next to Marseilles, H. is the most important commercial place of the country. It communicates directly with New York, Havana, Rio Janeiro, Calcutta, and all the chief commercial places in Europe. Pop. 105,867.

Havre de Grace, *hav'er de grass*, Harford co., Md., 36 m. N. E. of Baltimore, on R. R. and the S. bank of the Susquehanna River, near where it empties into the Chesapeake Bay. It is located at the natural outlet to tidewater, through the Pa. and Susquehanna Canal, for the anthracite coal of the Wyoming and Shamokin regions, and for the bituminous coal of the Juniata, as well as the lumber, minerals, manufactures, and agricultural products from the valleys of the Susquehanna and its tributaries. It has a fine harbor and an extensive trade in coal and lumber; also extensive shad and alewife fisheries, and in its vicinity are secured, in large numbers, the celebrated canvas-back ducks. Pop. 1870, 2381; 1880, 2816.

Hawaiian (ha-wi'yan) **Islands** (formerly called **Sandwich Islands**), in the N. Pacific, between lat. 18° 50' and 22° 50' N., and lon. 154° 50' and 161° 40' W. They are 12 in number, with a total area of about 6400 sq. m., of which Hawaii contains 4000. Eight of them are habitable, the others barren rocks. The rock of the whole group is volcanic, with the exception of the anc. elevated coral reef and the resulting sandstone. There are 2 active volcanoes on Hawaii—Kilauea and Mauna Loa—of which there have been, since 1789, 12 recorded eruptions, the latest in 1880-81, from Mauna Loa, lasting 9 months; many of the eruptions were accompanied by earthquakes. The craters of Mokuawe-weo (on Mauna Loa) and Kilauea are now active. The altitude of Mauna Kea, the highest point on Hawaii, is 13,805 ft. The extinct crater of Haleakala is 7 m. long, 3 wide, and 19 in circumference, and is from 700 to 2000 ft. deep.

Agriculture.—Sugar is the prin. product; between 40 and 50 plantations raise and manufacture an aggregate of about 40,000 tons of sugar per annum, beside molasses. Most crops of temperate climates can be successfully grown.

Exports and Imports.—The total exports for 1880 were valued at \$4,968,445, and the imports for the same period were estimated at \$3,673,268.

History.—The H. I. were discovered by Gaetano, a Sp. navigator, in 1542. Before this (probably about 1527) one or two Sp. vessels were wrecked on the coast of Hawaii, and the few survivors intermarried with the natives. Capt. Cook first visited the H. I. in 1778. He afterward revisited Hawaii, where he was killed by the natives in a quarrel, Feb. 14, 1779. At the time of Capt. Cook's visit, under the sovereignty of 5 or 6 independent kings, the people had reached a fair degree of barbaric civilization. The administration of these kings was absolute, and their persons were sacred: there were several orders of chiefs. The common people were vassals, tenants, and serfs, who, with all they possessed, belonged to the chiefs and were under their protection. In 1790 Kamehameha, then king of a portion of Hawaii, obtained possession of the whole island, and subsequently conquered the entire group, with the exception of 2 small islands. His eldest son, Liholiho, succeeded (1819) him under the title of Kamehameha II., with Kaahumanu, widow of Kamehameha I., as premier. Under her leadership the taboo system was overthrown, and the conservative party routed in a sanguinary battle. The universal destruction of the idols followed. In Apr. 1820 the first Amer. missionaries arrived. They immediately began to reduce the lang. to writing. The first printing was done in 1822. In 1825 the Ten Commandments were adopted as laws by the govt., and a few criminal laws were enacted in 1827 and 1829. In 1840 Kamehameha III. promulgated a const. granting civil rights to the people. In 1846 he released the royal right to a large portion of the lands of the kingdom. In 1853 free suffrage was established as a civil right. Kamehameha V., the last of his dynasty, d. 1873, and Lunalilo, a high chief, was elected king by the legislature. He d. 1874, and Kalakaua was raised to the throne.

Population.—Capt. Cook's estimate of the pop. (400,000) was probably too high by 100,000. From his time it decreased rapidly through wars and pestilences. The census of 1832 gave 130,313 males and 23,882 females; 1853, 73,137; 1866, 62,959; 1872, 56,897, and that of 1878, 57,985, showing an increase of 5119 over the foreign pop. of 1872. [From orig. art. in *J.'s Univ. Cyc.*, by S. B. Dole; revised by ELISHA H. ALLEN, Chief-Justice of the H. I.]

Hawes (JOEL), D. D., b. at Medway, Mass., Dec. 22, 1789, grad. at Brown Univ. in 1813; studied theol. at Andover, and in 1818 became pastor of the First Congl. ch. in Hartford, Conn. He won great fame as an author and preacher. Wrote *Lectures to Young Men, The Religion of the E. An Offering to Home Missionaries*, etc. D. June 5, 1867.

Hawk, a popular name for many birds of prey of the family Falconidae, mostly smaller than those known as eagles, and having, as a rule, shorter wings than the true or noble falcons. The term is, however, a very vague one. The genus *Accipiter* is regarded as the typical one.

Hawkesworth (JOHN), LL.D., b. in Lond. 1715 or 1719; became compiler of parliamentary debates for the *Gentleman's Magazine*, for which periodical he was critic 1765-72; author of 70 of the 140 papers pub. in the *Advertiser*; also of *Zimri*, a good oratorio; *Edgar and Emdine*, a drama, and *Almoraz and Hamel*, a tale, etc. D. Nov. 17, 1773.

Hawking. See FALCONRY, by PROF. A. DE GIBERNATI.
Hawkins (BENJAMIN), b. in N. C. Aug. 15, 1754, ed. at Princeton; was an excellent Fr. scholar; became Washington's interpreter in his intercourse with the Fr. officers of his army; was with him at the battle of Monmouth. In 1780 was chosen commercial agent of N. C., and 1781-84 and 1786-87 was a delegate to Cong.; 1789-95 was a Senator from the same State. In the latter yr. he was appointed by Washington agent for superintending all the Indians S. of the O.; this office he retained until his death, making his headquarters most of the time at a station in Ga. which is now known as the city of Hawkinsville, named in honor of his memory. He left some valuable writings on topography and the Indian character. D. June 6, 1816. (See CHAPPELL'S *Historical Miscellanies* of Ga.)

Hawkins (BENJAMIN WATERHOUSE), F. G. S., F. L. S., b.

in Lond. Feb. 8, 1807; ed. at St. Aloysius' Coll.; studied art; began the pursuit of natural science in 1827, and in 1852 began the restoration of extinct animals in model, his previous labors (1842-47) in studying living forms of animal life at Knowsley Park having fitted him for the work. In 1868 he removed to the U. S. His 33 restorations of fossil animals for the Crystal Palace Park, near Lond., are famous examples of his skill in modelling.

Hawkins (Sir JOHN), b. in Lond. Mar. 1719, joined the Madrigal Society 1741, and in 1749 became a member of Dr. Johnson's literary club; magistrate for Middlesex 1761; suppressed the riots at Brentford 1768, at Spitalfields 1769; was knighted 1772, and d. 1789. Chiefly remembered for his *General Hist. of Music*.

Hawkinsville, Ga. See APPENDIX.

Hawk Moths, a name of Sphingidae, large lepidopterous insects. They have short bodies and narrow, strong wings, which make their flight swift and powerful. They often stand poised in the air like humming-birds, and in general obtain their food from flowers.

Hawks (CICERO STEPHEN), D. D., LL.D., P. E. bp. of Mo., was b. at Newberne, N. C., May 26, 1812, and grad. at the Univ. of N. C. in 1830; studied law; was ordained in 1834; rector of Trinity ch., Buffalo, N. Y., 1837-43, of Christ ch., St. Louis, 1843-44, and was consecrated bp. of Mo. in 1844. During the cholera season of 1849 he was conspicuous for his care for the phys. and spiritual good of the sufferers. D. Apr. 19, 1868.

Hawks (FRANCIS LISTER), D. D., LL.D., b. at Newberne, N. C., June 10, 1796, was an elder brother of Bp. C. S. Hawks; grad. at the Univ. of N. C. in 1815, and became a successful lawyer, but in 1827 was ordained to the ministry of the P. E. Ch. Was for a time assistant minister in New Haven, Conn., and in Phila.; in 1830 was chosen prof. of divinity in Washington—now Trinity—Coll., Hartford, Conn.; in 1831 was rector of St. Stephen's, New York, and of St. Thomas's 1832-43. In 1835 he declined the missionary bishopric of the S. W. In 1837 he became one of the founders of the *New York Review*, and in 1839 established St. Thomas's Hall, a school at Flushing, N. Y. He was (1840-42) ed. of the *Church Record*. In 1843-44 he resided in Miss., of which diocese he declined the bishopric. He was (1844-49) rector of Christ ch., New Orleans, and was chosen first pres. of the Univ. of La. He held (1849-61) rectorships in New York; in 1854 he declined the bishopric of R. I. Sympathizing with the South during the c. war, he held (1861-65) the rectorship of Christ ch., Baltimore. In 1865 he accepted the ministry of the chapel of the Holy Saviour, N. Y. Author of several vols. of legal reports and a digest, and afterward of *Narrative of Com. Perry's Expedition, Hist. of N. C.*, and *Documentary Hist. of the P. E. Ch.* D. Sept. 27, 1866.

Hawksbee, or **Hauksbee** (FRANCIS), F. R. S., chosen to the Royal Society in 1705. Author of 43 papers in the *Philos. Transactions* between 1704 and 1713, and of *Physico-Mechanical Experiments*. He was one of the founders of electrical science, and made improvements in electrical machines, air-pumps, and other apparatus. The times and places of his birth and death are not known.

Hawkshaw (JOHN), F. R. S., b. at Leeds, Eng., in 1811; pupil under Mr. Chas. Fowler; engaged in the construction of turnpike roads; became assistant to Mr. Alexander Nimmo, govt. engineer of public works. On the death of Mr. Nimmo, Mr. H. went to S. Amer. and assumed charge of the Bolivar copper-mines. Returning to Eng., he became engineer of the Manchester and Bolton Canal and Railway, and constructed the Lancashire and Yorkshire Railway and several others in various parts of Eng. His name is intimately connected with many great engineering achievements throughout Europe. On the failure of the great sluice at St. Germain, by which the tides of the river Ouse poured into the *Middle Level Drain*, bursting its banks at various points and inundating 6000 acres of land, Mr. H.'s services were called upon to remedy the disaster, which he did successfully, substituting for the first time large siphons for the fallen sluice; was one of the metropolitan coms. of sewers, and in 1860 was appointed royal com. to decide between the various schemes proposed for supplying the city of Dublin with water. In 1874 he sailed for Brazil, on invitation of the emp., to examine and report on all its prin. harbors.

Hawley, Pa. See APPENDIX.

Hawley (Gen. JOSEPH ROSWELL), b. at Stewartsville, N. C., Oct. 21, 1836. His father was a native of Farmington, Conn., and to that State the family returned in 1837, and afterward removed to Cazenovia, N. Y.; grad. at Hamilton Coll., N. Y., in 1847; in Sept. 1850 commenced the practice of law in Hartford, Conn. He was an active opponent of slavery, especially of its extension to the U. S. Terrs. In his law-office, and by his invitation, Hon. Gideon Welles, Hon. John M. Niles, and a few other prominent Hartford men met Feb. 4, 1856, and took steps which led to the organization of the Rep. party in Conn. In Feb. 1857 he left the practice of the law and became ed. of the *Hartford Evening Press*, a journal established in 1856 as the organ of the newly formed Rep. party. Upon the outbreak of the war of 1861-65 he enlisted in the army (Apr. 15, 1861), being the first man in Conn. to enroll his name for the volunteer service. He went to the field as capt. in the 1st Regiment Conn. Volunteers, and was in the battle of Bull Run. At the close of the 3 months' campaign he immediately engaged in recruiting for the 7th Conn. Volunteers, in which he was commissioned lieut.-col. He served in a campaign before Charleston, S. C., aided in the bombardment of Ft. Pulaski, and was in the battles of Morris Island, Ft. Wagner, James Island, Pocotaligo, and Olustee, commanding a brigade in the latter engagement. He was commissioned a col. in 1862 and a brig.-gen. in 1864; served in the Army of the James before Richmond and Petersburg; was military gov. at Wilmington, N. C., on the occupation of that city by the Federal troops; was brevetted maj.-gen. in 1865, was Gen. Terry's chief of staff at Richmond after the surrender of Lee, and was minister

out of service in Jan. 1866. In Apr. 1866 he was elected gov. of Conn., holding the office 1 yr.; returned to journalism as ed. of the Hartford *Courant*, with which the *Press* had been consolidated. He was pres. of the Rep. national convention at Chicago in 1868; was elected to the 43d Cong. Nov. 5, 1872, and re-elected to the 43d and 46th Congs.; was pres. of the Centennial commission to arrange for the celebration of the one hundredth anniversary of Amer. independence. U. S. Senator 1881-87.

Hawthorne (NATHANIEL), b. July 4, 1804, at Salem, Mass. In early youth he was sent to live upon a farm at Raymond, Me.; grad. at Bowdoin Coll. 1825; went to Boston in 1836 and edited the *Amer. Magazine*; in 1837 appeared *Twice-told Tales*; 1838-41 was employed in the Boston custom-house; in 1842 joined in the Brook Farm experiment; in 1843 he lived in the old parsonage, Concord, Mass., afterward immortalized by him in *Mosses from an Old Manse*. He was (1846-50) surveyor of the port of Salem. While here he wrote *The Scarlet Letter*, his most successful romance. He lived (1850-52) in Lenox, Mass., and wrote the *House of the Seven Gables* and *The Blithedale Romance*, also a *Life of Franklin Pierce*; was U. S. consul at Liverpool 1853-57, and afterward spent some yrs. in It. He lived in Concord, Mass., 1860-64. D. May 19, 1864. See *Life* by his son (1885).

Haxo, ahk-so (FRANÇOIS BENOÎT, BARON, b. June 24, 1774, one of the most able military engineers of modern times. Distinguished himself at the siege of Lerida, Mequenezza, and Tarragona; directed the construction of fortifications at Belfort, Sedan, Grenoble, and L'Eluse; also the operations at the siege of Antwerp, 1830. Best known out of Fr. by what is called the "Haxo casemate," formed in the parapet, and, though arched over, covered with earth, and open behind to the terreplein; the guns fire through embrasures formed in an extension of the parapet beyond its ordinarily retired position in his system, and are not only secured from the enemy's fire, but may be hidden by masking the embrasures. D. June 25, 1838.

Hay. The plants commonly used for making H. are many kinds of grasses, several leguminous plants, particularly the clovers, and a few plants of other natural families. As a rule, plants are in the best state to be cut for fodder when in blossom or just out of blossom, because during the development of the seeds great drafts are made upon the plant to supply phosphates and other valuable nutritive substances which are needed for their perfection. The manner of curing is no less important than the time of cutting. If exposed to the sun, turned often, and dried rapidly and thoroughly, grass and clover will be found to be harsh and brittle, the leaves will fall off, the sweet odor will be gone, and a great part of the value of the H. lost. The object sought is not to dry H. so that it will keep, but to cure it so that it will make the most nutritious fodder and be dry enough for storing.

The kinds of grasses and forage-plants most valued for H. in this country are: (1) Timothy (*Phleum pratense*), called herds-grass in N. Eng.; flowers in July, yields abundantly for the first cutting, little for the aftercrop. (2) Orchard grass (*Dactylis glomerata*), called also cock's-foot, a rough, rather coarse, leafy grass, flowering in June; yields a heavy crop of H. very early; makes afterward a great growth of root-leaves, useful for fall pasturage. (3) Red-top (*Agrostis vulgaris*), called herds-grass S. and W. of N. Y., a grass known under many names, and assuming different forms and colors in different soils; makes good H., not so much as the preceding. (4) Fowl-meadow (*Poa serotina*), an admirable grass for moist meadows. (5) June-grass or blue-grass (*Poa pratensis*) is hardly worthy of being included among H.-grasses, yet, as it finds its way into almost all permanent meadows, and makes good sweet H., excellent pasture, and a close sward, it is here named as one of our best grasses. In addition to these proper grasses, the clovers are most important. The most valuable is the common red clover (*Trifolium pratense*), which we have in 2 prin. varieties—the mammoth and medium. The latter is preferable for H. Alsike, or Swe. clover (*Trifolium hybridum*), is partially pre-cum-bent in its growth, but with grass to sustain it makes excellent H. Lucerne, or alfalfa (*Medicago sativa*), is sowed by itself, and after becoming established, where it does well yields at least 3 heavy crops of H. or green fodder each yr. [From orig. art. in *J.'s Univ. Cyc.*, by W. C. WELD, FR. B.]

Hay (JOHN), b. at Salem, Ind., Oct. 8, 1839, grad. at Brown Univ. in 1858; studied law at Springfield, Ill., and was admitted to the bar in 1861; afterward served Pres. Lincoln as assistant sec., and subsequently as adjutant and aide-de-camp. During the war he served under Gens. Hunter and Gillmore, attaining the ranks of col. and assistant adjutant-gen. He was appointed sec. of legation at Paris in 1865, and in 1867 became *chargé d'affaires* at Vienna by the withdrawal of Mr. Motley; in 1869 was appointed sec. of legation at Madrid, and held that position till 1870, when he returned to the U. S. and wrote for the New York *Tribune*. Soon after this he became widely known by his dialect poems of "Little Breeches," "Jim Bludsoe," "Banty Tim," etc., afterward pub. as *Pike Co. Ballads*.

Hay (Sir JOHN CHARLES DALRYMPLE, BART., F.R.S., b. Feb. 11, 1821; entered the navy as mdpn., served on the coast of Syria, and as flag-lieut. on the coast of Borneo; senior officer of the Columbine in 1849 in Chi., and promoted for the destruction of pirate vessels; commanded the Hannibal during the Crimean war, participating in the capture of Kerch and Kinburn and the bombardment and capture of Sevastopol; in command of the Indus 1857-59, on Greenwich Hospital commission 1860-61, and 1861-64 chairman of the iron-plate committee; succeeded to the baronetcy on the death of his father in 1861; elected to Parl. 1862, and again in 1866, in which yr. he was promoted to be rear-admiral, and retired as such 1870; was a lord of the admiralty 1866-68. Author of the *Flag List and its Prospects*, *Our Naval Defences*, etc.

Hay (THOMAS), M. D., b. Feb. 7, 1837, at York, Pa.; ed. at

the Pa. Coll., Gettysburg, Pa., and the Coll. of N. J.; in 1861 took his degree of M. D. from the Univ. of Pa., and commenced practice in Phila. Gynecology attracted his especial attention, and the most difficult operations in that branch of med. science were performed by him.

Hay **Asthma**, **Hay Fever**, or **Autumnal Catarrh**, a disease recurring in certain individuals at certain seasons (every yr., as in June (rose cold), in the hay-making season (hay fever), or (in this country especially) in the autumn, whence the name autumnal catarrh. It is a catarrhal affection of the nasal (and sometimes of the bronchial) passages, often with some fever and more or less asthmatic spasm. Sometimes incessant sneezing and coryza are the only prominent symptoms. It is not observed in very hot or very cold countries, on the sea, or at considerable heights in some mt. regions. It is very probably caused by pollen from some plants, but it is by no means certain of what species they are. Removal from dists. where the disease prevails is the only means of cure, but the usual palliatives may be employed. The insufflation of quinine, either in powder or as a saturated solution, at the inception of the disease, is claimed to cut short the specific catarrh while yet limited to the nostrils and fauces.

Hayden (FERDINAND VANDERVEER), M. D., PH. D., LL.D., b. in Westfield, Mass., Sept. 7, 1829. When young he emigrated to O.; grad. at Oberlin in 1850, and took his degree as M. D. at Albany, N. Y., in 1853. He did not practice med., but commenced his explorations of the W. Terrs. in 1853. He was a surgeon of volunteers during the c. war, and was brevetted lieut. col. at its close; was appointed prof. of mineralogy and geol. in the Univ. of Pa. at Phila. in 1865, and resigned in 1872; commenced the geological survey of the Terrs. in 1867 under the auspices of the gen. govt. Beside the reports of the survey, Dr. H. has written about 50 memoirs. His reports of the explorations of the famous Yellowstone region in 1870 and 1871 induced Cong. to set apart by law, as a national park, 3575 sq. m. of the public domain, containing within its limits most of the geysers, hot springs, and other wonders of that region. Dr. H. has occupied nearly 30 yrs. in the exploration of our great West, including the greater portion of Kan., Neb., Col., N. M., Dak., Mont., Id. and Ut.

Haydn, hă'dn (FRANZ JOSEPH), b. in Rohrau, near Vienna, Mar. 31, 1732. At 5 yrs. of age a schoolmaster took him to Hamburg for education. During the 3 yrs. spent there he learned reading and writing and the elements of music. At 8 his fine voice attracted the attention of Reuter, who took him to Vienna. At 13 he made his first effort at composing by writing a mass, and then taught himself the art of composition from the obscure works of the period. A poor barber named Keller gave him a bed in his garret. There, with a worm-eaten harpsichord, he worked in tranquillity. In these early yrs. he was so attracted by the sonatas of Karl Philipp Emanuel Bach as to study closely his style. Sammartini, an It. composer of graceful style, exerted the only other influence which affected his early work. He was introduced to Porpora, one of the masters of that day, and knowing what benefits might be derived from such a source, H. devoted himself to Porpora as valet, dressed his wig to perfection and steadily labored to overcome that master's ill-humor and repulses. Finally Porpora received him fully, and gave him knowledge of the art of It. singing and of correct composition. The precarious period of his life ended at 28 yrs. of age in 1760, when he became chapel-master to Prince Esterhazy. He was the friend of Prince Nicholas till death severed the bond. The prince played the violin, and appreciated H.'s genius. The monotony of the country life at the court of Eisenstadt was varied by the most healthful recreations. H. lived in his calm retirement, contented, laborious, and unambitious. By the death of the prince the tie was broken which made H. unwilling to travel. In 1790 he visited Lond., where his enthusiastic reception was surprising to him. At this time his fortune was \$5000. In 1795, after a second voyage to Lond. and some of the continental cities, having amassed \$100,000, he retired from the Esterhazy service, and bought a house and garden near Vienna. There he remained till his death.

H. is the father of symphony and of the stringed quartet. The qualities of his compositions are lucidity of ideas, symmetry in their development, and finish of every phrase. In his works are reflected the purity of nature, and there was no room for passion or romance. His works number about 800; his most esteemed compositions are the 12 grand symphonies written for Lond., the 50 last quartets for stringed instruments, and the oratorios *The Seasons* and *The Creation*. The master was 60 when he turned his attention from instrumental music to oratorio. Of the 118 symphonies and the 83 quartets that he composed, scarcely 1/4 part are ever performed, but the oratorios lose none of their freshness with time. D. May 26, 1809. [From orig. art. in *J.'s Univ. Cyc.*, by H. A. FARNHAM.]

Haydon (BENJAMIN ROBERT), b. at Plymouth Jan. 25, 1786, was a student at the Royal Acad. 1804. His first work, *Joseph and Mary Reposing*, was exhibited in 1807, and immediately bought at a high price. Two yrs. later his *Dentatus* gained a first prize from the Acad. In 1815 he opened a school of painting, where Eastlake and the Landseers studied, and delivered lectures on painting and design, which were pub. in 1844. At his instance the Brit. govt. bought the Elgin Marbles in 1816. H. was a man of eccentric genius, indordinate sensibility, and boundless ambition. His pictures treated of grand themes—*Uriel and Satan*, *Curtius Leaping into the Gulf*, *The Burning of Rome*, *The Judgment of Solomon*, *The Agony in Gethsemane*, *The Raising of Lazarus*, *Christ's Entry into Jerusalem*. The last is the property of the R. Cath. cathedral in Cin., O. D. June 22, 1846.

Hayes (ISAAC ISRAEL), M. D., b. in Chester co., Pa., Mar. 5, 1832, grad. M. D. in 1853 at the Univ. of Pa.; was surgeon to the second Grinnell expedition, under Dr. Kane, 1853-55; commanded an expedition (1860-61) in the schooner United

States, and with a small party in a boat and dog-sledges reached (*rid* Smith's Sound) land in lat. 81° 37' N.; was a med. officer in the U. S. service in the c. war; went in the steamer Panther to Greenland 1869; received gold medals from the geographical societies of Paris and Lond.; author of an *Arctic Boat-Journey, The Open Polar Sea, and The Land of Desolation*. D. Dec. 17, 1881.

HAYES (RUTHERFORD BICHARD), LL.D., 19th Pres. of the U. S., b. at Delaware, O., Oct. 4, 1822, grad. from Kenyon Coll., O., 1842, and from Harvard Law School 1845; began the practice of law at Fremont, O.; removed to Cin. 1849; was city solicitor 1858-61; appointed June 7, 1861, major 23d O. Volunteers, of which W. S. Rosecrans was the first col. and Stanley Matthews (now U. S. judge) lieutenant-col. In July the regiment was sent to W. Va. He was promoted to lieutenant-col. Oct. 15, 1861, from which date he commanded the 23d until Dec. 1862. In Sept. of 1862 his regiment joined the army of Gen. McClellan in Md., and in the brilliant action of S. Mountain, attached to the advance brigade of Cox's division, 9th corps, it was the first inf. engaged; early in the day H. received a severe wound in the left arm which compelled him to leave the field. After the battle of Antietam the regiment was returned to W. Va., where, Nov. 30, 1862, H. rejoined it as col., having been promoted Oct. 15. He was soon after placed in command of the 1st brigade of the Kanawha division, which he retained until Sept. 1864, when he succeeded to the command of the division. In the summer of 1863 his command was engaged in the pursuit and defeat of Morgan, then raiding through O., and in Apr. 1864 took part in Crook's raid on the Va. and Tenn. R. R. Subsequently he was engaged in the Shenandoah Valley, and was commissioned brig.-gen. of volunteers, to date from the battle of Cedar Creek (Oct. 19, 1864), at the close of which he received news of his election to Cong. from the 2d dist. of O. He was now brevetted maj.-gen. for gallant services during the war, and June 1, 1865, resigning from the army, returned soon after to Cin. In Dec. he took his seat in Cong.; was re-elected in 1866, but left his seat in 1867, having been nominated for gov. of O., to which office he was elected in Oct., and re-elected in 1869. In 1872 he suffered his first defeat for Cong.; in 1875 he reluctantly consented to allow his name to be used once more as a candidate for gov., and was elected for a third time—an honor never before conferred on a citizen of O. On June 16, 1876, he was nominated as the Rep. candidate for Pres. at Cin. on the 7th ballot, receiving 384 votes, to 351 for J. G. Blaine and 21 for B. H. Bristow. The ensuing canvass was closed by a disputed election, the electoral votes of Fla., S. C., and La., and one of those of Or., being claimed by both parties; but he was finally declared to have been elected. (See PRESIDENTIAL ELECTORAL COMMISSION.)

HAYNAU, h'now, von (JULIUS JAKOB), BARON, b. at Cassel, Ger., Oct. 14, 1786, son, by a morganatic marriage, of the elector of Hesse-Cassel; entered the Aus. service 1801, engaged at Austerlitz and Wagram; became a maj.-gen. 1835, field-marshal-lieut. 1844, commandant of Verona 1848; was distinguished for military skill and executive rigor in It. 1848-49; took supreme command in Hungary 1849, gained the victories of Raab, Szőreg, Temesvár, etc.; was proclaimed gov. of Hungary. In 1850 he was dismissed from the service for insubordination. D. Mar. 24, 1853.

HAYNE (COL. ARTHUR P.), b. at Charleston, S. C., Mar. 12, 1790, was a brother of Gov. R. Y. Hayne; entered the army, and served in the war of 1812-15 and in the Creek and Fla. wars; was admitted to the Pa. bar after the war with G. Brit., but returned to the army, which he voluntarily left in 1820; in 1858 was sent to the U. S. Senate from S. C. D. Jan. 7, 1867.

HAYNE (ISAAC), b. in S. C. Sept. 23, 1745. He served in a cav. regiment in the Revolution, but in 1780 was made prisoner and set free on parole. In 1781 he was ordered to bear arms as a Brit. subject; was carried to Charleston, and there compelled to acknowledge his allegiance to G. Brit., though under protest; he was exempted from bearing arms and allowed to return home. Soon after he received orders to take up arms against his country. These orders being a plain violation of the agreement made with him, he considered himself free from his parole, and assumed command of a regiment of S. C. militia, in which he distinguished himself, but was soon taken prisoner and hanged, without a trial, Aug. 4, 1781.

HAYNE (ROBERT YOUNG), b. Nov. 10, 1791, in Colleton dist., S. C.; came to the bar in 1812; served for a time in the war of 1812; was in 1818 speaker of the House, and soon after atty.-gen. of S. C. He was in 1822 chairman of a committee in the S. C. State convention which reported the celebrated "Ordinance of nullification." In the same yr. he was chosen gov. To Pres. Jackson's denunciation of the nullification acts, Gov. H. made a defiant reply, and prepared for resistance of the Federal authority. Meanwhile Mr. Clay's compromise measure averted the threatened danger, and another State convention repealed the nullification ordinance. During his U. S. Senatorship (1823-32) he displayed abilities of the first order. In 1834 he enunciated in an able speech the doctrine that a protective tariff is unconstitutional, and he was the first, at least in Cong., to propound the doctrine that a State has a right under the Const. to arrest the operation of such Federal enactments as she considers unconstitutional. This led to the famous debate between Daniel Webster and himself. In 1834 Mr. H. became mayor of Charleston. D. Sept. 24, 1830.

HAYNES (JOHN), b. in Eng., at Copford Hall, Essex; settled at Boston, Mass., in 1633; gov. of the Mass. Bay Colony 1635; removed in 1636 to the new colony of Conn.; was its first gov. 1639, and was chosen gov. every alternate yr. till his death, Mar. 1, 1654. He was one of the authors of the first const. of Conn. (1638).

HAYS (ALEXANDER), b. at Pittsburgh, Pa., 1820; grad. at the W. Pt. Military Acad. July 1, 1844, and entered the army as brevet second lieut. of inf.; served on frontier duty 1844-

46, and in the Mex. war. On Apr. 12, 1848, he resigned from the army and engaged in the manufacture of iron at Venango, Pa., subsequently adopting the profession of civil engineer; in Apr. 1861 he was appointed major 12th Pa. Volunteers, and in the following month a capt. in the 16th U. S. Inf. In Aug. 1861 he was commissioned col. of the 63d Pa. Volunteers, and led his regiment in the Va. Peninsular campaign of 1862, through most of the battles from Yorktown to Malvern Hill; was severely wounded in the second battle of Bull Run; Sept. 29, 1862, was promoted to be brig.-gen. of volunteers. At the battle of Gettysburg he was in command of a division of the 2d corps, and subsequently led it at Auburn, Bristol Station, and the Mine Run affair. In the Richmond campaign of 1864 he fell at the head of his command in the battle of the Wilderness, May 5, 1864.

HAYS (WILLIAM), b. in Richmond, Va., 1819, grad. from the Military Acad. at W. Pt. July 1, 1840, and entered the army as second lieut. of artill.; major 1863; served through the Mex. war, and subsequently against the hostile Indians in Fla. and in Dak. During the c. war he commanded the brigade of horse-artill. of the Army of the Potomac in the Va. Peninsular campaign of 1862, and the reserve artill. in the battles of Antietam and Fredericksburg; appointed brig.-gen. of volunteers Nov. 1862; at Chancellorsville was wounded and taken prisoner; rejoined the army at Gettysburg, and upon the fall of Hancock, severely wounded, was assigned to temporary command of the 2d army corps. From Nov. 1863 to Feb. 1865 he was provost-marshal-gen. of the S. dist. of N. Y.; joined the army before Petersburg, serving with the 2d corps and in command of the reserve artill. Brevetted brig.-gen. U. S. A. D. Feb. 7, 1875.

HAYS (WILLIAM JACOB), b. in New York Aug. 8, 1830; travelled extensively on the Amer. continent, studying nature and animal life at first hand. His pictures have the merit of entire fidelity, and are marked with a fine animation of feeling. Technically, too, they are admirable as works of art. D. Mar. 13, 1875.

HAYS CITY, cap. of Ellis co., Kan., $\frac{1}{2}$ m. from Ft. Hays, on R. R., 289 m. W. of Kansas City. Pop. 1870, 320; 1880, 850.

HAYTI, an island of the W. I., next to Cuba the largest of the Antilles, between the Atlantic and the Bahama Islands to the N., Cuba and Jamaica to the W., the Caribbean Sea to the S., and Porto Rico to the E. It extends between lat. 17° 36' and 19° 59' N. and lon. 68° 20' and 74° 38' W. Area, 28,000 sq. m., including some small islands adjacent. Its greatest length from E. to W. is 405 m.; greatest breadth from N. to S. 165 m. The coasts, much indented and presenting a line of about 1500 m., form a great number of bays, safe and commodious for vessels. The bay of Samana, on the E. coast, is of paramount importance for the passage into the Mex. Gulf. The prin. mts. are Cibao, Bahoraco, La Selle, and La Hotte. The range of Cibao, whose average height is only about 800 ft., but whose culminating point rises about 9000 ft., traverses the island from E. to W. and sends out numerous branches toward the sea. The slopes, very rough to the N., descend gently to the S. and S. E., and disappear in large savannas. The ridge itself, generally cultivable to the summit, is covered with forests. The plains occupy the largest portion of the surface of the island. The island is generally well watered. Pop. about 900,000; some 550,000, nine-tenths of whom are negroes, are in the republic of H., whose lang. is Fr., religion R. Cath.

The island is divided into 2 states—the republic of SANTO DOMINGO, comprising the E. or Sp. part; and the republic of HAYTI, comprising the W. or Fr. part. H. (which in the Caribbean lang. signifies "mountainous") was the second place which Columbus visited in the New World, and the first European colony was planted here in 1492. The Spaniards named the whole island Hispaniola, and a new colony was founded in 1496—Santo Domingo; in 1506 there were 15 colonies. The native inhabs., numbering about 2,000,000 at the arrival of the Spaniards, were put to work on plantations and in the mines. Rebellions ensued, and in 1517 it was necessary to introduce negro slaves, the first arriving in 1522. The native pop. decreased so rapidly that in 1711 only 21,000 were left. The Sp. pop. also decreased. New countries were discovered, and the first settlers or their descendants left for Mex. and Peru. The island became almost a waste. The Fr. settled in 1630 on the island of Tortuga, whence they crossed to the N. coast of the mainland. The Spaniards tried to drive the Fr. from the island, but failed; in 1697 Sp. ceded the W. part of the island to Fr.

The Fr. colony prospered. In 1792 its pop. amounted to about 780,000—viz. 40,000 white, 40,000 free colored, and 700,000 slaves. Of the free colored people, the mulattoes, many possessed large estates, and were men of education and refinement, but had no political rights. In 1790 they demanded to be placed on an equal footing with the whites, and organized an army to support their demand by force. They were defeated, and their leaders were put to death. In 1791 the national assembly granted their demand, and order seemed to return, when in the same yr. the negro slaves rose in insurrection. C. war raged for several yrs.; the Spaniards broke in from the E., and the Eng. conquered the W. coast dists. In 1793 the Fr. coms. declared all the inhabs. free and equal, and appointed Toussaint l'Ouverture commander of the army. He expelled the Spaniards and Eng., and restored order. In 1795 Sp. ceded her part of the island to Fr., and under the govt. of Toussaint the prosperity of the island was revived. In 1801 Nap. determined to restore slavery, and sent for that purpose expeditions to the island. Toussaint was treacherously captured and sent to Paris, where he d. shortly after, but his successor, Dessalines, carried on the war, and the Fr. army had (Nov. 30, 1803) to capitulate to an Eng. squadron; and (Jan. 1, 1804) St. Domingue declared itself an independent republic. Dessalines was chosen gov. for life, but on Oct. 8, 1804, he assumed the title of emp. of Hayti. He was assassinated Oct. 17, 1806. The E. part of the island returned to Sp. rule, the W. (or H.) was for many yrs. divided between several rival

chiefs. In 1822 Boyer united the whole island under his govt., and in 1825 Fr. acknowledged the independence of the republic. In 1842 Boyer was expelled, the E. part formed itself into an independent republic under the name of Santo Domingo, and H. was again divided into different portions. In 1849 Soulouque, who had been elected pres. in 1847, assumed the imperial title, but in 1858 he was deposed and expelled, and a republic was again proclaimed. Its first pres. was Geffrard, who died in 1867; the next was Salnave, who was expelled in 1870; then followed Nissage-Saget, who established peace. The pres. (1884) is Gen. Salomon. [From *orig. art. in J. S. Univ. Cyc.*, by MELVIL BLONCOURT.]

Hayward (GEORGE), M. D., b. at Boston, Mass., Mar. 9, 1791, grad. at Harvard in 1809; took his med. degree at the Univ. of Pa. 1812, prof. of clinical surgery in Harvard Univ. 1835-49. Author of *Outlines of Physiology*, *Surgical Reports*, etc. D. Oct. 7, 1863. He was one of the leaders of his profession in Boston.—His father, DR. LEMUEL HAYWARD, b. at Braintree, Mass., Mar. 22, 1749, grad. at Harvard 1768, was a surgeon in the Revolutionary war. D. Mar. 20, 1821.

Hayward (NATHANIEL), b. at Easton, Conn., in 1808; shares with Charles Goodyear the honor of inventing the process of vulcanizing India-rubber; later made important improvements in the manufacture of rubber goods, and in 1847 established the Hayward Rubber Co. at Colchester, Conn. D. July 18, 1865.

Ha'zel, a genus (*Corylus*) of trees and shrubs of the order Cupulifere. Of these, the *C. Avellana* and *Colurna* of Europe and Asia produce the filbert, as well as some of the varieties of nut called cobnut and hazel-nut. The hazel-bush is extensively planted for copses in Europe, and yields material for hoops, hurdles, gunpowder, etc. The *C. Americana*, or wild H., and *C. rostrata*, or beaked H., yield nuts smaller and not so good as those of Europe.

Ha'zen (WILLIAM B.), b. in Hartford, Windsor co., Vt., Sept. 27, 1830, grad. at the U. S. Military Acad. July 1, 1855, and received the appointment of 2d lieut. of inf. in Sept. following; was assigned to frontier duty, and mostly engaged against hostile Indians; capt. May 1861. During the C. war he recruited the 41st O. Volunteers, of which he was appointed col., and commanded it in defending the O. frontier and in operations in Ky. In the Tenn. campaign (1862) he commanded a brigade at the battles of Shiloh, Perryville, and Stone River; appointed brig.-gen. of volunteers Nov. 1862. In the campaign of 1863 he was engaged at Chickamauga, Chattanooga, Missionary Ridge, and in E. Tenn. against Gen. Longstreet. In the invasion of Ga. (1864) he was engaged in the various actions up to the capture of Atlanta, in command of a division from Aug. 1864, and with the army of Gen. Sherman in the march to the sea. Appointed maj.-gen. of volunteers Dec. 1864, and engaged in the march through the Carolinas up to the surrender of the army of Gen. J. E. Johnston, Apr. 1865. He commanded the 15th army corps from May to Aug. 1865; dist. of Middle Tenn. Oct. 1865 to Jan. 1866; mustered out of volunteer service Jan. 15, 1866; was appointed col. 38th Inf., transferred to 6th Inf. 1869. During the Franco-Ger. war (1870) Gen. H. visited the seat of war. Brevetted maj.-gen. U. S. A. He was appointed chief signal officer, with the rank of brig.-gen., Dec. 1880.

Hazlehurst, Miss. See APPENDIX.

Hazleton, R. R. junc., Luzerne co., Pa., 80 m. N. N. W. of Phila. It has important anthracite coal-mines, and is a popular summer resort. Pop. 1870, 4317; 1880, 6935.

Hazlett (WILLIAM). See APPENDIX.

Head (Rt. Hon. Sir FRANCIS BOND), BART., b. near Rochester, Eng., Jan. 1, 1793; served with the royal engineers at Waterloo, at Fleurus under the Prus. gen. Ziethen; retired from the army and took charge of a gold and silver mining co. in S. Amer., riding over 6000 m., a narrative of which he pub. in 1826; in 1835 was appointed lieut.-gov. of Upper Canada, where he suppressed an insurrection. The title of privy councillor was conferred on him in 1867. Wrote *Life of Bruce*, etc. D. July 23, 1875.

Headache (*Cephalalgia*) is of many kinds. It is often the result of indigestion, of excess in eating or drinking, of malarial or other specific poison, of uterine disease, or of neuralgia. It is also a common symptom of many fevers and other acute diseases. If persistent H. be not relieved by a correction of the hygienic conditions as regards diet, clothing, exercise, etc., the case requires med. treatment, the character of which must depend upon the probable cause of the difficulty. Opiates, chloral, paulinia, citrate of caffeine will deaden the pain; aconite, chloroform, and chloral camphor may be applied externally; aromatic spirits of ammonia, bicarbonate of soda, and laxatives are efficient when stomach disorder is the cause.

Headley (JOEL TYLER), b. at Walton, Delaware co., N. Y., Dec. 30, 1814, grad. at Union Coll. 1839; studied theol. at Auburn; for 2 yrs. held a pastorate at Stockbridge, Mass.; was (1856-57) sec. of state for N. Y. Wrote *The Alps and the Rhine*, *Washington and his Gens.*, and *Hist. of the Second War between Eng. and the U. S.*

Healdsburg, Sonoma co., Cal., on R. R., 70 m. N. of San Francisco, the point at which tourists leave the cars for the Geysers. It has an acad. and sem. Quicksilver is mined. Pop. 1870, 959; 1880, 1133.

Health [A.-S. *hal*, "hale," "sound," "whole"], physiologically considered, is that condition of organized living bodies in which the blood and tissues are in the state of integrity and functional activity inherent in their normal const. A tendency to development and to retrograde metamorphosis of the elements of tissues is impressed upon the organism as a whole, but differs in intensity at different periods of life. In the young the tendency to development is greatest; in the middle-aged these forces are balanced; in the later periods the tendency to retrograde metamorphosis predominates and the organism wastes, and at length falls into decay and death. At all periods in the life of any organized body, molecular changes are in active progress in

every tissue, and yet while these changes are in exact accordance with the normal const. of their elements, a state of H. is maintained. So numerous are the elementary parts and so various the causes which impair their integrity and prevent their functions, that there must be abnormal conditions which do not sufficiently impair structure and function to enable us to appreciate the deviation from the natural standard. It is only when changes in structure and function are so great as to be detected that we can decide that a condition of H. does not exist.

Healy (GEORGE PETER ALEXANDER), b. in Boston 1808. The larger part of his life has been spent abroad, in Rome and Paris. The striking merit of his great historical picture, *Webster Delivering his Reply to Hayne*, is the portraiture of 130 persons. In 20 yrs. H. executed 577 portraits, many of distinguished people—Cardinal McCloskey, W. H. Seward, M. Guizot, Marshal Soult, George Peabody, H. W. Longfellow, John A. Lowell, and others, as well Amer. as foreign. His style is free, vigorous, and effective.

Hearing. See ACOUSTICS; also EAR, ANATOMY OF.

Heart, Human. This organ is the great central power regulating and compelling the circulation of blood throughout the body. It is really 2 organs united in one, one half governing the circulation through the lungs, the other half that of all the rest of the body. Each of the halves is com-

FIG. 1.

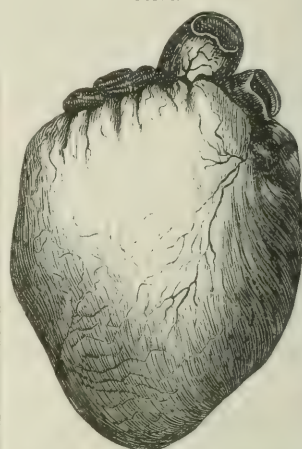


Fig. 1. External view of the heart, showing the beginning of the aorta and pulmonary artery, and parts of the right and left auricles; reduced to one third its natural size.

posed of the mitral and tricuspid valves, by which the blood once received by the ventricles is forbidden a return to the vessels and parts from which it came. But there is another prevention. At the very opening of the arteries a valve is provided, the like of which human ingenuity has never imitated. Each is formed of 3 cups, about half an inch deep, of which the outer portion is the artery itself, and the rest is formed of a strong membrane attached at its sides and bottom to the arterial wall. The membranous

FIG. 2.

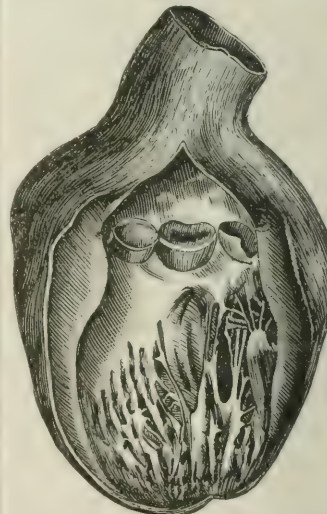


Fig. 2. The left ventricle and the beginning of the aorta, interior view, showing the aortic valve; and below it, and to the left, the mitral valve, with its tendinous cords and fleshy columns.

serous pericardium, while the name pericardium is also applied to the fibrous bag in which the heart moves.

posed of a receptacle of blood and a propeller of the blood-current—*auricle and ventricle*. This heart has 4 cavities—the right auricle and the right ventricle, and the left auricle and ventricle. The walls of these cavities are composed essentially of muscular tissue, more or less abundant as the required force is greater or less. The walls of the left ventricle are, at the thickest part, more than half an inch in thickness.

If the blood entered the ventricle by an unguarded opening, there would be no reason why it would not flow back into the auricle and veins, as well as onward into the arteries. To prevent this, on the left side there is a thin but strong membrane attached to the auriculo-ventricular opening, as a bag may be attached to a hoop, forming with its append-

ages the mitral and tricuspid valves, by which the blood once received by the ventricles is forbidden a return to the vessels and parts from which it came. But there is another prevention. At the very opening of the arteries a valve is provided, the like of which human ingenuity has never imitated. Each is formed of 3 cups, about half an inch deep, of which the outer portion is the artery itself, and the rest is formed of a strong membrane attached at its sides and bottom to the arterial wall. The membranous portion of each can fall inward, so as to fill just $\frac{1}{4}$ of the arterial tube. When the blood goes out of the ventricle the membranous portion of these cups yields to the current and becomes closely applied to the wall of the artery, and so offers no obstacle to the flow. As soon as the ventricle ceases to contract, the elasticity of the now distended artery produces a reflux, as well as an onward current. This contrivance is called the *semilunar valve of the aorta*. In the pulmonary artery it is called the *semilunar valve of the pulmonary artery*. By this arrangement all the contractile force of these arteries is made to supplement the action of the ventricles and carry the blood forward. The muscular structure of the H. is covered on the outside by a membrane called the

Endocardium is the name given to the membrane which lines the cavities of the H.

Two *coronary arteries* nourish the H. They descend on opposite sides of the organ, giving off numerous branches till they become capillary and countless.

The *nerves of the heart* have very little connection with those of the voluntary system, yet it is reported that men have lived who could stop the heart's action at will.

Systole and diastole are the contraction and dilatation of the several cavities.

The *sounds* produced by the action of the heart are 2. The first begins with the first of the ventricular contraction, and continues till it is ended. The second results from the striking together of the aortic and pulmonary valves at the close of the systole.

The *force of the heart's action* has been carefully studied in the inferior animals. It is assumed that the average human H., at its strongest part, would sustain a column of blood in a perpendicular tube 9 ft. high. This is equal to nearly 5 lbs. to the square inch. But the atmospheric pressure must be overcome by the central force; so that the contractions of the left ventricle are effected with a force that can move about 20 lbs. through the space of 1 ft. in 1 second in the course of the vessels.

The *velocity of the blood-current* in the larger arteries is assumed, from experiments made on the inferior animals, to be about 12 inches in a second of time.

The *position of the heart in the chest* is easily described. In its shape the organ has an imperfect resemblance to a cone. The base of this cone is uppermost, the apex downward and to the left. It is very much imbedded in the left lung.

The *impulse of the heart*, or "the heart-beat," as it is felt on the outside of the chest, has been a subject of much discussion, and each one of the many writers on the subject has proposed a new explanation; but Mr. Searle's studies of the course of the muscular layer in its walls have probably suggested the true explanation.

Weight of the Heart, and the Dimensions of its Vessels.—The size of the H. varies in the adult a little. The average from 20 to 90 yrs., in the male, is 10 ounces; in the female, 8 to 9; but 12 ounces in man and 11 in woman would not be pronounced hypertrophy.

The *fetal heart*, when it begins to show itself as a beating organ, suggests nothing of the elaborate organization it is to become before independent breathing life can be possible. It is at first merely an enlargement of a beating blood-vessel. From this state it changes to such forms as are permanent in inferior types of animal life, passing from one to another, but always from a lower to a higher type, till it is completed. *From orig. art. in J.'s Univ. Cyclopedia, by PROF. ALONZO CLARK, M. D.*

Heart Diseases. Hypertrophy or enlargement of the heart is generally due to some obstacle to the circulation, requiring increased strength of muscle to overcome it, as a diseased valve, or a tumor pressing upon a large artery, or a large organ so diseased that the circulation through it is seriously obstructed. The heart, once enlarged, never returns to its original size, and alone it rarely causes death.

Dilatation of the heart is an enlargement of its cavities. The left ventricle may be so dilated that its capacity is considerably greater than would be sufficient to contain the whole of a healthy heart. Dilatation and hypertrophy very commonly go together, so that eccentric hypertrophy or hypertrophy with dilatation, associated with and caused by morbid changes in the shape and function of the valves is the most common form of H. D. In this state the heart has been known to weigh 60 ounces, or 6 times its natural weight. Hearts like these are *enormitas cordis*, or *cor borinum vel laurinum*. They are almost always found in persons who have had rheumatism and H. D. in childhood, and have grown to manhood with a damaged heart.

Diseases of the Valves of the Heart.—*Endocarditis*, or inflammation of the lining membrane of the cavities of the heart, is a common attendant on acute rheumatic inflammation of the joints, but it may occur without rheumatism. This inflammation is one of the prin. causes of derangement and imperfection in the valves of the heart. It deposits a new material between their folds, and at first increases their thickness. A portion of this new material is converted into fibrous structure, and finally the fibres contract. The result is, that the valves become thick and unyielding. Again, this new fibrous structure contracts and shortens the valves so that their parts cannot meet properly and prevent the reflux of the blood. This is *insufficiency*, or regurgitative disease of a valve. The stiff, unyielding state, when it obstructs the current, is called *obstructive disease of the valve*. *Rupture of the valves* is possible.

Vegetations on the valves is another of the results of inflammation. They are minute hard warts that are formed on the free surface of the aortic valve just below its thickened margin. These are chiefly important as being the occasion of the deposit of masses of the fibrine of the blood upon the valves, so producing large granular-looking warts, which obstruct the outflow from the ventricle. Any roughening of a valve-surface by inflammatory or other disease or by rupture, may cause the deposit of these *fibrinous concretions*. When they occur they not only obstruct the flow of the blood, and partially disable the valves, but portions of them may be washed off into the arterial current, and be carried into a distant organ, as the brain, spleen, or kidney, plugging up the arteries; the plug itself is an *embolus*. In the advanced stages of these diseases of the valves and muscular structure it is not difficult to arrive at the opinion that there is H. D. Shortness of breath, induced by exercise, the strong heart-beating, beating of the vessels in the neck, and, when the kidneys become diseased, the dropsies, the distress produced by lying down, tell the truth but too certainly. But they do not designate the particular form or forms of disease. This can only be learned by listening to the sounds produced by the action of the heart, and by actual

measurement by percussion. Thus, in addition to the 2 natural sounds remaining, from 1 to 4 new ones may be produced called *murmurs*.

Pericarditis.—As the lining membrane of the cavities is subject to inflammation, so is the external covering. This and the lining of the fibrous pericardium are alike liable. They are indeed but one membrane. Pericarditis and endocarditis often occur at the same time, being both produced by an extension or migration of articular rheumatism, or rather by that same state of the system which causes the articular disease. Either of these diseases may accompany Bright's disease. When there is little serous fluid in the pericardium the disease may run its course with but little gen. disturbance; but when the quantity is large there is a rapid pulse, oppressed breathing, and a tendency to faint when sitting or standing. The pericardium is distended by its watery contents, sometimes even to tension; then the normal dilatation of the heart-cavities becomes difficult. But this fluid is absorbed usually in about a week, and the pericardium comes back to its contact with the heart. Pericarditis is rarely fatal in the first attack. But in young persons subject to recurring rheumatism each return is more and more dangerous; even the third is not unfrequently fatal.

Carditis, or myocarditis, is an inflammation of the muscular structure of the heart. It is an occasional attendant of endocarditis or pericarditis, or may occur independently. The symptoms are vague and uncertain, so that it is difficult, and often impossible, to recognize it during life. It is, then, chiefly known by certain conditions found after death.

The muscular fibres of the heart sometimes undergo a *fatty degeneration*, in which, without change of size or change in the valves, little globules of oil have replaced the muscular substance. This degeneration weakens the heart, and causes it to act irregularly, changes its color from dark red to yellow, and materially diminishes its firmness. The disease is named, after the Eng. surgeon who first described it, *Quain's degeneration*, or, better, *Quain's disease*.

Rupture of the heart may occur when the wall of either ventricle is weakened in one part only or principally. This may be the effect of a local development of Quain's disease; of an ulcer caused by the deposit of atheromatous matter on the outer surface, and its subsequent softening; of abscess and pseudo-abscess resulting from myocarditis, as above described; or from *aneurism of the heart*, in which an external tumor is formed by the internal pressure of the blood and the gradual yielding of a limited portion of the wall.

Heart-Clot.—In rare instances the blood coagulates in the heart before death. This coagulation may be the cause of death, or the subject of it may survive for yrs. It may occur in the left ventricle, where it may be an inch or more in diameter, but being attached to the raised cross-muscles of this cavity, it does not obstruct the passage of the blood into the aorta.

Angina pectoris (heart-panic). See ANGINA PECTORIS.

Deformities and Defects.—The growth of the heart may be arrested in any of the stages of fetal life. The most common of these defects is an open foramen ovale, permitting venous blood from the right auricle to mingle with the arterial in the left. This is produced when the current through the pulmonary artery is obstructed. This state of the heart is known as *monbus caruleus*, or blue disease. This color is not constant, except in a few, but is produced by crying, a fit of coughing, excitement, or unusual phys. exertion. It is not incompatible with a life of limited duration, but is likely to be attended by diminished growth of body, bodily and mental sluggishness, shortness of breath, palpitation at times, and occasional fainting. Less than $\frac{1}{25}$ (4 per cent.) of all deaths are caused by H. D. (See ANEMIA, PALPITATION.) *From orig. art. in J.'s Univ. Cyclopedia, by PROF. ALONZO CLARK, M. D.*

Heat. It is difficult to give a scientific definition of the term *heat* in any other way than by the enunciation of the "dynamic theory," upon which all its manifestations depend. In its most common acceptation it refers to phys. effects which bodies in nature, in certain conditions, produce upon others. A person exposed to the direct action of the sun or a fire experiences a feeling of comfort or discomfort, which is involuntarily attributed to some sort of emanation from these sources; and bodies in certain conditions are observed to produce effects on other bodies near them, or in contact with them, which are attributed to the same kind of influence. It was formerly supposed that a material agent passed from one body to another. Under this hypothesis it was conceivable that a body might "contain" H., and that this substance might exist in greater "quantity" at one time than another in the same body; and although the term *heat* and the expressions "quantity of heat," "transfer of heat," and others having significations which involve the idea of quantity, are still retained, even in scientific explanations, the quantities referred to are not those of matter, but of dynamic effects.

The dynamic theory of H.—a theory which has revolutionized the phys. sciences—is founded on the assumption that all substances in nature are composed of indefinitely small material molecules, which are maintained by the forces which act upon them in a constant state of vibration or oscillation. When a body, whether solid, liquid, or gaseous, becomes hotter in the popular sense of this term, the scientific condition involved is that the vibrations of the molecules become more rapid; and a decrease in the velocity of vibration of the molecules accompanies or produces the effect called cooling. The forces which act upon the molecules, and which determine the velocity of vibration, are presumed to be their own mutual attractions and opposing centrifugal forces, to which is added the external pressure of the atmosphere or other medium which surrounds the body. Each molecule in motion possesses a certain *vis viva*, or living force, corresponding to that which is manifested by bodies

having visible or sensible motions; so that the living force due to the H.-vibrations may be said to represent generally the H.-condition of the body. The dynamical process of heating or cooling may be effected in various ways. The most common and universal phenomena of this kind in nature take place through radiation of H. If a heated body be placed near another which is cooler, a transfer takes place until an equilibrium is attained in their conditions. This equilibrium is assumed to be effected through the vibrations of an elastic medium which pervades all space, and which is composed of ponderable molecules so small that they penetrate the spaces between the molecules of other substances, and form, so to speak, an atmosphere around them. The ethereal atmosphere may be said to perform the same office in the transfer of H. that the common atmosphere performs in the phenomena of sound. The cooling of a body through radiation implies a loss of living force through the impact of its molecules with the atoms of the ethereal atmosphere, waves or vibrations being communicated to the latter, which are propagated in all directions. Another body within the influence of these waves will receive H. by the impulse communicated to its molecules; or, in other words, an increased rate of vibration will be communicated to its molecules, its living force will be increased, and it will become hotter. The variations of the H. of a body are thus known by common observation to be connected with the action of ordinary forms of dynamic energy.

The supposed motions of the separate molecules of bodies with which the phenomena of H. are connected cannot be made evident to the senses, and hence the dynamic theory was the result of inductive reasoning, and not of observation. It had its origin in the fundamental principle of the science of dynamics, connected with that force in nature which arises from the inertia of matter. The well known law of dynamics, that when the velocity of a material particle or of a body is changed by the action of a force, the *work of the force* in a given time is equal to the *variation of the living force of the particle or body*, is a law which may be derived directly from the definition of the mass of a body and the principle of measuring forces by velocities. Applied to a system of bodies acted upon by a system of forces, this theorem of dynamics assumes the following gen. form of expression: *The aggregate work of the forces applied to a system in a given time is equal to the variation of the living force of the system in the same time.*

The discovery that this theorem of the transformation of energy, as applied to sensible finite velocities of bodies, is applicable to the insensible or indefinitely small vibrations of the molecules of a body which accompanies the changes of vol. and the excitation of energy in the phenomena of H. was definitely demonstrated and received as a new theory about the yr. 1852. During many yrs. previous to this the subject of the true theory of H. had been discussed, and the new theory was even announced in precise lang. by Lavoisier and Laplace as early as 1780, in the following lang. (VERDET, *Théorie Mécanique de la Chaleur*): "Other physicists think that heat is only the result of insensible vibrations of matter." "In this system H. is the living force which results from the insensible movements of the molecules of a body;" "It is the sum of the products of the mass of each molecule by the square of its velocity." "We shall not decide between the 2 preceding hypotheses [referring to the material theory]. Many phenomena appear favorable to the latter. Such is, for example, that of the heat which is produced in the friction of 2 solid bodies; but there are others which are applied more simply in the first." "Perhaps they both have place at the same time." Laplace afterward, however, in his discussions on H., defended the material theory. The experiments of Rumford and of Davy in 1798 and 1799 upon the H. produced by friction served to demonstrate the failure of the material theory, and gave a new impetus to investigation.

The discoveries which led to the foundation of the science of thermodynamics were made between the yrs. 1842 and 1849, and were due to the independent and separate investigations of Dr. Robert Mayer, a Ger. phys., Mr. Colding, an engineer of Copenhagen, and Mr. Joule of Manchester, Eng. An approximate determination of the *dynamic equivalent* of a unit of H. was first pub. by Mayer; while Mr. Joule was the first to give by exact experiments the determinations which established the principle, and placed the value of the dynamic equivalent beyond doubt. The final development of the science into a definite form, immediately following the determinations of Mayer and Joule, was principally due to the labors of R. J. E. Clausius, Mr. M. Rankine, and Sir William Thomson, their most important researches having been pub. in the yrs. 1849 to 1851. To these illustrious philos. and maths. we are principally indebted for the establishment of the science of thermodynamics.

H. being no longer regarded as a material substance, but its phenomena being those of force, motion, and work, it is proper to explain the meaning of the term "quantity of heat," which is retained even in scientific discussions. For this purpose it will be necessary first to explain the signification of the term *temperature*. The thermometer is so common an instrument that its construction need not be described. Degrees of temperature, as exhibited when the thermometer is brought in contact with a body, indicate, as is well known, various conditions of the body in regard to H., and under the material theory it was rational to suppose that the lowering of the thermometer when in contact with a body would indicate the quantity of H. which passed out of the body; or, in other words, variations in the thermometer might be taken to represent variations of quantities of H. in a given mass. Under the dynamic theory, however, a change of H. in a body indicated by the thermometer involves 3 effects, an increase or decrease of the living force due to the H.-motions, the work of the force of attraction of the molecules, due to the change if the body expands or contracts; and also the work of the external pressure upon

the bounding surfaces. The variation of H. in the body is the resultant of these effects. If the body heated or cooled retains its form and dimensions, then the only effect of an external modifying force is to produce a change of molecular movement, provided no visible or sensible motion is communicated to it; and this increment of living force, or "heat," will be indicated by the thermometer, or become *sensible* through the thermometer. The *dynamic equivalent* of a certain quantity of H. or living force will in such a case be the work of the exterior force which produces it. One mode of finding such an equivalent may be mentioned, especially, as that followed by Mr. Joule. He found by experiment the quantity of work expended in producing friction among particles of water, corresponding to the heating of one unit of weight, or one pound, one degree of the thermometer. The water was taken at its maximum density, so that the only effect of friction was the heating effect, no part of the external force being expended in producing expansion or in overcoming the attraction of the particles and the force of external pressure; or at least these effects were insensible. It was found that 772 ft.-lbs. of work correspond to an elevation of temperature in 1 lb. of water 1° F. This quantity of H. being represented by 1, the dynamic equivalent of a unit of H. in Eng. measures is said to be 772 ft.-lbs. This operation being merely a transformation of the energy of a force exerted into another form of energy, the energy of motion in a mass, is necessarily invariable. To find the equivalent *thermal* effect in any other substance, it is only necessary to find experimentally the quantity in weight of such substance that will have its temperature changed 1° by the quantity of H. thus represented by unity. It is obvious that any other quantity of water might be taken, as, for instance, a kilogramme, and any other thermometer, the centigrade for instance. This would give a different unit of H., which would correspond, however, to a different quantity of work of the modifying force, but the relations of the 2 units and the quantities of work would be invariable. Thus, a Fr. unit of H., a "calorie," is such a unit; it corresponds, nearly, to 4 Brit. units, the exact ratio being 3.968, the quantity of work equivalent to a calorie being 433.55 kilogrammetres.

Various modes of determining the dynamic equivalent have been adopted, and laborious experiments and investigations have been made by eminent physicists with this view. These experiments include those in which H. is generated by friction of water, mercury, and iron; experiments with steam and air; the electro-magnetic machine; and the shock of bodies, all leading substantially to the same result, small differences only occurring in the determinations arising from causes of loss of H. or work which could not be always experimentally ascertained, the accepted result being that stated above. The determinations by Joule in 1843-45, which first gave to the dynamic equivalent a value worthy of confidence, may be said to have been the starting-point of modern progress in the science of H. We are thus led to the enunciation of the fundamental principle of the dynamic theory of H. sometimes called the principle of equivalence of H. and work—viz. *heat and dynamic energy are mutually convertible*; the law of this equivalence, stated with reference to Brit. measures, being that 1 unit of H. corresponds to 772 ft.-lbs. of dynamic energy exerted. A quantity of H. expressed in Brit. units of H. may therefore be expressed as work by multiplying the number of units of H. by 772, the result being work in ft.-lbs.

The gen. conclusions to be deduced from what precedes are as follows: (1) The word *heat* implies a condition of bodies in nature which is a condition of energy, or capacity for producing changes. (2) This capacity is indicated by the thermometer; and one kind of change effected between 2 bodies in different conditions through the action of H. is the *transfer of H.*, by which bodies are brought to the same degree of temperature, as indicated by the thermometer, through radiation or actual contact. (3) The changes of H. in a body are accompanied by corresponding changes of the density and elasticity, or by changes in vol. and in pressure, upon the medium which envelops the bounding surfaces of the body. (4) Among the changes produced by a change of H. also may be enumerated chemical, electric, and magnetic changes. (5) H. considered as a source of energy is identical with the kind of energy called living force, and may be regarded as a quantity capable of being measured by its dynamic effects; and in this respect it is subject, like other forms of energy, to the law of conservation. This law, as applied to H., gives rise to the principle of equivalence, and its proof is the determination experimentally of the *dynamic equivalent* of H. In a complete study of H. 2 very different systems of investigation are necessary. One consists in the determination of the quantities of H. which are absorbed or disengaged by bodies when they pass from one condition of H. to another through intermediate states, in which the relation between the temperatures, vols., and external pressures are considered. In this system of investigation the equivalence of H. and work is to be taken into account, and also the principles which form the basis of the science of thermodynamics. The phenomena of greatest interest to be considered are the changes of vol. and of states of aggregation of bodies which accompany changes of H.; the performance of external work through the elastic force in the expansion of bodies; the applications of H. to electricity, magnetism, and chem. The investigations are prosecuted partly by experiment and observation, and partly by analytical investigation, the experimental investigations furnishing usually the constants or coefficients of the mathematical formulas. The other class of investigations relates to the phenomena of H. as exhibited between bodies in which the interchange of temperatures is effected without any modifying external cause, and embraces the laws of the *propagation* or *transfer* of H.; the study of radiant H. in its relation to the wave-motions of the ethereal medium; and the action of bodies in refer-

ence to radiation and absorption. In these investigations the phenomena of H. and light are regarded as identical in character or as resulting from the same phys. agencies.

Heath, or **Heath'er** [Ger. *Heide*], small shrubs of the order Ericaceae, found mostly in the Old World. The common ling or heather of Europe (*Calluna vulgaris*) grows also very sparingly in parts of N. Eng. and in Newfoundland. It is the only true H. known in Amer. In Europe it covers great tracts of waste land. It is the only species of the genus. Most of the H. are of the great genus *Erica*, nearly 500 species of which are known. A few of these are small trees. Most of the H. are S. Afr.; none except *Calluna* are Amer.; none are S. Amer. or Australian. A very large proportion of the H. are beautiful when in flower. They are not much cultivated in the U. S.

Heath (WILLIAM), b. at Roxbury, Mass., Mar. 2, 1737; became capt. of the Suffolk regiment; commandant of the Anc. and Honorable Artillery of Boston 1770; afterward a provincial col.; was often in the legislature; was in the Provincial Cong. 1774-75; a brigadier and then maj.-gen. 1775; brig.-gen. of the Continental forces 1775, maj.-gen. 1776; was an exceedingly useful officer throughout the Revolutionary war; State senator 1791-92; became judge of probate for Norfolk co., Mass., 1793; was elected lieut.-gov. in 1806, but declined to serve. D. Jan. 24, 1814.

Heav'en. Among its names, the A.-S. word *heaven* is that which is "heaved" up; *Caelum* means that which is "hollowed." *Olympus*, the Gr. abode of the gods, was a high mt. of Thessaly; *Elysium* is of unknown derivation. The Hindoo H. for the ordinary righteous was on Meru, a mt. 2,000,000 m. high; that for those who had reached Brahmanism was *Nirwana*, or virtually "nothingness." The Heb. words for H. mean "high places," the "rolling" (sky), that which is "stretched or beaten out." The common N. T. word means "elevated." The highest conception of H. among the heathen is that of the Grs.; Plato describes it as it "may be," the home of the just who have led holy lives and purified themselves with philos. Poets describe it as the shadowy isles of the blest, Elysian Fields in the Atlantic, or in the sky or the under-world, where heroes were gathered. The Hindoo Vedas describe it as a continuation of this life under better conditions. The Per. book *Avesta* taught of a paradise beyond the E. mts. The H. of the Egyptians was in the course of the sun; of the Druzes, in Chi.; of the Druids, was in the sky, reached after transmigrations; of the Scandinavians, was *Walhalla*, the gathering-place of heroes. The N. Amer. Indians look forward to a happy hunting-ground in the W. The Mohammedan paradise is mainly depicted as a place of earthly delights. The Heb. description is of a firmament between the upper and lower waters, above which is the throne of God. Some of the later Jews hold to 2 H., some to 3, and some to 7. The N. T. speaks of H. as a country, a house, an assembly, etc., but emphasizes its spiritual and moral attractions. Mention is made rather of *what* it is than *where*. Among pagans the occupations of H. were generally of the same character as the pleasures of life. The Bible represents it as a place of activity in worship, in spiritual intercourse, and enjoyment of divine favors. [From orig. art. in *J.'s Univ. Cyc.*, by REV. ISAAC RILEY.]

Heaves. See BROKEN WIND.

Hebe [*Ἥβη*], the goddess of youth and the cupbearer and attendant of the Olympian gods; daughter of Zeus and Hera, wife of Heracles.

Heber (REGINALD), b. at Malpas, Cheshire, Eng., Apr. 21, 1783, and was a half-brother of Richard Heber; ed. at Brasenose Coll., Ox., and wrote (1803) the prize poem *Palestine*; in 1807 rector of Hodnet. In 1812 pub. a vol. of hymns; was Bampton lecturer 1815; a prebendary of St. Asaph 1817; became (1822) preacher of Lincoln's Inn; in 1823 was consecrated bp. of Calcutta; labored in India with zeal and wisdom until Apr. 3, 1826, when he was found dead in his bath at Trichinopoly. Wrote *Narrative of a Journey in N. India*. His hymn "From Greenland's icy mountains" is the most popular missionary hymn in the Eng. lang.

Heber (SIR RICHARD), b. in Lond. in 1773, ed. at Brasenose, Ox.; pub. the songs of Claudian in 1793; was M. P. for Ox. Univ. 1821-26; is chiefly known as a book-collector. He possessed, according to Allibone, no less than 146,827 vols. beside bound and unbound pamphlets, which cost him some £180,000. D. Oct. 4, 1833.

Hébert (JACQUES RENÉ), nicknamed the "Père Duchêne," from the ultra-radical paper pub. by him, b. at Alençon in 1755. Previous to the Revolution, as he was uneducated, he led a miserable life as lackey and ticket-seller at the doors of the theatres. Immediately after the capture of the Bastille in 1789 he started his journal, *Le Père Duchêne*, the real patriotism but also the extreme opinions of which soon made H. extensively known, and carried him to atty.-gen. of the then Paris Commune, and afterward a member of the National Convention. H. wielded a tremendous influence, but Robespierre understood that the exaggerations of the Hébertist or ultra-radical party founded by H. discredited the cause of the Revolution, and the committee of public safety sent the "Père Duchêne" to the guillotine Mar. 24, 1794.

Hébert (PAUL O.), b. in La. in 1819, grad. at the U. S. Military Acad. in 1840, and entered the army as second lieut. of engineers; engaged as prof. of engineering at the Military Acad. and in constructing defences in La. till 1845, when he resigned. On the outbreak of the war with Mex. he was appointed lieut.-col. 14th Inf., being engaged in the battles of Contreras, Churubusco, Molino del Rey, Chapultepec, and at the capture of the city of Mexico; at the close of the war became a planter in La.; in 1853 was chosen gov. of the State. During the c. war he served as a brig.-gen. in the Confed. army. D. Aug. 20, 1880.

Hebrew Language. It belongs to the Semitic stock of langs. (see SEMITIC), and is closely related to the Chaldee,

Syriac, and Arabic. The name is derived from Eber, the ancestor of Abraham, who emigrated from Chaldæa to Canaan. It was the spoken lang. of the Jews down to the destruction of Jerusalem and their independent nationality (A. D. 70), and is still used in their synagogues as the sacred lang. All the canonical books of the O. T. are written in H., and hence the importance of the lang. for the biblical scholar. The best H. grams. are by Gesenius and Ewald; the best H. dict. is that of Gesenius, Eng. translation by E. Robinson. PHILIP SCHAFF.

Hebrew Literature. See JEWISH LITERATURE.

Hebrews. See JEWS, by PROF. FELIX ADLER.

Hebrews, Epistle to the, an anonymous Epistle of the N. T., written by St. Paul, or by one of his disciples, is addressed to the Chrs. of Heb. descent in the E. Its object is to show the infinite superiority of Christianity over Judaism, and to warn its readers against apostasy. The writer makes the O. T. itself prove the New, to which it pointed as its fulfilment. He sets forth especially the eternal priesthood and sacrifice of Christ, of which the Levitical worship was a significant symbol and type. It was written before the destruction of Jerusalem, probably in It. during first imprisonment of Paul in Rome. A. D. 63 or 64. See the work of Riehm on the *Lehrbegriff des Hebräerbriefs*. PHILIP SCHAFF.

Hebrides, or Western Islands, the common name given to the large group along the W. coast of Scot., numbering about 490, of which only 120 are inhabited. They are divided into the Outer and Inner H. In the 9th century they were colonized by emigrants from Nor. In the following centuries they were alternately under Nor. and Scotch authority, or under "Lords of the Isles," until in 1540 they were finally annexed to the Scotch crown. Area, estimated, 3,000 sq. m. Pop. 100,000.

Hebron, in Pal., about 20 m. W. of S. from Jerusalem, one of the oldest existing cities in the world. The valley (about 300 ft. above the sea) in which it is situated is exceedingly fertile, abounding in grapes, olives, figs, pomegranates, and the like. The great mosque of Hebron, on rising ground, is over the cave of Machpelah, in which Abraham, Isaac, and Jacob, with their wives, are buried. Pop. 8,000 or 10,000; 400 or 500 are Jews; the rest Mohammedans.

Hebron, Neb. See APPENDIX.

Hecateus, of Miletus, one of the earliest and most important of the chroniclers (*logographi*), was the son of Hegesander, and lived about B. C. 549 to 479. He took a prominent part in the affairs of his native city; visited many countries, and pub. the results of his travels in a work entitled *Περὶ πόλεως ἡῆς* or *Περὶ ἡῆς*, in 2 books; the first was devoted to Europe, the second to Asia, including Egypt; wrote also *Γενεαλογίαι* or *Ἱστορίαι*, containing the mythological histories of the Grs. in 4 books. Only fragments remain.

Hecate, hek'a'te [*Ἥκατη*], a mysterious Gr. goddess, whose mythus is variously given. She is oftenest reckoned as one of the infernal divinities, and was worshipped with gloomy sacrifices and magical rites.

Heck (BARBARA), "the foundress of Amer. Methodism," was b. in Ire., in a settlement of Ger. emigrants from the Palatinate on the Rhine. In 1760 Philip Embury, Paul Heck, and Barbara his wife, with others of the settlement, sailed for New York. There the little company lapsed from their faith, or at least from their Wesleyan usages; but in 1766 Barbara Heck recalled Embury to his duty as a Meth. local preacher (in which capacity he had labored in Ire.). She gathered a little congregation at his house, and rested not till she saw the famous "Old John st. chapel" completed. Methodism was thus effectively introduced into the U. S. When Wesley's preachers arrived to take charge of the John st. society she removed with her family and that of Embury to N. New York, where they founded Meth. societies. They finally settled in Upper Canada, and became the founders of their denomination there. Barbara Heck d. there in 1804, aged 70 yrs. A. STEVENS.

Heckewelder (JOHN GOTTLIEB ERNEST), b. at Bedford, Eng., Mar. 12, 1743, of Moravian parents, with whom he came in 1754 to Amer.; became in 1762 an Indian missionary, laboring in O., Pa., and Mich.; became in 1768 missionary agent for the Moravians, serving at times as U. S. peace com. with the Indians; residing 1801-10 at Gnadenhütten, O., and after that at Bethlehem, Pa., where he d. Jan. 21, 1823. Wrote *An Account of the Hist., etc. of the Indian Nations*. (See RONDTHALER, *Life*, 1847.)

Hec'la, or Hek'la, a volcano in the S. W. part of Iceland, 20 m. from the coast. It is conical in shape, 5,110 ft. high, and covered with snow. Since 1104, 18 eruptions are on record. The last was that of 1845, lasting 7 months, pouring out a stream of lava 1 m. broad, 50 ft. deep, and sending clouds of dust 400 m. over the ocean, as far as the Orkney Islands.

Hec'tor, one of the central characters of the *Iliad*, a Trojan prince, son of Priam by Hecuba, husband of Andromache, father of Astyanax. He is the prin. champion of the Trojans, the slayer of Patroclus, and is himself slain by Achilles, aided by Pallas Athena.

Hec'uba, wife of Priam, the king of Troy. She became a slave among the Grs. after the fall of Troy, but the narratives of the residue of her life are various.

Hedge (FREDERIC HENRY), D. D., Unit. clergyman, b. in Cambridge, Mass., Dec. 12, 1805. At the age of 13 he went to Ger., and studied there for several yrs.; returned in 1822, and entered Harvard Coll. in the class of 1825; studied theol. 3 yrs. at the Cambridge Divinity School; was settled in W. Cambridge 1833; then in Bangor, Me.; took charge (1850) of the Westminster ch. in Providence, R. I.; accepted a call to Brookline, Mass., 1856, and in 1872 became instructor in Ger. at Harvard Coll., where he had lectured on ch. hist. His greatest work, *Prose Writers of Ger.*, has a standard reputation. Other vols. are *Reason in Religion*, *The Primæval World of Heb. Tradition*. From 1857 to 1860 he edited the *Chr. Examiner*; was at one time pres. of the Unit. Association. He is eminent outside of his sect as a preacher

and writer, for the vigor of his thought, the dignity of his presence, and the noble purity of his Eng. style. Dr. H. is a Chr. rationalist, combining intellectual independence with fidelity to ecclesiastical tradition. D. B. FROTHINGHAM.

Hedge (LEVY), L.L.D., b. at Warwick, Mass., Apr. 19, 1766, grad. at Harvard 1792; a coll. tutor 1805-11; prof. of Lat. in Harvard Coll. 1811-17; of natural theol., political economy, and moral philos. 1817-22 and 1827-32; of logic and metaphysics 1810-27. Author of a treatise on logic, ed. of an abridgment of Brown's *Philos.* D. Jan. 3, 1844.

Hedgehog (*Erinaceus Europæus*), a harmless little nocturnal animal, type of the family ERINACEIDÆ (which see), which subsists mainly on insects, though sometimes eating fruit and even reptiles. The back is covered with spines, and when attacked he rolls himself into a ball from which they radiate in every direction, and serve as a defence that enables him to defy many of his enemies. Related species are found in Asia, etc. The name is quite improperly applied to the N. Amer. porcupine in some parts of U. S.

Hedge-sparrow. See ACCECTOR.

Hedj'rah, or **Heg'irah** [Ar. the "separation,"] more fully *Hedj'rat-ul-Nebi*, the "prophet's departure," the escape of Mohammed in secret from Mecca to Medina. This event, regarded as the true origin of Mohammedanism, occurred Sept. 13, 622, but it was not until 639 that Omar the caliph established the H. as the beginning of the Mohammedan era. As the Arabic yr. is nearly 11 days shorter than ours, it is difficult to transfer dates accurately from one to the other yr. If 3 per cent. be taken from the number of the yr. of the H., and 622 be added to the remainder, the sum is the yr. of the Chr. era.

He'gel (GEORG WILHELM FRIEDRICH), b. at Stuttgart Aug. 27, 1770. His father was an officer under the ducal govt. He entered the Univ. of Tübingen in the autumn of 1788 as student of theol. In 1790 Schelling, then in his 16th yr., came to the univ., and his precocious intellect awakened in H. new enthusiasm for philos. H. obtained a situation in 1797 as tutor in Frankfurt. In 1801 he removed to Jena, the centre of literary activity at that time. Fichte had recently gone to Berlin; Schelling was there as prof. extraordinarius. H. lectured on logic and metaphysics, the philos. of nature, and the philos. of spirit. In 1805 he lectured on the hist. of philos., pure math., and natural rights; in 1806, on the unity of philosophical systems and the phenomenology of spirit. Up to this time he had been a follower of Schelling, with whom he had edited the *Critical Journal of Philos.* 4 yrs. before. His own system begins to reveal its outlines at this period: I. Logic or science of pure thought or Reason—universal ideas applying to nature and mind alike; II. philos. of nature, treating of the realization of Reason in time and space; III. philos. of man as finite spirit; rising through Religion to the Absolute or Pure Reason again, and thus completing the circle of philos. In the *Phenomenology of Spirit*, pub. in 1807—a work which he called his "voyage of discovery"—H. begins his independent career. He closed his lectures at Jena Sept. 18, 1806, and in 1808 took charge of a gymnasium at Nuremberg. He was married in 1811 to Marie von Tucher. He elaborated and expounded his *Science of Logic* (1812-16) in 3 vols., presenting in it the science of pure thought or the fundamental basis of his entire system. He pub. the *Encyc. of Philosophical Sciences* in 1817, at Heidelberg, whither he had gone, in Oct. 1816, to assume a professorship in the univ.

The *Philos. of Spirit* is the labor of his Berlin period, which began in 1818, Oct. 22. In 1821 he pub. his *Philos. of Rights*, containing the science of jurisprudence, morals, and politics. The lectures on the philos. of hist. were written in 1822-23, and delivered with modifications 5 times. A series of lectures on the proof of the being of God were delivered by him in 1830. While engaged on a new edition of his complete *Logic*, having finished the revision of the first vol., he died of cholera, Nov. 14, 1831.

His complete works were edited, and in some cases compiled, from notes taken at his lectures, by his disciples Marheineke, Schulze, Gans, Von Henning, Hotho, Michelet, Förster, and Boumann. They included the writings of the Schelling period (1 vol.), the *Phenomenology of Spirit* (1 vol.), *Science of Logic* (3 vols.), *Outlines of the Philos. of Rights* (1 vol.), *Philos. of Hist.* (1 vol.), *Esthetics* (3 vols.), *Philos. of Religion* (2 vols.), *Hist. of Philos.* (3 vols.), miscellaneous writings (2 vols.). To these should be added the *Life of Hegel* by ROSENKRANZ. Access to H.'s system through works in Eng.: *The Subjective Logic of Hegel* translated by H. SLONAN, DR., and J. WALLON, Lond., 1855; *Lectures on the Philos. of Hist.*, translated from the 3d Ger. ed. by J. SIERCKE (*Bohn's Library*, Lond., 1857); *The Logic of Hegel*, with prolegomena, by W. W. WALLACE, OX., 1874 containing vol. i. of the *Encyc. Phil.* 864; *The Secret of Hegel, being the Hegelian System in Origin, Principle, Form, and Matter*, by JAMES HUTCHINSON STIRLING, 2 vols., Lond., 1865; *ten Principles of the Philos. of Nature*, with an Outline of some of its Recent Developments among the Germans, embracing the Philosophical Systems of Schelling and Hegel, and Oken's System of Nature, by J. B. STALLO, BOSTON, 1848; *The Science of Thought, a System of Logic*, by CHARLES CARROLL EVERETT, BOSTON, 1869 contains an original exposition and justification of a system substantially identical with H.'s *Logic*; *The Nation; the Foundations of Civil Order and Political Life in the U. S.*, by E. M. FORD, NEW YORK, 1870 contains an original exposition and discussion of positions substantially agreeing with H.'s *Philos. of Rights*. In the *Journal of Speculative Philos.* (St. Louis, 1867-82) have appeared translations of BÉNAÏD's *Analysis of Hegel's Esthetics*; of chapters from the *Phenomenology of Spirit*, with analysis and commentary; of the *Philosophical Propædæutic on Rights, Morals, and Religion*, *Logic*, and the *Phenomenology*; of the chapters in the *Hist. of Philos.* on Plato and Aristotle; of the portion of the *Esthetics*, relating to symbolic, classic, and romantic arts; the third part of Hegel's *Philos. of Religion*, relating to Christianity; of the greater part of Rosenkranz's *Hegel as the National Philos. of Ger.* (written in 1869 for the

centennial anniversary of H.'s birthday); of Trendelenburg *On the Logical Question in Hegel's System*; of Michelet and Von Hartmann *on Hegel's Dialectic*; beside original articles on different phases of H.'s system, and in particular an extended *Introduction to Speculative Philos. and Logic*, by A. Vera, the leading expounder of H. in Fr. and It. Vera has expanded the *Encyc.* into 7 vols. in Fr. by his copious commentary, and has pub. a Fr. translation of the *Philos. of Religion* in 3 vols. Charles BÉNAÏD has pub. 5 vols. in Fr. giving a translation of nearly all of the *Esthetics*.

The most distinguished names in H.'s school are Göschel, Hinrichs, Gabler, Erdmann, Marheineke, Daub, Rosenkranz, Gans, Vatke, Michelet, Conradi, Kuno Fischer, Hotho, Carrière, Vischer, Bruno Bauer. The best hist. of the Hegelian school is to be found in ERDMANN'S *Grundriss der Geschichte der Philosophie*. W. W. T. HARRIS.

Hegesip'pus, a contemporary of Demosthenes and Eschines, opposed Philip of Macedon. Two of the orations which have come down to us under the name of Demosthenes are ascribed to H. by the anc. grammarians—namely, that on Halonesus and that on the treaty with Alexander.

Hegirah. See HEDJRAH.

Heib'erg (JOHAN LUDWIG), b. at Copenhagen Dec. 14, 1791. In 1817 took a degree as Doctor in Philos. at the Univ. of Copenhagen. From 1819 to 1822 lived in Paris; from 1822 to 1825 occupied a chair as prof. at the Univ. of Kiel. After 1825 resided in Copenhagen, closely connected with the Royal Theatre as poet and translator, as director from 1849 to 1856, and as censor. His prose writings comprise 11 vols. of criticisms. Tendency of his criticism was to educate the public, and make it capable of appreciating lit. and art. His poetical works consist mostly of dramas, of which one, *Elverhøj* ("Elves' hill"), has become the national drama of the Danes. His chief work is a comedy not destined for the stage, *A Soul after Death*. D. Aug. 25, 1860. CLEMENS PETERSEN.

Heidel'berg, town of Ger., on the Neckar, has one of the oldest and most celebrated univs. of Ger. It has a library of 200,000 vols. A zoological museum, a botanical garden, a laboratory, and an observatory are connected with it. The old castle, built in the 12th century, enlarged in the 14th and 15th, much injured by the Fr., in 1688, and nearly destroyed by fire in 1764, forms a picturesque ruin. Pop. 1890, 24,417.

Heim'dall, or **Heimdallr**, the watchman of the Æsir, or Scandinavian gods, son of Odin. He has golden teeth, rides a horse with a golden mane, can see by night as well as by day, and behold everything within a hundred leagues. He can hear the growing of grass and wool. He dwells at the place where the rainbow-bridge enters heaven. When danger approaches he blows the great trumpet so loudly that the whole universe can hear.

Heine (HEINRICH), b. at Düsseldorf of Jewish parentage Dec. 12, 1799, was early sent to Hamburg to his uncle, the well known banker, Salomon Heine, to prepare himself for commercial pursuits; but as he utterly disliked business, he went in 1819, with his uncle's consent and support, to Bonn to study law. After a short stay in that city, during which he became quite intimately acquainted with A. W. Schlegel, he proceeded to Berlin, where Schlegel's letters introduced him to the celebrated literary circle which gathered around Rahel Levin, and which was frequented by Hegel, Chamisso, Grabbe, and others. Here he studied lit. and philos., and pub. his first book, a vol. of poems, in 1822. The poems were hardly noticed, however, and the young poet, disappointed and disgusted, left Berlin for Göttingen, where, after 2 yrs.' unwearied study, he took his degree in law in 1825. Once more he returned to Berlin, and pub. his 2 tragedies, *Atmanzor* and *Radecliff*, but this second attempt was still more unsuccessful than the first had been. It was his *Reisebilder*, pub. in Hamburg in 4 vols. from 1826 to 1831, which first attracted public attention. They made quite a sensation at their first appearance. Next yr. he pub. his *Buch der Lieder*, in which he inserted the greatest part of his earlier poems from 1822, and this book made him at once the most widely read author in Ger. From 1827 to 1831 H. resided partly in Munich, where he edited *Pölitische Annalen* together with Lindner; partly in Berlin, where he fell out with Platen and enriched the Ger. lit. with a piece of polemics to which no other lit. has an equal either in scandal or in wit; and partly in Hamburg. The revolution of July put him in a sort of democratic frenzy; and as it perhaps was not very safe for him to live in Ger. after the publication of *Kahlhof über den Adel*, in *Briefen an den Grafen M. von Moltke* (Hamburg, 1831), he removed in that yr. to Paris, where he resided with some short interruptions for the rest of his life. D. there Feb. 17, 1856. From 1836 to the fall of the cabinet of Guizot in 1848 he received an annual pension from the Fr. govt. of 4000 francs. From 1847 he was for the most time bedridden, suffering from a disease of the spine, which also affected his eyes. During the first part of his residence in Paris he developed a great literary activity. His prin. books written in Paris were *Neue Gedichte*, *Atta Troll*, *Romanzero*, *Beiträge zur Geschichte der neuern schönen Litteratur in Deutschland*, etc.

CLEMENS PETERSEN.

Hein'sius (ANTONIUS), b. about 1641. When William of Orange ascended the Eng. throne, H. became the real gov. of Hol., and he acted in this position with success and in harmony with his royal master. He was a promoter of the alliance between Eng., Hol., Hanover, Den., Prus., Aus., and Savoy against Louis XIV., and it was to him, as the real soul of the alliance, that Louis XIV. made overtures of peace in 1708, 1709, and 1710. But the negotiations were every time broken off on account of the sacrifices which H. demanded of Fr. A caprice of Queen Anne changed the whole situation, and as at the same time the Fr. became successful in the field, the Peace of Utrecht was concluded Apr. 11, 1713. D. Aug. 13, 1720.

Heintzelman (SAMUEL P.), b. in Manheim, Lancaster

co., Pa., Sept. 30, 1805; grad. at W. P. L., and entered the army as second lieutenant of inf. July 1826; served on the N. frontier and in the Fla. and Mex. wars; subsequently served in Cal. against the Coyote and Uma Indians, and on frontier duty in Tex., commanding operations on the Rio Grande against Cortina's marauders, etc. He attained a majority in the army in 1855, and in May 1861 was commissioned col. of the 17th Inf., and assigned to duty in Wash. as acting inspector-gen. of that dept.; appointed brig.-gen. of volunteers May 17, 1861, he commanded the forces which captured Alexandria, Va., May 24. He took part in the first battle of Bull Run, July 21, 1861. In the Va. Peninsular campaign of 1862 he commanded the 3d army corps before Yorktown, Apr. May, and at Williamsburg, May 5. Promoted to be maj.-gen. of volunteers from the date of the latter battle, he commanded the 3d and 4th corps at Fair Oaks, May 31, June 1, and in the "Seven Days'" fight. At the second battle of Bull Run (Aug. 1862) he was engaged; also present at Chantilly Sept. 1. On Feb. 2, 1863, he was placed in command of the defenses of Wash. and the 23d army corps, which command he held till Oct. 1863, and from Jan. to Oct. 1864 commanded the N. dept. (O., Mich., Ind., and Ill.); mustered out of the volunteer service in Aug. 1865. Brevet maj.-gen. U. S. A. Resumed command of the 17th Inf. in Sept. 1865. In Feb. 1869 he was retired from active service upon the full rank of maj.-gen. D. May 1, 1880.

Heir, *är* [Lat. *heres*], one who is entitled by law to succeed to the real estate of a deceased person who dies without a will or who leaves property undisposed of by his will. Property passing to an H. is said to be acquired by descent, while all other modes of obtaining title to land are denominated, in law, acquisitions by purchase. An ancestor is under no obligation to refrain from disposing of his real estate in order that his H. may not be deprived of his prospective int. therein, but may, if he desires, devise it entirely to third persons in his will. This rule is sometimes modified by statute, as in N. Y., where a testator cannot devise, in certain cases of nearly related H., more than half of his estate to charitable corporations. When the H. is vested with the real estate, he does not take it absolutely, discharged of all the claims of creditors, but subject to their right to levy upon it, as if the ancestor were living, in case the avails of the personal property are not sufficient for the payment of debts. The question as to what relatives shall constitute the H. of an intestate is determined upon different principles in Eng. and the U. S. It is the policy of the Eng. law to keep landed estates undivided, and inheritance is therefore governed by the law of primogeniture. In the U. S. no preferential claim is given to any one of the children above the others, and all share the inheritance equally, being generally considered tenants in common. If there be no children living or their descendants, the other blood relatives who are nearest in degree inherit the property according to rules prescribed by statute. When there are no H. of the deceased the property escheats to the State.

An *heir-apparent* is one whose right of succession is indefeasible in case he survive his ancestor; as, for example, the eldest son under the Eng. law of inheritance. An *heir-presumptive* is one who would succeed if the ancestor were to die immediately, but whose right may be displaced, if the ancestor live, by the coming into existence of another as H. Thus, in Eng. an only daughter would be H.-presumptive until a son were born.

GEORGE CHASE.

Hel [related to the word *hell*], the Norse goddess of the dead, the daughter of Loki and Angurboda, dwelt in Nifheim, under one of the roots of Yggdrasil, the mystic ash tree, where she had been hurled by the All-Father. Her abode was the home of evils of every kind, and from it there was no escape.

Hel'en [Εἰλη], wife of Menelaus, the most beautiful woman among the Grs., a daughter of Leda, b. at the same time with Castor and Pollux. Her seduction by Paris was the cause of the Trojan war.

Hel'ena, on R. R., city, cap. of Phillips co., Ark., on the Miss. River, 80 m. below Memphis, Tenn. Pop. 1870, 2249; 1880, 3652.

Hel'ena, on R. R., cap. Mont. Terr. and Lewis and Clarke co., in heart of the gold and silver mining dist. of Mont., 150 m. S. of Ft. Benton; has silver-smelting works and quartz and lumber mills. It is the chief town of Mont. Pop. 1870, 3106; 1880, 3624; 1885, about 8000.

Hel'ena, SAINT, mother of Constantine the Great, b. at Drepanum in Bithynia in 247 (or, as some say, at Gloucester in Brit.). She was married to the emp. Constantius Chlorus, who for reasons of state divorced her in 292; but her son, Constantine the Great, on succeeding to the throne in 306, treated her with great honor, and conferred upon her the title of Augusta. After her conversion to the Chr. faith she made a pilgrimage to Jerusalem, and, as we are told, discovered the burial place of the "Magi" or Wise Men of the East (the "Three Kings"), removed their bodies to Constantinople, whence they were transferred to Milan, and thence (1164) to Cologne. D. about 328, and was canonized.

Helianthus, See SUNFLOWER.

Hel'icoid [Gr. ἑλῆξ, "a scroll," and εἶδος, "form"], a warped surface that may be generated by a straight line moving so that each of its points shall advance uniformly in the direction of a given straight line, and at the same time have a uniform angular motion around it. The fixed line is called the *axis* of the surface, the moving line, the *directrix*, and any position of the directrix, an *element*.

Hel'icou [Gr. ἑλικών], **Mount**, a mt. of Gr., in Bæotia, between the Gulf of Corinth and Lake Copals. It is strictly a range of mts., a continuation eastward of Parnassus. Its highest point is a cone 5000 ft. high. Its E. side is fertile and abounds in springs. H. was sacred to the Muses; on it was the fountain Aganippe. Higher up was the grove of the Muses. Still higher up was the well Hippocrene. These points are well identified in modern times.

Hel'igoland, or **Hel'goland** ("holy land"), a small

island in the N. Sea, captured by Eng. from Den. in 1807, opposite to and about 40 m. from the mouth of the Elbe, in lat. 54° 11' N. and lon. 7° 53' E. Including Sandy Island, it is about 1 m. long from N. to S., $\frac{1}{4}$ m. wide, and about 3 m. in circumference. It is fortified, and has a light-house. Pop. 1912.

Heli'odorus [Ἡλιόδωρος], classed among the *scriptores erotici Græci*, b. at Emesa in Syria, and flourished toward the end of the 4th cent. A. D.; wrote, probably in early life, a romance entitled *Æthiopia*, in 10 books. H. became in later life bp. of Tricca.

Heliogabalus, See ELAGABALUS.

Heliop'olis, city of anc. Egypt, near the delta of the Nile, on the canal which connected that river with the Red Sea. It was the chief seat of the worship of the sun, and was celebrated for the magnificence of its temples and for the learning of its priests. Many of the Gr. philos. spent some time in H. to study. In the 5th century A. C. it began to decline, and when Strabo visited it at the beginning of the Chr. era, he found it a city of magnificent ruins, of which now only a few fragments are left. Its site is occupied by a small v., Matareeyeh.

Heliopolis of Syria, See BAALBEK.

Hel'iotast [Gr. ἥλιος, the "sun;" ἵστας, "placed," from ἵσταναι, to "place"], a mirror carried by a clock-work mechanism, so contrived as to reflect a beam of solar light in an unvarying direction, notwithstanding the apparent change of place of the sun in its diurnal motion. The H. has long been in use in physical investigations and experiments, without possessing a high degree of precision. More recently it has been employed in aid of astronomical observation, for which purpose it has been greatly improved. The Amer. expeditions sent out to observe the transit of Venus of 1874 (and also the Fr.) made use of the H. in photographing the successive aspects of that phenomenon by means of telescopes of long focus (40 ft.), instruments which without it could not have been employed at all. A nearly or quite perfect form of heliostatic apparatus, as it respects precision of movement, was one of the latest inventions of the very ingenious Foucault, and was called by him the *heliostat* (Lat. *sidus*, a "star or constellation"; *statuere*, to "place" or "fix"), being designed for use in all the ordinary observations of astron., for the purpose of enabling the observer to occupy constantly the same and the most convenient position.

F. A. P. BARNARD.

Hel'iotrope, or **Bloodstone**, a variety of jaspery quartz, much used in jewelry, and presenting bright red spots upon a deep green ground.

Heliotrope [Gr. ἥλιος, the "sun;" τροπή, "turning"], an instrument employed in geodesy to reflect the sun's rays from one signal-station to another in order to facilitate observation; the reflecting surface presenting to the distant observer the appearance of a brilliantly luminous point or star. There are several varieties.

Heliotropium [Gr. ἥλιος, "sun," and τροπω, to "turn," the flowers were once believed to turn with the sun], a genus (*Heliotropium*) of herbs and shrubs of the order Boraginaceæ. The *H. Peruvianum* and its hybrids are greenhouse shrubs, having flowers of delightful fragrance. *H. curassavicum* and *myosotoides* are natives of the U. S., where also the common H. (*H. Europæum*) is naturalized.

Hel'iotype [Gr. ἥλιος, "sun," and τύπος, "mark," "outline"], any process of reproducing pictures obtained by the actinic power of the sun's rays, by printing in fatty inks. Poitevin discovered that on a plate covered with bichromated gelatine, and exposed to light under a negative, some pores of the gelatine would be partially or wholly closed, while others would be unchanged. If this plate be steeped in water and rubbed over with grease, the grease will attach itself to those places where the light has closed the pores, while it will not touch those where they have remained open, and become filled with water. If the grease employed be lithographic ink, the light-produced image will at once be revealed. Edwards discovered that gelatine might be converted into a substance like parchment, by the addition of alum or chrome alum. The prepared gelatine is poured on a level plate and dried in the dark. When required for use, the sheet is stripped from the plate and printed under a photographic negative.

Hel'ix [Gr. ἑλῆξ, "a winding"], a curve described by any point of the generatrix of a helicoid. (See HELICOID.) If a screw is turned around in a fixed nut, every point of the screw describes a H. From the method of its generation it follows that every point of a H. is equally distant from the axis; hence, if we suppose the axis vertical, the horizontal projection of a H. is the circumference of a circle; further, every tangent to a H. makes a constant angle with the horizontal plane.

Hell, originally, that which is "covered" [A.-S. *helan*], the invisible world; the Heb. *Sheol* (to "ask," or "to be hollow") is the *under-world*; the Gr. *Hades* is the *unseen* place; *Gehenna* means the valley of Hinnom. The O. T. uses *Sheol*, and the N. T. uses *Hades*, for the place of the dead; sometimes the words may be restricted to the grave, at others to the place of the spirit without regard to character. The Jews after the exile divided *Sheol* into Paradise and *Gehenna*. The place of punishment (the present meaning of "hell") is described in the Bible as a place of torment or everlasting punishment. It is figuratively spoken of as under the earth, as *Gehenna*, as Tartarus, as silence, the prison-house, the pit of destruction, outer (or blackness of) darkness, where the worm dieth not, etc. Between H. and heaven the scholastic divines placed Purgatory, with various compartments. The Ch. has almost always and universally held to the future, eternal punishment of the wicked; although here and there some have taught (1) no future punishment; (2) a partial (3) or complete restoration. Almost every nation and tribe has believed in the existence of H. as a place of punishment. Descriptions have depended largely on the power and character of men's imagina-

tions. The pagan accounts vary with the peculiar views of each people as to the character of evil and that which constitutes the horrible. The Bible is very reticent as to particulars; heathen writings are generally very minute. [From orig. art. in *J.'s Univ. Cyc.*, by Rev. ISAAC RILEY.]

Hellanius [Ἑλλάνιος], the most distinguished of the old λογογράφοι, was a native of Mitylene, in Lesbos, b. according to Pamphila, a. c. 496, and d. about 411; but these dates are much questioned. His works treated principally the early Gr. and Per. hist.

Hell-bender, *Monopoma alleghaniensis*, or *Protonopsis horrida*, called also **Mud Devil**, **Ground Puppy**, and **Young Alligator**, a large salamandroid found in the U. S. It lives at the bottom of streams, is 1 or 2 ft. long, and is incorrectly believed by fishermen to be poisonous. It is greedy, and often bites at a fish-hook.

Helle [Ἥλλη], in Gr. mythology, a daughter of Athamas and Nephele. When Phrixus, her brother, was to be put to death, Nephele placed her children on the back of Chrysomallos, the ram with the golden fleece, who went with them through the air; but H. fell off, and was drowned in the Hellespont, which was named from her.

Hellebore [Gr. ἡλεβορος], a remedy used by the anc. in cases of insanity. It was the root of *Helleborus orientalis*, an herb of the order Ranunculaceæ. The "black hellebore" of modern pharmacy is chiefly the product of *H. niger*. H. is not much used in med. except as an emmenagogue.

Hellen, according to Gr. mythology, was a son of Deucalion and Pyrrha, and the progenitor of the whole Hellenic nation. He had 3 sons—Dorus, Æolus, and Xuthus. From the 2 former, and from the 2 sons of Xuthus, Ion and Achæus, descended the 4 branches of the Gr. nation—the Dorian, Æolian, Ionian, and Achæan peoples.

Hellenist [Gr. ἑλληνιστής], among the Jews of Pal. and other countries in the Rom. period, and among the Jewish Chrs. of the same times, a name applied to those persons who yielded to the influence of Gentile, and especially Gr. civilization, probably including also Judaized Grs. It is disputed whether there were or were not distinct Hellenistic sects among Jews or Judaizing Chrs. The Hellenistic spirit did much in preparing the way for the spread of Christianity.

Hellenistic Greek, the Gr. lang. as it appears in the LXX., the N. T., the writings of Josephus and Philo, and those of some of the early Chrs. It abounds in Heb. and Aramaic forms, idioms, and even words.

Hellespont [Ἑλλησπόντος], the anc. name of the Dardanelles, the strait which connects the Propontis and the Ægean; named from the old legend of Helle. It was the scene of many events conspicuous in the hist. and mythology of antiquity.

Hell Gate. The E. River, connecting the waters of the Hudson and of L. I. Sound, forms a large portion of the water-front of the cities of New York and Brooklyn, and is in many ways important to the prosperity and safety of those cities. This stream receives the tide at its 2 extremities—at the E. the Sound tide, at the W. the Sandy Hook tide. The times as well as the heights of these tides are different. By this want of uniformity velocities are imparted to the currents sufficient to keep the channel dredged to depths suitable for the largest vessels. All the obstructions of moment are to be found in that portion of the river which passes under the name of Hell Gate, and are due to numerous reefs of rocks encroaching upon the channels and to the violent currents caused by them.

The character of these obstructions and the importance of their removal were set forth in the report of a survey made in 1848 by Lieut. Commanders C. H. Davis and David Porter, U. S. N.; but these officers differed somewhat as to the manner in which the work should be undertaken. In 1851 some citizens of New York subscribed \$13,000 in order to test a scheme proposed by M. Maillefert. This consisted of placing upon the top of the submerged rock a charge of gunpowder (usually 125 lbs.), confined in a tin case, and exploding it by means of the voltaic current. The result was that the depth of water upon several of the most dangerous rocks was greatly increased. About half the labor was expended upon "Pot Rock," over which at low tide there was a depth of water of 8 ft., which was increased to 18.3 ft. "Its form was quite pointed, and essentially that of a truncated pyramid, down to a depth of 18 ft., where the surface became flattened out, and of considerable development in every direction." In 1852 Cong. made an appropriation of \$20,000 for the removal of the rocks at H. G., the operation to be conducted by the engineer dept. of the army; \$18,000 was expended upon Pot Rock, the result being that "at the commencement it required only \$687 to reduce the height 10.3 ft., but at the end of the expenditure of \$18,000 but a little more than 2 additional ft. of depth was gained."

Little further was attempted until 1866, when Brevet Maj.-Gen. Newton, U. S. Engineers, was instructed to examine H. G., and "prepare a project with a view to its improvement for the purposes of navigation." In *J.'s Univ. Cyc.* he has given a detailed account of his plan, and of the methods and appliances for carrying it into execution. "This was based upon removing the reefs by blasting after drilling the surface from a fixed platform above the water. . . . After the rock broken by the explosion covers the greater part of the reef, its removal is commenced by means of a steam-grapple." Nitro-glycerine was the prin. explosive material used for blasting. A large part of the work has been upon "Hallett's Point Reef, which is in shape an irregular semi-ellipse, the longer axis, which lies next to the shore, being 720 ft. in length, and the shorter semi-axis, projecting straight into the channel, about 300 ft. The cubic contents above the depth of 26 ft. at mean low water amount to 51,000 cubic yards." The work here has been done by means of "tunnels and galleries used to explore the interior of the rock, and thus obtain places for blasting-charges or mines to overthrow the whole rock at once." The chambers were successfully exploded Sept. 24, 1876, and the work is still being prosecuted.

[From orig. art. in *J.'s Univ. Cyc.*, by GEN. JOHN NEWTON, U. S. Engineers.]

Hellmouth (Rt. Rev. ISAAC), D. D., by birth a Polish Jew, became in 1856 an Anglican minister of Canada; founded Huron Coll. (1863) and Hellmouth Coll. (1865), Lond., Ont., and Hellmouth Ladies' Coll. (1869); was successively archdeacon and dean of Huron; became in 1870 suffragan bp. of Norfolk and coadjutor of Huron, and in 1871 succeeded Dr. Cronyn as lord bp. of Huron, Ont.

Helm (BEN. HARDIN), a son of John L. Helm, b. in Ky. in 1831; grad. at W. Pt. July 1, 1851, and entered the army as brevet second lieut. of dragoons; resigned his commission in Oct. 1852, and followed the practice of the law at Elizabethtown and Louisville till 1861. He joined the State guards under Gen. Buckner in 1861, and as a col. in the Confed. army was engaged at the battle of Shiloh, being shortly after promoted to be brig.-gen. He took part in the battle of Perryville, and commanded a division at Stone River and at Chickamauga (Sept. 19-20, 1863), where he was mortally wounded. D. Sept. 21, 1863.

Helm (JOHN L.), b. in Hardin co., Ky., in 1802; became a lawyer, and was several times speaker of the house of reps. of Ky. In 1848 was chosen lieut.-gov., and succeeded Mr. Crittenden as gov. in 1850. During the c. war he strongly sympathized with the South. In 1865 became a State senator, and in 1867 gov., but d. Sept. 8, 5 days after inauguration.

Helmet-shell, the large shell of gasteropods of the genus *Cassia*; there are some 35 living and as many fossil species. The living ones are found in all tropical seas, and are used in making shell cameos. *Cassia cornuta* gives a white figure on an orange ground; *C. tuberosa* and *madagascariensis*, white on claret color; *C. rufa* a salmon color on orange.

Helmholtz (HERMANN LUDWIG FERDINAND), physicist and physiologist, b. at Potsdam, Prus., Aug. 31, 1821; studied med. at Berlin, and became an army surgeon; was prof. at the Art Acad., Berlin, 1848-49, at Königsberg 1849-58, then at Heidelberg, and in 1871 became prof. of physics in Berlin. Wrote *Handbook of Physiological Optics* and *Theory of the Impressions of Sound*; invented the ophthalmoscope and made important discoveries in acoustics.

Helmont, van (JAN BAPTISTA), b. at Brussels 1577, and studied at the Univ. of Louvain. The mystical bent of his mind first assumed a religious character; he conferred all his property on his sister, studied med. in order to serve Christ by curing the sick, and lectured in the 17th yr. of his age on med. But having met with a case which he could not cure, he gave up his science in despair, and strolled around for 10 yrs., conversing with mountebanks and charlatans, and searching after the hidden knowledge—the philosopher's stone or panacea. Chem. and alchemy became his favorite studies. He married a rich lady, settled down at Vilvoorden, and spent all his time in his laboratory and in curing people according to a new method. His mystical writings contain real discoveries in chem. Thousands of people gathered to his house, and many of his cures were wonderfully successful. D. Dec. 30, 1644.

Heloise. See ABELARD.

Helotes [plu.; Gr. ἑλωτες, εἰλωτής, plu. εἰλωτες, meaning either "captives," or "inhabitants of Helos," a town of Laconia], the serfs of the anc. Spartans; a peasantry of Gr. blood, owned by the state and compelled to do certain kinds of military duty. They could not be sold. It was the custom of the Spartans to keep their numbers within bounds by the occasional slaughter of the strongest of the H., and young Lacedæmonians were from time to time sent out to slay numbers of them secretly.

Helper (HINTON ROWAN), b. in Davie co., N. C., Dec. 27, 1829; removed in 1851 to Cal., and was U. S. consul at Buenos Ayres 1861-67. Author of *The Land of Gold, Impending Crisis of the South*, etc.

Helsingfors, the cap. of the grand duchy of Finland, in Rus., on the Gulf of Finland. It has an excellent harbor, and is strongly fortified. Its fortifications stretch over 7 rocky islands and were in 1854 bombarded by the allied Fr. and Eng. fleets. H. has a Univ. and a military acad. Pop. 43,142.

Helvetii, the anc. Celtic inhabs. of Switz. Cesar gives a graphic account of their attempt to occupy more fertile parts of Gaul, and their terrible punishment and subjugation by the Roms (58 b. c.). In 70 a. d., refusing to recognize Vitellius, and taking the part of Galba, the former put an end to their existence as a distinct people.

Helvétius (CLAUDE ADRIEN), b. at Paris Jan. 1715, and ed. in the College of Louis-le-Grand. In 1738 he obtained a place as fermier-général, which gave him a yearly income of 100,000 francs. He grew rich, bought land, and retired in 1751 to his estate, Yveré, in Le Perche, where he spent the rest of his life. His famous book, *De l'Esprit*, the gospel of materialism, appeared in 1758. It made a tremendous sensation, and the author was shrewd enough not to outshine himself; he pub. nothing more. D. Dec. 26, 1771.

Hemiplegia [from the Gr. ἡμι, "half," and πλῆγῃ, a "stroke"], that kind of paralysis which affects only one side of the body. It manifests itself usually in the upper and lower extremities of one side, and in the parts of the head which are supplied by the fifth nerve. It may be the result of an apoplectic stroke, or of a slow effusion, or of the growth of a tumor within the brain. The paralysis takes place usually on the side of the body opposite to the side of the brain in which the lesion has occurred. For example, if there be a tumor growing in the left hemisphere of the brain, the paralysis will, as a rule, be manifested in the right side of the body, because the nerve-fibres cross over from side to side near the base of the brain. But if the lesion occur below this crossing, there may be H. on the same side. H. affects chiefly the nerves of motion, but affects more or less those of sensation also. Temporary attacks of H. are also observed in chorea, epilepsy, and hysteria. The treatment of H. varies with the condition of the patient and the cause of the stroke.

Hemisphere [Gr. *hēmi*, "half," and *sphaîra*, "sphere"], $\frac{1}{2}$ a sphere; applied particularly to the halves of the terrestrial globe. The distinction between the E. and W. H. is an arbitrary one. The meridian of Ferro is assumed as the dividing line, and it serves the purpose, though but rather imperfectly, since a small part of N. E. Asia is by this arrangement thrown into the W. H. The equator gives a very natural division into a N. and S. H. As the land-surface of the earth is generally situated to the N. of the equator, and as the land-areas expand northward and taper to the S., the N. H. contains nearly 3 times as much land as the S., in which water correspondingly predominates. And as 4 continents are crowded together in the E. H., it has $\frac{2}{3}$, and the W. only $\frac{1}{3}$ of the lands. The Old World is thus double the size of the New. See EARTH. ANOLD GUYOT.

Hemlock, or **Spotted Hemlock** (*Ulmus maculatum*), a biennial plant, natural order Umbellifera; native in Europe, but naturalized and cultivated in the U. S. for medicinal purposes. It has an erect, round, branching stem from 3 to 6 ft. high, marked with brownish-purple spots, whence the name "spotted hemlock." The plant, especially in summer, has a peculiar fetid smell. The leaves and fruit are used in med., the active principle being an alkaloid, *conioid*, most abundant in the fruit. This is a yellowish, oily fluid, volatile, of acrid taste, and strong mousy odor, slightly soluble in water, but freely in alcohol, ether, and oils. The action of H. is simply to destroy the conducting power of the nerves of motion, producing muscular weakness and paralysis. It is not certain whether the H. used by the anc. as a state poison was this plant or the *Cicuta virosa*, a much more virulent herb.

Hemlock Tree, called also **Hemlock Spruce**, the *Abies Canadensis*, one of the most common of the coniferous trees of the N. States and Brit. Amer. It is a very large tree, and though the timber is coarse and cheap, it is very serviceable. The bark and its extract are extensively used in tanning leather in the U. S. The wood is very inferior as fuel. "Hemlock oil" is distilled from its leaves and twigs, and "Canada pitch" is obtained from the old trees.

Hemorrhage. See BLEEDING.

Hemorrhoids. See PILES.

Hemp. The plant is known botanically as *Cannabis sativa*, and is an annual belonging to the nettle family (Urticaceae). It is a dioecious plant, having the fruit-bearing or female flowers and the sterile or male flowers upon different plants. H. grows 4 to 12 ft. high, and makes its growth almost as rapidly as Indian corn. The stem is somewhat angular, rough, and hairy, branching freely when growing singly, but very little when crowded. As usually cultivated, it flowers in June, and ripens its seed in Aug. The Riga H. of Rus. combines fineness and strength, and is regarded as the best. The fibre is separated from the boon much as flax is, and is spun and woven in almost identically the same way. By far the greatest consumption of the fibre is for rope, cordage, and twine.

Cultivation.—A large portion of the U. S. is well adapted to raising H. The cultivation for fibre is simple, the seed being sown as early as the ground is warm on well-prepared sward ground. The seed is thoroughly harrowed in and rolled, and requires no attention until it is cut. Cutworms are often injurious to it, and crows and blackbirds on a hemp-field are the farmer's best friends. When the blossoms of the flowering (male) plants turn yellow and fall off, it is usual in U. S. to cut the whole crop. After 2 or 3 days' sunning the H. is bound and stacked, either upon the ground if it is to be dew-rotted, or near the pools if it is to be water-rotted. The rotting is performed in the autumn at the commencement of cool weather, and requires in pools or vats 10 to 20 days, according to the temperature. The process is completed when the fibre separates readily from the stalk. It is dried and stacked, and "broken" in the winter. This operation is like that of breaking flax, but performed with heavier implements. In dew-rotting the H. is exposed to the weather in thin layers, and turned occasionally until the fibre separates from the boon. When H. is cultivated for the seed, it is planted upon good corn-ground, manured the fall before if the soil be not too light and sandy. The seed-H. is cut before the seed will shell out of itself, stacked till dry, and the seed beaten out. H.-seed is largely consumed as food for cage-birds and fancy poultry. It contains about 25 per cent. of oil, which may be extracted, leaving a cake still rich in oil. The oil is used in the manufacture of certain soaps and somewhat in paints and varnishes. The name "hemp" is commercially applied to several coarse fibres which come chiefly from tropical or extreme S. countries. They resemble true H. only in the fact that the fibre may be used for cordage, etc.

Hempstead, N. Y. See APPENDIX.

Hempstead, R. R. June, cap. of Waller co., Tex., 100 m. N. of Galveston. Pop. 1890, 1612.

Hempbane, *Hyoscyamus niger*, a plant, generally biennial, though sometimes annual, natural order Solanaceae; native in Europe, but naturalized in the U. S., growing in waste places in the N. and E. sections of the country. The root somewhat resembles that of parsley, and poisoning has resulted from eating it. The stem is erect, round, branching, from 1 to 4 ft. high; the leaves numerous, large, deeply sinuate, sea-green, and both leaves and stem viscid and hairy. The flowers are yellow, veined with purple. The whole plant has a rank, offensive smell. The leaves and seeds are used in med., the active principle being a poisonous alkaloid, *hyoscyamina*. The action of H. on the system is almost identical with that of belladonna, causing increased pulse-rate, dryness of the throat, giddiness, staggering gait, dilatation of the pupils, delirium, and, in sufficient dose, death. Its uses in med. are in the main similar to those of belladonna.

Hendecagon, less correctly **Endecagon** [Gr. *en*, "one," *deka*, "ten," and *gonia*, "angle"], a plane rectilinear figure of 11 sides. The area of a regular or equilateral H. is nearly 9.36564 times that of the square of one of its sides.

Henderson, cap. of Henderson co., Ky., 212 m. W. S. W. of Louisville, on R. R. and the Ohio River, 10 m. S. of Evansville, Ind. Pop. 1870, 4171; 1890, 5365.

Henderson, N. C. See APPENDIX.

Henderson, Tenn. See APPENDIX.

Henderson (JAMES PINCKNEY), b. in Lincoln co., N. C., Mar. 31, 1808, whence he removed to Miss. and engaged in the practice of law. In 1836 he was appointed a brig.-gen. in the army of the republic of Tex.; on its disbandment was chosen atty.-gen., and subsequently (1837-39) sec. of state of Tex.; minister from Tex. to Eng. to procure the recognition of the republic, and in 1844 to the U. S. to secure its annexation, which being accomplished he was chosen its first gov. in the U. (1846-47). In the war with Mex. he commanded a division of Tex. volunteers, with the rank of maj.-gen., and for gallant conduct at Monterey was presented by Cong. with a sword and the thanks of that body. In 1857 he was elected U. S. Senator from Tex. D. June 4, 1858.

Hendricks (THOMAS FRANCIS), D. D., b. at Kilkenny, Ire., May 5, 1827, of partial Dut. descent; grad. at St. Kieran's Coll., Kilkenny, 1847; studied at Maynooth; ordained at Dublin for Amer. mission 1851; occupied important R. Cath. parishes at Providence, R. I., Winsted and Waterbury, Conn.; consecrated bp. of Providence Apr. 28, 1872.

Hendricks (THOMAS ANDREWS), b. in Muskingum co., O., Sept. 7, 1819; removed with his father in 1832 to Shelby co., Ind.; grad. in 1841 at S. Hanover Coll.; admitted to the bar in 1843; was M. C. 1851-55 from the Indianapolis dist., com. of U. S. gen. land office 1855-59, U. S. Senator (Dem.) 1863-69, chosen gov. in 1872 for the term of 4 yrs., and nominated candidate for the Vice-Presidency of the U. S. by the Dem. party June 29, 1876; elected V.-P. of U. S. Nov. 4, 1884.

Hendricks (WILLIAM), b. in Westmoreland co., Pa., in 1738; settled in Madison, Ind., in 1814; was M. C. 1816-22, gov. 1822-25, U. S. Senator 1825-37. D. May 16, 1850.

Hen'gest, a prince of the Jutes, who in 449, with Horsa, his brother, landed at Ebbsfleet on the Isle of Thanet, and was employed by Vortigern, king of Britain, to repel the Picts and Scots. This the Jutes accomplished, but soon turned their arms against the Britons, whom they overcame in a series of wars. Horsa was slain at Eglestrep 455; H. declared himself king of Kent 457, and repeatedly defeated the Britons in battle (465-473). D. 488.

Hen'na, or **Alkan'na** [Ar.], a paste made from the leaves of *Lawsonia inermis* or of *L. spinosa*, mixed with catechu, and used in the E. to stain the nails, the fingertips, and the edges of the eyelids of women and the beards of men. Some species of *Hibiscus* are in E. Asia put to the same use. The Lawsonias are shrubs of the order Lythraceae. Their leaves are used for dyeing leather.

Hen'nepin (LOUIS), a reformed Franciscan missionary and explorer, b. about 1640 at Ath. in Flanders. In 1675 he became a missionary to Canada; was (1679-80) a member of La Salle's band of explorers, who traversed the great lakes and the Upper Miss. and its tributaries. He returned to Europe in 1697. D. about 1706.

Henrietta, Tex. See APPENDIX.

Hen'ry, city of Marshall co., Ill., on the Ill. River, 120 m. S. from Chicago, on R. R. The first lock and dam to improve the Ill. River is located here. It has a sem. Pop. 1870, 2162; 1880, 1728.

Henry I. (BEAUCLEERC), king of Eng., son of William the Conqueror and Queen Matilda, successor of William Rufus, b. at Selby, Yorkshire, in the autumn of 1068. His youth was marked by quarrels with his elder brothers; when William II. d. H. assumed the crown (1100) while Robert was absent in Pal. He recalled Anselm, declared the validity of the Confessor's laws, married Maud of Scot., securing the Ch., the A.-S. Eng., and the Scots against Robert in the coming struggle, in which H. was successful; he was acknowledged duke of Normandy in 1106, and engaged in wars with Fr. The drowning of his son William in 1120 broke the king's heart, and the troubles with his nephew William in Normandy, and with the Welsh in the W. of Eng., greatly disturbed the last of his reign. D. Dec. 1, 1135, leaving as his heir his daughter, the countess Matilda of Anjou, former wife of Henry V. of Ger.

Henry II., first Plantagenet king of Eng., son of Geoffrey Plantagenet and of Matilda, former empress of Ger., the heiress and only surviving child of Henry I., b. at Mans, in Maine, Mar. 5, 1113; ed. in Normandy and Eng.; in 1152 invaded Eng. with troops for the overthrow of the king Stephen, with whom in 1153 a peace was concluded by which H. was acknowledged as heir to the crown; succeeded Stephen in 1154; had in 1151 become count of Anjou, Touraine, and Maine by his father's death, and by his marriage in 1152 with Eleanor of Aquitaine, the divorced queen of Fr., had acquired sovereignty over nearly half of Fr., subject in some degree to Fr. suzerainty. The great events of H.'s eventful reign were the Irish conquest; the wars with the Scots, Welsh, and the Fr. king; the destruction of more than 1000 feudal castles in Eng. — "dens of thieves," H. called them; the contest with Thomas à Becket; the subscription to the Constitutions of Clarendon (1164); and the rebellion of his sons and queen. D. July 6, 1189.

Henry III., of Eng., b. at Winchester Oct. 1, 1207, succeeded John, his father, in 1216. His reign of 56 yrs. was the longest except that of George III. in Brit. hist. H.'s minority at his accession, and the great power acquired by the barons under King John, crippled his power and made his reign a weak one. He was chiefly eminent as a builder, many of the finest structures in the Early Eng. Gothic style being his work. D. Nov. 16, 1272.

Henry IV., of Eng., first Lancastrian king, b. at Bolingbroke, Lincolnshire, Apr. 4, 1366, son of John of Gaunt, the fourth son of Edward III., while his mother was a lineal descendant of Henry III. He was made earl of Derby and duke of Hereford. With his adversary, the duke of Norfolk, he was banished in 1398 by Richard II., who seized his estate in 1399. Soon H. landed at Ravenspur with a small following,

the king being absent in Ire. All Eng. joined H., Richard was dethroned, and H. crowned. H.'s defective title led him to persecute the Lollards, so as to win the support of the Ch. D. Mar. 19, 1413.

Henry V. of Eng., son and successor of Henry IV., b. at Monmouth Aug. 9, 1388; served in his youth against the rebellious Glendower and Hotspur. He was very popular with the people. He came to the throne in 1413, persecuted the Lollards, and in 1414 announced to Parl. his intention of making the conquest of Fr. upon the strength of Edward III.'s claim to that sovereignty; landed at Harfleur, which he took Sept. 22, 1415; totally defeated the greatly superior force of the Fr. at Agincourt Oct. 25; occupied the greater part of Fr., aided by the duke of Burgundy and other malcontents; married in 1420 the Fr. princess Catharine, and was recognized as heir-presumptive. D. Aug. 31, 1422.

Henry VI. of Eng., the last Lancastrian king, son of Henry V., b. at Windsor Dec. 6, 1421, succeeded his father on Sept. 1, 1422, and in 1431 was crowned king of Fr. at Paris. His reign was marked by the wars of the Roses. In these wars the old nobility of Eng. was almost exterminated, and the power of the Lancastrian house overthrown. In Fr. Joan of Arc and her followers had expelled the Eng., and the popular sense of disgrace vented itself upon the unoffending king, whose title was indeed defective. H. founded Eton School (1440) and King's Coll., Cambridge (1449). Was found dead in the Tower (where he had been imprisoned) May 22, 1471.

Henry VII. of Eng., the first of the Tudor kings, b. in Wales Jan. 21, 1456. He was descended, on his mother's side, from John of Gaunt (son of Edward III.) and Catharine Swynford, whose offspring had been legitimated by the pope, the king, and the Parl. His father was a son of Owen Tudor, a Welsh gentleman, and Catharine, widow of Henry V. of Eng., whose marriage to Tudor has been denied. Young H. became earl of Richmond; was attainted by the Yorkists 1461, and in 1471 retired to Fr.; attempted a revolt in 1483; landed at Milford Haven in 1485; defeated and killed Richard III. at Bosworth; married Elizabeth, heir of the Yorkist sovereigns, 1486. D. Apr. 22, 1509.

Henry VIII. of Eng., son and successor of Henry VII., b. at Greenwich June 28, 1491; became in 1502 prince of Wales on the death of his brother Arthur; married Catharine of Aragon, Arthur's widow, in 1509, a papal dispensation having permitted the unlawful union; succeeded to the crown in 1509; joined the emp. Maximilian in a war with Fr. 1511-14, during which war the Scots were overthrown at Flodden Sept. 9, 1513; made Wolsey chancellor 1515; was involved in competition with Francis I. and Charles V. for the empire of Ger.; wrote in 1521 his book on the sacraments against Luther, for which he received from the pope the title of "defender of the faith," a distinction claimed, as we are told, by some anc. Eng. kings; made war in 1522 against Fr. in the interest of Charles V.; applied in vain in 1528 to the pope for a commission to inquire into the legality of his marriage, but in 1529, by Cranmer's advice, applied to the univ. with better success. The influence of the king and Wolsey at Rome was foiled by the Sp. interest in the queen's behalf, and the great seal was taken from Wolsey and given to Sir Thomas More. The convocation was now compelled to acknowledge H. as the head of the Eng. Ch.; the king married Anne Boleyn in 1533, and Cranmer, now abp. of Canterbury, declared the former marriage null. In 1535 the papal authority was set aside by act of Parl., More and Fisher were executed, Thomas Cromwell made vicar-gen., and the visitation and destruction of monasteries commenced. Anne Boleyn was executed and Jane Seymour married in 1536; R. Cath. insurrections broke out in 1536, and Queen Jane d. in 1537; Anne of Cleves was married to the king in 1540, soon after which Cromwell was executed, and the marriage annulled by convocation and Parl.; H. married Catharine Howard in the same yr., and had her executed in 1542; was married in 1543 to Catharine Parr, his sixth and last wife. Many R. Caths., and Reformers as well, were executed during the latter part of H.'s reign, and great numbers of the nobles and aristocracy died on the scaffold on suspicion of treason. D. Jan. 28, 1547.

Henry I., king of Fr., b. 1011, succeeded Robert II., his father, 1031; his reign was disturbed by c. wars. D. Aug. 4, 1060, and was succeeded by Philip I., his son.

Henry II. of Fr., b. Mar. 31, 1159; married Catharine de' Medici 1533; succeeded Francis I., his father, 1547. His reign was distinguished by bloody persecutions of the Protsts., and by wars with Charles V. and his son, Philip II. of Sp. These wars were advantageous to Fr., but by the peace of Cateau-Cambresis (1559) H. gave up the greater part of his advantages. D. July 10, 1559, in consequence of a wound received in a tournament.

Henry III. of Fr., son of Henry II. and Catharine de' Medici, b. at Fontainebleau Sept. 19, 1551; served as duke of Anjou against the Huguenots 1569-73; was crowned king of Poland in 1574; abandoned Poland, and succeeded his brother, Charles IX., as king of Fr. 1575. His reign was disturbed by the wars of the League, designed to prevent the succession of Henry IV., and is memorable for the assassination of the Guises 1588, and for the king's licentiousness. H. was stabbed with a knife by Jacques Clément, a partisan of the Guises, and d. Aug. 2, 1589. He was the last of the Valois line, and was succeeded by Henry IV., the first Bourbon king.

Henry IV., king of Fr. and Anjou, the first Bourbon monarch of Fr., succeeded Henry III. in 1589, being a lineal descendant of Louis IX.; was b. at Pau Dec. 14, 1553, the son of Antoine de Bourbon and Jeanne d'Albret, queen of Navarre; he was bred a Prot. by his mother. In 1589 he joined the Prot. army under Coligny. In 1572, after the peace of St. Germain, and just before the massacre of St. Bartholomew, he married Margaret of Valois, sister of Charles IX., and was compelled to abjure his faith. H., who had just succeeded to the crown of Navarre, was detained

at court until 1576, when he escaped and put himself at the head of the Protsts., and by his valor and skill greatly bettered their circumstances in the wars which followed. In 1584 Francis of Anjou d., and H. became heir-presumptive to the crown. In 1585 he was excommunicated by Sixtus V., and declared incapable of the succession. Then followed the "war of the three Henries" (1586-87), the murder of Henry III. (1589), the claim of the cardinal of Bourbon to the throne, the battle of Ivry, the siege of Paris, the Sp. invasion under Parma, and a long and varied war, in which H., with small means and the ineffectual support of the Eng., performed prodigies of valor and activity. In 1593 H. professed the R. Cath. faith, and the fear of the ambition of Philip II. caused many of H.'s former enemies to go over to his side; he was anointed king at Chartres 1594; entered Paris, and in the course of 4 yrs. had expelled the Spaniards and brought all Fr. to subjection. In 1598 he pub. the Edict of Nantes and restored toleration. Prosperity followed such as Fr. had never known before. H. was murdered by one Ravaillac, a fanatic, May 14, 1610.

Henry I., the Fowler, king of Ger. and duke of Sax., b. in 876, succeeded his father, Otho I., as duke in 912; elected to succeed Conrad I. in 919; carried on wars with Lorraine (which he conquered 923-925), with the Hungarians, the Slavi, Danes, etc. This monarch was one of the founders of the Ger. supremacy in the Middle Ages. He is reckoned as Henry I. in the line of Ger. emps., but never bore the imperial title. D. July 2, 936.

Henry II., SAINT, emp. of Ger., the last of the Sax. line of Ger. monarchs, and the first Henry who properly bears the imperial title, known also as *the Lame*, b. May 6, 972; succeeded to the duchy of Bavaria 995; was elected king of Ger., to succeed Otho III., in 1002; carried on wars in Poland, with vassals in Ger., with It. and Fr., etc.; erected Hungary into a kingdom 1007; was crowned emp. of the Roms. 1014. D. July 14, 1024; was canonized 1152 on account of his zeal for the Ch., and is honored July 15.

Henry III. of Ger., "the Old," "the Black," or "the Pious," b. at Osterbeck, in the Low Countries, Oct. 28, 1017; was elected king in 1026, and succeeded Conrad II., his father; ruled with dignity and success; made and unmade popes at his will; crowned emp. in 1046; won applause by challenging Henry I. of Fr. to mortal combat. His first wife was a daughter of Canute of Eng. D. Oct. 5, 1056.

Henry IV. of Ger., b. Nov. 11, 1050, elected king when but 3 yrs. old, succeeded Henry III., his father, in 1056. His reign was a series of contests with vassals and with Pope Gregory VII., who at the period of H.'s lowest fortunes compelled him to sue at Canossa for absolution in the most humiliating manner (1077). This he received, and after many yrs. of warfare in Ger. compelled the pope to retire under the protection of Robert Guiscard to Salerno (1064); was dethroned and imprisoned by his son, Henry V., in 1105, but escaped. D. Aug. 7, 1106.

Henry V. of Ger., b. Aug. 11, 1081, crowned king and colleague of his father, Henry IV., in 1099; deposed his father 1105, crowned emp. 1111. His reign was disturbed by discussions with the popes, and he was 4 times excommunicated. Wars at home and with Flanders, Hungary, and Poland. He married Matilda, daughter of Henry I. of Eng. D. May 23, 1125; was the last of the Salic line.

Henry VI. of Ger., THE CRUEL, b. in 1165, succeeded Frederick Barbarossa, his father, in 1190. His reign was disturbed by It. wars, and is famous for the imprisonment of Richard Lion-heart, king of Eng., at Trifels (1192-94). D. Sept. 28, 1197, poisoned, as it was thought, by his wife.

Henry VII. of Ger. (Henry of Luxemburg), b. 1262; elected king of the Roms. in 1308; invaded It. at the head of a Ghibelline army, and had an interview with Dante; received the iron crown in 1311; crowned emp. in 1312. D. Aug. 24, 1313, poisoned, it was said, while receiving the Eucharist.

Henry (CALEB SPRAGUE), D. D., b. at Rutland, Mass., Aug. 2, 1804, grad. at Dartmouth in 1825, studied divinity at Andover and at New Haven. After holding Congl. pastorates at Greenfield, Mass., and at Hartford, Conn., he was ordained in the P. E. Ch., and was appointed prof. of mental and moral philos. in Bristol Coll., Pa. In 1837 he became one of the founders of the New York Review. He was (1839-52) prof. of philos. and hist. in the Univ. of New York; 1847-50 rector of St. Clement's, New York. He afterward held rectorships in Poughkeepsie and Newburg, N. Y., and Litchfield, Conn. In 1874 he removed to Stamford, Conn. Author of a translation of Batain's *Hist. of Philos.* and Guizot's *Hist. of Civilization*.

Henry (JOSEPH), LL.D., b. at Albany, N. Y., Dec. 17, 1797; ed. in the common schools of that city and in the Albany Acad., where (1826) he became prof. of math., and (1827) commenced a course of investigation which was continued for a number of yrs., and resulted in important discoveries in electricity and electro-magnetism. His first success consisted in producing the electro-magnet properly so called, an important invention which no subsequent improvement has essentially modified. He next demonstrated that the difficulty of exciting magnetic energy at a distance may be completely overcome by the use of an intensity-battery, provided that the receiving electro-magnet be constructed with many turns of a single wire. He also showed that a large iron bar may be powerfully magnetized by a quantity-battery, if surrounded by many helices forming separate short circuits; but that if the wires of these helices be so united as to form a single continuous circuit, a battery of intensity is required to produce the effect. It was the invention of the intensity-magnet which first made the electric telegraph a possibility. In a communication made to the *Amer. Journal of Science* in 1831, he called attention to the practicability of applying the intensity-magnet to telegraphic uses. During the same yr. he produced the first mechanical contrivance ever invented for maintaining continuous motion by means of electro-magnetism—a contrivance which involved the essential principle

(pole-changing) of every effective electro-magnetic machine which has been since devised; and he also constructed and exhibited a similar contrivance for making signals by electro-magnetism at a distance—the signals being produced by means of a lever striking on a bell. He also devised a scheme for producing large mechanical effects at a distance, by causing heavy weights to fall in consequence of the rupture of electric currents. Some of the electro-magnets constructed by him at this time were of enormous power. In 1832 he made the discovery of the secondary currents produced in a long conductor by the induction of the primary current upon itself, and succeeded also in the same yr. in producing the electric spark by means of a purely magnetic induction. These discoveries embraced the germ of the science of magneto-electricity, which received subsequently from Faraday a development. In 1832 H. was elected prof. of nat. philos. in the Coll. of N. J., and in his earliest lectures demonstrated the feasibility of an electro-magnetic telegraph. He visited Europe in 1837, and held interviews with Prof. Wheatstone, the inventor of the needle magnetic telegraph, whom he acquainted with his plans for producing not only signals, but large mechanical effects at distances indefinitely great, by means of electro-magnetism. In 1846 he was elected sec. of the Smithsonian Inst. at Wash., being the first incumbent of that office, a position which he held till his death. In 1849 he was elected pres. of the Amer. Association for the Advancement of Science. In 1868 he was elected pres. of the National Acad. of Sciences, a post which he held till his death. He was made chairman, in 1871, of the light-house board of the U. S., and in this capacity was constantly engaged in active and laborious duty till 1878. He received the honorary degree of LL.D. from Union Coll. in 1829, and from Harvard Univ. in 1851. He furnished *Contributions to Electricity and Magnetism*, and numerous papers in the *Am. Philos. Trans.*, the *Am. Jour. of Science*, the *Four of the Franklin Inst.*, the *Proceedings of the Amer. Association for the Advancement of Science*, and in the annual reports of the Smithsonian Inst. He was one of the associate eds. of *J. S. Univ. Cyc.* D. May 13, 1878. F. A. P. BARNARD.

Henry (MATTHEW), a son of Philip Henry, b. at Broad Oaks, Flintshire, Wales, Oct. 18, 1662; studied law and divinity; became nonconformist (Independent) pastor at Chester 1687, at Hackney, Lond., 1712. Chiefly remembered for his *Exposition of the Bible*. D. June 22, 1714.

Henry (PATRICK), b. at Studley, Hanover co., Va., May 20, 1736. He was instructed chiefly by his father, but was diverted from his studies by his passion for hunting and fishing. At 18 he married the daughter of an innkeeper, and for a time assisted his father-in-law at Hanover C.H. He twice became bankrupt, before the age of 24, when, after 6 weeks' study, he was admitted to the bar. For 3 yrs. he obtained no practice, when his triumphant plea for the people's rights in the celebrated "parsons' cause" won him applause and popularity. In 1765 he introduced into the house of burgesses his famous resolutions against the Stamp Act, which he carried through by a majority of 1 after a stormy debate, in which he exclaimed, "Cæsar had his Brutus, Charles I. his Cromwell, and George III." (here he was interrupted by cries of "Treason!") "may profit by their example. If this be treason, make the most of it." Thenceforward he was the acknowledged leader of the friends of freedom in Va. In 1769 he was admitted to practice law in the gen. court, where his ability as a speaker won him a fortune. He was the first speaker of the Gen. Cong. at Phila. in 1774. In 1775, in the Va. convention, was delivered his speech in favor of his resolution for putting the colony into a state of defence. In 1775 he was for a time a col. of militia, and from 1776 to 1779 was gov. of the State, and again 1781-86. In 1788 he opposed the ratification of the Federal const. as inconsistent with the sovereignty of the States. In 1794 he left public life, and afterward declined the secretaryship of state, the mission to Fr., and the governorship. Elected to State senate in Mar. 1799, but did not take his seat. D. June 6, 1799.

Henry (ROBERT), D. D., LL.D., b. at Charleston, S. C., Dec. 6, 1792, grad. at the Univ. of Edinburgh 1814; became minister to the Fr. Prot. ch. of Charleston; prof. of logic and moral philos. 1818, and later of metaphysics and political philos. in S. C. Coll.; its pres. 1834-35 and 1840-43, beside holding other professorships there. D. Feb. 6, 1856.

Henry (WILLIAM ALEXANDER), Q. C., a Canadian statesman, b. at Halifax, N. S., Dec. 30, 1816; was admitted a barrister in 1841 and queen's counsel in 1849. He has been for many yrs. prominent in the affairs of N. S.; was solicitor-gen. 1854, 1859, and 1863; provincial sec. 1856-57, and has been surrogate, mayor of Halifax, etc. He was prominent in the union of the provs. in 1867.

Henry the Navigator, b. at Oporto Mar. 4, 1394, the fourth son of King John I. of Port., distinguished himself at the conquest of Ceuta in 1415, and was in 1430 placed at the head of Afr. affairs. He now fixed his residence at Sagres in Algarve, near Cape St. Vincent, where he established a school of navigation. From this school issued that movement of maritime discovery and commercial enterprise which placed the Port. people at the head of European civilization for more than half a century, and whose two greatest results were the discovery of Amer. and of the water-route to India. The introduction of the compass and the astrolabe are due to him. D. Nov. 13, 1460.

Hen'shaw (DAVID), b. at Leicester, Mass., Apr. 2, 1791, where he was ed.; apprenticed to a firm of druggists in Boston; entered business with his brothers in 1814; elected to the State senate 1826; member of the board of internal improvements 1828, and during its continuance; active promoter of railroad enterprises; collector of the port of Boston 1830-38; member of the legislature 1839; in 1843 appointed sec. of the navy by Pres. Tyler. He was an ardent Dem. and advocate of free trade. D. Nov. 11, 1852.

Hen'shaw (JOHN PRENTISS KEWLEY), D. D., b. at Middletown, Conn., June 13, 1792, grad. at Middlebury Coll. in

1805; was ordained deacon in the P. E. Ch. 1813, a priest in 1816; officiated for a time in St. Ann's, Brooklyn, N. Y., and was (1817-43) rector of St. Peter's, Baltimore; in 1843 was consecrated bp. of R. I. Wrote *Theol. for the People and On the Second Advent*. D. July 20, 1852.

Hepaticæ, or **Liverworts** (*Musci hepatici*, or "liver-mosses"), a natural order of little moss-like plants, mostly of a loose cellular structure throughout, usually procumbent, and emitting rootlets from beneath, propagated by spores, and also frequently by gemmæ, rarely by tubers. Vegetation sometimes frondose—i. e. the plants without distinct stem and leaves, but expanded into a leaf-like mass (*frond*), which is usually furnished with a midrib, with scales, or (rarely) with slender hairs underneath, and often with pores above; sometimes foliaceous, when there is a distinct stem and leaves; or often lacinated. Inflorescence monœcious or dioecious. Reproductive organs and evolution of the fruit much as in mosses. The *perianth* is a tubular organ (sometimes absent), inclosing the pistillidia, and is usually formed after their fertilization. Surrounding the perianth is the *involucre* (occasionally wanting), which is either tubular or composed of leaves of particular forms. [From orig. art. in *J. S. Univ. Cyc.*, by C. F. ALSTIN.]

Hepatitis [Gr. *ἥπαρ*, the "liver"], an inflammation of the liver. H. is not a very common disease in any country. Several kinds are recognized: (1) Suppurative H. or abscess of the liver, sometimes occurring in India, but rare in other countries. (2) Interstitial H., called, rather incorrectly, cirrhosis, known also as granular liver and gin-drinker's liver. It is incurable, and is probably always caused by the improper use of alcoholic drinks. It frequently leads to ascites or abdominal dropsy. (3) Portal phlebitis, or inflammation of the portal vein, may occur. (4) Inflammatory disease of the liver is sometimes a syphilitic complication. Each of the above-named conditions is a grave one, and in few cases can treatment be of much avail.

Hephestion, he-fes'te-on, the friend of Alexander the Great, b. at Pella about 357 B. C. He and the prince are first mentioned together on the occasion of Alexander's visit to Troy, where H. brought the same honors to the grave of Patroclus as Alexander to that of Achilles; after that time they never separated until the death of H. in Ecbatana in 325, 1 yr. before that of Alexander.

Hephestion (Ἡφαιστίων), a Gr. grammarian of Alexandria, according to Suidas, flourished about A. D. 150. To him is ascribed the *Ἐγχειρίδιον περὶ μέτρων* ("Manual of Metres"), from which most of our knowledge of the Gr. metres is obtained.

Hephestus. See VULCAN.

Hep'tarchy [Gr. *ἑπτά*, "seven," and *ἀρχή*, "sovereignty"], a govt. by 7, especially applied to the 7 principalities of the A.-S. in Eng. before the reign of Egbert, the first king of Eng., who became king of Wessex 800, and d. 836. Eight kings, of 6 different kingdoms, had at times possessed a certain supremacy over the rest. The actual number of kingdoms was sometimes greater and sometimes less than 7, and yet 7 stand out so prominently as to justify the use of the term heptarchy. The 7 kingdoms were 1st, Kent (449-823); 2d, Sussex (477-823); 3d, Wessex (519-823); 4th, Essex (526-823); 5th, Northumbria (547-827); 6th, E. Anglia (571-823); 7th, Mercia (584-827). In 828 Egbert of Wessex, the 8th bretwalda, became the first hereditary king of Eng., but some of the minor kingdoms existed many yrs. after.

Hep'worth (GEORGE HUGHES), b. in Boston, Mass., Feb. 4, 1833; studied divinity at Cambridge, Mass.; was pastor of a Unit. ch. at Nantucket 1855-57, of the Ch. of the Unity, Boston, 1858-70; became in 1862 a regimental chaplain in La., and served in 1863 on the staff of Gen. Banks; was 1870-72 pastor of the Ch. of the Messiah, New York. In 1872 he became a Trinitarian, and soon organized the "Church of the Disciples," of which he was pastor till Feb. 14, 1879. Wrote *Rocks and Shoals*. In 1882 became pastor of Belleville ave. Congl. ch., Newark, N. J.

Hera. See JUNO.

Heracleia, Gr. city in S. It., not far from the Tarentine Gulf. It was founded 432 B. C., and became a kind of cap. for the Italiote Grs. Its site is marked by extensive mounds, and among the relics found here in 1732 were the bronze tablets containing the *Lex Julia municipalis* (45 B. C.), important to the student of Rom. jurisprudence. Many other anc. towns, including one on the S. coast of Sic., bore this name.

Heracleidae [Gr. *Ἡρακλείδαι*], the descendants of Heracles (Hercules), to whom many prominent Gr. families traced their origin. But the name especially belongs to those H. who joined the Dorians in their conquest of the Peloponnesus, which is often called the "return of the Heracleidae." The Gr. historians narrate the exploits and successes of the H. in the early Dorian wars. The H. became the progenitors of several princely houses, and were even admitted to rule over Dorians.

Heracleides (Ἡρακλείδης) **Ponticus** (so called from his native place, Heraclea, on the *Pontus Euxinus*), b. probably A. C. 378. He appears to have gone at an early age to Athens, where he attached himself to Plato about 361 or 358; he attended the lectures of Aristotle also. He was a man of great learning, and wrote on a great variety of subjects—philos., natural science, math., music, gram., hist., and poetry—so that he was fairly entitled to the designation of *polyhistor*. Of all his writings only fragments remain, with the exception of a small treatise entitled (*Ἐκ τῶν*) *περὶ πολιτείων* ("Extracts from Forms of Government").

Herac'lus (Ἡρακλῆς), surnamed THE DARK (*σκοτεινός*), b. at Ephesus about 535 or 500 B. C. The son of Blyson, he belonged to the noble family of the Codrids. Unlike the philos. of his time, he took no part in public affairs. His contempt for the unthinking rabble, as well as for the social and political condition of Ephesus, was extreme. Though he was evidently acquainted with the works of Hesiod, Pythagoras, Xenophanes, and Hecateus, he was apparently justified in asserting that he had learned everything from himself. He

had numerous disciples for many succeeding ages. He is known to have written only one work, entitled *On Nature*. It was divided into 3 parts: I. *On the All*; II. *Political*; III. *Theological*.

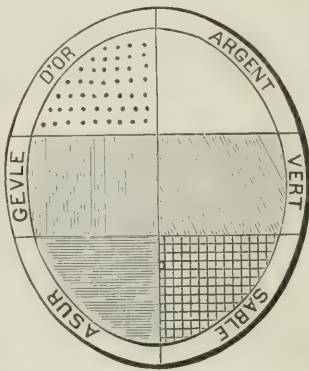
Philosophy.—The philos. of H. was a development of the Ionic doctrine, influenced by the speculations of the Eleatic Xenophanes. This development consists in an advance from the idea of *being* to that of *becoming*. The principle—i. e. the inneressence of all things (not their origin)—is fire, whereof the purest form is soul or spirit, and which, by rhythmical qualitative and local change resulting in condensation and rarefaction, creates and uncreates the sensible world. The way to creation, or the downward way, is through extinction or deprivation, and proceeds thus—fire, water, earth; the way to dissolution, the upward way, is through ignition or fulness, and proceeds—earth, water, fire. All things are in motion: stability is an illusion produced by uniformity of motion. Resolution into original fire is spiritual activity, and, at the same time, rest and peace in the union of contraries; creation is relaxation of activity, but, at the same time, war, through the opposition of contraries. War, strife, is therefore the parent of all relative created things. These are known to us through our senses, which, though necessary, are bad witnesses, unless corrected by the inner wisdom. The soul is immortal, a part of primal fire, but takes rest from utter activity in the creation of a body. The microcosm is the image of the macrocosm. [From orig. art. in *J.'s Univ. Cyc.*, by THOMAS DAVIDSON.]

Herald, an official connected with European courts, whose duties at present are the conducting of processions, and the funerals of those entitled to bear coat-armour, the inspection of arms, the tracing of genealogies and titles. In the Middle Ages they marshalled the combatants in the lists, and served as messengers between princes. Wars were declared and defiance uttered by them in the sovereign's name. In Eng. the "Heralds' College" or "College of Arms," is a corporation of most of the existing Eng. H. It was instituted 1464, chartered 1483, confirmed 1549, rechartered 1554. Its pres. is the duke of Norfolk, hereditary earl-marshal of Eng. The "Lyon Office" in Scot. and the "Office of Arms" in Ire. perform similar functions. The prin. Fr. H. was Montjoie king of arms. Other famous H. were Toison d'Or king of arms for Burgundy (whose title still exists in Aus.) and Tower and Sword king of arms for Port.

Heraldry, in gen., the science which treats of coat-armour, descents, precedence, ceremonies, and processions; in a narrower sense, the science of coat-armour, or the art of identifying, drawing, and describing coats of arms. In Eng. the whole subject is intrusted to the College of Arms or Heralds' College, which has the right of granting and confirming coats of arms; of recording pedigrees and descents, and of visiting the counties of the kingdom for that purpose; of directing solemn ceremonies, particularly those of a coronation, and of deciding all questions of precedence. In the U. S. there is no official body charged with these functions. The chief value of this science with us is in tracing descents, a matter sometimes of very great importance. Little attention has here been paid to this, and there probably are not many Amer. families which can trace their descent beyond the first emigrant.

A fabulous antiquity has been ascribed to that branch of the science which treats of coat armor, but it cannot be traced with any certainty beyond the 12th century. It appears to have had its origin in necessity, and to have served

much the same purpose as the modern uniforms and decorations of military officers. When warriors wore armor and looked exactly alike, even concealing their faces in their helmets, some method of distinguishing them was necessary. The shield was the most conspicuous part of their armor, and nothing would be more natural than to decorate it with color, applied according to certain fixed rules, or to enrich it with figures of natural or artificial objects. Hence arose tinctures, ordinaries, and charges; from which simple beginnings the whole science of H., or, as some prefer calling it, of armory, has been developed. The tinctures are divided into metals, colors, and furs. The metals are gold and silver, called *or* and *argent*. The colors are red, black, blue, green, and purple, called respectively *gules*, *sable*, *azure*, *vert*, and *purpure*. To these some writers add orange tawny and blood-color, in heraldic lang., *tenné* and *sanguine*, which they call *staind* colors. Gold may be represented by gamboge yellow, silver by pure white, and the various colors can be produced by India ink, vermilion, ultramarine, Prus. blue, etc., and combinations of them. In printing the different colors are represented by black lines differently arranged. Heralds have also devised certain arrangements of the shield which they call abatements of honor; but as most men would be reluctant to carry about with them such tokens of disgrace, it is not surprising that staind colors and abatements should have been long ago forgotten, if indeed they ever had any real existence. The furs are ermine and vair; the former white, with black spots, arranged in a peculiar way, the latter composed of bell-shaped figures, alternately argent and azure, placed in rows, base to base, so



that the base of every white figure touches that of every blue one. Modifications of these furs have been introduced from time to time. For a full exposition of this subject, see *HERALDRY*, in *J.'s Univ. Cyc.*, and the authorities there cited. [From orig. art. in *J.'s Univ. Cyc.*, by REV. B. R. BETTS.]

He'rat, city in W. Afghanistan, on the Huri, in lat. 34° 50' N., and lon. 62° 30' E. It is fortified, and situated in a fertile and highly cultivated country. On account of its position it may become the point of contention between Eng. and Rus. in their Asiatic rivalries. Its pop. is estimated at between 30,000 and 80,000.

Herbarium, or **Hortus Sic'cus** [Lat. "dry garden"], a botanist's collection of dried plants. If possible, plants with flowers, buds, and leaves should be chosen, and many small plants may be gathered roots and all. If too large, collect branches with a few radical leaves. Thick roots may be sliced before drying. For drying, take soft, unsized bibulous paper, folded into a convenient size, and stitch a dozen sheets or so into a book called a drier. Fold each specimen in a single sheet, place the sheet between driers and put the whole into the press under as much weight as the specimen will bear without crushing. Change the driers every day or oftener for about a week. Finally, the specimens may be carefully folded in sheets of thickish white paper, or fastened by slips of paper or by hot glue to half sheets of paper. Care must be taken to prevent the ravages of destructive insects. An alcoholic solution of mercuric chloride (1 ounce to the quart), applied to the specimens before they are mounted, is useful.

Herbart (JOHANN FRIEDRICH), b. at Oldenburg May 4, 1776, his father being a public officer at that place. H. attended the gymnasium there, studying Wolff and Kant. In 1794 he entered the Univ. of Jena, when Fichte was there unfolding his science of knowledge. From Fichte he received a great impulse. In 1802 he became *Docent* of philos. and pedagogics in Göttingen, and in 1805 prof. extraordinarius. In 1809 Wilhelm von Humboldt called him to Königsberg, as prof. ordinarius to succeed Krug, the successor of Kant. In 1833 he returned to Göttingen, where he remained till his death in 1841. His chief works are: *Lehrbuch zur Einleitung in die Philosophie*, *Lehrbuch zur Psychologie*, *Psychologie als Wissenschaft*, *neu gegründet auf Erfahrung*, *Metaphysik und Mathematik*, *Allgemeine Metaphysik*, etc. H. became convinced that, for a satisfactory settlement of the questions involved in self-consciousness, it was indispensable to enter into the consideration of infinitesimal quantities by means of the Calculus. He contends that the ultimate real elements of which the world is composed are infinitesimal parts of that which appears, absolutely simple, without parts as to space or time, mathematical points, distinguished only by difference of quality; and he holds that original change and development, that infinite continuity of space and time, that substances possessing a multiplicity of qualities and forces, that causality transferring something from one essence to another, and that a self endowed with arbitrary and conflicting faculties, are crude and contradictory suggestions of phenomena. Impenetrability of simple substances must be limited to the extent of their similarity; if it was absolute, communication between them would be incomprehensible. Contiguous substances of different qualities attract each other with infinite force, occupying the same point of space, and exert repulsion in the measure of their identity. This elementary action does not alter the primary qualities of the substances; he therefore calls it self-preservation. The number of substances holding the same point of space is comprehended by the terms of "internal state;" the attractions and repulsions resulting from the "internal state," and producing a more or less constant relation to the surrounding elements, is termed the "external state or constitution." Consequently, the external const. is defined by the internal state. The only substance and elementary actions of which we are directly conscious are the soul and its simple sensations; but the simple acts of all substances are acts of self-preservation, sensations; therefore are self-perservations of the soul. When an element, partly similar and partly dissimilar, enters the space of another element, a perturbation is created to which a definite self-preservation corresponds. While the soul, by perceptions, responds to countless perturbations, it expels from consciousness that which is contradictory, blending what remains in definite succession and order. The rich experience of the outer world is thus produced by the soul without innate categories of time and space, without being contaminated by an influx foreign to it, and without a fatalistic law of evolution. Moreover, the soul preserves itself with reference to these its own products, forming series of perceptions, weaving the series into textures, and grouping the textures. This is the origin of higher generalizations and of complicated intuitions, which are generally attributed to special faculties of an inner sense. The very idea of self is thus created by the soul; it is a work of the soul, not the soul itself; this latter operates not only consciously, but in sleep also. The construction of matter, of the imponderables, and of life by modifications of the preceding principles, constitute H.'s *Natural Philos.* The purpose of his *Rational Psychology* is to do away with the foundation of empirical psychology, the faculties of the soul, which evidently act without precision, concert, or assignable laws, and to explain, by a mathematical analysis, the apparently irregular and anomalous facts of consciousness, which seem to violate the autonomy of the soul.

We have thus far given an outline of his theoretical philos. The principles determining what ought to be are contained in his *Practical Philos.* The latter is not founded upon commands, either of society or conscience, nor is it based upon desires in connection with objects, but upon involuntary and axiomatic intuitions, succeeding inward and outward actions, approving of the harmonious, disapproving of the inharmonious relation of volitions. These momentary decisions are called "aesthetical judgments." An application

of both his theoretical and practical philos. was made by H. in his *Pedagogics*, with the design to educate by means of instruction. His *Encyclopaedic* investigates the relation and interaction between the arts and sciences of civilized life. [From orig. art. in *J.'s Univ. Cyc.*, by HUGO HAANEL, PH. D.]

Herbert (GEORGE), a brother of Lord Herbert of Chesham, b. at Montgomery Castle, Apr. 3, 1593; was ed. at Trinity, Cambridge; received a fellowship in 1615 and proceeded M. A. in 1616; took holy orders in 1625; became a prebendary under the bp. of Lincoln 1626, and in 1630 rector of Bemerton. The writings of the "holy Herbert" in prose and verse have often been reprinted. His poetry includes some of the finest sacred lyrics in our lang. D. Feb. 1633.

Herbert (HENRY WILLIAM), a son of the dean of Manchester and grandson of the earl of Carnarvon, b. in Lond. Apr. 7, 1807; ed. at Eton and Cambridge, and came to New York in 1831, having become hopelessly involved in debt. In this country he was for a time a highly successful teacher of Gr. Author of historical works and a successful series of historical novels; also of the "Frank Forester" series of sporting vols., including the *Field Sports of the U. S.* and *The Horse and Horsemanship of Amer.* D. May 17, 1858.

Herculaneum, or, less properly, **Herculænum**, city of It., on the slope of Vesuvius, between Naples and Pompeii, to which Retina served as a port. This site was first occupied by the Oscii, afterward by Gr. colonists, who named it *Herakleion*, and both in arch. and in insts. it had the character of a Gr. city. It was conquered by the Romans after the so called War of the Allies, and in the time of the empire was a pleasant resort. The earthquake of A. D. 63 did great damage to Pompeii, but comparatively little to H., which appears to have been more solidly constructed. The houses of Pompeii were small, while H. had its palaces and temples. The great eruption of Vesuvius which buried Pompeii (A. D. 79) also overwhelmed H. with volcanic ashes, afterward converted into mud by water, and finally hardened into stone. Upon the soil deposited above the city have arisen Portici and Resina. H. was buried deeper and deeper by later eruptions of Vesuvius, until it had almost passed out of memory. In 1684 some ruins were found in digging a well. In 1730, in the excavations for the prince of Elbeuf's villa at Portici, several statues were found, with 24 columns of giallo antico, etc. Charles III., having become king of the Two Sicilies in 1736, assumed possession of the property, and carried on the excavations energetically. Between 1750 and 1760 a villa was excavated, where, beside beautiful works of art, was found a library of 2000 rolls or vols. Many of the MSS., though damaged by water and externally decomposed, have been unrolled and made legible. About 500 have been already opened, for the most part Gr. treatises on philos. by Epicurus and other less known writers. In 1828, under the reign of Francis I., the excavations were renewed with some zeal. Fiorelli, director of the excavations at Pompeii, is now turning his attention to H., but thus far no new discoveries of importance have been made. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. ANGELO DE GUBERNATI.]

Hercules, or **Heracles**, the most famous hero in the Gr. mythology, was a son of Zeus and Alcmena. He was possessed of extraordinary phys. strength. While a babe in the cradle he strangled 2 serpents sent by Hera to kill him. When full grown he upheld the dome of the heavens while Atlas was away in the gardens of the Hesperides. Hera struck him twice with insanity. During the first fit he slew his 3 children, and in order to expiate this crime the Delphic oracle sent him to serve Eurystheus. While here he performed the 12 famous labors: (1) slaying the Nemean lion; (2) killing the Lernean hydra; (3) catching the Arcadian stag; (4) hunting the Erymanthian boar; (5) cleansing the Augean stable; (6) destroying the Stymphalian birds; (7) capturing the Cretan bull; (8) carrying away the mares of Diomedes; (9) fetching the girdle of the queen of the Amazons; (10) chasing the oxen of Geryon; (11) stealing the apples of the Hesperides; (12) seizing Cerberus and carrying him up into the daylight. During the second fit he killed his friend Iphitus, and in obedience to the Delphian oracle he went and served Omphale, the queen of the Lydians, as her slave. His death was tragical. Believing that it was a philtre, Deianira, his wife, tinged his garment with a poison. When H. put on the garment the poison attacked his body, and he fled from place to place in agony. At last he could bear it no more. He heaped up a huge pile of wood, and, setting fire to it, he placed himself on its top. But when the flames began to lick his body a cloud came down from the sky and carried him up to heaven. There is perhaps no name in the whole Gr. mythology around which myths cluster so thickly as around that of H. He was also a favorite subject in epics and dramas, and with sculptors.

Hercules, Pillars of, the name given by the anc. to Calpe (Gibraltar) and Abyla (now Ceuta), 2 rocky promontories, one on each side of the Strait of Gibraltar. It was fabled that Hercules found them 1 mt., but tore them asunder, thus making a connection between the ocean and the Mediterranean. In heraldry, they figure as the supporters of the Sp. national arms. They are seen with the motto *Ne plus ultra* ("No more beyond"), indicating that the pillars are at the end of the world, as anciently believed. These are the well known pillars on Sp. coins; and the sign S. standing for "dollars," probably represents these pillars with the fillet for the motto across them.

Hercynian Forest (*Hercynia Silva*), a name employed by anc. Gr. and Lat. geogs. to denote the great central and S. forest-region of anc. Ger. The term in its widest sense seems to have included the Bohemian Forest, the Hartz, the Black Forest, and others.

Herder, von (JOHANN GOTTFRIED), b. Aug. 25, 1744, at Mohrungen, E. Prus., was ed. in Königsberg, where he studied theol., philos., and lit. From 1764 to 1769 he lived in Riga as rector of a kind of theological sem., and there he pub. his *Fragments on Ger. Lit.*, which attracted considerable atten-

tion. After 1769 he travelled much in Ger., and held different positions until 1776 he settled down in Weimar, beside Goethe, Wieland, Schiller, and Schlegel, in an influential and responsible position as court-preacher, ephorus of the schools, and pres. of the consistory. In his *Letters on Heb. Poetry*, an analysis of the æsthetic character of the poetical part of the O. T.; in his *Cid*, a translation or remodeling of the old Sp. ballads celebrating this hero; and in a number of minor essays pub. in different literary magazines, he showed that all the greatest works of art are also the most exclusively national. His most interesting and most important work is his *Ideen zur Philosophie der Geschichte der Menschheit* ("Ideas of the Philosophy of the History of Mankind"), the first in which was set forth the idea of hist. as the development of a national genius, as the growth of a vital power, as an evolution—an idea perfected in the philos. of Hegel. D. Dec. 18, 1803.

Herds-Grass. See TIMOTHY.

Hereditaments, Incorporeal, in law. By the term "hereditaments" is meant any property which on the death of an individual owner, without a disposition of it by will, passes to an heir. By the Eng. common law all the property of an intestate must devolve either upon his administrator or his heirs; personal property passing to the administrator, and real to the heirs. The word "hereditaments" thus becomes one of the most comprehensive terms in the law to indicate real property or landed interests. The distinction between "hereditaments" on the one hand, and "chattels" (as indicating personal property) on the other, is thus of great practical importance, as the two classes of property are governed by distinct sets of rules. Hereditaments are of two kinds—corporeal and incorporeal. The former term is used to indicate the land itself. Incorporeal hereditaments, the subject of this article, are intangible, and are rights claimed by one person in the land of another. The right in legal phrase is *dominant*; that is, it is superior to the claims of the owner of the land over which it is exercised. The land to which the right is attached is said to be *servient*. In other words, the right of the owner of it is subordinate to that of the owner of the incorporeal interest. The Rom. lawyers, regarding the subject principally from this point of view, used the term "servitudes" to indicate this class of rights. An illustration is readily found in the case of a highway. A private owner may own the land over which a highway passes, but his right to make use of it is plainly subservient to the power of the public to use it for the purposes of travel, etc.

There are a number of rights in Eng. that are deemed to be incorporeal estates which have no existence in this country, such as *advowsons*, or a right of presentation to a ch.; *tithes*, a right of an ecclesiastical nature to take a portion of the profits of land for the use of the ch. (tithes); and certain public offices, of which an example is the office of a sheriff. *Dignities* or titles of nobility, and *annuities*, belong to the same class. In the U. S. incorporeal H. are divisible into 3 prin. classes—*Profits à prendre*, *easements*, and *rents*. *Profit à prendre* is a phrase derived from the Norman Fr. lang., indicating a profit which consists in taking something from the land of another, such as a right to take fish, petroleum, or minerals. An easement differs from a *profit à prendre* in the fact that nothing is taken by the owner of the incorporeal right from the land over which it is exercised. This class of rights has been considered. (See EASEMENT.)

The third class of incorporeal H. is that of *rents*. By a rent is meant the right which one person possesses to call upon another to pay him periodically a sum of money or a thing as a return for the use of land. It differs from a *profit à prendre* in the fact that while this is a part of the land itself, a rent is no part of the land, but is some new and independent thing.

When an incorporeal right is enjoyed in connection with the ownership of an estate, it in gen. follows the ownership as that passes from one to another. A sale transfers it to a purchaser. An example is a right of way over the land of another as incidental to the ownership of adjoining land. The right may be a mere personal privilege, having no connection with the ownership of land, when it would be termed a right "in gross."

T. W. DWIGHT.

Hereditary Characteristics. The laws which govern the transmission of H. C. are generally unknown, but the number and diversity of inheritable deviations of structure and peculiarities of temperament are endless. Scientists have not explained how it is that a man may possess characteristics which have been observed in his grandfather or great-grandmother, and have not appeared in his own parents. Equally inscrutable too is the fact of the transmission of a characteristic from one sex to both sexes, or to one sex alone, generally the like sex. There are numerous instances on record of the strange and undoubted transmission of peculiarities.

It was for a long time doubted whether genius and talent were hereditary even where both parents were endowed. Mr. F. Galton has, however, settled the question. He reviews the judges of Eng. from 1660 to 1868, the statesmen of the time of George III., and the prime ministers during the last 100 yrs. Subsequently, after discussing the relationships of illustrious commanders, men of letters and science, poets, painters, musicians, divines, scholars, oarsmen, and wrestlers, he arrives at his results. In the 300 families under discussion nearly 1000 are eminent and 415 illustrious. The gen. result is that $\frac{1}{2}$ of the illustrious men have one or more eminent relations.

That certain diseases are inherited is beyond all doubt. Insanity, gout, syphilis, consumption, scrofula, and kindred maladies have been long regarded as hereditary. The frequency of certain maladies in particular dists. is illustrative also of a tendency to the inheritance of disease. The goitre, for instance, stone in the bladder, and plica polonica are known to infest certain localities where there is no obvious peculiarity of air, water, or food as a possible cause. Dis-

orders of the brain and the nervous system are generally hereditary, insanity being conspicuous as an inherited taint. Headaches and neuralgia offer constant evidence of the transmission of these disorders, although in nervous diseases like results are occasionally due to imitation. A noteworthy point in the consideration of the subject is the disposition of individuals of the same family to be similarly attacked by given maladies, and to suffer from the same after-effects, as in whooping cough, measles, and other infantile maladies. [From *orig. art.* in *J. s. Univ. Cyc.*, by W. J. Dixon.]

Heresy [αἵρεσις, from αἵρεω, "to take," "taking" (as of a city), choice, preference, chosen way of life, of belief, doctrine, or teaching; a sect, school, party in philos., med., lit., or religion; the doctrine of such a party; hence discord, separation, faction as the result of such views. In the N. T. *hairesis* means sect and faction. In its later sense, H. is a doctrine in conflict with important truth. In the Ch. it is a doctrine perversely held by nominal Chrs. in conflict with an article of faith.

As the term is relative, all enumerations of H. are relative. That is considered H. on one standard which is accepted as sound belief on another. That is H. by the gen. judgment of the great body of the Chr. world which is in conflict with the 3 gen. Creeds. The R. Cath. Ch. and Gr. Ch. consider as H. all doctrines conflicting with the gen. Creeds and their own confessional standards. But at the beginning, almost universally among Prots. and still to some extent, the word is used to mark all doctrines in conflict with fundamentals, as defined in the confessions of particular bodies.

The treatment of H. in the Ch. has been very varied. In the early Ch., not merely from the necessity of her condition, but from principle, the means of correcting it were purely moral. With the conjunction of Ch. and State H. came to be regarded as also a civil offence, in the nature of a double treason, and was punished by the magistracy. From the 12th and 13th centuries the treatment of H. was one of gen. persecution, leading to bloody wars. Courts for the trial of H. were established throughout W. Christendom, with a body of judges of H., presided over by masters of H. These courts formed the Inquisition. The first great official voucher for an important change from this state of things was the Peace of Westphalia (1648), according to which the 3 Confessions, the R. Cath., the Lutheran, and the Reformed, were acknowledged as in all civil respects non-heretical.

In the earlier Reformed views of the treatment of H. there was a concurrence in gen. with the principle that it should be dealt with by the civil magistracy. Calvin and Beza wrote in defence of the right and duty of putting heretics to death. Luther opposed the use of coercion in removing H. The Augsburg Confession expressly denies the right of civil govt. over questions of H. The Lutheran Ch. stood almost alone for a time in denying that H. should be punished with death. It may now be regarded as a fixed principle of nearly the entire Prot. world that civil govt. has no right to interfere with the mere holding of religious opinions, however wrong, nor to repress any publication of them or acting upon them which does not interfere with the civil order and law of the land. C. P. KRAUTH.

Herkimer, R. R. junc., cap. of Herkimer co., N. Y., 81 m. W. of Albany. Pop. 1870, 1220; 1880, 2359.

Herkimer (NICHOLAS), b. about 1720, the son of J. J. Herkimer (or Erghemar), a Ger. from the Palatinate, who was one of the patentees of the Burnettsfield patent, now in Herkimer co., N. Y. The son became a militia lieut. 1758, and commanded at Ft. Herkimer on the Mohawk (now in German Flats, N. Y.) in that yr., at the time of the Fr. and Indian attack. He soon afterward lived in the Canajoharie dist., now in Montgomery co.; became col. of militia for Tryon co. 1775; appointed brig.-gen. by the State convention 1776; marched against Sir John Johnson's Tories and Indians 1776; led an expedition to the relief of Ft. Stanwix (now Rome, N. Y.), then besieged by St. Leger; was ambuscaded by the Indians, defeated, and wounded in the leg, at Oriskany, Aug. 5, 1777; suffered unskilful amputation, and d. in consequence Aug. 17, 1777, at Danube, N. Y., where he resided. Cong. voted (Oct. 1777) to erect a monument to "Brigadier Harkemer," but the monument was not erected until 1884, when it was completed at a cost of over \$7000.

Hermann [Lat. *Arminius*], a Ger. chieftain of the Cherusci, a son of Sigimer, b. 18 B. C.; entered the Rom. service, and became an equestrian. In 9 A. D., when Ger. was groaning under the oppression of Varus, H. ambuscaded the Romans in the Teutoburger Forest, and almost all the Romans, Varus included, lost their lives. He fought Germanicus (14-16 A. D.) with disadvantage; defeated Marbodius, king of the Suevi, 17; was put to death by his own relations 19 A. D., for aiming at absolute power.

Hermann (JOHANN GOTTFRIED JAKOB), b. at Leipzig Nov. 28, 1772; studied law, langs., and philos. at Leipzig and Jena, and was appointed *professor eloquentie* in 1803 at the Univ. of Leipzig, which position he filled to his death, Dec. 31, 1848. He exercised great influence on metrical science by his *De metris Græcorum et Romanorum poematum* (1796) and *Handbuch der Metrik* (1798), etc.; and on gram. by his *De emendanda ratione Græcæ grammaticæ* (1801), and a number of minor essays. Also as a text critic he acquired a great name; he edited *Æschylus*, *Sophocles*, portions of *Euripides* and *Aristophanes*, *Blon* and *Moschus*, and others. His lectures were very attractive and instructive.

Hermaphroditism, or **Hermaphroditism**, the union of the characteristic organs of each sex in one individual. It is the normal condition in the great majority of plants and in many of the lower animals, but has not been observed in vertebrates, except in fishes of the family *Serranidae*. Spurious H., in which the characteristic organs of one sex assume, from incomplete or abnormal development, something of the appearance of those of the opposite sex is, however, frequent.

Hermaphroditus was a son of *Hermes* and *Aphrodite*. Once, when he was bathing in the well of *Salmacis*, the nymph of the well fell in love with him, and prayed to the gods that she might remain united with him forever; and when he ascended from the bath he was changed so that he was neither man nor woman, but both. The idea of this myth is of Asiatic, the myth itself of Rom. origin.

Hermas, the author of a once celebrated book, *The Shepherd*, was by *Irenæus*, *Clemens Alexandrinus*, and *Eusebius* considered identical with the *Hermas* mentioned by St. Paul in his Epistle to the Romans. (xvi. 14), while others have placed him a little later. *The Shepherd* is divided into 3 parts—the *Visions*, *Precepts*, and *Similitudes*—and consists of a blending of fantastic poetry and naïve morals. It was originally written in Gr., but exists now only in translations.

Hermeneutics is the science of interpretation, and more particularly the interpretation of the Bible. It is closely related to gram. and logic. It deals with the laws and kinds of interpretation (grammatical, historical, theological, practical, allegorical, mystical) and the qualifications of an interpreter. PHILIP SCHAFF.

Hermes. See **MERCURY**.

Hermes (GEORG), a Ger. theologian who, under the influence of the "new philosophy," endeavored to carry out the doctrines of unity and identity into forming a common basis for Protestantism and Roman Catholicism. B. in Dreierwald, Westphalia, Apr. 22, 1775, he d. at Bonn May 26, 1831. Having studied theol. at Münster, where he became in 1807 prof., he was subsequently teacher of Catholic theol. at Bonn. He founded a school or doctrine termed *Hermesianism*, and his followers occupied many important positions as preachers and teachers in Ger. The fundamental principle of the *Hermesian* doctrine is, that human reason can grasp the truth, and that religion, being true, is or may be based on this "natural sense." But the Ch. holds a directly different doctrine, and does not look up to philos. or science to authorize her doctrines, as the Rom. Catechism declares "the mysteries which are contained in God's holy Ch. are to be understood only by faith, and not by reason." (See *Hinweisungen auf den Grundcharakter des Hermesianischen Systems*, by J. B. BALTZER.)

Hermes/anax, b. at Colophon, lived in the times of Philip and Alexander the Great, and d. before the destruction of his native city by *Lysimachus* in 302 A. C. He wrote an elegiac poem in 3 books to his mistress *Leontion*, of which a large part of the third book has been quoted by *Athenæus*, and thus come down to us.

Hermes/anism, the religious philos. taught by *GEORG HERMES* (which see).

Hermes Trismegistus ("thrice-great *Hermes*," or *Mercury*, or *Thoth*, an Egyptian god, regarded as inventor of all science and learning—*e. g.* speech, writing, religion, geom., arch., and the arts. Every Egyptian book relating to religion or science was inscribed with his name, as if inspired by him; and according to *Jamblichus* there were of these 36,000. The name "thrice-great" is supposed to refer to the god's triple manifestation as philos., priest, and king. Certain dialogues on mystical theol., still extant, and which were very popular during the 15th and 16th centuries, were subsequently regarded as forgeries. They had been transmitted from an early age in a rude Gr. form. More recent research has indicated that the Gr., by its very defects, possesses the character of a translation. Many of the very peculiar phrases and ideas contained in the *Hermetic* books are to be found in the papyri and inscriptions. There were also a number of works written in the Middle Ages by alchemists, and in later times perhaps by the *Rosicrucians*, which profess to have been written by H. T. The *Zabians* of the E. have writings in Gr. which they ascribe to H.

Hermias was a slave in the household of *Eubulus*, tyrant of *Atarneus* and *Assus*, in *Mysia*, *Asia Minor*; was made free, travelled to Athens, heard *Plato's* lectures in company with *Aristotle*, and succeeded *Eubulus* on the throne of *Atarneus* in 347. *Aristotle* spent several yrs. at his court, but had to flee when *Artaxerxes*, king of *Per.*, sent an army to reduce all the petty tyrants in *Asia Minor*. H. was put to death, but *Aristotle* raised a statue at *Delphi* in honor of him, and married his relative *Pythias*.

Hermit [Gr. ἐρημίτης; Lat. *eremita*, "a dweller in solitude"], a person who retires from human society and dwells alone; a title given especially to religious recluses, and particularly to those who do not live in common with others. So also the Augustinian monks, though living in monasteries, are called H., being accustomed to spend a part of their time in solitude. There are other monastic congregations called H., notably certain lay members of the third order of St. Francis, who, being married before taking their vows, cannot be received in full into the order.

Hermist Crab. See **CRA**.

Hermogenes [Ἑρμογένης] lived in the time of the emp. M. Antoninus, son of *Calippus*, and b. at *Tarsus* in *Cilicia*. He was noted for the early development of his oratorical powers, so that at the age of 15 he attracted the attention of the emp., who listened to his extempore discourses with great pleasure. When 17 he became a public teacher of rhetoric, and at 18 or 20 he composed his rhetorical works, which *Suidas* speaks of as most worthy of admiration, and which were for several centuries the established books of instruction. At the age of 25 he lost his intellectual power and sank into imbecility. Five of his works, forming a *Τέχνη ῥητορικὴ* ("System of Rhetoric"), have come down to our time.

Hermon, Mount, the highest elevation of the Syrian system of mts. It is formed by a spur from *Anti-Lebanon*, which, separating the valley of *Cœle-Syria* from that of the *Jordan*, unites to the W. with the range of *Lebanon*. Great H., or Mt. H. proper, is about 10,000 ft. high. Its top is generally covered with snow. The Ps. speak of the "dew of *Hermon*," and modern travellers say that during the night their tents become as wet with dew as by a rainstorm.

Hermopolis Magna, anc. city of Egypt, on the Nile, near the boundary between Upper and Middle Egypt, on the site now occupied by the v. of Oshmoonegu or Eshmoon. At the time of the Ptolemies it was a magnificent city, prominent among whose buildings was the temple of Thoth or Tauth, the ibis-headed god, the inventor of the pen and letters, identified with the Gr. Hermes. It was destroyed by the Mohammedans, who carried away its monuments for building purposes, and left nothing behind but large mounds of ruins and rubbish.

Hernia [Lat.], the term generally used to express the protrusion of an abdominal viscus. The predisposing cause of H. is a weakness of some portion of the abdominal walls, and there are certain parts which are naturally weaker than others, as the inguinal, umbilical, and femoral regions. This weakness very often exists congenitally, and may be increased or produced by injury, disease, or pregnancy. Among the exciting causes may be mentioned violent muscular exertion, jumping, straining from lifting heavy weights or at stool, playing on wind instruments, etc. The usual contents of a hernial sac is a portion of the small intestine or the omentum, but we may find portions of any of the viscera in it, especially when the abdominal walls are congenitally weak. The sac is formed of peritoneum, which is covered by the integument and subjacent fascia.

H. is generally divided in 2 ways: 1st, according to its situation, as inguinal, femoral, umbilical, diaphragmatic; 2d, according to the condition of the protruded viscus, as reducible, irreducible, and strangulated. Reduction of H. is facilitated by raising the foot of the bed in which the patient reclines, and by the inhalation of ether or chloroform. The treatment usually adopted consists of the reduction of the contents, and the application of a suitable truss to prevent the reproduction. If the patient is young, this method will effect a radical cure in time, but in the adult recourse must be had to an operation to effect this. "H. is said to be strangulated when it is constricted in such a way that the contents of the protruded bowel cannot be propelled onward, and the return of its venous blood is impeded." There is always more or less inflammation, caused by the constriction. The object of treatment is to return the intestine into its cavity. When this cannot be accomplished by manipulation, or manipulation combined with warm baths and the administration of ether—the patient having first been placed in such a position that all the parts in the neighborhood of the trouble shall be completely relaxed—recourse must immediately be had to an operation. This consists in enlarging the constricting portion, so as to allow of the return of the gut. It is done by cutting down to the sac, and either opening it and dividing the stricture, or dividing the stricture without opening the sac, or by merely incising the neck of the sac. [From orig. art. in *J. s. Univ. Cyc.*, by E. J. BIRMINGHAM, M. D.]

Herō, a priestess of the temple of Aphrodite at Sestos, on the coast of Thrace, was loved by Leander, a native of Abydos, on the opposite shore of the Hellespont. Guided by the light of the torch which H. planted on the cliffs of Sestos, Leander used to swim across the sea to meet her, but one night the storm put out the torch, and when next morning H. discovered the corpse of her lover floating on the waves she threw herself into the sea.

Herod the Great, king of the Jews, was b. in 62 B. C. at Ascalon in Judea, and was of Idumean descent. When in 47 B. C. his father, Antipater, was made procurator of Judea by Julius Caesar, he himself received the govt. of Galilee, to which was afterward added that of Samaria and Cœle-Syria. The title of king of Judea was conferred on him 40 B. C. He established himself by force in Jerusalem, and by unheard-of cruelty he maintained his power. The slaughter of the infants at Bethlehem was for him so insignificant an affair that Josephus does not mention it. A few days before he died he had his son, Antipater, strangled. But, although cruel, his govt. was vigorous and brilliant. He was 10 times married, and d. between Mar. 13 and Apr. 5, a few weeks after the birth of Christ, of a horrible disease, the same as killed Sulla and Philip II. of Sp.—His son, **HEROD ANTIPAS**, by his wife Malthea, a Samaritan, was by his will appointed tetrarch of Galilee and Peræa. In 39 A. D. he was banished to Lyons.—**HEROD AGRIPPA I.**, grandson of Herod the Great, was ed. in Rome. In 37 he received the tetrarchates of Philip and Lysanias, in 41 the govt. of Judea and Samaria, and d. in 44 A. D.—**HEROD AGRIPPA II.**, a son of the preceding, was, like his father, ed. in Rome, and resided there, at the court of Claudius, at the death of Agrippa I. He obtained at first (50 A. D.) only the small kingdom of Chalcis. Abilene and Trachonitis were subsequently added. In the Jewish war he sided against his countrymen, and after the destruction of Jerusalem (70 A. D.) he resided in Rome, where he d. in 100 A. D. R. D. HIRSCOCK.

Herodes Atticus, one of the most celebrated Gr. orators, was b. at Marathon in 104 A. D., and d. at Athens in 180. He was immensely wealthy and held several public offices. He was remarkable for his eloquence, and was called the "tongue of Greece." His speeches were compared to silver streams running in golden beds. The work (*Ἡερὶ Ποιητικῆς*), ascribed to him and which has come down to us, is an inferior production.

Herodians, a Jewish party in the time of Christ, first mentioned in Mark iii. 6. They were partisans of the Herod family, whose tyranny they preferred to that of the Romans. They appear to have been mostly Sadducees.

Herodianus was a Gr. by birth, but lived for a long time in Rome, and wrote in the Gr. lang. a work in 8 books on the hist. of Rome from the death of M. Aurelius (180 A. D.) to the accession of Gordianus III. (238 A. D.), narrating events, as he informs us, which had occurred in his own lifetime. The work, which is still extant, is interesting, and is considered truthful and impartial in the main.

Herodotus, a Gr. historian, called the "father of history," was b. at Halicarnassus, a Doric colony in Caria, Asia

Minor, in 484 B. C. He belonged to a wealthy and influential family, but under the reign of Lygdamis his family was expelled from Halicarnassus. He went to Samos, where he lived several yrs., and where he learned the Ionian dialect, in which he wrote his book. He returned, however, to Halicarnassus, and took part in the expulsion of the tyrant; but he soon again left his native city, and entered on the long and extensive travels which formed the necessary preparation for his great work. He wandered through the whole of Gr., studying the hist. of each place on the spot by making himself acquainted with its monuments and its traditions. No less intimate and comprehensive was his acquaintance with Egypt. He had visited Memphis and Heliopolis, and crossed the whole country from the Delta to Elephantine, and from the Libyan desert to the Red Sea. In Asia Minor he knew from personal acquaintance every place he mentions, and in Asia proper he travelled as far as Colchis to the N. and Babylon to the S. The latter part of his life he spent in Thurii, a Gr. colony in S. It., established in 444 B. C., near the ruins of Sybaris. From his residence in this city he is often called the *Thurian* by the anc., and here he probably wrote, or at least finished, his book. It is also probable that he d. here, about 408 B. C. His *Hist.* has been translated into Eng. by Rev. G. Rawlinson.

Heroic Age, the more than half-mythical age of Gr. hist. preceding the true historic period. In it the heroes, who were often of half-divine descent—great warriors, kings, navigators—are the central figures. In later times the H. A. furnished abundant material for dramatic and epic poetry, and the heroic character afforded many noble examples of fortitude, piety, purity, and justice which the Gr. people too generally failed to imitate.

Heron, a gen. name for a part of the birds of the family Ardeidae, wading birds found in all parts of the globe. In the same family are the egrets and the bitterns. Among the H. of the U. S. are the *Demigretta ludoviciana*, or La. H. of the S.; the *Garzetta candidissima*, or snowy H.; the *Herodias egretta*, or white H.; the *Ardea herodias*, or great blue H., a splendid bird, but dangerous when wounded, as it aims severe blows of its long bill at the eyes of its captor; the great white H., *Audubonia occidentalis*; the night H. (*Nycticardea* and *Nyctherodias*); the green H., *Butorides virescens*, and many others. The common European H. (*Ardea cinerea*) was anciently esteemed for the table, and hunted by falconry or shot with the long-bow. It was at times forbidden to any but kings and great nobles to kill it, and when taken by falconry it was usual to let the H.'s wounds be dressed and then set free. H. plumes, once highly prized, are still worn upon the helmets of some corps of Brit. cav.

Herophilus [*Ἡροφίλος*], b. at Chalcodon, in Bithynia, about 300 B. C.; studied med. under Praxagoras; removed to Alexandria in Egypt, and was there one of the founders of the famous med. school of that city; was a distinguished surgeon, and the most celebrated anatomist and zoötomist of antiquity. It is also stated that he practised vivisection upon human beings, probably condemned criminals. It is to be remembered that the anc. regarded the dissection of the dead body as something almost impious, while they had few scruples with regard to inflicting pain upon the living.

Herostatus, an Ephesian, who in 356 B. C. set fire to the temple of Diana at Ephesus, and destroyed it, simply in order to make his name immortal; the Ephesians passed a decree that he should never be named.

Herpes, her'pēz [from the Gr. *ἑρπας*, to "creep"], a name applied to several skin diseases, characterized by the development of a series of vesicles or clusters of vesicles, which generally run a definite, self-limited course. By far the most important of these diseases is *H. zoster*, *zona*, or "shingles," as it is called. This may surround one thigh or one arm with a band of vesicles, or more frequently it starts from the backbone and follows an intercostal space half round the body. Other forms of so called H., such as *H. circinatus*, are caused by parasitic vegetation.

Herpetology. SEE APPENDIX.

Her'rick (JOHN RUSSELL), S. T. D., b. at Milton, Vt., May 12, 1822; grad. at Univ. of Vt. 1847; studied at Andover two yrs., and grad. at Auburn Theological Sem. 1852; from 1854 to 1867 was over a Congl. Presb. ch., Malone, N. Y.; prof. of systematic theol. in Bangor, Me., 1867-73; became pastor at South Hadley, Mass., in 1874. Author of *Positivism* in Boston Lectures, etc.

Her'ring, a name given to many clupeid and coregonid fishes, but primarily to the *C. harengus* of Europe and Amer. The H. fisheries of Amer. are prosecuted chiefly along the N. Eng. coasts and Brit. Amer. waters. In Europe the great H. fisheries are those of G. Brit., Ire., Scandinavia, the Netherlands, and the N. of Fr. They are generally caught in gill-nets or scoop-nets. H. are smoked and dried, pickled, or eaten fresh.

Herrnhut. SEE APPENDIX.

Her'ron (FRANCIS JAY), b. at Pittsburg, Pa., Feb. 17, 1837; grad. at the W. Univ. of Pa. 1853; entered the U. S. A. Apr. 1861 as capt. 1st Ia. Volunteers, and engaged in the battles of Dug Springs, Ozark, and Wilson's Creek; promoted to lieut.-col. 9th Ia. Volunteers, and in command of the regiment through campaigns in Mo., Ark., and Ind. Terr.; engaged in the battle of Pea Ridge. Appointed brig.-gen. of volunteers July 1862, and in command of Army of the Frontier at battles of Prairie Grove and Van Buren; promoted to maj.-gen. of volunteers Nov. 19, 1862. In command of the left wing of investing forces at Vicksburg, and of the army and navy expedition that captured Yazoo City; subsequently of 13th army corps on Tex. coast till assigned to command the N. division of La. In May 1865 negotiated, and in June received, the formal surrender of the Trans-Miss. army and all Confed. forces W. of the Miss. Appointed one of the coms. to negotiate treaties with Indian tribes July 1865. Resigned commission as maj.-gen. and Indian com. Aug. 1865. Was U. S. marshal dist. of La. 1867-69, and sec. of state of La. 1870-72.

Herschel (CAROLINE LUCRETIA), sister of Sir William, b. at Hanover Mar. 16, 1750; became assistant to Sir William in 1781. She was his constant companion in the observatory, wrote from his dictation, and performed the mathematical work necessary for his reductions. She discovered independently 8 comets and numerous nebulae and clusters. Was elected member of the Royal Astronomical Society in 1832. D. Jan. 9, 1848.

Herschel (SIR JOHN FREDERICK WILLIAM), BART., son of Sir William, b. in Eng. Mar. 7, 1792, grad. at Cambridge 1813. He was elected rector of Marischal Coll., pres. of the Astronomical Society, master of the mint, and was a member of many learned societies. In 1825 he began with Sir James South a series of important observations. He passed in review the nebulae catalogued by his father, and catalogued between 2000 and 3000 double stars. In 1833 he went at his own expense to the Cape of Good Hope, where he spent 4 yrs. in observing and 5 yrs. in reducing and preparing his observations, which were pub. under the title *Results of Observations made at the Cape of Good Hope during the Years 1834-38*, etc. This included 7 treatises on: 1, nebulae; 2, double stars; 3, apparent size of stars; 4, distribution of stars and constitution of the Milky Way; 5, Halley's comet; 6, satellites of Saturn; 7, solar spots. He added 2208 nebulae to the list discovered by his father, which with those previously known brought the list up to 5200. He prepared the elaborate articles on "Light" and "Sound" pub. in the *Encyc. Metropolitana*, wrote a treatise on natural philos., and also one known as *Outlines of Astron.* In addition he prepared 131 papers which were communicated to various scientific societies. D. Apr. 13, 1871.

Herschel (SIR WILLIAM), b. at Hanover Nov. 15, 1738, went to Eng. 1759. He was special astron. to the king (George III.), member of the Acad. of Sciences, Paris, and pres. of the Royal Astronomical Society, Lond. In 1781 he discovered the planet Uranus with a telescope of his own construction; made many valuable observations of bodies of the solar system; swept the N. heavens with a 20-ft. telescope, cataloguing stars and nebulae that passed through the field; added 2500 of the latter to the 500 already known, and showed that many of these were resolvable into stars. His pub. works consisted principally of contributions to the *Philosophical Transactions*. D. Aug. 23, 1822.

Hertz (HENRIK), b. at Copenhagen Aug. 25, 1798, and d. there Feb. 26, 1870; devoted himself exclusively to literary work. Several of his works caused a great commotion, especially his *Poetical Epistles from Paradise* (1830), whose satire and criticism made people furious. He has written other satirical, lyric, and epical poems, and also some novels, but his talent was eminently dramatic. The most important of his dramas are his tragedy *Svend Dyrings Huus*, his character comedies *Sparekassen* and *Et Offer*, his romantic comedies *Ninon* and *Kong Rens Datter*.

Hertzen (ALEXANDER), b. in Moscow, March 25, 1812, inherited a large fortune at the death of his father in 1847, and, having spent several years in Siberia or the interior of Russia under police superintendence on account of his radical ideas, he left the country, and spent the rest of his life in Italy, Switzerland, France, and England. D. in Paris, Jan. 21, 1870. He published, besides many novels and sketches of a lighter description, *Russia and the Revolution*, 1860, 3 vols., *Russia and the Old World*, 1864, etc., but his chief literary undertaking was *The Kolokol* (The Bell), a Russian periodical, published for many years, first in London and afterward in Geneva, and very extensively read in Russia, where it exercised a deep and widespread influence.

Heruli, a Germanic race who first appear in hist. in the 3d century A. D. on the shores of the Euxine. They were conquered by the Ostrogoths under Hermanric, and bands of H. appear after this in all parts of Europe. They swelled the train of Attila, and are later found among the enemies of the Huns. In the valley of the Theiss, on the lower Danube, and in Illyria they founded govts., and were everywhere among the bravest and most barbarous and unruly of the Germanic peoples. Odoacer was called king of the H., but was not of this race. After the fall of the W. empire (476 A. D.) the H. became one of the dominant races, but the subject Lombards almost annihilated them about 512 A. D.

Hervogovina. See BOSNIA.

Hesiod, hē'she-od [Hēsiōdos], next to Homer the oldest of the Gr. poets whose works are known to us, and founder of the epic-didactic school of poetry at the foot of Mt. Helicon in Boeotia. H. inculcates the duty of labor and frugality, and treats of the daily round of domestic life. From these characteristics Cleomenes termed him the poet of the Helots. Herodotus (ii. 53) says that H. and Homer lived 400 yrs. before his time, which would give his date about 840 B. C. H. was of Æolian parentage, b. at Ascra, in Boeotia, where his father possessed and cultivated a farm, which he left at his death to his 2 sons, H. and Perses. After the division, Perses, the younger brother, managed by bribing the judges to defraud his brother of a portion of his inheritance. H. thereupon in disgust removed to Orchomenus, where he spent the rest of his life. The works ascribed to H. are numerous, but some of these are not his own productions: (1) *Ἔργα καὶ Ἡμέραι* ("Works and Days"), a poem treating of the duties of the farmer and the best method of conducting the operations of agriculture, also inculcating justice, maintaining the dignity of honest labor, laying down rules for the regulation of life and the rearing of children (the "Works"); followed by a calendar of the days of the month on which it is advantageous or otherwise to undertake any labor (the "Days"). (2) The *Theogony* (Θεογονία), which treats of the genealogy of the gods, being in great measure a mere enumeration of names, but containing some episodes of considerable beauty. (3) *The Shield of Hercules* (Ἀσπίς Ἡρακλέους) is the title of a poem made up apparently from other works of H.; only a portion is devoted to the description of the shield, and this is an imitation of Homer's

shield of Achilles. (See CREUZER u. HERMANN, *Briefe über Homer und Hesiod.*) H. DRISLER.

Hesperides, 3 or 4, or even 7 in number, were the daughters of Atlas and Hesperis. To their guardianship were intrusted the golden apples which Gea gave Hera as a bridal present, and which Heracles stole and brought to Eurystheus. Their number, their descent, and the place of their garden are variously given in the Gr. mythology.

Hesse [Ger. *Hessen*; Lat. *Hessia*], a mountainous terr. in the W. part of Central Ger., situated between the Neckar, Rhine, Main, Lahn, and Fulda. It was inhabited by the tribe of the Catti at the time of Germanicus, but the Catti became lost as an individual tribe among the Franks, and when these emigrated to Belg. and Fr. the Hessian terr. became nearly depopulated. Meanwhile the Sax. pushed into the country from Thuringia, and for a period Hessa was united with the Thuringian principality, but at the death of Henry Raspe in 1247 a succession-war broke out between his nephew, Henry of Misnia, and his niece, Sophia, married to Henry, duke of Brabant, which ended in 1283 in a separation of the 2 countries. Sophia obtained Hessa, and her son, Ludwig the Child, was acknowledged as landgrave, took up his residence at Cassel, and founded the Hessian dynasty. One of his descendants, Philip the Magnanimous, divided his land at his death in 1567 between his 4 sons, William IV., Ludwig IV., Philip II., and George I. But Ludwig IV. d. in 1604 and Philip II. in 1583, without children, and thus only 2 branches of the family were continued—that of Hesse-Cassel, descending from William IV., and that of Hesse-Darmstadt, descending from George I. The elder branch, that of Hesse-Cassel, ceased to reign Aug. 17, 1866, when its dominions were incorporated with Prus. The younger branch, that of Hesse-Darmstadt, is still reigning.

Hesse-Darmstadt, Ger. grand duchy, consists of 2 large and 18 small separate dists., situated partly between Prus., Bavaria, and Baden, partly within the Prus. frontier. The country is mountainous or hilly, covered by Vogelsberg, Odenwald, and spurs of Taunus and Westerwald, but the soil is productive and well cultivated. Area, 2964 sq. m. Pop. 1880, 936,944.

Hessian-Fly [so called because it was believed to have been brought from Ger. by the Hessian troops during the Revolution], the *Cecidomyia destructor*, a dipterous insect which is very destructive to wheat in parts of the U. S. In spring and autumn the larvæ crawl in between the stalk and the sheath of a leaf, and remain near the ground, head downward, sucking the juice. In 5 or 6 weeks they enter a semi-pupa or "flaxseed state," from which they go into the pupa, and then become perfect insects. They are destroyed in great numbers by insect parasites, and burning the stubble in the autumn will destroy a great part of their larvæ.

Hesychasts [Gr. ἡσυχασταί, "quietists"], a body of mystics in the Gr. Ch., chiefly monks of Mt. Athos, who professed that by retirement and contemplation they could come to behold the divine glory (called the "Taboritic light," because it was regarded as the same as that which shone at Christ's transfiguration on Mt. Tabor). They believed that the best position they could assume for beholding this light was to sit and gaze upon the navel. They flourished in the 14th century.

Hesychius, he-sik'e-us [Ἡσύχιος], a grammarian of Alexandria, under whose name a valuable though much interpolated Gr. lexicon has come down to us. Flourished probably in 4th century.

Hesychius, of Miletus, a philos. and historian, lived in the 6th century A. D. He wrote a synoptical hist. of the world, from Belus, king of Assyria, to the death of Anastasius I., and a work treating of persons distinguished for their learning, arranged under the letters of the alphabet.

Heterodontidae, a family of sharks, including the Pt. Jackson shark (*Heterodontus Philippi*) and several other living species, interesting to naturalists as the surviving relics of a once extensive group. The head is squarish, with a declivous forehead; the mouth near the anterior extremity; the teeth cuspidate in front, molar at the sides, and the 2 dorsal fins are each armed in front with a spine. Important anatomical peculiarities also differentiate it as a peculiar group or super-family. One species (*Gyrodontus francisci*) occurs on the Californian coast.

Heusser (MRS. META), the best female song-writer in the Ger. lang., b. Apr. 6, 1797, in the mt.-v. of Hirzel, canton Zürich, Switz., where she resided till her death Jan. 2, 1876. She married Dr. Heusser, an eminent phys., and became the mother of a large family, but her household duties did not prevent her from singing. She never dreamed that her lays would ever be given to the world, but her friends thought differently, and after many vain efforts they obtained her consent to publish anonymously some of them, which were followed by others under her real name, and at last became generally known.

Hewes (JOSEPH), a signer of the Dec. of Ind., b. of Quaker stock at Kingston, N. J., in 1730; ed. at Princeton, and went into business, first in Philadelphia, and then at Edenton, N. C.; was a member of the General Cong. from N. C. 1774-77, and again in 1779. In Cong. he took a prominent part in public business. D. Nov. 10, 1799.

Hewitt (ABRAHAM STEVENS), A. M., b. at Haverstraw, N. Y., July 31, 1822, grad. at Columbia Coll. 1842; studied law, but engaged in the manufacture of iron; was com. to the Fr. exposition of 1867; elected in 1874 to the 44th Cong. (1875-77) from the 10th dist. of N. Y.; became sec. of the Cooper Union for the Advancement of Science and Art, New York city, at its organization, and is an expert in questions relating to the iron manufacture. Author of official *Report on the Iron and Steel of the Universal Exposition of 1867*. M. C. for 1877-79 and 1881-87.

Hexameter [Gr. ἑξαμετρος, "of six metres" ἑξ, "six," μετρον, "measure"], in Gr. and Lat. prosody, is the name of the heroic verse of Homer, Virgil, Ovid, and others. Anc. rhythm is based chiefly on the distribution of long and

short syllables, while the ear of the moderns is satisfied with the alternate presence or absence of accent. Taking a succession of Virgil's lines, and representing them in Eng. syllable for syllable and accent for accent, we find that the feet are composed of dactyls (—) and spondee (˘), with the accents entirely absent or present at any point. Any foot from the first to the fourth may be dactylic or spondaic at pleasure; the fifth in nearly every case is a dactyl, and the sixth a spondee. The misnamed H. of Southey, Coleridge and other moderns are mere hexameters, without dactyls and spondees. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. S. S. HALDEMAN, LL.D.]

Hexapla [Gr. "the sixfold," a celebrated ed. of the Septuagint text of the O. T., the original Heb., the Heb. in Gr. letters, the Gr. versions of Aquila, Symmachus, and Theodotion. Beside these, there were columns containing parts of 3 other Gr. versions, whose authors are not known. Origen was the author of this great work, which he originally prepared as a tetrapla, giving 4 columns only. The H. had also marginal notes, and marks indicating variations, retrenchments, and additions in the texts. It is not extant except in fragments.]

Heyward (THOMAS, JR.), b. in St. Luke's parish, S. C., in 1746; studied law in Lond., and was early and prominently connected with the Revolutionary movement in N. C. He was (1775-78) one of the signers of the Dec. of Ind., and was afterward a judge in his native State, holding also a military command. In 1780-81 was a prisoner in the hands of the Brit. D. Mar. 1806.

Hezekiah ("The Lord hath strengthened"), 13th monarch of Judah, son and successor of Ahaz. He reigned 29 yrs. (728-697 B. C.). He was an enemy of idolatry, and the restorer of the anc. worship. He refused to pay the established tribute to the king of Assyria; Jerusalem was besieged, and H. was forced to purchase peace by a heavy mullet, and by the loss of parts of his dominions. It is probable that Sennacherib, the Assyrian gen., next marched into Egypt to punish the Ethiopians and Egyptians, H.'s allies, that he was repelled by Tirhakah, and that the miraculous destruction of 185,000 Assyrians took place in a second invasion, after the failure of the Egyptian campaign. H. was soon after visited with a severe sickness, from which he was miraculously healed. The remaining yrs. of his reign were prosperous. D. 697 B. C.

Hiawatha, city and R. R. junc., cap. of Brown co., Kan., 42 m. W. of St. Joseph. It has excellent water-power. Pop. 1880, 1375.

Hibbard (FREEBORN GARRETSON), D. D., b. at New Rochelle, N. Y., Feb. 18, 1811; entered the M. E. ministry; labored 1830-60 chiefly in N. Y.; was ed. of the *Northern Chr. Advocate*, Auburn, N. Y., 1860-64; became presiding elder of the Geneva dist. Author of *Baptism, Geog. and Hist. of Pal.*, a work on *The Psalms*, etc.

Hibernation [Lat. *hibernus*, "pertaining to winter"], a condition into which certain mammals (bats, bears, etc.) and many inferior animals pass in cold weather, simulating sleep; great loss of weight occurs from the slow absorption of the store of fat which the animal has laid up in the autumn. Animals feeding on insects and succulent vegetables could not survive a winter but for the state of H. which suspends the need of food.

Hiber'nia, Iber'nia, Iver'nia, and Ier'ne are the names under which Ire. is mentioned by anc. writers.

Hibiscus [Gr. *ἵστος*], a large genus of malvaceous trees, shrubs, and herbs, often with large showy flowers. The herbaceous species are numerous in the U. S., and are known as rose-mallows. Among the cultivated species are the Gumbo, the *H. cannabinus*, or Decandean hemp of India, a useful fibre-plant, and *H. Syriacus*, the ornamental, shrubby althæa of gardeners. An interesting species is *H. tilia-cens*, a large but not tall tree growing in Fla., the E. and W. I., and the S. Sea Islands. Its wood is light and tough; its bark yields material for matting and cordage, and is used as food in the Pacific Islands.

Hic'cough, or Hic'cup [Lat. *singultus*], a clonic spasm of the diaphragm and of the glottis, accompanied by a sharp sound, produced by the rush of air into the larynx from without. In children it is often the forerunner of intestinal disturbances. Lumps of ice frequently swallowed or small doses of anti-spasmodic meds. will usually relieve obstinate H.

Hickman, Ky. See APPENDIX.

Hick'ok (LAURENS PERSEUS), D. D., LL.D., b. at Bethel, Conn., Dec. 29, 1798, grad. at Union Coll 1820; ordained and settled as pastor of the Congl. ch. at Kent, Conn., 1824; again installed pastor at Litchfield, Conn., 1829; became prof. of theol. in Western Reserve Coll. 1836, and in the Auburn Theological Sem. 1844; was transferred to Union Coll., first as v.-p. and prof. of mental and moral philos., and afterward as pres. 1852. At the age of 70, in fulfilment of a purpose long cherished, he retired from all public and official station, and removed to Amherst, Mass., where he has since resided, devoting his time to philosophical studies. Beside occasional sermons and addresses, he has been a frequent contributor to such periodical publications as the *Chr. Spectator*, *Bibliotheca Sacra*, *Biblical Repository*, *Presb. Quarterly*, etc. on various theological and philosophical themes. His more extended pub. works are *Rational Psychology, System of Moral Science, Empirical Psychology, Creation and Creation, Humanity Immortal, and Logic of Reason*. Eds. of his *Moral Science and Empirical Psychology*, revised with the co-operation of Pres. Seelye of Amherst Coll., have appeared, the former in 1880, the latter in 1882.

Hick'ory, the common name of trees of the genus *Carya* (order Juglandaceæ), erroneously called walnut trees in N. Eng. The H. trees are N. Amer. Beside the pecan tree there are 4 species (*C. alba, microcarpa, tomentosa, and ovalata*), known as shellbark or shagbark H., having excellent timber and nuts generally edible, the bark of the trees becoming very rough. The pignut or bitter H. has more

generally a smooth bark, inedible nuts, and inferior wood.

Hickory, N. C. See APPENDIX.

Hicks (ELIAS), a minister of the Society of Friends, b. at Hempstead, L. I., Mar. 19, 1748; was placed as an apprentice to a carpenter; subsequently followed the business of building houses. In the more advanced period of his life he engaged in agriculture. In 1781 and subsequently he visited the meetings and families of Friends extensively through the country, working at his trade in the intervals passed at home, whereby he obtained means to pay his own expenses, declining to have them borne by the society, which made provision for its travelling ministers in necessity. He held it to be no less a religious duty to work than to preach when called. He was frequently chosen as an umpire to settle differences. Very early in life he denounced slavery as a crime, and preached persistently against it. In 1811 he pub. an essay on the subject, and exerted constant personal influence to induce persons who held slaves to set them free. He was a bold and fearless preacher. His religious visitations were not confined to members of his own society, but extended to distant sections of country where few such resided. His meetings were crowded by people of every sect and opinion. He was an impressive speaker, with direct and clear enunciation of commanding presence, and profoundly serious deportment. He was, however, the subject of much misrepresentation in his religious opinions. The name Hicksite was given as a reproach to that part of the old Society of Friends with which he continued in fellowship. Wrote a journal of his religious travels, *Observations on Slavery, and Doctrinal Epistle*. D. Feb. 27, 1830.

Hicks (THOMAS), a descendant of Elias Hicks, b. in Newtown, Bucks co., Pa., Oct. 18, 1823; came to New York to study art in 1838; exhibited a picture, *The Death of Abel*, in 1841; went to It. in 1845, to Paris in 1848, where he studied under Couture; returned and made New York his residence. Mr. H. has painted composition pictures, out-door and in-door scenes, and landscapes, but his reputation rests on his portraits, of which he has painted a great number; among them, Dr. Kane in the cabin of his vessel, Dr. Cogswell in his library, Edwin Booth as Iago. Elected to National Acad. of Design in 1851.

Hicks (THOMAS HOLLYDAY), b. in Dorchester co., Md., Sept. 2, 1798; in 1849 became a member of the Md. constitutional convention; was gov. of Md. 1858-62, standing firmly for the U.; U. S. Senator 1863-65. D. Feb. 13, 1865.

Hicksville, O. See APPENDIX.

Hides, in commerce, the skins of large animals, such as domestic cattle, horses, and the buffaloes of the Old World. H. are used chiefly in the manufacture of leather, and the fragments and waste go to the glue-maker. The hair is also saved for plasterers' use, and is used to some extent in upholstery. The H. of gen. commerce are the product of S. Amer., S. Afr., Australia, India, Cal., Rus., etc. The H. of sheep, goats, deer, etc., are known in commerce as "skins." (See also LEATHER.)

Hierap'olis, in Phrygia, between the rivers Lycus and Meander, was celebrated for its warm mineral springs. Among its ruins, which are 1½ m. in circumference, is one of the best preserved Gr. theatres. Its present name, *Pam-buk Kaleesi* (the "cotton castle"), is probably derived from the appearance which the deposit of the springs has given to the place. It is totally deserted.

Hierapolis (i. e. "sacred city"), or **Bamby'ce**, a ruined city of Syria, 5 days' journey from Antioch, on the road to Seleucia and Babylon. It stood on a barren plain, and derived its prosperity from the caravan trade. Extensive ruins mark its site.

Hi'erarchy [Gr. *ἱερός*, "sacred," and *ἀρχή*, "rule"], or **Hieroc'racy**, the power, post, dignity, or office of a *hierarches*, a steward or pres. of sacred rites, one supreme in holy things, a high priest, a hierarch; especially in ecclesiastical Gr., the episcopate or patriarchate. The word is unknown to the classic Gr. and to the Septuagint and N. T. The word *hierarchy* came to be applied to the orders of clergy in the Chr. Ch.—the ecclesiastical H. It is sometimes transferred to other spheres of govt., as the political, military, social H.

Among the Hebs. the administration was hereditary, and its headship was in the high priest. In the Chr. Ch. the H. is the govt. of the Ch. by the clergy. It took its historical shape as the congregations increased in number and came into closer conjunction. The government of the Ch. is conceded to have originally been, at least relatively, popular in part (democratic H.), and to have changed more and more into a spiritual aristocracy (aristocratic H.). The line of historical advance is generally supposed by Prot. writers to have been from a govt. of perfect co-ordination among the presbyter-bps. of a congregation to the congl. and parochial episcopate, then to the diocesan episcopate. From this arose the metropolitan system, in which a governmental superiority was exercised by the bps. of the chief cities of the provts. Then came the system of patriarchates, under which the bps. of the great sees of Rome, Constantinople, Antioch, Alexandria, and Jerusalem were recognized as patriarchs of the metropolitan. Civil events destroyed the prominence claimed for the last 3. A tendency to unification remained fixed at the patriarchate in the E. Ch., but advanced in the W. Ch. till it culminated in the papacy. The theory on which the papal H. rests is that the one catholic Ch. of Chr. on earth is a divine monarchy, under one catholic head, the pope, who is the oecumenical pastor of all the chs. The prelates under him govern particular chs., participating in the solicitude, but not possessing the plenary power, which belongs to the pope alone. To the spiritual rule, supreme in the pope and subordinate in the prelates, the whole laity owe obedience. In the R. Cath. system the H. is usually treated of under *Ordo*, the sacrament of holy orders. *Ordo* is defined as (1) the ecclesiastical H., or estate of the ministers of the Ch.; and (2) the act by which they are constituted a part of that estate—ordination.

Under the "ministry" is embraced certainly the deacons. How many more, or whether any more, are included, is left an open question.

In Prot. theol. the term hierarchy is sometimes used in a generic sense to designate the sacred and divine rule of the Ch. established by Chr. The body of Prot. divines hold that Chr. instituted no H. in the ecclesiastical sense, but condemned it; that he endowed his Ch. with no civil power, and that the functions of its teachers and officers are purely moral and spiritual. From these views many writers of the Ch. of Eng. dissent, rejecting the papal supremacy and what is involved in it, but holding in substantial the rest of the hierarchical views of the Ch. of Rome. C. P. KRAUTH.

Hiero [*Ἱέρων*], tyrannus of Syracuse, in Sic.; was victor at Olympia 488 B. C.; succeeded Gelon, his brother, in 478; conquered Naxos and Catana in Sic.; defeated the great fleet of the Etruscans 474, and in the same yr. won a victory at the Pythian games; was a patron of art and letters. In 472 and 468 he won his second and third victories in the Olympic games. D. 467 B. C.

Hiero, king of Syracuse, a natural son of one Hierocles, b. before 306 B. C.; served under Pyrrhus; became gen. of the Syracusans; sent a supply of corn to Rome 272; routed the Mamertines at the river Longanus; was declared king in 270 B. C.; waged a disadvantageous war with Rome 264-263 B. C., after which he was an ally of it. D. 216 B. C.

Hierocles, a grammarian, so called by way of distinction from others of the name, wrote a guide-book containing an account of the 64 provs. of the E. Rom. empire, and of the 935 towns situated in them. Its date is probably about the beginning of the 6th century A. D. It was inserted by Wesseling in his *Vet. Rom. Itineraria* (Amsterdam, 1735).

Hierocles [*Ἱεροκλῆς*], a Neo-Platonist, lived in the middle of the 5th century, and taught philos. at Alexandria. He wrote a commentary on the golden verses of Pythagoras, which is useful for the understanding of the Pythagorean doctrines; also a work in 7 books on Providence, Fate, and Free-will, and a third treating of morals, no longer extant.

Hieroglyphics [Gr. *ἱερογλυφικός*, from *ἱερός*, "sacred," and *γλῶσση*, "carving"]. All writing began with pictorial representation. As only a small part of the words in any lang. can be directly represented by pictures, the first step to a system that allowed of the expression of all words was taken when the picture which represented any word was allowed to represent any other word having a different meaning and proximately the same sound. This may be illustrated by supposing the picture of a gate to be made to stand also for *gate*, or for the first two letters *ga*, or for the consonant *g*. If now the character itself receives a conventional form, the passage has become complete from the system of the pictorial H. to that of the alphabet. All alphabets have arisen in this way, but not all H. have reached the purely alphabetic stage. The H. of Egypt are the only ones that contain a lit. of any value, and the term is generally applied to the Egyptian system from which it was named.










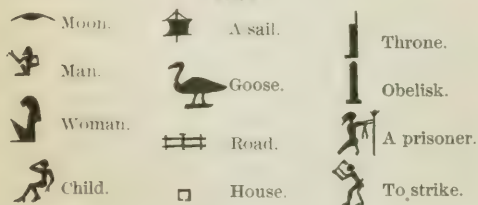
The Egyptian hieroglyphical characters are either ideographic, syllabic, alphabetic, or determinative. All writing originated in ideographs, pictures of objects to be suggested by them to the reader. The Egyptians very early passed through the pure ideographic stage into the syllabic, and even the alphabetic, but the idea of the alphabet, depending wholly on ultimate vocal analysis, never dominated in their writing, as it did in the Phœnician. Even in our own writing we employ some purely ideographic signs, like \perp , plus, and \S , section, although they are not, like the original ideographs, pictorial. A vast number of objects could be directly drawn, as the head, ear, eyes, nose, mouth, hand, leg, foot; also actions, as writing, building, walking; also such objects as sun, moon, star, the lion, water (represented by a line of waves), etc. A combination of single figures might express an appropriate idea. Thus, if a waved line  expressed water, an ellipse inclosing the waved line  would represent a cistern. If a circle represented the sun, a half circle with rays streaming upward  would represent sunrise, and a circle half sunk below a  line  sunset. A canopy  represented the heavens, and a star underneath the canopy suggested night; while a circle in the same position  represented midday; and the same canopy with something like tunnels running through it  represented rain. The range of these pictorial objects  is considerable, but its limitations are soon reached. The following are examples:

FIG. 1.



The next step was that of allowing the figure not merely to represent the idea and its name, but the sounds by which that word is expressed. This may be illustrated by the picture of an altar, which might also stand for the word *altar*. But the Egyptians regarded the consonants as the substantial parts of a word, and, disregarding the vowels, the same figure might stand for *later*, *letter*, *litter*, or *ultra*.

The next stage was to allow any character to stand for only the first one or two sounds in the word which it primarily represented, generally for the first consonant and vowel. A single letter or syllable may often be represented by a number of different signs. The sense often guided the

selection of the character. The accompanying table includes the common alphabetic characters:

FIG. 2.

Phonetic power or sound.	Characters in common use.	Characters rarely used.	Phonetic power or sound.	Characters in common use.	Characters rarely used.
A			D		
Ā			TS		
I			M		
U or OU			N		
F			R or L		
B			S		
P			SH		
K			KH		
Q			HH		
G			H		
T					

The Egyptians paid regard to vowels only as they were needed to avoid ambiguity in writing. These were not put in their place between their consonants, but either after or under the consonants which formed the word. The scribes often found it necessary to employ certain signs, not as characters to be pronounced, but as suggestions to the reader how to read other ambiguous signs. Thus, a figure like a hill—pronounced *love*, and meaning *much*—indicated that the characters preceding it were to be read not as single letters, but as full syllables with two or more consonants. When the characters had settled into their almost completely phonetic use, a word spelled out was often followed by its pictorial representation. This system of determinatives had considerable extension, of which the following are examples:

FIG. 3.

	Names of foreign countries.		Names of animals.
	Names of places in Egypt.		Evil or hurtful actions.
	Incloses royal names.		Articles of clothing.
	Names of enemies.		Articles of metal.
	Objects in wood.		Disaster, storm, confusion.

The direction of the H. writing was unfixed. On the same monument it was in one place read vertically and in another horizontally. The common way was from right to left, as in Heb. The hieratic writing was an abbreviation of the H. Most of the papyrus is inscribed in this character. In the 7th century B. C. a still more abridged style, called demotic, came into use, in which no trace can be recognized of the original pictures. [From *orig. art. in J's Univ. Cyc.*, by REV. WILLIAM H. WARD, D. D.]

Hieronymites [from St. Jerome, or *Hieronymus*], properly the hermits of St. Jerome, were originally Franciscan Tertiaries of the Strict Observance. In 1373 the order was accredited by Pope Gregory XI., and received an Augustinian rule. Charles V. entered the order upon his abdication. This order, once very rich and extensive, is now small and feeble.—Another small congregation called H. was founded at Pisa about 1390. It still exists.

Hierophant [Gr. *ἱεροφάντης*], the mystagogue, prophet or priest of Demeter who had charge of the Eleusinian Mysteries, and initiated new members. He must be a descendant of the hero Eumolpus, unmarried, and unblemished in character and in body. He preserved and expounded the unwritten law.

Higginson (THOMAS WENTWORTH), b. in Cambridge, Mass., Dec. 22, 1823, grad. at Harvard Coll. 1841; received the degree of A. M. 1869; studied divinity at Cambridge; was ordained at Newburyport, Mass. (First Religious Society), in 1847, the yr. he left the Divinity School; was Free-Soil candidate for Cong. in 1850; went to Worcester, Mass., in 1852 as minister of the Free ch.; resigned in 1858, and left the ministry. He took a leading part in the anti-slavery conflict that preceded the c. war. On Sept. 25, 1862, he was made capt. in the 51st Mass. Volunteers; on Nov. 10 accepted the colonelcy of 1st S. C. Volunteers, colored; was

wounded Aug. 1863, and mustered out Oct. 1864. He has since lived in Newport, R. I., devoting himself to lit. and the work of social reform; visited Europe in 1872. His efforts to introduce modern ideas and men into the management of Harvard Coll., and to have its facilities extended to women, have been assiduous. He is the author of several vols. of collected essays: *Out-door Papers*, *Army Life in a Black Regiment*, and *Atlantic Essays*; wrote a novel, *Madame*, an *Oldport Romance*; *Oldport Days*, *Young Folks' Hist. of the U. S.*, beside various pamphlets, magazine articles, and biographies. Is also well known as a lyceum lecturer.

Higginsville, Mo. See APPENDIX.

Highland, city and R. R. junc., Madison co., Ill., 30 m. E. of St. Louis. It contains a Catholic Univ. Pop. (composed of Swiss and Gers.) 1870, 1757; 1880, 1969.

Highlanders, properly the Gaels or Celtic inhabs. of the Highlands of Scot. In the Brit. army the term designates the 8 regiments (the 42d, 71st, 72d, 74th, 78th, 79th, 92d, and 93d) of foot soldiers who wear the old Highland costume, each with its own distinctive tartan. The 91st (Argyleshire regiment) is also sometimes reckoned with the H. There are several Highland volunteer regiments.

Highlands, of the Hudson, are the broken hills which stretch from S. W. to N. E. through Rockland, Orange, Putnam, and Dutchess cos., N. Y., being the N. E. continuation of the Blue Ridge, and extending farther N. E. in the Taconic and Green Mts. of W. N. Eng. The passage of the Hudson through the H. is remarkable as almost the only instance in the U. S. of a navigable river passage through a great mt.-range. The H. have rugged and steep sides. The highest peaks are not over 1700 ft. above tide.

High Places, in the O. T. frequent mention is made of H. P., where the people went to worship strange gods. The custom of erecting shrines upon hilltops is very anc. and widespread, and seems to have arisen from the belief that the tops of hills were nearer the abode of Deity. In spite of the denunciations of the practice in the Jewish law, the custom became a prevalent one, and such men as Samuel, David, and Elijah conformed to it; but in later times the more devout kings of Judah destroyed the H. P.

High Point, N. C. See APPENDIX.

High Priest, in the Heb. hierarchy, the prin. religious dignitary of the nation. By the Mosaic law the office was held for life, and was hereditary in the line of Eleazar, son of Aaron, the first H. P. But in N. T. times the office had ceased to be hereditary, and was held at the will of the civil ruler. One of the most brilliant periods of this pontificate was that of the Asmonean princes (Maccabees), some of whom joined regal to priestly authority.

Hights'town, Mercer co., N. J., 14 m. N. E. of Trenton, on R. R. It is an incorporated borough, containing 3 educational insts. Pop. 1870, 1347; 1880, 1355.

Highway, a road or way over which the public at large have a free right of passage. The term, in popular usage, is commonly restricted to ways upon land, as carriage or foot roads or turnpikes, but it is employed in law as a generic designation, including not only ways of this kind, but also water-courses which are, in a similar manner, open to public convenience, as, for instance, natural streams. Ferries are also sometimes comprehended within the same category. H. upon land are created either by express dedication of the owner, by prescription, or in pursuance of legislative authority. But much the most common mode is by the exercise of the governmental prerogative of taking property for public uses. (See EMINENT DOMAIN.) Laws have been enacted, both in Eng. and in the several States of the U., regulating the methods by which new roads may be laid out as occasion may require. The authority in this country is usually delegated to towns or bodies of coms., who, in conjunction with a jury, determine upon the necessity of a road, its direction and extent. If, by water, in the case of natural streams, exist independently of the granting of any privilege by dedication or of any legislative interposition—by force of the natural right which every citizen possesses of free passage along all water-courses not of artificial construction.

The establishment of a H. does not necessarily give the public a right of ownership in the soil over which the privilege of passage is exercised. It is a gen. rule, applying both to H. upon land and to water-courses above the point where the tide ebbs and flows, that the property in the soil is vested in the adjoining owners. If a single individual own the land upon both sides of a road or stream, he has in gen. also the exclusive title to the entire H. as far as the limits of his estate extend; but if the proprietors upon the opposite sides be different persons, the right of each extends to the middle of the H. The right of the public in such a case constitutes merely an easement, and must be enjoyed simply as a right to travel over the land. If there are trees or grass growing along the line of a road, the adjoining owner has a right to them, and can maintain an action against any one who attempts to carry them away. In like manner, he may obtain redress for injuries occasioned by encroachments upon the soil, or unlawful excavations, or any violation of his rights as owner which is not strictly incidental to the public privilege. Grants of property bounded upon a H. carry with them the same interest in the soil of the road as the grantor previously possessed, even though there be no distinct statement to that effect. Such a presumed conveyance can only be prevented by precise expressions in the deed of transfer, limiting the boundary to the edge of the way.

The public right of transit must be entirely unrestricted. If obstructions be placed in the way impeding free travel, they will constitute public nuisances, and will afford ground for an indictment or for a private action by any person especially discommoded. They may also be abated or removed by any one, so far as may be necessary to permit him to continue on his way. Moreover, in order that the privilege of passage may be enjoyed with as little inconvenience as possible, it is the duty of every traveller to observe proper care

to avoid collisions and accident. To promote this desirable end, it has been made the rule in Eng. that vehicles in passing each other must keep to the left. In the U. S. the regulation is exactly the reverse—that they must keep to the right. In Eng. the repair of H. is a duty obligatory upon the inhabs. of the parishes, and they may be indicted if they suffer defects to continue after knowledge of their existence. In the U. S. the liability is created by statute. In N. Eng. the duty is imposed upon the towns, and a statutory right of action is given against them if any injury be sustained by a traveller in consequence of their neglect. In other States the obligation devolves, as a gen. rule, upon municipal corporations, such as cities and villages, while towns are sometimes made liable, as in N. Eng., or the roads within their limits are placed under the charge of specially appointed coms., who may be subjected to an action if they fail to make repairs after they are provided with the means to obtain the requisite funds.

GEORGE CHASE.

Hilary. Four persons of this name are prominent in ch. hist.: I. HILARY OF ARLES, SAINT, was b. at Arles, in S. Gaul, about 401 A. D., and d. there May 5, 449, 20 yrs. after being made bp.—II. HILARY OF POITIERS, SAINT, "the Athanasius of the West," b. at Poitiers in Central Gaul, near the end of the 3d century, and d. there Jan. 13, 368, 18 yrs. after being made bp.—III. HILARY, THE POPE, was b. (date unknown) in Sardinia; succeeded Leo in the papal chair in 461, being consecrated Nov. 12, 2 days after the death of Leo, and d. at Rome Feb. 21, 468.—IV. HILARY THE DEACON. A Rom. deacon of this name was sent by Pope Liberius (352-366 A. D.) to a council (attended by 300 bps.) which met at Milan in 355. He has generally been identified with the unknown author (AMBROSIAS) of the commentary on the Pauline Epistles, wrongly ascribed to Ambrose of Milan; who also wrote the *Questiones Veteris et Novi Testamenti*, wrongly ascribed to Augustine. But this identification is now questioned. R. D. HITCHCOCK.

Hildebrand. See GREGORY (VII.).

Hil'desheim, a town of Ger., in Hanover, on the Innerste. It contains several fine old monuments, as the cathedral, built in 1015, with its famous bronze gates and glass-paintings; the ch. of St. Godehard, built in 1133; and the ch. of St. Michael, built in 1022. It is a R. Cath. bp.'s see. Pop. 25,887.

Hil'dreth (RICHARD), son of Rev. Hosea Hildreth, b. at Deerfield, Mass., June 28, 1807, and grad. at Harvard in 1830; was admitted to the bar at Boston; in 1832 became ed. of the Boston *Atlas*; resided 1834-35 in Fla., where he wrote *Archy Moore*, an anti-slavery tale, republished in 1852 as *The White Slave*. Wrote *Hist. of Banks, a Life of W. H. Harrison*, whom he vigorously supported for the Presidency, and *Despotism in Amer.*, an anti-slavery work; his great work is a *Hist. of the U. S.*, in which the author's standpoint is anti-Jeffersonian. He also produced *Japan as it Was and Is*, and *Atrocious Judges*. He was for several yrs. on the editorial staff of the New York *Tribune*, and became U. S. consul at Trieste in 1861. D. July 11, 1865.

Hildreth (SAMUEL PRESCOTT), M. D., b. at Methuen, Mass., Sept. 30, 1783; studied med.; removed from N. H. to Belpre, O., in 1806, and to Marietta, O., in 1808. He wrote a *Hist. of the Diseases and Climate of S. E. Ohio*, *Hist. of Bellefonte in W. Va.*, and *Lives of Early Settlers of O.* His valuable library and scientific collections he gave to Marietta Coll. D. July 24, 1863.

Hil'gard (EUGENE WALDEMAR), PH. D., b. in Zwickbrücken, Rhenish Bavaria, Jan. 5, 1831; emigrated with his father to Belleville, Ill., 1835-36; in 1849 returned to Europe and studied at the Acad. of Mines, Freiberg, Ger.; also at the univs. of Zürich and Heidelberg, graduating at Heidelberg in 1853; in 1855 returned to the U. S.; in 1858 was appointed State geologist of Miss. Since 1871 he has held that office in connection with the chair of agricultural chem. in the State Univ. at Oxford, Miss. In 1873 he took a similar position in the Univ. of Mich., and in 1874 was elected prof. of agriculture in the Univ. of Cal. Author of a report on the geol. and agriculture of Miss.; became a member of the National Acad. of Sciences.

Hilgard (JULIUS ERASMUS), b. Jan. 7, 1825, in Zwickbrücken, Ger.; emigrated in 1835 to Ill. with his father, from whom he received a classical education; studied civil engineering in Phila.; in 1845 entered the Coast Survey service, which has been the prin. sphere of his labors. His writings on geodetic methods, tides, and terrestrial magnetism are pub. in the Coast Survey reports. In 1863 he took charge of the Coast Survey office, and of the construction of standard weights and measures; in 1863 was named a member of the National Acad. of Sciences; in 1872 took an active part in the international metric commission which met at Paris. He at the same time conducted a determination by telegraph of the lon. between Amer. and Europe, including that between the observatories of Greenwich and Paris. Was elected pres. of Amer. Association for Advance of Science in 1874. Dec. 22, 1881, was appointed supt. of the U. S. Coast and Geodetic Survey.

Hilli (AMBROSE POWELL), b. in Culpeper co., Va., 1825, grad. at the U. S. Military Acad. July 1, 1847, and appointed second lieut. of artill.; in Mex. war he participated in actions at Huamantla and Atlixco, subsequently serving in garrison and on frontier duty, and in Fla. against the hostile Seminoles, until 1855, when he was placed on duty in the Coast Survey office at Wash.; in Mar. 1861 he resigned his commission to follow the fortunes of his native State. On the secession of Va. he was appointed col. 13th Va. Volunteers and despatched to Harper's Ferry, rejoining the army at and engaged in the first battle of Bull Run. Promoted to be brig.-gen., he was distinguished at the battle of Williamsburg, and advanced to be maj.-gen. In Aug. 1862 his division was added to Jackson's force in N. Va., and was engaged at Cedar Mountain (Aug. 1862), at Bull Run, and Chantilly. In the following month he received the surrender of Harper's Ferry, and hurrying forward arrived with his com-

mand at Antietam at the moment when most needed; was at Fredericksburg, and at Chancellorsville participated in the famous flank movement which broke the Federal lines, and on the death of Jackson assumed command of the corps; promoted to be lieutenant-general, and placed in command of one of the three corps composing the Army of N. Va. In the campaign of 1864-65 he was engaged in all the conflicts from the Wilderness to the final assault of the Confederates before Petersburg, Apr. 2, 1865, where he met his death by a rifle-shot while engaged in reconnoitering at the moment it was decided that Richmond could no longer be held.

HILL (BENJAMIN HARVEY), b. in Jasper co., Ga., Sept. 14, 1823, of Irish descent on the father's side, and of English on the mother's side; grad. at the State Univ. in 1844; entered the profession of law at La Grange, Ga., in Aug. 1845, in which he has since attained eminence; in 1851 was elected a member of the legislature from Troup co.; in 1856 was elector at large on the Fillmore or Amer. party ticket; in 1857 was run without success by the same party as their candidate for gov.; in 1859 was returned to the State senate as a U. man; in 1860 was run as an elector for the State at large on the Bell-Everett ticket; was a member of the secession convention of Jan. 1861; was an earnest advocate of the U. until the convention passed a resolution declaring that the State ought to secede; he then voted for the ordinance, and cast his fortunes with those of all other citizens of the State. He was elected to the provisional Confed. Cong. that met at Montgomery, Ala., Feb. 4, 1861; the same yr. he was elected to the Confed. Senate, in which body he served until the end of the war. He was arrested at his home, La Grange, Ga., in May 1865, and confined in Ft. La Fayette, New York, until July following, when he was released on parole. In 1867 he presided over the convention held at Macon, Ga., for the purpose of reorganizing the Dem. party; in this and the next yr. (1868) appeared his *Notes on the Situation*, embodying arguments of great power against the reconstruction policy of Cong. Mr. H. supported the "Greeley movement" in the Dem. party. On this line of policy he competed in Jan. 1873 for a seat in the U. S. Senate which was to become vacant in the Mar. following by the expiration of the term of Hon. Joshua Hill. One of his competitors was Gen. John B. Gordon, who, though he had supported Mr. Greeley as the nominee of his party, disapproved of the principles set forth in the "New Departure" platform. The other was Alexander H. Stephens, who had been utterly opposed to the election of Mr. Greeley, as well as to any departure from the fundamental principles of Jeffersonian Democracy. In this triangular contest Gen. Gordon bore off the palm. U. S. Senator 1877-82. D. Aug. 16, 1882.

A. H. STEPHENS.

HILL (DANIEL HARVEY), b. in S. C. in 1821, grad. from the U. S. Military Acad., and was appointed brevet second lieutenant of art. July 1, 1842; transferred to the inf. in 1847, with rank of first lieutenant. In the war with Mex. he served with distinction from Monterey to the final capture of the city of Mexico, and was presented by his native State with a sword of honor. In Feb. 1849 he resigned his commission, and accepted the chair of math. in Washington Coll., Va., which he filled until 1854; that of math. and engineering in Davidson Coll., N. C., 1854-59, when he became supt. of the N. C. Military Inst. at Charlotte. On the outbreak of the c. war he was made col. 1st N. C. Volunteers; was engaged at the affair of Big Bethel, Va., June 1861; promoted to be major-gen., he commanded a division during the Seven Days' fight on the Va. Peninsula, remaining in command of the James on the departure of the main army of Gen. Lee for N. Va., but rejoining it in season to participate in the battles of S. Mountain and Antietam, where he led his division, as subsequently at Fredericksburg; in Sept. 1863 he was at the battle of Chickamauga, Ga., and in 1864 at Bermuda Hundred, Va.; his division was surrendered at Durham Station by Gen. Johnston. At the close of the war he returned to Charlotte, N. C. Wrote *Elements of Algebra, Consideration of the Sermon on the Mount*, etc.

HILL (ISAAC), b. at Cambridge, Mass., Apr. 6, 1788; was apprenticed to a printer at Amherst, N. H. In 1809 became ed. of the N. H. *Patriot*, a Jeffersonian or Democratic journal. In 1824 he was second comptroller of the U. S. treas. U. S. Senator 1830-36, gov. N. H. 1836-39, and afterward U. S. sub-treas. at Boston. He again edited, with his sons, the *Patriot* (1840-47), and for 15 yrs. pub. *The Farmer's Monthly Visitor*. D. Mar. 22, 1851.

HILL (JOHN HENRY), D. D., LL.D., b. Sept. 11, 1791, in New York city, grad. at Columbia Coll.; became a minister of the P. E. Ch.; has been a missionary at Athens, Gr., for about 50 yrs., and for over 30 yrs. chaplain to the Brit. legation in Gr.

HILL (JOSHUA), b. in Abbeville dist., S. C., in 1812; removed to Ga. early in life; was admitted to the bar; was M. C. from Ga. 1857-61, when he resigned his seat after the convention of his State passed the ordinance of secession in Jan. of that yr., though he was strongly opposed to that measure. During the war he took no part on either side, except that he allowed his friends to run him for gov. of the State in 1863. After the war he was a member of the constitutional convention called in pursuance of the proclamation of Pres. Johnson, and which met in Nov. 1865; was a candidate for the office of U. S. Senator before the legislature of 1866, but was not elected. In 1868, after another const. was formed and another legislature was elected under the reconstruction acts of Cong., he was chosen U. S. Senator.

A. H. STEPHENS.

HILL (ROWLAND), an eccentric divine, b. at Hawkstone, Eng., Aug. 13, 1744; ed. at Eton and St. John's, Cambridge; became a Calvinistic Meth.; took orders in the Ch. of Eng., though 6 bps. refused his ordination on account of his Methodist opinions; became an itinerant, and in 1773 rector of Kingston, Somerset; minister of the Surrey chapel, Lond., 1782-1833, and was remarkable for success as a preacher. D. Apr. 11, 1833.

HILL (ROWLAND), Viscount, nephew of the great preacher, b. at Prees, Shropshire, Aug. 11, 1772; entered the army in 1790; served with great distinction in most of the battles against Nap. in which the Brit. participated, from Toulon to Waterloo; took the chief command in 1828, and became a viscount in 1842. H. was called the "right arm of Wellington," and was the most popular gen. in the Brit. army. D. Dec. 10, 1842.

HILL (Sir ROWLAND), K. C. B., D. C. L., F. R. S., b. at Kidderminster in Oct. 1795; entered the Brit. civil service in 1835, and in 1837 brought forward in a pamphlet a plan for uniform penny postage, which was adopted in 1840, and was the recipient of honors and pensions, the result of his labors for postal reform. D. Aug. 27, 1879.

HILL (THOMAS), D. D., LL.D., Unit. minister and math., b. at New Brunswick, N. J., Jan. 7, 1818. His parents were poor, but the boy's thirst for knowledge overcame all difficulties; he entered Harvard Coll. in the class of 1843; gave 2 yrs. to the study of theol.; was settled in Waltham, Mass., 1845; was made pres. of Antioch Coll. 1859, of Harvard Coll. 1862; resigned in 1868 on account of ill-health; retired to Waltham; accompanied Agassiz on the expedition to S. Amer.; accepted on his return a call to Portland, Me. As a math. he might have reached eminence had he not preferred the office of a Chr. minister to any scientific position. Mr. H. is a man of remarkable intellectual power and of singular simplicity and devoutness of heart, and his ambition is to make science tributary to faith. He has pub. a vol. of poems, *Geometry and Faith, First Lessons in Geometry, Liberal Education, Jesus the Interpreter of Nature, The Natural Sources of Theol.*, etc. His special distinction is as a discoverer in the laws of curves.

Hilliard (GEORGE STILLMAN), LL.D., b. at Machias, Me., Sept. 22, 1808, and grad. at Harvard in 1828. He taught for a time in the Round Hill School, Northampton, and was admitted to the bar in 1833 at Boston. In 1833 he became one of the eds. of the *Chr. Register* (Unit.), and was afterward connected editorially with the *Jurist* and the *Boston Courier*. He took a high position at the bar and pub. *Six Months in U. S. Life of G. B. McClellan, Political Duties of the Educated Classes*, and educational works, etc. D. Jan. 21, 1879.

Hillel, THE GREAT OF THE ELDER (*Hazaken of Hassaken*), b. at Babylon about 75 B. C., or, as others say, 110 B. C.; became one of the most illustrious of Jewish rabbis, eminent alike for wisdom, holiness, and learning; went about 36 B. C. to Jerusalem, and worked with his hands for his living, at the same period attending the lectures of the prin. officers of the Sanhedrim, of which, about 30 B. C., he became pres., retaining that position till his death, 10 A. D. He became the founder of the "school of Hillel," while Shammai, v.-p. of the Sanhedrim, was at the head of the rival "school of Shammai." The 2 schools disputed mainly about questions of the law and discipline in sacred things; H.'s, which was the more liberal party, finally becoming the dominant one. —HILLEL THE YOUNGER, a descendant of the foregoing, became pres. of the Sanhedrim and head of the school of Tiberias. Was the great reformer of the Jewish calendar. D. before 400 A. D.

Hillhouse (JAMES), LL.D., b. at Montville, Conn., Oct. 21, 1754, grad. at Yale in 1773. His father, William, who d. in 1816, was a member of the Continental Cong. 1783-86, and 40 yrs. a judge in Conn. Dr. H. was a lawyer, served against Tryon in the Revolution, was M. C. 1791-94, and U. S. Senator from Conn. 1794-1810. D. Dec. 29, 1832.

Hilliard (HENRY WASHINGTON), b. in Cumberland co., N. C., Aug. 8, 1808, grad. at the S. C. Coll. in Columbia in 1826; soon after he moved to Athens, Ga., where in 1829 he was admitted to the bar; in 1831 was elected to a professorship in the Ala. Univ. at Tuscaloosa; after 3 yrs. he resigned, resuming the practice of law at Montgomery in that State; was a member of the State legislature in 1838, and a Presidential elector on the Whig ticket in 1840. In 1842 he was appointed by Pres. Tyler minister to Belg.; M. C. from Ala. 1845-51. He was a warm supporter of the Compromise measures of 1850. In 1856 he was a candidate on the Fillmore electoral ticket of Ala., and also on the Bell-Everett ticket in 1860. He opposed secession in 1861 with all his might, but after the convention of Ala. passed their ordinance of secession he espoused the cause of his State. He became brig.-gen. in the provisional army of the Confed. States. After the war he returned to Ga., when he resumed the practice of law, first at Augusta, and then at Atlanta. U. S. minister to Brazil 1877.

Hillsboro', city, cap. of Montgomery co., Ill., 66 m. N. E. of St. Louis, on R. R. Pop. 1880, 1803.

Hillsboro', R. R. junc., cap. of Highland co., O., 60 m. E. of Cin. It has 2 female insts. Pop. 1870, 2318; 1880, 3234.

Hillsboro', Tex. See APPENDIX.

Hillsdale, R. R. junc., city, and cap. of Hillsdale co., Mich., 66 m. W. of Toledo and 177 E. of Chicago. It is the seat of Hillsdale Coll. Pop. 1880, 3441; 1884, 3550.

Hillsdale College was founded as Mich. Central Coll. at Spring Arbor, Mich., in consequence of a vote (1844) of the Mich. yearly meeting of the Freewill Bap. denomination. The coll. was chartered in 1845 by the legislature, rechartered and removed to Hillsdale, Mich., in 1855. It has depts. for the classical course, theol., science, music, and art, beside 2 preparatory depts. Both sexes are ed. here.

Hillyer (JUNIOR), b. in Wilkes co., Ga., Apr. 23, 1807, grad. at the State Univ. in 1828; was admitted to the bar immediately. In 1834 was elected by the legislature solicitor-gen. of the W. judicial circuit of Ga.; was elevated to the bench in 1841, where he served several yrs., and was M. C. from Ga. 1851-55; in 1857 was appointed solicitor of the U. S. treas., which position he held until Ga. passed her ordinance of secession in 1861. He then resigned and returned home, and resumed practice of law.

A. H. STEPHENS.

Hillyer (Rev. SHALER GRANBY), D. D., b. in Wilkes co., Ga., June 20, 1809, grad. at the State Univ. in 1829; was admitted to the bar, but abandoning this profession early in

1832, devoted himself to the ministry. After having had pastoral charge of several chs., he was in 1846 called to the chair of belles-lettres and metaphysics in Mercer Univ.; 2 yrs. afterward he took charge of the Bap. ch. in Rome, Ga. In 1859 he returned to Mercer Univ. as prof. of theol. In 1867 he was called to the presidency of the Monroe Female Coll., located at Forsyth, Ga., where he is also pastor of the Bap. ch.

ALEXANDER H. STEPHENS.

Hilo, an important seaport of Hawaii, and the second town in size in the Hawaiian Islands. It has a spacious and commodious harbor. Pop. 4231.

Hilton Head, v. and tp. of Beaufort co., S. C., on Hilton Head Island, and has on the N. the Pt. Royal entrance, which constitutes a noble harbor. It was fortified by the Confeds. and taken by the U. S. naval forces Nov. 7, 1861. Pop. 1870, 3073; 1880, 2513.

Himala'ya ("the abode of snow"), the highest system of mts. on our globe, forms the boundary between the high table-land of Tibet on the N. and the low, alluvial plain of Hindostan on the S., and stretches in a curved line, 1500 m. long, and at some points 350 m. broad, from Hindoo-Koosh to Assam, from lon. 73° to lon. 98° E. To the S. H. stands almost perpendicular, from 4000 to 5000 ft. high, like a wall, from which the rivers formed by the melting of the snow burst forth, splitting the granite masses and forming long, winding, but narrow chasms. To the N. the mts. slope more gently toward the plateau of Tibet. The H. consists of several ranges, with a direction parallel to each other, and inclosing fertile valleys. The central range is the highest, averaging from 16,000 to 20,000 ft., and 45 peaks are known to rise above 23,000 ft. Mt. Everest, the highest mt. on our globe, is 29,002 ft. high; Kanchinjinga, 28,156; Dhawalagiri, 28,826; Nanda Devi, 25,749; and Shumalari, 23,929. The line of perpetual snow descends to 16,200 ft. on the S. side of the range, but only to 17,400 ft. on the N. Glaciers abound, and at some places they descend from the regions of perpetual snow to about 12,000 ft. At an elevation of 2000 ft. the heat varies from 100° to 37°; at 7000 ft., from 80° to 26°; at 12,000 ft. the thermometer falls during the nights of Sept. below zero. Wheat can be grown at an elevation of 13,000 ft., and up to 5000 ft. the vegetation retains a tropical character. The passes are few and difficult. Ibi-Gamin, the highest known pass, is 20,457 ft.; the highest pass used for traffic is Parany, 18,500 ft. above the sea. The H. consists of granite and gneiss, which form the loftiest peaks, and against which strata of the Silurian period rest. Mines of gold, copper, iron, and lead exist, but do not seem to be of importance. The flora of the H. is peculiarly rich.

Himerius, a celebrated Gr. sophist of the 4th century after Christ (probably from 315 to 386), b. at Prusa in Bithynia; studied at Athens; travelled, and settled finally at Athens as a teacher of rhetoric. For some time he lived in Antioch at the court of the emp. Julian, who fully appreciated him. Of his orations, 24 have come down complete.

Himil'co, or **Hamilear**, is a name of common occurrence in the hist. of Carthage. Pliny mentions one Himilco, a Carthaginian, who made a voyage of discovery along the W. coast of Europe at the same time that Hanno explored the W. coast of Afr.; but H.'s voyage is stated to have been stopped by the absence of wind and by the sea's being loaded with sea-weed.—Both in the first and third Punic wars there were noted Carthaginian gens. of this name, but the most famous was that Himilco, the son of Hanno, who in 406 B. C. commanded the Carthaginian expedition against Sic., together with Hannibal, the son of Gisco. The whole W. part of the island was conquered. In 397 Dionysius, tyrant of Syracuse, renewed the war. H. again commanded the Carthaginian force, and was successful in the beginning, but while he besieged Syracuse a pestilence broke out in his camp. In this emergency Dionysius defeated him, and H. now made a capitulation, paying 300 talents in order to be permitted to depart unmolested, leaving his allies and the mercenary troops to the mercy of Dionysius. Having returned to Carthage, the popular odium which he incurred pressed so heavily on him that he committed suicide.

Himyaritic Language, a Semitic lang. formerly spoken in S. W. Ar. by the Himyarites (or Homerites), a people of whom little is known. A Himyaritic kingdom was destroyed 525 A. D. by the Ethiopians, who compelled the people to abandon Christianity. Himyaritic inscriptions of great age exist, but have not been deciphered until a recent date. The modern Ekhlili Arabic is regarded as a representative of the old Himyaritic.

Hincks (EDWARD), D. D., b. at Cork, Ire., Aug. 1792; grad. 1812 at Trinity Coll., Dublin, and received a fellowship; took Anglican orders, and became rector of Ardrea, and in 1826 rector of Killyleagh, Ire. Though living in a remote country parish, and possessed of but small means, he became one of the first and ablest restorers of the lost knowledge of the meaning of the Assyrian inscriptions. He discovered the key to the Assyrian numeral system, and his papers *On Assyrian Verbs* (1855-56) contain the first successful attempts at an Assyrian gram. D. Dec. 3, 1866.

Hincks (Sir FRANCIS), K. C. M. G., C. B., b. at Cork, Ire., in 1805; was a merchant, and in 1832 settled at Toronto, Canada, where he became a prominent ed.; finance minister of Upper Canada 1842-43 and 1848-54, prime minister 1851, gov. of the Windward Islands 1853-62, of Brit. Guiana 1862-69; finance minister of Canada 1869-73.

Hind (JOHN RUSSELL), b. at Nottingham, Eng., May 12, 1823, the son of a manufacturer of laces; became interested in astron. in childhood; discovered (1847-54) 10 new asteroids, and made many other even more important observations; became foreign sec. of the Royal Astronomical Society 1847, corresponding member of the Fr. Inst. 1850; supt. of the *Nautical Almanac*. Author of *The Solar System and Elements of Algebra*.

Hind'oo - Koosh', Hindu - Kush, or Indian Caucasus, a range in Central Asia, extending from lon. 68° to 75° E., and forming the boundary between Afghan-

istan and Turkestan. At its E. extremity it is connected with the Himalaya, which it resembles in many features, though it is lower and destitute of forests. Its highest point is Hindoo-Koh, 20,000 ft. high.

Hindostan. See INDIA.

Hindu Philosophy. The primitive religion of the Hindu branch of the Aryan race seems to have been monotheistic, but as it is exhibited in the hymns of the Vedas it is a pure nature-worship. As the Hindu race advanced in knowledge there sprang up 6 distinct schools of philosophy. Though widely differing in their developments, all the schools recognize one fundamental maxim, *ex nihilo nihil fit*—"from nothing comes nothing." All also have one final object, the attainment of *mukti*, or deliverance, the emancipation of the soul from future birth and existence, and its absorption into the Supreme Soul of the universe. But certain points of resemblance bring the 6 into association in 3 pairs, called *Nyāya*, *Sāṅkhya*, and *Vedānta*.

I. (1) *Nyāya*, founded by Gautama, who held the sensations to be the source of all knowledge. (2) *Tāisheshika*, founded by Kanada, whose distinctive doctrine is the existence of a transient world composed of aggregations of eternal atoms. Both divisions recognize a Supreme Being.

II. (1) *Sāṅkhya*, with which is classed the *Yoga*. The *Sāṅkhya*, founded by Kapila, defines the nature of evidence, and the principles of which a knowledge is attainable. First among the latter is nature, "the universal material cause." Matter it declares to be eternal, but it recognizes also an intellectual power with affections and faculties. It admits the existence of separate souls, and that intellect is exercised in the work of creation; but it denies the existence of any Supreme Being, either material or spiritual, by whose *volition* the universe was produced. (2) *Yoga*, founded by Patanjali, and sometimes called after him *Patanjali*. This holds most of the doctrines of the *Sāṅkhya*, but it asserts not only the existence of separate individual souls, but of one all-pervading Spirit, unaffected by the influences to which other souls are subject, the Supreme Ruler, God. The *Yoga* insists upon the necessity of devotion, and prescribes the exercises and discipline to be practised.

III. *Vedānta*.—This includes the *Pūrva-Mīmāṃsā*, founded by Jaimini, and the *Uttara-Mīmāṃsā*, attributed to Vyāsa. The *Uttara*, or later *Mīmāṃsā*, is the more important, and it is to this that the term *Vedānta* especially applies. It teaches that "God is the omniscient and omnipotent cause of the existence, continuance, and dissolution of the universe. Creation is an act of his *will*; he is both the efficient and the material cause of the world," and in the end all things are resolved into him.

The time when these systems sprang up is uncertain. The *Uttara-Mīmāṃsā*, or *Vedānta*, is generally admitted to be the latest, and is supposed to have been especially directed against the teachings of the Buddhists. This would bring it within 3 or 4 centuries B. C. The other schools are to all appearance older, but reasons have been urged for placing them all after the rise of Buddhism. If this be the correct view, the date of the *Vedānta* must be brought down later. This is a question of some interest, for the later the rise of these schools the greater is the possibility of their having been evoked by the teachings of the Gr. philos. Mr. Colebrooke expresses his decided opinion that "the Hindus were the teachers, not the learners." [From orig. art. in *J.'s Univ. Cyc.*, by Prof. JOHN DOWSON.]

Hindu Religion. The origin of the H. R. is veiled in remote antiquity. When the Aryans crossed the Indus in their migration from Central Asia, they carried with them certain hymns which were afterward increased in number. The lang. in which the hymns are composed is the oldest known form of Sanskrit, and centuries probably passed before these scattered compositions were collected and arranged in the books called *Vedas*. The date of these compositions is uncertain; that which has received perhaps the greatest approval is 1400 B. C. The hymns are addressed to the elements and powers of nature personified. There are glimpses in some of them of a high and spiritual conception of the Deity, or direct mystical allusions to one superior Being, from whom all the rest emanate; but the gen. character does not rise above earthly objects.

In course of time the hymns were collected and arranged in books by a sage who is known as Vyāsa, "the compiler." The *Vedas* as they are now known, and have been known for ages, are 4 in number, named *Rig*, *Yajur*, *Sāma*, and *Atharva*. The *Rig* is the most important and original. The hymns of the *Vedas* recognize a priestly class and a regal class. The fourth or servile caste, called *śūdra*, seems to have had no recognized existence in those days.

The difference between the religion of the *Vedas* and modern Hinduism is so wide that the 2 religions have little or nothing in common beyond the Vedic texts and formulas which still remain in use. The great feature of difference is the total absence of the divinities who have for ages to a great degree engrossed the adoration of the Hindus. Brahma does not appear as a deity, and Vishnu, although named, has nothing in common with the Vishnu of the *Purāṇas*. As a divinity Siva is not named; nor is his type, the *Lingam*, ever adverted to.

Second only to the *Veda* in importance is the Code of Menu, in which a future state of reward and punishment is clearly recognized, the doctrine of transmigration is distinctly enunciated, and Brahma, the Creator, is recognized. He is not the One Supreme Being, but merely the creative energy; and after the world which he has produced has endured for long ages, Brahma himself returns to the Supreme essence from which he emanated. The principal feature in Menu is the full development of the caste system.

The 2 great poems *Rāmāyana* and *Mahābhārata* are supposed to have been written a little before the Chr. era. They depict the heroic age, and those deified heroes come upon the scene who occupy so prominent a position in modern Hinduism. Krishna is the hero of the *Mahābhārata*.

From the epic poems to the *Purāṇas* is a wide interval. They are supposed to have been written between the 8th and 14th centuries of our era. In these works the H. R. receives its full development. Brahmā the Creator, Vishnu the Preserver, and Siva the Destroyer (or rather Regenerator) are acknowledged as the 3 great divinities constituting the Triad. It is doubtful if Brahmā was ever worshipped. Vishnu the Preserver was then, as now, the most popular deity, under one or other of his *avatāras* or incarnations.

Siva, the Destroyer and Regenerator, has also a vast number of votaries, but fewer than Vishnu. His appearance and attributes are of a very gloomy character. The especial form under which he is worshipped is the *lingam*, or phallus, the male organ of reproduction, which symbolizes his office of regenerator. There is nothing offensive in the way this is represented, nor anything obscene in the ideas attached to it. A plain column of stone, a cone of clay, or even a natural oblong stone, is its representative.

Sarasvatī, the wife of Brahmā, is the goddess of learning and the arts, and the inventress of the Sanskrit lang. Lakshmi, the wife of Vishnu, is the goddess of prosperity and fortune. Both of these deities receive adoration on particular occasions, and the latter is very frequently invoked, but they are not the objects of any regular worship. It is far different with the consort of Siva, who is known under a great variety of names—Devī, Durgā, Kālī, Pārvatī, Bhavāī, etc.—and is the recipient of a fierce fanatical adoration. This goddess is represented in a variety of ways, all more or less terrible and disgusting. The worship of Devī owes its diffusion, perhaps its rise, to a comparatively late class of writings called *Tantras*. The great feature of the religion taught by these is the worship of Sakti—divine power personified as a female. The chief objects of adoration are, however, the manifold forms of the bride of Siva. It is to this that the bloody sacrifices offered to Kālī must be imputed, and that all the barbarities and indecencies perpetrated at the annual worship of Durgā and the swinging festival are to be ascribed.

The religion of the Hindus is thus principally directed to the worship of 3 leading divinities, Vishnu, Siva, and Devī—each of whom has many names and forms. The worship of Vishnu is cheerful and sensuous; of Siva, sombre and severe; of Devī, terrible and disgusting. But beside these great divinities there are many others of less dignity and power, who have their special attributes and spheres of action. The total number of gods is said to be 330,000,000.

Two very remarkable features in the H. R. are the great powers and virtues ascribed to sacrifice and faith. Sacrifice and austere penance make even the gods subservient to the wishes of the devotee, and that quite irrespective of the object in view. The merit is in the performance, not in the spirit of the observance. Trust in the chosen deity, constant repetition of his name, the bearing of his sectarian marks, are of more avail than piety. Morality and innocence may be inculcated, but the saving principle is belief. [From *orig. art. in J. S. Univ. Libr.*, by Prof. JOHN DOWSON.]

Hindus. See ISDA.

Hingham, Mass. See APPENDIX.

Hin'man (CLARK TITUS), D. D., b. at Kortwright, N. Y., Aug. 3, 1819, grad. at the Wesleyan Univ. in 1839; was connected with the Meth. Sem., Newbury, Vt., 1839-46; prin. of Albion Sem., Mich., 1846-53; founder of N. W. Univ., Evanston, Ill., and its first pres. 1853-54. He was an able orator and scholar, and a successful instructor. D. Oct. 21, 1854.

Hinman (JOHN), LL.D., b. in Fairfield co., Conn., in 1802; was admitted to the bar at New Haven, and afterward practised law at Waterbury, Conn.; was appointed a justice of the superior court 1842, of the State supreme court 1850, its chief-justice 1861. D. Feb. 21, 1870.

Hin'ny, or **Jen'net** [Gr. *hyvos, yivos*, a "mule"], a hybrid between the horse and the she-ass, a very different animal from the mule, which is bred between the ass and the mare. The H. neighs like a horse, the mule brays like the ass. The mule's ears, tail, and gen. aspect are asinine. The H. more nearly resembles the horse; is of slighter build, and of strength inferior to that of the mule. It is bred to some extent in Sp. and Barbary. It was once called *jumart*, and was absurdly believed to be the fruit of a cross between the bull and the mare.

Hinsdale, Cheshire co., N. H., on R. R. It has a fine water-power. Pop. 1870, 1342; 1880, 1863.

Hinsdale (BURKE AARON), A. M., b. at Wadsworth, Medina co., O., Mar. 31, 1837, ed. at the Elective Institute, now Hiram Coll.; entered the ministry of the Chr. Ch. (called also Disciples, Campbellites, etc.) in 1861; was pastor in Solon, O., 1864-66; in Cleveland 1866-68; prof. of hist. and Eng. lit. in Hiram Coll. 1869-70; its pres. 1870. Wrote *Genuineness and Authenticity of the Gospels*.

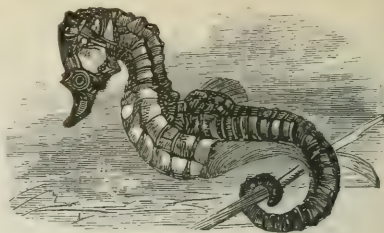
Hip, the fruit of the rosebush, is used in pharmacy as a material for making "confection of hips" (*confectio rose canina*), the *Rosa canina*, or dog rose, and *R. pomifera* of Europe, furnishing the most of the fruit. The seeds are taken out and the hips beaten in a mortar with white sugar. The more fleshy and juicy sorts of H. are in some places preserved or dried, and in winter are boiled in pottage, after taking out the seeds and bristly substance within them.

Hip-joint, Diseases of. See COXALGIA.

Hippar'chus, generally considered the founder of the science of astron., lived in the middle of the 2d century B. C.; b. at Nicaea, in Bithynia. Of his life nothing is known, but from the *Synopsis* of Ptolemy we know that by his great discoveries, and more especially by his method, he laid the foundation of the science of astron.

Hip'pias, a contemporary of Protagoras and Socrates, b. at Elis, and lived mostly at Athens. Of his life nothing is known, and of his writings none have come down to us, but his character has been very vividly drawn by Plato in the 2 dialogues which bear his name. He seems to have been a man of great gifts and comprehensive knowledge, but arrogant, vain and superficial.

Hippocamp'idæ [Gr. *Hippocampus*, a sea-monster half horse and half fish], a family of lophobranchiate fishes, of which the sea-horse is the type. The males carry the



The Sea-Horse.

spawn in pouches upon the tail until the fry are hatched. *Hippocampus Hudsonius* is found along our Atlantic coast.

Hippoc'rates [Ἱπποκράτης], the father of med. and the most distinguished of Gr. phys., b. in Cos in 460 B. C. (according to Soranus), and was the son of Heracleides, one of the Asclepiadæ, and Phænarete, a woman who belonged to the Heracleidæ. Practised his profession chiefly at Cos, and rendered its med. school, already very famous, by far more illustrious than it had ever before been. Part or all of the *Aphorisms*, parts of the *Epidemics*, parts of the *Prognostics*, the *Regimen in Acute Diseases*, the treatise on *Wounds of the Head*, and that *On Air, Water, and Places*, are considered genuine works of H.; and (according to Littre) the treatises *On Anc. Med.*, on *Joints*, on *Fractures*, on *The Use of the Lever* (in reducing luxations), on *Laws*, on *Ulcers*, on *Hæmorrhoids*, on the *Sacred Disease*, on *Fistula*, and the *De Medici Officiis*, are possibly genuine. As a practitioner, it would be unfair to judge of H.'s merits by any modern standard. He also taught the doctrines of *crases*, *coctions*, and *crises*, treated disease chiefly by attention to regimen, and earnestly advocated the expectant treatment in many acute diseases. He was a careful observer and excellent describer of symptoms. D. B. C. 357.

Hippocratic Oath, a solemn engagement entered into in anc. times by young men about commencing the practice of med., and especially by the Asclepiadæ. The formula itself has been ascribed to Hippocrates, and is certainly very anc. The most important parts of this oath are these: "I swear that I will follow that system of regimen which, according to my best judgment, I consider best for my patients, and abstain from whatever is injurious. I will give no deadly med. to any one if asked, nor suggest any such counsel. Furthermore, I will not give to a woman an instrument to procure abortion. With purity and holiness I will pass my life and practice my art. I will not cut a person who is suffering with stone, but will leave this to be done by those who are practitioners of such work. Into whatever houses I enter I will go for the advantage of the sick, and will abstain from every voluntary act of mischief and corruption, and, further, from the seduction of females or males, bond or free. Whatever in connection with my professional practice, or not in connection with it, I may see or hear, I will not divulge, holding that all such things should be kept secret."

Hippoc're'ne [Gr. ἵππος, κρήνη, "horse-spring"], a fountain upon the side of Mt. Helicon, was believed to be a favorite haunt of the Muses and a source of poetic inspiration. It was fabled to have been produced by a stroke of the foot of Pegasus. It is still a fine spring.

Hippodrome [Gr. ἵπποδρομος, a "horse-race"], the name anciently given in Gr. and Constantinople to the ground where chariot and other horse-races took place. Of these races, those in chariots were the most popular. The H. at Olympia was long the most famous, but in later times that at Constantinople acquired great renown.

Hippoly'tus, in Gr. mythology, a son of Theseus. His stepmother, Phædra, fell in love with him, and accused him to his father in order to revenge herself for his coldness. Theseus cursed his son, and asked Poseidon to destroy him, but after the death of H. the king learned the innocence of his son and fell into grief; Phædra killed herself.

Hippolytus, SAINT, bp. and martyr, was probably b. after the middle of the 2d century, and in It., though he travelled in the E., and was also a disciple of Irenæus of Gaul. His diocese was certainly in the neighborhood of Rome, and probably at Portus Romanus. In 235, under the emp. Maximinus, he was banished, along with the Rom. bp. Pontianus, to Sardinia, and is supposed to have suffered martyrdom the yr. following. His statue, in a sitting posture, with a list of his writings inscribed upon the back of the chair, was dug up in 1551 near the basilica of San Lorenzo in Rome. By much the most important of his writings is the *Philosophumena*, a *Refutation of All Heresies*, in 10 books. (See monographs by Bunsen, Cruice, Doellinger, Wordsworth, and Volkmar.) R. D. HIRSCOCK.

Hippox'ax, a Gr. satirical poet of the 6th century B. C. He was banished from his native city, Ephesus, on account of his satires, and lived afterward at Clazomenæ. He is the inventor of the choliambic verse, in which a spondee or trochee is placed in the last foot, instead of an iambus, thus giving to the rhythm a jarring movement which is well adapted for satire.

Hippopotam'idæ [Gr. ἵπποπόταμος, "river-horse"], a family of omnivorous ungulates, distinguished by the massive body, of which two living species are known. The *Hippopotamus amphibius* inhabits most of the rivers and lakes of Afr. from the Nile to the Cape of Good Hope. The largest males sometimes are 14 or 15 ft. long. It lives chiefly upon soft water-plants, but quite often visits cultivated fields. Its flesh somewhat resembles pork, and its skin

makes leather, used as a material for buffing-wheels and heavy belts, etc. Its teeth also furnish excellent ivory, used in making philosophical instruments, etc. The *Choropsis minor* is a much smaller species, inhabiting Liberia, etc.

Hippo Regius was a Tyrian colony on the W. side of the Gulf of Bona. It became under the Romans a splendid city, and was famed as the see of St. Augustine, who d. there Aug. 28, 430. It was captured by the Vandals, after a siege of 14 months, in Aug. 431. About the middle of the 7th century it was destroyed by the Arabs, and its materials were used in building Bona, the present Algerine city, 2 m. N. of the anc. site.

Hippurites [once considered a fossil *Hippuris*, the plant called mare's tail], an interesting genus of extinct conchiferous mollusks, of which the shells of some 16 species are found fossil in the *hippurite limestone* and other European Lower Cretaceous strata. There have been many theories as to the origin of these shells; they are now generally referred to an extinct order (Rudista) of conchifera.

Hiram, O. See APPENDIX.

Hiram [called also **HIROM** and **HURAM**; Heb. *Chiram*, "high-born," the **HIROMUS** of Mercader], a king of Tyre, contemporaneous with David and Solomon, and the ally of both. He sent a supply of cedar-timber, with skilled craftsmen, to assist David in constructing his palace, and in Solomon's reign supplied timber, treasure, and men for the building of the temple at Jerusalem (969 B. C.). He was a great builder at Tyre; was son and successor of Abibal.

Hiring. This term has a variety of applications in law as well as in common usage, and may refer to the engagement of servants or to the leasing of real property, as well as to the hire of things or professional services. But in its more specific legal signification it denotes a species of bailment by which the use of a chattel is contracted for, or labor or services affecting it are stipulated to be given for a compensation, express or implied. In this sense alone will the subject of H. be here considered. H. as a form of bailment is of 3 varieties, whose names are expressed in Lat. phrases: (1) *Locatio rei*, the H. of a thing for temporary use; (2) *Locatio operis faciendi*, the H. of work and services or care and attention to be bestowed upon articles delivered by the hirer to the person whose labor is engaged; (3) *Locatio operis mercium vehendarum*, the hire of the transportation of goods from one place to another. (See CARRIERS.)

(1) *Locatio rei*.—The hire of things constitutes a contract for the mutual benefit of both parties, since the owner receives a compensation, while the hirer becomes entitled to the use of the property; and the latter is accordingly bound to ordinary care and diligence, and is liable only for ordinary neglect. He must conduct himself with such prudence, forethought, and discretion as a man of ordinary sagacity and reasonable soundness of judgment would exhibit in similar circumstances. The degree of care requisite will vary with the nature of the property with which he is intrusted. If it be delicate and fragile, or of great value, or subject to deterioration unless attended to and preserved with unusual watchfulness, greater care will be necessary than if it be of such a character that injury or loss is not to be presumed probable unless there be excessive imprudence. The hirer becomes invested with a special property in the goods for the period during which his right of temporary use is to continue, and for any interference with his possession or injury to the property by third persons, he has a right of action to recover damages for the loss sustained. If the H. be for a definite time, as is usually the case, any attempt even by the owner to retake the property or to prevent its intended use will give the hirer a claim for redress. This rule is, however, subject to the qualification that if the hirer makes any unwarrantable misuse of the property the owner has a right to retake it, if he can do so peaceably, or to bring an action for its immediate recovery. The contract of H. may be terminated by the expiration of the time for which the contract was made, or the completion of the intended purpose, when the property reverts to the owner, who has a claim for whatever compensation was agreed upon, or, if no definite arrangement had been made, to a sum deemed reasonable under the circumstances.

(2) *Locatio operis faciendi*.—The same principles in reference to the degree of care to be required of the bailee apply to contracts for labor and services to be bestowed upon the thing bailed as in the H. of chattels. Ordinary care is required, and the measure of obligation is estimated by the value and nature of the articles delivered. But the obligations of the workman depend also, in large measure, upon the nature of his occupation. He is held responsible for the exercise of such a degree of skill and careful workmanship in fulfilling the task imposed upon him as is requisite in the ordinary labors of his trade or profession. If the bailee only completes a portion of the desired work, he can claim a proportionate compensation if the benefit of what was actually performed was received in its incomplete state by the assent of the employer; but if the employer insist on full performance or decline to make compensation on account of some substantial imperfection in the workmanship or some injury which the goods have sustained, the workman is not only entitled to no reward, but may even be held liable for the original value of the goods. If the property is destroyed by some unexpected casualty, without any fault on the part of the workman, or is carried away by robbers notwithstanding the use of reasonable precautionary measures for security, since the absolute ownership remains continually in the employer, he must sustain the loss. But that the loss of the property in such instances may fall upon the employer, it is necessary that the contract be strictly in the nature of bailment. If cloth be given to a tailor or gold to a jeweller, and the identical piece of cloth is to be returned in the form of a suit, or the same gold to be made into an article of ornament, it is a case of bailment, even though additions be made to the original article delivered in the course of its alteration. But if the workman

has liberty to expend his labor upon other materials of the same kind as those delivered, being under no further obligation than to return articles similar to those which would be made if the employer's goods were used, this is not generally considered as constituting a bailment, but only a species of barter or sale. The workman, therefore, owns the goods until his labor is complete and the finished product accepted; and if they are destroyed before that time the loss is his alone, and the employer has still a claim for the delivery of the article ordered.

GEORGE CHASE.

Hirpini, an anc. people of It. of Samnite race, inhabiting the central group of the Apennines, and deriving their name from *hirpus*, the Samnite name of a wolf. They were subjugated by the Romans before 268 B. C. Immediately after the battle of Cannæ (216 B. C.) they declared in favor of Hannibal, but when he (209 B. C.) was driven toward the S. part of It., they bought peace from the Romans, by betraying the Carthaginian garrisons. In the Social war (90 B. C.) they were among the first who took up arms against Rome, but were soon reduced by Sulla.

Hirtius (**AULUS**) belonged to a plebeian family, but played a conspicuous part in Rom. politics on account of his connection with Cæsar. He served him in Gaul as legate, and was often employed as negotiator. He was chosen consul for the yr. 43 B. C., and entered on his official duties Jan. 1. Of the convulsions into which the assassination of Cæsar threw the Rom. republic, H. was by no means the master, but his moderation exercised a beneficial influence; he fell at the head of the army which was sent against Antony, then besieging Mutina.

Hispania, the Lat. name of SPAIN (which see).

Hispaniola. See HAITI.

Histiæus, tyrant of Miletus, won the attachment of Darius by guarding the bridge of boats over which the Per. army crossed the Danube on its expedition into Scythia in 513 B. C.—a service by which he saved the army and the life of the Per. king. His adventurous and ambitious character, however, could not help exciting suspicion, and he was detained at the Per. court for 13 yrs. At last he succeeded in raising his Gr. countrymen in Ionia in rebellion against Per., and Darius sent him down to quell it. The rebellion failed, and the treachery of H. was discovered by Artaphernes, the Per. satrap of Sardis. He now fled from place to place, stirring the Gr. colonies in Asia Minor into insurrections, but at last he was captured by Artaphernes, who sent his head to the Per. king. Darius, however, mourned deeply, buried the head with honors, and blamed Artaphernes for having acted hastily.

Histology [Gr. *ιστός*, "web," and *λόγος*, "discourse"] is the branch of anat. which treats of the minute structure of the tissues of which living beings are composed. It is subdivided into *Human H.*, which treats of the tissues of man; *Comparative H.*, which treats comparatively of the tissues of animals; and *Vegetable H.*, which treats of the tissues of plants. Each of these subdivisions may be again divided into *Normal* and *Pathological H.*—the first referring to the healthy tissues, the second investigating the changes they undergo in disease.

The tissues are composed of elementary cells and their derivatives. According



Epithelium of an cell of lining.

problematic: Max Schultze accordingly defines the cell simply as a little mass of protoplasm containing a nucleus, and Brücke and Stricker, going a step farther, are disposed to regard the nucleus itself as unessential.

H. may be said to date back only to the appearance of the *Anatomie Générale* of Bichat in 1801, for although many interesting observations had previously been made, yet Bichat was the first who treated the subject in a comprehensive way, classifying according to their structure, so far as it was then understood, all the tissues of the human body, and giving a gen. view of their relations, both in health and disease. His work gave a great impulse to the study of the tissues, but the imperfect condition of the compound microscope at that time was a serious obstacle to progress, and it was not until the opticians succeeded in devising efficient methods of correcting the spherical and chromatic aberrations of that instrument that H. made any important advance beyond the position in which Bichat left it. [From *Gen. Anat.*, in J. S. Unit. Corp., by Col. J. J. Woodward, M. D.]

History [Gr. *ιστορία*, from *ιστορεω*, to "learn by inquiry" to "examine"], etymologically, denotes *ascertainment by inquiry*, hence the process of investigation; hence, further, an account of the circumstances thus ascertained. In its most ordinary sense it is restricted to a narrative of transactions in the order of time, with or without critical and philosophical commentary.

Ancient History.—In its origin H. is indistinguishable from oral tradition. A considerable advance was made when traditions assumed the form of ballads, but no really authentic record could exist previous to the invention of writ

ing. From about 3000 B. C. the Egyptians may be said to have possessed an historical lit. The practice of recording events by writing spread to various Oriental nations, but the pursuit of H. as a dept. of intellectual culture was reserved for the Grs. About the middle of the 5th century B. C., Herodotus composed the first work fully answering to our present idea of H. A considerable step in advance was taken by Thucydides, who, not content with relating the actions of men, endeavors to penetrate into their motives, and to investigate not merely the accompanying incidents, but the determining causes of changes in human affairs. Some new elements were added by Polybius, who was enabled to investigate the causes of national greatness and decay on a much larger scale than his predecessor. Xenophon's *Anabasis* and Caesar's *Commentaries* are perfect examples of pure narrative unaccompanied by reflection. Of the two great Rom. historians, Livy aims principally at narrative, but also at the glorification of his own people. He also follows the example of Thucydides in interspersing his own reflections. Tacitus imitates Thucydides, but with the addition of an intense moral purpose.

Modern History.—During the Middle Ages H. was entirely eclipsed, except among the Saracens. H. was not replaced upon her old footing until the invention of printing. Two great It. historians, Machiavelli and Guicciardini, traced the former the mediæval, the latter the contemporary H. of his country. Their example was emulated by De Thou, the Fr., and Davila, the It., historian of the wars of religion in Fr.; by Mariana, the historian of Sp., and Strada, the narrator of the revolt of the Low Countries; Raleigh, the first Englishman to attempt a H. of the world, and Clarendon, whose work is perhaps the best example of a partisan H. These remain the only eminent Eng. historians until Hume. Robertson gave the first example of a high-class Eng. historian devoting himself to the transactions of foreign nations. Gibbon's *Decline and Fall of the Rom. Empire* is perhaps the greatest historical work ever produced.

Recent Historians.—Since the 18th century H. has claimed more and more the attention of superior minds. Early Eng. H. has been treated by Freeman, that of the Tudor dynasty by Froude, the Commonwealth by Guizot, the Revolution by Macaulay, Scot. H. by Tytler and Burton. Among the historians of Fr. are Michelet, her gen. historian; Thierry, the investigator of her early H.; Thiers, Guizot, Barante, Lamartine, Louis Blanc, Henri Martin, etc. In virtue of its subject, Carlyle's *Fr. Revolution* may be included among Fr. histories.

Some of the most valuable contributions to It. H. have been made by foreigners, Sismondi, Roscoe, Gregorovius; but It. also boasts her Botta, Cantù, and Colletta. Ger. has produced numerous historians, among whom are Müller, Ranke, Von Raumer, Schlosser, Schiller, and Heeren. Motley has immortalized himself as the historian of the revolt of the Netherlands. The H. of Bohemia has been written by Palacky, of Rus. by Karamsin, of Swe. by Geijer, and of Port. by Hercolano. Bancroft is as yet the standard historian of the U. S. The best H. of the Sp. conquest of S. Amer. are by Prescott and Arthur Hays.

Classical H., with the exception of the era comprehended in Gibbon's work, may be said to have been completely rewritten during the present century. Niebuhr disentangled the legendary from the authentic portions of early Rom. H. The H. of the Republic has been written by Mommsen, and the interval between him and Gibbon has been bridged by Merivale. Grote has produced the standard H. of the Gr. republics. The H. of the Chr. Ch. has been told by Milman. The H. of Egypt is told by Brugsch, and that of Assyria by Rawlinson. India has found historians in Mill and Orme.

Archives, Statutes, Etc.—It was long before it was recognized that the H. of every civilized people was in some sort written in its public insts., and that the essential principles underlying great struggles were displayed in such manifestoes as the Solemn League and Covenant or the Dec. of Ind. It was discovered that laws and charters not only filled up the outlines of historians, but corrected their errors, and it is now universally admitted that an authentic H. of any period must be based upon documentary testimony where such is procurable.

History in its Relation to Private Life.—It was natural that in its infancy the attention of H. should be principally fixed upon great public events and picturesque occurrences. But the conviction that the intrigues of cabinets and the shocks of armies are only important in so far as they affect the gen. well-being has now thoroughly leavened every branch of historical research, and no historian is satisfied unless he can exhibit the moral and social condition of a nation at a given period. Macaulay's view of the social state of Eng. at the Revolution and Mill's picture of the condition of India at the Brit. conquest are famous examples.

The Study of History.—As there is no study more delightful than that of H., so is there none more vitally necessary to the citizen of a free state. It is impossible to form a correct judgment of present circumstances without the means of comparison with the past supplied by a knowledge of H. The student must bear in mind, however, that all such knowledge is not equally useful. The Amer. citizen should especially familiarize himself with the H. of free states, his own country before all others, and then proceed to that of other nations. The best method of study is that which commences with an outline or skeleton of the subject, serviceable even if the student proceeds no further, but capable of being filled up indefinitely. [From orig. art. in *J.'s Univ. Cyc.*, by R. GARNETT.]

Hitchcock (CHARLES HENRY), A. M., Ph. D., b. at Amherst, Mass., Aug. 23, 1836, grad. at Amherst Coll., Mass.; was instructor in geol. in that inst. and at Lafayette Coll., also prof. of geol. at Dartmouth Coll., N. H., 1869; assistant geologist of Vt. 1857-61; State geologist of Me. 1861-62, and of N. H. 1863; has written largely upon geol., and in 1870-71 established the meteorological observatory upon Mt. Wash-

ington, N. H., which has since been adopted by the signal service of the U. S. A.

Hitchcock (EDWARD), D. D., LL.D., b. in Deerfield, Franklin co., Mass., May 24, 1793. Interrupted in his preparation for Harvard Coll. by sickness and weakness of the eyes, he ed. himself while following the plough. From 1815 to 1818 he was prin. of Deerfield Acad., assisted by Miss Orta White, the lady who afterward became his wife, who rendered him invaluable aid in illustrating his scientific works, and to whom he dedicated his *Religion of Geol.* His first publication was *The Downfall of Bonaparte*, a dramatic poem of 500 lines; this appeared in 1815. From that date till 1818, while prin. of the acad., he furnished the calculations for the *Farmer's Almanac* and frequent corrections to the *Nautical Almanac*. From 1821 to 1825 he was pastor of the Congl. ch. in Conway, and meanwhile engaged in a geological survey of W. Mass.; was prof. of chem. and nat. hist. in Amherst Coll. 1825-44; in 1830 was appointed State geologist of Mass.; in 1836 was commissioned to do the same work in the first dist. of N. Y., but resigned the office on account of his health. From 1844 to 1854 he was pres. of Amherst Coll. and prof. of natural theol. and geol. He accepted the presidency when the coll. was sinking under the weight of poverty and debt, and having secured for it liberal endowments, doubled the number of students in 10 yrs., and greatly increased its literary and scientific advantages, he resigned that office and, retaining the professorship, devoted the remainder of his life to his favorite science of geol., but always in its connection with religion. He was an eloquent preacher and the faithful pastor of the coll. ch. Religion was the inspiration of his writings and his life. He was one of the originators and founders of Mt. Holyoke Sem. and of the Mass. Agricultural Coll. His most unique and enduring monument is the Hitchcock Ichnological Museum of Amherst Coll., created by his genius, science, and industry, and containing a complete collection, comprising every known variety of those fossil footmarks from the Conn. Valley which he was the first scientifically to examine, classify, and interpret. Dr. H. was among the first and foremost of the pioneers of Amer. geol. The Amer. Geological Society owes its existence to his suggestion, and he was its first pres. He originated new doctrines and arguments in geol. and natural theol. D. Feb. 27, 1864. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. W. S. TYLER, D. D., LL.D.]

Hitchcock (EDWARD), A. M., M. D., b. at Amherst, Mass., May 23, 1828, grad. at Amherst Coll. 1849, and at Harvard Med. School 1852; instructor in Williston Sem., Easthampton, Mass., and in 1861 appointed prof. of hygiene and phys. education in Amherst Coll.

Hitchcock (ETHAN ALLEN), b. at Vergennes, Vt., May 18, 1798; grad. from the U. S. Military Acad., and entered the army as third lieu. of art. July 1817. Till 1829, except for 3 yrs. as assistant instructor of inf. tactics at W. Pt., he served on garrison and recruiting duty, after which he became commandant of cadets at the Military Acad.; in Gaines's campaign of 1836 in Fla. he was acting inspector-gen.; was transferred to recruiting service, and subsequently to Indian duty. Promoted to be major 8th Inf. in 1838, and in 1841 placed in charge of the Indian bureau; in the Mex. war he was inspector-gen. of Gen. Scott's army. After this war he made an extended tour in Europe and the E., and on his return was placed on duty in Wash. In 1851, then col. of the 2d Inf., he was ordered to San Francisco, Cal., and commanded the military division of the Pacific till 1854. He resigned Oct. 18, 1855, and made his home at St. Louis, where he devoted himself to lit. and his peculiar philosophical investigations. In Feb. 1862 he was appointed maj.-gen. of volunteers, and was placed on duty in the war dept., to which duties were added in Nov. those of com. for exchange of prisoners of war and commissary-gen. of prisoners. These duties he discharged till Oct. 1867. Wrote *The Doctrines of Swedenborg and Spinoza Identified and Christ the Spirit, being an attempt to State the Primitive View of Christianity*. D. Aug. 5, 1870.

Hitchcock (HENRY LAWRENCE), D. D., b. at Burton, O., Oct. 31, 1813, son of Chief-Justice Peter Hitchcock of O.; grad. at Yale 1832; studied divinity in Lane Sem.; held Presb. pastorates in Morgan, O., 1837-40, in Columbus 1840-55; pres. of Western Reserve Coll. 1855-71. D. July 6, 1873.

Hitchcock (PETER), LL.D., b. at Cheshire, Conn., Oct. 19, 1780, grad. at Yale 1801; was admitted to the bar 1804, removed to O. 1806, State senator 1812-16, M. C. 1817-19; was afterward for 27 yrs. a justice of supreme court of the State, and a part of that time chief-justice. D. May 11, 1853.

Hitchcock (ROSWELL DWIGHT), D. D., LL.D., b. in E. Machias, Me., Aug. 15, 1817; joined the sophomore class in Amherst Coll. in 1833, grad. in 1836; was prin. of an acad. in Jaffrey, N. H., 1836-37; pursued biblical and other studies under private tuition 1837-38; entered Andover Theological Sem. in 1838; was assistant teacher in Phillips Acad., Andover, for one term; was tutor at Amherst 1839-42, and in 1869 was elected one of the trustees of the coll. From 1842 to 1844 he was a resident licentiate at Andover; then preached for a yr. in Waterville, Me., and was ordained and installed over the First Congl. ch. in Exeter, N. H., Nov. 19, 1845. Spent 1847-48 in Ger. at the univs. of Halle and Berlin. In 1852 he resigned his pastorate to accept the Collins professorship of natural and revealed religion in Bowdoin Coll., and in 1855 he was chosen Washburn prof. of ch. hist. in Union Theological Sem., N. Y. In 1866 he visited It. and Gr., and in 1869-70 Egypt, Sinai, and Pal. In 1871 he was made pres. of the Amer. Pal. Exploration Society. During the c. war he took a decided stand on the side of the gen. govt. He received the degree of D. D. from Bowdoin Coll. in 1855, and of LL.D. from Williams Coll. in 1873. He was one of the assistant eds. of *Amer. Theological Review* 1863-70, for which and *Presb. Quarterly* he has written many articles. Wrote also *Socialism*, and has edited *A Complete Analysis of the Bible*, and (with Drs. Eddy and Schaft) *Hymns and Songs of Praise and Hymns and Songs for Social and Sabbath Wor-*

ship; was elected pres. of Union Theological Sem. in 1880. He was one of the associate eds. of *J. A. Unit. Cyc.*

Hitchcock (SAMUEL A.), a citizen of Brimfield, Mass., b. about 1784; acquired great wealth, and was the founder of the Hitchcock Free High School, Brimfield, and a liberal benefactor of Amherst Coll., Mass., Tabor Coll., Ia., Ill. Coll., Andover Theological Sem., and of various chs. and charities. These gifts exceeded \$650,000. D. Nov. 24, 1873.

Hitopadesa [Sans., "good instruction"], a collection of fables of a didactic character and anc. origin, existing in the Sans. lang. It is an abbreviation of the old *Panchatantra*. In substance, the H. is nearly identical with the reputed fables of Pilpay, and obviously came from same source.

Hittites [Heb. *Chitti*, "descendants of Heth"], a Canaanitish nation whose original seat was Hebron. They are frequently mentioned on the Egyptian monuments, as well as in the Bible, and were often noticed in the cuneiform inscriptions. After the conquest of Pal. they established a kingdom in the Orontes valley, their cap. being Kadesh. Numbers of them remained with the Jews even as late as the time of Ezra and Nehemiah. The Egyptian records contain the names of several of the H. kings.

Hives. See NETTLE RASH.

Hivites [Heb. *Chivi*, "midlanders" or "villagers"], a Canaanitish race conquered by the Hebs. A part of them, the Gibeonites and their neighbors, became Jewish proselytes, but the great mass of them, living in the region of Tyre, seem to have been unconquered; but Solomon made them tributaries, and even menial subjects.

Hilwassee College, in a p.-v. of the same name, in Monroe co., Tenn., was designed to secure a thorough practical training to those young men who had not means to attend more expensive colls. It was organized in 1849.

Hoang-Hai. See YELLOW SEA.

Hoang-Ho ("yellow river"), one of the prin. rivers of Chl., rises in Thibet, flows first N. E. into Mongolia, then S. and S. W. through Chl. proper, and enters the Yellow Sea in lat. 34° N. Its course is winding, its current rapid, and when it reaches the lowland it is scarcely navigable. The immense amount of yellow clay which it carries along with it is deposited partly at its mouth, partly along its bed. Thus, not only the level of its waters but of its bed is higher than the surrounding land, which must be protected against its inundations by immense levees. An extensive system of canals has been constructed to lead parts of its waters into other river-beds, and prevent the devastations with which it threatens one of the most fertile provs. of the empire. Its prin. affluent is Hoel-Ho; among the large cities along its shores are Lan-Choo and Kai-Fung. In 1833 the H.-H. broke from its old course, and began pouring its waters into the Yellow Sea by a mouth some hundreds of m. N. of its former one. Length, about 3000 m.

Hoar (EBENEZER ROCKWOOD), LL.D., b. at Concord, Mass., Feb. 17, 1816, a son of Samuel Hoar; grad. at Harvard in 1835, and was admitted to the bar in 1840; a judge in the court of common pleas 1849-55; a judge of the supreme judicial court 1859-69, U. S. atty.-gen. 1869-70, joint high com. on the Wash. treaty of 1871; M. C. from Mass. 1873-75.

Hoar (GEORGE FRISBIE), a son of Hon. Samuel Hoar, b. at Concord, Mass., Aug. 29, 1826, grad. at Harvard in 1846; was admitted to the bar in 1849, and settled at Worcester, Mass.; was elected to the 41st Cong., and re-elected to the 42d, 43d, and 44th. In 1877 was elected to the U. S. Senate from Mass. Re-elected Jan. 18, 1883.

Hoar (SAMUEL), LL.D., b. in Lincoln, Mass., May 18, 1778, grad. at Harvard 1802; was teacher in Va. 2 yrs.; admitted to the bar 1805, and attained eminence as a lawyer; was in 1830 a member of the State constitutional convention; a State senator 1825-33, a State councillor 1845-46, and M. C. 1835-37. In 1844 he was sent by the legislature of Mass. to S. C. to test the constitutionality of certain acts authorizing the imprisonment of free negroes from outside the State, and on Dec. 5 of that yr. he was forcibly expelled from Charleston, the State legislature on the same day authorizing the gov. to expel him. D. Nov. 2, 1836.

Hoatzin, the *Opisthocomus cristatus*, a S. Amer. bird resembling somewhat the peacock in appearance. It exhibits a number of peculiarities in structure, and is the type of a group of gallinaceous birds of equal value with the Aleuteromorphæ (Phasianide), Pterocolumorphæ, and Turnicimorphæ. It has a large crop and a small gizzard, is gregarious, and frequents marshes, where it feeds upon the leaves of *Arum arborescens*. Its flesh has an intolerable rank taste.

Hobart (JOHN HENRY), S. T. D., an Amer. bp., b. in Phila. Sept. 14, 1775, grad. at Princeton in 1793; ordained deacon of the P. E. Ch. in 1798, a priest in 1801; in 1799 was made rector of Christ ch., New Brunswick, N. J., in 1800 rector of St. George's, Hempstead, L. I., and in the same year assistant minister of Trinity ch., New York, of which in 1812 he became assistant rector, and in 1816 rector; was bp. of New York in 1816, and in 1821 prof. of pastoral theol. and pulpit eloquence in the Gen. Theological Sem., New York, of which he was one of the founders. Wrote *Apology for Apostolic Order*. D. Sept. 10, 1830.

Hobart (JOHN SLOSS), LL.D., b. at Fairfield, Conn., in 1798, grad. at Yale in 1757; was in the N. Y. Cong., and in 1766 was appointed a member of a committee to prepare a State const.; became a judge of the State supreme court; U. S. Senator in 1798; resigned in the same yr., and became justice of the U. S. dist. court for N. Y. D. Feb. 4, 1805.

Hobart Town, or **Hobarton**, cap. of Van Diemen's Land, on the Derwent, which at its entrance into Storm Bay forms an excellent harbor. It is connected with Melbourne by steamers. Pop. 27,248.

Hobbes (THOMAS), one of the most distinguished thinkers of the period of Eng. emancipation from scholasticism, b. Apr. 5, 1588, at Malmesbury, in Wiltshire; was ed. at Ox.; travelled in Fr. and It. In 1647 he became mathematical instructor to Charles, prince of Wales, a relation which was broken in alarm upon the publication of his views on politi-

cal, moral, and theological subjects in the treatises (1) *Treatise on Human Nature* in 1650, (2) *De Corpore Politico* (Lond., 1650), and (3) his collected views in the *Leviathan, or the Matter, Power, and Form of a Commonwealth, Ecclesiastical and Civil*, in 1651. He pub. a remarkable *Letter upon Liberty and Necessity* in 1654, and the first and second divisions of his great work, *Philosophical Rudiments*, in 1655-58; the first division treating of *Body*, the second division of *Human Nature*, the third of *the State*. After the Restoration H. received a pension of £100 from Charles II., his former pupil. In 1675 he pub. translations of Homer's *Iliad* and *Odyssey*. He wrote his autobiography in Lat. verse, and his *Behemoth*, a dialogue on the c. wars between 1640 and 1660, was finished in the yr. of his death, which occurred in Dec. 1679, at the seat of the earl of Devonshire, his constant friend and supporter. Complete *Works*, ed. by Molesworth, 16 vols. (5 vols. Lat., 11 vols. Eng.), Lond. Wm. T. HARRIS.

Hobby, name given in G. Brit. to certain small falcons, especially to the *Falcon subuteo*, a bird about 1 ft. in length and of very elegant shape. It was once much employed in hawking.

Ho'boken, an important R. R. and commercial centre, city of Hudson co., N. J., on the W. side of the Hudson River, directly opposite New York city, and N. of and adjoining Jersey City; incorporated in 1855. Lines of European steamers start from this point. Its trade in coal is extensive, it being one of the prin. depots from which New York city and its shipping are supplied. Prominent among its acads. is the Stevens Inst. of Technology, which has very complete apparatus and arrangements for teaching the natural sciences and their applications to the arts and industries. The Franklin Lyceum Association has a library of several thousand vols. Its prin. industries are connected with European steamers and the coal-docks. Pop. 1870, 20,297; 1880, 30,999.

Hobson's Choice. It is related that Tobias Hobson, univ. carrier at Cambridge, was the first person in Eng. who kept a hackney-stable. He always asked his customers to take their choice of his 40 horses, but managed to put off the traveller with the horse which stood nearest the door. Hence "Hobson's choice" signifies a nominal choice with no real alternative.

Hoche, Gsh (LAZARE), b. June 25, 1768, at Montreuil, the son of a poor workman, who could give him no education. In 1784 he enlisted in the army; in 1791 he fought as sergeant in the regiment of Gardes Françaises with the rabble before the door of Marie Antoinette; in 1792 he became lieut. in the regiment of Rouergue, and in 1793 he distinguished himself in the siege of Thionville and in the battle of Neerwinden. While imprisoned on some suspicion, he sent a plan of a campaign to the Committee of Public Safety; he was immediately liberated, made a brig.-gen., and sent to serve in the army of Houchard. He soon received an independent command, and in 1793 defeated the Aus. at Weissenburg, and compelled them to withdraw from Alsace. In 1795 he foiled the invasion of the royalists and the Eng., attempted from the peninsula of Quiberon. In 1796 he pacified the Vendée, and in 1797 he again commanded against the Aus. and defeated them thrice. D. Sept. 18, 1797.

Hochkirch, v. of Sax., 7 m. S. E. of Bautzen, where Frederick the Great was defeated by the Aus. Oct. 14, 1758.

Höchst, town of Pruss., at the influx of the Nidda into the Main, where, June 30, 1622, Tilly defeated Duke Christian of Brunswick; and Oct. 11, 1795, the Aus. defeated the Fr.

Hochstädt, town of Bavaria, on the Danube, where, Aug. 13, 1704, the Aus. and Eng. under Prince Eugene and Marlborough defeated the Fr. and Bavarians. The Eng. named the battle after Blenheim, a small v. near H., where one of its most decisive episodes took place.

Hock Tide, or **Hock Days**, the Monday and Tuesday occurring 2 weeks after Easter, a former Eng. festival in memory of Ethelred's victory over the Danes in 1002. Tolls were taken at the town-gates and money was collected throughout the parish for the priest. Traces of the old customs existed in some places in the 18th century.

Hodge (ARCHIBALD ALEXANDER), D. D., LL.D., son of Dr. Charles Hodge, noticed below, was b. in Princeton, N. J., July 18, 1823; grad. at the Coll. of New Jersey in 1841; was tutor 1844-46; grad. at Princeton Theological Sem. in 1847; was missionary in India 1847-50; was settled as a pastor in Lower W. Nottingham, Md., 1851-55; at Fredericksburg, Va., 1855-61, and at Wilkesbarre, Pa., 1861-62. In 1864 he was elected to the chair of didactic, historical, and polemic theol. in the W. Theological Sem., Allegheny, Pa., and in 1879 was made prof. of didactic and polemic theol. at Princeton. Has pub. *Outlines of Theol.*, etc.

Hodge (CHARLES), D. D., LL.D., of Scotch-Irish descent, was b. in Phila., Pa., Dec. 28, 1797, grad. at Princeton Coll. 1815. From 1816 to 1819 he was a student in the Theological Sem. at Princeton. In 1820 he accepted the appointment of assistant teacher of the original langs. of Script. in the sem., and in 1822 was elected by the Gen. Assembly prof. of Oriental and biblical lit. In 1828 he returned to his chair, after an absence of some 3 yrs. spent in study at the univs. of Paris, Halle, and Berlin. In 1840 he was transferred to the chair of exegetical and didactic theol., to which, in 1852, polemic theol. was added, Dr. Archibald Alexander, the incumbent of that professorship, having d. in 1851. The celebration at Princeton, Apr. 24, 1872, of the semi-centennial anniversary of his professorship was a memorable occasion, the first of its kind in Amer. hist. He founded the *Biblical Repertory and Princeton Review*, and was its ed.-in-chief nearly 40 yrs. His great work is *Systematic Theol.* D. June 19, 1878.

Hodge (HUGH LENOX), M. D., LL.D., b. in Phila. June 27, 1796, brother of Prof. Charles Hodge and son of Dr. Hugh Hodge; grad. at Princeton with honors 1814; took the med. degree in 1817 at the Univ. of Pa.; prof. of obstetrics in that inst. 1835-63. Wrote *System of Obstetrics* and on *Diseases Peculiar to Women*, standard treatises of the first authority; wrote much for the professional journals, and had a wide fame as a practitioner and instructor. D. Feb. 23, 1873.

Hodge (H. LENOX), M. D., b. July 30, 1836, in Phila., Pa.; studied at the Univ. of Pa., and received the degrees of B. A., 1855, M. A. 1858, and M. D. 1858; was resident phys. in the Pa. Hospital 1858-60. In 1861 was appointed demonstrator of surgery and chief of the surgical dispensary of the Univ. of Pa., and in 1870 was made demonstrator of anat. During the war was one of the surgeons attached to the U. S. Satterlee Hospital, belonged to the Pa. reserve corps of surgeons, and was pension examining surgeon to the U. S. Sanitary Commission; has been attending surgeon to the Children's Hospital since 1864, and attending surgeon to the Presb. Hospital since its opening in 1872. He has written and pub. a number of articles in med. journals in connection with original investigations on metallic sutures, trachotomy, ovariectomy, etc.

Hodograph [hōd'og'raf, "path," and γράφειν, to "write" or "describe"]. If from any fixed point lines be drawn at every instant representing in magnitude and direction the velocity of a point describing any path in any manner, the extremities of these lines form a curve which is called the *hodograph*. The invention of this construction is due to Sir W. R. Hamilton, and the most beautiful of the many remarkable theorems to which it leads is this: *The H. for the motion of a planet or comet is always a circle, whatever be the form and dimensions of the orbit.*

Hoei-Shin, or Hui-Shen, a Buddhist monk from Chi., who, according to his own narrative, regularly entered on the Chi. Year-Books, returned a. n. 499 from a long journey to the E., where, as he declared, he had visited a country which, according to the distances as he gave them, would be Cal. or Mex. He describes a plant, *fusing*, from which he named the country. From its fruit, "like a red pear," and the description of the cloth and paper made from its fibres, this appears to have been the magney or *Agave Americana*, so characteristic of the country. "No iron," he says, "is found in this land, but copper, gold, and silver are not prized, and do not serve as a medium of exchange in the market." In this and all other particulars the narrative of H.-S. applies accurately to what is known in part of Mex. and in part of Peru. The monk declares that he found Buddhist insts. which had been introduced 50 yrs. before him by 5 beggar-priests from Kipin (Beloochistan). (See C. G. LELAND, *Fa-san, or the Discovery of Amer. by Chi. Buddhist Priests in the Fifth Century*, Lond.)

Hofer (ANDREAS), b. at St. Leonard, in the Tyrol, Nov. 22, 1767; took command of a party of riflemen serving against the Fr. 1796; took a prominent part (1803-09) in the public affairs of the Tyrol; led in the uprising of the people against the Fr. and Bavarians 1809; gained the important battles of Sterzing and Innsbruck; defeated Lefebvre and drove him out of the prov., and was declared ruler of the Tyrol. Soon after, Aus. having been reduced to submission by Nap., H. became unable to sustain himself. Betrayed for money by one of his most trusted followers, he was taken prisoner and shot by order of Nap. at Mantua Feb. 20, 1810.

Hoffman (DAVID), LL.D., b. in Baltimore Dec. 25, 1784; was prof. of law in the Univ. of Md. 1817-36, after which he practised law in Phila., though passing some yrs. in Europe, from which he returned in 1853. He pub. *A Course of Legal Study, Chronicles from the Originals of Carthage*, etc. D. Nov. 11, 1854.

Hoffman (JOHN THOMPSON), LL.D., b. at Sing Sing, N. Y., Jan. 10, 1828, grad. in 1846 at Union Coll., Schenectady; was admitted to the bar in 1849; became in 1860, and again in 1863, recorder of New York city; was Dem. mayor of New York 1866-69, gov. of N. Y. 1869-73.

Hoffman (MURRAY), b. in New York Sept. 29, 1791, grad. in 1809 at Columbia Coll.; admitted to the bar, and was (1839-43) assistant vice-chancellor, and (1853-61) judge of the superior court of New York. Author of *Treatise on the Corporation of New York, Vice-Chancery Reports, and Ecclesiastical Law in New York*. D. May 7, 1878.

Hoffman (OGDEN), a son of Judge Josiah Ogden Hoffman, b. in New York in 1799, and grad. at Columbia Coll. in 1812; served 3 yrs. as a mdpn. in the war with G. Brit.; was admitted to the bar of Orange co., N. Y.; removed to New York city in 1826; was M. C. 1837-41, and again in 1848; in 1854 was chosen atty.-gen. of N. Y. D. May 1, 1856.

Hoffman (WILLIAM), b. in the city of New York Dec. 2, 1807, grad. from the U. S. Military Acad., and entered the army as brevet second lieu. of inf., rising to be col. 1862; saw much active service against the Sac and Seminole Indians, being thus engaged and on frontier duty till 1846; in the war with Mex. he participated in the siege of Vera Cruz and the various battles up to and including the capture of the city of Mexico; on duty in Tex. at the outbreak of the c. war, where he was made a prisoner of war; exchanged Aug. 1862. Appointed commissary-gen. of prisoners in 1862, he supervised and controlled all captured and paroled prisoners until the close of the war (brevetted brig.-gen. and maj.-gen.), when he assumed command of his regiment; retired in 1870.

Hoffmann (ERNST THEODOR WILHELM), a Ger. novelist of great talent but of somewhat unsound character, b. at Königsberg in 1776. He studied law, and held for some yrs. various judicial offices in Posen and Warsaw. In 1816 he was appointed councillor of the court of judicature in Berlin, in which city he d. in 1822. His life was very unhappy. His father, who deserted him, was a man of bad temper, and his uncle, who ed. him, was a man of pedantic character. In his early manhood he was thrown out of his position by Nap.'s invasion. When he was once more reinstated in his judicial office he had contracted habits which made him unfit for society. He retired to the tavern, where his fine gifts were rapidly destroyed. His first book, *Phantasie-stücke in Callot's Manner* (1814), a collection of essays or papers chiefly on music, belongs to the finest and most charming efforts of Ger. genius. His *Elevere des Teufels* is still more brilliant and powerful, though it is wild, weird, and eccentric. His last effort was *Lebens ansichten des Kater-*

Murr (1821-22). Among his minor novels many may be considered as masterpieces, such as *Meister Martin*, *Fraulein Soutery*, *Doge und Dogeresse*, etc. CLEMENS PETERSEN.

Hoffmann (FRIEDRICH), M. D., F. R. S., b. at Halle, Ger., Feb. 19, 1660, grad. M. D. at Jena 1681; became phys. to the king of Prus. 1708; was prof. of med. at Halle 1693-1742. His greatest work was *Systema Medicinæ Rationalis*. His name is perpetuated by "Hoffman's anodyne" (*Spiritus ætheris compositus*), a preparation devised by him. D. Nov. 12, 1742.

Hog [a word of Cynic origin], the domestic swine, the remote offspring of the wild swine (*Sus scrofa*). Its flesh, rejected as unclean by Jews, Mohammedans, etc., is an important article of food among most civilized and many barbarous nations. The flesh is not the only valuable product. The skin makes a leather valued by the saddler; the bristles make the best brushes; the fat supplies lard, and glycerine, soap, and star candles. There are many breeds of domestic swine, which differ greatly in size, fattening qualities, and profitability in raising. When neglected and bred in the woods and fattened upon nuts and acorns, the swine tends strongly to revert to the wild type.

Hogarth (WILLIAM), a celebrated Eng. artist, foremost in his line of subjects; b. in Lond. 1697 or 1698, date uncertain. His father, a school-master, apprenticed him in 1712 to a silversmith as an engraver of armorial bearings on plate. A few yrs. later he was engaged in engraving for booksellers. His first profession was that of portrait-painter; but his talent leading him in other directions, he soon struck the vein that made him famous. H.'s industry was indefatigable, and his achievements too numerous to be mentioned here even by name. *The Analysis of Beauty*, a vol. pub. in 1753, contained much keen observation and abounded in clever hints, but has not materially added to his fame. The public galleries of Lond. hold many of H.'s great pictures, the best of which are accessible to everybody in prints from the artist's own plates. A list of the most important of these is in Spooner's *Dict.* and Mrs. Clements's *Handbook*. D. Oct. 26, 1764. O. B. FROTHINGHAM.

Hogg (JAMES), "the Ettrick Shepherd," b. in Ettrick parish, Selkirkshire, Scot., Jan. 25, 1772; followed his ancestral occupation of shepherd, and several times attempted, with poor success, to gain a living as a farmer on his own account. His school education was very slight, but he was a great reader. In 1801 he pub. *Scot. Pastorals, Poems and Songs*, followed by *The Mountain Bard*; became in 1810 ed. of *The Spy*, a journal in Edinburgh. Here he was the associate of Scott and the other Tory men of letters and a contributor to *Blackwood*. In 1817 the duke of Buccleugh settled him upon the farm of Altrive, where he lived his remaining yrs., engaged mainly in literary work. His best work is *The Queen's Wake*. D. Nov. 21, 1835.

Hog Plum, the fruit of *Spondias lutea, tuberosa, purpurea*, and *Mombin* of Brazil and the W. I., so called because hogs are fed upon the fruits. The fruit of *S. Birrea* of Senegal and Abyssinia yields an intoxicating drink. That of *S. dulcis* or *Poupartia*, in the Society Islands, is delicious. Several of the above and other species have medicinal qualities. They belong to the order Anacardiaceæ.

Hog Rat, a name given to certain large rodents of the family Spalacopodidæ, genus *Capromys*, natives of the West Indies. They are sometimes used as food. The hair is coarse, but not spiny. Three species are known.

Hogshead [derivation uncertain], in wine-measure $\frac{1}{4}$ a pipe, or 63 wine-gallons. In beer-measure a hogshead contains 54 beer-gallons. The first kind contains $52\frac{1}{2}$ imperial gallons, nearly; the second about 55 imperial gallons. Any large cask is in popular lang. called a hogshead. A hogshead of tobacco weighs from 750 to 1200 lbs., varying in the different States.

Hohenlinden, v. of Bavaria, where the Fr. under Moreau defeated the Aus. Dec. 3, 1800.

Hohenlohe, ho'en-lo-eh, a princely family of Ger., sprang from Franconia, where the castle of Holloch was the family seat; acquired much landed property, became counts, and branched off into various lines. In 1776 the counts of H. were created princes of the empire. At present the family comprises 2 prin. lines—H.-Neuenstein (subdivisions, H.-Langenburg and H.-Oehringen) and H.-Waldenburg (subdivisions, H.-Bartenstein and H.-Schillingfürst). The following members are known to hist.: (1) FRIEDRICH LUDWIG, prince of H.-Ingelfingen, Prus. gen., b. 1746, d. 1818; famous for the infamous capitulation at Preulzau, Oct. 28, 1806. (2) LUDWIG ALOYSIUS, prince of H.-Waldenburg-Bartenstein, b. 1765, d. 1829; distinguished himself in the Fr., Dut., and Aus. services; became marshal and peer of Fr.; fought against Nap. (3) ALEXANDER LEOPOLD FRANZ EMMERICH, prince of H.-Waldenburg-Schillingfürst, b. 1794, d. 1849; became a priest, wrote mystical books; had great fame as a healer of the sick by miraculous power. (4) CHLODWIG, prince of H.-Waldenburg-Schillingfürst, ambassador of the Ger. emp. to Fr., Mar. 31, 1819.

Hohenstaufen, ho'en-stōw-fen, was the name of a princely family in Ger. which arose in the middle of the 11th century, bore the imperial crown from 1138 to 1254, and died out in the latter part of the 13th century. The founder of the family was Friederich von Büren, whose son, FRIEDRICH VON STAUFEN OF HOHNSTAUFEN, followed Henry IV., and distinguished himself so much by valor and military talents that the king made him duke of Suabia, gave him his daughter Agnes in marriage, and appointed him regent in Ger. during his absence in It. By this rapid rise the family of H. (also called by the Its. *Ghibellines*, from another of their possessions, the castle of Weiblingen) could not help coming into collision with the powerful family of the Welfs or Guelphs, which in Ger. held the dukedom of Bavaria, beside large possessions in It. Friedrich was compelled by his enemies to renounce parts of his dukedom. On his death in 1105 he left 2 sons, of whom the eldest, Friedrich II., was confirmed as duke of Suabia by Henry V., and the younger created duke of Franconia in 1112. Both the brothers ad-

hered to the emp., and when, in 1125, the Franconian dynasty died out with Henry V., the family of H. inherited a large part of the emp.'s private fortune. Friedrich II. even attempted to obtain the imperial dignity. Lothar the Sax., an enemy of him and his family, was chosen emp., and the H. were pressed so hard that they had to sue for peace in 1135. Nevertheless, on the death of Lothar in 1138, Friedrich II.'s brother, Conrad, duke of Franconia, became emp., and the family held the dignity for more than a century in the persons of Conrad III., 1138-52; Frederick I. Barbarossa, 1152-90; Henry VI., 1190-97; Philip, 1197-1203; Frederick II., 1212-50; Conrad IV., 1250-52. The gen. character of these men was energy, tending toward despotism, but allied with magnanimity. The most prominent feature of their reign was their perpetual contest with the Guelphs and the popes. In 1252 Conrad IV. left Ger. for It., in order to consolidate his power in his inherited countries in S. It., but in 1254 he was poisoned. His half-brother, Manfred, endeavored to sustain the authority of the family, but was killed in the battle at Benevento in 1266, and when (1268) Conradin, the son of Conrad IV., tried to come into possession of Naples, he was defeated at Tagliacazzo and beheaded. The male line of the family of H. died out with him.

Hohenzollern, ho'en-zen-lern, a terr. of Ger., inclosed by Württemberg and Baden, but belonging to Prus. It is mountainous, but fertile, watered by the Neckar and the Danube. It formed 2 independent principalities, Hechingen and Sigmaringen, until 1849, when the king of Prus. bought the sovereignty by paying the 2 princes an annual pension. Area, 453 sq. m. Pop. 1880, 67,624.

Hohenzollern, a princely family of Ger., which now occupies the imperial throne in the person of the emp. Wilhelm. Thassilo, count of Zollern, was the oldest member of the family known to hist.: he d. about the yr. 800, and his eldest son, Tharcho, propagated the family and d. in 866. His son Rudolf rendered service in the war against the Huns and Wends. A descendant of his, Rudolf II., acquired much landed property. On his death (1210) the family branched off into 2 lines, of which the elder kept the paternal possessions in Suabia, and continued up to our days under the name of Hohenzollern, while the younger line, called the Conradine, settled in Franconia, founded the house of the burgraves of Nuremberg, and formed the dynasty of Brandenburg and Prus. Count Konrad I. of Zollern, the younger son of Rudolf II., married Maria, the daughter and heiress of Count Diebold of Vohburg, and came thereby into the possession of the burgraviat of Nuremberg. The Suabian line separated in 1576 into 2 branches—H. Hechingen and H. Sigmaringen. The former was raised to the princely rank Mar. 28, 1623, but the title of prince was bestowed only on the chief. The emp. Leopold I. gave the title of prince to all members in 1692. In the same yr. a covenant of inheritance was concluded between the 2 branches of the family, of which the younger one had now assumed the name of Brandenburg. Hermann Friedrich Otto, sovereign prince of H. Hechingen, concluded a treaty with Prus., by which he transferred his sovereignty to the Prus. crown, Apr. 8, 1850. The branch of H. Sigmaringen obtained the princely dignity in 1638, and ceded its sovereignty to Prus. in consequence of the revolution of 1849. The male line of the branch of H. Hechingen is now extinct; the princes of H. Sigmaringen take rank as younger sons of the house of Prus.; one of them is sovereign prince of Roumania. The younger line, the Franconian, obtained the princely dignity in 1273. Friedrich VI., burgrave of Nuremberg, bought the margraviat of Brandenburg from the emp., and was created elector of Brandenburg in the same yr. In 1605 the elector Joachim Friedrich obtained the regency in the duchy of Prus., and his successor, Johann Sigismund, secured for his family the possession of that country. Georg Wilhelm added the title of duke of Prus. to his other titles, and his successor, Frederick William, the "Great Elector," gave the country political influence, acquired new provs., and left at his death (Apr. 29, 1688) a state with 1,500,000 inhabs. His son, Frederick III., attained the royal dignity, and was crowned Jan. 18, 1701 (as king of Prus. Frederick I.). He was followed by Frederick William I., then Frederick II., "the Great," who left his state with 6,000,000 inhabs.; Frederick William II.; Frederick William III., who was defeated by Nap., but regained his country; his son, Frederick William IV.; and then his younger son, William, who became emp. of Ger. Jan. 18, 1871.

Holbach, BARON VON. See APPENDIX.

Holbein, hol'bin (HANS), called the YOUNGER, b. at Augsburg, Bavaria, in 1494, or perhaps even a few yrs. earlier, received his first instruction from his father, a painter of some note. As early as 1512 his brilliant talent had attracted great attention, and he received large orders both for private houses and public buildings. With a letter of introduction from Erasmus to Sir Thomas More he went to Eng. in 1526, and here Henry VIII. was so charmed by his pictures that he made him court-painter and heaped both honors and money on him. In accuracy of drawing, in truth and richness of coloring, H. stands among the greatest painters of the world. His portraits especially are excellent. While in Eng. he painted or drew not only the king, but his queens Jane Seymour and Anne of Cleves, and Prince Edward. His most famous picture is the *Madonna of the Meyer Family*, in the gallery of Dresden. D. Nov. 1543.

Holberg (LUDVIG). See APPENDIX.

Holbrook (JOHN E.), M. D., b. in Beaufort, S. C., Dec. 31, 1796; was carried North when an infant; grad. in 1815 at Brown Univ., and took the degree in med. at the Univ. of Pa. After visiting the hospitals of Europe, he commenced the practice of his profession in Charleston, S. C., and upon the organization of the Med. Coll. of S. C. was assigned to the chair of anat., which he occupied for more than 30 yrs. His reputation rests especially upon his investigations as a naturalist. In 1842 he pub. his great work, *Amer. Herpetology*. D. Sept. 8, 1871.

Holcombe (AMASA), A. M., b. at Southwick, Mass., June 18, 1787, a farmer's son; when 19 yrs. old made surveyors' compasses, and at 20 began to compile almanacs, several of which he pub. When 27 he began to teach engineering, astron., and surveying; adopted the profession of civil engineer 1826; began to make telescopes in 1828, and had, it is believed, no competition from any other maker in the U. S. until 1842. Was a member of both branches of the State legislature.

Hol'den, R. R. junce., Johnson co., Mo., 50 m. S. E. of Kansas City; timber, coal, and building-stone are plenty. Pop. 1870, 1576; 1880, 2044.

Hol'den (OLIVER), the composer of the psalm-tune *Coronation*; was a carpenter, and afterward a music-teacher and the keeper of a music bookstore. Pub. *Amer. Harmony* and the *Worcester Collection*, and was one of the pioneers of Amer. psalmody. D. 1831.

Hol'kar, the name of a family of Mahratta chieftains who have played a conspicuous part in the hist. of India during the last 2 centuries, and often proved themselves formidable enemies of the Brit. empire in Hindostan. Mulhar Rao H. (b. 1693, d. 1765) was the founder of the family. But its most remarkable member was Jeswunt Rao H., who reigned from 1801 to 1811. Although he was defeated at Indore (Oct. 14, 1801) by Dowlat Rao Sindia, his reputation for valor and energy was so great that a part of the victorious army went over to his side, and next yr. (Oct. 25, 1802) he routed Sindia at Poona. Sindia took refuge with the Brit., and now a war began between H. and the Brit., which was carried on to Dec. 24, 1805, when peace was concluded and H. compelled to give up some maritime dists. He d. insane, and was succeeded by his son Mulhar Rao H. (1811-33). He began war against the Brit. in 1817, but was defeated, and under the peace of Jan. 6, 1818, an Eng. residency was established at Indore. The ruler of Indore, Mulkerji Rao H., is not of the H. family; with Kumdri Rao H. the family died out in 1852.

Holland. See NETHERLANDS.

Holland, city, Ottawa co., Mich., on R. R. It contains a coll. The town was settled by Hollanders, who form $\frac{3}{4}$ of the pop. Pop. 1870, 2319; 1880, 2620; 1884, 2972.

Holland (HENRY), BART., M. D., D. C., F. R. S. b. at Knutsford, Cheshire, Eng., Oct. 27, 1788, grad. M. D. at Edinburgh 1811; was for many yrs. a phys. in ordinary to Queen Victoria, and one of the most popular men, professionally and socially, in Lond. He several times visited the U. S., and travelled in Europe and Asia. His second wife, a daughter of Sydney Smith, and a writer, d. Nov. 2, 1866. Sir Henry wrote *Med. Notes and Reflections and Recollections of Past Life*. D. Oct. 28, 1873.

Holland (HENRY RICHARD VASSALL-HOLLAND), LORD, b. in Wiltshire Nov. 21, 1773; succeeded in 1774 to the peerage as the third Lord Holland of the Fox family; but his patronymic was changed from Fox to Vassall in 1797, the latter being the family name of his wife, the divorced Lady Webster. His uncle, Charles James Fox, trained him up to liberal political principles, and he was (1806) made a plenipotentiary for settling disputes with the U. S.; was lord privy seal 1806-07, chancellor of the duchy of Lancaster 1830-40. Author of *Life and Writings of Lord the Viscount, Memoirs of the Whig Party*, etc. D. Oct. 22, 1840.

Holland (JOSIAH GILBERT), M. D., b. at Belchertown, Mass., July 24, 1819, grad. at Berkshire Med. Coll., Pittsfield, and practised med. 3 yrs.; was for a short time an ed. in Springfield, Mass., and for 1 yr. supt. of schools, Vicksburg, Miss. He was (1849-66) editorially connected with the *Springfield Republican*, and in 1870 became ed. of *Scribner's Monthly*, New York. Among his works, some of them pub. under the name of "Timothy Titcomb," are a *Hist. of Western Mass.*, *Bitter Sweet*, a poem; *Life of Lincoln*, and *The Mistop of the Masses*. D. Oct. 12, 1881.

Hol'ley (ALEXANDER LYMAN), C. E., b. July 20, 1832, at Lakeville, Conn.; grad. at Brown Univ. 1853, and was technically educated at the Corliss Steam-Engine Works. In 1865 he introduced the Bessemer process into Amer., and built the first steel-works at Troy, N. Y.; also built Bessemer steel-works and rolling-mills in other places, and became a consulting engineer. D. Jan. 29, 1882.

Holley (HORACE), LL.D., b. at Salisbury, Conn., Feb. 13, 1781, grad. at Yale 1803; studied law, and then divinity; was pastor of the Hollis st. ch., Boston, 1809-18; became a Unit.; pres. of Transylvania Univ., Ky., 1818-27. D. July 31, 1827.

Hol'lidaysburg, cap. of Blair co., Pa., 7 m. from Altoona, on R. R. It has a female sem. Its industries are principally manufacturing. Pop. 1870, 2952; 1880, 3150.

Hol'lister, on R. R., cap. of San Benito co., Cal., 94 m. S. of San Francisco. It contains a sem. The prin. tobacco plantations of Cal. are near the town, and the quicksilver and coal developments are rich and promising in the mt. ranges. Pop. 1880, 1634.

Hol'liston, Middlesex co., Mass., 26 m. S. W. of Boston, on R. R. Has free library. Pop. tp. 1870, 3073; 1880, 3098.

Holloway's College, Eng. See APPENDIX.

Holly, the name of various shrubs and small trees, chiefly of the genus *Ilex* and order Aquifoliaceæ. They are mostly evergreens, with green leaves and red berries. The typical species is *I. aquifolium*, the European H., whose leaves are prized for Christmas decoration. Its bark yields bird-lime and has medicinal powers. The finest Amer. species is the *I. opaca*, a small tree, used also in Christmas decoration. The wood of both the above species is used by turners, inlayers, and carvers. *I. Cassine* and other species yield the "yaupon tea" of the Carolinas and the "black drink" of the Creek Indians. Maté, or Paraguay tea, is produced by certain S. Amer. H. The U. S. has some 12 or 14 species of *Ilex*, mostly unimportant shrubs. The sea-H. or sea-holm of Europe is the *Eryngium maritimum*.

Holly, R. R. junce., Oakland co., Mich., 52 m. from Detroit. Ice is extensively shipped from this vicinity. Pop. 1870, 1429; 1880, 1443.

Hollyhock, the name of certain biennial plants of the

genus *Althaea* (*A. rosea*, *ficifolia*, *Chinensis*), tall herbs, much cultivated in gardens for their flowers, of which there are many varieties, single and double. The stalks abound in a fibre which may be utilized as paper-stock.

Holly Springs, city, cap. of Marshall co., Miss., R. R. June, 43 m. S. E. from Memphis, Tenn. It ships annually over 23,000 bales of cotton. Pop. 1870, 2406; 1880, 2370.

Holm, or **Holly Oak** (*Quercus ilex*, the *ilex* of Rom. authors), a fine evergreen tree of S. Europe.

Holmes (ABIEL), D. D., LL.D., b. at Woodstock, Conn., Dec. 24, 1763, grad. at Yale in 1783; held Congl. pastorates at Midway, Ga., 1785-91, and at Cambridge, Mass., 1792-1832. Author of *Annals of Amer.* and many papers in the *Mass. Historical Collections*. He was the father of Dr. Oliver Wendell Holmes. D. June 4, 1837.

Holmes (DAVID), son of Col. Joseph Holmes of Frederick co., Va., was in Cong. 1797-1809, gov. of Miss. Terr. 1809-17, gov. of the State of Miss. 1817-19 and 1825-27, U. S. Senator 1820-25. D. Aug. 20, 1832.

Holmes (GABRIEL), b. in Sampson co., N. C., in 1769, ed. at Harvard Coll.; became a lawyer; State senator 1827, gov. of N. C. 1821-24, in Cong. 1825-29, also gen. of militia. D. Sept. 26, 1829.

Holmes (GEORGE FREDERICK), b. in Brit. Guiana in 1820, ed. in Eng. at Durham Univ. When 18 yrs. old he came to the U. S., and was a teacher in Va., Ga., and S. C., and in 1842 was admitted to the bar of S. C. by the legislature, although not naturalized; in 1845 accepted a professorship in Richmond Coll., Va.; in 1846 was chosen pres. of the Univ. of Miss.; in 1847 prof. of hist., political economy, and international law in William and Mary Coll., and in 1857 prof. of hist. and lit. in the Univ. of Va. Author of a series of school-books for the S. States.

Holmes (ISAAC EDWARD), b. at Charleston, S. C., Apr. 6, 1796, grad. at Yale 1815; became a lawyer of his native town 1818; was one of the founders of the S. C. Association and a leader of the extreme States' Rights party; was an able and distinguished M. C. 1839-50; resided in Cal. 1850-61; strove to avert the c. war in 1861. D. Feb. 24, 1867.

Holmes (JOHN), b. at Kingston, Mass., Mar. 1773, grad. at Brown Univ. 1796; removed in 1799 to what is now Me., and became a lawyer of the town of Alfred; was prominent in the convention which drew up the const. of Me. 1820; was in Cong. 1817-20, U. S. Senator 1820-27 and 1829-33, in the legislature 1829 and 1835-38, U. S. dist. atty. 1841-43. Author of *The Statesman, or Principles of Legislation and Law*. D. July 7, 1843.

Holmes (OLIVER WENDELL), M. D., LL.D., a son of Dr. Abiel Holmes, b. at Cambridge, Mass., Aug. 29, 1809, grad. at Harvard in 1829; studied law for a time, and afterward med., receiving his doctor's degree in 1836, after several yrs.' attendance in the European hospitals. In 1838 became prof. of anat. and physiology in Dartmouth, and occupied the same chair in the Mass. Med. School, Boston, 1847-82. He is distinguished as an accurate anatomist, a skillful microscopist and auscultator, and a successful amateur photographer, but his widest fame is as a poet, wit, and man of letters. Wrote the poems *Terpsichore*, *Urania*, and *Astræa*; also *Autocrat of the Breakfast Table*, *Prof. at the Breakfast Table*, *Poet at the Breakfast Table*, *Elsie Venner*, *The Guardian Angel*, *Songs of Many Seasons*, *John L. Molley*, a *Memoir*, *Ralph Waldo Emerson*, etc.

Holmes (THEOPHILUS HUNTER), b. in N. C. in 1805, grad. at the U. S. Military Acad. 1829; first lieut. 7th Inf. 1833, major 8th Inf. 1855, resigned in 1861; commanded a Confed. brigade in reserve at Manassas; with the rank of lieut.-gen. he held (1862-64) a command in Ark.; attacked Helena July 3, 1863, and was repelled with heavy loss. D. June 20, 1880.

Holofernes. See JUDITH.

Holothurians [Gr. ὅλος, "whole," and ὄπιον, a "mouth," an "opening"], or **Holothuroidea**, an order of echinoderms having a long, cylindroid, somewhat worm-like body, and with a circle of appendages around the mouth. The integument is generally leathery. There are several families. The trepang or *bêche de mer* (*Holothuria edulis*) and sea-cucumber (*Pentacta frondosa*) of the N. Atlantic are typical species.

Holstein, hol-stin, a former duchy which belonged to Den., whose king, as duke of H., was a member of the Ger. confederation, but which in 1866 was annexed to Prus., and now, together with Schleswig, forms a part of the empire of Ger. Pop. 1880 (including Schleswig), 1,127,149.

Holston River rises in Va., by 2 heads, the N. and S. forks, which unite near Kingsport, Tenn., and flows S. W. 200 m. to Kingston, Tenn., where it joins the Clinch and forms the Tenn. River. It is navigable for light-draft boats throughout, and for large steamers to Knoxville for 9 months of the yr.

Holt (Sir JOHN), b. at Thame, Oxfordshire, Eng., 1642; became a prominent advocate; in 1685 he was appointed recorder of Lond., administering his office until the following yr., when, by opposing a court measure, he was removed. Subsequently he was sergeant-at-law. William (prince of Orange), upon his accession to the throne (1689), appointed H. lord chief-justice of the king's bench. D. 1709.

Holt (JOSEPH), b. in Breckenridge co., Ky., Jan. 6, 1807, ed. at St. Joseph's Coll., Bardonia, and at Centre Coll., Danville; in 1828 he entered upon the practice of law at Elizabethtown, Ky., removing to Louisville in 1832; in 1835 removed to Pt. Gibson, Miss., where he practised with great success until 1842, when he returned to Louisville. In 1857 Pres. Buchanan appointed him com. of patents, and in 1859 P. M.-gen. Upon the resignation of John B. Floyd (Dec. 1860) Gen. H. was appointed to succeed him as sec. of war, and during the eventful months which preceded as well as on the occasion of the inauguration of Pres. Lincoln, he actively co-operated with the gen.-in-chief in maintaining order and suppressing threatened traitorous outbursts at the cap. He subsequently made a report detailing the facts of the intended seizure of the cap. In Sept. 1862 Pres.

Lincoln selected him as judge-advocate-gen. of the army, with the rank of col., which he accepted, and upon the establishment of the bureau of military justice in June 1864 was retained at its head with the same title, but with the increased rank of brig.-gen. In this capacity he has borne a conspicuous part in the various important courts-martial, courts of inquiry, and military commissions—notably that before which were arraigned the assassins of Pres. Lincoln. Retired Nov. 1875.

Holton, city, cap. of Jackson co., Kan., on R. R., 56 m. W. of Leavenworth. Pop. tp. 1870, 426; 1880 (not given).

Holton (SAMUEL), b. at Danvers, Mass., June 9, 1738; was a phys. of his native town; assisted in forming the Confederation 1777; was in Cong. 1778-83, 1784-87, and 1793-95; judge of probate 1796-1815; 27 yrs. a State councillor, and was a justice of the common pleas. D. Jan. 2, 1816.

Holy Alliance, a compact entered into at Paris Sept. 26, 1815, by the sovereigns of Rus., Aus., and Prus., joined by most of the other European powers, and pub. Feb. 2, 1816. It forever excluded all members of the Bonaparte family from any throne in Europe, expressed the intention of the contracting powers to live in Chr. harmony, and exhorted the people to faithful daily fulfilment of Chr. duties.

Holy Communion. See EUCHARIST.

Holy Communion, Sisters of the, a society of ladies of the P. E. Ch., founded in New York in 1845 by the Rev. Dr. W. A. Muhlenberg. They are not bound by vows, do not wear a strictly uniform habit, and are devoted to the care of the sick in hospitals and to other charitable labors.

Holy Cross, Congregation of the, an association of regular clerks, founded 1834. Their present rule was approved 1856, in which yr. the Brotherhood of St. Joseph was merged into this congregation. They were introduced into the U. S. 1842. They have a coll. at Watertown, Wis., and are numerous in continental Europe; called also Croisiers and Cross-bearers.

Holy Cross, Sisterhood of the, founded 1834 at Mans, Belg. Their rule was approved in 1857. There are 2 orders of "Daughters of the Cross" and one of "Sisters of the Cross," independent of the above.

Holy Ghost, or Holy Spirit [Heb. *Ruah Elohim* and *Ruah Jehovah*; Gr. *πνεῦμα ἁγίου*], the Spirit of God, of Christ, of the Lord, etc., is the third Person of the Trinity, whose existence, character, and offices are revealed in the Bible. Sax. *ghost*, Ger. *geist*, Dan. *ånd*, Heb. *ruah*, Gr. *πνεῦμα*, Lat. *spiritus*, Eng. *spirit*, all originally mean "wind," then "breath," then "life," then the self-conscious, intelligent, self-determined, thinking substance of God, angels, and man. The term *πνεῦμα ἁγίου*, "Holy Ghost," in Script. and Chr. theol., does not designate the spiritual substance common to the three Persons of the Godhead, but the third Person or Hypostasis existing in the unity of that substance.

SCRIPTURAL AND CHURCH DOCTRINE OF THE HOLY GHOST.

1. *His Personality*.—The attributes of personality are intelligence, will, individual subsistence; and in Script. all of these are predicated of the Spirit.

2. *His Divinity*.—He is called by the exclusive names of God. What Jehovah says in the O. T. the N. T. writers ascribe to the Holy Ghost. Divine attributes are predicated of him; divine works are ascribed to him; divine worship is to be paid to him.

3. *The Procession of the Holy Ghost* is a technical phrase, originating in John xv. 26 ("the Spirit of truth which proceedeth from the Father"), and used by theol. to express the essential relations of the Holy Ghost to the other Persons of the Trinity. The terms Father and Son express an eternal reciprocal relation. The Father eternally begets the Son. The Spirit is the infinite personal "Breath" of God, as the Son is his infinite personal "Word." He is the "Spirit of God" and "from God," and the "Spirit of the Father," "who proceedeth from the Father." He is also the Spirit "of the Son" and "of Christ." He is sent by and acts for the Father; so he is sent by and acts for the Son.

4. *His Office in Nature*.—The "Spirit" or personal "Breath" is the Executive of the Godhead, as the "Son" or "Word" is the Revealer. The Spirit of God moved upon the face of Chaos and developed Cosmos. Henceforth he is always represented as the author of order and beauty in the natural as of holiness in the moral world.

5. *His Office in Redemption*.—Christ promised his disciples on the eve of his crucifixion that he would send them the Spirit of truth as another Comforter, *παράκλητος*, *Paraclete Advocate*. Although he had been the divine agent effecting the salvation of men ever since Adam, it is said this Paraclete was not given until after the ascension and glorification of Christ. The present is the dispensation of the Spirit in contrast with the preceding preparatory dispensation of the Law. (1) The Spirit fashioned the body of Christ in the womb of the Virgin, enriched and supported his human soul, and co-operated with him in all the offices he performed in his estate of humiliation. (2) He inspired the writers of both the O. and the N. T. as to thoughts and words. (3) He teaches those who are spiritually minded the meaning of Script., and applies to all the redemption purchased by Christ. He regenerates, sanctifies, and preserves the souls and raises the dead bodies of the saints. He is to the Ch. and to the individual Chr. the immanent source of life. (4) He is the bond of life and the organizing principle of the historic Ch. on earth, and Ch. teachers and rulers are properly only the organs of the Holy Ghost.

6. *Blasphemy against the Holy Ghost* appears to be an intelligent, deliberate, and malignant "speaking against," and rejection of the Spirit of grace by one who has been under his special influence. It is never pardoned, because of its peculiar guilt, and because it is a definite and final rejection of Christ's salvation. [From orig. art. in *J's Univ. Cyc.*, by Prof. A. A. Hodge, D. D., LL.D.]

Holy Ghost, Orders of the (R. Cath.). (1) An order, at first consisting of hospital knights of St. Augustine, was founded in 1178, and in part removed to Rome in 1204. Here

they became in part canons regular, and after many vicissitudes the knightly branch ceased in 1700 to exist, but the canons regular are not yet extinct. In 1254 the Hospitallers of the Holy Ghost, a secular branch of the above, were organized, containing both brethren and sisters. The latter, called White Sisters, are still numerous and active in benevolent works. With them became connected another sisterhood of the Holy Ghost, established in 1212. (2) Another congregation of canons of the Holy Ghost was confirmed in 1588. (3) A society of missionary priests of the Holy Ghost was founded in 1700, and is still active.

Holy Grail. See SANGREAL.

Holyhead, seaport of N. Wales, on an island of the same name, and connected with the main portion of Anglesea by a causeway and a bridge. H. is notable for the breakwater providing harbor accommodation for the packet service between Eng. and Ire., and an important harbor of refuge. Pop. of parliamentary borough, 8131. The breakwater, commenced in 1847, was completed in 1873, at a cost of £1,500,000. As originally planned, it was 1 m. in length, forming, in conjunction with islands, an almost close harbor of 267 acres. A subsequent extension of 2500 ft. has added 400 acres of "sheltered roadstead." The average depth of water being 40 ft. and tidal rise 18 ft., the stone mound has necessarily great dimensions, averaging 225 ft. width at low water, and (in 50 ft. depth) 400 ft. at base.

Holy Innocents. See CHILDREMAN.

Holy Island, or Lindisfarne (a peninsula at low tide), off the E. coast of Eng. In 635 it became a bp.'s see, and was the episcopal seat of St. Cuthbert. In 900 the see was transferred to Durham. H. I. is a favorite bathing-place; its old castle and ruined abbey are interesting.

Holy League, a name applied to several alliances of European princes. (1) That of 1511, between the pope, Julius II., Sp., and Venice, to expel the Fr. from It. It lasted till 1513. (2) That of Nuremberg (1538), between Charles V. and the Catholic princes of Ger. against the league of Schmalkald. (3) That of 1571, of the pope, Venice, and Sp. against the Turks. (4) The great league of the Guises, the Fr. Parl., the monks, Sp., and the pope against the Huguenots (1576). (5) That of 1609, between the pope and the Catholic states of Suabia and Bavaria. (6) That of 1684, Poland, Ger., and Venice against the Turks.

Holy Maid of Kent, an epileptic maid-servant, named Elizabeth Barton, of an inn at Aldington, Kent, who in 1525 acquired a great reputation for sanctity and prophetic gifts. She became a nun of St. Sepulchre's, Canterbury, and her pretensions were favored by Abp. Warham and Bp. Fisher. Presuming to denounce the judgments of Heaven against Henry VIII. in case of his persistence in his suit for divorce from Catharine of Sp., she with 5 priests, her alleged accomplices, was attainted of high treason and beheaded, Apr. 21, 1534.

Holy Names of Jesus and Mary, Sisters of the, a R. Cath. sisterhood, established at Longueuil, near Montreal, in 1843. Their aim is the instruction of young ladies.

Holyoke, city and R. R. centre, Hampden co., Mass. It contains a public library, and has an immense water-power. The manufacture of paper is the leading industry. It has a free bridge across the Conn. River, connecting it with S. Hadley. Pop. 1870, 10,733; 1880, 21,915; 1885, 30,000.

Holyoke (EDWARD AUGUSTUS), M. D., LL.D., phys. and surgeon of Salem, Mass., b. at Marblehead, Mass., Aug. 1, 1728, and grad. at Harvard in 1746. In 1749 he began his practice at Salem, where he remained actively engaged in his profession 79 yrs. He was temperate in his habits, ate much fruit, walked habitually in his professional business, and took great care to have abundant sleep. D. Mar. 31, 1829, retaining his faculties in a good degree to the last.

Holyoke, Mount, a steep narrow ridge of greenstone trap in Hampshire co., Mass. It is 7 m. long. Its W. extremity is separated from Mt. Tom by a cleft through which the Conn. River flows. The name is limited to the W. extremity. The highest point is 1120 ft. above the sea.

Holy Rood. See TREE CROSS.

Holy Sepulchre, the tomb in which our Lord lay. It was hewn out of a rock in a garden in the place of the crucifixion, just outside the walls of Jerusalem. In the opinion of many, the spot has not yet been identified, and never will be. The traditional site, fixed upon early in the 4th century, is a cave underneath the pile of buildings known as the Ch. of the H. S. The edifice, begun by Constantine in 326, and dedicated in 335, was destroyed by the Pers. under Chosroes in 614; rebuilt after about 16 yrs.; destroyed again by Khalif Hakim, the Fatimite, in 1010; again rebuilt in 1048; enlarged and improved by the crusaders (after 1099); suffered severely from fire in 1808, and in 1810, after extensive repairs, was consecrated anew. It contains chapels for Greeks, Latins, and Armenians, with smaller apartments for Copts, Jacobites, and Maronites. The identity of this traditional site, first disputed by Korte in 1738, has been ably argued for by Williams (*Holy City*, 1845), and ably argued against by Robinson (*Biblical Researches*, 1841; *Liter. Researches*, 1856; *Bibliotheca Sacra*, 1846). Fergusson (*Anc. Topography of Jerusalem*, 1847) identifies the cave underneath the mosque of Omar with the H. S. Fisher How (1871) looks for it on the N. side of the city, just outside of Damascus gate. Barclay (*City of the Great King*, 1858) and others look for it on E. side of the city, just outside of St. Stephen's gate, either N. or S. of it. R. D. HENCOCK.

Holy Sepulchre, Orders of the. (1) CANONS REGULAR AND CANONesses OF (Augustinian), founded at Jerusalem in 1099 or 1114, spread throughout Europe. The canons ceased to exist in the 17th century, but there are still some nuns who live in seclusion and instruct children. (2) KNIGHTS OF THE HOLY SEPULCHRE, perhaps founded by Alexander III., and still found in small numbers. They are now appointed by the pope and by the patriarch of Jerusalem. An order of this name existed in Eng. from 1174 to the 17th century. The Franciscans once had the sole right to confer

this rank. At present the Lat. patriarch of Jerusalem is grand master.

Holy Spirit Plant, or Dove Plant, the *Peristeria alata*, an orchidaceous plant of Central Amer., having white symmetrical floral envelopes, and the stamens and pistil united into a column which curiously resembles a bird with expanded wings. It is venerated in its native regions as the symbol of the Holy Dove, the form in which the Divine Spirit descended at the baptism of our Lord.

Holy Water, in the Gr., R. Cath., and Oriental chs., water which has been consecrated and is used in religious ceremonies. In the Ch. of Rome it is composed of pure spring-water in which a little consecrated salt has been cast. The Grs. use pure water.

Holy Week, the last 7 days of Lent, the week before Easter, popularly known in continental Europe as *Still Week*; often called *Passion Week*, but that name is also given to the week preceding it. It contains Palm Sunday, Spy Wednesday, Maundy or Holy Thursday, Good Friday, and Holy Saturday. It is a penitential season, in commemoration of our Lord's passion and death.

Ho'melyn, Spotted Ray, or Sand Ray, the *Raja miraletus*, a fish common in European seas. It is an abundant food-fish.

Ho'mer, Cortland Co., N. Y., 27 m. S. of Syracuse, on R. R. It contains an acad. Pop. 1870, 2008; 1880, 2331.

Homer, the greatest of epic poets, and the earliest and most eminent author in the lit. of Gr. He lived at so early a period that no certain record of its date has come down to us, and his birthplace is equally a matter of doubt. Herodotus places his birth about 850 yrs. before Christ, and Aristotle makes him contemporary with the Ionian migration, about 140 yrs. after the Trojan war. It is proverbially said that 7 cities contended for the honor of being H.'s birthplace, but, according to Suidas, the list might be nearly doubled. Two different traditions mentioned by Gr. authors make him to have been born on the banks of the Meles, a little river, the windings of which are seen from the highlands overlooking Smyrna. It is inferred from the style and lang. of his poems that, at all events, he was born in some part of Asia Minor. One of the traditions concerning him is that he was blind.

The fame of H. rests upon his 2 great poems, the *Iliad* and *Odyssey*. The common consent of the civilized world has placed those 2 poems at an unapproachable height of poetic excellence. All the qualities which make the great poet are there—sublimity, fire, pathos, grace, knowledge of the human heart, the power of vividly representing action to the eye of the mind, and sweetness and majesty of numbers.

About the yr. 560 B. C., Pisistratus, the tyrant of Athens, caused the different books of the Homeric poems to be collected and arranged in their proper order. About the time of the Chr. era there were in Gr. certain critics called Separatists, who maintained that the *Iliad* and the *Odyssey* were the work of different poets. The difference, however, between the style and treatment of the subject in the 2 poems is not greater than is observed between the *Paradise Lost* and *Paradise Regained* of Milton, and Longinus accounts for it with sufficient probability by supposing the *Iliad* to be the work of H.'s youth, and the *Odyssey* that of his declining yrs. But the personality of H. has been made in modern times the subject of another attack. In 1795 F. A. Wolf, a Ger. scholar, brought forward the theory that the Homeric poems were composed in portions, by the different minstrels who sang them in the public assemblies, and afterward collected and put together in the form and order which they now present.

The editions of H. are almost innumerable. The translations of the Homeric poems into all the langs. of civilized Europe have been numerous, and are still multiplying. [*From orig. text in J.'s Univ. Cyc.*, by WILLIAM CULLEN BRYANT, LL.D.]

Homes (HENRY AUGUSTUS), LL.D., b. at Boston, Mass., Mar. 10, 1812, grad. at Amherst in 1830; was ordained in 1835 at Paris as a missionary of the *Eglise Réformée* to Tur.; served as a missionary of the Amer. Board at Constantinople 1836-50; was assistant dragoman in the Amer. legation to the Porte 1850-53; became in 1854 librarian of the State Library, Albany, N. Y.

Homicide [Lat. *homicidium*, from *homo*, "a man," and *caedo*, to "kill"], the killing of one human being by another. The word *homicide* is the most comprehensive designation employed in law to denote the causing of a person's death by human agency, and has reference to every mode by which such an act may be committed, whether it be innocent or criminal. H., at common law, is divided into 3 classes—justifiable, excusable, and felonious. Felonious H. is the killing of a human creature without justification or excuse, and is divided into manslaughter and murder. These 2 subjects will be examined under their respective titles, so that acts of a defensible nature will alone be considered here. (See MURDER, MANSLAUGHTER.)

1. *Justifiable Homicide.*—This is of various kinds. (1) Where the proper officer executes a criminal in strict conformity with his sentence. Such an act is not only not wrongful, but is obligatory upon the officer as a legal duty. (2) Where an officer of justice or other person acting in his aid, in the proper performance of a legal act which he is required to perform, kills a person who resists or prevents him from executing it. An officer who has authority to arrest and imprison may repel force by force in the attempted discharge of his duty, even to the extent of killing his assailant if he cannot otherwise take the person whom he intends to arrest into custody, or it is necessary for self-protection. So, if a person charged with a felony escapes after arrest or flees to avoid an arrest, the officer is justified in killing him if it be impossible to effect his capture. There will be no such justification, however, if the alleged crime be merely a misdemeanor. Jailers may prevent the escape of prisoners by killing them if it be necessary. But in all such cases killing

must only be resorted to as the last alternative, without which the performance of the officer's duty cannot be accomplished. (3) Where the prevention of a forcible and atrocious crime renders the H. necessary. Whenever any such offence is attempted, as murder, robbery, burglary, arson, rape, etc., either the person whose life or property is endangered, or any one who has knowledge of the intended crime, may use every effort to prevent its commission, and causing the death of the offender is justifiable if the imminent danger cannot otherwise be averted. Nor is it essential to his justification to show that the crime would actually have been perpetrated if the act of H. had not been performed. For a person under such circumstances is warranted in acting upon a natural and reasonable presumption, and if there be sufficient indications of a felonious design and of an immediate purpose to carry it into execution, he may conclude that there is actual premeditation, and use the same means for his protection as would, if such were really the case, be allowable. Under no circumstances can the H. be committed if the crime can be averted by less severe precautions, or unless the necessity continue to the time when the felon is killed. (4) Killing of the enemy during time of war in the actual prosecution of hostilities is, of course, justifiable on the ground of military necessity.

II. Excusable Homicide.—This is of 2 kinds: (1) By misadventure, or accident. This is, however, innocent only when the person committing the H. is engaged in a lawful act, without any intention of inflicting injury upon another, and without any failure to use proper precautions to prevent danger. If the act is unlawful, the H. will be felonious. If the head of a hatchet which a person is using, and which he has reason to believe is firmly fastened, flies off and kills a bystander, or if a wagoner drives over and kills a person lying on the road upon a dark night, the H. is accidental and excusable. The lawful act which results in a person's death may be the administering of reasonable and moderate correction by a parent or school-teacher or other person occupying a position of similar authority. But the H. is only innocent in such a case when the bounds of a proper restraint upon the severity of the punishment are not exceeded. (2) H. in self-defence, or in protection of one's property or his wife, child, parent, or servant. But under this head are not included cases of defence against felonious crimes, which have been already considered, but only against any other modes of attack or injury which may be attempted, as in cases of common assault or trespass, where there is no intention to commit a felony. The distinction is of considerable importance, on account of the difference in the nature of the legal obligation which is imposed upon the person against whom an offence is perpetrated so seek to avoid the commission of H. When an attack is made with intent to kill, or any other felony is attempted, the person whose life or property is endangered is under no duty to seek to avoid the threatened injury by availing himself of every practicable means of escape, but he may stand his ground, use every possible means of defence, and kill the wrong-doer if a reasonable and necessary precaution requires such an act. But when the attempted injury is not felonious, H. cannot be committed in defence unless all available measures are first adopted to escape from or avert the danger. Therefore, if a simple assault be committed, though the person assailed may protect himself by blows, he must, as the old phrase expresses it, "retreat to the wall," or retire and forbear as long as is consistent with safety before he ventures to kill his assailant. In the defence of property retreat is not necessary in order that the H. may be justified, since that would be a yielding of the property without attempting protection; but the wrong-doer must first be requested to leave a house or refrain from interfering with goods before preventive measures can be adopted, and even then the trespasser cannot be killed unless he persists so strenuously in effecting his purpose that such a course is rendered necessary. Only a reasonable degree of force can be used against an intruder if that will prove sufficient. In the U. S. crimes are generally defined by statute, and the principles relating to H. have therefore received various modifications.

GEORGE CHASE.

Homiletics, following the etymology of the term *homily*, denotes the science and the art of preaching. It is that part of practical theol. which relates to the composition and delivery of sermons. It is the technical synonym of "sacred rhetoric," which denotes the application of rhetorical canons to religious discourse. H. relate to the application of the universal laws of conviction and persuasion to the utterances of the pulpit. H. are not supposed to treat of the philos. of rhetoric in gen.; but, presupposing some knowledge of this, it undertakes to show the method in which rhetoric may successfully be employed in the restricted province of the Chr. preacher. The chief object of H. relates to the manner of preaching, including in this gen. term the structure of the discourse and its enunciation. Style, lang., elocution, management of the voice, the carriage of the person, manner, gesticulation, different modes of preparing for the pulpit, different modes of delivery, with or without the MS., memoriter or extemporaneous, all these and many other particulars are included in this gen. designation of homiletical instruction. [From orig. art. in J.'s Univ. Cyc., by WILLIAM ADAMS, D. D., LL.D.]

Homily [Gr. *ὁμιλία*; Fr. *homélie*], a simple religious discourse. The distinction between the *homily* and the *sermon*, as made by writers on sacred rhetoric, is, that the former is less elaborate, with less of method and disposition after rhetorical rules than the latter. A technical sense attaches to the word in hist. which is not strictly observed in ordinary usage. The Fr. observe nice distinctions between homilies, conferences, discourses, and sermons. By "homilies," in modern Eng. use, we should understand that description of sermons which has more of exposition than rhetorical system. So many are the forms of pastoral instruction in the present day, that the old distinction between the H. and

the sermon is nearly obliterated. Historically, H. were designed to supply the deficiencies of an ignorant clergy and an ignorant people. When philosophical and rhetorical method had greatly vitiated pulpit discourse, making it scholastic, subtle, and cold, the H. was intended to provide a simpler mode of conveying religious instruction. In the Rom. Ch. at that period, when few of the clergy were capable of making discourses for themselves, collections of H., consisting of compilations from the Fathers, were authorized for their use. Similar collections were prepared, at the Ref., in the Eng. Ch. by Cramer and Jewell. Their use in the Ch. was authorized as a means of religious instruction at a time of imperfect education. The lang. of the Article enjoining their use requires them to be "read in chs. by the ministers, diligently and distinctly, that they may be understood by the people." The first vol. of the *Homilies* was pub. in the reign of Edward VI.; the second vol. in the reign of Elizabeth. The substance of these Eng. *Homilies* is generally accepted as good and wholesome doctrine, but very considerable differences of opinion have long existed as to the authority attached to their contents as parts of the constitution of the Anglican Ch.

WILLIAM ADAMS.

Homeopathy, ho-me-op'a-the (Gr. *ὁμοιος*, "like," and *πάθειν*, "to be affected"), a method or system of med. treatment based upon the principle that the therapeutic or curative properties of drugs and other medicinal agents are represented by their morbid effects upon the healthy. Hence the name, in contradistinction to allopathy (*dissimilar suffering*), by which term the homeopaths designate the ordinary methods of practice.

The following propositions comprise the essential points of the homeopathic doctrine, as held by the best authorities of the school: (1) The cure of disease is most easily and completely effected by meds. that are themselves capable of producing in a healthy person morbid conditions analogous to those of the disease; and the more exact the similarity, the greater probability of a favorable result. (2) The most certain way of ascertaining the therapeutic value of medicinal agents is by carefully conducted trials of them, singly, upon persons in ordinary health. (3) In order to secure the best results meds. should not be administered to the sick in combination, but singly and in the simplest preparations. (4) Remedies prescribed according to the homeopathic method may be, and in fact generally require to be, administered in smaller and more attenuated doses than are necessary to produce their characteristic effects upon the healthy. The practical application of these rules to the treatment of diseases necessitates the individualization of each particular case. To be strictly homeopathic a med. should correspond not only to the gen. pathological state, but also to the peculiar symptoms of the patient. [From orig. art. in J.'s Univ. Cyc., by H. D. PAINE, M. D.]

Homs, or **Hums**, the *Emesa* of Strabo and Pliny, town of Syria, in the valley of the Orontes, 1 m. E. of the river and about 60 m. N. E. of Baalbek. It was the birthplace of the Rom. emps. Elagabalus (218-232) and his cousin, Alexander Severus (232-235), and was noted for its splendid temple of the Sun, in which these youths were sharing between them the office of high priest when (in 218) the former was chosen Augustus and the latter was made Caesar. The modern town is well built, of black basalt, with which also most of the streets are paved. It is surrounded by a wall of no great strength, but which suffices to keep off the prowling Bedouin. Nothing anc. is now found there except some ruins and Gr. inscriptions. It is a place of considerable trade, and has a pop. of about 20,000, including 7000 Gr. Chrs. and some 200 Jacobites.

R. D. HITCHCOCK.

Hondt, the name of a family of Flemish engravers. The founder of the family, JOSSE HONDT, b. at Wackene, in Flanders, in 1546, and d. in Lond. Feb. 16, 1611, spent a large part of his life in Eng., where he sought refuge from the religious persecutions of the Spaniards; was celebrated as an engraver of maps.—Of his sons, HENRY DE HONDT, the ELDER, b. at Ghent in 1573, and d. at the Hague in 1610; HENRY DE HONDT, the YOUNGER, b. in Lond. about 1581, and d. at Amsterdam about 1650; and WILLIAM HONDT, b. at the Hague in 1601, and d. at Dantzig. A series of portraits by Henry de Hondt the Elder of 144 artists, mostly Flemish, and of Melanchthon, Bugenhagen, Wycliffe, Savonarola, Calvin, and Knox, are widely known; so are those by Henry de Hondt the Younger of Queen Elizabeth and William of Orange, and a view of the Hague.—ABRAHAM HONDT, b. at Rotterdam in 1638, and d. in Lond. in 1691, acquired a great name as a painter of animals.

Honduras, republic of Central Amer., between lat. 13° 10' and 16° 5' N., and bounded by the Caribbean Sea, Nicaragua, the Bay of Fonseca, San Salvador, and Guatemala. The Caribbean coast is low and marshy E. of lon. 85°, lined with extensive salt-water lagoons; W. of lon. 85° it is higher, often rocky, and lined with islands. The Pacific coast, along the Bay of Fonseca, is also low, but it presents several fine harbors. The interior is high, but diversified by mt.-ranges, plateaus, terraces, and valleys. The climate is hot, along the coast very unhealthy, and everywhere capricious. Soil fertile. Forests cover the mts., and yield excellent timber, fine cabinet woods, gums, drugs, and dyestuffs. Gold, silver, copper, and coal are found in many localities, but very few mines are worked. The religion is R. Cath., the govt. republican. Area, 50,000 sq. m. Pop. about 400,000.

Hone, a stone of fine grain used for giving a fine edge to steel blades. They are made of several kinds of stone, often of Paleozoic age. Various greenstones, siliceo-argillaceous slates, etc. are used. One of the best hone-stones is the novaculite of Ark. of Carboniferous age. There are also excellent oil-stones from Tur., Aus., Siberia, Eng., Wales, and Scot. For many purposes the Tur. stone is the best.

Honesdale, R. R. junc., cap. of Wayne co., Pa., 160 m. N. E. of Harrisburg, on the Del. and Hudson Canal, was incorporated as a borough 1831; made the co. seat 1842. It contains a public library. The "Stourbridge Lion," the first

locomotive made in Amer., made its trial-trip from this place in 1828. Large quantities of coal are shipped during the summer by the canal. Pop. 1870, 2654; 1880, 3939.

Honey, the saccharine material collected from flowers by several kinds of insects for the food of themselves and progeny, especially by the honey-bee (*Apis mellifica*). In bee-h. there have been reported as present 4 kinds of sugar—cane-sugar, dextrose, levulose, the fourth being a sugar stated by Soubeiran to be laevo-rotatory to a degree 3 times as great as levulose, but which is little known. There are other substances present, among them an acid ferment, which gradually changes the cane-sugar into a mixture of dextrose and levulose, so that the clear, limpid fresh H. from the comb often becomes granular and opaque, from the crystallizing out of the less soluble glucose. Wasp-H. (of *Polybia apicipennis*) gives large crystals of ordinary sucrose, and Mex. ant-H. yielded to C. M. Wetherill an uncrystallizable sugar. H. varies in aroma and flavor with the flowers from which it has been collected: clover H., buckwheat H., and wild H. being readily distinguishable in this respect; and some cases are on record of poisonous qualities derived from the like source. H. is said to be now much adulterated with glycerine, and even imitated, as a whole, by combining the latter product with other materials, and flavoring with appropriate essential oils. H. WURTZ.

Honey-Ant. See ANT.

Honey-Buzzard, a name given in Eng. to *Pernis apivorus*, a chiefly insectivorous bird of the falcon family, differing from other birds of the family in its food, and in having the space between its eyes and bill completely feathered. *Pernis cristatus*, the crested H.-B., is an Asiatic bird. Bees, wasps, and honey are sought by them.

Honey-comb Moth, or **Bee Moth** (*Galleria cerecina* and *G. albicaria*), small lepidopterous insects of the Pyralidae family. The moth lays her eggs at evening, while the bees are at rest. The larvæ spin silken galleries in beehives between the layers of honey-comb, upon which the young insects feed. They commit great ravages in hives.

Honey Grove, Tex. See APPENDIX.

Honey-Guide, a name given to certain birds of the genus *Indicator* and type of a peculiar family, found in Afr., Borneo, and India, and named from their curious instinct which prompts them to guide the hunter to a hive of wild bees—a feat which it often accomplishes.

Honey Locust, the *Gleditsia triacanthos*, a well known leguminous tree of the U. S.; so named from the sweet pulp in the flat pods; has stout compound thorns; wood coarser than the true locust (*Robinia Pseudacacia*).

Honey-Suckers, an Old-World family of passerine birds, analogous in habits, food, and other characteristics to the humming-birds of the New World, though of larger size. They are also closely connected with the sun-birds (Promeropidae), the humming-birds of the Old-World tropical lands. The H.-S. are mostly very beautiful.

Honey-suckle, the popular name of many shrubs, erect or twining, of the genera *Lonicera*, *Dierilla*, etc., order Caprifoliaceæ; cultivated for ornament. Species of azalea and even columbines are locally known as H.

Hong-Kong ("red harbor"), an island off the S. E. coast of Chi., at the mouth of the Canton River, 75 m. S. E. of Canton. This island was ceded to G. Brit. in 1842, and together with a small strip of the opposite mainland, ceded in 1861, and from which it is separated by a narrow strait, it forms a flourishing colony. The island itself is rocky and bare, but on its N. side it presents a fine harbor, and here is the city of Victoria, which has become a place of great commercial importance. Steamers from Bombay, Calcutta, San Francisco, Canton, Macao, and Singapore go and come daily, and thousands of sailing-vessels, especially Chi. junks, throng the harbor. The city stretches for about 3 m. along the bay, from the foot of the hills to the edge of the water, and contains the cathedral, gov.'s house, bp.'s palace, ex. change, jail, hospital, etc. Beautiful public gardens have been laid out, and free schools for the lower Chi. pop. established. Area, 29 sq. m. Pop. 160,402.

Honolulu, cap. of the Hawaiian Islands, on the S. side of the island of Oahu. Its harbor, formed by a spacious basin in the coral reef which surrounds the island, is safe at all seasons, and lined with substantial and commodious wharves. In 1880 it was visited by 16 whalers and 239 merchant vessels, of which the large majority were Amer. The steamers from San Francisco to Melbourne touch regularly at H. The city itself is situated among beautiful tropical surroundings, and enjoys an equable and healthy climate. Among its public buildings the most remarkable are the king's palace, the parliament-house, the R. Cath. cathedral, the treas., the P. O., etc. It has 1 Anglican and 2 Amer. chs. The value of its importations amounted in 1880 to \$3,673,268, and of its exportations to \$4,968,445. Pop. 14,852.

Honorata (JUSTA GRATA), a daughter of Constantius III. and a sister to Valentinian III., b. at Constantinople in 418 A. D., lived at the court of Valentinian III. She invited Attila, king of the Huns, to come to it, and marry her, and sent him her ring; but Attila took no notice of the invitation. Having become pregnant by her steward, Eugenius, she was sent to Constantinople, but returned to Rome in 450. She again invited Attila, and he saw fit to accept the invitation. He claimed her, together with her part of the empire; and as his claims were disregarded by Valentinian III., he invaded Gaul. What became of H. is not known.

Honorius, Rom. emp. from 395 to 423, b. at Constantinople Sept. 9, 384. At the death of Theodosius the Great (395) the Rom. empire was divided between his 2 sons, Arcadius and Honorius. H. received the W. part—It., Afr., Sp., Gaul, Brittany, and Illyria—with Ravenna for his residence; and as he was only 11 yrs. old he was placed under the guardianship of Stilicho. Stilicho was a vigorous ruler, but when he was killed (408) the barbarian tribes poured in over the frontiers and rebellion arose in all the provs. Brittany was given up; Gaul was overrun by Gothic and Ger. in-

vaders; Afr. made itself independent; It. was thrice plundered, and Rome taken by Alaric. The weak emp. could do nothing, and when one of his gens. defended the empire, he became suspicious and had him killed. After Stilicho followed Constantius. During the reign of H. a gen. persecution was raised against paganism. D. Aug. 27, 423.

Honorius I., Pope, a Campanian, became pope in 625. Special interest his arisen in this pope since the promulgation of the doctrine of papal infallibility from the fact that the letters of H. are conceived to teach, *ex cathedra*, the Monothelite heresy, so called, for which heresy he was anathematized by the third Council General of Constantinople, and afterward was officially pronounced a heretic by Leo II. D. 638.—HONORIUS II., ANTIPOPE, bp. of Parma, elected in 1061, deposed in 1064; d. in 1072.—HONORIUS II., POPE, chosen in 1124; d. Feb. 14, 1130.—HONORIUS III. (*Cencio Savelli*) succeeded Innocent III. in 1216; d. Mar. 18, 1227.—HONORIUS IV. (*Giacomo Savelli*), pope in 1285; d. Apr. 3, 1287.

Honthelm, See FEBRONIANISM.

Hon'uman, or **Entel'us Monkey** *Semnopithecus Entellus*, an E. I. monkey, having long limbs and tail. It is regarded as sacred by the Hindoos, who dedicate temples to it, and erect hospitals for it when sick or wounded. They believe that it is a metamorphosed prince, and to kill it is considered a deadly sin; hence these monkeys swarm in many places, especially in the vicinity of the temples.

Honvéd, the Hungarian militia. The name was first used in 1848, when in order to combat the Aus. supremacy the Hungarian Diet called out about 200,000 men, who were interspersed among the regular soldiers. This militia was called *Honvédség*.

Hood, the name of 2 Eng. admirals, sons of a rector of Bath. The elder brother, SAMUEL, b. Dec. 12, 1724, became admiral in 1780; d. Jan. 27, 1816. He fought with great valor against the Fr. during the N. Amer. war of independence, and again in the war of 1793, when he commanded in the Mediterranean, and expelled the Fr. from Corsica.—The younger brother, ALEXANDER, b. in 1727, became admiral in 1782, and d. May 3, 1814. He commanded under Lord Howe at Gibraltar and in the Channel in 1794, and gained in 1795 a victory over a Fr. fleet off L'Orient.

Hood (JOHN BELL), b. at Owingsville, Bath co., Ky., June 29, 1831; grad. from the U. S. Military Acad., and appointed brevet second lieutenant, of inf. July 1853; transferred to cav., and promoted to be first lieutenant, 1858; was actively engaged on frontier duty until 1861, when he entered the Confed. army, serving in every position from first lieutenant to that of commander-in-chief of an army with the rank of lieutenant-gen., and throughout the Va. Peninsula campaign, at the second battle of Bull Run, Antietam, Gettysburg, and Chickamauga, where he lost a leg; in 1864 he succeeded Gen. Johnston in command of the army resisting Gen. Sherman's invasion of Ga.; met the U. forces in battle at Franklin Nov. 30, 1864, and at Nashville Dec. 15-16, soon after which he was relieved by Gen. Richard Taylor. After the war he settled in New Orleans. D. Aug. 30, 1879.

Hood (ROBIN), the hero of a great number of the most popular among the old Eng. ballads, was an outlaw and a robber who lived in the beginning of the 14th century in the depths of Sherwood Forest, Nottinghamshire, and Barnsdale Forest, Yorkshire, with a company of similar fellows, and among them Little John, Friar Tuck, and the Maid Marian. Although a robber by profession, he had some gallant and magnanimous qualities, which won for him not only the admiration but even the affection of the lower classes. It is probable that he was driven into this kind of life by some political circumstances which made him the knight of the lower classes, and that he was one of those yeoman who under Edward II. joined the rebellion of the earl of Lancaster, but failed and were ruined. According to tradition, he was bled to death by a nun and buried in Kirkles Park, Yorkshire. He is first mentioned in the *Vision of Piers Ploughman* (1335-65), and next in the *Scottichronicle*, 1357-84. In 1495 Wynkyn de Worde pub. a long poem under the title *Lytle Geste of Robyn Hood*, which seems to be a combination of several ballads. In the 16th century rustic sports and masquerades were celebrated in many places under the name of "Robin Hood games." In 1795 Ritson pub. a collection of all the ballads and historical anecdotes referring to R. H.; enlarged in 1847 by J. M. Gutch.

Hood (THOMAS), b. in Lond. May 23, 1799. His father was a bookseller. From school he entered a counting-house, but his health failing he was sent to Dundee, where he contributed various pieces to the local publications. Returning to Lond. in 2 yrs. with improved health, he entered the service of his uncle to learn the art of engraving. In 1821 the *Lond. Magazine* fell into the hands of some friends, and H. became sub-editor. In this position he formed the acquaintance of all the leading literary men of the time, and in this society his own powers developed, and his *Odes and Addresses* appeared. *Whims and Quibbles* appeared in 1826, followed by *National Bells* 1827, *Pics of the Months*, *Fairies*, etc. In 1829 the *Comic Annual* was issued. For a yr. he edited *The Gem*, in which appeared his poem entitled *Eugene Aram's Dream*. In 1838 Hood's *Oien* was started. His health still being delicate he went to the Continent. On his return to Eng. he became ed. of the *New Monthly Magazine*. In 1844 Hood's *Magazine* was started. A short time before his death, while on a bed of sickness, he contributed to *Punch* those touching verses which have rendered his name immortal—"The Song of a Shirt," "Bridge of Sighs," and "The Lay of a Laborer." D. May 3, 1845.

Hooded Seal, the *Ursophora rostrata*, a seal of the N. Atlantic coasts, about 3 ft. long, characterized by a cartilaginous inflated hood or crest, which in the adult male is of considerable size. It is hunted for its fur and oil.

Hooghly River, the W. outlet of the Ganges, formed by the confluence of the Bhagruti and the Jellinghy, 2 branches of the Ganges, and considered as the proper mouth of this river. It is about 300 m. long, 10 m. broad at

its entrance into the Bay of Bengal, and although its mouth and shores are encumbered by mud-shoals, it is navigable for the largest vessels up to Calcutta.

Hook (THEODORE EDWARD), b. in Lond. Sept. 22, 1788; displayed at an early age aptitude in making verses and arranging them to music. In 1805 his first farce was produced, *The Soldier's Return*, a comic opera in 2 acts, which was followed by numerous farces and melodramas. But it was his own life which attracted public attention toward him. His practical jokes were of the boldest kind, while his brilliant conversational powers, his remarkable talent for punning and improvisation, his convivial disposition soon made him a favorite in aristocratic society and gained him the friendship of the prince-regent, who in 1812 secured for him the appointment of accountant-gen. and treas. of Mauritius. In 1818 irregularities were discovered in his accounts, and he was returned to Eng. in arrest, but soon liberated. In 1820 he assumed the editorship of the new journal, *John Bull*. The board of audit declared him in 1823 a debtor to the Crown in the sum of £12,000, and he was confined for nearly 2 yrs. Although it was believed the guilty parties were among his subordinates, the govt. never abated its claim, and at the death of H. the small sum realized from the sale of his effects was claimed by the Crown. In 1824 the first series of *Sayings and Doings* appeared; *Murcell* was pub. in 1830. *The Parson's Daughter* in 1833, etc.; in 1836 he became ed. of the *New Monthly Magazine*. D. Aug. 24, 1841.

Hook'er (JOSEPH), b. at Hadley, Mass., Nov. 13, 1814; grad. at W. Pt., and entered the army as second lieut. of artill. July 1, 1837; after a campaign in Fla. against the Seminoles he served on frontier and garrison duty till 1846, and 1846-48 in the war with Mex.; in 1847 appointed assistant adjutant-gen. In Feb. 1853 he resigned from the army and engaged in farming in Cal.; also engaged as supt. of military roads in Or. On the outbreak of the c. war he tendered his services to the govt., and was appointed (May 17, 1861) brig.-gen. of volunteers, serving in the defences of Wash. and on the lower Potomac until Mar. 1862, when he was assigned to the command of a division of the 3d corps, Army of the Potomac; in the Va. Peninsular campaign, 1862, was engaged in the siege of Yorktown, April-May; battle of Williamsburg, May 5; at Fair Oaks (second day), Frazier's Farm, and Malvern Hill; promoted to be maj.-gen. of volunteers, to date from the battle of Williamsburg, and engaged at the battle of Manassas, Aug. 29-30, and Chantilly, Sept. 1; appointed to command the 1st corps Sept. 6, 1862, he displayed great bravery at S. Mountain and Antietam; made brig.-gen. in the regular army, and on Burnside's succession to the command of the Army of the Potomac was assigned to command the centre grand division (3d and 5th corps) in the new organization of that army, and held this command at the battle of Fredericksburg, Dec. 13, 1862. In Jan. 1863 H. succeeded Burnside in command of the Army of the Potomac, and in May following fought the battle of Chancellorsville. At the time of the invasion of Pa. by the Confed. army, the Army of the Potomac, following, had reached the vicinity of Frederick, Md., when, owing to the refusal of Gen. Halleck to place the troops at Harper's Ferry at the disposal of H., the latter requested to be (June 27), and was, relieved from command of the army the next morning. For the skill and energy by which he first covered Wash. and Baltimore from the meditated blow of the advancing enemy Gen. H. received the thanks of Cong. In Sept. 1863 he was assigned to the command of the 20th army corps (Army of the Cumberland), and was distinguished at the capture of Lookout Mountain, battle of Missionary Ridge (Nov. 24-25), pursuit of the Confed. army, and the action of Ringgold, Ga., Nov. 27, 1863. In the invasion of Ga. by the army of Gen. Sherman, H. led his corps in the almost constant fighting up to and including the siege of Atlanta, until July 30, 1864, when on a question of command he was relieved at his own request. He subsequently commanded N. dept., dept. of the E., and that of the Lakes; retired Oct. 1868, as maj.-gen. D. Oct. 31, 1879. [From orig. art. in *J.'s Univ. Cyc.*, by G. C. SIMMONS.]

Hooker (JOSEPH DALTON), b. D. C. L., LL.D., C. B., F. R. S., b. in 1817; went in 1839 as botanist to the Erebus Antarctic expedition; was 1847-51 engaged in an expedition to the Himalayas; became in 1855 assistant director, and in 1865 director of the Kew Gardens; explored in 1871 Morocco and the Great Atlas Mts. Wrote *Flora Antarctica*, *Flora of New Zealand*, *Sikkim-Himalayan Plants*, *Flora Tasmanica*, *The Student's Flora*, etc.

Hooker (RICHARD), b. near Exeter about 1554; studied at Ox., and took orders in 1581. He held ecclesiastical offices in Drayton-Beauchamp, Temple, Boscombe, and Bishopsbourne. His colleague in Temple was Travers, a zealous Puritan, and between him and H. a sharp controversy arose, which occasioned the famous work of the latter, the *Laws of Ecclesiastical Polity*, a defence of the Ch. of Eng. and Ch. establishments in gen. D. Nov. 2, 1600.

Hooker (THOMAS), b. at Markfield, Leicestershire, Eng., in 1586; studied theol. at Cambridge; preached in Lond., but left Eng. in 1630, persecuted for nonconformity; after preaching in Delft and Rotterdam, came to Amer. in 1633 and settled at Newtown (now Cambridge), Mass., whence in 1636 he removed with 100 others to the present Hartford, Conn. He and Stone were the first ministers at the ch. here, and his influence was very large. His prin. work is *A Survey of the Summe of Ch. Discipline*, written in connection with John Cotton. D. July 7, 1647.

Hooker (SIR WILLIAM JACKSON), D. C. L., F. R. S., b. at Norwich, Eng., in 1785; became regius prof. of bot. at Glasgow 1820; edited the *Botanical Miscellany* and the *Lond. Journal of Bot.*; was knighted 1836; became director of Kew Gardens 1841. Wrote *Flora Scotica*, *Exotic Flora*, *Icones Plantarum*, *Brit. Flora*, etc. D. Aug. 12, 1865.

Hooper (JOHN), b. in Somersetshire about 1495; studied theol. at Ox., but having adopted the views of the Ger. Reformers, he was compelled to leave Ox. and went to Switz.

On the accession of Edward VI. in 1547, he returned to Eng., and was in 1550 appointed bp. of Gloucester. In the beginning of the reign of Mary, in 1553, he was imprisoned, and as he refused to retract he was burned at the stake at Gloucester. Feb. 9, 1555. Wrote *Twelve Lectures on the Creed*.

Hooper (SAMUEL), M. A., b. at Marblehead, Mass., Feb. 3, 1808; an importing merchant of Boston; in 1857 was chosen a member of the Mass. Senate, and M. C. 1861-75; wrote 2 pamphlets on the currency question, and contributed much to the success of the national banking system. Founded the School of Mines in Howard Univ., from which in 1866 he received the degree of M. A. D. Feb. 13, 1875.

Hooper (WILLIAM), a signer of the Dec. of Ind., b. at Boston, Mass., June 17, 1742; grad. at Harvard in 1760; studied law under James Otis; removed in 1767 to N. C.; served in the old Cong. 1774-77. D. Oct. 1790.

Hoope'ston, city and R. R. junc., Vermillion co., Ill., 104 m. S. of Chicago. It has a sem. Pop. 1880, 1272.

Hooping Cough. See WHOOPING COUGH.

Hoopoe, hoo'pō (so named from its note), the *Upupa epops*, a slender-billed bird of Europe, Asia, and Afr., type of the family Upupidae. It feeds on insects, and is the subject of many popular superstitions, being regarded as ominous of evil. It is in reality a very harmless and even useful bird. It is quite small, but very elegant in appearance. Other species are described, none of them Amer.

Hoo'sac Tun'nel, in the N. W. part of Mass., on the R. R. route from Boston to Troy. The distance from Boston to the E. portal is 137 m., and thence to Troy 54 m. Experimental work was first commenced in 1851, but no actual tunnelling until 1856. In 1862 the State took possession and prosecuted the work. The tunnel is a little more than 434 m. long. The cost of the tunnel and 39 m. of adjoining R. R., including the accumulation of interest, has been about \$13,000,000. The H. T. route between Boston and Troy is now in full operation through this tunnel.

Hoo'sick Falls, on R. R., Rensselaer co., N. Y., 2 m. S. of Hoosick junc., 25 m. N. E. of Troy. It contains a large mowing-machining factory, malleable iron-works, etc. Pop. 1880, 4530.

Hop-culture. Hops grow wild in most parts of the N. U. S. and Europe. There is but one botanical species—*Humulus lupulus*—but this is broken into varieties by cultivation. The plant belongs to the nettle family (Urticaceæ), and like the hemp is diœcious. It is a climbing vine with harsh foliage and rough stems, twining with the sun—i. e. from left to right. The root is perennial, but the stems die in winter. The soil of a hop-yard should be made deep and rich. It should be on sunny and elevated ground, where it may have the influence of the sun and air, and be exposed neither to high winds nor to early frosts.

Hops are cultivated in hills set 7½ to 8 ft. apart. The roots do not fill the ground until the end of the second or third yr. The first yr., therefore, any crop may be raised to fill the soil which will not interfere with the cultivation. Cuttings ("sets") are obtained from some established and healthy yard. They should be fresh, and may be kept in the cellar or in the ground until wanted. Two to 4 bushels are required to plant an acre. If the soil is rich, the sets vigorous, and planted early, a fair crop may be gathered the first yr. In all hop-yards there must be some male hops, in order that the blossoms may become fruitful.

In the spring of the second and subsequent yrs. the earth is drawn away from the hills, the plants exposed, the crowns cut back to the new sprouts, taking usually an inch or two from the crowns. Ordinary corn-cultivators are generally used for hoeing hops, the ground being thoroughly ploughed at least once early in each yr. As soon as the vines are 2 ft. long they must be trained to the poles, selecting 2 strong ones for each pole, and cutting the rest away. Hop-vines are very brittle in the morning or evening, but may be handled when the sun is hot. They must always be wound about the poles with the course of the sun.

Hops are usually ripe enough to pick by the last week in Aug., and the harvest continues several weeks. The hop is known to be ripe when the seeds are hard and purple or beginning to get purple. If the picking commences too early, the vines bleed, and not unfrequently are thus destroyed or receive great injury.

Immediately after picking, the hops are placed in the drying-room of the kiln, the floor of which is of slats covered with a hempen carpet, loosely woven to allow the air to pass freely. After from 12 to 22 hours' drying they are generally cured. They are dry enough when they crumble ¾ to pieces in the hand, and when the stems do not feel moist or cool when pressed by the lips. After the first heat, and subsequently, flowers of sulphur are burned in the stove-room. The fumes passing through the hops serve to liberate the moisture rapidly. After 10 days or so, and within 6 weeks, the hops should be baled. [From orig. art. in *J.'s Univ. Cyc.*, by M. C. WELD, Ph. B.]

Hop-devouring Insects are numerous in species. Among the more important kinds are *Grapta interrogationis*, *G. c-argenteum*, *G. comma*, and *Thecla humuli*, all hop-butterflies; *Illepidius humuli*, a European moth; *Hypona humuli*, a very destructive hop-moth, common in the U. S.; *Amthycephalus interruptus*, a froth-fly; *Halicta concinna*, a flea-beetle; *Aphis humuli*, a plant-louse, and others. The best methods for treating them are hand-picking, the use of whale-oil soap, frequent shaking of the vines, etc.

Hope, R. R. junc., Hempstead co., Ark., 112 m. S. W. of Little Rock. Pop. 1880, 1233.

Hope (ALEXANDER JAMES BEREFOORD), LL.D., son of the author of *Anastasis*, b. 1830; ed. at Harrow and Cambridge, graduating at Trinity 1841; M. P. for Maidstone 1841-52, and again in 1857; elected for Stoke-upon-Trent 1865, and in 1868 for the Univ. of Cambridge; was pres. of the Royal Inst. of Brit. Archs. 1865-67. Author of *The Eng. Cathedral of the Nineteenth Century*, etc.

Hope (Admiral Sir JAMES), G. C. B., b. at Edinburgh in

1808, ed. at the Royal Naval Coll., entered the Brit. navy as midm. 1822; served near Buenos Ayres 1841-43, in the Baltic 1854-56, in the E. I. and Ch. waters 1856-61; was distinguished in the operations that led to the taking of Peking; transferred to the W. I. 1863; a full admiral 1870; first and prin. naval aide-de-camp to the queen. D. 1881.

Hopkins (EDWARD), b. at Shrewsbury, Eng., in 1600; was a successful merchant of Lond.; removed to Boston, Mass., in 1637; was 7 times gov. of Conn. between 1640 and 1654, and assisted in forming the union of the colonies of N. Eng. 1643; returned to Eng., became a M. P., and held important offices under the Commonwealth; bequeathed a portion of his estate to the support of schools in Hartford, New Haven, Hadley, and Cambridge in N. Eng. The town of Hopkinton, Mass., was named for him, having been purchased in 1700 of the "praying Indians" with moneys of his which fell to Harvard Coll. D. Mar. 1657.

Hopkins (ESEK), b. at Scituate, R. I., in 1718; was commissioned by Gov. Cooke as brig.-gen. at the beginning of the war of independence. In 1773 he was appointed commander-in-chief of the navy by the Continental Cong., and addressed officially by Washington as admiral. In the beginning he was very successful in his undertakings, but afterward failed to fulfil the expectations of the govt., and, having neglected to appear at Phila. when summoned, was dismissed from the service in 1777; retired to N. Providence, where he resided till his death, Feb. 26, 1802, taking part very actively in the politics of the State.

Hopkins (JOHN HENRY), D. C. L., LL.D., b. in Dublin, Ire., Jan. 30, 1792; came in 1800 with his parents to Amer.; received a good education and assisted Alexander Wilson in preparing the illustrations of his *Ornithology*; afterward was an iron manufacturer in W. Pa.; was admitted to the bar at Pittsburg in 1818; in 1824 became rector of Trinity ch., Pittsburg (P. E.), of whose ch. edifice he was the arch. In 1831 he became assistant minister of Trinity ch., Boston, Mass., and prof. of systematic divinity in a theological sem. in Mass. In 1832 he was consecrated the first bp. of Vt., became rector of St. Paul's, Burlington, and afterward devoted much time to the establishment of the Vt. Epis. Inst. He took a strong stand for the High-Ch. movement, and was an active member of the Pan-Anglican Synod. Wrote *Christianity Vindicated, The Ch. of Rome in her Primitive Purity, Vindication of Slavery*, etc. D. Jan. 9, 1868.

Hopkins (JOHN HENRY), S. T. D., b. Oct. 28, 1820, at Pittsburg, Pa., grad. in 1839 at the Univ. of Burlington, Vt.; appointed rector of St. John's ch., Essex, N. Y., in 1869, and of Trinity ch., Plattsburg, N. Y., in 1872; ordained priest in 1872. Wrote *Decline and Fall of the Low Ch. Party*; founded and edited *The Ch. Journal* (1853-68).

Hopkins (JOHNS), b. in Anne Arundel co., Md., May 19, 1795; was carefully ed., became a wholesale grocer, retired with an ample fortune in 1847. He was a member of the Society of Friends. In 1873 he founded the Hopkins free hospital, Baltimore, at a cost of some \$4,000,000; an orphanage for colored youth, a convalescent hospital, and the Johns Hopkins Univ. at Clifton, near Baltimore, with 400 acres of land and an endowment of \$3,000,000. These benefactions exceeded \$8,000,000 in aggregate value. D. Dec. 24, 1873.

Hopkins (MARK), M. D., D. D., LL.D., b. at Stockbridge, Mass., Feb. 4, 1802, and grad. at Williams Coll. in 1824; M. D. in 1828; was prof. of moral philos. and rhetoric in Williams Coll. 1830-36; pres. of the coll. 1836-72; then resumed the former position; 1857 became pres. of A. B. C. F. M. Author of *Evidences of Christianity, Law of Love and Love as Law, and An Outline Study of Man*. Presidential elector 1884.

Hopkins (SAMUEL), D. D., b. at Waterbury, Conn., Sept. 17, 1721, grad. at Yale in 1741; studied theol. with Jonathan Edwards. In 1743 was ordained over a ch. at Housatonic, now Great Barrington, Mass.; in 1770-76 minister of a ch. at Newport, R. I., and again in 1779. In consequence of his labors against slavery the State of R. I. freed all her slaves b. after Mar. 1784. Wrote *System of Doctrines* (1793), and his views have had a wide influence. D. Dec. 20, 1803.

Hopkins (STEPHEN), LL.D., a signer of the Dec. of Ind., b. at Scituate, R. I., Mar. 7, 1707; was bred a farmer; removed in 1731 to Providence, where he was a land-surveyor and merchant; speaker of the R. I. Assembly 1732-41; became chief-justice of the common pleas 1739, chief-justice of the superior court 1754-54; 10 times gov. of R. I. between 1754 and 1768; a member of the Continental Cong. 1774-78. Author of *Rights of the Colonies Examined*, and long the chancellor of Brown Univ., then R. I. Coll. D. July 19, 1785.

Hopkins (WILLIAM), LL.D., F. R. S., b. in 1733. With little early education he entered at the age of 30 at St. Peter's Coll., Cambridge, where he grad., and became the most celebrated mathematical teacher of his day; his pub. works consist chiefly of the application of the methods of mathematical analysis to the elucidation of probs. of phys. geol. But his name is most widely known through his mathematical investigation of the effects which internal fluidity should have upon the "precession of the equinoxes," and the result which he arrived at, that the solid crust of the earth must have a thickness of at least 800 or 1000 m. The erroneous-ness of this conclusion, and the analytical source of it, is pointed out in the *Smithsonian Contributions to Knowledge*, vol. xix. D. Oct. 13, 1866.

Hopkinson (FRANCIS), a signer of the Dec. of Ind., b. in Phila. in 1737, and was a grandson of the bp. of Worcester, Eng.; grad. at Princeton in 1763; in 1765 was admitted to the bar. He was M. C. from N. J. 1776-77, and a resident of Bordentown. His witty and satirical writings during and after the Revolution had much influence in political affairs. Wrote *The Battle of the Kegs*; he was an admiralty judge in Pa. 1779-80, U. S. dist. judge for Pa. 1790-91. D. May 9, 1791.

Hopkinson (JOSEPH), LL.D., a son of Francis Hopkinson, b. in Phila. Nov. 12, 1770, grad. at the Univ. of Pa. in 1786. He became an able lawyer, residing mostly in Phila. Author of *Hail Columbia*; was a prominent member of Cong.

1816-20, and in 1828 was appointed U. S. dist. judge for the E. dist. of Pa. D. Jan. 15, 1842.

Hopkinsville, city, cap. of Christian co., Ky., 71 m. N. W. of Nashville, Tenn., on R. R. It contains an acad. and 2 sems., a public library, and a State insane asylum. Tobacco is the prin. staple. Coal and iron are found in the vicinity. Pop. 1870, 3126; 1880, 4229.

Hop'pin (REV. JAMES MASON), D. D., b. in Providence, R. I., Jan. 17, 1820, grad. at Yale in 1840; studied law at Harvard, and afterward theol. at Andover and in Ger. under Neander; became pastor of a ch. in Salem, Mass., Mar. 27, 1850, and was prof. of homiletics in the theological dept. of Yale Coll. 1861-79. Wrote *The Office and Work of the Chr. Ministry, Life of Andrew Hall Fiske, Rear-Admiral U. S. N.*, and for *Bibliotheca Sacra*, etc.

Hops [Ger. *Hopfen*; Fr. *houblon*; bot. *Humulus lupulus*]. The fruiting calyx is sprinkled with yellow resinous grains. The nervine, aromatic bitter tonic, and other supposed virtues of the H., as imparted to beer, etc., reside chiefly in this yellow powder. The constituents of commercial H. are a highly aromatic essential oil, residing almost entirely in the yellow powder; a resinous substance, a bitter crystalline principle, tannic acid, gum, cellulose, extractive matter soluble in water, quercitrin, and, according to some, a waxy matter. The yellow powder, called lupuline, forms in a pure state about 10 per cent. of the whole.

Hop Tree (*Ptelea trifoliata*), also called **Shrubby Trefoil**, an Amer. shrub of the rue family, found from Pa. southward and westward. When kept trimmed to a single stem it attains a height of 30 or 40 ft. The fruit is 2-celled and 2-seeded, having a broad wing, and resembles that of the elm, whence its generic name (Gr. *pteleia*, "elm"). The flowers and bruised leaves have an unpleasant odor. The fruit is intensely bitter, and is destitute of the aromatic principle of the true hop, for which it is often substituted in the manufacture of beer. An infusion of the leaves and young shoots is used as a remedy for worms. It is a neat ornamental shrub, not liable to the attacks of insects.

Hor, a mt. of Ar. Petraea, forming a part of the range of Seir or Edom, upon which Aaron died. The summit still bears the name of Mt. Aaron (Arab. *Jebel Harun*), and, rising 4800 ft. above the sea, is the most conspicuous summit of the range. The mt. has a double top, and is surmounted by an edifice, of later date than the Crusades, which is called Aaron's tomb. There is another Mt. H., mentioned as one of the marks of the N. boundary of the land which the Israelites were to conquer. The word *Hor* means simply "mountain," and in this instance probably designates the entire Lebanon range.

Horace (QUINTUS HORATIUS FLACCUS), b. Dec. 8, 65 B. C., at Venusia, in Apulia; went in 47 B. C. to Athens to study philos. and rhetoric, but the murder of Cæsar and the c. war which ensued made him a soldier, and he fought as a tribune under Brutus in the battle of Philippi (42 B. C.). After the defeat he fled to Rome, and his offence was forgiven or forgotten. With the rest of his patrimony he bought a position as a registrar in the office of the prætor, but he soon gave it up in order to devote himself entirely to literary pursuits. His first productions were satires, or, as he calls them himself, *sermones*, on account of the colloquial tone in which they are written. These he read to his friends, and thus by degrees he was admitted to the literary circles of Rome. He made the acquaintance of Varius and Virgil, who introduced him to Mæcenas, who again introduced him to Augustus; and Mæcenas appreciated his talent and his friendship so much that he gave him a fine country-seat near Tivoli, in the Sabine Mts., and also a competency. After the satires (35 B. C.) followed the epodes or *iambi* (30 B. C.), then the odes or *carmina* (23 B. C.), and at last the epistles (19 B. C.), the second book of which contains the long epistle *Ad Pisones*, generally known under the title of *Ars Poetica*. D. Nov. 27, 8 B. C.

Ho'reb, according to some, a lower elevation of Mt. Sinai; others consider it to be a gen. name for the whole range of which Mt. Sinai was one of the prin. summits. The name in Heb. means "desert."

Horehound, an herb of the labiate family (*Marrubium vulgare*) native of Asia and S. Europe, now widely spread, is a bitter, aromatic tonic, useful in coughs and colds, and is generally taken in syrup or candy. The fetid H. is of another genus (*Ballota nigra*). The water H. (*Lycopus Europæus*) of Europe has similar properties. The Amer. L. *Virginicus* (bugle-wort) nearly resembles it, and is used in med. for its expectorant properties.

Horicon Lake. See GEORGE LAKE.

Ho'rites, the aboriginal inhabs. of Mt. Seir before the Canaanites conquered Pal. Their name is derived from Hori, the grandson of Seir, and refers to their habit of dwelling in caves.

Horizon denotes the line formed by the apparent contact of the sky and the earth.

Horn, or **Moorne** (PHILIPPE), COUNT OF, b. in 1522, a son of De Montmorency-Nivelle, a Flemish nobleman. When his mother, having become a widow, married Count Horn, Philippe was adopted by his stepfather and assumed his name. He distinguished himself both in the battles of St. Quentin and Gravelines and in the councils of Philip II. and Margaret, vicegerent of the Netherlands. He was loyal to the Sp. crown, but he would not deliver up the rights of his native country without resistance. He was seized, together with Egmont, and beheaded June 5, 1568.

Horn-beam, trees of the oak family, with hard, very tough, white wood, highly prized by turners and joiners. *Carpinus Betulus* is the European, and *C. Americana* the Amer. H., also called lever-wood, iron-wood, and blue beech. The hop-H., called also lever-wood or iron-wood, is of a related genus, *Ostrya Virginica*.

Horn-bill. See BUCCONIDÆ.

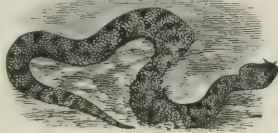
Horn'blende, a term used in mineralogy, sometimes as synonymous with amphibole, sometimes to designate

only the dark-colored varieties of that mineral. In composition it varies much, being, however, essentially a silicate of magnesia and oxide of iron, with generally lime, and with or without alumina, manganese-oxide, or soda. It is one of the more important rock-forming minerals, occurring especially in granitic and metamorphic rocks, and volcanic rocks of deep-seated origin. It presents a great variety of forms and great differences in color, several of the varieties having specific names.

Horn'blower (JOSEPH COURTEN), LL.D., b. at Belleville, N. J., May 6, 1777; was admitted to the bar in 1803; was chief justice of the N. J. supreme court 1832-46, prominent in the constitutional convention of 1844. D. June 11, 1864.

Horn'book, a tablet of parchment or paper, covered with a thin transparent layer of horn, containing the alphabet, with some other simple lessons. Their use originated before the invention of printing, and continued till about the middle of the last century.

Horned Snake, a name applied to venomous serpents of N. Afr. of the genus *Cerastes*. Its name is derived from the horned scale which grows upon the eyelids of the male. Several deadly species of *Ophiophagus* and *S. Afr.* have somewhat similar horns.



Cerastes.

Horned Toad (*Phrynosoma*), a genus of agamid lizards, of which 10 or 11 species are found in Tex., Mex., Cal., Ut., etc. They are sluggish, and crawl like other lizards. *P. Douglasii*, *Blainvillii*, and *cornutum* are the best known species.

Horn'ellsville, Steuben co., N. Y., 58 m. S. of Rochester, on Erie R. R. Pop. 1870, 4552; 1880, 8195.

Hornet, a name applied to large stinging insects of the wasp (*Vespidæ*) family. The most common in the U. S. is the *Vespa maculata*, which builds a great nest of brown paper and hangs it from the branches of a tree. Its paper is made from the fibre of wood. Its sting is very severe. The H. is omnivorous, devouring fruits, honey, and insects of many kinds. *Vespa crabro*, the commonest European H., is naturalized to some extent in the U. S.

Horn'rocks, or **Horrox** (JEREMIAH), b. at Toxteth, Lancashire, Eng., about 1615; studied in Emmanuel Coll., Cambridge; took holy orders and became curate of Hooe, where in 1639 he made an observation of the transit of Venus (Nov. 24). William Crabtree was apprised by H. of the calculations which led him to expect this transit (which not even Kepler had predicted), and accordingly Crabtree and H. both made observations (the first on record) of the transit of Venus. Author of *Venus in Solivisa Observationum Celestium Catalogus, Novæ Theoriæ Lunariss explicatæ*, etc. D. Jan. 3, 1641.

Hor'ry (PETER), a distinguished South Carolinian in the Revolutionary war, was a brig.-gen. under the partisan command of Gen. Francis Marion. The life of Marion prepared by him and Weems has gone through many editions.

Horsa. See HENGEST.

Horse (*Equus caballus* of Linnaeus), a well known domestic animal, non-ruminating and simple-hoofed, belongs to the family Equidæ, sub-order Perissodactyla (odd-toed), order Ungulata (hoofed), class Mammalia. The H., with the ass, zebra, quagga, and a few other similar animals, constitutes a natural family of hoofed quadrupeds. The H. differs from the other species of this family in having the tail covered with long hairs from the base, instead of tufted at the end, and in the presence of horny callosities on the inner side of the hind legs below the "hock," as well as on the fore legs above the "knee," where they are also found in the other species. The pattern of coloration in the H. is, moreover, not striped, but in most respects he closely resembles the other living representatives of the family. Nearly all these animals may breed together, producing hybrids, which are, however, usually sterile—e. g. the mule, the offspring of an ass by a mare, or the hinny, the product of a stallion by a female ass.

The H. often lives 30 yrs. or more, but is usually serviceable for less than half that time. Its perception is quick, its memory retentive, and it is capable of much affection. It is surpassed in docility by no animal except the dog, and perhaps the elephant. Its flesh is often used for food. The original habitat of the H. is unknown. It is found wild in Central and W. Asia, and upon the plains of both N. and S. Amer. In the latter country, especially upon the pampas of Brazil and Buenos Ayres, it is abundant and lives in large herds. All these animals are, however, known to be descended from domestic H. brought from Europe by the Spaniards. The H. has been domesticated from a very early period. Its remains are very rare in the Stone Age, but a few bones have been found in the Swiss lake-villages, enough to indicate its presence. In the Bronze Period its bones become more numerous. Upon Egyptian monuments it is not represented earlier than the 18th dynasty. It is first mentioned in the Bible after the children of Israel went into Egypt.

The most celebrated races of the H. are those of Ar., Tur., and Barbary, and from these, by a thorough and judicious system of breeding, has sprung the Eng. race-horse. A H. under 13 hands high is called a pony, and some Welsh and Scotch breeds of ponies are very celebrated for their endurance. In Amer. more attention has been paid to the rearing and training of trotting-horses, and the constant improvement is shown by the fact that nearly every yr. the fastest time previously recorded is surpassed. The H. of the N. part of Afr., from Barbary (hence called Barbs), from Ar., and from Tur. resemble each other, and are usually confounded under the name of Arabians. They are beautifully formed, have fine legs and feet and small bony heads,

and are usually small, not over 15 hands high. The Flanders H. is a large, heavy, coarse-legged, slow H., and the Tartar H., which has been carried into Rus. and Hungary, is a small, bony, rough H., with a large head and great endurance. From various mixtures of these 3 types the modern H. are descended.

Horse, Fossil. The existing species of the H. family are so closely related to each other as not to be distinguished generically by any characters derived from the skeleton, but a large number of extinct genera have left their remains in Quaternary and Tertiary strata of various parts of the world, and especially of N. Amer. At the time of the discovery of this continent by Europeans, no species of H. or ass existed in either N. or S. Amer., but since the introduction of these animals large herds of wild H. are now common on the pampas and prairies of both continents. This complete absence of indigenous species is the more remarkable in view of the fact that not less than 12 species of *Equus* have been described from Quaternary deposits, and more than 30 other related forms from the Tertiary of Amer. The large number of equine mammals and their regular distribution in geological time afford a good opportunity to ascertain the probable lineal descent of the modern H. The most marked changes undergone by the successive genera are the following: 1st, increase in size, from *Orohippus*, as large as a fox, to the modern H.; 2d, increase in speed through concentration of the limb-bones; 3d, elongation of the head and neck and modification of the skull. The increase of speed was a direct result of a gradual and striking modification of the limbs. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. O. C. MARSH.]

Horse-Chestnut, a well known ornamental tree (*Æsculus Hippocastanum*, order Sapindaceæ), native of Asia, much planted for ornament, so called because its large seeds resemble chestnuts. These are full of starch, but a bitter principle renders them uneatable. The buckeyes of the U. S. are other species of the same genus.

Horse Distemper, a species of catarrh. As the disease is contagious, an animal having it should be kept apart from the others, and after a thorough purge should be fed on light bran mashes and kept warm until recovery.

Horse-Fly. The females of many dipterous insects of the family Tabanidæ are called horse-flies, from the great annoyance their bite causes the horse. Among the most common are *Tabanus lineola*, the green-headed fly, which in hot weather has been known to worry horses and cattle to death. The bite is severe, and even venomous, always drawing blood. *Tabanus atratus* and *cinctus*, the orange-belted fly, are also common. Their larvæ are very destructive of snails and of other larvæ. The H.-F. of G. Brit. is *Hippobosca equina*. (See FOREST-FLY.)

Horse-heads, R. R. junc., Chemung co., N. Y.; has a very large brickyard. Pop. 1870, 1410; 1880, 1684.

Horse-Mackerel, a name given in G. Brit. to the SCAD (which see), but applied in the U. S. to *Thynnus secundadorsalis*, called also albicore and Amer. tunny. It is often 10 or 12 ft. long, is very destructive to fish and fishermen's nets, and is caught chiefly for its abundant oil, although its flesh is pronounced excellent by good judges. It is best killed by the harpoon.

Horse'manship. It seems probable that the horse was used from the earliest periods for war and the chase. This was unquestionably true in India and in Per. From Xenophon (424 B. C.) we learn that the horsemen of his time were accustomed to ride much as we do. The saddle was not, however, known to them, and their bit seems to have been of the simplest form. The saddle came into use in the 4th century, and the stirrup was no doubt invented soon after. From that time, and through the Middle Ages, the more civilized nations used most elaborate horse-trappings, and the art of riding was no doubt considerably advanced as the equipments were improved. The tournaments which were in fashion from the 11th to the 16th century, and the Crusades, brought the art into special prominence. The saddle in the time of the Crusades was made principally of wood, very deep, and so formed that the rider sat upon his fork perfectly straight up and down, as if standing. About 1500 the equipments were somewhat modified to suit the purposes of civil life, but the position of the rider remained nearly the same until about 1730, when the saddle assumed more nearly the modern form, and the seat of the rider was changed by bending the knee and sitting down more in the saddle. The E. nations have from the earliest times used a deep saddle, but with a very short stirrup. The heavy curb bit of the Middle Ages was retained until quite a late period, and the equipments and mode of riding of the Mex. and S. Amers. of the present day are almost exactly those of the beginning of the 18th century. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. FAIRMAN ROGERS.]

Horse-Power. See DYNAMIC UNITS, by PROF. W. P. TROWBRIDGE, LL.D.]

Horse-Radish (*Nasturtium Armoracia*), a perennial herb of the mustard family, native of the Old World, whose large white roots furnish a pungent condiment for the table, and are antiscorbutic. They yield a volatile oil which contains sulphur. The young leaves are boiled as potherbs.

Horse-radish Tree, Afr. and E. I. trees, species of *Moringa*, of a peculiar family, from whose seeds is expressed the oil of ben, used for oiling watches and as a basis for perfumes.

Horseshoe Crab. See KING CRAB.

Horsehoeing. See FARRIERY, by M. C. WELD, PH. B.

Horse'tail, name of species of Equisetum, some of which are also called **Shave-Grass**, **Scouring Rush**, etc., forming a peculiar family of vascular cryptogamous plants. The stems are rush-like, hollow, and jointed, arising from running root-stocks, and terminated by the fructification in the form of a cone or spike, composed of shield-shaped stalked scales, with spore-cases underneath. The little, common, or field H., as it is variously called, is chiefly notable for

its alleged poisonous influence on cattle which partake of it, though no tangible proof of such effects has, as yet, been brought to light. Certainly in the dry state, as in hay, it is perfectly innocent.

Horsford (Eben Norton), M. D., a chemist, b. at Genesee, N. Y., in 1818; became prin. of the Albany Female Acad.; studied chem. in Ger. under Baron Liebig; was Rumford prof. in Harvard Univ. 1847-63, and one of the founders of the Lawrence Scientific School. He is the author of many scientific papers, and has given much attention to improved methods of making bread.

Horsley (Charles Edward), son of William, b. at Brompton, near Lond., Dec. 16, 1824. For a time his parents tried to check his love for music, but an opinion of Mendelssohn, who visited Lond. in 1832, decided the question, and after some yrs. of preliminary study he was placed with Moritz Hauptmann, then residing with Spohr at Cassel. Here for 3 yrs. he had theoretical instruction from Hauptmann and the advice of Spohr. Before returning home, H. passed several months with Mendelssohn in Leipzig. He returned to Lond. in 1842, where he remained until 1861, when, owing to ill-health, he went to Australia, residing for some yrs. in Melbourne, Victoria, where he created the taste for music which now exists. In 1871 he returned to Eng., and in 1872 came to New York as organist of St. John's chapel, Trinity Parish. His prin. works are 3 oratorios, *David, Joseph, Gideon*; cantatas, *Comus, Euterpe, Bridal Cantata*, etc. D. Feb. 27, 1876.

Horsley (John Callcott), R. A., eldest son of William, an excellent painter of the modern Eng. school, b. in Lond. Jan. 29, 1816. His love for drawing was fostered by the painter, Sir A. W. Callcott, R. A., and at the age of 14 he entered the drawing acad. of Mr. Sorsse, and subsequently was elected a student of the Royal Acad. of Arts. Here he gained all the best prizes for drawing, etc., and on the competition for cartoons for the new Houses of Parl. he received a premium of £300 and 2 commissions for frescoes in the same building. Since that time his career has had an uninterrupted success.

Horsley (William), b. at Whitehaven, in Cumberland, Eng., Nov. 15, 1774. At a very early age the boy developed great talents for musical composition. His father's means were inadequate to afford his son a complete artistic education, but the youth presented himself to the composer, Dr. J. W. Callcott, who took the lad under his protection and made him his assistant at the orphan asylum. For learning, his 6 *Books of Canons* are unrivalled by any similar specimens since Sebastian Bach: as a glee-writer, "By Cella's Arbor," "See the Chariot at Hand," and "Blow, Wind, thou Balmy Air," testify to the greatness of this master of the Eng. school of music. D. June 1859.

Hortense, or -toness (Eugénie de Beauharnais), b. in Paris 1783, d. 1837, was daughter of the Fr. gen. Alexandre de Beauharnais and of Joséphine Tascher de la Pagerie, who became the wife of Nap. I. In 1802 she married Louis Bonaparte, afterward king of Hol., and brother of Nap. I. She gave him 3 sons, the youngest being afterward Nap. III., b. in 1808. After the fall of the First Empire, Queen H. resided usually in her château at Arenenberg, Switz. She is the author of one song, "Partant pour la Syrie," which under the Third Empire was a kind of national air for the Bonapartists. She is buried by the side of the empress Joséphine at Rueil, a suburb of Paris, near château of Malmaison.

Horten'sius (Quintus), son of L. Hortensius the prætor. The son was b. 114 b. c.; made a speech in the forum when 19 yrs. old which at once gave him rank with the ablest advocates of his time; served (91-90 b. c.) in the Social war; defended the youthful Pompey (86 b. c.), who was accused of the embezzlement of public booty; attached himself to the side of Sulla and the aristocrats; was quæstor b. c. 81, ædile in 75, prætor urbanus 72; defended Verres against Cicero 70; was consul 69 b. c., and was an opponent of Pompey and a defender of Milo in the quarrel with Clodius.

Horticulture, hor-te-kult-yur [Lat. *hortus*, a "garden," and *cultura*, "attendance"], the management of the garden, the cultivation of a smaller area of land than a farm or field, may be divided into floriculture and market-gardening, the latter being separated from agriculture by no definite line. For market-gardening the first essentials are abundant fertilizers and well directed labor. A good exposure to the sun and protection from heavy winds by hills, forests, or screens of trees are very desirable. It is ordinarily best to raise a succession of products, following each other in such a way that there is something to sell throughout the season. Frequently 2 crops may be raised from the same ground in a single yr. Many early crops are greatly forwarded by the proper use of hot-beds and cold-frames. In the application of fertilizers regard should be had to the chemical const. of the plant to be raised; and the same consideration ought to govern the rotation of crops.

Horus [Gr. Ὄρος; Egyptian *Har*, the "day"], the name of several Egyptian gods, of which the prin. was the son of Osiris and Isis. He was the sun-god, and is often confounded with Harpocrates, who was called the Younger Horus; also with Haroeris, the hawk-headed god, called the Elder Horus. He is also confounded with the god Ra and with the Gr. Apollo.

Hosack (David), M. D., LL.D., F. R. S., b. in New York Aug. 31, 1769; grad. at N. J. Coll. in 1789, and in 1791 received his med. degree at Phila.; studied in Europe until 1794; became in 1795 prof. of bot. in Columbia Coll.; was (1797-1807) prof. of materia medica; prof. of materia medica and midwifery in the Coll. of Phys. and Surgeons 1807-11, after which he held other professorships there until 1826. After this he was until 1830 connected with Rutgers Med. Coll. He was one of the first mineralogists and botanists of his time, founded the first botanic garden in Amer., and was the author of several med. treatises. D. Dec. 23, 1835.

Hosea [Heb. *Hoshea*, "deliverance"], the **Ose'e** [Ὀση'e] of the LXX., Vulgate, and N. T., the first in order of

arrangement, but apparently third in order of time, of the 12 minor prophets. His prophetic activity covers a period of about 60 yrs.—say from 784 to 724 b. c. He belonged to the N. kingdom of Israel, and set himself against the idolatrous apostasy which had seemed almost essential in order to political independence. In style he is the obscurest of all the Heb. prophets. In the Rom. martyrology he is commemorated with Hagai on the 4th of July.

Hoshea (another form of *Hosea*), the last king of Israel, son of Elah; conspired against his predecessor, Pekah, and put him to death 737 b. c.; became established on the throne after 8 yrs. of war. His reign was disturbed by civil commotions and by the invasions of the Assyrians. He probably perished at the destruction of Samaria (720 b. c.). His name occurs on Assyrian monuments.

Hosiery [from *hose*, "stockings"], in a large sense, includes knit goods of all kinds. The anc. Grs. wore stockings of felt. The Romans, we are told, used no stockings until after Hadrian's time. The A.-S. used them, and so did the people of mediæval Europe. Trunk-hose were a combination of stockings and breeches. The art of knitting is reputed to be a Scot. invention of the 16th century, and St. Flacre was made patron of a Fr. stocking-weavers' guild in 1527. But it is almost certain that the art of knitting is older than this. It is now largely manufactured by machinery.

Hosius [Gr. Ὅσιος, "holy"], b. about 257 A. D., became bp. of Cordova about 290; took part in the Council of Ilberri; was persecuted under Diocletian and Maximian; was honored for faithfulness; was sent by Constantine the Great to Alexandria to conciliate the contending parties of Alexander the bp. and of Arius; was present at the Council of Nice (325 A. D.); induced Constantine to ratify the Nicene Creed 325; was at the Council of Sardica 347; was directed by Constantius in 355 to write against Athanasius, but refused; was compelled by the emp. to attend the Council of Sirmium, and felt compelled to take the communion with Arians, but he would not condemn Athanasius. In 357 was permitted to return to Cordova, where he d. 358 A. D.

Hosmer (Harriet G.), b. at Watertown, Mass., Oct. 9, 1830. She took anatomical lessons in St. Louis, and both worked in clay and chiselled marble at home. In 1852 she went to Rome with her father and Miss Charlotte Cushman; was received into Gibson's studio; studied hard under him, and soon won her way to public favor. Her statue of *Puck*, sent to Boston in 1856, made her reputation in her own country; it was frequently copied. Her *Beatrice Cenci* and *Zenobia*, both full length statues, the latter of colossal size, were more ambitious works, but of less originality. She exhibited at the Paris Exposition in 1867 a statue called *The Sleeping Faun*. The legislature of Mo. honored Miss H. with a commission to make a statue of Thomas H. Benton. Excepting a brief visit to her native country, the artist has remained in Rome since her first visit.

Hospice [Fr. for "hospital"], houses maintained by ecclesiastics for the relief of travellers passing over the Alps. That of the great St. Bernard, founded in 962 and inhabited by Augustinian monks, is the most celebrated. The name is also applied to other charitable insts., especially those for the treatment of mental diseases.

Hospital [from the Lat. *hospitālis*, "pertaining to guests or strangers"; Fr. *hôpital*; Ger. *Krankenhaus*, *Lazareth*; It. *ospedale*]. H. for the sick poor appear to have been established in India about 220 b. c. They are, however, more especially characteristic of Christianity, and were recognized insts. in the 4th century. H., as now existing, are insts. intended primarily for the care of the sick and wounded; secondarily, to furnish means of instruction to students of med. H. may be designed to receive patients of both sexes and all ages, or may be more or less specialized, as for women, for the insane, for contagious diseases, etc.

In some respects the simplest form of H. is that intended for adult males only, as in the military and naval service; and it is now believed that the buildings should be temporary in character—i. e. not intended to last more than 10 or 12 yrs. Such H. are found to be more favorable to the recovery of the sick and wounded, because of the less prevalence of erysipelas, hospital gangrene, and other septicæmic diseases, than more pretentious and costly structures.

The great object in H. construction is to have the wards supplied with plenty of light and fresh air, and to keep it at a proper temperature. The minimum amount of fresh air to be furnished is 3000 cubic ft. of air per hour per man, and under some circumstances it may be desirable to double this amount. The ventilation of each ward, water-closet, bath-room, and kitchen should be entirely independent of all other rooms, halls, or parts of the building.

Beside the care of the sick, it is necessary in many H. to provide for the supervision and restraint of the vicious. This is best secured by placing the H. in such a location that access to means of dissipation shall be as difficult as possible. On this account a small island is a very desirable locality, and especially so in seaport towns and for marine H. Whatever be the plan of the H., the most important thing is that it shall be under constant hygienic supervision and management of a competent man who should be a phys.

[From *Medical Dictionary*, by JOHN S. BILLINGS, M. D.]

Hospitallers, the members of various fraternities and sisterhoods of the R. Cath Ch., who join to the vows of poverty, chastity, and obedience, another which binds them to serve the poor and sick in hospitals. Some knightly orders also took the monastic and hospital vows—such as the Knights of St. John of Jerusalem, Knights of the Holy Sepulchre, and the Teutonic Knights. There have been 12 or more monastic congregations whose members were popularly called H., but the term more generally denotes the Knights of St. John of Jerusalem.

Hospodar [Slavic], a former title of the govts. of Wallachia and Moldavia. The term signifies "master." The same officers were also called waiwodes or wojewods [*i. e.* dukes or leaders]. The czar of Rus. is popularly called *hose*.

soodar or *gospodar*, forms of "hospodar," and equivalent titles were formerly employed by Polish kings and Lithuanian princes.

Host [Lat. *hostia*, "victim," "sacrifice"], in the R. Cath. Ch., the consecrated Eucharistic bread, believed to be the veritable body of the Lord Jesus Christ. As such, it is elevated by the priest at the mass for the adoration of the people. It is a circular wafer or cake of unleavened bread, having various emblematic figures. It is borne upon a plate called the paten, broken by the priest over the chalice, and distributed to the laity.

Hostages are persons detained in a country as pledges for fulfilling a treaty, and also for fulfilling a ransom contract made by a vessel captured but not detained as a prize. One of the last instances of the first kind occurred in 1748.

Hot-air Engine, a prime mover in which the motive-power is derived from the expansion of atmospheric air by heat. Numerous inventions of this kind have been produced, of which the earliest to excite interest was that of the Rev. Dr. Stirling, now of Galston, Ayrshire, in Scot., patented in 1816; though earlier air engines were constructed by Sir George Cayley and others which seem to have been very simple and were unsuccessful. An improvement on Stirling's engine was suggested later by his brother, Mr. James Stirling; and this was patented in 1827, and again, with further improvements, in 1840. Among more recent inventions of this class, which have been more or less successful, may be mentioned those of Ericsson, Wilcox, Roper, and Shaw, all of this country, and those of Lauberau and Belou of Fr. At the Vienna Exposition of 1873 there was exhibited, by Friedrich Siemens of Berlin, under the name of a *calorimotor*, a working model of a H.-A. E. on quite a novel plan; more remarkable however for its ingenuity than for promise of utility. It would be impossible, within the limits of an article like the present, to give a detailed description of these various forms of mechanism. Those who desire such particulars are referred to the *Report on the Machinery and Processes of the Industrial Arts*, etc. in the Paris Exposition of 1867, by the present writer. In what follows, it is proposed to give only their characteristic differences, and to set forth certain gen. principles relating to this mode of generating motive power.

All forms of the H.-A. E. have certain advantages in common, and all are subject to certain disadvantages which are inseparable from the system. It is an advantage that they require no boiler, and are exempt from the dangers which arise from that source. Could air be employed at a pressure equal to that of steam, it would be an important advantage to be free from the great weight which the use of the boiler necessitates, and unembarrassed by its bulk. As yet, however, this condition has not been realized, and hence the dimensions of the working parts of air-engines are necessarily so much more considerable than those of steam-engines of corresponding power, as to render the gain in this direction, if there is any, unimportant. It is, however, an advantage that air-engines are cheaper of construction than those driven by steam, and that their management is easier, and requires less constant watchfulness. It has generally been claimed for them that they economize fuel. Theory might seem to justify this claim, but in practice it has not been generally sustained. The disadvantages of air-engines consist in the difficulty of heating and cooling the air employed, with the rapidity necessary to secure the best performance; and in the fact that the supply of the cylinder consumes more than half the power developed. To this it may be added, that, while the efficiency of the machine depends upon the difference between the maximum and minimum temperatures, there are certain practical limits which neither of these temperatures can transcend.

Air-engines may be arranged in 2 classes, of which the first embraces those which draw their supplies directly from the atmosphere, and discharge them into the atmosphere again after they have produced their effect; and the second, those which employ continually the same air, which is alternately heated and cooled, but is not allowed to escape. Stirling's first engine belonged to the first of these classes; his later forms to the second. To the first also belong Ericsson's, Wilcox's, Roper's, Shaw's, and Belou's; to the second Lauberau's. The second class have the advantage that they admit the use of high pressures; but this is attended with the disadvantage that they require refrigerating appliances, which, with the first, are wholly unnecessary. In each of these classes a subordinate classification may be made, according as the air is heated in the cylinder in which it performs its work, or in a separate chamber. The plan of the Ericsson engine is the first of these; that of Roper's, Shaw's, and Belou's, the second. In Lauberau's, which does not discharge the air, the heat is applied in one cylinder, and the work is done in another. In this class of engines the arrangements admit of a variety of modifications. The heater and the refrigerator, for example, may be both independent of the working cylinder, and of each other; presenting an analogy to the boiler and condenser of the steam-engine; or the refrigerator only may be separate; or finally, as in the engine of Lauberau, the heating and refrigeration may take place at the opposite extremities of the same vessel, the air being driven from one end to the other alternately by means of a plunger.

It is true of these, as of all engines operated by heat, that there is a theoretic limit to the economy of which they are capable—that is to say, whatever be the amount of heat received from the source, a fraction only of this can under any circumstances be converted into mechanical force; and theory enables us to state definitely the maximum value which this fraction can have. This maximum depends on the extreme temperatures at the command of the engineer. Suppose the highest of these temperatures, as referred to the absolute zero (a point 273° C. below the freezing-point of water), to be represented by T, and the lowest, referred

to the same zero, by T'; then if Q be the entire quantity of heat imparted to the air, steam, or vapor operating any thermo-dynamic engine; and U, the portion of that quantity capable of being converted into useful effect, it is true in all cases that

$$\frac{U}{Q} = \frac{T - T'}{T}.$$

This principle we take at present for granted. It follows that, in proportion as the interval between T and T' is increased, the machine will work with correspondingly greater economy. This interval can be increased by increasing T, or by diminishing T', or by doing both at once. It is impracticable, however, to employ a refrigerator having a temperature below that of the weather. We must therefore take for a mean lower limit about 17° C., or 62.5° F., a temperature which, referred to the absolute zero, is equal to 290° C. On the other hand, a practical upper limit is imposed by the consideration that a red heat is reached for solids at about 650° C., which is 923° C. above the absolute zero. This limit could not be safely approached; but supposing it to be actually attained, the economical coefficient would be

$$\frac{923 - 290}{923} = 0.684,$$

or a little more than $\frac{2}{3}$ of the heat taken up by the air. Probably no H.-A. E. has yet been actually employed in which the temperature has been carried much above 300° C. With a maximum temperature of 307° C. = 580° C. above the absolute zero, the economical coefficient would be

$$\frac{580 - 290}{580} = 0.50,$$

which would show a utilization of $\frac{1}{2}$ the heat taken up. The first Ericsson engine was designed to work at a maximum temperature of about 450° F. = 232° C. = 550° above the absolute zero. The limit of economy realizable by it, had it been successful, and provided the air could have been made to pass through the complete cycle of changes of temperature and pressure embraced in the theory, would have been

$$\frac{505 - 290}{505} = 0.426.$$

But in point of fact, no H.-A. E. fulfils, or can fulfil completely, the theoretic conditions. In order to do so it would be necessary that the air should leave the working cylinder at the minimum temperature; that is to say, at a temperature as low as that of the supply; or else that, by some contrivance, the excess of heat which it retains should be transferred to the supply on its way to the working cylinder. As the first of these conditions—that is to say, the expansion of the air, in working, sufficiently to reduce the temperature to the minimum—is practically unrealizable, it is the second which inventors have in many instances sought to secure. In order to accomplish this, the emergent air has, in some cases, been made to pass through successive sheets of wire gauze, or between thin sheets of metal, or has been in some other manner brought into contact with metallic surfaces of large extent in proportion to the weight of the mass, in order that the excess of heat being transferred to these might be afterward taken up by the cold air of the supply as it enters. The first of the expedients here mentioned was employed by Ericsson, and the second in the successive inventions of Stirling. In Shaw's engine the hot air escapes through a cluster of thin tubes, while the cold air circulates between them. The term "regenerator" was applied by Ericsson to this contrivance, as applied to his original engine, and this term has come into gen. use. The regenerator is applicable to any form of engine, but it is not employed in all. The theoretic advantage is considerable, but in practice is not fully realized; and it is attended with the disadvantage of sensibly increasing the amount of the passive resistances of the machine. In fact, in order that the regenerator, suppose it for instance to be a succession of wire gauze sheets, should entirely absorb the excess of heat of the escaping air, the number of sheets should be very considerable. It is easily seen that if this number were quite unlimited, there would be somewhere a point at which the air would have no longer any heat to impart, its temperature being sensibly reduced to that of the metal. From this point backward to the cylinder from which it was discharged, the successive sheets of wire gauze would rise in temperature, and the last one would have sensibly the same temperature as that with which the air emerged. The number of sheets which would be required effectually to absorb the heat would depend for a given excess of temperature upon the closeness of the meshes, and in any case must be considerable. The obstruction which every such contrivance necessarily presents to the free passage of the air creates a resistance which makes its presence objectionable, and which may go far to neutralize the advantage which it is designed to secure. By diminishing the number of the sheets and the closeness of the meshes, the resistance is reduced, but the absorption of the heat is proportionally less complete. Practically, where the regenerator continues to be used, a middle course is taken; the economy is not wholly realized, and the obstruction to circulation is not very serious. This is the case in the engine of Shaw, in which the regenerator consists, as above remarked, of a series of tubes. It is to be considered, however, that the loss of heat suffered in operating engines driven by heated air or steam is by no means limited to the fraction, large as it is, of the heat which, after being actually imparted to the medium, is unavailable for work. If this were true, the cost of working such engines would fall to a very small proportion of what it actually is. It is unfortunately the case that by far the largest source of loss is to be found in the escape of a great part of the heat which the combustible develops, in

other ways than in raising the temperature of the elastic medium which does the work. And the improvement of all these engines, so far as economy is concerned, is to be sought in such forms of furnace and such modes of applying heat as may reduce what is now the sheer waste of the chimneys or of the radiating surfaces, rather than in the endeavor to push to extremes the temperatures employed in the working cylinder. It is to be observed that the difficulty of guarding against losses by conduction and radiation is enormously increased when excessive temperatures are employed; and also that such temperatures decompose lubricants, destroy packing, and by the large expansion which they give to metals, loosen joints, and impair the strength of the whole structure. Since the largest room for economy is evidently in the direction of preventing the useless waste at present occurring, the effort should be to keep the maximum temperature as low, and not to push it as high, as possible. For a more complete article on this subject see *J.'s Univ. Cyc.*, where may be found a particular description of some of the many forms of H.-A. E.

To the class of H.-A. E. belongs properly the so called inflammable gas engine known as Brayton's Ready Motor. (See GAS ENGINE.) F. A. P. BARNARD.

Hot-bed, a frame for forcing the early growth of plants in cold regions. Its top is a glazed sash, sloping toward the S. The glass permits the sun's rays to enter and heat the air, and at the same time prevents the escape of the warm air. The heat of the sun is reinforced by that of fermenting animal and vegetable matter which fill a trench beneath the soil of the H.-B. These are very necessary to prevent freezing at night and in cloudy weather. When the sun shines brightly it is often necessary to admit some cold air, or partly to cover the H.-B. with mats, otherwise the sun's heat may blast the plants. In very cold weather bast matting is spread over the glass to keep from freezing.

Hotch-kiss (VELONA R.), D. D., b. at Spafford, N. Y., June 3, 1815, ed. at Madison Univ., N. Y.; pastor of Bap. chs. in Poughkeepsie, N. Y., 1839-42; Rochester, N. Y., 1842-46; Fall River, Mass., 1846-49; Buffalo, N. Y., 1849-54 and 1865-73; was prof. of biblical lit. in Rochester Theological Sem. 1854 to 1865. Afterward pastor of the Washington st. Bap. ch., Buffalo, N. Y. D. Jan. 24, 1882.

Hot Springs, on R. R., cap. of Garland co., Ark., 55 m. S. W. of Little Rock. It has about 60 thermal springs, much visited by invalids and others. The springs are very copious, and some of them discharge waters of the temperature of 150° F. Pop. 1870, 1276; 1880, 3554.

Hot-tentots, the native race of Cape Colony, S. Afr. Their present terr. extends N. from Cape Colony to Orange River, and E. from the Atlantic to Kafraria. With some exceptions their country is an arid desert. The H. are tall, meagre, with high cheek-bones, sallow complexion, and oblique eyes, but they have thick lips, flat nose, and woolly hair growing in tufts. When the Dut. first settled at the Cape of Good Hope, the H. were numerous, but of a low grade of civilization. In contact with the Dut. they sunk still lower, and their number decreased at a fearful rate. Under the Eng. govt. some of the tribes show receptivity of civilization, though others, as the Bushmen, have proved unfit for civilized life. The Bushmen are small, ugly, and degraded; their number is rapidly decreasing. The lang. of the H. has several dialects, all remarkable for the presence of clicking sounds. The present number of H. and Bushmen does not exceed 150,000.

Houdon, oo-don' (JEAN ANTOINE), b. in Versailles Mar. 20, 1741; d. in Paris July 15, 1828. He spent 10 yrs. in Rome as the king's pensioner, he having won the first prize at the Royal Acad. for sculpture, and there executed the statue of St. Bruno in the S. Maria degli Angeli; afterward, in Paris, made statues of Voltaire, Cicero, Tourville, and busts of Nap., Josephine, Ney, Rousseau, Diderot, D'Alembert, Barthelémy, Mirabeau, Franklin, Turgot, and other eminent men of the time; came to the U. S. with Franklin in 1785, and modelled the statue of Washington in the capitol at Richmond, Va. While making studies for the statue he was the guest of Washington at Mt. Vernon.

Houghton, ho'ton, cap. of Houghton co., Mich., on Lake Portage, an arm of Lake Superior, is the centre of the great copper-producing dist. Prin. business, mining. Pop. of Portage tp. 1870, 1540; 1880 (increased in 1875 by Webster and Huron), 2863.

Houlton, hōl'ton, cap. of Aroostook co., Me., 120 m. N. E. of Bangor, on R. R. It is the rendezvous for the lumbermen of that region. Pop. 1870, 2850; 1880, 3228.

Hound [Ger. *Hund*, a "dog"], a term properly restricted to those dogs which hunt by following the track of the game by scent. This definition includes the bloodhound, stag-hound, foxhound, beagle, harrier, and a few others, but does not include the greyhound. Most H. are muscular, strong, sagacious animals, with large pendulous ears.

Hound-Fish, a synonym for Dog-Fish (which see).

Hour [Lat. *hora*], the 24th part of a day, or of the interval between 2 consecutive meridian passages of the mean sun (mean solar day), true sun (apparent solar day), or of a fixed star (sidereal day). As mean solar time is the legally recognized time according to which the affairs of business are regulated, and is the time kept by ordinary clocks and watches, the word *hour*, in its usual acceptance, is understood to signify a mean solar H. As the mean solar meridian passage commonly divides the interval between sunrise and sunset unequally, clocks are sometimes, and for certain purposes, constructed to give apparent time. Such clocks are called equation clocks (see EQUATION OF TIME), and are designed to mark exactly 12 when the true sun is on the meridian. Astronomical clocks (so called), or the clocks of astronomical observatories, are regulated to sidereal time for convenience in recording right ascensions (which are measured in such time), or to facilitate the finding of celestial objects whose right ascensions are known. (See TIME.) F. A. P. BARNARD.

Hour-Glass, a contrivance much used, before the invention and introduction into gen. use of clocks and watches, for the measurement of time. It consists of a hollow glass vessel blown into a form externally resembling the figure 8, or presenting the appearance of 2 spherico-conoidal bulbs united at their vertices. In the blowing, the contraction in the middle is such as almost to close communication between the bulbs. This passage is then smoothly drilled out, by passing the drill through the aperture left in the base in blowing; and a quantity of fine and dry sand is then introduced, sufficient to occupy an hour in running through this passage from one bulb to the other when the instrument is held in a vertical position. During the adjustment the external aperture is temporarily closed by a cork. After the adjustment this aperture should be sealed in such a manner as effectually to exclude moisture. The whole should then be protected by a surrounding frame. The H.-G. is by no means a very exact instrument. A perceptible difference will not unfrequently be observed between the times of running out, according as one or the other of the bulbs is uppermost. Temperature also affects its performance; and in case of the absorption of moisture by the sand, in consequence of imperfect sealing, its irregularities are much increased. Half-hour glasses, minute-glasses, half-minute glasses, etc. are constructed on the same principle. The H.-G. is now rarely used, more accurate and convenient timekeepers having superseded it; but the half-minute glass is still employed at sea to time the running of the log-line. F. A. P. BARNARD.

Houries, howr'iz (pl.), (i. e. the "black-eyed"), the nymphs of Paradise, whose society, according to the Koran, is to be one of the great felicities of the Mohammedan believer after death. They are endowed with perpetual youth, health, and beauty.

Hours, The [Gr. *ὥραι*; Lat. *Horæ*], in Gr. mythology, the goddesses of nature and the seasons of the yr.; in later times the personifications of justice and good order. Their number and myths are variously given. At Athens there were 2—Thallo (Spring) and Carpo (Autumn). Hesiod makes them 3—Eunomia, Dice, and Irene. In art they are blooming nymphs, laden with fruits and flowers.

Housatonic River rises in Mass., flows S., through Conn., into L. I. Sound. For 14 m. it is a tidal stream.

House-Fly, *Musca domestica*, a household pest, breeding as a maggot in heaps of filth, upon which it feeds.

Household Suffrage. Under the Eng. law, the right to vote in boroughs for members of Parl. is granted to male persons of full age who during 12 months preceding the last day of July in any yr., as well as on that day, have been occupiers, either as owners or tenants, of any dwelling-house within the borough, and have been rated, and have paid the rates, in a specified way for the relief of the poor in respect to the premises. The phrase "dwelling-house" is defined by the act to mean any part of a house occupied as a separate dwelling, and separately rated for the relief of the poor. The right of suffrage is also extended to lodgers occupying the same lodgings for a similar period to that prescribed for occupants of dwelling-houses, such lodgings being of the clear yearly value, if let unfurnished, of £10 a yr. and upward. (See, for the details of the subject, 30 and 31 Vict. c. 102, A. D. 1867.) Rules of a similar nature in respect to the right of voting as a burgess of a borough at municipal elections are found in 32 and 33 Vict. ch. 55, A. D. 1869.

House-Leaf (*Semperivum tectorum*), a fleshy herb of the order Crassulaceæ, a native of Europe, often cultivated in the U. S.; takes its name from the fact that it is often set upon the roofs of cottages, where it grows well, propagating abundantly by offsets.

House-maid's Knee (so called because it is said, though with little reason, to be most common among house-maids, who scrub stairs and floors upon their knees), an acute or chronic dropsical effusion into the bursa before the knee-pan. It is easily diagnosed, and does not communicate with the knee-joint proper. Acute cases may be cured by rest and the application of iodine, mercurials, and tight bandages; chronic ones, by compression with suitable splints, or even by evacuation and injection of iodine solution into the sac.

Hous'sa, or **Haus'sa**, a large terr. of Central Afr., extending between lat. 12° and 13° N. and between lon. 5° and 10° E. The inhabs. have in some places formed independent states, in others they have been subjugated by neighboring tribes, especially the Fellatahs, and thus the name Hausa signifies a race and a lang. rather than a political unit.

Houston, hū'ston, city, cap. of Harris co., Tex., in lat. 29° 30', lon. 94° 50', at the head of navigation on Buffalo Bayou, 50 m. N. W. of Galveston. It is the R. R. centre of Tex. The city is situated on both sides the bayou, and has steamboat communication with Galveston daily. It contains 2 acads. and the Masonic temple of the Grand Lodge of Tex. The annual State fair is held here on the fair-grounds. Pop. 1870, 9382; 1880, 16,513; 1885, about 25,000.

Houston (GEORGE SMITH), b. in Williamson co., Tenn., Jan. 17, 1811; removed in youth to Limestone co., Ala.; was admitted to the bar in 1831; M. C. 1841-49 and 1851-61; chosen in 1865 to U. S. Senate, but did not take his seat. In 1874 was elected gov. of Ala., and in 1878 was chosen U. S. Senator. D. Dec. 31, 1879.

Houston (General SAM), born in Rockbridge co., Va., Mar. 2, 1793, moved with his widowed mother to Tenn. in early youth. He was in destitute circumstances, with but scanty education, and spent most of his youthful yrs. among the Cherokee-Indians. In 1813 he enlisted as a private in the U. S. A., and served under Gen. Jackson in his campaign against the Creek Indians; was promoted to the rank of lieutenant; after the war resigned his commission. Studied law at Nashville, and rose to distinction. Was elected to Cong. in 1823, and chosen gov. of the State in 1827; resigned the governorship, went to Ark., and took up his abode among

the Cherokees; became agent of the tribe to represent their interests at Wash.; then moved to Tex., where he won his greatest distinction as the conqueror of Santa Anna and deliverer of the prov. from the dominion of Mex. Became first pres. of Tex. 1836. On the admission of Tex. into the Federal Union he was one of her first U. S. Senators. All in all, he was one of the most remarkable men who ever figured in Amer. hist. He opposed secession, but took no part in the war. D. July 25, 1863. ALEXANDER H. STEPHENS.

Houtzdale, on R. K., Clearfield co., Pa. Pop. 1880, 2060. **Ho'ven**, or **Hoove**, a disease of cattle and sheep, characterized by great distension of the stomach by carbonic acid gas, derived from fermentation of food. A smart purge, the administration of lime-water or weak ammonia-water, and the introduction of the stomach-tube are to be tried. If these fail, plunge a trocar and canula into the stomach at a point half way between the haunch-bone and the last rib, and near the back-bone. There is some danger of fatal peritonitis, but most animals recover.

Hovey (ALVAH), D. D., b. at Greene, N. Y., Mar. 5, 1820, grad. at Dartmouth Coll., N. H., 1844, and Newton (Mass.) Theological Inst. in 1848; was Bap. pastor at N. Gloucester, Me.; from 1850 to 1853 instructor in biblical lit. at Newton Theological Sem.; from 1853 to 1856 prof. of ecclesiastical hist.; since 1856 prof. of Chr. theol., and became pres. of same inst. in 1868. Wrote *State of the Impenitent Dead* and *Scriptural Law of Divorce*.

Hovey (ALVIN P.), b. at Mt. Vernon, Ind., May 8, 1821; practised law. During the c. war he was appointed major of Ind. volunteers, subsequently col., serving in the S. W. at Shiloh and Corinth; promoted to be brig.-gen. of volunteers Apr. 28, 1862; commanded a division at the battle of Champion Hills; subsequently engaged in the Vicksburg campaign. Brevetted maj.-gen. of volunteers July 1864; resigned Oct. 1865. In 1866 he became U. S. minister to Peru.

Howard, Kan. See APPENDIX.

Howard (CATHERINE), the fifth wife of Henry VIII. and queen of Eng. for some months, b. in 1520, a daughter of Edmund Howard, third son of Thomas Howard, duke of Norfolk. The king first saw her at a banquet given by the bp. of Winchester in 1540. He had just married Anne of Cleves, and his dislike for that vulgar woman grew into disgust by comparison with the graceful and spirited Catharine. On July 9, 1540, he was divorced from Anne, and on Aug. 8 he married Catharine. Abp. Crammer communicated to the king the confessions of a certain Lascelles, according to which Dereham and Mannock, two gentlemen in the service of the Duchess of Norfolk, had been Catharine's lovers before her marriage. The king at first refused to believe. Nevertheless, Dereham and Mannock were seized and questioned. They confessed, and were executed. At last, even the queen confessed. But as such a crime, committed before marriage, was not a sufficient reason of divorce, her conduct after marriage was subjected to a most rigorous scrutiny. Very suspicious circumstances concerning such conduct came to light. After a protracted trial she was sentenced, and decapitated Feb. 13, 1542.

Howard (JACOB M.), LL.D., b. at Shaftesbury, Vt., 1805, grad. at Williams Coll. 1830; taught in acads. in Mass. and Mich. in 1832; was admitted to the bar in 1833; M. C. 1841-43, atty.-gen. of Mich. 1855-61, U. S. Senator 1862-71, and is said to have drawn up the platform at the first convention of the Rep. party in 1854. Translated *Secret Memoirs of the Empress Josephine*, from the Fr. D. 1871.

Howard (JOHN), b. at Hackney, near London, Sept. 2, 1726. He spent his youth in studying med. and in travelling. Having settled at Cardington, Bedfordshire, in 1758, and having made himself conspicuous by his schools and model cottages for the peasantry, he was elected sheriff in 1773. On visiting the jails he became acquainted with the intolerable conditions under which prisoners lived. He travelled through the whole kingdom, visited all its jails, and presented in 1774 a report to the House of Commons, the result of which was the passing of 2 reform bills. Next he went to the Continent, visited Fr., Ger., and Hol., examined their prisons, and pub. on his return, in 1777, *State of the Prisons in Eng. and Wales, with Preliminary Observations and an Account of some Foreign Prisons*. The immediate result was the Eng. prisons. In 1785 he started on a new tour through It., Tur., and Asia Minor, and on his return pub. *An Account of the Prin. Lazarettos of Europe*. D. Jan. 20, 1790.

Howard (JOHN EAGER), b. in Baltimore co., Md., June 4, 1752; served throughout the Revolutionary war, and was present upon most of the important battle-fields of the war; became lieut.-col. and received a medal from Cong. for his valor at the Cowpens, Jan. 17, 1781. He was M. C. 1787-88, gov. of Md. 1789-92, U. S. Senator 1796-1803, and in 1798 was appointed a brig.-gen. by Washington. D. Oct. 12, 1827.

Howard (OLIVER OTIS), LL.D., b. at Leeds, Me., Nov. 8, 1830, grad. at Bowdoin Coll. 1850, and at the Military Acad. 1854; made brevet second lieut. of ordnance; served at arsenals and in Fla.; assistant prof. of math. at Military Acad. 1857-61; resigned June 7, 1861. Appointed col. of the 3d Me. Volunteers June 4, 1861, and commanded a brigade in the battle of Bull Run, July 21. Appointed brig.-gen. of volunteers Sept. 1861; served in the Va. Peninsular campaign 1862, and lost his right arm at the battle of Fair Oaks (June 1); was engaged in the battles of Antietam and Fredericksburg; appointed maj.-gen. of volunteers Nov. 1862; at the battle of Chancellorsville (May 1863) he commanded the 11th army corps, as also at Gettysburg, July 1863. Transferred with his command to Tenn. Oct. 1863, he was engaged in the battles of Lookout Valley and Missionary Ridge. In Apr. 1864 the 11th and 12th corps were united to form the 20th corps, and Gen. H. was assigned to the command of the 4th corps, Army of the Cumberland, and the July following to that of the Army of the Tenn., being engaged in the advance on Atlanta and in the march to the sea with Gen. Sherman, and subsequent invasion of the

Carolinas, terminating with the surrender of Gen. J. E. Johnston at Durham Station, N. C., Apr. 26, 1865. Appointed com. of Bureau of Refugees, Freedmen, and Abandoned Lands, May 1865, which position he retained till June 1872; served as special com. of Indian affairs 1865, and was pres. of Howard Univ. 1869-73; was appointed brig.-gen. in the U. S. A. Dec. 21, 1864, and brevet maj.-gen. U. S. A. 1865; supt. W. Pt. Military Acad. 1881-82.

Howard (WILLIAM A.), b. in Vt., grad. at Middlebury Coll. 1839; moved to Mich., from which State he was a leading M. C. on the anti-slavery side 1855-61. Being a man of high order of talents, strong convictions, and unquestioned integrity, he had not only the respect but the esteem of his most decided opponents. Became P. M. of Detroit 1861; was gov. of Dak. 1878-80. D. Apr. 10, 1880. A. H. STEPHENS.

Howard City, Mich. See APPENDIX.

Howard University, an educational foundation situate at Seventh st., Wash., D. C., established by virtue of a charter granted by Cong. in 1867, and deriving its patronymic from one of its most prominent founders, Gen. O. O. Howard, who continued to occupy the presidential chair until 1873, when he resigned. Though neither creed, color, nor sex is permitted to preclude admission to the ranks of its alumni, the inst. was specially designed for colored people, of whom fully 3/4 of its students consist. There are normal, preparatory, collegiate, theological, legal, and med. depts. Though the U. S. govt. granted aid at its establishment, it is now entirely dependent upon voluntary contributions and the fees of students for its support.

Howe (ELIAS), inventor of the sewing-machine, b. at Spencer, Mass., July 9, 1819; was the son of a farmer and miller; went in 1835 to Lowell, and worked there, and afterward in Boston, in machine-shops. In 1845 he completed his first machine, and patented it in 1846, laboring with the greatest persistency, in spite of poverty and neglect. After 2 yrs. of unsuccessful exertion in Eng., striving in vain to bring his invention into notice, he returned to the U. S. in almost hopeless poverty, to find that his patent had been violated; but he at last found friends who assisted him with money, and after yrs. of litigation he made good his claims in the courts in 1854. He realized a large fortune from his invention. During the c. war he volunteered as a private of the 17th Conn. Volunteers, and served for some time. He received the cross of the Legion of Honor and many medals. D. Oct. 3, 1867.

Howe (JOHN), b. May 17, 1630, in Leicestershire, Eng.; completed his education at Cambridge and Ox.; domestic chaplain to Cromwell (1654-58). He was the friend of Baxter, and labored in the same line with him for Chr. unity. He was one of the leading controversialist writers of his day among the nonconformist party, but free from all animosity and bitterness. His prin. works are *The Oracles of God*, *The Living Temple*, *The Redeemer's Tears over Lost Souls*, and *The Blessedness of the Righteous*. D. Apr. 2, 1705.

Howe (HON. JOSEPH), b. in Halifax, N. S., in 1804, was the son of John Howe, a loyalist refugee from Boston. He was bred a printer, and in 1827 became connected with the *Acadian* newspaper, and in 1828 ed. and proprietor of the *Nova Scotian*. As a member of the Provincial Parl., colonial agent in Eng., provincial sec., etc., he was long one of the most prominent men in N. S., and was one of the founders of responsible govt. in the prov. He was (1869-72) sec. of state for the provs. in the Dominion govt., and supt. of Indian affairs, and became a member of the Dominion Parl. for Hants, N. S.; was lieut.-gov. of N. S. D. June 1, 1873.

Howe (JULIA WARD), the daughter of Mr. Samuel Ward and the wife of Dr. S. G. Howe, b. in New York May 27, 1819. Her *Passion Flowers*, *Words for the Hour*, and *Later Lyrics* contain her most important lyric poems. *The World's Own* and *Hippolytus* are dramas. She is an active worker in the woman's suffrage movement.

Howe (RICHARD), EARL, b. Mar. 19, 1725; studied at Eton and Westminster; became a mdpn. 1739, post-capt. for gallantry at Ft. William 1745; captured Cherbourg and Martigan 1758; succeeded his brother as viscount (Irish peerage) 1758, defeated Conflans 1759, treasurer of the navy 1765, rear-admiral of the blue, with chief command in the Mediterranean, 1770; with William Howe, his brother, was appointed com. to avert the war in the Amer. colonies 1776; fought D'Estaing off R. I. 1778; became admiral and viscount in the Brit. peerage, by creation, 1782; relieved Gibraltar in 1782, first lord of the admiralty 1783, created earl 1788; commanded Channel fleet 1793, defeated Fr. off Brest 1794, K. G. and gen. of marines 1795. D. Aug. 5, 1799.

Howe (SAMUEL GRIDLEY), M. D., b. in Boston Nov. 10, 1801, grad. at Brown Univ. in 1821; was a surgeon in the Gr. war for liberty 1824-27; organized the surgical service, and was placed at his head. He then returned to Amer. for aid, and afterward founded a colony on the Isthmus of Corinth. In 1831 he visited Europe again and attempted, as pres. of the Polish committee of Paris, to carry aid to the struggling Poles, but was imprisoned for 6 weeks in Prus. After 1832 he had charge of the Perkins Inst. for the blind, S. Boston, Mass. He was long a prominent abolitionist. In 1871 he was one of the U. S. coms. to Santo Domingo. Wrote *An Historical Sketch of the Gr. Revolution and Reader for the Blind*. D. Jan. 9, 1876.

Howe (TIMOTHY O.), b. at Livermore, Me., Feb. 24, 1816; received an academic education, and was admitted to the bar; member of State legislature 1845; removed to Wis. late in 1845, and was judge of its circuit and supreme courts 1850-55, when he resigned. Chosen U. S. Senator for Wis. in 1861, and was twice re-elected; became F. M.-gen. Dec. 20, 1881. D. Mar. 25, 1883.

Howe (Sir WILLIAM), VISCOUNT, b. Aug. 10, 1729, brother of Richard, Earl Howe; studied at Eton; entered the dragoons; served at Quebec under Wolfe; col. of the 4th Foot 1764, and maj.-gen. 1772; took the chief command in N. Amer., 1775, after Gage's departure, H. having previously commanded at Bunker Hill; evacuated Boston Mar. 1776;

went to Halifax, and thence to Staten Island; gained the battle of L. I. Aug. 27; occupied New York Sept. 15; won the victory of White Plains Oct. 28, of Ft. Washington Nov. 16, of Brandywine Sept. 11, 1777; occupied Phila. Sept. 26; repulsed Washington at Germantown Oct. 4; was superseded by Sir H. Clinton in 1778; returned to Eng., where his conduct was vindicated after a parliamentary investigation; became a lieutenant-gen. 1782, gen. 1786, succeeded to the Irish peerage as viscount 1799. D. July 12, 1814.

Howell, cap. of Livingston co., Mich., 50 m. N. W. of Detroit, on R. R. Pop. 1880, 2071.

Howell (DAVID), LL.D., a native of N. J., b. 1747. At the age of 23 he was appointed prof. of natural philos. and math., and filled the chair of law at the Brown Univ. from 1790 to 1824. In the interval he was atty.-gen. of State, judge of supreme court, member of Continental Cong., com. for settling the E. boundary of the U. S., and dist. atty., and was subsequently dist. judge for R. I. till his death. D. July 1824.

Howell (E. N.). See APPENDIX.

Howell (JAMES), an Eng. writer, son of Thomas Howell, minister of Abernethy in Wales, b. in 1596. He was the author of over 40 works on various subjects, the most important being *Epistulae Ho. Eliani, Familiar Letters, Domestic and Foreign*, divided into sundry sections, partly Historical, partly Political, partly Philosophical. D. Nov. 1666.

Howells (WILLIAM DEAN), b. at Martinsville, Belmont co., O., Mar. 1, 1837; removed to Hamilton, O., in 1840 with his father, who was a printer. His father was of Welsh, his mother of Pa.-Ger. stock. Mr. H. learned the printer's trade of his father, and was afterward editorially connected with the *Cin. Gazette* and the *O. State Journal*. He was (1861-65) U. S. consul at Venice. Was ed. in chief of the *Atlantic Monthly* 1871-81. Wrote *Poems of Two Friends* (written with J. J. Platt, 1860), *No Journeys, No Love Lost, Their Wedding Journey, A Chance Acquaintance, A Modern Instance*, etc.

Howitt (MARY), wife of William Howitt, b. at Uttoxeter, Eng., about 1804, the daughter of a Mr. Botham, a Quaker; was married in 1823; has written many poems; translated Miss Bremer's works and some of those of H. C. Andersen, and was with her husband joint author of *The Lit. and Romance of N. Europe*.—Her daughter, Mrs. ANNA MARY WATTS, is author of *The Art Student in Munich, The School of Life*, etc., and a painter.

Howitt (WILLIAM), b. at Heanor, Derbyshire, in 1795, of Quaker stock. His first books were written partly by his wife, Mary Howitt. Wrote a *Hist. of Priestcraft, Rural Life in Eng.; Student Life in Ger.; Land, Labor, and Gold; Hist. of Eng.* D. Mar. 3, 1879.

Howitzer [perhaps from the Bohemian *haufrice*, "catapult"], a short cannon, introduced by the Dut. in 1606, for firing shells horizontally, differing in this from the mortar, which is used for vertical fire. The H. was made with a chamber for the powder (of smaller diameter than the bore), and with a length of bore regulated to admit of the shell being reached by the hand, to adjust the fuse in the axis after the gun was loaded. The first cannon cast by the colonial authorities of Amer. were 8-inch and 24-pounder brass H. Howitzers, except for siege and mt. service, are no longer manufactured in the U. S.

Howland (Hon. WILLIAM PEARCE), C. B., b. in the State of N. Y. May 29, 1811; removed when young to Canada, and became one of the wealthiest merchants of the Upper Prov.; in 1858 was elected to the Parl. of Canada, in 1862 became minister of finance, in 1863 receiver-gen., in 1864 P. M.-gen., in 1866 minister of finance; was sent as a delegate to Eng., and was made a Companion of the Bath; in 1868 became lieutenant-gov. of the prov. of Ont.

Howling Monkeys, a genus of prehensile tailed monkeys of S. Amer. Some 12 or 14 species are reported. The genus (*Myceles* or *Alouatta*) is distinguished from all others by the presence of a great chamber within the hyoid bone and communicating with the larynx. The possession of this chamber gives these monkeys the power of producing those tremendous howls which in the night re-echo for half a league through the tropical forests.

Howson (JOHN SAUL), D. D., b. in Eng. in 1816, grad. at Cambridge in 1837; ordained in 1845, prin. of the Liverpool Coll. 1849-65; became dean of Chester in 1867. With W. J. Conybeare he pub. *The Life and Epistles of St. Paul*, furnishing the prin. part of the geographical and historical matter. He pub. *The Character of St. Paul*, etc.

Hoyle (BENJAMIN THOMAS), son of the Rev. Benj. R. Hoyle, b. at Boston Oct. 18, 1820; ed. of the *Ind. State School Journal*; 1846-52 prin. in the schools of Middletown, Conn., and Chelsea, Mass.; 1852-58 pres. of the inst. of Lawrenceburg, and of the Coll. for Young Women in Indianapolis; prof. of Lat. 1858-63, and prof. of belles-lettres and hist. in the Ind. Asbury Univ.; was also pres. of the State Teachers' Association. D. 1867.

Hoyle (FRANCIS SOUTHCOTE), D. D., b. at Lyndon, Vt., Nov. 5, 1822, grad. at Wesleyan Univ., Middletown, Conn., in 1844; was pres. of Williamette Univ., Salem, Or. 1854-60; prof. of chem., etc., in the O. Wesleyan Univ. 1860-72, and in 1872 became ed. of the *W. Chr. Advocate*.

Hoyle (JOHN W.), M. D., LL.D., b. in 1831 in Franklin co., O.; ed. at O. Wesleyan Univ. and in the Law and Med. Schools of Cin. O.; prof. at Antioch Coll., O. 1855-57, and in Cin. Coll. of Med. 1857-57; ed. of *Wis. Farmer* 1857-67; sec. and manager of Wis. State Agricultural Society 1860-72; v.-p. U. S. Agricultural Society, Wis. com. to Lond. Exhibition of 1862, U. S. com. to Paris Exposition 1867, U. S. com. to Vienna Exposition 1873, pres. international jury for education 1873; knighted in 1874 by emp. of Aus. for services in interest of industry and education; sec. and acting chairman of board of Centennial judges for education and science; gov. of Wyo. Terr. 1878; author of report on *Resources and Progress of Wis.* and report to sec. of interior on *Resources, Condition, and Progress of Wyo. Terr.*, etc.

Hoyle (JOSEPH GIBSON), LL.D., b. at Dunbarton, N. H., in Jan. 1815, grad. at Yale Coll. 1840; was instructor in math.

and natural philos., member of faculty in Phillips Acad., Exeter, N. H., 1841-58; chancellor and prof. of Gr. in Washington Univ., St. Louis, from 1859 to his death, in 1862.

Huaca. See GUACA, by Com. FOXHALL A. PARKER.

Huamanga. See AYACUCHO.

Hubbard (DAVID), b. in Va., removed to Lawrence co., Ala., and in 1842 entered the State legislature, having for many yrs. been connected with the State gov't.; M. C. 1839-41 and 1849-51; a man of ability, and an extreme State rights man; was a prominent State legislator, and after the c. war removed to Nashville, Tenn.

Hubbard (HENRY), b. at Charlestown, N. H., May 3, 1784, grad. at Dartmouth in 1803; became a lawyer, and was several times speaker of the N. H. house; judge of probate in Sullivan co. 1827-29; Dem. M. C. 1829-35, and for a short time speaker; U. S. Senator 1835-41, gov. of N. H. 1842-43, U. S. assistant treas. 1846-49. D. June 5, 1857.

Hubbard (JOHN), M. D., LL.D., b. at Readfield, Me., Mar. 22, 1794, grad. at Dartmouth in 1816; taught in Me. and Va.; practised med. in Dinwiddie co., Va., 1822-29, and in 1830 removed to Hallowell, Me.; State senator 1842-43, gov. of Me. 1850-53, and a Maine-law Dem.; agent for U. S. treas. 1857-59, com. under Reciprocity Treaty 1859-61. D. Feb. 6, 1869.

Hubbard (SAMUEL DICKINSON), LL.D., b. at Middletown, Conn., Aug. 10, 1799, grad. at Yale in 1819; was a lawyer and manufacturer; a Whig M. C. 1845-49, P. M.-gen. 1852-53. D. Oct. 8, 1855.

Hubbard (WILLIAM), b. in Eng. in 1621; came in youth to N. Eng.; grad. at Harvard Coll. 1642; settled as minister of Ipswich, Mass., 1658; temporary pres. of Harvard Univ. in 1688. Author of *Memoirs of Maj.-Gen. Denison* and a *Hist. of N. Eng.* D. Sept. 14, 1704.

Hübner (FRANÇOIS), b. at Geneva July 2, 1750. Inheritance and education combined to awaken early in him a passion for nat. hist., but intense application and study at night forced him for a time to suspend his studies. His father took him to Paris, when he was just 15, to consult the best phys., but his ophthalmia was incurable, and he became totally blind. He married Marie Aimée Lullin, who proved unfailing in her devotion. By the aid of his wife, his son, and an intelligent peasant, H. devoted his life to the study of bees, and discovered and demonstrated the most important facts of their life and work within the darkened hive. The record of his work he gave to the world under the title of *Lettres à Ch. Bonnet et Nouvelles Observations sur les Abeilles*. D. Dec. 22, 1831.

Huber (PIERRE), b. at Geneva Jan. 23, 1777; made investigations upon humble-bees, ants, butterflies, etc., and assisted his father. His most valuable work is *Hist. of the Nature and Habits of Ants*. D. Dec. 22, 1840.

Hubmeyer, or **Hübmaier** (BALTHASAR), one of the originators of the Anabaptist movement in Ger. in the 16th century, b. about 1480 at Friedberg, near Augsburg; studied theol. and philos. at Freiburg under Eck 1503; became prof. of theol. in Ingolstadt in 1512, and in 1516 preacher at the cathedral at Regensburg, whence he removed in 1523 to Waldshut. Here he embraced the Ref., but began to develop separatist ideas, especially after his acquaintance with Thomas Münzer. He taught that it was wrong to baptize small children; the baptism ought not to take place until the full-grown man demands it as the external symbol of his faith. The Aus. gov't. interfered, and he then fled (in 1525) to Zurich. Imprisoned and persecuted here also, he went to Nikolsberg in Moravia, where he formed a large Anabaptist congregation. Disorders arose, and when Moravia fell to Ferdinand of Aus., H. was seized and burned at the stake, Mar. 10, 1528.

Hübner (JOSEPH ALEXANDER), BARON, b. at Vienna Nov. 26, 1811; was introduced by Prince Metternich into the service of the gov't. in 1833. His diplomatic career began at Paris in 1837; he was sent ambassador to Paris in 1849, and recalled in 1859. It was to him, on New Year's Day, 1859, that Nap. III. addressed the remark which foreshadowed the impending Franco-Aus. war. From 1866 to 1867 he was a second time at the head of the Aus. embassy at Rome. He visited the U. S. in 1870, and again in 1871, when he went around the globe. He wrote *Sixtus der Fünfte*, and *Promenade Autour du Monde*.

Huc (ÉVARISTE RÉGIS), b. Aug. 1, 1813, in Toulouse, where he studied theol.; entered the order of the Lazarists and took holy orders in 1839. Immediately after he set out for Macao. With his skin dyed, his head shaved, and in Chi. costume, he travelled from Canton to Peking, and from Peking to He-Shuy in Mongolia. In 1844 he started from He-Shuy for Lhassa in Tibet, which he reached in 1846. He now travelled through the S. parts of the empire to Canton. Wrote *Souvenirs d'un voyage dans la Tartarie, le Tibet, et la Chine, l'Empire Chinois, la Christianisme en Chine, en Tartarie, et en Tibet*. D. Mar. 31, 1860.

Huckleberry and **Blueberry**, names applied to the North American representatives of the whortleberry of Europe. Our H. bushes are ericaceous shrubs of the genera *Gaylussacia* and *Vaccinium*. The berries are extensively marketed, and eaten as dessert fruit and in pies and puddings. The annual product and the money-value of fruits of these 2 genera are very great.

Huddersfield, town of Eng., at the confluence of the Holme and the Colne. It has very large manufactures, extensive coal-mines in the vicinity, and easy communication with all parts of Eng. Pop. 81,825.

Hudson, Middlesex co., Mass., 16 m. N. E. of Worcester, on R. R. Pop. tp. 1870, 3389; 1880, 3739.

Hudson, Lenawee co., Mich., 50 m. W. of Toledo, on R. R. Pop. 1870, 2459; 1880, 2254.

Hudson, R. R. centre and city, cap. of Columbia co., N. Y., on E. bank of Hudson River, at the natural head of navigation, 115 m. N. of New York and 36 m. below Albany. It contains the Hudson Acad., one of the oldest collegiate schools in the State. Pop. 1870, 8615; 1880, 8670.

Hudson, R. R. junr., Summit co., O., 24 m. S. E. of Cleveland. It is the seat of Western Reserve Coll. Pop. tp. 1870, 1520; 1880, 1817.

Hudson, city, cap. of St. Croix co., Wis., 18 m. E. of St. Paul, Minn., on R. R. and St. Croix Lake. It has an acad. Pop. 1870, 1748; 1880, 2298.

Hudson (ERASMUS DARWIN), M. D., b. Dec. 15, 1806, at Torrington, Conn., ed. by private tutor and at Torrington Acad.; grad. in med. at the Berkshire Med. Coll. 1827; practised in Bloomfield, Conn., and was a member of the Conn. State Med. Society. In 1828 he began to lecture on temperance; from 1837 to 1849 was lecturing agent of the Conn. Anti-Slavery Society and gen. agent of the Amer. Anti-Slavery Society. After 1849 devoted himself to mechanical and orthopaedic surgery; was a contributor to *The Liberator* and *National Anti-Slavery Standard*, and author of monographs on *Resections, Syme's Amputation*, and *Immobile Apparatus for Ununited Fractures*. D. Dec. 31, 1880.

Hudson (ERASMUS DARWIN, JR.), M. D., b. Nov. 10, 1843, at Northampton, Mass.; grad. at the Coll. of the City of New York in 1864, and at the Coll. of Phys. and Surgeons, New York, in 1867; in 1867 and 1868 was house-surgeon of Bellevue Hospital, health inspector 1869-70, attending phys. to the class for diseases of the eye, out-door dept. of Bellevue Hospital, same yr.; was attending phys. at N. W. Dispensary 1870-72, attending phys. to Trinity chapel parish and Trinity Home 1870-75, and since 1872 has been prof. of principles and practice of med. at the Woman's Med. Coll. of the New York Infirmary. Pub. *Report of Pulse and Respiration of Infants in Elliot's Obstetric Clinic*. He was a contributor to *J.'s Univ. Cyc.*

Hudson (FREDERIC), b. at Quincy, Mass., Apr. 25, 1819, ed. in Boston; was for 30 yrs. on the editorial staff of the New York *Herald*. Author of *Journalism in the U. S.* D. Oct. 21, 1875.

Hudson (HENRY or HENDRIK), an Eng. discoverer, of whose early hist. nothing is known. In 1607 he made a voyage in search of the N. W. passage. In 1608 he sailed to Nova Zembla, and in 1609, in the service of the Dut. India Co., he sailed in the Half Moon for Davis's Strait, but reached Cape Cod, went to Chesapeake Bay, and discovered the Hudson River. In 1610 he sailed again in an Eng. ship, discovered Hudson's Strait and Hudson's Bay, in which he wintered, but his crew became mutinous and set him, with his son John and 7 infirm sailors, adrift in a shallop, after which he was never heard of.

Hudson (HENRY NORMAN), b. in Cornwall, Vt., Jan. 28, 1814, grad. in 1840 at Middlebury Coll.; he afterward taught in Ky., Ala., and elsewhere, and became a successful lecturer on Shakspeare, whose works he edited in several forms. In 1849 he was ordained a priest of the P. E. Ch.; was ed. of the *Churchman*; rector of a ch. at Litchfield, Conn., 1859-60, and army chaplain during the c. war. Now prof. of Shakspeare Lit. in Boston Univ.

Hudson River [named after Henry Hudson, who first explored it], called also **North River** in its lower course, rises some 3000 ft. above tide-water among the Adirondacs. After a devious course among the mts., it is joined by the Schoharo River, and 10 m. farther on by the Sacandaga. Thence its course is generally E. to Sandy Hill, from which point it flows almost due S. to its mouth. At Cohoes it receives the Mohawk, which more than doubles its volume. Three m. below, at Troy, it becomes a navigable tidal stream. The tidal rise at Albany is only 1 ft., and a little below this point there are some obstructions to navigation. The river is navigable 117 m. to Hudson for ships of the first class, and to Troy, 166 m., for steamers and schooners. At Newburg, 60 m. from New York, it enters the Highlands, through whose impressive scenery it flows for 20 m. Below Verplank's Point it expands into Haverstraw Bay and the Tappan Sea, a lake-like expansion. Below, the W. bank of the river is marked by the Palisades, a precipice at some points 500 ft. high. The Erie Canal connects the H. with Lake Erie, the Champlain Canal with Lake Champlain, the Del. and Hudson with the Pa. coal-regions. The waters of the H. enter the inner bay of New York, flowing between New York City and Jersey City on the E. and W. respectively. Length, about 300 m.

Hudson's Bay, a landlocked sea of Brit. N. Amer. 800 m. long from N. to S. and 600 m. across, lying between 51° and 64° N. lat. and 78° and 95° W. lon. It is so much obstructed by ice that in winter it is not navigable. At no time is its navigation safe or easy. It has many islands and shoals. Area, 300,000 sq. m. Hudson's Strait is its outlet to the Atlantic.

Hudson's Bay Company was chartered 1670, by Charles II., and ceased to exercise its monopoly 1870, after 200 yrs. of authority in the N. parts of N. Amer. The prin. trade of the co. was in furs. It originally possessed a proprietorship and a monopoly of trade throughout Rupert's Land, as the land whose streams flow into Hudson's Bay was called. In 1821 this jurisdiction was extended W. to the Pacific—the authority for the new terr. to last only for periods of 20 yrs. by royal license. From 1849 to 1859 Vancouver's Island was also licensed to this co. After 1859 it had no monopoly W. of the Rocky Mts. In 1868 the co. was authorized by Brit. Parl. to surrender its powers and rights to the Crown and incorporate its terrs. with Dominion of Canada. The transfer was completed June 23, 1870.

Hudson's Strait, connecting Hudson's Bay with Davis's Strait and the Atlantic, in Brit. N. Amer., between 60° and 64° N. lat. and 65° and 77° W. lon. It is 450 m. long, its breadth averaging 100 m., the narrowest point being 60 m.

Hué, hwá, cap. of Anam, on the Hué, near its entrance into the Chi Sea. In the beginning of the present century it was fortified by Fr. engineers. It is accessible only to small vessels, on account of the shallowness of its harbor. Pop. 30,000; with surroundings, 50,000.

Huger, ū-jee' (BENJAMIN), b. at Santee, St. James parish, S. C., Nov. 22, 1805; grad. at W. Pt., and entered the army

as second lieut. of artil. July 1825; served on topographical and ordnance duty, and in the war with Mex. was chief of ordnance and artil. with Gen. Scott's army from Vera Cruz to the city of Mexico; was presented with a sword of honor by the State of S. C.; from 1848 to 1861 he commanded various arsenals; in Apr. 1861, being at that time a major of ordnance, resigned his commission and espoused the Southern cause; was made a maj.-gen. of the Confed. army, and bore a prominent but unsuccessful part in the early days of the c. war; in 1869 became a farmer in Va. D. Dec. 1877.

Hug'gins (WILLIAM), F. R. S., D. C. L., LL.D., b. in Lond. Feb. 7, 1824; gave much attention to the experimental study of the phys. sciences and to astron.; in 1852 was made a member of the Microscopical Society, and became a student of biology; in 1855 established a private astronomical observatory, where after 1862 he gave attention to spectroscopic observations upon the heavenly bodies, especially with respect to the discovery of the direction and rate of the proper motions of the fixed stars.

Hughes (BALL), b. in Lond. Jan. 19, 1804; studied with Edward Hodge Bailey, and while a student won prizes awarded by the Royal Acad., and other silver and gold medals; made busts of George IV. and the dukes of York, Sussex, and Cambridge; came to New York in 1829; made the marble statue of Hamilton—the first work of the kind done in Amer.—for the Merchants' Exchange, which was destroyed by fire in 1835; also the high relief of Bp. Hobart in Trinity ch.; the casts of *Little Nell* and *Uncle Toby* in the Boston Athenæum are his work, and the bronze statue of Dr. Bowditch in the cemetery of Mt. Auburn, etc. He was a lecturer on art as well as an artist. D. Mar. 5, 1868.

Hughes (MOST REV. JOHN), D. D., b. at Annaboghan, co. Tyrone, Ire., June 24, 1797; emigrated to Amer. in 1817; ed. at Mt. St. Mary's Coll., Emmitsburg, Md., which he entered in 1819. In 1825 he was ordained a deacon of the R. Cath. Ch., and in the same yr. a priest. He had (1826-38) pastoral charges in Phila. In 1838 he was made bp. of Basileopolis *in partibus*, and coadjutor to Bp. Dubois of New York, and in 1842 became bp. of New York. In 1839 he founded St. John's Coll., Fordham. In 1850 he was made abp. of New York. In 1861-62 he was a special agent of the U. S. in Europe, and in 1863 publicly addressed the draft-rioters in New York with a view of dissuading them from violence. He early attracted much attention by his controversial correspondence with Rev. John Breckinridge in 1833-35. In 1839-42 he was prominent in the struggle of the R. Caths. against the public school system of N. Y. D. Jan. 3, 1864. (See his *Life* by J. R. G. HASSARD.)

Hughes (THOMAS), Q. C., b. Oct. 20, 1823, at Newbury, Berks, Eng.; ed. at Rugby and at Oriel Coll., Oxford; studied at Lincoln's Inn; was called to the bar in 1848; became queen's counsel in 1869; was in Parl. from Lambeth 1865-68, from Frome 1869-74. Author of *Tom Brown's School Days* and *Tom Brown at Oxford*; in 1874 prin. of the Coll. for Working Men and Women, Lond., and prominent in reforms and questions of social science.

Hu'go (VICTOR MARIE), VICOMTE, b. at Besançon Feb. 26, 1802; in childhood he led a rather errant life, moving from Fr. to It., and from It. to Sp., but he received, nevertheless, an excellent education. In 1817 an ode he addressed to the Acad., *Sur les Avantages de l'Étude*, was highly commended by that inst., and in 1818 he gave up his professional education to devote himself exclusively to lit. He was eminently successful. In 1840, after publishing his novels, *Han d'Islande*, *Bug-Jargal*, and *Notre Dame de Paris*, his dramas, *Cromwell*, *Marion Delorme*, *Le Roi s'amuse*, *Lucrèce Borgia*, *Ruy Blas*, and *Hernani*, and the 2 celebrated vols. of lyrical poems, *Les Feuilles d'Automne*, and *Les Chants de Crépuscule*, he stood as the founder of a new literary school in his country, and was acknowledged as the greatest living poet of Fr., perhaps of Europe. In 1823 Louis XVIII. gave him a pension, in 1845 Louis Philippe created him a peer of Fr., and in 1848 he was elected a representative of the city of Paris both to the constituent and to the legislative assembly. When, in 1851, Nap. banished him from Fr., he took up his residence on the island of Guernsey, and in his exile he wrote *La Légende des siècles*, *Les Misérables*, *Les Travailleurs de la Mer*, *L'Homme qui rit*, and *Quatre-vingt-treize*. After the fall of Nap. III. he returned to Fr. and took up his residence in Paris. CLEMENS PETERSEN.

Huguenots, hū'ge-nots, the name by which in 1560 the R. Caths. began to designate the adherents of the Calvinistic Ref. in Fr. It is of doubtful origin, some deriving it from the Ger. *Edigenossen*, others from the words *Huc nos*, with which one of the earliest public documents of Fr. Protestantism begins. After the consolidation of the Ref. in Fr., it fell into disuse, and the Prot. establishment of that country is now known under the name of the Reformed Ch. of Fr. The reforming movement in Fr. received its direction from Calvin. Francis I. tried to stop the movement, and H. were burned. But during the reign of Henry II. (1547-59) Protestantism was rather favored, and at his death there existed a Prot. party of great political power; and a religious war began which lasted almost without interruption to the end of the century, was renewed in the following, and did not finally subside until the spirit of tolerance made religious persecutions an impossibility in Fr. The two great turning points in this struggle were the issuing of the Edict of Nantes, 1598, and its revocation, 1685. By the *Code Napoléon*, the *Chartes* of 1815 and 1830, and the const. of 1848 and 1872, the social and political position of the Prots. in Fr. has been made equal to that of the R. Caths.

Hulin, or **Hullin** (PIERRE AUGUSTIN), COUNT, b. at Paris Sept. 6, 1758; enlisted in the army in 1771; distinguished himself at the storming of the Bastille July 14, 1789; was appointed capt. of the national guard, but became suspicious to Robespierre, and was imprisoned. Liberated at the fall of Robespierre, he entered the lt. army; was made a brig.-gen. in 1803; presided over the court-martial which sentenced the duke of Enghien to death Mar. 24, 1804; was military

gov. of Vienna in 1806, of Berlin in 1807, of Paris in 1812, and was created a count in 1808. On the restoration of the Bourbons he was banished from Fr. in 1816, but allowed to return in 1819; pub. *Explications officielles aux hommes impériaux au sujet de la commission militaire instituée en l'an XII. pour juger le duc d'Enghien*. D. Jan. 9, 1841.

Hull, or Kingston-on-Hull, city of Eng., at the influx of the Hull into the Humber. It is defended by a citadel, commanding the entrance of the Hull roads, and by 2 forts lower down the Humber. Among its public buildings are the ch. of the Holy Trinity, the oldest brick building in Eng., erected in 1312, and the ch. of St. Mary. There is an equestrian statue of William III. in the market-place, and a statue of Wilberforce, raised on a column 80 ft. high. Nearly all the traffic between Eng. and N. Europe is carried on through this port. It is connected by steamship lines with St. Petersburg, Königsberg, Stettin, Copenhagen, Gothenburg, Hamburg, Bremen, Amsterdam, Rotterdam, Antwerp, and Havre. Pop. 1881, 162,194.

Hull (ASBURY), son of Hope, b. in Washington, Wilkes co., Ga., Jan. 30, 1797, grad. at the State Univ. 1814; was for more than 40 yrs. sec. and treas. of the board of trustees of the same; was often a member of the legislature, and repeatedly speaker of the house; was a member of the secession convention of 1861, but declined its presidency. He was a man of a high order of talent and great purity of character. D. Jan. 25, 1866.

Hull (HENRY), son of Hope, b. in Washington, Wilkes co., Ga., Oct. 20, 1798, grad. at the State Univ. 1815; studied med., and rose to distinction in its practice; afterward was prof. of math. in his alma mater from 1830 to 1846, when he resigned, and has since devoted his time to literary and scientific pursuits.

Hull (HOPE), one of the founders of Methodism in Ga. (son of an Englishman of the same name), b. in Worcester co., Md., Mar. 13, 1763; moved to Ga., and established a high school at Washington in the latter part of the last century; was a man of great usefulness and distinction, and made an impression upon the times in Ga. that will remain for generations. D. Oct. 4, 1818.

Hull (ISAAC), b. at Derby, Conn., Mar. 9, 1775, the son of a Revolutionary officer; became a mariner, and when 19 yrs. of age was master of a merchant ship in the Lond. trade; became lieut. U. S. N. 1798; was made first lieut. of the Constitution frigate 1801; sailed from Annapolis in command of the Constitution July 12, 1812, and for 3 days was chased by a Brit. squadron of 5 ships, from which he escaped by bold and ingenious seamanship. On Aug. 19 he encountered the frigate Guerrière, Capt. Dacres, one of his late pursuers, and fought her for half an hour at close quarters, when she surrendered, but was so much cut up that she had to be burned. For this, the first naval advantage of the war, H. received a gold medal from Cong.; was afterward made a naval commissioner, and had command of various navy-yards. D. Feb. 13, 1843.

Hull (WILLIAM), b. at Derby, Conn., June 24, 1753, grad. at Yale 1772; studied divinity 1 yr.; went to Litchfield Law School, and in 1775 was admitted to the bar; served with distinction throughout the Revolutionary war, becoming a col.; was maj.-gen. of militia in Shay's insurrection; com. to treat with the Indians of Upper Canada 1793; became a judge of common pleas in Mass., gov. of Mich. Terr. 1805-14. As brig.-gen. commanding the army of the N. W. he surrendered Detroit to Gen. Brock, for which he was court-martialed, found guilty of cowardice, and sentenced (1814) to be shot, but was pardoned in consideration of his age and former services. Wrote *The Campaign of the N. W. Army*. D. Nov. 29, 1825. (See his *Life*, by MARIA CAMPBELL and JAMES FREEMAN CLARKE.)

Hull (WILLIAM HOPE), son of Asbury, b. in Athens, Ga., Feb. 2, 1820, grad. at the State Univ. 1839; studied law; was elected solicitor-gen. of the W. judicial circuit; held many positions of public trust; was assistant in the U. S. atty.-gen.'s office during Mr. Buchanan's administration. When Ga. passed her ordinance of secession he returned to his native State and resumed his profession. D. Sept. 13, 1877.

Humanitarians sometimes designates that school of Unitarians who consider Christ a mere man; sometimes the professors of the so-called "religion of humanity."

Humanists, see APPENDIX.

Humbert I., king of It., b. Mar. 14, 1844, the eldest son of King Vittorio Emanuele II. of It. and of Archduchess Adelaide of Aus. Succeeded to the throne on the death of his father, Jan. 9, 1878. Married April 22, 1868, to Margarita, b. Nov. 20, 1851, the only daughter of the late Prince Ferdinando of Piedmont, Duke of Genoa. H. took part in the wars of 1859 and 1866, and covered the retreat of the It. army after the battle of Custoza.

Humble-bee, a name common to the species *Bombus*, etc. The mother-bee hibernates, and in the spring selects a place for her nest in a wet, mossy place, or in a mouse's nest, or under a stump. She collects pollen, mixes honey with it, laying her eggs in the mass from time to time, and meanwhile busily adding to her store of food. The larvae exit out cells in the pollen mass, spinning a lining of silk, which the old bee fortifies with wax. The young bees come forth from time to time and add to the stores. The number of insects in one community is usually small.

Humboldt, Iowa. See APPENDIX.

Humboldt, city and R. R. junc., Allen co., Kan., on the Neosho River. Pop. 1870, 1202; 1880, 1542.

Humboldt, city, Richardson co., Neb., on R. R., 21 m. N. W. of Falls City. Pop. 1880, 917.

Humboldt, von (FRIEDRICH HEINRICH ALEXANDER), BARON, b. Sept. 14, 1769, at Berlin; studied at Frankfurt-on-the-Oder and Göttingen. His first pub. work, *Über die Basalte am Rhein* (1790), belongs to this period. After a rapid journey through Belg., Hol., Eng., and Fr. he entered the celebrated mining school at Freiberg, where he studied under Werner and Leopold von Buch, and where he wrote

his interesting essay on the *Flora Subterranea Fribergensis*, which appeared in 1793. From 1792 to 1797 he occupied a superior position as a mining officer at Bayreuth, at the same time finishing his great work, *Über die gereizte Muskel- und Nervenfaser, nebst Vermuthungen über den chemischen Prozess des Lebens in der Thier und Pflanzenwelt*. On the death of his mother (in 1797) he determined to gratify his desire and make a scientific journey in the tropical zones. On June 5, 1799, he started from Corunna; on Aug. 3, 1804, he returned to Bordeaux. He spent 5 yrs. in the Sp. colonies of Central and S. Amer. On his return he settled in Paris as the scientific centre of the world, and, although frequently engaged in scientific travels or diplomatic missions, he resided here from 1803 to 1827, occupied with the arrangement and publication of his scientific acquisitions, which appeared successively during this period in 29 vols., written in Fr. and translated into Ger., and accompanied by upward of 2000 illustrations. In 1827 he removed to Berlin at the solicitation of the king, and resided in his native city for the rest of his life, occupying himself with diplomatic offices of a lighter description and the most severe studies. The two remarkable events of this period of his life were the Rus. expedition to Central Asia and the publication of his *Kosmos*. In 1829 the Rus. emp. Nicholas fitted out a magnificent expedition, which he placed under the direction of H., and which went through Moscow, Kasan, and Tobolsk to the Atlas Mts. and the Chi. frontier, and thence back to the Caspian Sea. The results of this journey H. communicated in his *Asie Centrale*. The first vol. of *Kosmos* appeared in 1845; the fourth and last was not pub. till after the death of the author, May 6, 1859. (See KLENKE, *Alexander von Humboldt, ein biographisches Denkmal*.) CLEMENS PETERSEN.

Humboldt, von (KARL WILHELM), BARON, brother of the preceding, b. at Potsdam June 22, 1767; studied at Göttingen philology and philos.; was appointed Prus. ambassador at Rome 1801, and minister of the interior 1808, and played a conspicuous part in the immense diplomatic stir which accompanied and followed the fall of Nap. He sat at the congs. of Prague, Chatillon, Vienna, and Aix-la-Chapelle; he signed the treaty of Paris, and represented Prus. in the first Ger. diet. He was a member of the Prus. council of state up to 1819. In lit. his merits consist in the establishment and development of the science of comparative philology, and his linguistic researches are in many points both ingenious and exhaustive. His prin. works in this line are—*Prüfung der Untersuchungen über die Ueberwindung Hispaniens vermittelt der baskischen Sprache; Ueber die Kawi-sprache; Vocabulaire inédit de la langue Tuluene*, etc. D. Apr. 8, 1835. CLEMENS PETERSEN.

Humboldt River, Nev., flows 384 m. in a generally S. W. course. Its waters are charged with soda. It is nowhere many yards in width. It ends in Humboldt Sink, a marshy spot in a sandy plain, not really a lake. The river furnishes the only E. and W. valley through this region. The Central Pacific R. R. follows its valley for many m. Numerous streams approach the H., but sink after leaving their cañons. The Little H. is its largest affluent; but in high water the Reese River passes its sink and flows into the H. The sink is 3920 ft. above the sea.

Hume (DAVID), the most noted of modern sceptical philos., and a distinguished essayist and historian, b. Apr. 26, 1711, at Edinburgh. He pub. his *Treatise on Human Nature* in 1738; in 1741-42 he pub. the first part of his *Moral and Political Essays*; in 1747 he attended Gen. St. Clair on an embassy to Vienna and Turin, where he recast the first part of his *Treatise*, and pub. it as an *Inquiry concerning the Human Understanding*. In 1751 he became librarian of the Advocates' Library in Edinburgh, and undertook his *Hist. of Eng.*, publishing the first vol. in 1754. His *Political Discourses*, pub. in 1752, obtained wide fame on the Continent, and contributed largely to the creation of the science of political economy. His *Inquiry concerning the Principles of Morals* appeared in 1752. In 1767-68 he was appointed undersec. of state, by Lord Conway. Warned by an incurable disease, he wrote his own *Life* and provided for the publication of his *Dialogues on Natural Religion*, a work written in early life, and calmly awaited death, which came Aug. 25, 1776. (See the *Life and Correspondence of David Hume*, by JOHN HILL BURTON, also *My Own Life*, in vol. i. *Hist. of Eng.*, by D. HUME.) WM. T. HARRIS.

Humes (THOMAS WILLIAM), S. T. D., b. at Knoxville, Tenn., Apr. 22, 1815, grad. in 1830 at E. Tenn. Coll. (now a univ.); rector of St. John's ch. (P. E.) 1846-61 and 1863-69, and since 1865 pres. of E. Tenn. Univ.

Humiliate Nuns, an order of Benedictine nuns, called also **Nuns of Blasoni**, from the name of their foundress. They served as nurses, etc. In 1571 they were suppressed by Pius V., but a few convents, greatly decayed, still exist in It.

Humiliates (*Humiliati*), an order of canons and lay brothers following the rule of St. Benedict. They were originally lay brothers of a congregation founded about 1134. In 1151 they became in part canons regular of St. Benedict.

Hummel (JOHANN NEPOMCK), b. at Presburg Nov. 14, 1778. His father taught him the violin. But the child showed no talent. He was then taught to sing and to play the piano, and in these studies his gifts became manifest. The Hummels removed to Vienna, where they found Mozart. The boy so interested him that he took him to his own house and gave him lessons. At 9 yrs. of age he was admired by all, and he and his father made a concerting tour through Ger., Den., and Scot. The yrs. 1791 and 1792 he passed in Lond., and there studied under Clementi. At 15 yrs. of age he returned home, and settled down to study in Vienna under his father. He became the pupil of Albrechtsberger for harmony, and of Salieri for singing and the principles of dramatic composition; in 1803 entered the service of Prince Nicholas Esterhazy, for whom he wrote his first mass; in 1810 he was appointed chapel-master to

the king of Württemberg; in 1820 became chapel-master to the grand duke of Saxe-Weimar; in 1822 made a pedestrian tour in Rus., where he was enthusiastically received; in 1823 travelled through Hol. and Belg. on his way to Paris. In 1829 he made a second visit to Paris, where 6 yrs. before his reception had been one of the most brilliant passages in art; but now his performances were a failure. In Lond. his presence was scarcely remarked. In H. were 3 artists—the performer, the improviser, the composer—in each respect he was a genius of high order. As a performer he founded a school and pub. his voluminous *Method* for the piano. As an improviser his inspirations seemed like meditated compositions. As a composer he is not generally appreciated by the public. Had Beethoven not been his contemporary, he probably would stand as the first composer of his age in instrumental music. His most esteemed works are the Septuor in D minor, the quintet for piano, the concertos in A minor, in B minor, in E major, and in A flat major, and the grand sonata for piano for 4 hands. D. Oct. 17, 1837.

Humming-Bird, the name of many species of small slender-billed Amer. birds of the family Trochilidae. They are most numerous in species and individuals near the equator, are quite numerous in Mex., and one species is found northward in summer even in Brit. Amer. This species is the *Trochilus colubris*, the only species seen in the E. States. It is known as the ruby-throated H.-B. In its flight its wings produce that well known humming sound which is so characteristic of the family. In the far N. W. the *Selasphorus rufus*, a very brilliant red species, appears to replace the foregoing. There are 400 species. Of these only 12 or 13 are ever found in the U. S. The largest known species (*Hylocharis gigas*, 8 inches long) and the smallest (*Melicospiza minima*, whose body is barely $1\frac{1}{4}$ inches long) are both tropical.

Humpback Whale, a name given to those fin-backed whales (Baleenopteridae) which have the dorsal fin represented by a hump or bunch. One of the best known is *Megaptera longimana*, found in the N. Atlantic waters. It is killed for its oil, which is worth nearly as much as sperm oil. The baleen is short and poor.

Humphrey (EDWARD PORTER), D. D., LL.D., eldest son of Heman, noticed below, b. at Fairfield, Conn., Jan. 28, 1809, grad. at Amherst in 1828, and at Andover in 1833; was tutor at Amherst 1832-33; preached at Jeffersonville, Ind., 1833-35; was pastor of second Presb. ch. in Louisville, Ky., 1835-53, prof. of ecclesiastical hist. in Danville (Ky.) Theological Sem. 1853-66, and in 1866 took charge of College st. ch. in Louisville. Although in the S. during the war, he was loyal to the U. and bore an important part in the reunion of Old and New School Presb. Chs.

Humphrey (HEMAN), D. D., b. in W. Simsbury, Hartford co., Conn., Mar. 26, 1779, grad. at Yale Coll. in 1805; was pastor of the Congl. ch. in Fairfield, Conn., 10 yrs., pastor of the ch. in Pittsfield, Mass., 5 yrs., and pres. of Amherst Coll. 1823-45. Taking charge of that inst. in its infancy, he contributed largely to its growth and prosperity. Wrote often for the religious newspapers and journals. Among his pamphlets, the most celebrated was the *Parallel between Intemperance and the Slave Trade*. Of his books, the *Tour in Fr., G. Brit., and Belg.* has had the widest circulation. D. Apr. 3, 1861.

Humphrey (JAMES), a son of Dr. Heman Humphrey, b. at Fairfield, Conn., Oct. 9, 1811, grad. at Amherst in 1831; became a lawyer of Louisville, Ky. (where he resided but 1 yr.) and of New York. He was (1858-60 and 1864-66) M. C. from New York. D. June 16, 1866.

Humphrey (ZEPHANIAH MOORE), D. D., fifth son of Dr. Heman Humphrey, b. at Amherst, Mass., Aug. 30, 1824, grad. at Amherst Coll. 1843, and at Andover Theological Sem. 1849; pastor of chs. at Racine and Milwaukee, Wis., 1850-59; of First Presb. ch., Chicago, 1859-68; of Calvary Presb. ch., Phila., 1868-75; became prof. of ecclesiastical hist. and ch. polity at Lane Theological Sem., Cin. O.; was connected with the New School branch of the Presb. Ch. before the reunion of 1869; contributed his influence to the reunion, and was elected moderator of the reunited Ch. at Chicago in 1871. D. Nov. 13, 1881.

Humphreys (ANDREW ATKINSON), LL.D., b. at Phila., Pa., Nov. 2, 1810, grad. at the U. S. Military Acad., and appointed second lieut. of artill. July 1, 1831; on garrison and frontier duty, and for 5 yrs. (1844-49) in charge of the Coast Survey office at Wash. In Nov. 1850 he commenced the topographic and hydrographic survey of the delta of the Miss.; in 1851 visited Europe, and from a personal examination of its river-deltas informed himself as to methods of protection against inundation. Returning in 1854, he was assigned to special service to determine the route for a railroad from the Miss. River to the Pacific Ocean, upon which he continued until 1861, meanwhile in 1857 resuming the survey of the delta of the Miss. The valuable report upon the Physics and Hydraulics of the Miss. River was submitted in Aug. 1861, having been hastened to a close by the outbreak of c. war. In Dec. 1861 H., now major, was assigned to duty on the staff of Gen. McClellan, and upon the transfer of the Army of the Potomac to the Va. Peninsula was appointed its chief topographical engineer, serving as such throughout the campaign, having been promoted, however, to be col. A. A. D. C., Mar., and brig.-gen. of volunteers Apr. 1862; Sept. 13, 1862, was assigned to command a division of new troops attached to the 5th corps as 3d division, and followed the army, making a night-march of 26 m. from Monocacy Bridge, joining it at Antietam on the morning of Sept. 18; engaged at Fredericksburg, Dec. 1862, the battle closing with the assault of his division on the "stone wall" at Marye Heights; in command of his division at Chancellorsville; commanded 2d division, 3d corps, at Gettysburg; on July 8 was promoted to be maj.-gen. of volunteers and appointed chief of staff to the commanding gen. Army of the Potomac; assigned to the command of the 2d army corps, Nov. 25, 1864, participating in the events

before Petersburg and subsequent pursuit of the Confed. army up to the final action at Farmville Apr. 7, 1865, and made brevet maj.-gen. U. S. A.; in the volunteer service until Aug. 31, 1866; Aug. 8, 1866, appointed chief of engineers, U. S. A., with the rank of brig.-gen.

Humphreys (DAVID), LL.D., b. at Derby, Conn., in 1752; entered the army as a capt. at the beginning of the Revolutionary war; was appointed aide-de-camp to Washington in 1780; accompanied Jefferson to Fr. in 1780 as sec. of legation; went in 1794 to Lisbon, and in 1797 to Madrid, as ambassador, and returned to Amer. in 1802. He was one of the first to introduce merino sheep to this country, and established a large woollen and cotton factory in Derby. During the war of 1812 he commanded the militia of Conn.; pub. together with Hopkins, Barlow, and Trumbull, the *Anarchiad*; also wrote a *Life of Putnam*. D. Feb. 21, 1818.

Humus, Humic Acid, Ulimine, Ulimic Acid, Geic Acid, Crenic and Apocrenic Acids, Peat, etc., a large class of substances which result from the decay of vegetable substances, and are found in the soil. All these bodies contain carbon, hydrogen, and oxygen. Ulimine is insoluble in water, acids, and alkalis; ulmic acid is soluble in alkalis; humus or humine is the product of the oxidation of ulmine; humic acid occurs in peat, combined with ammonia; the compound is soluble in sodium carbonate; crenic and apocrenic acids are soluble in water, and are found in natural spring, pond, and river water. All these bodies occur in peat. C. F. CHANDLER.

Huneric [*Ὠνέριχος*], the second king of the Vandalic empire in Afr., reigned from 477 to 484 A. D.; was a son of Genseric, and married to a daughter of the emp. Valentinian. Cruel and cowardly, he became most noted for the persecutions against the orthodox Chrs.

Hungarian Grass, an annual grass much sown as a forage-plant, a variety of *Setaria Germanica*, the common millet, valuable for its luxuriant growth on even poor soils, and is much relished by horses and cattle; but if overfed it appears to act as a diuretic, and is hence by many considered injurious to horses. In reasonable quantity is very nutritious and quite harmless. It gives a good weight of excellent hay.

Hungary, hung'-ga-re, is inhabited by several distinct races speaking several distinct langs., but the predominant race is the Magyar. They came into H. at the close of the 9th century. The country had been a Rom. possession, forming parts of the 2 provs. of Pannonia and Dacia. After the fall of the Rom. empire it was overrun by different nations, among which the Huns and the Avars sustained themselves on the soil for the longest period, and are supposed to have given the country its name. The Magyars are a Turanian people, allied to the Turks and to the Finns. For a long time they dwelt first in Caucasus, and then in the region between the Don and the Dniester, but in 887 they descended under Arpad into the plain of the Danube, and after 10 yrs. fighting they conquered the country and ruled from the summits of the Carpathian Mts. to the foot of the Styrian Alps. Their hist. falls into 3 periods—under the dynasty of the Arpads to 1301; under the elective monarchy from 1301 to 1526; and under the dynasty of the house of Hapsburg from 1526 to our time. The most remarkable of the Arpad dynasty was Stephen I., from 997 to 1038. He was crowned by Pope Sylvester II. in 1000 as king of H., and received the title of "His Apostolic Majesty" (which since that time has been the title of the Hungarian kings) as a reward for his exertions in behalf of the Ch. Under him Christianity was established among the people, the country was divided into bishoprics, and schools were founded for classical and theological learning. But it was also under him that Lat. became not only the official lang. of the Hungarian govt., but also the only acknowledged vehicle of Hungarian civilization; and this pitiful mistake, this great calamity, stood unremedied for nearly 800 yrs., and affected the people like a somniferous potion. The first regular newspaper of the country, started in 1721, was pub. in Lat. It was the school reforms of Joseph II., which first awakened the popular spirit. Laws were promulgated which introduced the Hungarian lang. in schools and courts of all degrees, and social life commenced to assume, in all its various branches, a most decidedly national character. In 1787 Matthias Ráth started in Presburg the first Hungarian newspaper. But its true inauguration as a literary lang., as the bearer of a national civilization, as the expression of a national genius, the Hungarian lang. received by the publication in 1817 of *Hunyf's Love*, by Sándor Kisfaludy. (See AUSTRIA-HUNGARY.)

CLEMENS PETERSEN.

Hungary Water is dilute alcohol aromatized with sage, rosemary, ginger-root, or other fragrant substances, and then distilled. It has had a limited use in med. as a stimulant.

Huns, The [Lat. *Hunni*], a tribe of warlike nomades, with dark complexions, small, deep-set, black eyes, and flat noses. They came from the barren plateaus of E. Asia, N. of Chi. One part settled along the Caspian, and later became known as the White H.; the other part crossed the Volga and conquered the Alani. In 376 they crossed the Dnieper, defeated the Goths, and drove them over the Danube; in 434, under Attila, they crossed the Danube, and the Rom. emp. Theodosius II. paid them an annual tribute. When the tribute ceased to be paid, Attila invaded Gaul, where he was defeated, and lt., where Pope Leo I. persuaded him to retreat. After the death of Attila the H. dissolved and disappeared among the other barbarian tribes. The H. were Turanians, probably of the Turkish branch.

Hunt (FREEMAN), b. at Quincy, Mass., Mar. 21, 1804; entered in 1816 a printing-office in Boston; became managing director of the Bewick Co. and edited *The Amer. Magazine*; removed in 1831 to New York, where he established *The Traveller* in 1831 and the *Merchant's Magazine* in 1839; also pub. *The Library of Commerce* and *The Lives of Amer. Merchants*. D. Mar. 2, 1858.

Hunt (HENRY JACKSON), b. in Detroit, Mich. (then a Terr.), Sept. 14, 1819; grad. at W. Pt. Military Acad. July 1, 1839, and entered the army as second lieut. of artil.; served on frontier and garrison duty and in Mex. war. During the c. war served as aide-de-camp to Gen. McClellan, commanded the artil. reserves of the Army of the Potomac in the Peninsular campaign of 1862, and commanded in chief the artil. of that army from Sept. 18, 1862, to the close of the war. Appointed maj.-gen. of volunteers. Author of various reports and papers on artil., artil. projectiles, tactics, army organization, and organization of artil. schools; pres. of the permanent artil. board for the army.

Hunt (JAMES HENRY LEIGH), b. at Southgate, Middlesex, Eng., Oct. 19, 1784, the son of a clergyman who had been a lawyer in Phila. H. was ed. at Christ's Hospital, read law for a time, and found a place in the war office, which he left in 1808. His *Juvenilia* was pub. by his father; in 1805 he became a critic for the *News*, and in 1808 established *The Examiner*, which became a power in the political world. He was imprisoned (1812-15) for using lang. lacking in respect for the prince-regent. His literary life was one of much activity; in 1822 he visited Byron in It. His best poem is *The Story of Rimini*; he wrote *Recollections of Byron; Men, Women, and Books; and Autobiography*. D. Aug. 28, 1859.

Hunt (RICHARD MORRIS), b. in Brattleboro', Vt., Oct. 28, 1828; went to Europe in 1843; was a pupil at the *École des Beaux Arts* in Paris, and attained distinction there; returned to Amer. in 1855; devoted himself actively to his profession, and has elevated the taste for arch. at home. He has built the Lenox Library, the Divinity Coll. building at Yale, the Capitol extension at Wash., etc.

Hunt (ROBERT), b. at Devonport, Eng., Sept. 6, 1807; is a self-educated man, but has acquired a great name, partly by *Mineral Statistics* for United Kingdom, partly by his researches on light; conservator of Museum of Geol. in Lond., and wrote *Poetry of Science and Panthea*.

Hunt (THOMAS), M. D., b. in Charleston, S. C., May 18, 1808, grad. in the med. dept. of the Univ. of Pa. 1829; was the first prof. of anat. and physics in the med. dept. of the Univ. of La. 1834, then its dean, and in 1848 became prof. of physiological and pathological anat., which he held at his death. He was also house-surgeon to the Charity Hospital, pres. of the Physico-Med. Society of New Orleans, and became the pres. of the Univ. of La. 1866. D. Mar. 30, 1867.

Hunt (THOMAS STERRY), F. R. S., LL.D., Ph. D., b. at Norwich, Conn., Sept. 5, 1826; studied med. and chem., and in 1845 became assistant in chem. to Prof. Silliman; served under Sir W. E. Logan as chemist and mineralogist for the geological survey of Canada; was in 1855 one of the Eng. jurors at the Paris Exposition, when he received the cross of the Legion of Honor. In 1859 he was chosen F. R. S. He has been prof. of chem. in the Univ. of Que. and in McGill Coll., Montreal, and prof. of geology in the Mass. Inst. of Technology. He has written much upon mineralogy, chem., dynamic geol., and kindred topics.

Hunt (WARD), LL.D., b. at Utica, N. Y., June 14, 1810, ed. at Hamilton and Union Colls., graduating in 1828; was mayor of Utica and member of the N. Y. assembly; judge of the court of appeals of the State of N. Y. 1865-73, when he became justice of the supreme court of the U. S. Retired Jan. 27, 1882.

Hunt (WASHINGTON), b. at Windham, N. Y., Aug. 5, 1811; admitted to the bar at Lockport in 1834, appointed first judge of Niagara co. 1836, M. C. 1843-49, comptroller of N. Y. 1849, and gov. 1851-53. When the Whig party was dissolved he became a Dem.; was a delegate to the Chicago Convention in 1864. D. Feb. 2, 1867.

Hunt (WILLIAM H.), b. in S. C.; settled in La., ed. at Yale Coll.; was solicitor in chancery and prof. of commercial and criminal law and the law of evidence in New Orleans law school; atty.-gen. of La. 1876; in 1878 became judge in court of claims at Wash., D. C.; sec. of navy Mar. 5, 1881, U. S. minister to Rus. 1882 till his death, Feb. 27, 1884.

Hunt (WILLIAM MORRIS), brother of Richard M., b. in Brattleboro', Vt., Mar. 31, 1824; entered Harvard Coll. in 1840, but did not complete his course; went to Düsseldorf in 1846; in 1848 was a pupil of Couture in Paris; returned to the U. S. in 1855. H. was one of the first to introduce what is commonly known as the Fr. school of art into Amer., but he made it his own, and used it to express original ideas. His pictures are numerous and of great variety in subject, genre-painting and portrait being his great excellence. *The Lost Kid, The Choristers, Girl at the Fountain, Marguerite, Morning Star, Bugle Call, and Drummer Boy* are well known. D. Sept. 8, 1879.

Hunter (DAVID), b. at Wash., D. C., July 21, 1802; grad. from the U. S. Military Acad., and entered the army as second lieut. of inf. July 1822; engaged for 14 yrs. on frontier duty, resigned in 1836; re-entered the service as paymaster in 1842, with the rank of major, on which duty he served until 1861, when (May 14) he was appointed col. 6th U. S. Cav., and 3 days later brig.-gen. of volunteers, as such commanding division at Bull Run (July 21); promoted to be maj.-gen. of volunteers Aug. 1861. In May 1862, while in command of the dept. of the South, he issued an order declaring slavery abolished in that dept., which order was annulled by Pres. Lincoln in a proclamation. In May 1864 H. succeeded Gen. Sigel in command of the dept. of W. Va.; the battle of Piedmont and subsequent march against Lynchburg *via* Lexington occurred the following month. In 1865 was member of the military commission to try the conspirators engaged in the assassination of Lincoln. Retired July 1866.

Hunter (JOHN), F. R. S., b. at Long Calderwood, near Glasgow, Scot., July 14, 1728; received imperfect instruction at school; was apprenticed to a cabinetmaker; went in 1748 to study anat. with his brother; studied at Ox. 1753-54; became a surgical pupil at St. Bartholomew's 1751, and at St. George's 1754; studied surgery under Cheselden and Pott; lectured upon anat. 1754-59; served in Fr. and Port. as staff-

surgeon 1761-63; began to practise surgery in Lond. 1763; pub. new discoveries in pathology and physiology; became surgeon to St. George's Hospital 1768, surgeon extraordinary to the king 1776, surgeon-gen. of the forces and inspector-gen. of hospitals 1790. H. was the boldest and best operator of his time, an anatomist of marvellous knowledge, and one of the fathers of zoological science. Author of *Nat. Hist. of the Human Teeth, On Venereal Disease, Observations on Certain Parts of the Animal Economy, On the Blood, Inflammation, and Gunshot Wounds*. D. Oct. 16, 1793.

Hunter (ROBERT MERCER TALIAFERRO), b. in Essex co., Va., Apr. 21, 1809, ed. at the Univ. of Va. and the Winchester Law School; M. C. 1837-41 and 1845-47, and speaker 1839-41; U. S. Senator from Va. 1847-61; then Confed. sec. of state, and still later a member of the Confed. Senate, and was one of the coms. who met Pres. Lincoln and Mr. Seward at the Hampton Roads conference in Feb. 1865.

Hunter (WILLIAM), M. D., F. R. S., elder brother of John Hunter, was b. at Long Calderwood, Scot., May 23, 1718; studied at Glasgow Univ. 1732-37; became the med. pupil of Cullen; studied med. in Edinburgh and Lond., whither he went in 1741; began to lecture on surgery and anat. 1746; acquired fame as a surgeon and accoucheur; became phys. to the queen 1764, prof. of anat. 1770, pres. of the Coll. of Phys. 1781, associate of the Acad. of Sciences, Paris, 1782. His collection of anatomical and pathological specimens, coins, books, etc. is now the Hunterian Museum of the Univ. of Glasgow. His prin. works were *Medical Commentaries and Anatomia Humani Uteri Gravid.* D. Mar. 30, 1783.

Hunter (WILLIAM), D. D., b. May 26, 1811, in Antrim co., Ire.; brought to the U. S. in 1817, he entered Madison Coll. in 1830. In 1833 he began his ministry in connection with the Pittsburg (Pa.) conference. He has edited the *Pittsburg Conference Journal*, also the *Pittsburg Chr. Advocate* (M. E.), and was presiding elder in the Clarksburg (Pa.) and Beaver (Pa.) dists. In 1855 he became Kramer prof. of Heb. and biblical lit. in Allegheny Coll., Pa. In 1870 he returned to pastoral work, and in 1872 to religious journalism, being then re-elected as ed. of the *Chr. Advocate*. He was author of several books of hymns and spiritual songs, and a poem on *Amer. Methodism, a Plea for Unity*. D. Oct. 18, 1877.

Hunter (WILLIAM), LL.D., b. at Newport, Nov. 26, 1774, grad. at Brown Univ. in 1791; was admitted to practice of law in Newport in 1795; M. C. 1799-1811, and U. S. Senator 1811-21; was *chargé d'affaires* and minister plenipotentiary to Brazil 1834-45. D. Dec. 3, 1849.

Huntingdon, R. R. junc., cap. of Huntingdon co., Pa., on the Juniata, 104 m. W. of Harrisburg. It has an acad.; is in a region abounding in iron, lead, coal, fire-clay, limestone, and fine timber. Pop. 1870, 3034; 1880, 4125.

Huntingdon (SELINA), COUNTESS of, daughter of Washington Shirley, Earl Ferrers, b. 1707; was married to Theophilus Hastings, earl of Huntingdon, a man of great religious zeal. The countess became a very devout Chr. and inclined to the Calvinistic tenets of Whitefield, whom she made her private chaplain; she became the leader of Calvinistic Methodism in Eng., and her followers were known as the "Countess of Huntingdon's Connection." Her large means were devoted to the dissemination of her religious views, and she built and maintained a coll. at Trevecca, Wales, and erected 64 chapels, the finest of which is at Bath, for the management of which she bequeathed the bulk of her fortune in trust. D. June 17, 1791.

Huntington, city, cap. of Huntington co., Ind., on R. R. and the Wabash and Erie Canal, 24 m. S. W. of Ft. Wayne and 118 m. S. W. of Toledo. It is the depot for a large lime-burning region. The city is built on both banks of Little River. Pop. 1870, 2925; 1880, 3863.

Huntington, Suffolk co., N. Y., on R. R. 38 m. from New York, with which it is also connected by steamboat the greater part of the yr. Many million bricks are annually made in the vicinity. Pop. 1870, 2433; 1880, 2952.

Huntington, city of Cabell co., W. Va., on R. R. and O. River, was founded in 1871, and has extensive manufactures. It is the seat of Marshall Coll. Pop. 1880, 3174.

Huntington (DANIEL), b. in New York, Oct. 14, 1816, ed. at Hamilton Coll.; was first stimulated to the pursuit of art by Charles L. Elliot, whom he met while a student; in 1835 began to study under Morse; later was a pupil of Inman; in 1836 travelled and sketched in the Highlands of the Hudson; in 1839 went to It. and painted figure-pieces; returned to New York, painted portraits, and commenced illustrations of the *Pilgrim's Progress*, which failure of eye-sight compelled him to discontinue; revisited Europe in 1844; on his return resumed the painting of portraits, but found time to execute 2 or 3 historical pieces. For many yrs. past his permanent residence has been in New York, where his reputation is very high. Mr. H. has been greatly honored by his profession and by the public. In 1850 a special exhibition was made in New York of all the pictures of his that could be collected, the best known artists and citizens joining to make the tribute worthily expressive of their regard. On May 14, 1862, he was elected pres. of the National Acad. of Design.

Huntington (Right Rev. FREDERIC DAN), D. D., b. at Hadley, Mass., May 28, 1819; grad. at Amherst in 1839 and at the Cambridge Divinity School in 1842. Entering the Unit. ministry, he held a pastorate in Boston 1842-55, when he became Plummer prof. of Chr. morals and preacher to Harvard Univ. In 1859 took orders in the Epis. Ch.; in 1861 was one of the founders of the *Ch. Monthly*, and in 1869 was consecrated bp. of Central N. Y. Author of *Human Society and Lessons on the Parables*.

Huntington (SAMUEL), LL.D., a signer of the Dec. of Ind., b. at Windham, Conn., July 3, 1731; became in 1758 a lawyer of Norwich, Conn.; was a member of the Continental Cong. 1776-83, and its pres. 1779-81; judge of the Conn. superior court 1774-81, and its chief-justice 1784; lieut.-gov. of Conn. 1785, gov. 1786-96. D. Jan. 5, 1796.

Huntington (SAMUEL), a nephew of Gov. Samuel Hunt-

ington, b. at Coventry, Conn., Oct. 4, 1765, grad. at Yale in 1785; became a lawyer in 1793; settled near Painesville, O., in 1800; was a judge of the common pleas court 1802-03, of the superior court in 1803, and afterward chief justice; gov. of O. 1808-10; a col. and paymaster in the war of 1812-14. He was also a member of the first constitutional convention of O., and speaker of the first State senate. D. June 8, 1817.

Huntsville, on R. R., city, cap. of Madison co., Ala., the "Queen city of the mountains." It stands upon a mt., a spur of the Cumberland Mts.; has a female coll. (Meth.) and a female sem. (Presb.). Pop. 1870, 4907; 1880, 4977.

Huntsville, Mo. See APPENDIX.

Huntsville, city, cap. of Walker co., Tex., 200 m. S. E. of Austin, on R. R. It is the seat of the State penitentiary, also of Austin Coll. (Presb.) and Andrew Female Sem. Chief business, shipping cotton. Pop. 1870, 1599; 1880, 1322.

Hunyady (János), surnamed CORVINUS, b. in Hungary at the close of the 14th century. Under Sigismund and Albert he acquired fame by the skill with which he fought against the Turks, and by Albert he was made gov. of the Hungarian provs. S. of the Danube. In 1439 Vladislas, king of Poland, was elected king of Hungary. Under his reign the arms of H. were still more successful. He drove the Turks behind the Balkan, and compelled them to conclude an armistice of 10 yrs. (July 12, 1444). Vladislas broke this armistice, and the result was the battle of Varna, in which the Hungarians were routed and the king fell (Nov. 10, 1444). During the minority of Ladislas, a son of Albert, elected king of Hungary in 1444, H. governed the country. He kept order in the country, and succeeded in preventing the Turks from overrunning Europe. His most brilliant exploit was the attack on the Tur. camp at Belgrad (July 14, 1456). Shortly after he died. Of his 2 sons, the oldest, Ladislas, was beheaded at Buda for having killed Count Cilley, a personal enemy of his father; the younger, Matthias Corvinus, was ed. by Georg Podiebrad of Bohemia, and became king of Hungary after Ladislas.

Hu'sa, **Sand-box Tree** (*Hura crepitans*, order Euphorbiaceae), a native of tropical Amer. When the seed is ripe the woody capsule bursts with a loud report. It was once customary to make sand-boxes of the unripe woody fruit, and it is related that these boxes would sometimes spontaneously explode after being used for yrs. The seeds are sharply purgative.

Hurlbert (WILLIAM HENRY), b. in Charleston, S. C., July 3, 1827; grad. at Harvard Coll. in 1847, at Harvard Divinity School in 1849; went the same yr. to the Univ. of Berlin, and the next yr. to Rome and Paris. In 1852 he entered Harvard Law School, and in 1853 went to the W. L.; in 1854 pub. *Pictures of Cuba*; in 1855 joined the staff of *Pittman's Magazine* and the *Albion*; in 1856 went to Eng.; in 1857 joined the New York *Times*; in 1858 travelled through Eng., Ger., and Rus.; in 1862 joined the New York *World*; has since travelled in Europe, Afr., Mex., and Sp. Amer. Wrote *Gen. McClellan and the Conduct of the War*.

Hurlbut (STEPHEN A.), b. at Charleston, S. C., Nov. 29, 1815; received a liberal education, and was admitted to the bar in 1837; removed to Ill. and settled in Belvidere. In 1847 he was elected to the State constitutional convention as a Whig; Presidential elector on the Whig ticket 1848; member of the State legislature 1859, 1861, and 1867, and Presidential elector on the Rep. ticket 1868. During the c. war he was appointed in May 1861 a brig.-gen. of volunteers, commanding a division at the battle of Pittsburg Landing; promoted to be maj.-gen. of volunteers Sept. 1862, and commanded the 16th army corps and dept. of the Gulf. Minister to U. S. of Colombia 1869-72; member of 43d Cong.; became U. S. minister to Peru May 19, 1881. D. Mar. 28, 1882.

Huron, Dak. See APPENDIX.

Huron Lake, the third in area of the great lakes of the St. Lawrence Basin, lies between the State of Mich. on the W. and the prov. of Ontario on the E. It has more bays and harbors than any other of the great lakes, but it is subject to severe storms. The prin. bay is Georgian Bay or Lake Manitoulin, in Canadian terr. The river St. Mary connects it with Lake Superior, and Mackinaw Strait with Lake Michigan. Its outlet is the river St. Clair. L. H. averages about 1000 ft. deep, the maximum being about 1800 ft. Its surface is 574 ft. above sea-level. Area, 23,800 sq. m.

Hurricane [originally a Carib word, signifying a "high wind"] is distinguishable by its fury and sudden change in character. It is not necessarily rotatory, as in a cyclone, or spiral, as in whirlwinds, but may partake of all or any of these characteristics. H. are unknown in the polar regions, of frequent occurrence in the torrid, and occasionally occur in the temperate zone. In the Pacific and N. Indian oceans and the Chi. Sea they are called typhoons. The premonitory indications of a H. are a peculiar haziness of atmosphere and an ominous calmness of wind and tide. The barometer falls sensibly, and winds from unexpected quarters of the compass arise. The H. arrives at its climax in from 4 to 24 hours. The highest H. winds on the Brit. coast are recorded to have attained a velocity of 130 m. per hour. Their course appears to be, in the N. Atlantic, southerly, to the N. of the Windward Islands; northwardly, over Newfoundland. Very few H. occur in the S. Atlantic. The most frequently visited portions of the U. S. are the coasts of Ga. and S. C. The great proportion of the Atlantic H. originate between the Windward Islands and the Afr. coast, moving along the Amer. coast on its route to Iceland and Nor.

Hurst (JOHN F.), D. D., LL. D., b. Aug. 17, 1834, in Dorchester co., Md.; ed. at Dickinson Coll., Carlisle, Pa., and Halle Univ., Ger.; entered Meth. ministry in 1858, and in 1866 went to Ger. to take charge of the theological instruction in the Martin Mission Inst., Bremen; in 1870 accepted the professorship of historical theol. in the Drew Theological Sem., Madison, N. J.; in 1873 pres. of same sem. Author of translation of Hagenbach's *Hist. of the Ch. in Eighteenth and Nineteenth Centuries* and of an original *Hist. of Rationalism*. Elected bp. in M. E. Ch. May 12, 1880.

Husbandry, Patrons of. See PATRONS OF HUSBANDRY, by L. F. BROCKETT, M. D.

Huss (JOHN), b. July 6, 1373, at Hussinetz, S. Bohemia, near Bavarian frontier; entered in 1389 Univ. of Prague, where he took the degree of M. A. in 1396, and began to give lectures on theol. and philos. in 1398. In 1401 he became pres. of the faculty of theol., and in 1409 rector of the univ. In 1400 he had taken holy orders, and in 1402 he was appointed preacher at the Bethlehem chapel at Prague. He delivered his sermons in the Bohemian lang., and gathered immense audiences. In a short time he became the idol of the lower classes of Prague, and at court he was high in favor; he was his friend. Nor was he at first met with enmity by the Ch., though his denunciations of the false doctrines in her teaching and the vices in her discipline were very loud. But by degrees Abp. Sbynko of Prague became frightened at the commotion which H.'s preaching caused, and as he knew the connection existing between the ideas of H. and the writings of Wycliffe, he ordered all books by the latter to be deposited in his palace, and appealed to the pope. Alexander V. sent a bull against Wycliffe and all who held his opinions, and Sbynko had the books, 200 vols., publicly burned. H. protested, not against the pope, but against the measures of Sbynko, and addressed a brilliant exposition of the whole matter to the new pope, John XXIII. A committee of cardinals was appointed, and Sbynko's acts were denounced as transgressions of his legitimate power, but at the same time H. was accused of heresy and summoned to appear before the pope. The king, the queen, the univ., the magistrates of Prague, even the abp. himself, wrote to the pope to attest the orthodoxy of H., but in vain; and as he refused to appear, he was condemned and excommunicated, and a ban was placed on the city which received him within its walls. He left Prague, but the popular movements became so violent that Sbynko had to flee for his life, and H. returned to his chapel, where his preaching against the pope and the Ch. became bolder and bolder; the pope was compelled to acquiesce. But in 1412 John XXIII. preached a crusade against Ladislas, who fought with Louis II. for the possession of Naples, and the pope granted indulgences to all who would take arms against Ladislas. Scandalized at seeing the head of the Ch. meddle in this way with secular affairs, H. gave an exposition of the frauds and lies, doctrinal and historical, on which the whole Ch. establishment rested. A new bull of ban was flung against him, but he now appealed to a gen. council in open opposition to the pope. Provided with a safeguard from the emp. Sigismund, he repaired to Constance, where (Nov. 19, 1414) the gen. council opened. He was well received both by the pope and the prelates, and seemed even to inspire confidence. But by the intrigues of his enemies affairs soon took another turn. He was imprisoned first in the cathedral, then in a Dominican convent on an island of the lake of Constance, then in the castle of Gottleben, where chains were put on him; and when at last (June 1415) he actually appeared before the council, it was evident that he was condemned before he was heard. On July 6 he was sentenced and burned at the stake outside of the city, and his ashes were strewn on the Rhine. Many attempts were made to persuade him to recant, but he refused, and died singing with loud voice the *Kyrie eleison*. CLEMENS PETERSEN.

Hussites, the followers of Huss, immediately after his martyrdom they arose in Bohemia against the Catholics. King Wenceslaus appeased the storm by granting them religious freedom. The king d. 1419, and the pope issued an order for the conversion of the H. by force, and a civil war began. They assembled under John Ziska, captured Prague, pillaged and burned the monasteries, and defeated the troops of Sigismund, the Ger. emp., heir of Wenceslaus. Ziska d. in 1424, but his successor, Procopius, was still more successful. He defeated Sigismund and carried the war into Aus., Bavaria, Franconia, and Sax. Meanwhile the H. had separated into the Taborites and the Calixtines. The former acknowledged no doctrine which was not immediately given in the Scriptures; the latter held a more moderate position. In 1433 the council of Bale came to an agreement with the Calixtines, and drew them out of the contest, the result of which was that the Taborites were totally defeated in 1434. By the treaty of Iglau (1436) Sigismund granted to Bohemia religious and political freedom, but the c. war did not cease until 1485, when King Ladislas confirmed the treaty of Iglau.

Husted (JAMES W.), b. at Bedford, N. Y., Oct. 31, 1833, grad. at Yale 1854; was admitted to the bar 1857; deputy supt. of ins. dept. 1860; was afterward harbor-master and then deputy capt. of the port of New York; judge-advocate for the 7th brigade N. Y. National Guard, etc. became maj.-gen. of the 5th division N. Y. National Guard in 1873, speaker of the assembly 1874, pres. of the N. Y. State Military Association 1874.

Hutcheson (FRANCIS), b. Aug. 8, 1694, at Drumalig, Ulster, Ire.; studied theol. at the Univ. of Glasgow 1712-16; lived as a public teacher in Dublin 1717-29, during which period he pub. *Inquiry into the Original of Our Ideas of Beauty and Virtue* and *Nature and Conduct of the Passions and Affections*, and was in 1729 appointed prof. of moral philos. at the Univ. of Glasgow. His *System of Moral Philos.* was pub. in 1755. In the hist. of Scot. philos. H. occupies a conspicuous place. He was opposed to Locke and the empirical tendency of the Eng. philos., which is the pre-eminently Scot. element in his philos. But by his own time he was suspected as belonging to the "new lights," and intending to put a new face on Scotch theol. Moral goodness he defines as the right relation between the propensities; virtue he represents as benevolence; and the whole moral state of man he rests on the moral sense. But the assumption of a moral sense brought him in propinquity to the opinion that man could be moral without knowing God. D. Aug. 8, 1746.

Hutchins (THOMAS), b. at Monmouth, N. J., about 1730, entered the Brit. military service, and became capt. in the "Royal American" regiment; acted as engineer in Gen. Henry Bouquet's famous expedition against the Shawnees (1764), and served in a campaign against the Fla. Indians. Being in Lond. in 1779, his known devotion to Amer. independence led to an imprisonment for 6 weeks on a charge of maintaining correspondence with Franklin. Soon afterward he sailed from Fr. to Charleston, S. C., and joined the army under Gen. Greene, receiving the title of "geographer-gen." He furnished the maps and plates for Dr. Smith's *Account of Bouquet's Expedition*; pub. *A Topographical Description of Va., Pa., Md., and Carolina, with maps, and An Historical and Topographical Description of La. and W. Fla.* D. Apr. 28, 1789.

Hutchinson, city, cap. of Reno co., Kan., on R. R. Founded 1871. Pop. 1880, 1540.

Hutchinson (ANNE), a religious enthusiast, founder of the Antinomian sect of N. Eng., b. at Alford, Lincolnshire, Eng., in 1591, the daughter of Francis Marbury, a parish clergyman. In 1634 she came to Boston, Mass., to enjoy the preaching of John Cotton. Here she instituted meetings of women for the discussion of doctrinal questions, and her influence created a powerful faction and led to public disturbances. She even claimed a measure of divine inspiration. In 1637 she was banished to R. I., where she was the leader of a small sect until 1642, when she removed to the Dut. colony of New Amsterdam, where (as some say near Hell Gate, or according to others near Albany) she was murdered by the Indians in 1643.

Hutchinson (JOHN), b. about 1616. In the beginning of the Eng. c. war he was appointed gov. of Nottingham castle; represented Nottingham in Parl., and was a member of the high court of judicature which sentenced the king to death, but retired from public life, disagreeing with Cromwell. Shortly after the Restoration he was arrested and detained in prison, first in the Tower, and then in Sandown Castle, Kent, where he d. Sept. 11, 1664.

Hutchinson (THOMAS), b. at Boston Sept. 9, 1711, grad. at Harvard Coll. in 1727; studied law, and served as rep. for Boston in the gen. court for 10 yrs.; was 3 times speaker; became lieut.-gov. in 1758, chief-justice in 1760, acting gov. in 1769, and was commissioned full gov. in 1771. H. early became obnoxious to the patriots on account of his unwavering support of all the tyrannical measures of the Brit. ministry. In the Stamp Act riots of 1765 his house was twice attacked; on the second occasion (Aug. 26) his furniture was burned in the street and an invaluable collection of historical MSS. lost or destroyed. H. was the most prominent mark in Amer. for the invectives of Otis, Bowdoin, Hancock, and the 2 Adamses. Wearing with the conflict he sailed for Eng. on leave of absence June 1, 1774, and never returned to Amer. His services were rewarded by a pension from the Crown. His writings are valuable sources of information for N. Eng. hist. Wrote a *Hist. of the Prov. of Mass. Bay*, and in 1769 a *Collection of Original Papers relative to the Hist. of the Colony of Mass. Bay*. D. June 3, 1780.

Hutten, von (ULRICH), was a kind of literary knight-errant. He was b. in the castle of Steckelberg, near Fulda, Hesse, Apr. 20, 1488, and in 1498 was placed in a monastery. But in 1504 he fled to Erfurt, where he conversed with poets and scholars, and in the next yr. he went to Cologne. Here he made acquaintance with some of the *virri obscuri*, and also with one of their opponents, whom he followed to Frankfurt-on-the-Oder. Here he received the degree of M. A., and pub. *Carmen in Laudem Marchia*; but in 1508 he was attacked by a pestilential disease, and for several yrs. he wandered around, experiencing many turns of fortune. In 1511 he was in Wittenberg, where he pub. his *Ars versificatoria*; in Pavia he was plundered of all he owned, and was compelled by the danger of starvation to enlist in the imperial army. He left it very soon, and returned home to Ger., and during the 2 following yrs. (1513-15) his denunciations of Ulrich, duke of Wurtemberg, and especially his defence of Reuchlin, made his name quite famous. The publication of *Epistolæ obscurorum virorum*, in the writing of which he probably bore a part, is generally considered as having furthered the cause of the Ref. In 1517 he was knighted by the emp. at the diet of Augsburg, and entered the service of the abp. of Mentz. Next yr. he retired from the court and began the publication of the attacks on the pope and the clergy written in Ger. The pope demanded his surrender as a prisoner, and H. fled to Switz., where he d. Aug. 23, 1523.

Huxley (THOMAS HENRY), M. B., Ph. D., LL.D., F. R. S., b. at Ealing, Middlesex, Eng., May 4, 1825; became a student of Charing Cross Hospital 1842; grad. M. B. from the Univ. of Lond. 1845; was assistant surgeon of the R. N. 1846-53; sailed around the world in H. M. S. Rattlesnake, which then performed surveying service in Australasia, 1846-50; became F. R. S. 1851, in acknowledgment of the observations in natural science made by him while in the naval service; became in 1854 prof. of nat. hist. in the School of Mines; Hunterian prof. in the Royal Coll. of Surgeons 1863-69; pres. of the Geological and the Ethnological societies 1869-70; was appointed one of the royal coms. on scientific instruction and the advancement of science 1870; was on the Lond. school board 1870-72; sec. of the Royal Society 1872, lord rector of the Univ. of Aberdeen 1873, and has twice been named Fullerian prof. in the Royal Inst. The comparative anatomy of both vertebrate and invertebrate animals has been the field in which he has been chiefly distinguished. His theory of protoplasm, his able advocacy of the Darwinian hypothesis, and the doctrine that the seemingly voluntary movements of animals, and even of men, are automatic and independent of the will, have attracted much attention. Author of *The Oceanic Hydrozoa, Man's Place in Nature, On the Phys. Basis of Life, Elementary Physiology, Introduction to the Classification of Animals*, etc.

Huyghens, h'gens (CHRISTIAN), b. at the Hague Apr. 14,

1629, and ed. at the univ. of Leyden and Breda, where he studied law and math. He made several journeys to Den., Fr., and Eng., and resided from 1665 to 1681, at the invitation of Colbert, at Paris, where he was made a member of the Acad. of Science. The latter part of his life he spent at the Hague. As a mathematician he enjoyed the greatest fame, and his views on optics and mechanics attracted great attention. He was the most able advocate of the undulatory hypothesis of light, which he developed in 1678. At different times in his life he was occupied in making improvements in the construction of telescopes, and in 1656 he discovered the first satellite of Saturn, and in 1659 the ring, which discoveries he described in his *Systema Saturnium*. He became still more widely known as the inventor of the pendulum clock, which he described in his *Horologium Oscillatorium*. D. July 8, 1695.

Hyacinth [so called from the youth Hyacinthus, slain by the quoit of Apollo: from his blood the flower was fabled to have sprung], a genus of bulbous-rooted flowering plants of the lily family, natives of the Old World. The true H. of cultivation are varieties of *Hyacinthus orientalis*. The bulbs come chiefly from Haarlem in the Netherlands. They do best in a rich but sandy soil, are often planted in pots, and for house-culture they do tolerably well in hyacinth-glasses with water only.

Hyacinth, or **Jacinth**, a term applied to bright-colored varieties of zircon, is in composition a silicate of zirconia. The H. is used as a gem, and varies in color from various shades of red to orange. It is doubtful whether this is the *vakarhos* of the anc., which may have been the amethyst or the sapphire.

Hyacinthe, e-h-sant' (CHARLES LOYSON), FATHER, b. at Orléans in 1827; after his course of studies in the coll. of Pau he entered the coll. of St. Sulpice. Four yrs. after he was ordained priest and was prof. of theol. in several schools. H. was then attached, as a working priest, to the parish of St. Sulpice in Paris, but he soon made himself a monk, and entered the convent of the Carmelites in Lyons. From 1864 till 1869 he was one of the most celebrated preachers ever heard at Bordeaux, Nantes, and in Notre Dame of Paris. But he was suspected of uttering too liberal religious doctrines, and finally excommunicated by the pope. Father H. soon after (1869) made a voyage to the U. S., and on his return to Fr. he married an Amer. lady. Persecution compelled him to take refuge in Switz., where he established an Old Cath. ch. at Geneva.

Hyæna. See HYÆNIDÆ.

Hyænidæ [Gr. *hæva*; Lat. *hyæna*], a carnivore, with the feet digitigrade; teeth 34; the last upper tooth or true molar, small and tubercular; the last upper premolar sectorial; in the lower jaw the true molar sectorial. The hind legs are usually short, the tail short and bushy, and the neck provided with a short, bristly mane, whence the classical name, signifying a "sow." Three living species are known: two of these are from S. Afr.—viz. the brown H. (*H. brunnea*), and the Spotted H. (*H. crocuta*). The striped H. (*H. striata*) ranges over Afr. and S. Asia.

Hyænodon [Gr. *hæva*, a "hyæna," and *odon*, a "tooth"] an extinct genus of mammals, the type of an extinct family, Hyænodontidæ, partaking of characters of the true carnivores, but representing another order. The name was first used for a species from the Lower Miocene of Fr., and the genus also occurs in the Upper Eocene of that country. Dr. Leidy has also described 3 species from the Miocene of Dakota. The largest of these, *H. horridus*, is the largest known species of the genus, and equalled in size a large black bear. The lower jaw is strong. The *H. cruentus* and *H. cruentus* are smaller species.

Hyalite, or **Muller's Glass**, a form of opal or hydrated silica, of glassy lustre. It occurs as an incrustation, generally in the form of pellicud drops.

Hyatt (ALPHEUS). See APPENDIX.

Hybernation. See HIBERNATION.

Hyde (ALVAN), D. D., LL.D., b. at Franklin, Conn., Feb. 2, 1768; grad. at Dartmouth 1788, and in 1792 was ordained pastor of the Congl. ch. at Lee, Mass., where he remained the rest of his life. He was for 21 yrs. v.-p. of Williams Coll., and pub. several sermons. D. Dec. 4, 1833.

Hyde (ANNE), a daughter of Edward Hyde, earl of Clarendon, b. in 1637, and lived at the Hague as maid-of-honor to the princess of Orange, sister to Charles II. and James II. Here James, at that time duke of York, formed a liaison with her, and shortly after the restoration of his family to the throne of Eng. in 1660 he married her clandestinely. She exercised a great influence on her husband. She was a R. Cath. and converted him. Her 2 daughters, Mary and Anne, who both became queens of Eng., were ed. in the Prot. religion. Anne d. in 1671.

Hyde (EDWARD). See CLARENDON.

Hyde Park, on R. R., Cook co., Ill., a suburb of Chicago. Pop. 1870, 3644; 1880, 15,716.

Hyde Park, R. R. centre, Norfolk co., Mass., 7 m. from Boston, on Neponset River. Pop. tp. 1870, 4136; 1880, 7088.

Hyderabad (or **Haiderabad**, as it is written in official Eng. papers), the cap. of the nizâm of the Deccan, the most powerful of the Indian princes under Eng. protection. Pop. 200,000. The city is situated in the centre of the plateau of the Deccan, about 520 metres above the sea, on the Musli River, which here is nearly 160 metres broad. The larger part of the city, the old city, stands on the S. bank of the Musli; on the N. is that quarter which by Englishmen is called the Princess Bazaar, and which contains the magnificent building of the Eng. residency. This building communicates directly with the palace of the nizâm, standing on the opposite bank of the river. Among the private houses the palace of the influential minister, Salâr Jung, is the most remarkable; the palace of Shumsul Umra, who is at the head of the administration together with Salâr Jung, is also noteworthy. The city is principally Mohammedan, and the most prominent of its mosques are the cathedral mosque

and the mosque of the Prophet. A very striking building is the Chahar Minar, formerly a univ. Where the 4 prin. streets cross each other it rises on 4 immense arches, so that the streets run below it. The city is very extensive, but contains many small and poor houses in narrow streets. The surrounding country is rich in magnificent gardens with ponds, pavilions, and villas. H. was once the prin. market for the diamonds cut in the neighboring Golconda; its manufactures of cotton and paper are still considerable; *kim-khwab*, a silk embroidered with gold, and turbans are made. [From *orig. art. in J.'s Univ. Cyc.*, by AUGUST NIEMANN.]

Hyder Ali, b. in 1728 at Bangalore, which his father held as a fief of the rajah of Mysore. In 1756 he inherited the fief at the death of his elder brother, and in 1759 he made himself actual ruler of Mysore, leaving to the rajah nothing but his title and a portion of the revenues. H. was one of the most prominent of the Mohammedan princes of India, had great respect for all the inventions of a higher civilization, and was possessed of great military talent. He conquered Calicut, Bednor, Onor, and Cananor, and threw off the supremacy of the Mahrattas over Mysore. In his first war with the Eng. he dictated peace under the walls of Madras: Apr. 15, 1769, and in the war between the Eng. and Fr. he sided with the latter, and fought with various success, but d. at Chitore in 1782, before the war was over; his son, Tippoo Sahib, succeeded him.

Hydra (Polyp). See HYDROIDA.

Hydra, island of Gr., off the E. coast of Morea, 11 m. long and 3 m. broad. It is high, rocky, and bare; and almost all its inhabs. live in the town of Hydra, on the N. coast. The island was uninhabited in anc. times. In the 15th and 16th centuries fugitives from Albania, Argolis, and Attica founded the city, and it soon rose to a high degree of prosperity. Pop. 1825, 40,000; 1877, 6,811.

Hydrangea [Gr. *ὕδωρ*, "water," and *ἄγγος*, a "vessel," perhaps from the fondness of the plants for water], a genus of shrubs of the saxifrage family, natives of U. S. and N. E. Asia. The H. of the green-house is *H. hortensis* of Chi.

Hydrastis Canadensis, the only known species of its genus, a ranunculaceous plant of the U. S., and known as puccoon, yellow root, etc., is used to some extent in med. and has the power of dyeing a rich yellow. Its tonic powers depend in part on the presence of berberin and hydrastin.

Hydrate of Chloral. See CHLORAL.

Hydrate of Croton-Chloral. By passing dry chlorine gas over pure aldehyde, there are formed hydrochloric acid and the chlorated aldehyde of crotonic acid, or *croton-chloral*. Obtained pure, it is a dense oily liquid of peculiar odor. Mixed with excess of warm water, it forms croton-chloral hydrate, a crystalline substance almost insoluble in cold, but soluble in hot water and in alcohol. Croton-chloral hydrate has been tried in med. as a substitute for chloral-hydrate in certain cases. Its asserted advantages are a greater freedom from danger of paralyzing the heart, and a special power of producing anaesthesia—and thus relieving pain—in parts of head and face innervated by fifth pair of cranial nerves. EDWARD CURTIS.

Hydrates [Gr. *ὕδωρ*, "water"]. This term was formerly applied to compounds formed by the combination of water with metallic or other oxides. Modern chemistry has shown that they contain hydroxyl and not water, and they are now called *hydroxides*. Thus, slaked lime was formerly known as "hydrate of lime," now as "calcium hydroxide."

Hydra, The Lernean, in Gr. mythology, was a monster with the body of a serpent, but with many heads, which grew up again as often as they were cut off, and from whose mouths issued a deadly venom. It inhabited the marshes of Lerna, but was destroyed by Hercules.

Hydraulic Crane, a device by which the hydrostatic press is utilized in working derricks, cranes, etc. In unloading and loading ships, etc. it is sometimes convenient to have a number of cranes, which, if managed by the direct application of steam-power, would require cumbersome machinery; but a steam-engine working a hydrostatic press is made to work the cranes, the necessary rapidity of motion being gained by long leverage and the use of pulleys.

Hydraulic Elevator, or Ascenseur Edoux. This is an invention of M. Léon Édoux of Paris, Fr., designed to lift weights by hydraulic pressure from level to level, though in its actual application employed only to elevate persons from story to story in public hotels or other lofty buildings. Its construction may be understood from the following description of an elevator of this kind which was in operation during the Exposition of 1867 in Paris, in the gallery of machines of the Exposition: The essential parts of this apparatus consisted of a cylinder 20 metres (66 ft.) long, sunken perpendicularly into the earth, with a plunger descending into it to the same depth, and packed water-tight at the top of the cylinder. Into this, below the packing, water, from the source from which the Exposition received its supply for gen. purposes, was admitted, by means of a valve which was under the control of the attendant. The piston rose under the pressure to the required height, and was maintained there by closing the valve. A car or kiosk, for the accommodation of passengers, rested on the upper extremity of the piston, and was elevated as it rose. The descent was effected by opening another valve which allowed the water to escape at the level of the earth's surface; when, the pressure being relieved, the car descended by its own weight. The diameter of the piston plunger was 0.35 metre (10 inches), and that of the cylinder only sufficiently greater to allow free water-way. The plunger was a hollow casting, turned and polished on the exterior, and closed at the bottom. It was formed of 4 lengths carefully united. A strong wire cable extending through the interior from end to end firmly bound the parts together, and served as a security for holding them in position in case of the occurrence of any accident. In its ascent, the car was guided by 4 cast-iron columns, which formed a rectangu-

lar frame-work or tower around it. These columns were hollow also, affording space for the ascent and descent of heavy weights within them, by which the weight of the empty car was principally counterpoised. Chains passing over pulleys at the top connected these weights with the car at its 4 angles. Only sufficient preponderance was given to the car to allow it to descend without a load. The resistance to which the hydraulic pressure was opposed amounted, therefore, to little more than the weight of the varying charge. It is to be noticed, however, that as the car ascends the weight opposed to the pressure virtually increases, since the plunger, so long as it is immersed, is buoyed by the weight of an equal bulk of water. A compensation for this increase of resistance is provided by M. Édoux, in giving to the chains a weight per running foot equal to the eighth part of the thus accruing increase of weight of the piston—that is to say, about 2 kilograms, or a little more than 4 lbs. There being 4 chains, and each chain being diminished 1 ft. in length on the side of the car, and increased in length on the side of the counterpoise, 1 ft. for each ft. of elevation, the counterpoise is thus increased at the same time 16 kilograms, or about 34 lbs., which is equal to the simultaneous increase in the virtual weight of the piston. For a more complete article on this subject see *J.'s Univ. Cyc.*, where the conditions of the practical operation of the H. E. are fully discussed.

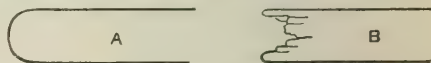
F. A. P. BARNARD.

Hydraulic Engines. The usual, and generally the most eligible mode of employing water-power is to apply it to the circumference of a wheel. (See TURBINE.) Occasionally, however, it may be more advantageous to use it as steam is used, to act on a piston in a cylinder. This mode of application is especially adapted to the case of a small supply of water having a large fall. Hydraulic engines, like steam-engines, may be either reciprocating or rotary. Some modifications are necessary in the construction of the parts, to accommodate them to the different properties of the denser fluid. The induction and eduction pipes, for instance, must be larger than are required for steam, and should have no abrupt angles. Freer valve-ways are necessary; the eduction valve should open very promptly at the end of the stroke, and the induction valve should not close until the stroke is quite completed—that is to say, the influx should cease and the efflux should begin exactly at the same moment. Any material error in making the adjustments designed to accomplish this end, or any imperfect working of the machinery which prevents its attainment, will produce concussions (*coups de bélier*, "water-ram blows," as they are called by the Fr.), which will very certainly be injurious, and which may be destructive. In the H. E. which have been most extensively introduced, and most successful in practice, provision is made by relief valves or other expedients to mitigate or obviate the evil resulting from this cause; but in so far as it is possible by the adjustments of the machine itself to permit the column by which it is operated to maintain a uniform velocity, both true economy of power and durability of parts will be best consulted. In the case of steam, attention to the particulars here pointed out is not so rigidly necessary; the difference arising from the fact that steam is eminently compressible, while water is so only to a degree which for ordinary purposes may be regarded as insensible.

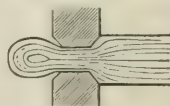
It is only in some special industries that H. E. have as yet been extensively introduced. In large foundries they have been found very convenient in the working of cranes and other heavy machinery. They have also been employed occasionally for the drainage of mines. They may be said to be indispensable in the management of Bessemer converters. (For a more complete article see *J.'s Univ. Cyc.*)

F. A. P. BARNARD.

Hydraulic Forging. This process consists in substituting the continuous pressure of the hydraulic press for the repeated blows of a hammer in shaping wrought iron and steel. A swedge, or mould, of the desired object is necessary, and under the proper conditions of temperature the metal may be forced into every angle and recess as perfectly as if made fluid by fusion and cast. It is used chiefly for forming parts of locomotives, and R. R. rolling stock where superior strength and lightness are important. It is also used instead of heavy steam-hammers for drawing down large ingots of Bessemer steel. In this operation there is no noise or jar. The piston descends slowly, but irresistibly, and forces the hot metal each way as if it were a mass of soft putty. The ingot yields gradually to the pressure, and bulges out at the sides and end as in Fig. A, and is not drawn over more at the surface than at the centre, so as to give a ragged hollow end (Fig. B), such as is usually formed under hammers and rollers.

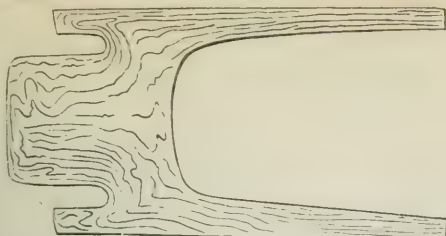


Before the forging of an ingot is completed a distinct structural arrangement of the steel is developed. As the piston-head descends into the mass and squeezes it upon the anvil, the lines of structures visible in the ingot bend downward, and are compressed as shown in the annexed cut, the movement extending to the very centre of the mass.



From whatever cause it originates, this grain is an important factor of strength in pressed forgings. These structural peculiarities are most distinct in the pressed forgings made from piled iron masses, and are beautifully shown in etched sections of irregular angular objects like cross-heads, as in the figure, a section of a cross-head, about $\frac{1}{4}$ natural size. The lines of the grain conform in a remarkable degree to the form of the mass, winding in and out around the

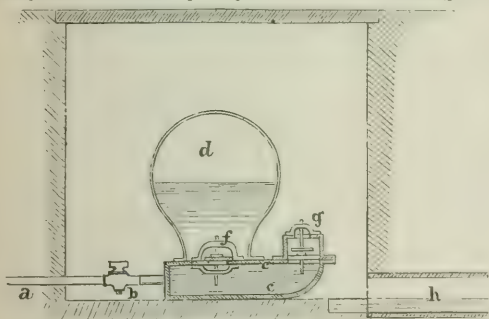
curves, and angles in such a manner as to give the greatest strength where it is most needed.



In forging such objects as the parts of machines weighing from 50 to 150 lbs. or more, a mass or ball of metal is cut as nearly as possible of the required weight from the end of an ingot, and is heated nearly white hot preparatory to being thrown into the mould. The moulds are made of iron or steel, in several parts if necessary. The mould is placed directly under the piston-head. All the parts being properly adjusted, and the inside of the mould and the surface of the plunger being smeared with thick oil or grease, a mass of hot steel is thrown into the open top of the mould; the plunger is brought slowly down, and pushes the hot metal before it into every part and recess of the mould. If the work has been well done, all the angles of the object are full and solid. All pieces pressed in the same mould are alike in dimensions, and there is no great excess of metal in any part to be cut away, and consequently it requires less labor and expense to fit up such forgings than it does for those of irregular dimensions made in the ordinary manner. The rapidity with which intricate forgings are made is one of the greatest advantages of the method. It is especially adapted to heavy work, where there are many angles and interior surfaces to be shaped. The wheels for locomotives and for railway carriages are forged out in this way in segments, which are afterward united by welding under the press. [From orig. art. in *J's Unit. Cyc.*, by PROF. W. P. BLAKE.]

Hydraulic Press. See HYDROSTATIC PRESS.

Hydraulic Ram, a machine for elevating a part of the water furnished by a stream to a height greater than that of the source from which it is drawn. A heavy body, like water, moving with a given velocity, performs, while being brought to rest, an amount of mechanical work sufficient to raise the body to the height due to the velocity. In the H. R. the moving body is the mass of water contained in a long pipe, the exit of which is alternately opened and closed. The resistance opposed to the water's motion when its exit is closed is the elastic force of air confined in a closed vessel, and the work performed by it consists in compressing this air, which, by its tendency to expand, forces the water to a higher level. The accompanying figure is a section of a hydraulic ram: *a* is the supply-pipe leading from the pond or other source of supply; *b* is a cock for closing the supply-pipe; *c* is a plate to which the air-vessel *d* is bolted. Below this plate are 2 compartments—one, *e*, forming a channel through which the water passes freely when the valve *g* is open, and communicating with



Hydraulic Ram.

the air-vessel by the valve *f*, which allows the water to enter the air-vessel, but not to return. The other compartment communicates freely with the air-vessel, and with a rising pipe, not shown in the figure, for conveying the water to the higher level. The valve *g* being in the position shown, the water commences to move through the supply-pipe, escaping at *g* and passing off through the waste-pipe *h*. The velocity soon becomes so great as to lift the valve *g*, which closes the outlet. While coming to rest the water in the pipe exerts a pressure sufficient to lift the valve *f*, and compress air in the air-vessel by flowing into it. As soon as the water comes to rest the pressure ceases, the valve *f* closes, the valve *g* opens, and the same thing occurs again. The expansion of the air in the air-vessel causes a uniform flow through the rising pipe. [From orig. art. in *J's Unit. Cyc.*, by J. P. FRIZELL, C. E.]

Hydriodic Acid. See IODINE.

Hydrobromic Acid. See BROMINE.

Hydrocarbons [Gr. ὕδωρ, "water," and Lat. carbo, "coal"], compounds consisting of carbon and hydrogen only. Many such compounds are found ready formed in nature; most of the essential oils (which see), as turpentine, lemon, orange, bergamot, neroli, etc., are hydrocarbons. Caoutchouc and gutta-percha are hydrocarbons.

Methane (marsh-gas) is found in the mud of stagnant pools and in coal-beds, and under the name of *fire-damp* produces the disastrous explosions in mines. Petroleum and ozocerite are mixtures of several homologous hydrocarbons. The most fruitful source of hydrocarbons is the destructive distillation of vegetable and animal substances. This always results in the formation of 4 distinct products: (1) the charcoal or coke which remains behind in the retort; (2) the fixed gases; (3) the tar; (4) the watery product, which is acid when distilled from non-nitrogenous bodies, such as wood, etc., owing to the presence of acetic acid, and alkaline when derived from nitrogenous bodies, owing to the presence of ammonia. The gas and tar consist largely of H₂, solid, liquid, and gaseous. (For a detailed statement of the products of the destructive distillation of coal, see article GAS-LIGHTING.)

The H₂ are the simplest of all organic compounds, and are regarded as the starting-points from which all other organic bodies may be derived by substitution or addition. The H₂ may be formed (1) synthetically from carbon and hydrogen, as when hydrogen is passed over carbon heated to redness by the voltaic arc. From acetylene other more complicated H₂ may be built up. (2) From compounds containing carbon-disulphide, hydrogen sulphide, copper, methane, and cuprous sulphide. Methane (marsh-gas) may also be formed from carbon dioxide by first converting this into carbon monoxide, converting this into formic acid and then subjecting a salt of this acid to destructive distillation. Alcohol heated with an excess of sulphuric acid yields ethylene (olefiant gas). A H₂ may be transformed into another of greater or less complexity; methane may be changed to acetylene by a series of induction sparks, or to naphthalene by a very high temperature. Methane and carbon monoxide yield tritylene when passed through a red-hot tube: In the process of *cracking* the heavy H₂ are split up into lighter oils by exposure to temperatures near their boiling-points. By substitution, the H₂ yield haloalid ethers. These, in turn, may be changed to alcohols by the action of potassic hydrate.

The H₂ are classified in series, according to their composition. The **PARAFFINES** include methane or marsh-gas, and the various constituents of petroleum, including the solid paraffine. The **OLEFINS** include olefiant gas. The **BENZOLE** series includes benzole, toluol, etc. Other important H₂ are anthracene, naphthalene, etc. C. F. CHANDLER.

Hydrocele [Lat. hydrocele; Gr. ὑδροκήλη, from ὕδωρ, "water," and κήλη, "tumor"], an accumulation of water between the two serous coverings of the testicles or of the spermatic cord, known as the tunica vaginalis. It may follow an inflammation of the testes, but generally follows strains. It may affect both sides at the same time, but usually we find the effusion on one side only. It forms a pear-shaped, painless tumor, which causes uneasiness to the patient only on account of its size; it sometimes grows so large as to reach nearly down to the knees; fluctuation can be felt. By stretching the integuments over the tumor and placing a candle behind it in a dark room, the light will be transmitted; this would not occur if the swelling were solid. Another test to determine the consistence of it is to plunge a needle into the mass, and see whether it falls over to one side and floats about, or retains the position in which it was placed. The treatment of H₂ may be divided into the palliative and the radical. The former consists in drawing off the effused fluid by the trocar and canula; this relieves the patient for a longer or shorter time, but the sac is apt to fill again, when the operation has to be repeated. We find patients submitting to this operation from once to four times annually throughout their lives, rather than submit to a procedure which is perfectly harmless and would insure their complete recovery. The radical cure is effected by exciting an inflammation in the sac which shall cause the opposing surfaces to adhere, and thus obliterate the cavity and prevent further effusion. This is sometimes accomplished by irritating the surfaces with the end of the canula before it is withdrawn, but this method is uncertain. Generally, it is done by injecting some stimulating fluid; for this it was customary to use port wine or zinc lotion, but more recently tincture of iodine seems to be the favorite. If there is much inflammation, cold applications locally and opium internally are the indications.

Hydrocephalus [Gr. ὑδροκεφαλον, from ὕδωρ, "water," and κεφαλή, "head"], a dropsical effusion of fluids into the interior of the skull, occupying one or more of the ventricles of the brain or the sub-meningeal space, or both. Acute H₂ is ordinarily a symptom of MENINGITIS (which see), particularly of tubercular meningitis; but cases occur in which no tubercle can be discovered after death. The causes of chronic H₂ are various. The large majority of cases are congenital, and H₂ must be set down as a disease (or symptom) belonging to infantile life; but cases occasionally occur in mature life or in old age. Dean Swift, after 3 years of illness, died with H₂, the result, doubtless, of organic brain-disease. The prognosis of chronic H₂ is very grave. The child may live for many yrs., but (with rare exceptions) becomes idiotic, and in some cases is epileptic. When the disease is detected early, mercurial inunctions, with the administration of the iodides, may possibly afford benefit. Treatment by systematic compression or by tapping the skull (the latter operation to be followed by firm compression) has been tried in many cases, but the most common result has been the speedy death of the patient, although in a few instances it would appear that more or less advantage has been obtained by these means.

Hydrochloric Acid, called also **Muriatic**, **Chlorohydric**, and **Chlorhydric Acid** (anc. names, *maria acid*, *spirit of salt*; Fr. *acide muriatique*, *acide chlorhydrique*; Ger. *Salzsäure*, *Chlorwasserstoffsäure*). The muriatic or hydrochloric acid of commerce and of the laboratory is a solution in water of the gaseous compound of hydrogen and chlorine. It occurs in nature only as an irregular product

of volcanic eruptions. It is, however, a natural constituent of *gastric juices*. Artificially, it is always prepared by the action of sulphuric acid upon common salt, the chloride of sodium—an action evolving the gaseous chloride of hydrogen, the latter being passed into water kept cold, which absorbs it with great avidity to the maximum extent of about 460 times its vol., increasing in bulk $\frac{1}{2}$, and in weight about 75 per cent. In commerce, there are 3 distinct qualities—the common yellow commercial acid, which is sold in carboys, and which is usually quite impure, owing its yellow color, in part at least, to iron, and usually containing sulphurous and sulphuric acids, with other contaminations; the grade called “jeweller’s acid,” which, when prepared with the use of distilled water, is likely to be a good article, sufficiently so even for med. use; and the so called “chemically pure” acid, for analytical uses, which should of course be made from distilled water, and should justify its name. H. A. gas is colorless and transparent, and of suffocating odor. In the air it forms white fumes by condensing the aqueous vapor to a liquid fog. When saturated with the gas the liquid acid has a density of 1.20 or 1.21. Heated, it gives off the gas, with appearance of ebullition, until its density runs down to 1.094, when it will distil over unchanged.

Tests for Purity.—Pure acid should leave no trace when a drop is dried on bright platinum foil and the latter ignited. To test for sulphuric and sulphurous acids, evaporate in a clean porcelain dish after adding a crystal of nitrate of baryta, or a little chlorate of potash and chloride of barium. The dry residue should then form a clear solution in distilled water again. Any turbidity is sulphate of baryta. After warming with a fragment of chlorate of potash, saturation with ammonia should give no precipitate (iron). It must not tarnish bright copper when boiled in it (arsenic). It must not dissolve on boiling therewith the minutest speck of gold-leaf (nitric and nitrous acids). For most uses sulphurous acid is likely to be the most detrimental impurity, and, unfortunately, is one of the most common.

In case of poisoning with muriatic acid, the symptoms of which are generally similar to those of other corrosive mineral acids, *magnesia*, *prepared chalk*, or even *soap*, may be administered in large quantities as an immediate antidote. [From orig. art. in *J. S. Uric. Cyc.*, by Prof. H. WURTZ.]

Hydrocyanic Acid is a most deadly poison to both animals and plants. In the anhydrous state it is one of the most active destroyers of life known, a single drop put on the tongue killing a large dog in a few seconds, and death being even caused by breathing its fumes. Even the medicinal preparation, a dilute aqueous solution containing 2 per cent. of the anhydrous acid, is a tremendous poison, and must be used cautiously. In excessive dose the symptoms are merely those of the act of death. The sufferer falls as if struck by lightning, all the vital functions being apparently arrested simultaneously. In less dose death ensues by failure of breathing after a brief interval of from a few minutes to half an hour of convulsion or paralysis and collapse. The nature of the poisonous action is not yet thoroughly made out. There is no chemical antidote, and in cases of poisoning by accident or malice, death is generally so speedy that all remedies are too late. Ammonia, atropine by subcutaneous injection, artificial respiration, and alternate douchings of hot and cold water on the chest are the means that offer most hope. Medicinally, the dilute acid is useful to arrest nausea and vomiting, allay cough, and, locally applied, to relieve irritation and itching of the skin.

EDWARD CURTIS.

Hydrodynamic Engines. See HYDRAULIC ENGINES.

Hydrofluoric Acid. See FLUORHYDRIC ACID.

Hydrothiosilicic Acid. See FLUOSILICIC ACID.

Hydrogen [Fr. *hydrogène*; Ger. *Wasserstoffgas*; earlier chemists, *inflammable air*]. The anc. believed water an elementary substance. In the 16th century Paracelsus discovered that iron and sulphuric acid engender together an aeriform body or gas. Not until 1672 was this observed to be combustible. It was henceforward known as inflammable air, until Lavoisier, after the discovery of its chemical nature and origin, called it *hydrogen*, or water-generator, from the Gr. *ὕδωρ* and *γεννᾶω*. In 1700 Lemery discovered that it explodes in admixture with air. Henceforth it was regarded as being or conveying the principle of fire, and under the theory of Stahl was believed to be wholly or chiefly composed of the so called *phlogiston*. In 1766 Cavendish took up its investigation, and discovered that when burned it produces water. Not till 1781 did Cavendish complete the discovery by burning together *oxygen* and H., and finding that the sole product was water.

Many authorities assert that H. is never found free in nature upon the earth. It certainly exists, however, in volcanic gases. The spectroscope detects H. in the chromosphere of our sun and in many other stars, also in certain nebulae. Water contains $\frac{1}{9}$ of its weight of H. Steam, and water in other vaporous forms, contain an amount of H. which, when set free in gaseous form, is found to assume, at the same temperature, exactly the vol. of the vapor itself. Liquid water, however, contains 1238 times its vol. of free gaseous H. H. occurs also in nature in combination with nitrogen, as ammonia; with carbon, as marsh-gas, the chief constituent of the gas of gas-wells and of the fire-damp of coal-mines. It occurs with carbon also, as petroleum and paraffine, and as an essential constituent of most of the solid tissues of organic beings, both animal and vegetable, and therefore of all mineral substances of organic origin, such as coals, asphalts, bitumens, mineral resins and resins, etc. H. gas may be obtained from water by many methods, of which there are 7 prin. ones that have been and may be used, according to circumstances. H. is also a product of the destructive distillation, at incandescent heats, of all organic substances. Thus, common coal-gas contains 40 per cent. or more of this gas as a proximate constituent.

H. is the least dense of all known substances. Air is 14.43

times, and water 11.143 times as heavy as H. Pure H. is colorless, inodorous, and tasteless. It is not directly poisonous when inhaled pure, death ensuing from mere absence of oxygen. The great tenacity of H. gas gives it a great penetrative or rapid diffusive power; many solid metals are even readily penetrated or permeated through their pores, iron being one of these. When soft iron is permeated by condensed H., its tenacity is greatly injured.

H., in its tendency to combine directly under normal pressures and temperatures with other elements, is almost as passive and inert as nitrogen; the only element toward which it manifests much activity being chlorine. With this it does not combine spontaneously in the dark, but light causes an immediate combination to form muriatic acid gas; and direct sunshine will even set up rapid and explosive combustion. When mixed with oxygen or air no combination takes place spontaneously, but contact with certain metals causes a condensation and combination, to form water, on the surfaces of such metals, developing heat, which may easily be so managed as to raise the metal to incandescence, and thus cause the gaseous mixture to kindle throughout, with explosion if confined. [From orig. art. in *J. S. Uric. Cyc.*, by Prof. HENRY WURTZ.]

Hydrogen, Peroxide of, called also **Bioxide, Binoxide, Dioxide, and Dentoixide of Hydrogen**; also **Oxygenated Water** [Fr. *eau oxygénée*; Ger. *Wasserstoff Hyperoxyd, Sauerstoffwasser, Oxydirtes Wasser*]. It was discovered in 1818 by Thénard. Various methods have been employed for producing it. In the best of them the resulting product is transparent and colorless, with a density = 1.452, nearly half as high again as water, not freezing at 2° F. below zero; tastes like tartar-emetic, and makes itching sores on the skin. Cold preserves it. By suddenly heating it to the temperature of boiling water oxygen is evolved with explosive rapidity. Mere contact with certain substances, as charcoal and some metals, sets up decomposition, often with strong evolution of heat. On many substances it acts as a most powerful oxidizer, converting them into their highest oxides. On the other hand, on another class of substances it operates as a powerful reducer. It bleaches indigo and decomposes iodide of potassium. It also decolorizes a solution of permanganate of potash. With chromic acid it forms perchromic acid. Thénard proposed its use for restoring paintings which had become dim through the conversion of the white lead-carbonate used in the pigments to black sulphide of lead. The latter is at once converted by it into white lead-sulphate. [From orig. art. in *J. S. Uric. Cyc.*, by Prof. HENRY WURTZ.]

Hydrogen, Phosphides of. See PHOSPHORUS.

Hydrogen, Sulphides of. See SULPHUR.

Hydrography [Gr. *ὕδωρ*, “water,” and *γράφειν*, to “write”] is the science which has for its object the measurement and description of the surface-waters of the earth, together with their coasts and islands, in so far as they are important for purposes of navigation and commerce. H. embraces within its scope marine surveying, the construction of marine charts, and the collection and publication of all phys. and other information tending in any manner to the perfecting of navigation.

The early hist. of H. is involved in obscurity. We know, however, that from the earliest times mariners have made use of charts, but the charts of the anc. were mere sketches of the coasts, which were laid down according to roughly estimated distances; hence, in such of them as remain to us it is no unusual thing to find the coasts and islands represented at many times in excess of their actual extent.

The first steps toward erecting H. into a science were taken about 1440 by Prince Henry of Port., called “the Navigator,” who, by sending out expeditions of discovery, by collecting information from persons who had made noted voyages, and by constructing marine charts worthy of the name, laid the foundation for the science. The charts in the time of Henry, though a great improvement over those of an earlier date, were yet rude and imperfect. Instruments for determining positions and measuring distances with accuracy did not then exist.

Henry, whom we may style the first hydrographer, d. in 1463, and next to him in the science came Columbus, who, after having obtained much hydrographic knowledge, became a maker and seller of marine charts. While engaged in this occupation he conceived the design of a voyage of discovery to the W., and in 1492 discovered Amer., thus extending the field for hydrographic research more, in a single voyage, than had the labors of all the preceding centuries. The way having been thus pointed out, voyages of discovery were prosecuted in every direction, and the increase in hydrographic knowledge was vast and rapid; but the formation of H. into an exact science, such as we find it at the present day, had scarcely yet begun.

Although numberless discoveries had been effected, and vast additions made to the stock of hydrographic information, prior to the commencement of the present century, yet the great hydrographic works did not begin until that time. Then Fr. reorganized her corps of hydrographic engineers and began the survey of her coasts; and other maritime powers, in imitation of her, created special corps for hydrographic work, and the true hydrographic survey of the world began. For about 300 yrs. after the time of the discovery of Amer. by Columbus the expeditions fitted out and sent abroad by maritime powers in the interests of H., navigation, and commerce were voyages of discovery, and they did not result in permanent additions to H.; the surveys made during these voyages were rough ones, and the charts rude in comparison with those of the present day. Of this nature were all the famous voyages completed up to 1791. After that time the era of mere reconnaissance ended, and that of hydrographical surveying began.

The vast accumulation of hydrographic information by maritime powers led early to the establishment by them of hydrographic offices, where this information was taken in

hand and wrought into marine charts, books of sailing directions, and other practical shapes, for the benefit of navigation and commerce. The largest, best appointed, and most important hydrographic offices in the world are those of Eng. and Fr.; these together publish charts and sailing-directions for every portion of the known world.

The U. S. now supports 2 hydrographical establishments—a regular Hydrographic Office and a Coast Survey Office. The former of these is of comparatively recent origin, having been founded in 1866, yet already it issues many very important and valuable charts and works. The Coast Survey office was created many yrs. ago for the purpose of executing the H. of the coasts and inland waters of the U. S., and it has made great progress in that work, which is the greatest hydrographical work ever undertaken.

By reason of the rapid communication between countries at the present day, hydrographers are enabled to keep themselves posted on all which takes place concerning the science in any quarter of the globe. All new surveys are pub. at once by the office of the country making the survey, and no new light is established, nor any rock, shoal, or danger discovered, that is not immediately announced in a notice from some one of the offices, and copied by all the rest. There is a perfect system of exchange between all the hydrographic offices, so that all the publications of any one are known to all the rest as soon as they are issued.

The charts of the present day, issued from the leading hydrographic offices and covering exact surveys, are so perfect in topography, construction, and detail as to seem to leave nothing more to be added to them which would be of any aid or benefit to navigation. [From orig. art. in *J.'s Univ. Cyc.*, by LIEUT. GEORGE W. SUMNER.]

Hydroïda [Lat. *hydra*; Gr. *ὑδρα*, a "mythological monster," and *αἶμα*, "form"], one of the orders of Acalephs, remarkable for forming compound colonies, usually consisting of numerous individual zooids of 2 or more distinct kinds, organically united together, one set of the zooids being in all cases devoted to feeding the community another to sexual reproduction. The feeding or hydriform zooids are usually fixed, and originate from eggs produced by the reproductive or medusiform zooids, which originate as buds from the former, and may either remain permanently attached to them or may finally become free-swimming medusæ (Figs. 1 and 2). There may be but one nutritive zooid, but in most cases the primitive one originating from the egg, very soon gives rise to buds, either from its stem or from hollow, stolon-like extensions of its base; and these may develop into other zooids, like the first, thus producing more or less complex branching colonies, often consisting of hundreds, or even thousands, of zooids. Such colonies often grow to the height of 1 or 2 ft. on our sea-coasts, though the zooids themselves may be very minute. The reproductive zooids often develop into perfect medusæ (Figs. 2, 5), provided with tentacles, locomotive disk, proboscis, stomach, radiating and circular tubes, and sometimes with reproductive organs, even before they break away from the pedicels by which they were attached; but they commonly increase in size and perfection of parts after they become independent medusæ. The free medusæ of hydroids often grow to a large size attaining the diameter of 10 inches, while others never exceed $\frac{1}{4}$ inch. As a rule, large hydroid medusæ come from small and inconspicuous hydroid colonies, while those hydroids which produce large branching colonies, or which have large nutritive zooids, generally give rise to minute fixed medusoids (sporosacs) or to small free medusæ.

Two types of sexual reproduction have been observed. In most of the species the eggs, after fertilization by spermules, undergo complete segmentation and develop directly into round and somewhat elongated embryos (Fig. 6 a), which are covered externally with cilia, by means of which they swim actively about for a time; these young embryos are known as *planulae*. The planulae soon attach themselves to some object like a stone, or submerged timber, by one end, which rapidly enlarges (Fig. 8, b) into a flattened disk-like form; the cilia disappear at the same time; the upper end then begins to enlarge, and the intermediate portion becomes narrow and elongated to form a stem; very soon the upper end enlarges into a body, and develops a mouth at the end, and the central cavity becomes a stomach; at the same time tentacles grow out around the mouth, and a thin covering of chitinous matter is deposited over the stem and lower portion of the body; so that the little hydroids begin to resemble the adult nutritive zooids.

The second mode of sexual reproduction is only met with in *Tubulariida*, *Hydra*, and a few other genera. In *Tubulariida* the medusoids are small oval sporosacs (Figs. 3, 4), arising in clusters from the body just above the long tenta-

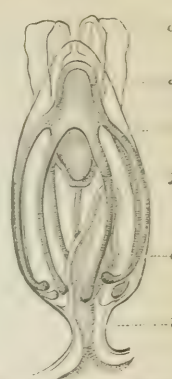
laridæ the medusoids are small oval sporosacs (Figs. 3, 4), arising in clusters from the body just above the long tenta-

FIG. 3.



Paryphthoecia crocea, one of the zooids, with clusters of medusoid buds (sporosacs), about natural size (Agassiz).

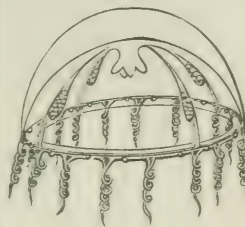
FIG. 4.



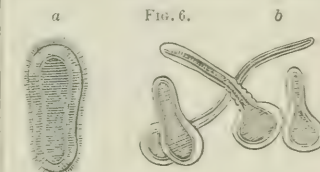
A female sporosac, much enlarged: a, tentacles; b, pedicel; c, spadix; d, body of embryo; e, tentacles; f, rudiment of stem of embryo (Agassiz).

cles. The *spadix* (Fig. 4, c) becomes surrounded by a cellular mass of germinal matter, from

FIG. 5.



Clytia Johnstoni, the mature medusa, enlarged.



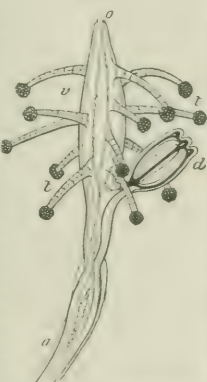
Embryos of *Melicertum campanula*: a, (*Millepora*) may contain a planula; b, embryos just attached, much enlarged (A. Agassiz).

the extinct *Graptolites* probably represent a sixth sub-order. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. A. E. VERRILL.]

Hydrometer [Gr. *ὑδρῶν*, "water," and *μέτρον*, "measure"; Fr. *hydromètre*]. **Areometer**, or **Gravimeter**, an instrument of 3 parts—(1) a graduated stem of uniform diameter and cross-section; (2) a bulb; (3) a counterpoise or ballast. On being placed in a liquid it sinks until a certain point on the scale is on a level with the surface of the liquid, and from the reading of the scale at that point the specific gravity of the liquid is either ascertained directly or by a simple calculation. The principle of the H. is simply that of the law of floating bodies—viz. that when a body floats the weight of the bulk of liquid displaced is equivalent to the weight of the body floated. The bulb is put on in order that the instrument may float, and the counterpoise or ballast insures its floating in an upright position. The stem is of small diameter, in order that small differences of specific gravities in liquids may show considerable differences on the scale. H. are usually of glass, though they are sometimes made of metal. Glass has the advantage of cleanliness, resistance to corrosion, incapability of fraudulent alteration except by an experienced worker in glass, and its facility of manufacture. Its fragility, however, is a point against it. [From orig. art. in *J.'s Univ. Cyc.*, by E. WALLER, PH. D.]

Hydropathy [Gr. *ὑδρῶν*, "water," and *πάθος*, "to be affected"; a system usually called **HYGIENE** by its practitioners in which water is largely used in the treatment of diseases. It originated with Victor Priessnitz, a Ger. peasant, who having sprained his wrist, and finding that water allayed the inflammation, followed the application by that of a wet cloth, with much benefit

FIG. 1.



One of the zooids of *S. mirabilis*, much enlarged: o, mouth; v, body; t, tentacles; d, a medusa bud not fully developed (Agassiz).

FIG. 2.



Mature free medusa of *S. mirabilis*: o, mouth; b, a radiating tube; c, circular tube; e, velum; t, tentacles (Agassiz).

Hydrometer.

Hydrometer.

Two accidents, more severe, were treated in the same manner; but the cure was attended with a rash upon the skin, which he attributed to impurity of the blood, and he conceived the idea that water favored the elimination of morbid matter from the system. He acquired reputation as a "water-doctor," and in 1839 opened the Gräfenberg "water-cure," where, reducing his plan to something like order and system, a variety of baths, adapted to different cases and constitutions, was added to the remedial appliances. Among these were *Hin-tuch*, or rubbing wet sheet, the wet-sheet pack, the dry-blanket or sweating pack, the hip or *Sitz*-bath, the head-bath, foot-bath, douche, spray, plunge, wave, etc. baths.

Patients were soon attracted to Gräfenberg from nearly all parts of the civilized world, and the writings of Claridge, Seidamore, Johnson, Wilson, and Gully of Eng., Francke, Weiss, and Munde of Ger., and Henry C. Wright and Drs. Trall and Shew of the U. S., made the public familiar with the leading features of the system. It has been charged that some of the practice at Gräfenberg, in the application of cold water, water-drinking, and exercise, was too severe, especially for the feeble invalids suffering from nervous and dyspeptic affections. It would be very strange if, in the infancy of the system, such errors did not occur. But it is not true that his method was a "cold water-cure," nor that he treated all diseases with "water alone." He attached great importance to the auxiliaries of simplicity of diet, due exercise, a proper amount of sleep, and other hygienic influences. Preissnitz was suspected of using more or less med. clandestinely, and on that suspicion he was arrested and imprisoned for practising med. without a license; but as no med. of any kind could be found by analyzing the water in which his patients were bathed and the sponges through which the patients drank while enveloped in the "pack," he was acquitted and released.

A hydrophobic society was organized in Lond. in 1842, and soon after insts. were opened at Malvern and other places in G. Brit. The system was introduced into the U. S. in 1843 by the writings of Drs. Trall and Shew. In the spring of 1844 Dr. Trall opened an inst. in New York, and in the fall of the same yr. Dr. Shew opened another. In the spring of 1845 Dr. Shew opened an inst. at Lebanon Springs, N. Y., in connection with David Campbell. In a few yrs. thereafter there were 100 similar insts. in the country.

The entire lit. of the system embraces about 100 vols., the most popular and comprehensive of which are Dr. Trall's *Hydrophobic Encyclopedia* and Dr. Shew's *Hydrophobic Family Physician*. Of European works, the best known are Francke on the *Water-cure*, Johnson's *Hydrophobia*, and Gully on *Chronic Diseases*. [From orig. art. in *J.'s Unit. Cyc.*, by R. T. TRALL, M. D.]

Hydrophobia (syns. *Rabies*, *Rabies canina*, *Rabies contagiosa*) [from the Gr. *ὕδωρ*, "water," and *φόβος*, "fear"] is a remarkable disease, to which both the human species and probably all of the brute creation are subject. We can discover only rare allusions to it previous to the Chr. era. Such references, however, are sufficient to indicate that, although it may not have been so prevalent among the nations of antiquity as among those of more modern periods, yet it was in very anc. times recognized as a peculiar disorder infesting certain animals, and even man himself. Aristotle, in his *Hist. of Animals*, remarks that dogs are afflicted with madness, quinsy, and gout; that the first renders them furious and inclined to bite other animals, which thereupon also become rabid; and that all animals except man are liable to be seized with and destroyed by the malady so engendered. Virgil, in his *Georgics*, classes rabies among the distempers of cattle and sheep induced by a pestilential condition of the atmosphere. According to Plutarch, it was not until the time of Pompey the Great that the rabific poison first began to manifest itself among human beings. Ætius, a Mesopotamian doctor of the 6th century, is the first to furnish anything like an accurate description of rabies in dogs. On the Continent of Europe the modern hist. of rabies is obscure until the 13th century. In 1776 rabies made its first appearance in the Fr. W. I., and in 1785 it became extremely prevalent throughout the U. S., and since that time the disease in both animals and men has occupied a prominent place in our med. lit. It has never appeared in Australia or New Zealand.

The popular belief that H. is in all animals characterized by an *abhorrence of water* was long since proved to be erroneous. The mad dog laps it eagerly, and will not hesitate to swim in it when it obstructs his course. In the case of man, however, the attempt to drink, or whatever is suggestive in any manner of that act, induces such dreadful spasms of the muscles of deglutition and respiration, with sense of suffocation, that a horror of fluids, even though associated with intolerable thirst, may be truly regarded as one of the most prominent and characteristic features of the disease. For these reasons a distinct term, *rabies*, has been employed by some writers to designate this affection as it prevails among the brute creation, the word *hydrophobia* being restricted to the disorder as manifested in man. Of the various conditions asserted as favoring its spontaneous development in the canine race, few have even a probable foundation. They are principally repressed sexual desire, extremes of atmospheric temperature, excitement of anger, want of water, and putrid or insufficient food. Still another presumed influence is the presence under the dog's tongue of a worm-like appendage, whose extirpation in puppyhood is considered an infallible preventive of the disease. Its efficacy has been entirely disproved by scientific investigation. The other presumed causes of spontaneous H. would appear to be equally equivocal. Unsatisfied salacity, putrid food, hunger, thirst, anger, and extremes of temperature are manifestly circumstances which obtain among dogs quite generally throughout the world.

H. in the dog has been by some writers divided into 2 varieties, *dumb* and *furious* rabies, according as the animal is

silent and undemonstrative or noisy and fierce. Virchow considers the different forms merely as prolonged conditions or stages, which, according to him, are—1st, the stage of *melancholy*; 2d, the *irritable and furious*; 3d, the *paralytic* stage. The disposition to bite is not apt to be exhibited until the affection is well established. The disease is first manifested by constant restlessness, uneasiness, and irritability of temper, the dog of fondling or sociable disposition becoming snarly, morose, and shy, retiring under pieces of furniture, into dark corners, or the interior of its kennel, but not remaining long in any one spot, and being continually engaged in licking, scratching, or rubbing some portion of its body. Costiveness and vomiting are often present. The appetite becomes depraved. The countenance undergoes a marked change—assumes an appealing expression or becomes the very picture of ferocity. In the early stages the animal's attachment for its master appears greatly exaggerated, and as long as it retains its consciousness it will refrain from injuring him. Two early and characteristic signs of rabies are a peculiar delirium, causing the animal to snap at imaginary objects in the air, and a remarkable alteration in its voice, the bark ending very abruptly and singularly in a howl a fifth, sixth, or eighth higher than at the commencement. Sometimes it will utter a hoarse inward bark, rising slightly in tone at the close. Froth is generally seen dripping from its jaws, but this soon lessens in quantity and becomes thick and glutinous, adhering to the corners of the mouth and fauces, and causing intense desire to drink. It is now insensible to pain—will munch burning coals or even mutilate itself without apparent suffering. It exhibits an inclination to escape from home, to which it will sometimes return after many hours of absence. It is restless and savage, wandering about, attacking imaginary objects or venting its fury upon real ones. If confined, it gives utterance to the peculiar bark and howl described. When at large, however, it gives forth no warning noise, but seems only determined upon a straightforward trot. If interfered with, and more especially if struck, it will wreak its vengeance on the offender, but will seldom, as a rule, go out of its way to do a mischief, and if pursued will generally endeavor to escape. It does not continue its process long, but becomes exhausted, and moves with unsteady, tottering gait, drooping tail, head toward the ground, mouth open, and protruded tongue of a lead-blue color; finally, paralysis ensues, first of the hind quarters and then of the whole body, which is promptly followed by death. Its duration rarely exceeds 10 days; the ordinary time is from 4 to 6 days. Nothing has been positively determined with regard to the interval elapsing between the receipt of the injury and the appearance of rabies in the dog and other animals. It seldom exceeds 6 months.

H. in our own species possesses a deep and melancholy interest on account of the peculiarity of its mysterious and often prolonged latency, the horrible intensity of its paroxysms, and its irresistible fatality. The virus of the rabid animal, when once its insidious operation has begun, defies the most consummate therapeutical skill. The duration of this latency is variable, extending to from 4 to 13 weeks. One occurred after 4 yrs., and another after 5½ yrs. One of the earliest symptoms is usually a tingling sensation at the cicatrix. In a short time the person grows dejected, morose, taciturn, restless, and irritable; he seeks solitude and shuns bright and sudden light. Within a period varying from a few hours to several days the more serious and characteristic symptoms are developed. The patient is sensible of a stiffness or tightness about the throat, and is troubled with some difficulty of swallowing, especially liquids. Deglutition soon becomes impossible unless attempted with the utmost resolution. The real paroxysms of the disease then supervene: they are either spontaneous or produced by anything suggestive in the slightest degree of the idea of drinking; they are preceded by chills and tremors. During these attacks sensations of stricture about the throat and chest are experienced; the respiration is painful and embarrassed, and interrupted with sighs and sobs; in fact, there occur terribly violent spasms of the muscles of the throat, almost intercepting the entrance of air into the trachea. In the intervals between the paroxysms the patient is sometimes calm and collected, retaining full consciousness and knowledge of his condition, but generally he exhibits more or less excitement and irregularity, and occasionally has fits like those of insanity. Hyperæsthesia of the skin and acute sensibility of the nerves distributed to the other organs of the senses are usual. A very characteristic symptom is the copious secretion of a viscid, tenacious mucus in the fauces, which the patient constantly hawks up and spits out with vehemence in every direction, producing a sound sometimes imagined to resemble a dog's bark. The temperature of the body is always elevated, which is coincident with rapid waste of tissue. The eyes are staring, bloodshot, and always open, frequently with dilated pupil; the speech is abrupt, rapid, and incoherent, and at length there is confirmed delirium. Death ordinarily ensues from asphyxia.

There is a special hysterical or *mental hydrophobia*, induced by emotion on seeing hydrophobic patients, or in very nervous people from simply hearing the description of a case. In this spurious H. there is only difficulty in swallowing. It is very rarely fatal. When once the rabific virus has declared its presence in the human system, all measures hitherto adopted would appear unavailing to arrest its course. There is no doubt that we have effectual prophylactic means for destroying the poison. These consist in application of a ligature, if possible, to impede circulation from wound, in sucking the wound, and in its thorough cauterization, nitrate of silver being the best agent; if this be not available, the hot iron, a burning coal, potassa fusa, or almost any acid may be used. (See, for the most recent development of the subject, the article PASTEUR.—ED.) [From orig. art. in *J.'s Unit. Cyc.*, by CHARLES P. RUSSELL, M. D.]

Hydrostatic Press, a machine employed for producing great pressures. The pressure applied to a small

FIG. 1.

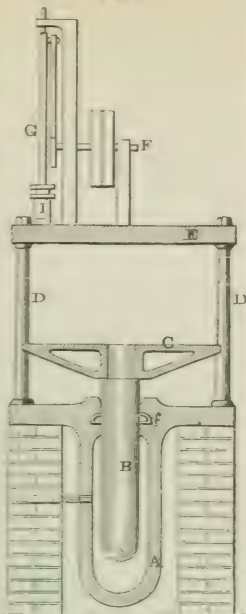


Fig. 1 shows the main features of this machine. A is a strong cylinder, generally of cast iron. A broad flange surrounds its mouth, resting upon masonry. B is the plunger, with a water-tight packing at *f*. It carries the platform C, on which is placed the body to be pressed. E, a strong plate confined by the uprights D D, receives the pressure exerted by B. F is a shaft turned by a belt and pulley, which works the plunger G of the force-pump L. The force-pump and its accessories are shown on a larger scale at Fig. 2, in which I is the force-pump with its plunger G working through a stuffing-box. The valve H opens during the up stroke of the plunger G, and closes during its down stroke, preventing the water from being driven backward through the supply-pipe N. In like manner, the valve K is closed during the up stroke and opens during the down stroke. The pipe O leads to the cylinder. L is a safety-valve so weighted that when the pressure becomes great enough to endanger the bursting of the cylinder, it allows the water to escape into the waste-pipe. M is a branch communicating with the waste-pipe. A cock in this pipe allows the water to escape from the cylinder and the plunger to descend. The packing of the plunger consists of a cupped leather collar (Fig. 3). It is a channel-shaped collar encircling the plunger in a recess formed in the mouth of the cylinder, its open side being turned toward the chamber of the cylinder. The water entering it from the cylinder, and tending to escape on the opposite side, keeps it firmly pressed against the surface of the plunger. If the diameter of the plunger G be 1 inch and that of the plunger B 1 ft., the area of the cross-section of the latter will be 144 times that of the former, and a pressure

FIG. 2.

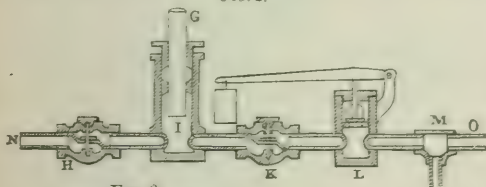


FIG. 3.

of 1 ton applied to G will exert a pressure of 144 tons upon B. About 10 per cent. of the power applied to B is absorbed by the friction of the packing collar. These are the essential parts of the hydraulic press, though in the different forms of the machine adapted to its numerous uses they occupy all conceivable positions with reference to one another. In many machines the force-pump is worked by hand.

J. P. FRIZZELL.

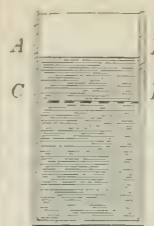
Hydrostatics [Gr. *ὕδωρ*, "water," and *στατική*, "statics," from *σταθαι*, to "stand"]. The term hydrostatics is used by most writers to mean the science which treats of the mechanical properties of fluids in a state of rest. A fluid is a body which offers no resistance to a change of form. In this treatise the term hydrostatics is restricted to liquids, of which water is taken as the representative, it being understood that whatever is affirmed of water is true, with certain modifications depending upon the weight, for any other liquid.

General Properties of Water.—Water is slightly compressible. Its vol. is diminished about $\frac{1}{1000000}$ by a pressure equal to that of the atmosphere, or 14.7 lbs. per square inch, while the vol. of air would be reduced $\frac{1}{2}$ by the same pressure. Water is expansible by heat. Its exact weight per cubic foot depends upon its temperature. Its density—i. e. its weight per cubic ft.—increases from 32° up to 39.1°, and thence diminishes up to the boiling-point. For ordinary temperatures, and for calculations not requiring great exactness, its weight may be taken at 62½ lbs. or 1000 ounces per cubic ft. In what follows the weight will be assumed as that corresponding to a temperature of 60°, being 62.37 lbs. per cubic ft. Water expands about $\frac{1}{12}$ of its vol. in freezing. A cubic ft. of ice weighs 57.5 lbs.

Pressure.—The condition of fluidity implies that the fluid particles move, with reference to one another, under the action of the slightest force; one consequence of which is, that a pressure applied at any part of a fluid mass acts at all parts of it and in all directions. If a vessel with a hori-

zontal bottom be filled with water to a depth of 1 ft., every square ft. of its bottom will sustain a pressure of 62.37 lbs.; every square inch will sustain a pressure of 62.37 ÷ 144 = 0.433 lbs. Let Fig. 1 be a prismatic vessel containing water,

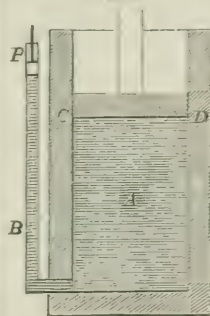
FIG. 1.



A B the surface of the liquid, and C D a horizontal plane. The fluid immediately below this plane sustains a pressure in lbs. per square inch of 0.433 times the height A C in ft. This is true not only of the vertical pressure, but also of that in every other direction. The fluid particles in the plane C D exert the above pressure against one another and against the sides of the vessel. The pressure now under consideration is that due to the weight of the water. If an additional pressure be applied to the surface, the pressure at any point within the vessel will be increased by the same number of lbs. per square inch. Such an additional pressure is always present, consisting in the weight of the atmosphere, which in its ordinary state, at heights not far above the sea-level, exerts a pressure of 14.7 lbs. per square inch. Thus, the absolute pressure at any point within a vessel is that due to the superincumbent water, increased by 14.7 lbs. per square inch. Inasmuch, however, as the atmospheric pressure acts upon the outside of the vessel as well as the inside, it may, for most practical purposes, be neglected, and we may regard the pressure as that due to the weight of the liquid. The pressure at any point in a mass of water does not depend upon the form of the vessel containing it. This may be a prismatic vessel, a vessel with a vertical tube, with an inclined tube, or an entirely irregular form. In either case, if we neglect the weight of the atmosphere, the pressure in any horizontal plane C D depends solely upon the vertical height from this plane to the horizontal plane A B of the surface. This vertical height is called the *head*. In most hydraulic calculations the pressure is designated as so many ft. of head. Thus we say, a head of 10 ft., 20 ft., 100 ft., in preference to saying a pressure of 4.33, 8.66, 43.3, etc. lbs. per square inch.

The foregoing considerations apply to vessels having free communication with the atmosphere. The pressure in confined vessels depends upon other conditions. In a steam-boiler, for instance, the pressure depends upon the tension of the steam, and this, again, upon the temperature.

FIG. 2.



It is often convenient to reduce such pressures to an equivalent head of water by dividing the pressure in lbs. per square inch by 2.3. Let B (Fig. 2) be a pipe communicating with the closed vessel A, both filled with water. Let P be a piston fitting closely in the tube B. Any pressure applied to this piston will be transmitted to all parts of the vessel A. If the area of the piston be 1 square inch, and the pressure applied to it be 10 lbs., the pressure at all points within the vessel A will be increased by 10 lbs. the square inch. The aggregate pressure transmitted to the surface C D will be as many times 10 lbs. as the surface contains square inches. If we suppose A to be a strong cylinder accurately bored, and C D to be a close fitting piston capable of moving therein, we have a hydrostatic press.

Pressures upon the Surfaces of Immersed Solids.—To find the pressure upon a horizontal immersed surface offers no difficulty. We simply multiply the area of the surface by the pressure due the head. Thus, the pressure upon a horizontal area 100 square inches in extent lying 10 ft. below the surface of the water is $100 \times 10 \times 0.433 = 433$ lbs. When the given surface is vertical or inclined the question is not so simple, the head being different upon different parts of the surface; and when the surface is bounded by curved lines the operation becomes very complicated. The gen. principle applicable to all plane surfaces, whether bounded by straight lines or curved lines, and whether vertical or inclined, is this: If we understand by *head* the depth of the centre of gravity of the surface below the surface of the water, the pressure may be found in the same way as for horizontal surfaces. For a plane surface partly immersed the centre of gravity of the immersed portion is to be used. The pressure so found is the normal pressure, or that perpendicular to the surface. In the case of an inclined surface, it is often necessary to find the pressure in a horizontal or vertical direction. Understanding the term *head* as above, the horizontal or vertical pressure upon an inclined plane is found by multiplying its horizontal or vertical projection by the pressure due the head.

Pressures upon Immersed Surfaces.—In considering such pressures, the object usually is to find the resultant pressure, or that with which the fluid tends to give motion to the surface, or to resist its motion in some particular direction, usually horizontal or vertical. The pressure, for instance, tending to burst a water-pipe is not the entire pressure upon the curved surface of the pipe, but the pressure tending to separate one half the pipe from the opposite half, and is represented by the pressure which the same head would exert upon a plane whose width is the diameter of the pipe. The pressure acting upon a curved surface in any given horizontal direction is the same as would be exerted upon the projection of the surface on a vertical plane perpendicular to the given direction. The pressure upon a curved surface in a vertical direction is equal to the weight of the mass of water lying vertically above the surface.

Weight Lost by Immersed Solids.—Specific Gravity. The up-

ward pressure upon an immersed solid tends to raise it; the downward pressure tends to sink it. This latter is equal to the weight of the mass of water lying vertically above the upper surface. The excess of the upward over the downward pressure is equal to the weight of the mass of water displaced by the solid. If the weight of the solid is less than this, it floats; if greater, it sinks. In either case, the weight lost by the body is equal to that of the mass of water displaced by it. If we weigh a body in air, or, more strictly, in a vacuum, and again while suspended in water, the difference is the weight of a vol. of water equal to that of the body. Dividing the entire weight of the body by the loss of weight in water, we have the ratio of the weight of the body to that of an equal vol. of water. This ratio is called the *specific gravity* of the substance.

Stability of Floating Bodies.—When a solid floats in water, it takes a position such that its centre of gravity is in the same vertical line with the centre of gravity of the fluid displaced by it. This position is called a position of rest or equilibrium. Most floating bodies have more than one position of rest. A position of rest is said to be stable when the body tends to return to it on being tilted or inclined; unstable, when it tends to rotate into another position. One body has more or less stability than another according as a greater or less inclination is necessary to overcome its tendency to return to its position of rest, and a greater or less force is necessary to produce that inclination. The theory of the stability of floating bodies is of the greatest importance in ship-building. The absolute stability of a very light body is but slight in any position, since the lighter the body the less the forces tending to restore it to its normal position when disturbed. Up to a certain point the stability of a floating body is increased by increasing its weight. On the other hand, beyond a certain point an increase of weight diminishes the stability of a floating body. A homogeneous body when entirely submerged has no stability; it rests indifferently in any position.

Surface of Liquids.—It is a law of mechanics that the surface of a liquid in equilibrium under any forces whatever is, at any point, perpendicular to the resultant of the forces acting upon it at that point. When, as is commonly the case, the only force acting upon water of limited extent is gravity, its surface, so far as our senses can perceive, assumes the form of an exactly horizontal plane. In strictness, however, no liquid surface is an exact plane, but forms a part of the surface of a vast sphere. When water is contained in a vessel revolving around a vertical axis, its surface is acted on at any point by 2 forces—viz. gravity, acting vertically, and the centrifugal force, acting horizontally. The resultant force is neither horizontal nor vertical, but inclined, and the surface takes such a form that the resultant force is at all points perpendicular to it. A vertical section of the surface of water in a vessel (Fig. 3) revolving around the vertical axis A B, is the curve called a parabola.

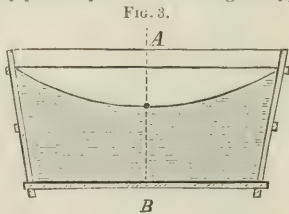


FIG. 3.

[From orig. art. in *J.'s Univ. Cyc.*, by J. P. FRIZELL, C. E.]

Hydroxyls. See HYDRATES.

Hydroxyl, a univalent radical which in its chemical relations is analogous to chlorine. Its compounds are called *hydroxides* (see HYDRATES), and some of them alcohols and phenols. It is water minus half its hydrogen.

Hygieia, hi-je-ya, in anc. mythology, the goddess of health, was a daughter (some say the wife) of Æsculapius. She is generally represented as a young girl feeding a serpent, the symbol of health, from a cup which she holds in her left hand, the serpent winding around the right arm.

Hygiene, hi-jeen, the science and art of preserving health and preventing disease. Coming directly from the Fr. *hygiène*, the term may be traced to the Gr. *hygieinós*, "healthy." From the earliest times men must have observed somewhat of the favorable or unfavorable influences of the circumstances under which they lived. As an art, in its rude beginnings, H. must have preceded med., and even surgery. The early temples of Æsculapius, before Hippocrates, were *sanitaria* rather than med. schools.

All the most enlightened nations of antiquity held phys. culture in high estimation. It is not improbable that the intellectual supremacy of the Grs. was in some part owing to their sedulous care of the development of the whole organization, brain and body together. In the school of Salerno, in It., the oldest med. school of Europe, founded in the 9th century, instruction was given upon the prevention of diseases as well as the preservation of health. The institution of *quarantine* in the 14th century in It., to exclude the plague, was an event in the hist. of sanitary progress. Jenner's introduction of vaccination for the prevention of smallpox is perhaps the greatest of all the triumphs of "preventive medicine," as sanitary science has sometimes been called. This event dates from 1798.

The benefits conferred upon mankind through the advance of knowledge in regard to the causes of disease and the conditions necessary for health have been obvious, great, and numerous. Statistics show that in Fr. in 1772 the annual proportion of deaths was 1 in 25; in 1846, 1 in 45. The mean duration of life in the same country was, in 1806, 28½ yrs.; now, 34½ yrs.. At Geneva the mean probability of life in the 16th century was 8 or 9 yrs.; in the 17th century, 13 to 14 yrs.; in the 18th, about 30 yrs.; in the 19th, 40 to 45 yrs. Life may be safely said to have been, on the average, prolonged 25 per cent. during the last 50 yrs. While improvements in med. and surgical practice no doubt have had their share in effecting this result, the greater part of

this very important change must be ascribed to increased knowledge and appreciation of the laws of health.

Alimentation.—Requisites in connection with food are, that material be furnished to supply the needs of the body for 2 purposes—(1) to form and repair its *tissues* or solid structures and fluid secretions for special uses; (2) to generate and maintain *force*, which is consumed in the *external* activities of the body and also in its *internal* functions—i. e. in external and internal work. For *tissue-making*, food-substances must be obtained which contain the elements of which the body is composed (carbon, hydrogen, nitrogen, oxygen, sulphur, phosphorus, iron, calcium, etc.); these must be in an organic state (vegetable or animal, not mineral, except salt), and of such consistence as to be broken up or crushed by the teeth and dissolved by the digestive fluids. The same kinds of materials avail also for *force-food*. For healthy alimentation food must be taken in sufficient quantities at such intervals as will meet the waste of the body. It must also be eaten slowly, chewed thoroughly, and at a time of repose both of body and mind. It is sometimes asserted that vegetable food alone is necessary or advantageous to man. It may be admitted that men can exist through long periods without meat; yet it is equally true that men can exist on meat alone. The teeth and digestive organs of man show him to be adapted to a mixed diet. Experience shows that such a diet is the most favorable to the maintenance of full vigor in an active or laborious life. Not more than ¼ of the whole amount of food consumed ought to consist of animal substances. Nature's model food is milk, consisting of representatives of 3 classes of substances—(1) casein and albumen, *nitrogenous* (i. e. containing carbon, hydrogen, oxygen, and nitrogen); sugar of milk or lactine, *saccharine* (non-nitrogenous, composed of carbon, hydrogen, and oxygen); and *fatty* substances (making butter); these last also being non-nitrogenous. It is a rule in alimentation that with man and all the higher animals life can be sustained for a length of time only by a diet containing at least 2 of the above named 3 classes of food-principles.

Errors concerning diet are chiefly: (1) Eating too fast, thus promoting indigestion; (2) excess in the amount of food taken; (3) insufficiency in amount or defect of quality for full nutrition; (4) unwholesome conditions of food—e. g. commencing putrefaction, or changes produced by disease in animals whose meat is eaten. Raw vegetables and fruits in moderation are wholesome. Raw meat frozen, and thus made tender, is so also. One danger attends the consumption of underdone meat—that of thus receiving parasites into the body; in the case of beef, *Tenia*, the tapeworm; of pork, the more dangerous *Trichina*. This danger is obviated by thoroughly cooking meat. Scurvy is produced especially by long deprivation of fresh vegetable food.

Water is indispensable to the sustenance of life. From 20 to 40 fluid-ounces of it, alone in the form of some beverage, are needed by every adult daily, the greatest amount under active exercise or in warm weather. Its purity is of great importance. Excess of mineral ingredients (making *hard* waters) may irritate the stomach and bowels. More injurious is excess of organic matter, as in rivers or wells poisoned by sewage, streams flowing through graveyards, etc. Filtration through charcoal and gravel will improve that which is defective; but if no good supply can be obtained from terrestrial sources, rain-water may be used. This also requires filtration when it passes through the air over a crowded city. Spring-water is mostly the best; well-water, free from contamination, is about equal to it.

As to stimulants, the important hygienic law is that all unnecessary stimulation involves a waste of force in proportion to the degree of excess above the level of natural, healthy action. Cocoa is scarcely to be called a stimulant. Black tea in moderation is an innocent and often a useful means of refreshment. Coffee is too powerful an excitant of the heart and nervous centres to be beneficial to most persons as a daily drink. Its best place is that of a prop under special strain of muscular or mental fatigue. Alcohol is a subject of much contention. Avoiding extreme views, it may be stated that during perfect health it is never necessary, and therefore never wholesome. In great prostration from disease it is often the most valuable of supporting agents. States occur, also, between illness and full health, in which, under the judgment of phys., dilute alcoholic beverages (ale, wine, etc.) may be employed in regulated quantities with advantage. No such article does good when it hurries the pulse, flushes the face, or disturbs the brain—i. e. acts as an inebriant narcotic.

Clothing.—This must, for health, be—(1) sufficient; (2) not excessive in amount or pressure; (3) properly distributed over the body; (4) permeable to air and moisture; (5) changed frequently enough for cleanliness. Being insufficiently clad in cold weather is depressing to the system. Wearing too much clothing makes the skin delicate and the whole body morbidly susceptible to changes of temperature. The order of warmth in materials is as follows: (1) furs and wool; (2) silk; (3) cotton, as muslin; (4) linen. In distribution over the body, the chest needs especial protection in winter and in cold climates, the abdomen in warm seasons and countries, and the feet in all times and places, unless near the tropics.

Excretion.—Health requires the regular removal from the body of the results of waste of the tissues and combustion of material for the generation of force. By the lungs we excrete carbonic acid; other matters by the skin, kidneys, and large intestine. If either of these eliminative processes be arrested, disorder must at once occur in the body; a continued interruption of either of them will be fatal. Neglect of the proper action of the bowels often brings on habitual constipation. Evils connected with this, always endangered, though not always resulting, are—(1) irritation or inflammation of the bowels; (2) hernia or rupture, with possibly fatal strangulation; (3) irremediable obstruction

of the bowels; (4) sympathetic disorder of other parts of the system, as the liver, brain, etc.; (5) blood-poisoning from non-excretion of effete putrefiable matter. To prevent constipation the most important measures are—sufficient daily exercise in the open air; a varied diet, including a moderate amount of fresh or dried fruit; bran bread; and, if these fail, rhubarb-root or some other laxative med.

Exercise.—In respect to this the most gen. statements are: Every organ, including the muscles, requires for its healthy development while growing, and afterward for maintenance of vigor, these conditions: (1) a sufficient supply of blood of good nourishing quality; (2) innervation—i. e. a supply of nerve-force; (3) exercise, according to its functions; (4) intervals of repose. Violent exercise is not conducive to health, because it tends to exhaust instead of adding to the strength, and also because it agitates the heart. Increase of strength follows exercise only when it is followed by periods of rest sufficient to remove all the effects of fatigue. Invalids require to be very cautious in the amount of their exercise. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. HENRY HARTSHORNE, M. D.]

Hygrometry (Gr. *ὕγρος*, "moist," and *μετρον*, "measure"). This term is applied to the measurement of the amount of vapor in the air. The atmosphere over every part of the earth contains a greater or less quantity of invisible vapor, which gives it the variable qualities denominated humidity, dryness, dampness, and aridity. As these are elements of climate, and as the human body is very much affected by these states of the air, the subject is one of much practical importance.

For determining the relative dryness or dampness of the air, 3 classes of instruments have been mainly employed: (1) those composed of substances such as sulphuric acid, various deliquescent salts, sponges, paper, etc., which are augmented or increased in weight by a change in the humidity of the air; (2) those composed of substances (such as hair, threads of silk or linen, slips of whalebone or wood, etc.), which increase or diminish in vol. according to the amount of moisture; (3) those composed of substances (like catgut) which twist when moist, and twist when dry.

All these instruments indicate, rather than measure, the hygrometric state of the air: they may be styled hygrosopes. Those by which the state of the air, with regard to moisture, can be determined with precision are denominated hygrometers. Daniell's dew-point hygrometer (Fig. 1) is composed of 2 glass bulbs: A is more than half filled with ether, and contains a thermometer, the bulb of which is plunged in the liquid. The space above is void of everything but the vapor of ether. B is covered with fine muslin, upon which ether is dropped. The evaporation of this produces intense cold, in consequence of which the ether vapor inside B is condensed, and hence the ether in A rapidly evaporates. The evaporation of the ether in A cools the bulb until the air surrounding it sinks below the dew-point. Dew is therefore deposited on the outside of A. At the moment of the deposition the temperature is read from the scale of the thermometer in A. When the dew disappears as the temperature rises by ceasing to drop ether on the bulb B, the same thermometer is read again, and the mean of the 2 readings is taken as the temperature of the dew-point. A thermometer, C, placed on the outside of the column which supports the instrument, gives the temperature of the air at the moment of observation. The objection to this method is its want of delicacy, and the liability to produce a local dew-point by the evaporation of the water.

Regnault's dew-point hygrometer is an improvement upon that of Daniell. But although observations with it give the elastic force of vapor of the air with great precision, yet it is not convenient for the daily registration of the hygrometric condition of the air by ordinary observers. To obviate this difficulty Mason's wet and dry bulb hygrometer has been invented. It consists of 2 thermometers, of the same size of bulb and bore, placed alongside of each other (Fig. 2), one having a naked dry bulb, and the other a bulb covered with fine muslin, kept moist by the ascent of water in a cotton wick. When it is wet, or

near the dew-point, the evaporation will be very slow, and the 2 thermometers will indicate nearly the same temperature. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JOSEPH HENRY, LL.D.]

Hyk'sos, or Hykshos ("shepherd kings"), the name given by Manetho to the kings of the 15th, 16th, and 17th dynasties in Egypt. Their cap, was Tanis in the Delta, the "Zoan" of the O. T., now called *Sân*. The H. were probably a collection of the nomadic hordes of Ar. and Syria, mostly Canaanites. They adopted Egyptian manners and customs and worshipped Egyptian gods. They held the country for about 500 yrs.

Hy'men [Gr. *ἡμὴν* or *ἡμεναίος*], the Gr. god of marriage, perhaps a personification of the nuptial song, called also *hymen*, and probably related etymologically to *hymn*. H. is represented as a comely youth bearing the bridal torch.

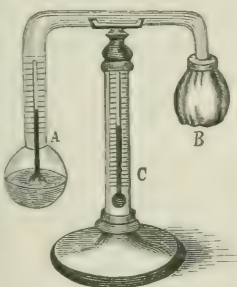
Hymenop'tera. This group of insects comprises the bees, paper, wood-, and sand-wasps, ants, ichneumon-flies, gall-flies, and saw-flies. There are estimated to be 25,000 species, of which perhaps 5000 species inhabit the U. S. Their range is not confined to the tropics and temperate zone alone, but a few species occur near the N. pole. Their geological range is not great, the earliest species known occurring in the Jurassic formation. The H. (so called from *ὑμῆν*, a "membrane," and *πτερόν*, a "wing") are usually characterized by the 4 membranous, naked wings, with a peculiar arrangement of the veins, the hinder pair being much smaller than the others; by the large head: the complication of the mouth-parts, the jaws being adapted for biting as well as seizing prey, while the maxillæ and labium are much elongated and adapted for lapping the sweets of flowers; the ligula, or so called tongue, which is a prolongation of the labium or under lip, sometimes attaining a great length; by the presence of a well developed ovipositor—in the ants, wasps, and bees modified to form a sting. The young, or larvæ, are white, soft, fleshy, and worm-like, without feet. They are fed by the parents directly or from stores of honey and pollen or animal food laid up before their birth by their parents. The pupa is inactive, resembling the adult, and protected by a thin silken cocoon.

The anat. of the H. is very complicated. The honey is formed, by some chemical change as yet unknown, from the food contained in the crop, which is regurgitated into the honey-cells. A characteristic of those species provided with a sting is the 2 large poison-glands situated in the end of the abdomen. The poison secreted in them is discharged into a pear-shaped sac lodged near the base of the sting, which is provided with a peculiar muscular apparatus for its sudden extension and withdrawal. Another feature of much interest in the bees is their power of secreting wax. This is accomplished by special minute one-celled glands lodged just under the skin, opening externally by pores connecting with a fine chitinous tube in the integument. The legs are exposed to much variation in the different genera. For example, in the hind legs in the pollen-gathering bees, such as the honey- and humble-bee, the tibia or shank is very broad and hollowed out on the outer side, while stiff bristles project over the depression from each side, forming the honey-basket (*corbiculum*) in which the masses of honey and pollen are piled up. The mode in which the bee collects the pollen is very curious. She gathers it from the flowers with her mandible, from which it is removed by the anterior pair of legs. From there it is passed to the intermediate pair of legs by manifold scrapings and twistings of the limbs, whence it is by similar manœuvres deposited on the hind legs.

Not only is the individual structure of the H. highly complicated, but in certain genera of bees, wasps, and ants there is a differentiation of the individual into 3 instead of 2 sexual forms—i. e. males, females, and workers (wrongly called neuters), the latter being sexually undeveloped females. In the bees and wasps the workers differ from the queen in having undeveloped ovaries and incomplete accessory organs, but differ externally only in size, being a little smaller than the females. In the ants, however, while the workers are much smaller, they are also wingless, and differ in the proportions of the body. The honey-bees and certain wasps and gall-flies lay eggs which produce young without being fertilized by the male. Only the queens' and workers' eggs are fertilized by the spermatozoa stored in the *receptaculum seminis* of the female. These she can fertilize at will (the only animal known to possess this power of producing either sex at pleasure), and retains the power for a period of 5 yrs., as the muscles guarding the duct leading from the spermatheca are supplied with a nerve, being thus rendered voluntary and subject to her will. When she wishes to lay an egg to produce a drone, the egg is allowed to slip out of the oviduct past the orifice of the receptaculum seminis, kept closed by the voluntary muscle. Drone eggs are also laid by unfertilized queen-bees, and in some cases even by worker-bees. It is well known that bees when deprived of their queen select several worker eggs or very young larvæ for the purpose of rearing queens.

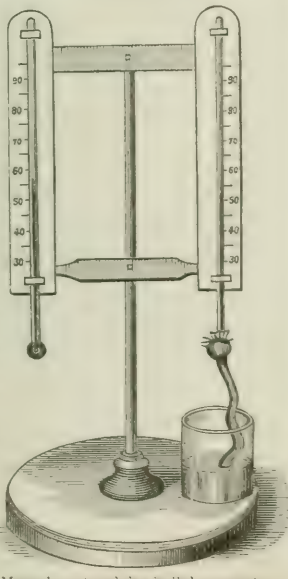
With the exception of the white ants, which belong to the Neuroptera, the H. is the only group of insects affording species which are truly social and live in colonies. In the social species there are almost invariably 3 sexual forms, the workers forming the large majority and doing most of the work of the colony. They even assist largely in rearing the young, the males and females not usually laying up food or providing for their offspring. This division of labor is carried on unequally in the different species, and is best marked in the honey-bee, whose colony contains but 1 female, the queen. In the colonies of the ants there are numerous males and females, and in some genera (*Pheidole*, *Eciton*) 2 sorts of workers—one with a large head, called a worker major or soldier, and the usual form or worker minor. In the honey-ant of Tex. and Mex., while the normal workers are of the usual shape and perform the active duties of the formicarium or nest, the large worker is inactive and does not quit the nest, but lies almost immovable in its gal-

FIG. 1.



Daniell's dew-point hygrometer.

FIG. 2.



Mason's wet and dry bulb hygrometer.

lery, and elaborates a kind of honey in its abdomen, which swells up as large as a pea. Certain ants also enslave other species, making them do the work of the colony. They also herd aphides in their underground nests, and entertain as permanent visitors certain beetles, thus adding much to their labors and to the complexity of their social life. [*From orig. art. in J's Univ. Cyc.*, by PROF. A. S. PACKARD, JR., M. D.]

Hymettus, a mt.-ridge of Gr., 4½ m. S. E. of Athens, 2680 ft. high. The honey collected here has been famous from antiquity to the present time.

Hymnology [Gr. *hymnos*, a "festive song," or "ode," and *hymos*, "discourse"], the science of sacred lyrical poetry. A hymn, according to St. Augustine, "must be praise to God in the form of song." By a looser definition it is a lyric expressive of religious feeling, or celebrating, however indirectly, the object of worship. The Gr. pagan hymns were in honor of gods and heroes, and were usually sung at their festivals. The Oriental sacred books, especially the Vedas, contain many hymns. Of all the sacred poems of antiquity, the Heb. Psalms are the most precious. They have become practically incorporated with Chr. hymnody, and their influence has been great on all its developments.

Chr. hymnody is coeval with Christianity. Every lang. in which the gospel was proclaimed had probably very soon its own supply of sacred verse. The "Tersanctus," the "Gloria in Excelsis," and the "Te Deum" are of early though unknown date. The seed of religious song was soon carried into Lat. soil. The great name here is Ambrose (d. 397). After him came Prudentius (d. about 413), Gregory (d. 604), Bede (d. 735), Theodulph (d. 821), and many others. St. Bernard (d. 1153) and his namesake, the monk of Cluny, have given us glowing strains. Peter Damiani (d. 1072), Hildebert (d. 1133), Hildegard (d. 1179), Adam of St. Victor (d. 1192), and Thomas Aquinas (d. 1274) were also no mean poets. Some of the world's most famous hymns, produced at this period, are of doubtful origin or by authors who are known by a single piece; and thus, eminent for grandeur, "Veni Creator Spiritus" and "Dies Irae" (by Thomas à Celano), and for loveliness or pathos, "Veni Sancte Spiritus" (Robert II. of Fr.), "Stabat Mater" (by Jacopone), and "O Deus, Ego amo Te," unquestionably ascribed to Xavier.

With the Ref. came a new birth of lyric fervor, in vernacular langs. Clement Marot rendered the Psalms into Fr. metre, and Calvin himself wrote a hymn or two. But the effect was naturally greatest in Ger. Luther led the van, and was closely followed by Hans Sachs, Paul Eber, M. Weiss, and other "Bohemian Brethren." In Eng. H. was a plant of late growth; its place was long filled by psalmody. Isaac Watts (b. 1674, d. 1748) is properly the father of Eng. H.; the appearance of his *Hymns* in 1707-09, and of his *Psalms* in 1719, introduced a new era; they were hailed with delight by the bulk of Dissenters, and for a long time by them used exclusively, or nearly so, in Brit. and Amer. The publication of Charles Wesley's first hymns in 1739 marked another era. For 50 yrs. he continued publishing, and his verses fill 13 vols. The influence of these lyrics was great in promoting the Wesleyan revival. The other hymnists of the 18th century, except Addison, Pope, and Byrom, were chiefly followers either of Watts or Wesley, or of both.

With the present century arose James Montgomery, whose services and influence in this field were great, and Thomas Kelly. The yr. 1827 was marked by the appearance of Heber's *Hymns* and of Keble's *Christian Year*. Faber, Caswall, and Bridges belong to the Romish Ch. That of Eng., long negligent in this particular, was awakened to its importance by the Ox. movement of 1833, and a fresh and increasing tide of lyric life has since been poured in. New and carefully prepared hymnals are constantly appearing, and the material for them is increasing every day.

In Amer., having the lit. of Eng. at her back, comparatively little has been done so far was needed. Davies, Dwight, Doane, Onderdonk, Muhlenberg, Bryant, Alexander, Pierpont, Furness, Cox, Palmer, Sean, and others have given us hymns, a few of which will not die. Here, as in Eng., attention is being paid to H., and the improvement is thus dept. of knowledge and worship is already visible. We have better hymnals than our ancestors had, and the next generation will have still better. [*From orig. art. in J's Univ. Cyc.*, by PROF. FREDERIC M. BIRD.]

Hyoseyamus. See HENBANE.

Hypatia, hi-pā'she-a [*Ἰππασία*], daughter of Theon, a Gr. of Alexandria, renowned for her knowledge of math. and of Neo-Platonic philos., which she taught with applause in her native city. The clergy believed that she made use of her influence with Orestes, prefect of Alexandria, to the injury of St. Cyril, abp. of Alexandria. She was set upon by a mob led by priests, who carried her into a ch. and tore her in pieces (415 A. D.).

Hyperbola [Gr. *huper*, "over," and *βάλλειν*, to "throw"], a plane curve that may be generated by a point moving in such a manner that the difference of its distances from 2 fixed points is always equal to a given distance. The fixed points are called *foci*, and a straight line drawn through them and limited by the curve is called the *transverse axis*. The *centre* is that point of the transverse axis which is midway between the foci, and a line through this point perpendicular to the transverse axis is called the *conjugate axis*. This axis does not cut the curve, but it is limited by the condition that the diagonal of the rectangle describes upon it and the transverse axis shall be equal to the distance between the foci. The *eccentricity* is the distance from the centre to either focus, divided by the semi-transverse axis. The diagonals of the rectangle described on the axes indefinitely prolonged are *asymptotes* to the curve; as we recede from the centre the curve continually approaches these lines, becomes tangent to them at an infinite distance, but never crosses them. These asymptotes are the limits of the curve.

Hyperboloid, a surface such that the sections made by passing planes in certain directions are hyperbolas.

There are 2 classes—*elliptical* and *parabolic* H. In the former all the plane sections that are not hyperbolas are ellipses, and in the latter all the sections that are not hyperbolas are parabolas. The elliptical H. are divided into 2 species—H. of 1 nappe and H. of 2 nappes. The former are warped surfaces, and the latter are surfaces of double curvature. In the H. of 1 nappe every section made by a plane parallel to a tangent plane is a hyperbola, and all other plane sections are ellipses; in the H. of 2 nappes every section made by a plane parallel to a tangent plane is an ellipse, and all other sections are hyperbolas. The parabolic H. is a warped surface which may be generated by a straight line moving so as to touch 2 straight lines and be parallel to a given plane. The fixed lines, which must not be parallel, are *directrices*, the plane is the *plane director*, the moving line is the *generatrix*, and any position of the directrix is an *element* of the surface. If we take a new plane director parallel to the given directrices, and any 2 elements of the surface as directrices, and generate a surface in the same manner as before, it will coincide with the surface just described. The surface has therefore a double mode of generation. Through any point of the surface 2 straight lines can always be drawn that will coincide with the surface, and the plane of these lines will be tangent to the surface at that point. Any plane parallel to a tangent plane intersects the surface in a hyperbola; every other, in a parabola. W. G. PECK.

Hyperboresans [*ὑπερβόρειοι*, "beyond the north wind," or Boreas], a mythical people who, as the anc. Grs. supposed, dwelt in the far N. in a happy clime, where sickness, old age, and sorrow were unknown.

Hyperides, a patriotic Athenian orator, b. about 400 B. C., a friend of Demosthenes and a pupil of Plato and Isocrates; was faithful to the interests of the people in the contests with Philip, and in 338 B. C. proposed to free all the slaves and enfranchise the resident aliens and the disfranchised Athenians. In 322 B. C., he was murdered at Ægina by the emissaries of Antipater.

Hypersthenes [from the Gr. *huper*, intensive, and *sthenos*, "strength"], the Labrador hornblende, or, more strictly, the thin-leaved, brittle, and bronze-colored variety of pyroxene, an impure ferro-silicate of magnesia. It is often cut as an ornamental stone.

Hypnotism. See MESMERISM.

Hypnum [Gr. *ὑπνον*], a very large genus of mosses of the sub-order Pleurocarpi and tribe Hypnæ. Many of them are large, and grow on wet ground or on old logs. The U. S. have some 100 species, many of which are European also. There are many sub-genera, some of which are probably worthy of being considered genera.

Hypochlorites, or **Bleaching Salts**. The compounds that belong under these heads comprise many of the most valuable of our bleaching and disinfecting agents. *H. of potash* is the active ingredient of what has been known as "Javelle water," or "*eau de Javelle*," also called "chloride of potash." This is a colorless liquid, of peculiar smell, which is prepared by passing chlorine gas through a cold solution of carbonate of potash. It therefore contains both potassic H. and chloride of potassium. Another method of preparing Javelle water is by adding to a solution of "bleaching powder" or "chloride of lime" (see below) a solution of potassic carbonate, in quantity sufficient to precipitate all the lime as calcic carbonate. The clear decanted liquid will contain the same constituents as before, but will be likely to be less potent, or to contain less, in proportion, of the active constituent. Javelle water is used for taking out stains, such as those of fruit, from white textile fabrics, and for bleaching wood, straw, etc.

H. of soda, in solution, constitutes what is called "Labarraque's disinfecting liquor," after a Parisian druggist who manufactured and sold it for disinfecting purposes. It is also called "chloride of soda," and in med., "chlorinated soda." The methods of preparation are precisely similar to those given above for the potash-H., using sodic instead of potassic carbonate.

H. of Lime.—Under this head it is proper to treat the important commercial product known as *bleaching powder* or *chloride of lime* (Ger. *Chlorkalk*; Fr. *chlorure de chaux*). It is proved, however, by recent researches that *solid dry* bleaching powder does not contain calcic H., which is first formed by the action of water or moisture upon it. The chloride of lime of commerce is prepared by exposure of dry or slightly damp slaked lime to chlorine gas. It forms a dry or slightly moist grayish-white powder, having a peculiar, highly nauseous odor, differing from, though suggesting, that of chlorine. It gradually decomposes in sealed packages, with time, and cannot be preserved in sealed packages, by reason of slowly evolved gas, probably chiefly oxygen.

H. of Magnesia.—This, in solution, is formed either by passing chlorine into a mixture of chloride of lime with sulphate of magnesia—is recommended for bleaching uses by Bolley, on the grounds that its action is more rapid than common bleaching powder by reason of the more ready decomposition of the magnesia compound, and that magnesia hydrate is less caustic, and hence less liable to injure delicate fabrics, than the calcic hydrate. [*From orig. art. in J's Univ. Cyc.*, by PROF. HENRY W. HARRIS.]

Hypochondriasis [so called from the old belief that the hypochondria or upper regions of the abdomen were the seats of the disease], a morbid state of mind, in which the patient imagines that he suffers from diseases which he does not possess, and in which he suffers from subjective sensations entirely unaccounted for by the objective signs of disease in his case. The disease itself is real. It may result from dyspepsia, from sexual excess, or from other causes interfering with the nutrition of the nerve-centres. The disease may amount to positive insanity, and is then classed as *melancholia*. Med. and hygienic regimen often do but little good. Cheerful companionship, fishing, hunting, and boating, long journeys, even the read-

ing of well-selected novels—in fact, anything which will divert the mind from its habit of morbid self-observation—will be found useful.

Hypnotic Acid. See NITROGEN.

Hypophosphites, salts of hypophosphorous acid. In med. the term is currently used as referring to potassium, sodium, and calcium H., which are considered by some to yield the medicinal effects of phosphorus, while free from the latter's poisonous qualities. They were not long since highly vaunted as remedies for consumption, but have not sustained their reputation in that particular.

Hypophosphorous Acid and Hypophosphites. See PHOSPHORUS, by PROF. HENRY WURTZ.

Hypsulphites, salts of hypsulphurous acid. Medicinally, the alkaline H. may be used for the same purpose as the corresponding sulphites.

Hypsometry [Gr. *ψῦς*, "height," and *μέτρον*, "measure"] treats of the measurement of heights, either absolute, when referring to the sea-level, or relative, between any 2 distant places on the earth's surface. There are 3 prin. methods in use. The first and most accurate depends on the property of fluids when at rest to present their surfaces at right angles to the direction of gravity; the second depends on the angular measure of elevation, in combination with the known distance of the object, and having regard to the effect of atmospheric refraction; the third and least accurate method depends on the law of the decrease of pressure of the atmosphere with an increase of altitude. The first method employs the levelling instrument, the second the theodolite, the third the barometer. Since the introduction of the aneroid barometer the method of measuring differences of elevations by means of the temperature of boiling water has almost been abandoned. The second or trigonometrical method is the only one applicable in case one or both stations are inaccessible.

Respecting the accuracy in resulting heights attainable by means of the barometer very divergent opinions exist, but it is believed that with close attention to sources of error, instrumental and local, and especially to the effect of the daily variation of the pressure and temperature, great relative accuracy may be reached. Errors of considerable magnitude may creep in if the 2 stations are at a great distance horizontally, but they will arise principally from the difficulty of ascertaining the true temperature of the intervening stratum of air. For accurate hypsometric measures the hours recommended are the following: beginning with Mar. and ending with Oct., 8, 7½, 7, 6½, 6¼, 7, 8, 10 A. M., and 6, 7, 7½, 9½, 7½, 6 P. M. [From orig. art. in J. S. Unit. *Op.*, by C. A. SCHOTT.]

Hyracæum, a substance imported from the Cape of Good Hope, and now believed to be the excrement of the klip-das (*Hyrax capensis*). It is a brown pitch-like substance, having much the taste and smell of Amer. castoreum. It was formerly collected for a fertilizer.

Hyracidae [Gr. *ὕραξ*, "mouse,"], a family of herbivorous mammals belonging to the order Hyracoidea. These animals were formerly classed with the rodents on account of superficial resemblances, and Cuvier considered them as closely related to the rhinoceros from the form of the molar teeth of the genus *Hyrax*. Several species have been described, which are found only in Syria and Afr., where they inhabit rocky places. *H. Sinaiticus* or *H. Syriacus* is the coney of the Bible.

Hyracidae, an order of mammals represented by the family Hyracidæ.

Hyracæus [Υρακάος], the name of several historic Jews of the Maccabæan period. (1) JOHN HYRACÆUS (135-105 B. C.), son and successor of Simon Maccabæus, prince and high priest of the Jews, restorer of the independence of Judæa, and founder of the monarchy, which continued in his family till the accession of Herod. (2) JOHN HYRACÆUS II., grandson of the foregoing, son of Alexander Jannæus; was appointed high priest by Alexandra, his mother, 78 B. C., and on her death (69 B. C.) assumed the sovereignty, which was disputed by his brother Aristobolus. He reigned from 63 to 40, when he was deposed and mutilated by Antigonus. Was put to death 30 B. C.

Hysop, *hiz-zop* [Gr. *ὕσσωπος*; Heb. *zibb*], the *Hyssoptus officinalis*, a half-shrubby labiate plant, a native of S. Europe. In domestic med. it is a very useful expectorant. As the H. of Gr. authors is conceded to be the common plant of that name, it has been inferred that it was also that of the O. and N. T., but this is by no means certain.

Hystaspes, author of a prophetic-apocalyptic work, *Vaticinia Hystaspis*, which was much read by the early Chrs. and believed to contain predictions of Christ and the future of his kingdom. Of his life nothing is known, and the book itself has vanished; but it is often mentioned by the early Chr. Fathers.

Hysteria [from *ὑστέρα*, the "womb"], a peculiar nervous affection which in former times was supposed to have had its seat in the womb, but at the present day ascribed to nutritive derangement of the gen. nervous system, both central and peripheral. This may be caused by any organ of the body being diseased, and there can be no doubt but that it is dependent most frequently upon disorders of the uterus and ovaries, simply because these affections produce a deeper impression upon the nervous system. This condition of the nervous system may also be produced by improper nourishment. H. generally attacks women from the age of puberty to the decline of menstruation. It is of rare occurrence among men, and in them is produced in a manner similar to that in which it is produced in the opposite sex. H. may manifest itself in a great variety of ways; in fact, it simulates almost every known disease, and often with the greatest care the practitioner is unable to differentiate them. The most common form, however, is the hysterical fit. In some cases this consists merely of the twitching of the muscles of a particular region, as of the face, arm, or leg. In other cases the whole body is affected

at once. The patient generally laughs and cries alternately; this is due to spasm of the group of muscles which operate in producing these acts. Another very common accompaniment of these paroxysms is the so called *globus hystericus*; this consists in the sensation as of a ball rising from the uterus and ascending through the abdominal and thoracic cavities to the throat, and is caused by a spasmodic contraction of the œsophagus. The patient may scream, tear her hair and clothes, and beat her breasts. In severe cases we sometimes have loss of consciousness and convulsions; when this occurs it is almost impossible to distinguish it from epilepsy. The fits usually terminate with the discharge of a large quantity of almost colorless urine.

We next come to speak of the treatment. This may be divided into 2 modes—viz. that of the paroxysm, and that between the paroxysms. In the first stage the dress should be loosened and plenty of fresh air admitted into the room. Spectators should not remain in the room, and the attendants should maintain quiet and composure. Cold water may be dashed in the face; strong aqua-ammonia may be held to the nostrils. The bowels may be unloaded with an enema of soap and water, or, better, of mixtura assafoetida. Forcibly holding the patient's mouth and nose for a moment, thus suspending respiration, will often divert all the patient's energy to restore breathing, and at once break the attack. When great nervous excitement exists, chloral, bromides, opiates, valerian, musk, etc. may be given at short intervals. In the intervals between the paroxysms, or in the other forms of H., laxatives, tonics, and the correction of any diseased function should be our first care. Iron, in the form of the carbonate, Blancard's and Bland's pills, and the muriated tincture of iron, benefit most cases. Beside this, the patient may take assafoetida pills, infusion of quassia, cinchona bark, and quinia.

WILLARD PARKER.

Hysterotomy [Gr. *ὑστέρα*, "womb," and *τομή*, "a cutting," from *τέμνω*, "to cut"], or **Cæsarean Operation**, the delivery of a child by opening the abdomen of the mother. The incision is made in or near the middle line of the body, to the length of 6 or 7 inches. The uterus is exposed, carefully opened, the child lifted out, and then the after-birth. The uterus contracts, the wound is closed, and opium is given to allay pain and nervous irritability. Anæsthetics should of course be given. In recent times the Cæsarean operation has repeatedly been performed with complete success, the life not only of the child but the mother having been saved. Some women, indeed, have had several children, each removed through an abdominal incision. Practitioners are not quite agreed as to all the circumstances which justify performance of this operation.

I.

I, the 9th letter of the Rom. alphabet, was once interchangeable with J, which is a form of the same letter. I is a vowel, and in Eng. has 3 well marked sounds: (1) the sound of long *i*, as in *machine*, *marine*; (2) the "long" sound, that heard in *mind*, *sign*; and (3) the "short" sound, heard in *pin*, *minion*. As a numeral I stands for one (1). In chem. it is the symbol of iodine.

Iaba'dius, the name under which Ptolemy described a vast island of the E. I., near the Golden Chersonesus. It was fertile in grain and produced gold; the cap. was called Argyre. From the similarity of names, both of which mean "barley," it is generally thought to be identical with *Java*, though Humboldt argues for Sumatra.

Iac'chus, the mystic name of the god Dionysus at Athens and Eleusis.

Ial'ysus, one of the 3 principal Doric cities in Rhodes, anciently the chief place of the island, and often taken as a synonym of the island itself. It was very flourishing in the time of the Homeric poems, and some remains of its anc. greatness are still seen at the modern v. of *Ialiso*.

Iam'bic [Lat. *iambicus*, from *iambus*; Gr. *ἰαμβος*], a poetic metre consisting of a succession of *iambi*. An iambic foot is formed either of one short and one long syllable (*āmāns*) or of an unaccented syllable followed by one accented *āstēm*.

Iam'blichus, a Neo-Platonic philos. of the 4th century after Christ, was a disciple of Porphyry, and resided in Syria. He taught that it was possible for man to put himself in direct communication with the Deity by theurgic rites and ceremonies. Five books of his work on Pythagoras, and his book on Egyptian theol. are extant. D. about 330.

Ian'thina [Gr. *ἰάνθινος*, "violet-colored"], a genus of mollusks including the ocean-snails or violet snails. They have a snail-like shell, and float on the open sea, supported by a cartilaginous raft, containing air-vesicles. They have no power of rising or sinking in the water. They are carnivorous gasteropods, named from their purple juice.

Iap'etus [Gr. *ἰανηρός*], in Gr. mythology, a son of Uranus and Ge, brother of Kronos and Oceanus, and father of Atlas, Prometheus, and Epimetheus. He was regarded by the Grs. as the father of all the human race.

Iberia, *i-bé-re-a*, one of the names by which Sp. was known to the anc., probably derived from *Iberus*, the Ebro.

Iberville, *d'*, *de-ber-vél'* (PIERRE LEMOINE), b. at Montreal July 30, 1661; captured Ft. Nelson 1686; served in the Schenectady affair 1690; in 1696 destroyed St. Johns, and took nearly all of Newfoundland from the Brit., whom he defeated in Hudson's Bay in 1697. In 1699 he fortified Biloxi, and in 1700 ascended the Miss. River. In 1702 he fortified Dauphin Island and founded a settlement near Mobile. In 1706 he captured the Isle of Nevis. D. July 9, 1706.

I'bex (Lat.), a genus or sub-genus of the goat family, distinguished by very large horns and rather scanty beards. The species of I. are *I. Alpinus*, *I. Pyrenaicus*, *Hispanicus*, *Caucasicus*, *Sibiricus*, *Nubicus*, *Himalayicus*. The Alpine I. breeds freely with the goat.

Ibididae [Gr. *ibis*], a family of wading birds, having very long legs, neck, and bill, and a very short tail, and typified by the celebrated *Ibis*. The Amer. species are *I. falcinellus*, the glossy I.; the white I. (*I. alba*) of Fla., and the scarlet I. (*I. rubra*). All these are handsome birds, found mostly in warm regions. The wood-I. of Amer. is *Tantalus loculator*. The sacred I. (*I. religiosa*) of Egypt, as well as the glossy I., is frequently found embalmed in that country. It was regarded as an incarnation of the god Thoth, and was looked upon with peculiar reverence by all classes of people.



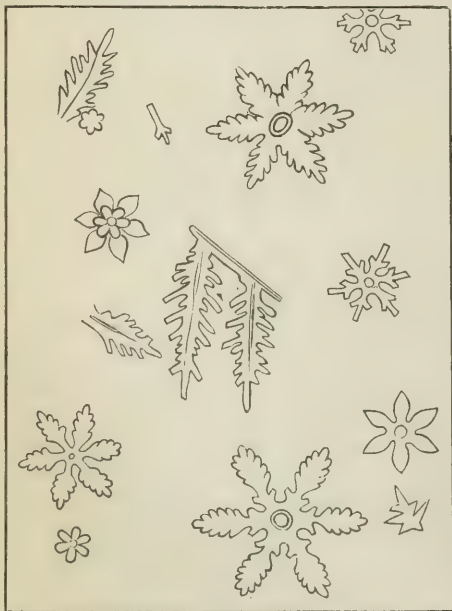
Sacred Ibis.

Ibis. See **IBIDIDE**.

Ibrahim Pasha, a son of Mehemet Ali, b. at Kavala, Roumelia, in 1789. His father was appointed viceroy of Egypt in 1806, and I. soon gave proofs of the qualities of which he was possessed by subduing the wild tribes of Upper Egypt in 1812, by reducing the Wahabees and conquering a part of Ar. in 1819, by reorganizing the Egyptian army and founding a navy, and by his campaign in the Peloponnesus from 1824 to 1828. In 1831 he conquered the whole of Syria in 1 yr., pushing forward into Asia Minor to Konieh. Here he routed the Tur. army, Dec. 20, 1832, and the way to Constantinople was open to him. But Rus. interfered. Peace was concluded, and the whole of Syria was ceded to Mehemet Ali. I. was appointed gov., and in this position he showed talents as a statesman and administrator. In 1839 I. again succeeded in routing the Tur. army at Nezib, June 24, but this time too the Ottoman empire was saved by the interference of the European powers, who compelled Mehemet Ali to content himself with the possession of Egypt. I. P. lived for several yrs. as a private gentleman on his estates at Heliopolis, but about 1844 Mehemet Ali began to fall into dotage, and the govt. now devolved on I. P. In 1848 he was confirmed as viceroy of Egypt. D. Nov. 9, 1848.

Icarus, the son of Dædalus, who, according to the old myth, flew so high that the sun melted the wax with which the wings were attached to his shoulders, and he fell down and was drowned in the Icarian sea.

Ice. The freezing-point of water is 32° F. or 0° C. The presence of salt impedes congelation; sea-water, therefore, requires a temperature several degrees lower than fresh water to solidify. Ice in assuming the solid form expands by about 1/9 of its own volume. As cold increases, solid ice contracts; the ice on ponds occasionally cracks from this cause with a loud report. Ice is the normal condition of water. As heat is withdrawn from water its constituent particles approach, in accordance with the gen. law that heat expands and cold contracts bodies. When the temperature 39° F. or 4° C. is reached, the vol. of water begins slowly to expand; a new force, that of crystallization, coming in to modify the result. In crystallizing each molecule approaches every other under the controlling power of a fixed law; each spicule, as it forms, unites with every other at an angle of 60°. As a result, ice-crystals are formed infinite in beauty and variety, but all obedient to this law.



Ice-crystals.

The ice as it melts contracts; the space filled by the frozen flower is not quite filled by the liquid one. The magnificent icebergs of the N. seas are generally only the terminal masses of the Arctic glaciers, which have crept over the beach to the sea, and there been worn away and broken off by the action of the waves and the tides. The ice-caves de-

scribed by Alpine travellers as existing in the glaciers are very beautiful; stalactite and stalagmite of pellucid ice, clustering branches, pillars, and domes adorn their roofs, floors, and walls. Ordinary ice, though crystalline, is not prismatic, but that which has frozen at a temperature below 32° F. shows a decided prismatic structure. In many of the ice-caves of Fr. and Switz, this structure is found; sometimes the stalactites are formed of common ice surrounded with a shell of the prismatic. The interior, being the softer, melts, leaving the stalactite hollow. In lake-ice bubbles may be seen, with solid layers between, evidently marking the limits of successive acts of freezing, and with each block composed of such layers of solid ice and bubbles, a surface layer is associated, which gives evidence of having been acted upon by external influences. In this surface layer are numerous small air-bubbles around which a bleb of water exists. As a geologic agent ice has been very prominent, not only by means of glacial action, but by the disintegration of rocks and mt. masses, which have then been carried away and deposited as laminated strata on the lowlands or the ocean's bed. Hoar frost, one of the most familiar forms of ice, is only frozen dew. [From orig. art. in *J. S. Univ. Cyc.*, by Mrs. S. B. HERRICK.]

ICE. Its Relations to Navigation, Travel, and Transportation.—The closing of rivers, bays, sounds, and estuaries by ice greatly impedes, and sometimes completely prevents, navigation for several months of the yr. N. of the 40th degree of lat. in N. Amer., and of the 50th degree in Europe and Asia, the navigable rivers are closed for 3 or 4 months, and in the higher lats. for 6 or 7, to all passage of steamers or sailing vessels. As we approach the Arctic regions the obstructions to navigation from ice become more formidable. The whaling fleet has met with heavy losses by the crushing of their vessels in the ice, and the numerous Arctic expeditions have almost without exception been thwarted or prevented by the ice from attaining their desired results.

As an Article of Commerce.—There is a large demand for ice as a commodity for 3 distinct purposes—viz. for its cooling qualities, for its antiseptic or preserving power, and for its use in med. and surgery. In all tropical and semi-tropical countries there has been a demand in all ages for some means of cooling wine and other beverages, and imparting to the drinking-water of those countries sufficient coldness to make it palatable. The means naturally suggested was the use of snow brought from the mts. and stored up to be used in cooling the beverages in use. In this country ice-houses have been very common in the rural districts for almost 2 centuries. They were cheap affairs—a cellar dug in the ground, floored with stone on which straw or sawdust was thickly strewn; the sides ceiled with rough boards placed nearly a ft. from the earthy wall, and the space between filled with spent tanbark or sawdust; the peaked roof covered first with rough boards, then heavily thatched with straw, and then another roof of rough boards with broken joints; the ice put in during the coldest weather of the winter, with layers of sawdust or straw between, and then, if the weather was cold enough, water thrown over each layer to freeze it into a solid mass, and the whole covered closely, and the double or triple roof put on. Access to it was generally indirect, and it was only opened at night in hot weather. The expense was considerable, but the supply was generally sufficient for several families. In our large cities at the N. as late as 1820 it was difficult to obtain ice even for the purpose of cooling water or other beverages, and the S. cities were entirely without it. Ice became a commercial product on a small scale in Boston about the beginning of this century—i. e. it was kept in storehouses, and probably carried around to the few customers who were disposed to buy at about that period. In New York city it was not a commodity to be generally bought and sold before 1825, though it was used by the butchers, fishmongers, and perhaps the confectioners, at an earlier date. The traffic has grown enormously in 50 yrs. The first demand for ice had reference solely to its cooling qualities, but its antiseptic properties soon created for it a still larger market. Indeed, had men but comprehended the lessons taught them by nature, the antiseptic character of ice would have given it its first value. That meats and the carcasses of animals intended for food could be transported for a great distance when frozen, without injury, was a fact well known ages ago; but the practicability of using ice to preserve such meats and carcasses, even without freezing them, does not seem to have occurred even to the keenest observers. Now, however, ice is regarded as absolutely necessary during the summer months in preserving the bodies of the dead until the time of burial; and it forms in the refrigerating closet or chest one of the most indispensable articles of household use for the preservation of meats, milk, butter, vegetables, or fruits. But its antiseptic value does not stop here. Refrigerating cars bring to us from the Pacific coast choice ripe fruits, game, and other articles which it would otherwise be impossible to obtain in this market, and bear back oysters and other shell-fish, condensed milk, butter, and other articles from the Atlantic coast. The exportation of ice, which commenced in 1805 by the shipment of 130 tons to Martinique by Mr. Frederick Tudor of Boston, had a slow growth. For the first 10 yrs. Mr. Tudor made little or no profit by his ventures. As late as 1832 his whole annual shipments amounted to but 4352 tons, all of which was taken from Fresh Pond in Cambridge, Mass. In 1833 he sent his first cargo to the E. I. From that time the business began to thrive. In 1836, 12,000 tons were exported from Boston alone; in 1846, 65,000 tons; in 1856, 146,000 tons; in 1866, nearly 250,000 tons. The total annual ice crop of the U. S. is estimated at 20,000,000 tons, and the consumption 12,000,000 tons, the difference being waste.

As a Remedial Agent in Medicine and Surgery.—The use of ice for med. and surgical purposes is one of the additions made to our materia medica in the present century. Ice is now used medically, internally and externally; in the

former way, by breaking it up into small bits to be swallowed by the patient, and in iced drinks in gastritis and gastric fevers, as well as in some diseases of the pharynx, larynx, or bronchial tubes. Its external uses are manifold: it is applied, pounded, in ice-bags to the head in acute mania, brain fever, or some injuries of the brain; to the temporal arteries and carotids in some fevers and in cases of diphtheria and scarlet fever; along the spine in ice-bags in cholera, yellow fever, etc.

The Gathering and Storing of the Ice-crop.—Although the act of freezing expels from the crystallized mass the salt and other mineral ingredients, leaving it when in a frozen state very nearly pure fresh water, yet ice formed from or floating in salt water gathers in the interstices between the crystals so much salt, brackish, or impure water that it becomes unfit for household purposes. Hence, the ice-crop must be gathered from fresh-water ponds or lakes or from rivers above tide-water. In most cases the ice-cos, have secured the right to take the ice from these lakes and ponds by the purchase of the lands bordering on them, and have erected large storehouses on the shores in which to deposit the crop. These ice-houses are sometimes of brick, but oftener of wood, from 100 to 200 ft. in width and from 200 to 400 ft. in length, with double, triple, or quadruple walls, and generally 3, 4, or 5 stories in height, with strong floors and doors closing tightly on each floor, but no windows. There are numerous inclined planes, movable and adapted to each story, and to service without as well as within; in the larger storehouses a steam-elevator is used to drag the blocks of ice up the planes. When a favorable time has come for storing the ice, there is a scene of great activity in the vicinity of the storehouses. On the Hudson and its neighborhood the period for gathering the ice is rarely more than 4 or 5 days at one time, and sometimes not more than 10 or 12 in all, and hence the greatest speed is necessary in securing the crop. The thickness of the ice being ascertained, the ice-field is temporarily fenced, the snow, if there is any, scraped off by a broad scraper drawn by one horse, and the ice planed by another scraper armed with a steel blade to the depth of perhaps 2 inches, to remove the porous ice. The surface being cleared, the marker commences his work, using a kind of plough drawn by one horse, which makes a narrow groove about 3 inches deep, and running the lines 5 ft. apart, and then turning and crossing these by another series of grooves, also 5 ft. apart, so as to make square blocks 5 ft. each way. If the ice is thick, these blocks are reduced by an implement like a harrow with 3 parallel rows of long sharp teeth, one row running in the groove, and another plough, with a long, sharp, and comparatively thin blade, is run rapidly through the prin. grooves. One row of blocks is then cut through by means of hand-saws, the blocks pushed under or hauled up on the ice, and run to the inclined planes or loaded on sleds. The succeeding blocks are pried off with a crowbar by one gang, and another catches them with boat-hooks and drags them up, or tows a sheet of perhaps 50 blocks, with a grappling-iron and rope or chain, by horse-power, toward the storehouse, where it is broken into blocks, run up the inclined plane by the elevator, and packed away, the blocks standing on end and being separated by sawdust, shavings, rice-hulls, or spent tan. As soon as a floor or story is filled the doors are closed tightly, and the inclined planes raised to the next story, which is filled in the same way. There are gutters and drainways near the walls which receive and carry off the drainings from the melting of the ice. During the moonlight nights the work is carried on by night and day until the storehouses are filled. (See FREEZING, ARTIFICIAL.)

L. P. BROCKETT.

Ice/bergs are huge fragments detached by the action of the water from the lower end of a glacier. Greenland, therefore, is the fatherland of the I., which are far more numerous in the N. than in the S. polar regions. They bring with them masses of rock, earth, and sometimes seeds of plants, polar bears and seals, and are often 300 ft. in height. Only $\frac{1}{2}$ of the mass is above the surface of the water. The streams of water from their sides are always fresh.

Ice/land [Dan. *Island*], a large island subject to Den., and situated between the Atlantic and the Arctic oceans, between lat. 63° 24' and 66° 33' N., and lon. 13° 31' and 24° 17' W., 600 m. from Nor., 250 from Greenland, and 500 from Scot. Area, 39,756 sq. m. Pop. 1880, 72,000. Cap. Reykjavik. I. is of volcanic formation. With the exception of the S. part, which presents some tracts of low and level land, the whole coast is high and precipitous. The interior is a high table-land resting on Plutonic rocks, covered with immense beds of lava, and broken now and then by hot springs (geysers), which throw columns of boiling water sometimes 100 ft. high into the air, and form steaming streams, which after a short course disappear under the lava. Hecla and Geyser are situated in the S. W. part, Krabla in the N. Only a few garden vegetables and potatoes can be raised, and bread made from imported meal is a luxury. But in the valleys grow good grass and many fine herbs, among which I. moss constitutes a considerable item of exportation. The rivers and the fiords abound in fish—salmon, trout, and cod. Numerous seals and whales gather along the coasts, and swarms of wild-sea-fowls, among which are the eider-duck and the swan, visit the shores. Hunting, fishing, and the rearing of sheep are the chief pursuits of Icelander's life, and eider-down, dried and salted fish, wool—generally manufactured into socks and mittens—tallow, and fish-oil are the main articles he can exchange for manufactured goods, coffee, tea, wine, tobacco, coal, and grain. CLEMENS PETERSEN.

Icelandic Language and Literature. The I. lang. is a sister of the Gothic, A.-S., etc., and the mother of the Dan., SWE., and Nor. The oldest monument of I. lit. is the poetical Edda, compiled by Sæmund Sigfusson (1054-1133), but whose single parts probably belong to the 8th or 9th century. This, as well as the prose Edda, compiled or written by Snorri Sturluson (1178-1241), is chiefly of religious

or mythological interest, giving a representation of the contents of the old pagan faith. Of a later date are the *Sagas*. They are of great importance for the hist. of the Scandinavian countries, of still greater interest to the hist. of European civilization, and perfect in their artistic form. They are partly fictitious, taking their subjects from old songs—as, for instance, *Völsungasaga* and *Erithiofssaga*—or from foreign tales, such as *Karlsmagnussaga*, *Tristamsaga*, and *Trojumannassaga*; partly biographical, narrating the hist. of some great and powerful I. family, as, for instance, *Njals-saga*, *Egilssaga*, *Laxdalssaga*, *Vatnsdalssaga* and *Grettis-saga*; and partly historical—as, for instance, *Knytlingsaga* and *Jomsvikingsaga*, treating Dan. hist.; *Heimskringla*, treating Nor., and *Sturlungasaga*, treating I. But of these 3 divisions of the sagas, the main importance rests on the second one, the biographical. CLEMENS PETERSEN.

Iceland Moss, a lichen belonging to the genus *Cetraria* (*C. Islandica*), so called from its habitat, but found in the N. parts of both continents. It is used as an article of food; boiled, it forms a nutritious jelly. It is also used as a med. in pulmonary complaints.

Iceland Spar, transparent calc-spar. It displays in great perfection the phenomena of double refraction.

Ice-plant, an herb of S. Europe and Afr., the *Mesembryanthemum crystallinum*. Its succulent leaves are covered with vesicles which appear like crystals of ice. It is often seen in house-culture, and has demulcent properties.

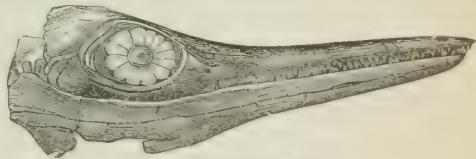
Ichneu'mon [Gr. *ιχνευμων*, the "tracker"], a name in its largest sense applicable to the numerous genera of small quadrupeds of the family Viverridae, sub-family Herpestinae—all Old-World carnivorous mammals, preying upon serpents, birds, and small game. But strictly the name designates the *Herpestes* I. of Egypt, worshipped by the anc. Egyptians. Sp. has *I. Herpestes Widdingtonii*.

Ichneu'mon-idles (Ichneu'monidae), a great family of hymenopterous insects which deposit their eggs either upon or within the eggs or larvae of larger insects and spiders, the future larva of the I.-F. devouring the insect upon which it is hatched. Myriads of noxious insects are thus destroyed.

Ichthyology [*ιχθυος*, "fish," and *λογος*, "discourse"], or science of tracks. Under this name are grouped data respecting the marks left by animals which have been preserved in a fossil condition. The following are some of the characters in foot-marks which distinguish different classes of animals: whether tracks of feet; trails made by the body or its caudal extremity drawn along in the mud; width of the track-way; relative size of hind and front feet; length of step; number of toes; mode of progression; spread of the toes; character of the heel, claws, and pellets.

Ichthyology [*ιχθυς*, a "fish," and *λογος*, "discourse"] is that branch of zoology which treats of vertebrate animals formerly collectively known under the name of fishes, but which are now distributed among the classes (1) FISHES, (2) SELACHIANS, (3) MARSIPPOBRANCHIATES, and (4) LEPTOCARDIANS. For information respecting the structure and relations of each, see articles under those several heads, as well as that under VERTEBRATES.

Ichthyosau'rus [Gr. *ιχθυς*, "fish," and *σαυρος*, "lizard"], an extinct genus of marine reptiles having some fish-like characters. In gen. form those reptiles were elongate, with the head set immediately upon the body, without any constriction at the neck. They had 4 fin-like paddles, and the tail was flattened, and probably expanded toward the end into a powerful vertical tail-fin, as in the fishes. The skull of the I. is elongated and tapering at the snout. The



Ichthyosaurus (head).

body seems to have been covered with a smooth or finely wrinkled skin, and destitute of scales. These animals sometimes attained a length of more than 30 ft., and were predaceous in their habits, as is witnessed by the scales and bones of contemporary fishes sometimes found under the ribs of these fossils. I. may have abounded in the Triassic seas, but their remains have not been identified earlier than the Lias, and the latest species occur in the Chalk. [From orig. art. in J. S. Nat. Cyc., by Prof. O. C. MARSH.]

Ico'nium [now *Konteh*], in Asia Minor, on the high-road between Ephesus and Antioch of Syria, a place of importance in the time of the apostles. In 1099 A. D. the Seljukian Turks made it the cap. of their kingdom of Roum. It was captured by Frederick Barbarossa in 1189, and recovered by the Turks in 1190. It has massive walls. Its most remarkable building is the tomb of Hazret Mevlana, the founder of the Mexlevi dervishes. Pop. 30,000.

Icti'nus, a contemporary of Pericles, built, in connection with Callicrates, the Parthenon at Athens, which was finished in 438 B. C.; also the temple of Apollo Epicurius, near Phigalia, and the building at Eleusis in which the mysteries were celebrated. All were of the Doric order.

Ida [Gr. *Ἰδα*], a mt. in Asia Minor, is a spur or branch of the Taurus system. From it flow the Granicus, the Simois, the Scamander, etc. Another IDA (now called Psiloriti) is in the island of Crete. It terminates in 3 peaks, and rises to the height of 764 ft.

Ida'cius, or **Itha'cius**, b. at Limicia, in Galicia, Sp., in the latter part of the 4th century, was appointed bp. of his native city about 427, but was deposed by the invading Suevi in 461, and d. after 469. He wrote a *Chronicon*, embracing the period from 379 A. D. to 429 A. D.

Ida Grove, Iowa. See APPENDIX.

Idaho, a Terr. of the Pacific slope of the U. S., lying almost wholly in the upper Columbia River basin, between 42° and 49° N. lat. and 111° and 117° W. lon.; bounded N. by British Columbia, E. by Mont. and Wyo., S. by Ut. and Nev., W. by Or. and Wash. Terr.; extreme length from N. to S., about 442 m.; mean breadth at the parallel of 44° 30', about 257 m. Area, 84,800 sq. m. or 54,272,000 acres.

Topography.—Mountains, Rivers, Etc.—I. is for the most part a mountainous country. The Bitter Root Mts. form at the N. E. line of I. the divide between it and Mont., and have covered the whole country to the Sierra Nevada with a succession of spurs running nearly due W. The Salmon range follows the course of the Salmon River and its affluents. The summits of this range are mostly lofty, rugged, and snow-capped. The town of Florence, in Florence Basin, 2000 ft. below the summit of Florence Mt., is 11,100 ft. above the sea, and is probably the highest town in the U. S. Toward the S. E., along a part of the Snake River, is a somewhat elevated plateau, constituting a broad and tolerably fertile tract of arable soil. S. of the Snake River Valley we find the Bear River Mts., the Goose Creek Mts., and other ranges. With the exception of Bear River in the extreme S. E., the entire drainage of the Terr. is into the Columbia River. It has Clark's or North Fork of Columbia and its affluents, the Pend d'Oreille Lake and its tributary streams, the Spokane River, with Cœur d'Alène Lake and its affluents, and, as the prin. river of the Terr., which has a course of about 850 m. within it, the Lewis Fork or Snake River, which, with its branches, the Clearwater and the Salmon, with their numerous affluents, drains nearly 70,000 sq. m. of the Terr. The only other river of any size in the Terr. is Bear River, which drains the S. E. corner and is tributary to Great Salt Lake. The prin. lakes beside Pend d'Oreille, Cœur d'Alène, Tessentines, Bear, and Henry's lakes, are the Payette lakes in Idaho co. and several unnamed lakes in Alturas and Boise cs. Between lon. 112° 50' and 114° 45' the Snake River forms 3 remarkable cataracts—Salmon Falls, Shoshone Falls, and American Falls. There are numerous waterfalls in the Terr. of great height. In the S. E. the Terr. contributes a small portion to the Yellowstone National Park. In S. E. I. there are a number of sinks or tracts where the roofs of deep caves have broken through, and considerable streams suddenly sink below the surface and become subterranean. The whole region is volcanic, and noted for its geysers, steam springs, soda springs, and natural hot baths.

Mineralogy.—Gold and silver ores are found abundantly in I. There are mines of gold or silver at the sources of all the rivers and in every co. of the Terr. In Kootenai co. there are extensive leads in the quartz veins, and many quartz-mills have been erected. The lead from the argenteiferous galena is so pure as to be worth saving for its own sake. There are extensive deposits of coal and iron at various points in the Terr.; quarries of valuable building-stone could be opened at small expense; and the volcanic region of S. E. I. yields sulphur, soda, magnesia, carbonates and sulphate of lime, very pure salt, and other valuable minerals and alkalis.

Vegetation.—The mts. of the Terr. are for the most part covered with forests up nearly to the snow-line, and the forests are largely evergreen. There are large tracts of red cedar in Kootenai and Shoshone cos. on the foot-hills and mt.-slopes. In the more S. counties there are many deciduous trees, and in some dists. vast sage-plains, the white sage being preferred by cattle to any of the grasses. There are said to be nearly 16,000,000 acres of sage lands. The river-valleys are very fertile, and though some of them require occasional irrigation they yield large crops. Agriculturally, I. is, with the exception of these valleys, better adapted to grazing than to the culture of cereals. The ordinary garden vegetables, as well as potatoes, do well in the valleys, and fruit trees generally yield fruit in great abundance and of fine flavor. There are native wild grapes of the *Vitis labrusca* or fox-grape species which ripen in the valleys.

Animals.—The grizzly bear and his congener, the black bear, are found in the forests of the Terr. The raccoon, badger, wolvenre, 2 species of skunk, the fisher-marten, the Amer. sable or marten, the mink, the panther, wild-cat or red lynx, and the banded lynx, raccoon-fox or mountain-cat, the gray wolf, the coyote or barking wolf, and 4 or 5 species of fox are found. Among the rodents, there are beavers, moles, several species of ground-squirrels and at least 3 of the tree-squirrels, the yellow-footed marmot, and at least 3 species of bat. There are 10 or 12 species of the mouse family, muskrats, gophers, one species of porcupine, and several new species of rabbits and hares. Among the ruminants there are the bison or Amer. buffalo, the moose, the elk, the black-tailed and mule deer, the Rocky Mt. or prong-horn antelope, and the big-horn or Rocky Mt. sheep. The birds are very numerous. There are 3 species of rattlesnake, 15 or 16 species of harmless snakes, 2 of tortoises, at least 15 species of lizards, 10 or 12 of frogs, several of toads, newts, etc. Fish of the usual fresh-water kinds are found in the lakes and rivers. There are also several fresh-water mollusks and testaceans.

Climate.—W. of the Rocky Mts. there is but a moderate amount of either snow or rainfall, and the climate is much milder than E. of those mts. The annual range of the thermometer in N. I. in the river and lake valleys, is said to be between 5° and 93° F., though in exceptional seasons it may surpass either boundary by 2 or 3 degrees. At Ft. Hall, 4754 ft. above the sea, in 1871 the barometric range from June to Oct. was but 24 of an inch; the mean temperature for June was 64.62° F.; of July, 70.44°; of Aug., 70.90°; of Sept., 57.79°; and of the first 18 days of Oct., 57.28°.

Agricultural Products.—Wheat and oats are the leading staples produced. The census of 1880 showed 540,589 bushels of wheat, 462,236 bushels of oats, and 16,408 bushels of corn.

Farm Animals.—Horses, 24,300; cattle, 84,867; sheep, 27,326; swine, 14,178.

Precious Metals.—I. ranks 5th among the States and Terrs.

in the order of production of gold and silver, having furnished the mints nearly \$26,000,000. The yr. 1881 showed a production of \$1,917,626 in gold and \$878,379 in silver.

Railroads.—In 1881 there were about 250 m. of R. R., the chief transportation yet being by wagon trains. The N. Pacific runs through the upper part of I., and the Ut. N. R. R. through I. into Mont.

Finances, Etc.—The taxable property was assessed in 1880 as follows: On real estate, \$2,297,526; personal, \$4,134,350; total, \$6,440,876. The Territorial debt was \$88,381; local, \$146,938; total, \$235,319.

Banks.—There is one national bank, at Boise City, with a capital of \$100,000, deposits \$320,000, and circulation \$82,850. Private banks exist in many towns.

Education, Etc.—The school returns are very imperfect for this Terr. In 1880 there were enrolled in public schools 6758 children of the school age (6-17 yrs.). The salaries of teachers employed amounted to \$33,844, and the total expenditure for free schools, \$38,812. Twelve newspapers were pub. in I. in 1882.

Churches.—The Mormon ch. appears to preponderate in I., which closely joins Ut. on the S. It claims 42 chs. and 6000 members, while the Presbs. have 4 chs. and 401 members; P. E., 4 chs. and 200 members; Meths., 1 ch. and 223 members; R. Caths., 7 chs., and Baps., Univts., Lutherans, and Dunkards, 1 ch. each.

Population.—In 1870, 14,999; 1880, 32,610 (white 29,013, colored 3597, including 3379 Chinese and 165 Indians).

Population of Principal Towns in 1880.—Boise City (cap.), 1899; Malad City, 759; Lewiston, 739; Idaho City, 672; Challis, 614; Paris, 611; Silver City, 593; Montpelier, 546; Bonanza City, 352.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Ada.....	5-A	2,675	4,674	Boise City.....	1,899
Alturas.....	5-B	689	1,893	Hailey.....	611
Bear Lake.....	6-C	.....	3,235	Paris.....	611
Boise.....	5-A	3,834	3,214	Idaho City.....	672
Cassia.....	6-B	.....	1,312	Albion.....	257
Custer.....	4-B	.....	.....	Challis.....	614
Idaho.....	4-A	849	2,031	Mt. Idaho.....	159
Kootenai.....	2-A	.....	518	Rathdrum.....	.....
Lemhi.....	4-B	988	2,320	Salmon City.....	392
Nev. Perce.....	3-A	1,407	3,965	Lewiston.....	739
Owheeia.....	5-C	1,922	6,964	Malad City.....	759
Owyhee.....	6-A	1,713	1,426	Silver City.....	593
Shoshone.....	3-A	722	469	Eagle.....	.....
Washington.....	4-A	.....	879	Weiser.....	.....
Total.....		14,999	32,610		

* Reference for location of counties. See map of Idaho.
† New county organized since census of 1880.

History.—I. Terr. formed a portion of the Terr. of Or. up to 1863. When first organized it included portions of the previous Terrs. of Or., Washington, Ut., and Neb. In 1864 its boundaries were changed, and a part set off to Mont.

Governors.

William H. Wallace.....	1863-64	John P. Hoyt.....	1879
Caleb Lyon.....	1864-66	Mason Brayman.....	1880
David W. Ballard.....	1866-67	John B. Neil.....	1880-83
Isaac L. Gibbs.....	1867-68	John N. Irwin.....	1883-84
David W. Ballard.....	1868-70	William N. Bunn.....	1884-88
Gilman Marston.....	1870-71		
Thomas W. Bennett.....	1871-75		
Mason Brayman.....	1877-78		

REVISED BY A. R. SPOFFORD.

Idaho Springs. See APPENDIX.

Ide (GEORGE BARTON), D. D., b. at Coventry, Vt., in 1806, grad. at Middlebury Coll. in 1830; became pastor of a Bap. ch. in Albany, N. Y., in 1834, of the Old Federal st. ch. in Boston in 1835, of the First Bap. ch. in Phila. in 1838, and of a ch. in Springfield, Mass., in 1852. D. Apr. 16, 1872.

Ides. See CALEND.

Idiocy [Gr. ἰδιωτης, a "private person," hence an unlettered man, and finally an idiot, or person without mental capacity], the want of a natural and harmonious development of the mental, active, and moral powers and faculties of a human being, dependent upon some defect or infirmity of the nervous organization. It varies in degree from a slight impairment of the mental faculties to complete I., which may exist with an apparent condition of bodily health, but is more commonly associated with diseased phys. states. I. is sometimes confounded with dementia, which is a loss of mental powers and faculties once possessed.

I. occurs (1) as a form of human degeneracy, or (2) as a consequence of accidental causes that have checked the laws of normal human growth. Of the former, a majority may be classed as the result of hereditary neuroses in one or both families. The intermarriage of near relatives is a not infrequent cause of I., because it intensifies the family defects in the offspring; so also any serious constitutional affection, or the intemperance of one or both parents at the time of conception, insufficient food, continued ill-health, depressing influences, or any sudden shock to the mother during gestation. Of the latter, all injuries to the brain in infancy.

From the nature of the case, most of the phys. causes of I. are not directly remediable; but in an indirect way much may be done to obviate their consequences. These phys. causes may be classed either as defects or infirmities. As a defect, there may be want of size or want of brain-capacity; a want of proper anatomical relation or connection in the elementary parts of the brain, or various abnormal modifications of its more intimate structure or organization. As an infirmity, there may be a gen. default of normal functional activity. The phys. causes of the first category cannot absolutely be removed by any treatment. Of the second class of phys. states or influences, some degree of reformation under favoring circumstances may be predicated. Rational efforts for the amelioration of the condition of idiots



resolve themselves, first, into measures of management, training, and education. In insts. for this purpose the same gen. features are everywhere seen: a gymnasium, to develop muscular power, etc.; a nursery, where the younger pupils are trained to habits of cleanliness, decency, order, and self-care; a school-room, with a complete scale of mental exercises, up to the ordinary studies of an elementary school. The same principles of education are here as in any other system of instruction, but the special adaptations of these principles to meet the peculiar needs of this class of pupils may be quite varied. Experience has established the fact that the majority of idiots of a school-attending age and condition are susceptible of marked improvement; but of some, unimprovability may be predicted at the very outset. For all such unimprovable cases there is needed another class of insts.—namely, of a custodial character. *From orig. art. in J. s. Educ. Cyn., by H. B. WILBUR, M. D.*

Idocrase (Gr. *είδος*, "form," and *κράσις*, "mixture," from its resemblances to other minerals), a mineral crystallizing in the dimetric system, and essentially a silicate of alumina and lime, with a smaller proportion of iron, and in some cases also containing magnesia, etc. It occurs chiefly in lavas, but is also met with in gneiss, serpentine, and granular limestone.

Idumæa, terr. of W. Asia, was bounded N. by Judæa, W. by the Mediterranean. It once comprised parts of Judæa as far N. as Hebron, and in Ar. the peninsula of Petraea. It was inhabited by the descendants of Esau.

Iglesias (JOSÉ MARIA), b. in the city of Mexico Jan. 5, 1823; was a prof. of Eng. and Fr. in the Coll. of San Ildefonso at 20, and at 24 a prof. of law. In 1846 he entered official life as a member of the ayuntamiento (council) of the city of Mexico. In 1850 he was made chief of a bureau of the board of public credit, which he gave up to enter the Mex. cong. in 1852. In 1855 he returned to the bureau of public credit as its chief, and in 1857 was intrusted with the portfolio of the ministry of justice. In 1863, I., following the fortunes of Juárez, was charged successively with the functions of minister of the treas., of justice, and of the interior. At the same time he wrote many papers upon foreign intervention in Mex. affairs. Upon the re-establishment of the govt. of Pres. Juárez at Mexico, I. acted as minister of the treas. until 1868, when he re-entered cong., but soon returned to the cabinet as minister of justice. In 1873 he was called by election to the post of pres. (chief-justice) of the supreme court of the republic.

Ignatius (NICHOLAS PAOLOVITCH). See APPENDIX.
Ignatius, SAINT, bp. of Antioch, who suffered martyrdom Dec. 20, 115 A. D. Bearing the name of Ignatius there are 15 *Epistles*, 8 of which (3 in a Lat. and 5 in a Gr. recension) are now generally considered spurious.

Ignatius, Loyola. See LOYOLA.

Ignatius Bean, or **Bean of St. Ignatius**, the bean-like seed of *Strychnos Ignatii*, a rather large shrub with curious vine-like branches growing in the Philippines, and belonging to the order Loganiaceæ. The seed has the properties of nux vomica.

Igneous Rocks are those which have been formed by the cooling of melted materials, as distinguished from *sedimentary* rocks, which are formed of material deposited from water, and *metamorphic* rocks, sedimentary in their origin, but much changed in character by the action of heat and pressure. I. R. are either *felspathic* or *angitic*.

Ignis Fatuus [Lat. "vain or foolish light;" Fr. *feu-follet*; Ger. *Irlicht* or *Irwisch*], a luminous meteor, appearing during summer and autumn nights in places where decomposition is going on. It is an unsteady bluish light, usually seen a few inches above the surface of the ground.

Ignorantines. See BRETHREN OF THE CHRISTIAN SCHOOLS.

Iguana [Sp.], a genus of lizards inhabiting Central and S. Amer. and W. I. These animals are of large size, often 4 or 5 ft. in length to the end of the tail, which is long, slender, compressed. The body is scaly, and provided with a prominent median fold of integument under the throat, forming a conspicuous dewlap, which is serrated in front, with large scales. Another fold along the back is similarly raised into a deeply and acutely serrated crest. They are active animals, living mostly upon trees, and are herbivorous. Their flesh is considered a delicacy. The best known species is *I. tuberculata*.

Iguanodon [from Sp. *iguana*, a species of lizard, and Gr. *ὄνυξ*, "tooth"], a genus of extinct reptiles belonging to the order Dinosauria, and found in the Wealden and Cretaceous of Europe. *I. Mantelli* was 30 ft. in length, and was perhaps the largest of terrestrial animals.

Ih-lang-Ih-lang [Tagel, for "flower of flowers"], the rich and powerful perfume of *Unona odoratissima*, a tree of the Philippines and Malay Islands. The volatile oil of the flowers of the tree is employed in making the rich handkerchief-perfume of this name.

Ilex. See HOLM OAK and HOLLY.

Ilijats, or **Ilijats**, the nomadic and sometimes predatory tribes of Per. Most of them are Mohammedans. Each tribe has a dist. or grazing-ground, for which it pays a tribute in kind, money being unknown among them.

Ilizi, or **Ilizisa**, a volcano of Ecuador, S. Amer., 10 m. S. of Quito. Its 2 peaks rise 17,380 ft.

Ilion, Herkimer co., N. Y., on the S. bank of Mohawk River, on R. R. and on the Erie Canal. Ilion Station, on N. Y. Central R. R., 70 m. from Albany, is on opposite side of river. Horse R. Rs. connect I. with Mohawk and Herkimer. It has extensive manufactures of firearms, sewing-machines, agricultural implements, etc. Pop. 1870, 2576; 1880, 3711.

Ilion, or **Ilum**. See TROY.

Illegitimate Children. See BASTARD.

Illimani, one of the highest peaks of the Bolivian Andes, 24,155 ft. high, and covered with glaciers to the height of 16,350 ft.

Illinois, il-le-noi', one of the central States of the U., lying in the upper Miss. Valley, between 36° 59' and 42° 30' N. lat. and 87° 35' and 91° 40' W. lon.; bounded N. by Wis.,



E. by Lake Mich., Ind., and Ky. S. by Ky. and Mo., W. by Mo. and Ia.; area, 56,650 sq. m. or 36,256,000 acres.

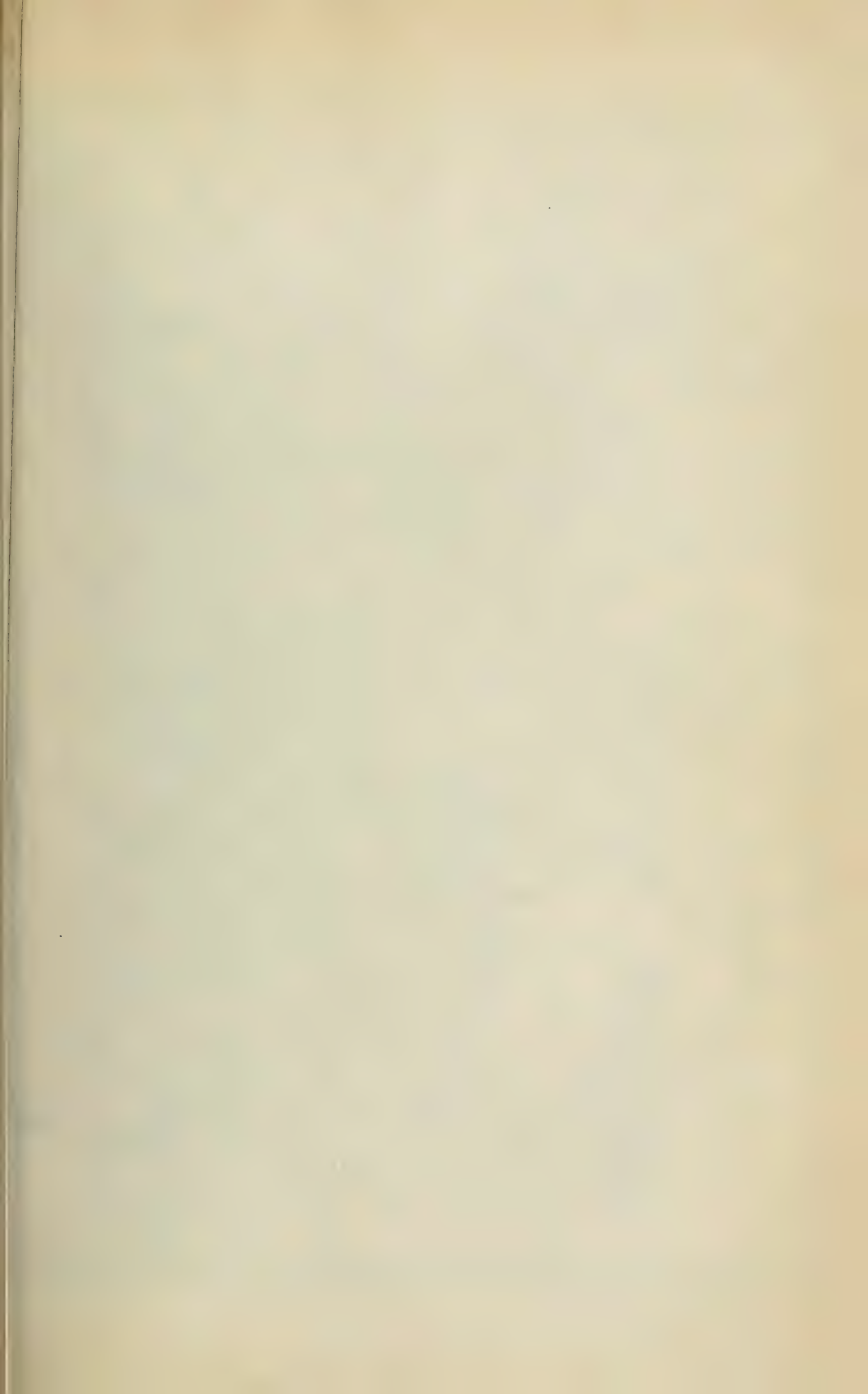
Topography—*Rivers, Lakes, Etc.*—I. is a gently inclined plain sloping from Lake Mich. toward the Miss. and O. A somewhat elevated plateau extends from Wis. into the N. W. section of the State, and another moderate elevation includes Ford and the adjacent cos.; the Grand Prairie is not more than 500 ft. above the sea, and the lowest portion of the State, at the junction of the O. and Miss., is 340 ft. above the Gulf of Mex. The State is therefore very nearly level. It is drained almost exclusively by the Miss. and its tributaries, the O. and its affluent the Wabash, the Kaskaskia, the Ill., and Rock rivers, and the smaller affluents and tributary streams of these. The Ill., formed by the junction of the Des Plaines River from Wis. and the Kankakee from Ind., is the largest river wholly within the State. Its course is nearly 500 m. in length. It enters the Miss. 15 m. above Alton. The Kaskaskia River runs nearly parallel with the Ill. for 250 m. Lake Pishtaka in the N. E. is the only considerable lake except Peoria Lake, an expansion of Ill. River.

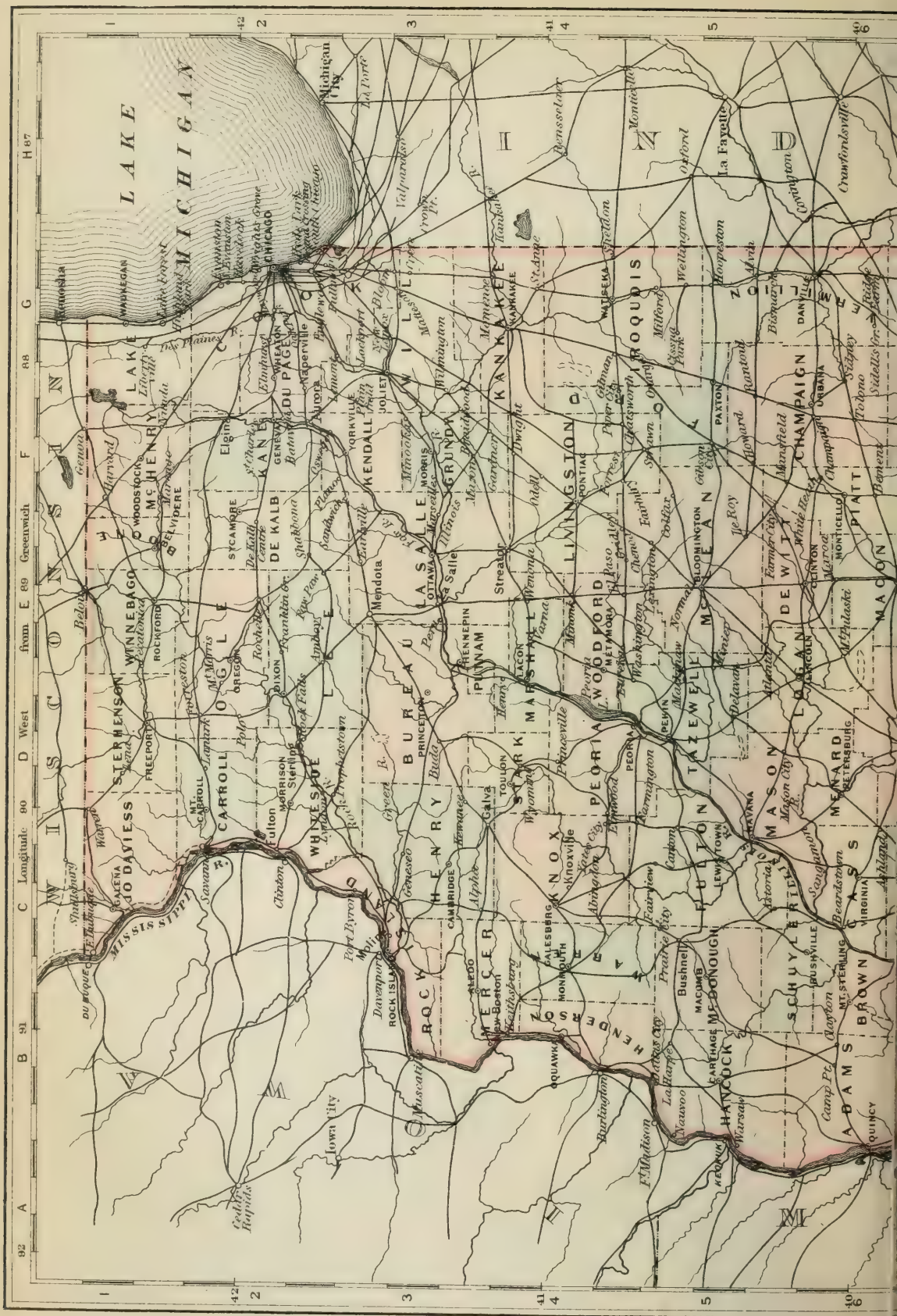
Mineralogy.—First among the minerals of the State is the coal. Its area is estimated at 45,000 sq. m. The coal is bituminous, containing from 3 to 20 per cent. of incombustible materials; in some of the mines the cannel coal predominates, in others excellent smelting coals are found. The iron ores of the State are not very valuable, though they answer a good purpose when mixed with the specular, spathic, and hematitic ores so cheaply brought into the State from Mo. and from the Lake Superior iron-region. Lead ore containing a considerable percentage of silver (argentiferous galena) is mined in large quantities in Jo Daviess co. There are fine and productive veins of copper ore in the N. part of the State. Zinc is also mined in the N. part of the State. Limestone of excellent quality, both for burning and for building, a drab freestone of great beauty, gypsum, and a fine variegated marble are among the other mineral treasures of economic value; there are salt-springs in Jackson, Vermilion, and Gallatin cos., sulphur and chalybeate springs in Jefferson co., and other medicinal springs between Ottawa and Peru.

Vegetation.—I. has a sufficiency of woodland for its present home requirements, covering a little more than 14 (16.9 per cent.) of its surface. The forest trees most abundant are oak, black walnut, sugar maple, ash, elm, locust, linden, hickory, persimmon, pecan; in the bottom-lands cottonwood, sycamore, buckeye, tulip tree, poplar, beech, and black birch prevail, and in the vicinity of the O. River yellow pine, cypress, and cedar. The prairies in the spring and early summer are carpeted with a profusion of flowers. The grasses in the rich and fertile soil attain great height. The State produces an abundance of fruit of excellent quality. The apple, peach, pear, plum, cherry, apricot, and grapes of all varieties do well, and strawberries, raspberries, blackberries, etc. are raised in great quantities.

Animals.—There are a few deer left in the State. Bears, wild cats, and panthers are very rare. The prairie wolf is occasionally found; there are some foxes, and of the rodents, the gopher, several species of squirrel, and numerous field and dormice. There are at least 2 species of hares. The wild-turkey, the prairie-hen, a species of grouse, and an abundance of other feathered game are found. The rivers and lakes abound in fish of good quality—the white-fish, the great lake-trout, black bass, catfish, and other species. The insect tribe are in their usual variety; the small number of species injurious to vegetation in some yrs. appear in countless numbers.

Climate.—In the N. portion the annual range of the thermometer is very great, the summer heat being at times intense, and the cold of winter very severe. The annual range of the thermometer in Peoria in 1859 and 1860 was 117° F. (the maximum being 104° in July and the minimum —13° in Dec.); in Riley, McHenry co., near the N. line of the State, 123° F. In 40 N. lat. the mean temperature of the yr. is about 54°; of the summer 77°, and of the winter 33° 30'. At Beloit, on the N. line of the State, the mean annual temperature is 47° 30'; at Cairo, 58° 30'. About 245 days of





ILLINOIS

MISSISSIPPI

CHICAGO

ST. LOUIS

SPRINGFIELD

CAIRO

PEORIA

QUINCY

ADAMS

BROWN

SCHUYLER

MACOMB

MC DONOUGH

HANCOCK

WARSAW

LA SALLE

ROCK

ALTON

PEORIA

SPRINGFIELD

ST. LOUIS

CHICAGO

WINNEBAGO

WOODSTOCK

MC HENRY

DE KALB

STAMBORE

ELGIN

CHICAGO

WINNEBAGO

WOODSTOCK

MC HENRY

DE KALB

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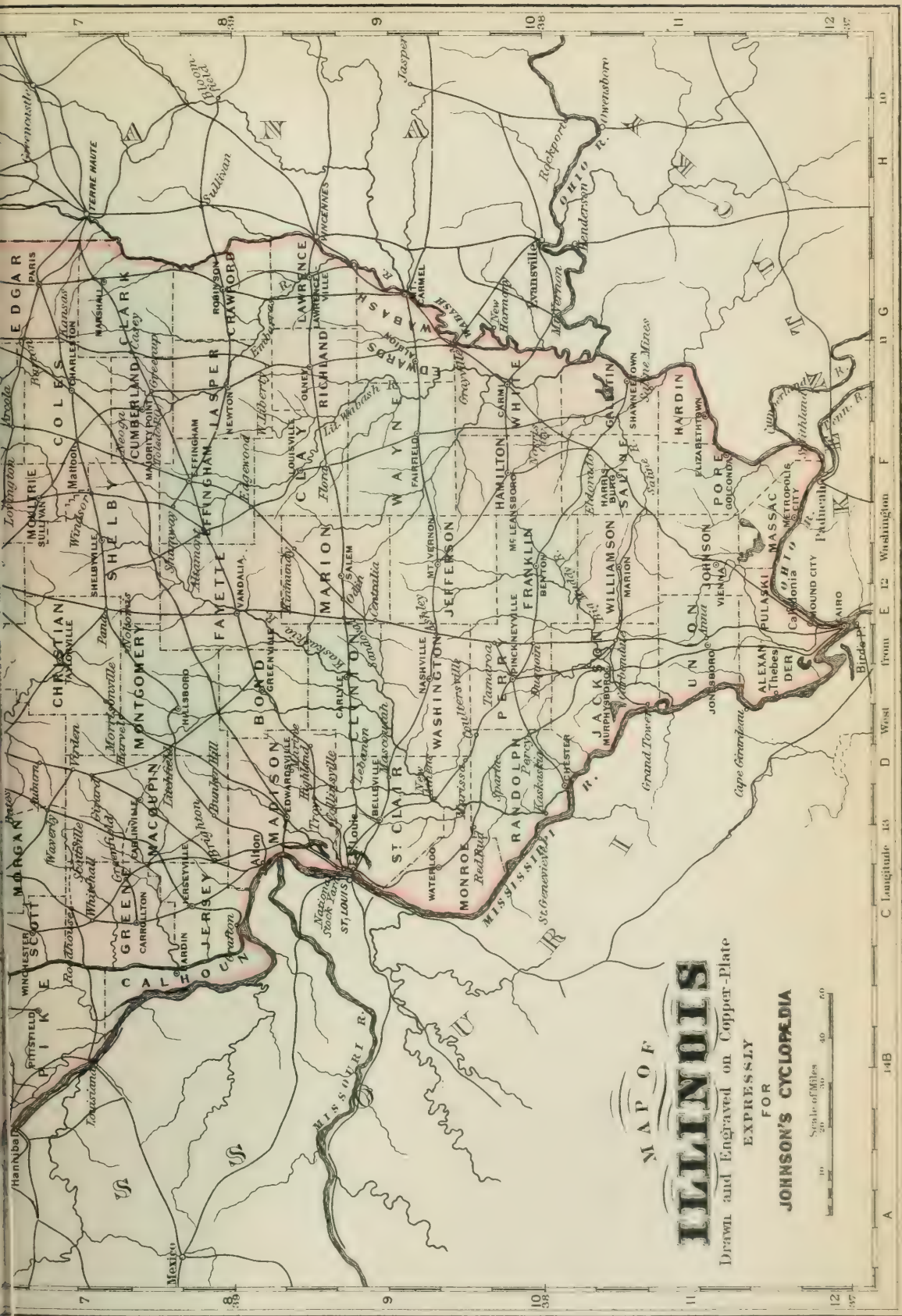
MC HENRY

DE KALB

STAMBORE

ELGIN

CHICAGO



MAP OF
ILLINOIS
Drawn and Engraved on Copper-Plate
EXPRESS
FOR
JOHNSON'S CYCLOPEDIA

Scale of Miles
0 20 40 60

A 14B C Longitude 43 D West from E 12 Washington F G H 10

ent States of Ill. and Wis. and part of Minn. The census of 1810 reported 12,282 inhabs. in this Terr. In 1818 there were 35,220 inhabs. Dec. 3, 1818, I. was admitted as a State. In 1830 it had 55,211 inhabs., and in 1830, 157,445. In 1832 the troubles with the Indians culminated in the Black Hawk war and the final removal of all the Indians from the State. Cong. granted an appropriation in 1834 for the improvement of the harbor at Chicago, and in 1835 the Ill. and Lake Mich. Canal was projected and the State bank organized. But the financial panic of 1837 fell with crushing effect upon Ill. The growth of the State in pop. continued, however, and in 1840 it had 476,183 inhabs. In 1840 the Mormons removed from Mo. to Nauvoo, in I., and, rapidly increasing in numbers, commenced erecting their temple there. From the first their lawlessness and their irregular and profligate lives had prejudiced the people against them, and as their offences became more flagrant there was manifested a very gen. determination to drive them out of the State. In June 1844 the brothers Joseph and Hyrum Smith, the leaders of the Mormons, having been arrested and confined in Carthage jail, the jail was surrounded by a mob on the 27th of that month, and the Smiths were both murdered. In the following autumn the Mormons, to the number of about 20,000, left the State under the leadership of Brigham Young, and commenced their migration to Ut. In 1845 the pop. was 643,482. In 1850 Cong. granted a vast quantity of land to the Ill. Central R. R. Co. for building their R. R. through the length of I. This gave a new impulse to the growth of the State, and has made its development more rapid than that of any State which had preceded it. A great city (Chicago) was rapidly growing up on the shores of the lake. The c. war taxed the resources of the State very severely, but her citizens responded nobly. Since 1870 she has enjoyed (except the great calamity of the Chicago fire) uninterrupted prosperity, and her growth has been rapid.

Governors.

TERRITORY.	William H. Bissell.....	1857-61
Ninian Edwards.....	1809-18 Richard Yates.....	1861-65
STATE.	Richard J. Oglesby.....	1865-69
Shadrack Bond.....	1818-22 John M. Palmer.....	1869-73
Edward Coles.....	1822-26 Richard J. Oglesby.....	1873
Ninian Edwards.....	1826-30 John L. Beveridge.....	1873-77
John Reynolds.....	1830-34 Shelby M. Cullom.....	1877-83
Joseph Duncan.....	1834-38 John M. Hamilton.....	1883-85
Thomas Carlin.....	1838-42 Richard J. Oglesby.....	1885-89
Thomas Ford.....	1842-46	
Augustus C. French.....	1846-53	
Joel A. Matteson.....	1853-57	

REVISED BY A. R. SPOFFORD.

Illinois and Michigan Canal unites Lake Mich. with the navigable waters of the Ill. River—that is to say, the Gulf of St. Lawrence with the Gulf of Mex. About 1822 Cong. granted the right of way through the public lands "for the route of a canal connecting the Illinois River with the S. bend of Lake Michigan," and in the yr. 1827 a further grant was made to aid the State in the construction of a canal. It was not until 1836, however, that really efficient measures were adopted for the prosecution of the work, which was put under contract in June 1836, and was prosecuted uninterruptedly until Mar. 1841, when operations were suspended. In Feb. 1843 the gov. was authorized by law to negotiate a loan of \$1,600,000 solely on the credit and pledge of the canal, its tolls, revenues, and lands, for the purpose of completing the work. The negotiation of this loan occupied more than 2 yrs. In June 1845 trustees were placed in possession of the canal, lands, etc., and proceeded to organize their work. The work was pushed forward diligently and successfully to its completion and opening for purposes of navigation in Apr. 1848. The cost of completing the canal and its subsidiary works fell within the estimate made by the chief engineer in the yr. 1843—\$1,429,606. This sum, added to the previous cost, estimated at \$4,740,620, exhibits the entire cost at \$6,170,226 at the opening of the canal for navigation, Apr. 1848.

Illinois Industrial University, at Urbana, opened in 1869, "to teach in the most thorough manner such branches of learning as are related to agriculture and the mechanic arts, including military tactics, and not excluding other scientific or literary studies." The Congressional land-grant amounted to 480,000 acres, most of which was sold, and the proceeds invested in interest-bearing bonds. The co. of Champaign made a donation of \$450,000 in buildings, lands, and farms. The State of Ill. has contributed nearly \$300,000. The assets of the univ. are nearly \$1,000,000. In 1871 women were admitted as students.

Illinois River, the largest stream in Illinois, nearly bisects that State. It is formed by the junction of the Des Plaines and Kankakee rivers, and flows S. W., traversing Peoria Lake, and reaches the Miss. 20 m. above the mouth of the Mo. It is navigable 245 m. by steamers, and, with the canal from Chicago to La Salle, affords an all-water route from the Miss. to Lake Mich.

Illuminati [from the Lat. *illuminatus*, "those who are enlightened"]. From early times, both in Asia and Europe, the mystics and theosophists of different religions, believing that by abstraction and devotion to God a divine light was shed on the soul, have called themselves Illuminati, or the Illuminated. About 100 yrs. ago, when the most radical theories as to govt., religion, and morals were inspiring all Europe, two ideas became prevalent—the one of a sceptical philos., which taught men that they were free to do as they pleased; and the other of occult philos., by which they learned that they might become whatever they would. At this time Adam Weishaupt, a prof. of ecclesiastical law in Ingolstadt, conceived the idea of a secret society which should unite all mankind in brotherly union, introduce justice, abolish all abuses resulting from priestcraft and aristocracy, extend education, surround kings with wise counsellors, and in short reform society. This union founded, it is said, May 1, 1776, received at first for its members the

name of Perfectibilists, and then Illuminati. Beginning with his students, Weishaupt made rapid progress. Within 3 yrs. he had lodges in Ger., Hol., and It., and thousands of adepts. The grades of initiation were those of novice, minerval, illuminatus minor and major, Scotch knight, epope or priest, regent or prince illuminatus, magus, and king. As in all mysteries of old, Weishaupt led his pupils through different grades of free thought up to complete "emancipation." A noted writer, Baron von Knigge, joined the order, and through his influence it rapidly increased. Weishaupt, who was a weak man, could not refrain from expressing to his neophytes his advanced opinions, and, moved by fear or jealousy, quarrelled with Knigge. This resulted in complete exposure, and works appeared revealing all the secrets of the order. On Jan. 22, 1784, an edict was issued for its suppression in Bavaria. Weishaupt was dismissed from the univ., and retired to Ratisbon and Halle, where he d. 1830, aged 83.

Illyricum, or Illyria, a name which at different epochs has denoted important provs. of different empires. It was in anc. times inhabited by a savage tribe, allied to the Thracians. The E. portion, corresponding nearly to the modern Albania, was conquered in 359 B. C. by Philip of Macedon. The W. portion, comprising the modern Dalmatia, Croatia, Herzegovina, and parts of Bosnia, remained independent till the middle of the century before the Chr. era, when it was conquered by the Roms. At the division of the Rom. empire both parts fell to the E. empire, but the Slavic tribes soon made themselves independent. During the Middle Ages I. was divided between the Venetians, the Hungarians, and the Turks, and the name fell out of use until Nap. in 1809 organized the Illyrian provs. and incorporated them with Fr. In 1815 these provs. were formed into a kingdom and annexed to Aus. The kingdom has since been dissolved, but the terrs. are still Aus. possessions.

Imbecility. The term imbecility, at law, follows in interpretation the etymology of the Lat. adjective *imbecillus*, from which it is derived, and means "weakness of mind." But inasmuch as its import, when applied to the admeasure of civil rights and responsibilities, is one of variable character, the law treats it as a condition of *qualified* rather than *absolute* incompetency. Hence, the acts of imbeciles, whether in the nature of contracts, wills, or torts, are always open to the suspicion of lacking a legally assenting mind, and as such the former are voidable wherever things can be restored to their previous condition. Says Mr. Justice Story: "The acts and contracts of persons who are of weak understanding, and who are thereby liable to impositions, will be held void in courts of equity if the nature of the act or contract justify the conclusion that the party has not exercised a deliberate judgment, but has been imposed upon, circumvented, or overcome by cunning or undue influence." It will be seen by this that the contracts of such persons, whether of marriage, purchase or sale, labor or hire, are not necessarily void, but simply voidable, upon proof that they were made under circumstances disadvantageous to a right comprehension of their full import by the party of weak understanding, and provided always that things can be restored to their original status. The voidability of any contract made under such circumstances will further depend upon the fact of its present condition. Is it still *executory* or is it *executed*? And if the latter, to what extent? If not completely so, and the condition of the things operated upon by the contract is not materially altered, then the contract may be annulled, and the parties restored to their previous condition. But in the case of wholly executed contracts, this redintegration of parties cannot always be accomplished without serious detriment to third and innocent parties, who have acted *bona fide* and in ignorance of the taint in the original contract. Hence, in such cases the contract will have to stand, and the injured party must seek his remedy in another way, for here equity follows the law.

In regard to *wills* made by imbeciles, whether the I. be congenital or supervene as a consequence of old age, the gen. rule is to allow the instrument to prove the capacity of the testator, and not to set it aside as void *ab initio* because executed by a person of weak understanding. Wills have been sustained where testators were very aged and greatly debilitated; where they were very deaf and partially blind; where they were so paralyzed as to be unable to write or feed themselves; and where they exhibited ridiculous eccentricities in conduct or religious belief.

As to *torts* committed by imbeciles, they are placed upon the same footing as those committed by the insane, and their estates are responsible in civil damages to any party aggrieved. Whenever the tort becomes a crime with a personal penalty affixed, then the legal responsibility of the wrong-doer will be tested by a similar standard to that applied to those partially insane. [From orig. art. in *J.'s Univ. Cyc.* by PROF. JOHN ORDONAX, M. D., LL.D.]

Immaculate Conception of the Virgin Mary, the doctrine that the mother of our Saviour was conceived and born without sin, and was consequently free from hereditary sin and guilt, as well as actual transgression. It was for a long time entertained as a pious opinion by a portion of the R. Cath. Ch., especially the Jesuits, and solemnly proclaimed as an article of faith by Pope Pius IX. Dec. 8, 1854. (See SCHAFF'S ART. in *J.'s Univ. Cyc.*)

Immortality (of the Soul), the doctrine that the human soul is imperishable, being separable from the body at death and destined to a conscious life beyond the grave. The hist. of this doctrine is the hist. of the development of the idea of substantiality, or, indeed, of the idea of God. Without a personal God there could be no I. If the substantial is found to be a rigid, lifeless substance or an unconscious force, there can be no persistent individuality. But, in spite of philosophical or theological tenets, the belief in a future life is almost universally prevalent. Among degraded savages, as in Central Afr., it takes the form of de-

monology, or belief in spectres or ghosts. In Asia, where the theological dogmas do not reconcile the Universal or Absolute with the existence of the individual being, making the Supreme Being an unconscious substance destined to absorb the individual man at death, still the popular belief holds to the doctrine of I. Egypt is especially noted as the country where great stress was laid on the doctrine of I. I., with Gr. and Rome, assumed a definite shape, elevated far above the Oriental conception, inasmuch as it eliminated the principle of transmigration. But there was not an adequate realization as yet of the principle of infinite responsibility, which the Chr. religion first added to that of the immortal destiny of the soul, making man, moreover, the object of divine mediation. The growth of the idea of the substantiality of the soul is marked in the world's hist. by the corresponding growth of insts. of a humanitarian character. (See MIND, SOUL, PHILOSOPHY.) W. T. HARRIS.

Immortelles' [Fr. "immortal"], or **Everlasting Flowers**, are flowers largely employed, especially in Fr., for the manufacture of wreaths and crosses for the adornment of chs. and cemeteries. *Helichrysium Orientale*, a native of Crete, but much cultivated in S. Fr., is chiefly used, but others are also occasionally employed.

Impeachment, in law, is commonly used to denote a mode of trial of a criminal offence. The same word is used in the law of evidence to mean the act of discrediting a witness before a jury or court trying a question of fact, by showing that he is unworthy of belief. In this article it will be employed exclusively in the sense first pointed out.

In the early Eng. law when a crime was committed it was regarded in 3 aspects—either as an injury to the individual or his family, to the king, or to the state or nation. The injury to the individual was prosecuted by a proceeding called an appeal; that supposed to be done to the king or executive officer, by indictment; while the wrong done to the state was redressed by a proceeding termed an impeachment. The appeal having become obsolete, there remained 2 great criminal proceedings—indictment and I. The office of an indictment is to present to an ordinary court of justice the opinion of a select body of citizens that there is apparent reason to believe that there has been a criminal violation of law by a specified person. Notwithstanding this, the law still presumes his innocence, and takes no action against him except that which is necessary to secure his attendance at the trial. Ultimately, the case is presented to another (or trial) jury, by whom the result is determined, either acquitting or convicting the person charged in the indictment. The same gen. train of thought is present in the case of an I. Instead, however, of being made by a small number of persons, it is a presentment of the House of Commons as representing the state. It is made in writing under the name of "articles of impeachment." The articles are presented before a tribunal acting judicially—not, it is true, an ordinary court of justice, but the entire House of Lords. The Commons may impeach for any crime, whether it be a felony or misdemeanor, no matter by whom committed, whether a peer or commoner, and may attach to conviction the ordinary punishments.

One of the most important questions connected with this whole subject is, whether an I. can be had where the act is of such a nature that it cannot be prosecuted by indictment. Can an I. be had for any act unless it constitutes a crime against the gen. law of the land? Can this mode of trial be extended to mere acts of indecorum having no fixed criminal aspects? Crimes may, of course, exist either by the rules of the common law or by statute. Can there be an I. in the absence of any form of crime? If this question is to be decided by the rules of the Eng. law, it would have to be said that principles and precedents are both opposed to an I. except for a crime. This subject has assumed great importance in recent trials by I. in the U. S. I. as used under Amer. law does not have so wide a scope as in Eng. The object of the trial here is to reach official delinquency, and to remove the offending officer from office or to impose a permanent disqualification upon him. It is, however, conceived that this does not vary the case. The I. is still for a crime; the officer is to be removed or disqualified because he has committed an act in the nature of a crime. On no other theory can there be a strictly judicial proceeding.

In the const. of N. Y. of the yr. 1777 I. and indictment are coupled together, as if they were deemed to be only different modes of trial of the same offence; "In every trial on impeachment or indictment for crimes or misdemeanors the party impeached or indicted shall be allowed counsel as in civil actions." (Art. 34.) In the U. S. const. it is "declared that the President and other civil officers of the U. S. shall be removed from office on impeachment for and conviction of treason, bribery, and other high crimes and misdemeanors." (Art. 2, § 4.) Who can doubt that the words "treason" and "bribery" are here used to mean specific crimes. According to all ordinary rules of construction, the words "other crimes" must have a similar application.

Mode of Procedure.—When an I. is resolved upon in Eng., a member of the House of Commons usually rises in his place and makes a charge of crime, which he supports by proofs, and then moves for an I. If this motion is sustained, the member is ordered to go to the House of Lords in company with others to institute the I. Written articles are subsequently presented. In this country the I. is commonly brought forward by the report of a committee of the more popular branch of the legislature. Assuming that articles of I. have been prepared, and an answer received and reply made if necessary, a day is fixed for the trial of the cause. The court in Eng. is organized with much pomp and solemnity. Under the U. S. const. the House of Reps. presents the I. The trial is had before the Senate, except that when the Pres. of the U. S. is tried the chief-justice of the supreme court presides, the V.-P. in that case not sitting. The Senators acting as a court of I. are required to take an oath or affirmation. In rendering judgment each member, rising in

his place, votes guilty or not guilty upon the respective "articles of impeachment" presented by the House of Reps. Two-thirds of the members present must concur to insure a conviction. The Pres. is deprived of the power to pardon.

In the various States of the U. it is the common practice to provide in their respective const. for the organization of a court of I. to try State officers. In the main, the gen. outlines of the clauses of the U. S. const. are followed. The more popular branch of the legislature presents the I., while the upper house or senate tries it. In N. Y. the judges of the court of appeals and the lieut.-gov. are joined with the senate, though the latter officer does not sit when the gov. is impeached. Some of the States provide expressly in their const. for the suspension of officers from office when on trial. In some there is a requirement that the chief-justice of the supreme or other high court shall preside when the gov. is tried. Recent I. in the U. S. are that of Andrew Johnson, Pres. of the U. S., 1868, and George G. Barnard, judge in New York, 1872. Earlier cases were the I. of William Blount, a Senator of the U. S., 1797; that of Samuel Chase, associate justice supreme court U. S., 1804, and that of John Pickens, dist. judge of N. H., 1803. T. W. DWIGHT.

Imperator [Lat. "commander"]. During the entire existence of the Rom. republic, the title *imperator* had a meaning very different from that of the modern term "emperor." Originally it meant nearly the same as "captain" or "general," and the soldiers who on the battle-field acclaimed their leader *imperator* meant only to express their belief that he was worthy to exercise command. The concentration of power in the hands of Augustus and his successors was exercised not by virtue of that title, but by accumulating in the hands of a single individual the additional offices of consul, proconsul, tribune, pontifex maximus, and censor; the attribution of all these powers to an *imperator* is a later idea.

Impeyan Pheasant, the *Lophophorus impeyanus*, a fine large pheasant from the Himalayas, is nearly as large as a turkey, splendidly colored, and has been domesticated. It is a native of the high, cold regions of the Himalayas.

Impressment, in Eng. law, is the forcible levying of mariners in time of war for the king's service at sea. It was formerly the usual method of manning the Brit. navy, and a similar procedure was employed by other maritime powers. The mariners were seized by an officer acting under an impress-warrant, and having under his orders an armed party (the press-gang). A merchant-vessel was liable to be so depleted of sailors as to be crippled for all practical purposes. The laws sanctioning I. are still unrepealed, but the system of bounties has practically taken its place.

Imprisonment. See FALSE IMPRISONMENT.

Inachus, in Gr. mythology, the god of the river Inachus in Argos, who in the dispute between Poseidon and Here about the possession of Argos decided in favor of the latter, and hence was deprived of his water by Poseidon and made dry except in the rainy season. In other places I. is referred to as the first king of Argos, who after the flood of Deucalion led the Argives from the mts. down into the plains.

In'ca [a Quichua word, signifying "chief"], in its strictest sense, designates the absolute monarch of the anc. Peruvian empire, who was also chief priest and the recipient of divine honors. In a larger sense, the whole ruling and sacerdotal caste of anc. Peru were called I. It is claimed by certain S. Amer. Indians that the old blood-royal is still preserved.

Incar'nate Word, Ladies of the, a congregation of nuns founded 1625, approved by the pope 1633. Their work was at first one of instruction, but in 1866 they assumed the care of hospitals.

Incarn'ation [Lat. *in*, and *caro, carnis*, "flesh"], a term applied in gen. to the presence of deity in a mortal form; theologically, to the union of God and man in the person of Christ. That Christ might be given to the world 2 principles were united—the Holy Ghost from heaven, the Virgin Mary on earth. Through his conception by the Spirit he was entirely holy, "perfect God;" through his human birth he had capability for all human infirmities except sin, being "perfect man."

Incense [Lat. *incendo*, to "burn"], a substance burned for the fragrance of its smoke, and used in the performance of a religious ceremony. The anc. Egyptian, the Heb., and other religious ceremonials made use of I.-burning. The R. Caths. and some of the E. chs. use I. in their services.

Inclined Plane, in mechanics, one of the mechanical powers by which a smaller force acting through a greater distance is enabled to overcome a greater force through a smaller distance.

Inclined Planes for Canals: for raising and lowering boats from one level to another on a canal, as substitutes for lift-locks. The plane consists of an ordinary railway track of wide gauge leading from the lower to the higher level or pool to be connected. The boats are carried up or down the plane on wheeled carriages running on the railway track. The carriages are moved by an endless wire rope attached to a winding drum operated by a turbine motor. The turbine is operated by a head of water taken from the upper pool. The economy of these planes is in their cost, in time saved on lockage, and in expenditure of water. A single-track carriage-plane for a lift of 64 ft. costs about $\frac{1}{2}$, and a double-track plane about $\frac{3}{4}$ as much as 8 locks of 8 ft. lift each. The cost of caisson-planes is about twice as much as for carriage-planes of equal height. A boat can be passed over a plane of this height in about the same time occupied in passing a lock of 8 or 10 ft. lift. The most effective economy is in the use of water. In a mountainous country, where the inclination of the valley to be followed by the canal is great and the water-supply not abundant, a great saving in cost of construction, in time of transit, and in expenditure of water for operating the canal can be made by the use of I. P.; also an increase in tonnage capacity. Carriage-planes, varying in height, are

in use in the U. S. and Europe, and Capt. Eads urges their adoption, instead of a ship-canal, for the transit of the Isthmus of Panama. [*From orig. art. in J.'s Univ. Cyc. by THOMAS S. SEDGWICK.*]

Income Tax, a form of direct tax based upon the actual annual income of individual citizens. Theoretically, it is the most equitable of all taxes, according most fully with the generally accepted maxim of Adam Smith, that "the subjects of every state ought to contribute to the support of the government as nearly as possible in proportion to their respective abilities; that is, in proportion to the revenues which they respectively enjoy under the protection of the state." The chief objection to an I. T. is the difficulty, almost impossibility, of ascertaining men's real incomes; partly because many keep no accurate accounts, and partly because few, comparatively, will make truthful report of their incomes, and the inquisitorial nature of the tax is offensive. In G. Brit. an I. T. has been levied since 1842, which yields nearly $\frac{1}{4}$ of the annual revenue of the kingdom. In the U. S. an I. T. was collected from 1863 to 1872. In 1866 about \$61,000,000 were collected from 460,170 persons assessed. A. L. CHAPIN.

Incorporeal Hereditaments. See HEREDITAMENTS, INCORPOREAL. by PROF. T. W. DWIGHT, LL.D.

Incubation. See HATCHING.

Incumbrance, or **Encumbrance**, a burden, impediment, a hindrance; in law, a legal claim on an estate, for the discharge of which the estate is liable. The term is a gen. name for liabilities by which an estate in lands and hereditaments may be burdened, such as mortgages and annuities.

Indenture. See DEED. by PROF. T. W. DWIGHT, LL.D.

Independence, The, of the U. S. of America. See DECLARATION OF INDEPENDENCE.

Independence, city and R. R. junc., cap. of Buchanan co., Ia., on the river Wapashippin, 65 m. W. of Dubuque. It is the seat of a State insane asylum, of which the buildings cost nearly \$1,000,000. Pop. 1870, 2945; 1880, 3128.

Independence, on R. R., cap. of Montgomery co., Kan., 134 m. S. by W. of Lawrence and on the river Verdigris. It was founded in 1870. Pop. 1870, 435; 1880, 2915.

Independence, city and R. R. junc., cap. of Jackson co., Mo., 10 m. E. of Kansas City, with which it is connected by R. R. It is 3 m. from the Mo. River, and is the seat of 2 colls. It was for many yrs. the head-quarters of the overland routes to Or., Cal., N. M., etc. Founded 1827. Pop. 1870, 3184; 1880, 3146.

Independence of States implies their internal self-govt., and performance of all international acts. Thus, no State in our U. is absolutely independent. T. D. WOOLSEY.

Independents. I. *Political*.—A politico-religious party in the time of the Commonwealth of Eng. The conflict which became a c. war in the reign of Charles I. was, politically, a conflict between a king who thought himself a sovereign by divine right with absolute power, and a people determined to maintain their inherited liberty and to guard it with new securities. But the political questions of the time were intimately blended with religious and ecclesiastical questions, which had been agitated for a hundred yrs. As the conflict proceeded, the Puritan or reforming party became almost identical with the political party opposed to absolutism in the state, and the court party, devoted to the king, became the conservative party in the Ch. When the conflict had become a war between the king and the Parl., and especially after "the Solemn League and Covenant" between the Puritanism of Eng. and that of Scot. (1642), diversities of opinion as to the future const. of the Ch. of Eng. began to be important in their relation to public affairs. It was assumed that the desired reformation of the national Ch. was to be effected by the authority of the nation. Parl. convened an "Assembly of Divines," who were to consider such matters only as might be referred to them by the Parl., and to give advice which the Parl. might accept or reject. Diversities of opinion developed parties both in the Assembly and in the Parl. Some had for their ideal a reduced episcopacy, with a liturgy expurgated in the interest of Protestantism. Others desired to see the national Ch. governed after the fashion of the Reformed chs. on the Continent and in Scot. Still another party had heard of "the New England way," and had learned to recognize no other ch. govt. than that of voluntary chs. self-governed under Christ and mutually independent. Those who preferred that "New England way" to the scheme of a reformed and purified national Ch. were known as *Independents*.

In the strictly ecclesiastical use of the name, the I., differing from the Presbs. not on doctrinal points, but only on ch. govt., were a small minority. Their demand was not that their ecclesiastical system should be established by law and all others suppressed, but only that the chs. which they were constituting by voluntary agreement might be tolerated. Politically, however, they became a numerous and powerful party. All the "sects and schisms" were counted with the same party, and the army was full of them. What had been the great Puritan party, intent on the reformation of the national Ch. and the vindication of Eng. liberty, was divided and broken up. On one side were the Presbs., zealous for uniformity of doctrine and discipline, and for uniformity of ritual. On the other side were the I., including all those who thought that an ecclesiastical govt. of Eng. by presbyteries and synods might be as irksome as that which had been so lately abolished. Puritanism had become Presbyterianism, and, the king and his party being vanquished, it found a new antagonist in the party of the I. When the control of affairs in the name of the Parl. had passed from the Presbs. to the I., the king, who had been for some time a prisoner, was brought to trial before a commission constituted for the purpose, was condemned to death, and was beheaded (Jan. 29, 1649). For that transaction the I. as a party were responsible.

The attempt of the I. to convert Eng. into a republic was

the attempt of a minority against the will of the majority. Of the 3 parties into which the Eng. nation was at that time divided, the I. were numerically the weakest. The most numerous party was the Presbs., animated with zeal for a national Ch. and for religious uniformity, but abhorrent of that religious liberty which the republic was to establish. Only less numerous was the party which, having adhered to the king, retained its sympathy with the lost cause, and which favored an episcopal rather than a presbyterian govt. over the national Ch. These 2 parties agreed in desiring a national Ch., together with the old govt. by king, lords, and commons; they also agreed in hating and fearing the I.

In the 5th yr. of the Commonwealth the republican Parl., derisively called "the Rump," was working at a bill for its own dissolution, and was endeavoring to provide such arrangements for the election of its successor as would secure the ascendancy of its own party, when it was dissolved and dispersed (1653) by the military power which had made it what it was. Then followed the Protectorate of Oliver Cromwell, who attempted in another way what the statesmen of the Rump were unable to do. Had his reign been prolonged, the vigor and splendor of his govt. might have reconciled the Eng. people to that principle of govt. which first made the I. a political party, but which was so abhorred by the Presbs. that to escape from it they aided in the restoration of Charles II.

II. *Ecclesiastical*.—A religious body in Eng. holding that every stated congregation of Chr. believers associated for worship and for mutual watchfulness and helpfulness in the Chr. life is a complete Ch., dependent for the exercise of ecclesiastical functions on no authority exterior to itself. The most considerable difference between Independency in Eng. and Congregationalism in the U. S. is that in the former the principle of the fellowship and mutual responsibility of chs., though recognized, is not so fully developed and made practical as in the latter. The ecclesiastical hist. of Eng. gives no definite trace of a Ch. constituted on the platform of Independency earlier than 1567. More than 10 yrs. later, Robert Browne, a clergyman of the Established Ch., began to urge the duty of falling back upon the original const. of Chr. societies as deduced by him from the N. T. His followers were called "Brownists," though Browne had deserted them. They were also called "Barrowists," from Henry Barrowe, one of their martyrs. At a later date (in the time of the Long Parl.) they began to be called Independents, and they accepted the name. The I. or Congregationalists in G. Brit. and the Brit. colonies have more than 3000 chs. Excluded till within a few yrs. past from the univs., they have established colls. of their own for the classical and theological education of their ministers, and their colls. in Eng. are now affiliated with the Lond. Univ. Several journals, weekly and monthly, are conducted in their interest. [*From orig. art. in J.'s Univ. Cyc. by LEONARD BACON, D. D., LL.D.*]

Indeterminate. A mathematical quantity is said to be *indeterminate* when it admits of an infinite number of values. An equation is said to be *indeterminate* when the unknown quantities that enter it admit of an infinite number of values. A problem is said to be *indeterminate* when it admits of an infinite number of solutions. A problem will be I. when the number of independent conditions is less than the number of required quantities, for in that case the number of equations that express the imposed conditions will be less than the number of unknown quantities; the equations of the problem will therefore be I., and consequently the problem itself will be I. Thus, the problem in which it is required to find a point from which the tangents to 2 given circles shall be equal is I.; the solution of the problem shows that there are an infinite number of such points, which, taken together, make up a straight line called the radical axis of the 2 circles. W. G. PECK.

Indeterminate Coefficients. An identical equation is an equation that is true for all values of the unknown quantity or quantities that enter it. In every such equation the unknown quantity or quantities are indeterminate, and the coefficients of the different powers and combinations of powers of these quantities are called *indeterminate coefficients*. If an identical equation containing any number of unknown quantities is cleared of fractions, the coefficients of the like powers and combinations of powers in the 2 members are respectively equal to each other. This is the principle of *indeterminate coefficients*; it is much used in developing quantities into series and in resolving fractions into partial fractions. W. G. PECK.

Index Librorum Prohibitorum. This title is applied to official lists issued from time to time, under papal authority, by the Congregation of the Index at Rome, enumerating books, single sheets, engravings, and other printed matter the use or even possession of which is forbidden by the Ch. The proscription of books deemed heretical in religion, seditious in politics, or corrupt in morals, is a practice of anc. date. Not to speak of examples under civil govts., we find that as early as the 5th century the works of Arius were publicly burned by the authorities of the Ch., and the writings of other heretics met with the same fate at different periods in the course of the Middle Ages. The right of prohibiting the use of such books is a necessary incident of the gen. authority claimed by the Romish Ch. over the consciences of the faithful, and not only popes and councils, but inferior spiritual directors and confessors, have exercised it at all times.

The earlier I. furnish some interesting contributions to literary hist. by fixing the date of the original publication of books condemned, and by giving titles of works no copies of which are now known to exist. At the same time they illustrate, by what they insert and what they omit, the fluctuations of religious tendency in the Catholic Ch. itself; but the value of all this information is diminished by the vagueness of the indications, which are often so bald that we cannot identify the book intended. GEORGE P. MARSH.

India: ITS GEOGRAPHY AND ETHNOLOGY, ITS LANGUAGES AND LITERATURE OTHER THAN SANSKRIT, AND ITS HISTORY. India, a large peninsula of S. Asia, otherwise called "The East Indies," and "Hindustan." Hindustan means "the country of the river Indus, the fertilizer."

Geography.—The I. of the present day extends from Peshawar, a frontier town in the N. W. of the Peninsula, to the Burmese river Salwin in the E., and from the Himalayas in the N. to Cape Comorin in the S. It is divided into Hither and Farther I.—that portion to the W. and that portion to the E. of the Ganges. Hither I., India within the Ganges (Hindustan), is that portion which monopolizes our attention. The rest consists of the Indo-Chi. peninsula and the islands of the Indian Archipelago. Including Farther I., the extent of I. from W. to E. is about 1600 m., and from N. to S. about 2000 m. I. contains about 1,470,207 sq. m. Of Brit. I. the entire pop. is 252,541,210.

PROVS. and STATES.	BRITISH INDIA.		NATIVE STATES.		TOTAL.	
	Area, sq. m.	Population.	Area, sq. m.	Population.	Area, sq. m.	Population.
Govt. of India—						
Ajmere	9,711	453,075	.....	.....	9,711	453,075
Benar	17,711	2,670,982	.....	.....	17,711	2,670,982
Coorg	2,000	178,283	.....	.....	2,000	178,283
Mysore .....	.....	29,325	4,166,399	.....	29,325	4,166,399
Cent. India States .....	.....	89,098	9,200,881	.....	89,098	9,200,881
Hyderabad .....	.....	90,000	9,167,789	.....	90,000	9,167,789
Munnipar .....	.....	7,584	126,000	.....	7,584	126,000
Rajputana .....	.....	130,989	11,005,512	.....	130,989	11,005,512
Baroda .....	.....	4,399	2,154,469	.....	4,399	2,154,469
Bengal	156,200	86,502,807	37,988	2,328,440	194,188	88,831,247
Assam	45,202	4,815,157	.....	.....	45,202	4,815,157
North-West Provs.	81,403	32,699,436	.....	.....	81,403	32,699,436
Rampore .....	.....	945	545,152	.....	945	545,152
North Garhwal .....	.....	4,180	200,523	.....	4,180	200,523
Oude	23,992	11,407,625	.....	.....	23,992	11,407,625
Punjab	104,975	15,794,260	.....	.....	104,975	15,794,260
Native States .....	.....	.....	114,742	3,853,282	.....	3,853,282
Central Provinces	84,208	8,201,519	29,112	1,049,719	113,320	11,505,149
British Burmah	88,556	3,707,646	.....	.....	88,556	3,707,646
Madras	138,559	30,839,181	.....	.....	138,559	30,839,181
Travancore .....	.....	6,730	2,401,158	.....	6,730	2,401,158
Cochin .....	.....	1,361	600,278	.....	1,361	600,278
Bombay	67,833	13,978,488	.....	.....	67,833	13,978,488
Sindh	56,632	2,404,924	.....	.....	56,632	2,404,924
Native States .....	.....	.....	71,769	6,941,631	.....	6,941,631
Total	870,379	190,653,483	608,222	52,761,233	1,470,207	252,541,210

* Details have not been received in these cases, and the figures of the last census are retained; hence the totals do not tally.

British Hindustan is made up, first, of dists. under the sway of Brit.; secondly, of a few scattered ports and tps. belonging to other European nations; thirdly, of protected states; and fourthly, of allied independent states. The whole country is divided into 3 presidencies—that of Bengal, cap. Calcutta; that of Madras, cap. Madras; that of Bombay, cap. Bombay. Bengal is under a lieut.-gov., but his powers are limited. The N. W. Provs., cap. Allahabad, are also under a lieut.-gov. The Punjab has also its lieut.-gov. Oude is under a chief com., as is also Mysore. Indore, in Central I., is under an agency. The Central Provs. are under coms. Rajputana is governed by a political agent. The following are the titles of the rulers of the 12 prin. feudatory states in I.: The nizam of Hyderabad, maharajah scindiah of Gwalior, the gaikwar of Baroda, maharajah of Jeypur, maharajah of Travancore, maharajah of Cashmere, maharajah of Joodpoor, the holkar, the begum of Bhopal, maharajah of Puttiala, maharajah of Oodeypore, and maharajah of Bhurtpore. The island of Goa, with a scrap of the mainland, belongs to the Port. The Port. possessions have an area of 1086 sq. m. and over 407,712 inhabs. The Fr. possess 5 settlements in I., with an area of 178 sq. m. and a pop. of 271,460. They are (1) Pondicherry, on the Coromandel or E. coast; (2) Karikal, close to Pondicherry; (3) Yanam, in Orissa; (4) Chandernagore, in Bengal; and (5) Mahé, on the Malabar or W. coast. Hindustan is remarkable for the height of its mts., the breadth of its plains, and the size of its rivers. The Himalayas stand supreme among the mts. of the world. The highest peak in them (Mt. Everest, in Nepal) reaches 29,002 ft. The other prin. mt.-ranges are the Vindhya, which extend through the N. W. Provs.; the E. and W. Ghats, which, running southward, continue their united course to Cape Comorin; the Suleiman and Hala Mts., on the N. W. frontier; the Satpoora Hills; the Rajmahal Hills; and the Garrows, to the E. of Bengal. The great rivers are the Indus, the Ganges, the Brahmapootra, the Nerbudda, the Taptee, the Mahanuddee, the Godavary, the Kistna, the Pennar, the Palār, and the Cauvery. The tributaries of the Indus are the Cabool and the 5 rivers which give its name to the Punjab—the Jhelum, the Chinab, the Ravi, the Bias, and the Sutlej. The tributaries of the Ganges are the Jumna and 15 other rivers of large size. The peninsula of I. is crowded with cities of great size, fertile plains, deserts such as that of Rajputana, and inaccessible jungles. Roughly speaking, in all I. there is only one European to 3500 natives. The W. coast of the Peninsula, washed by the Indian Ocean, is called the Malabar coast; the E. shore, washed by the Bay of Bengal, is called the Coromandel coast. The line of greatest heat is said to pass through the city of Madras. The heat of Bengal proper and the S. parts of the Malabar coast is moist and enervating, and the climate often malarious. As the peninsula narrows southward, it becomes more open to and affected by the sea-breezes, and its climate consequently becomes more equable. All through I. in the hill-ranges, are delightful sites for stations, where the climate is balmy and temperate. In these hill-ranges, tea, coffee, and cinchona cultivation is rapidly extending. Everywhere throughout I. a network of roads is being spread, and canals and railways are opening the country in every direction. The number of miles of railway completed is 9325. The total amount of capital expended up to March 31, 1880, was

£129,098,964. The net receipts were £5,907,422, including £586,101 from state lines. The foreign trade is practically concentrated at the 5 prin. ports in the following proportion: Calcutta, 42.95; Bombay, 38.16; Madras, 4.98; Rangoon, 5.04; Kurrachee, 1.85. About 78½ per cent. of the merchandise and all the treasure passed through the canal, in 1067 vessels, averaging 1507 tons each; 53.8 per cent. of the trade of the United Kingdom, Chi. coming next with 14 per cent.; Fr. took about 5 per cent.; the U. S., 3½; It., 2½ per cent. The coasting trade received a great stimulus on the outbreak of the famine in 1876-77, the total value for the 3 yrs. ending 1877-78 being 31½, 48, and 68 millions sterling. The grain thrown into Madras and Bombay during 1877-78, mainly from Bengal and Burmah, amounted to 1,161,990 tons, valued at £12,427,221, or 44 per cent. of the total imports of merchandise. Of the internal trade no complete returns have been made, but as the bulk of production is consumed in I. itself, it may be set down as far larger than the external trade. Commerce is promoted by numerous fairs all over I., and a considerable trade is carried on by native traders with countries over the frontier.

ETHNOLOGY.—The ethnology of I. may be treated of under 3 heads—viz. the Aryan, the Kolarian, and the Dravidian.

I. *The Kolarians* are undoubtedly Indian aborigines, not of the Dravidian stock. Their langs. are of the rudest description. Lit. they have none. Many of the more civilized of these scattered tribes speak Hindi and other Aryan dialects. As a rule they practice most degraded customs, some living almost entirely naked.

II. *The langs. other than Sans. of the Aryan inhabs. of Hindustan* are 7—viz. Sindhi, Punjaubi, Marathi, Gujarati, Hindi, Oriya, and Bengali. Hindustani, or Urdu, is Hindi plus a great deal of Per.; it is the *lingua franca*, so to speak, of Hindustan. Each one of these 7 vernaculars is based on the Prakrits of the Sans. In the composition of each of these dialects we have 3 elements: (1) words the same as Sans. words; (2) words like Sans.; (3) a number of non-Aryan words. Sindhi is the most north-westerly of the modern Aryan dialects of I., the roughest, and least Sanskritized. The first prov. in I. which was conquered by invaders from the N. W. was undoubtedly Sindh, and next the Punjab. It was in these provs. that Mohammedanism was rooted the earliest. Brahmans, from the earliest times, appear to have avoided these 2 provs. to a considerable extent. So we learn that the earliest Prakrits spoken in Sindh were noted for their corruptness. The whole land from the earliest times appears to have been in a state of chronic convulsion; in such a case little time could be devoted to the improvement of the lang., and so Sindhi is still a rough and in many ways an anomalous lang. Sindhi has 3 dialects—the Sirai, in the N. of Sindh; Vicholai, in the central parts; and Lari, in the S. and along the sea-coast. It has very little lit. and no fixed system of writing. We pass on to Punjaubi. Mohammedan power was consolidated in the Punjab 400 yrs. before such was the case in the lands where Hindi is spoken. Thus, the Prakrit had less time in its infancy to become trained, and the Mussulman invaders found a more virgin soil to plant their own idioms. Yet the Punjaubi of the present day is an old Hindi dialect. The character in which Punjaubi is written is called *Gurmukhi*. As for its lit., it is very scanty. Nanak, the religious reformer and founder of the Sikh creed, is the earliest author in the lang. We next come to Marathi. It is an elegant and cultured tongue. Mahratta Brahmans took care of the lang. in its infancy, and the wave of Mohammedan invasion was somewhat late in sweeping over the country where it had its central hold. Marathi contains many Sans. words, and is a pleasing, fluent tongue. In structure it is comparatively complicated. Its phraseology is copious and beautiful. In every part the lang. shows the effects of the labors of learned pundits who worked for centuries to beautify and polish it. The lit. of the lang. is copious. We pass on to Gujarati, which has a greater admixture of Arabic and Per. in it than Marathi has. It is a dialect of the Sauraseni Prakrit, and as a lang. is only partially developed. Of late days Gujarati is becoming more and more employed as a commercial lang., especially by the Parsees of Bombay, and thus it is becoming rapidly impregnated with foreign phrases and idioms, to the detriment of the purity of the lang. The Gujarati of the present day is strikingly similar to that lang. when it was first written. We now come to Hindi. This lang. is the first of the modern Aryan langs. of I. It is spoken in the great valley of the Ganges from the source of the Jumna to Rajmahal. Hindi holds the central position of all of the Aryan langs. of I., and the country in which it is spoken has ever been the centre of Aryan Hinduism. Hindi is to modern I. what Sans. was to the anc. The central seat of Hindi itself has ever been Delhi. The multifarious strength of Hindi is owing to the fact that the great central area of I. in which that lang. is spoken has always been occupied by Hindus and Mussulmans, in tolerably equal proportions; thus, while Sans. has not been forgotten, Arabic and Per. words have been allowed to enrich the vernacular. Of the 7 modern Aryan langs., Hindi is the most advanced, as it shows the most marked rise from the synthetical to the analytical state. The date of the earliest Hindi poem is A. D. 1200. It is a famous one—viz. the *Prithiraja Rasan* of Chand Bardai. This Chand was a native of Lahore. He was a professional bhāt or minstrel, and was attached to the court of the Rajput king Prithiraj, the last Hindu monarch of Delhi. The poem is the record of the birth, deeds, and overthrow of Prithiraj; but upon the hist. which forms the basis of the work Chand Bardai builds a fantastic structure of mythology. We now come to the Oriya lang., which, like the Bengali, is highly impregnated with Sans. But it is a neglected tongue, and retains to the present day many rude archaic forms. The mountainous character of the country of Orissa, peopled by men accustomed to a solitary life, often decimated by famine and disease, itself furnishes a reason for the very partial cultivation and polish of the lang. spoken

there. The lit. of Oriya commences with Upendro Bhanj, who did not live more than 300 yrs. ago. Nearly contemporaneously with Upendro Bhanj flourished Dinkrishno Dās, who wrote the *Rasakallola*, the most famous poem in the lang.; it is simply a farrago of obscenity. We have now to refer, briefly, to the last of the modern Aryan langs. of I.—viz. Bengali. Occupying the most easterly position of these langs., it possesses the largest share of the purely Sans. element in its composition. The origin of the lang. was a very obscure one, and for centuries it was extremely rude. It is only lately that Bengali lit. has, with marvellous success, sprung up. Four centuries ago Bengali was unwritten. Then it closely resembled Hindi, but since that time a marked change has crept over it. The alphabet of the Bengali is very elegant and facile; the typography of a Bengali book is simply charming to look at and read. The lit. of Bengali, as it is at present, is far ahead of all other portions of Aryan I. The reformer Chaitanya first gave it its impetus in the 15th century. The *Kirtans* or lyrics which he collected soon became popular. But the first Bengali poet was probably Vidyāpati. Some writers have ascribed to him a date as early as A. D. 1820, but he probably flourished considerably later. Another famous Bengali writer of the earliest period of its lit. is Kabi Kankan. Another Bengali poet of note is Bhārat Chandra Rai. *Kabi*, or satirical poems, have much popularity in Bengal. Iswar Chandra Gupta was famous half a century ago for his sparkling wit. Three great modern Bengali writers may be mentioned. The first is Babu Piari Chandra Mitra, who is the author of *Allāder Gharer Dulāl* ("The Spoilt Child of the House of Allā"), a novel, which is by far the best fiction in the lang. The second is Michael Madhusūdan Datt, a native Chr., whose voluminous works have gained for him a very high rank in Bengali. And the third is Kali Prasanna Singh, a clever but sometimes coarse writer, who has the art of depicting in the most felicitous way the main characteristics and foibles of his countrymen.

III. *Dravidian Languages and Literature.*—This family of langs. consists of Tamil, Telugu, Canarese, Malayalam, and 7 inferior members. The most important of the 4 prin. langs. is Tamil. Next to Sans., it stands supreme as an Indian lang., both in regard to its structure, its genius, and its varied, anc., and original lit. Dravidian I. is the whole of that portion of the Peninsula which lies to the S. of the Nerubudda River and the Vindhya Mts. There are offshoots from this broad base, and we find Dravidian words in use among the mt.-fastnesses of Beloochistan, in the northernmost jungles of the Rajmahal hills, and in parts of Ceylon. The Dravids were uncouth, savage, given to horrible rites, eaters of raw meat, cannibals, disturbers of holy hermits engaged in contemplation, and giants or apes in form. The Tamils, of all the Dravids, first experienced the dawn of Dravidian civilization. The date of this epoch may be fixed at about the 6th century B. C. But notwithstanding the comparative antiquity of this date, it was not till more than 12 centuries subsequently that Tamil lit. began to spring up, and of all Dravidian lit. the Tamil is the oldest as well as most important. In the case of Tamil, just as in the case of Telugu and Canarese, the period of the domination of the Jains was that in which the vernacular lit. sprang up. Malayalam lit. is not more than 3½ centuries old. That lang. has in its composition a very large admixture of Sans., and its lit. mainly consists in translations and adaptations from the Sans. This must also be affirmed of Telugu and Canarese. The Jaina period, during which lit. flourished in Tamil-land, extended from the end of the 7th to the 13th century of the Chr. era. The oldest work extant in the lang. is the *Tol-Kāppiyam* ("The Old Composition"), a gram. of the lang. The *Kural* of Tiruvalluvar, the greatest work in the Tamil lang., was probably written before the close of the 8th century. The *Chintā-mani*, a great epic poem, was probably written not a century later; and shortly afterward the *Nan-nūl*, a High Tamil gram., appears to have been composed. By this time several of the works ascribed to Auvvai ("the matron") were probably written.

The greater part of Hindu lit. is poetical in form; we have poems on astron., poems on med., poems on gram. But now, everywhere, a prose lit. is springing up, especially in Bengali and Tamil. Secondly, Indian poetry is poor. Hindu poets aim more at writing beautifully than at thinking deeply. Two effects have been produced by the introduction of Eng. civilization into Hindustan. Translations in the various vernaculars are appearing of the works of the leading thinkers of Christendom, and the native press has become an established fact. The vernacular journalistic lit. is daily assuming wider proportions, and in Calcutta and Bombay, and to a slight extent in Madras, the newspaper press is already a power.

HISTORY. I. *The Ancient History of India.*—The earliest hist. of I. is involved in the deepest obscurity. We have only traditions to guide us. (1) The *Vedas*, the oldest sacred hymns of the Aryan Hindus, were arranged in their present form 1400 B. C. Their actual antiquity is much greater. (2) Even before the time of Moses (b. 1574 B. C.) I. and Europe were in active communication by sea, and the Sabeans and the Phœnicians commerce with Hindustan was the most lucrative. (3) In the days of Solomon we read of the ships of Tarshish trading with Ophir, and bringing from thence to Jerusalem, "gold and ivory, apes and peacocks." The port of Galle in Ceylon is Ophir. (4) The hist. of the Solar and Lunar dynasties of I. is founded on fact. The magnificent Hindu epic, the *Rāmāyana*, records the adventures of Rāma, the hero of the Solar race, who conquered Ceylon 1300 B. C. The *Mahābhārata* is the record of the Lunar dynasty. It describes the wars of the Pandus and Kurus, fought between 1400 and 1300 B. C. (5) Gotama, Boodha, the founder of Booddhism, d. at Gya, in S. Behar, about 543 B. C. (6) The Per. monarch Darius, the son of Hystaspes (B. C. 518-485), conquered the Punjab and Sindh, and made it a satrapy. (7) Alexander the Great proceeded to I. In B. C. 329 he

founded the city of Herat on the frontier. We know this much of the I. of Alexander, that the Hindus were considered to be wonderfully civilized. Their cities were opulent, and arts and sciences flourished. (8) About this time in Bengal there were dynasties of Pala and Sēna kings. The Pers., under Nushirvan, are supposed to have driven these princes out of Newar. In the earliest ages, before the writing of the *Vedas* or the entry of the Aryan races into I., there appears to have existed in the country an aboriginal people, non-Aryan in their characteristics, and who were of the same family as the tribes of Central Asia. Invasion after invasion poured down into I., and always from the N. W., and the aboriginal inhabs. were either pushed down southward or left in isolated districts, surrounded by the advancing wave of colonization. The first invasion we know of is the Aryan, which took place in the times of the Heb. patriarchs. Then came the Mohammedan and mixed invasions, pushing the Indian aborigines farther southward, or isolating them more completely.

II. *The History of the Mohammedan Power in India from its First Establishment in 711, by Mahmūd of Ghazni, to its overthrow and the Establishment of the Mogul Empire in 1526.*—For more than 500 yrs. I. reeked with blood. One sovereign overturned another, one dynasty supplanted another. The first act of a monarch on ascending his throne was to murder his relatives, spoil a city, desolate a province, and slaughter thousands—men, women, and children—of his predecessor's adherents. Nearly all the Mohammedan invaders of I. at this time were Afghans or Pathans. Originally fire-worshippers, they were converted to Islam, and in bigotry soon surpassed those who converted them. Mahmūd of Ghazni succeeded in annexing Lahore and its fertile terrs., and in laying the foundation of Mohammedan power in I. He d. in 1030. In 1118 Beiram ascended the throne. He could not resist murdering his own son-in-law, because of which he himself was assassinated, and his assassin introduced the Ghori dynasty. A Turki slave, Kutub-deen, succeeded him, and founded the first Indian slave dynasty, which ended with Kei Kobad, whose life was not remarkable for anything but vice. He was followed by Feroz Shah, who inaugurated a new dynasty of these Pathan kings of I. in the yr. 1288, and was followed himself by Alla-ud-din-Khilji, who began his reign by murdering his predecessor and his 2 sons. Alla-ud-din was poisoned by the eunuch Malik Kafur, whom he had captured and appointed viceroy. Malik was assassinated by Mubarik, Mubarik by Khusr Khan, a slave, whom he had made his vizier, and Khusr was killed by Ghiaz-ud-deen-Tughlak, who in 1321 began the dynasty of the Tughlaks, which is commonly known as the 5th Afghan dynasty. We need not refer to the kings of this miserable dynasty. The 7th dynasty was more wretched still under the weak sway of the 4 Syeds. The last dynasty of the Mohammedan power, before the Mogul empire absorbed all, was that of the 3 Lodis. The last of these, Ibrahim, was overthrown at the battle of Panipat, and from this time (1526) we date the rise of the Mogul empire in I.

III. *The History of the Mogul Empire.*—The Mogul empire was one of the most splendid dominations I. has ever known. There were 15 emps. of this dynasty: Baber, who ruled from 1526 to 1530; Humāyūn, 1530-36; Akbar, 1556-1605; Jehangir, 1605-28; Shah Jehan, 1628-58; Aurunzeeb, 1658-1707; Shah Alam I., 1707-12; Jehandar Shah, 1712-13; Farukshir, 1713-19; Mohammed Shah, 1719-48; Ahmed Shah, 1748-54; Alamgir, 1754-59; Shah Alam II., 1759-1806; Akbar II., 1806-37; Mohammed Bahadur, 1837-57. Baber, the founder of this noble race of kings, was descended from the Tartar Tamerlane, his mother being a Mongol. He hated the Mongols, yet his dynasty obtained the name of that race under the corrupt form of "Mogul." Panipat secured his footing in I. His death (in 1530) was a romance in itself. His son, Humāyūn, was mortally sick. Baber prayed that his own life might be accepted for that of his son, and from that hour the son recovered and the father's health declined. Humāyūn now ascended the throne. He was defeated by his enemies, and during his flight from I. his son, the famous Akbar, the glory of the Mogul dynasty, was born. Nursed in warfare from his childhood, Akbar entered upon a number of campaigns, and proved successful in almost all his undertakings. All over I. his armies were victorious, and he exhibited an equable temper and a liberality and mercifulness which has never been paralleled in Indian hist. till Europe claimed I. for her own. He d. 1605, and Jehangir, his son, succeeded him. He soiled his hands with blood, and was followed by Shah Jehan, whose sons fought for the throne while he was still alive. Aurunzeeb was the most successful of these, and assumed the imperial dignity in 1658, putting nearly all his opponents and relations to death and his aged father in prison, where he d. 8 yrs. after. Thus began the most magnificent reign I. has ever known. Aurunzeeb was a most narrow-minded Mussulman, and the slaughter of infidels was his supreme delight. But he was a man of immense ability and resolution. Every detail of civil or military govt. passed under his eye. But he was morbidly jealous, and the gen. who rose to eminence was as a rule assassinated for his pains. Mosques, mausoleums, minarets, and palaces rose rapidly in the great centres of Mohammedanism, and enormous wealth flowed into the coffers of the emp. At length, in the 89th yr. of his age, Aurunzeeb d., and with him the Mogul empire passed away. Internal divisions rent it; the Mahrattas grew up to be a mighty and warlike people; the Carnatic became the great battle-ground of I. So one Mogul emp. succeeded another, till in 1857 Mohammed Bahadur Shah rose against Brit. and abetted the mutineers. His sons and grandson were shot, and he himself transported for life to Burmah. Such was the close of the Mogul empire.

IV. *The History of the Carnatic.*—After the first Aryan invasion the aborigines chiefly took shelter in S. I. The Carnatic, till A. D. 1294, was wholly ruled by Hindu rajahs. It

was the great Carnatic centre of Hindu activity from the 8th century till quite recently. It was the foster-mother of art, science, lit., and religion. It was the scene of the glories of the Pāndiyan and Chōla dynasties; not a span of land was free from cultivation, and everywhere stately temples arose. The Carnatic is the scene of Nizam-ul-Mulk's enduring successes. The famous Vizianagar Hindu kingdom has still a limited place in S. I. The fertile provs. of Mysore and Travancore have an interesting hist.; and it was in the Carnatic that the Eng. had to fight to the death—first with Hyder Ali and then with Tipoo Sultan.

V. *The History of the Mahrattas.*—The founder of the Mahratta power was the great Sivaji, b. in 1627 A. D. The Mahrattas at that time were good fighters and thorough haters of the Mohammedans. Their country is one which presents a constant succession of rocky hills and masses of boulders rising above alluvial plains. In these elevations the people constructed their most impregnable hill-forts. The race themselves were hardy, active, and brave, capital skirmishers, and ready to go to the world's end for plunder. Their system of warfare was of the rough and impetuous kind, and the *dan* of Mahratta cav. rendered them dreaded everywhere. Sivaji d. Apr. 5, 1680, but from those days, though the character and fortunes of their successive chiefs have changed, the Mahrattas have still remained a warlike people. They measured swords with the Port. and Eng., and were not thoroughly taken in hand till, after having been over and over again hopelessly vanquished by the Brit. arms, the "subsidiary system" was put in force, and the land is now at peace.

VI. *The History of the Portuguese and of the various Indo-European companies in India; the History of the French and the Anglo-Indian History till the appointment of the first Gov.-general.*—In 1497 Vasco da Gama rounded the Cape of Good Hope, and landing at Calicut on the Malabar coast was received with great pomp by the rajah. In 1500 a second expedition was sent out to I. under Alvarez Cabral, and in a yr.'s time the whole Indian Ocean was at the command of their fleet. But their arrogant policy made them hated in I. In 1505 the Port. sent out their first viceroy, Almeyda. In 1508 Albuquerque succeeded him, and in the next yr. he captured the city of Goa, and the power of Port. rose to importance in I. But after Albuquerque's death the Mahrattas and Mohammedans pressed the colony very sorely, and within a century the Port. empire in the E. may be said to have collapsed. Shortly after the first appearance of the Port. in I. 4 European E. I. cos. followed them—viz. the Dut. in 1594, the Eng. in 1600, the Fr. in 1668, and the Dan. in 1616. The Dut. settlements have subsequently all been ceded to Eng. The Danes established themselves at Tranquebar and Serampore, and sold these places subsequently to the Eng. in 1845. In 1600 Queen Elizabeth determined on incorporating by charter the famous Brit. E. I. Co. In 1611 the first Eng. factory was established at Surat, and everywhere along the sea-line factories sprung up, and did a rapidly increasing business. In 1698 a ft. was ordered to be built in Bengal; it was called Ft. William. Thus begins the hist. of Calcutta. But before this the Fr. had landed in I. The famous Colbert organized a co. on a firm basis in 1664, under the patronage of Louis XIV. In 1674 the Fr. bought Pondicherry, which in 1693 was attacked and taken by the Dut., but returned after the peace of Ryswick. In 1688 Aurungzeeb gave the Fr. Chandernagore, a small settlement which they possess at the present day. Everywhere the Fr. factories rose and flourished, and Fr. and Eng. vied with each other to obtain influence. At length war broke out between Eng. and Fr. in Europe, and the flame spread to I.; the Fr. took Madras in 1746, and defeated the nawab of Arcot, who sent 10,000 men against them. The Fr. were regarded as the greatest European power in I. This state of affairs continued till 1748, when by the Peace of Aix-la-Chapelle Eng. and Fr. were at unity. Dupleix had to deliver back Madras to the Eng. Peace was not long to continue between the 2 European powers in I. The throne of Arcot was the subject of a war between the occupier, Anwar-ud-Deen, and Chanda Sahib, the aspirant. The latter had the sympathies of the Fr., and Anwar-ud-deen was killed. The Brit. then supported the succession of his son, and marched 600 Englishmen toward Pondicherry. The Eng. under Clive won the day. But in a short time the Fr. murdered Nazir Jung, the viceroy of the Deccan whom the Eng. had appointed, and regained their prestige in S. I. But now a terrible struggle commenced. The Eng. were aroused. Clive, with 320 men and 4 officers, took Arcot, and held it for 7 weeks against 10,000 of Chanda Sahib's troops. The prestige of Eng. rose anew. In 1752 Clive followed up his victories. The Fr. army was caught in a trap in an island between the Cauvery and Coleroon rivers. Chanda Sahib fled, and was soon after assassinated. In 1756 the news reached I. that Eng. and Fr. were again at war. The decisive battle of Wandewash was fought. The Fr. power was forever utterly crushed in I. In 1756 a native ruler ascended the throne of Bengal, the infamous Nawab Surajah Dowlah. This man suddenly attacked the Eng. at Calcutta. The gov. found no means of resisting the enemy. Sending all the women and children out, he himself followed, leaving Mr. Holwell and 145 Europeans behind. The nawab now entered Calcutta. That evening the 146 Eng. captives were crammed into a dungeon 18 ft. square, with 2 breathing-holes in it. In the morning all of the captives were dead with the exception of 23, and these were at the last gasp and presented a sad sight. The news of the atrocity flew to Madras, and soon Clive was in Bengal. A peace was made in 1757, but soon broken. The nawab must be deposed. Clive wrote to the Nawab Surajah Dowlah demanding instant satisfaction for all the injuries which had been incurred by the Eng. Of course the nawab sprang to arms, and with an immense army poured down on the Eng. gen. On the evening of June 22 Clive held the only council he summoned in all his campaigns. Clive and his little army attacked the nawab with the dawn. The victory was terrible

and complete. Surajah was seized and put to death by his successor. By successful wars and the natural operations of trade the Eng. power in I. went on increasing and consolidating, till (in 1774) Warren Hastings became the first gov.-gen. of Brit. I.

VII. *The Governors-general of India.*—The governorship of Warren Hastings extended from 1774 to 1785. The Regulating Act was passed, by which the Parl. of Brit. recognized the E. I. Co. as a ruling body, it being agreed that the gov.-gen. should be paid £25,000 a yr. and have a supreme council of 4, and that I. should possess a supreme court of judicature. It was at the same time stipulated that Eng. should receive from the E. I. Co. 40 lakhs of rupees annually. It was in virtue of this act that Hastings became gov.-gen. Shujah-ud-Dowlah, nawab-vizier of Oude, d. in 1775. His mother and widow, called begums, claimed his treasures, 2,000,000 rupees, and for a time they got possession of them. Thus, the young nawab entered upon his reign with an empty treas., got into debt, and accused the begums of plotting against Hastings. The latter cut the knot of the difficulty by making the begums pay 6,700,000 rupees to the E. I. Co. Shortly before this a native named Nuncomar tried to crush Hastings by ascribing to him crimes of various kinds. The 3 members in the supreme council inimical to Hastings actually believed this accuser, and favored him. But Hastings was equal to the occasion. The Brahman had supported his evidence against Hastings by documents palpably forged. An eminent native merchant brought a suit against Nuncomar for forgery. The case was heard before the chief-justice of Calcutta. The real prosecutor was Hastings. Nuncomar was sentenced to be hanged. To the horror of all Bengal, the holy Brahman was not reprieved. The execution was not forgotten for many a day. On the part of Hastings it was a stroke as politic as it was pitiless. It at once asserted his power even against the majority of his council, and this was needed at a time when the Mysoreans, the Dut., the Fr., and the Mahrattas were all fighting together against the Eng. At length (in 1785) Hastings retired to Eng. In 1786 Lord Cornwallis went out to I. as the second gov.-gen. The third gov.-gen. was Sir John Shore (1793-98). The fourth was the marquis of Wellesley (1798-1805). Hyder Ali in the Carnatic had been overthrown. Under the Marquis Wellesley the fourth Mysore war, against Tipoo Sultan, son of Hyder, was successfully terminated in 1799. In 1801 the affairs of Oude were regulated. Shortly afterward the second Mahratta war was successfully brought to a close. Lord Cornwallis, for the second time gov.-gen., succeeded Marquis Wellesley in 1805. Sir George Barlow succeeded him, and governed till 1807. Earl Minto succeeded Barlow in 1807, and his gov.-generalship lasted till 1813. The marquis of Hastings succeeded Earl Minto in 1814, and his rule lasted till 1823. The eighth gov.-gen. was Lord Amherst (1823-28); Lord Bentinck was the ninth gov.-gen. (1828-35); Lord Auckland was the tenth. From 1842 to 1844 Lord Ellenborough ruled as the eleventh gov.-gen.; the twelfth was Lord Hardinge (1844-47); the thirteenth was the earl of Dalhousie (1848-56); the fourteenth was Lord Canning (1856-61), and his régime is not likely to be forgotten in the annals of Hindustan, because of the great Indian Sepoy mutiny of 1857. The Sepoy regiments were getting dissatisfied. They felt their numerical power. They had been furnished with new Enfield rifles. Bigoted Mussulmans among them declared that the new cartridges which had been supplied to the troops had been smeared with the fat of pigs and cows. On Mar. 19 the mutiny began at Berhampore. Everywhere throughout I. fanatics rushed about spreading disaffection, and prophesying the fall of the Brit. power and the extermination of white men from the face of I. Especially the Mohammedans considered that they were to regain their empire in the E. The last Mogul emp. headed them. At Meerut the first great outbreak took place. The European part of Meerut was burned, and every Eng. man, woman, and child massacred. At Delhi, the commissioner, military commandant, the chaplain and his poor daughter first met their doom in the sight of the last Mogul emp. Everywhere the land was in flames against the white man. The horrible massacre of Cawnpore forms one of the blackest pages of the hist. of the world, and was performed under the supervision of Nana Sahib. The garrison defended themselves, but were promised their lives if they would depart and give up the treasures of the place to the mutineers. After a long struggle they consented. When they were once in the boats which were to convey them away, Nana Sahib and the treacherous mutineers on the bank of the river opened fire. Men, women, and children were killed, mutilated, and wounded. Many were dragged back to the shore. Fair and noble European ladies were carried back to the city, suffered pollution worse than death, and were flung with their children down the now famous well of Cawnpore. Sir Henry Havelock soon avenged their death. Outram and Clyde and Lawrence and Neill are a few of the honorable names which shine in that dark and stormy time. Lucknow and Delhi were stormed. The mutiny was quelled, but the shadow of it has not yet passed from the hearts of living men who have had anything to do with I. In 1858, the yr. after the mutiny, a great change was inaugurated. I. was placed under the direct authority of the crown of Brit.; the E. I. Co. was done away with; the gov.-gen. was made "viceroy;" the Indian European army, as such, was abolished; the Indian civil service was thrown open to competition. R. C. CALDWELL.

India (or China) Ink is of 2 kinds: (1) the dried pigment from certain cuttle-fishes. When browned by the action of an alkali it becomes *sepio*. It is prepared in It., in Tur., and in Asia. (2) A mixture of fine lampblack with glue or size and a little camphor. It is prepared in Chi., and is a very useful pigment. Both of the above are used in Asia as writing inks, and both are practically indelible.

India Matting, a material employed for the covering of floors. It is imported from Bengal, where it is woven from the stems of *Papyrus Pungorei* or *corymbosus*.

Indiana, in-de-ahn'a, one of the Central States of the

Amer. Union. Between 37° 46' and 41° 46' N. lat. and 84° 49' and 88° 2' W. lon.; greatest length from N. to S., 377 m.; greatest breadth from E. to W., 176 m.; average breadth, about 140 m. It is bounded N. by Lake Mich. and State of Mich., E. by O., S. E. and S. by Ky., W. by Ill.; area, 36,350 sq. m. or 23,264,000 acres.



Face of the Country.—There are no mts. in I., and no hills of considerable height except what are called the river-hills. The rivers which drain the State have in the progress of ages eroded valleys of considerable depth and much greater width than their present channels, and the slopes which bound these valleys give the appearance of hills varying from 200 to 400 ft. in height above the river-valleys, and at the highest points being about 600 ft. above the sea. The highest portions of the State are on its E. and W. sides, some of the river-hills along the Wabash Valley attaining the altitude of 600 ft. above the sea; from these points to the Ohio below the falls near Louisville there is a gradual slope of somewhat more than 400 ft. There is, however, no marked or distinct watershed in any part of the State. But owing to this feature of river-hills an account of the river-systems is necessary to a full understanding of the face of the country. Beginning with the S., we have first the Ohio River Valley, including that of the White Water River, which occupies a tract of about 5500 sq. m. in the State. The Ohio River borders the State for a distance, by the course of the river, of about 380 m. The Ohio River Valley on the I. side was originally covered with heavy forests. The river-hills are rugged and broken, and about a dozen streams break through the river-hills on the N. side. The valleys of the E. and W. forks of White River, and the prairie-lands which they inclose, cover a little more than an area of about 9000 sq. m. The region is almost universally level, and the E. part was originally heavily timbered, while the W. is prairie, with occasionally some low, broken hills. The streams are generally clear and unfailing, and there are sufficient falls to furnish abundant water-power. The soil is very rich. The valley of the Wabash River and its affluents covers an area of over 12,000 sq. m. It interlocks with the White River Valley, and resembles it in its fertility. The Wabash has a course of 600 m., and might be made navigable for steamboats of light draft about 400 m. The valley of the Maumee and its prin. tributary, the St. Joseph, occupies a tract of about 2000 m. in the N. E. part of the State. Another and larger St. Joseph's River, from Mich., dipping down into Elkhart and St. Joseph cos., drains those cos. into Lake Mich., while in the N. W. the Kankakee, an affluent of the Ill., with its branches, drains 8 cos. into that river. The Kankakee Valley is somewhat swampy, and the river expands at several points into broad marshy lakes. The soil is generally good, though near Lake Mich. it is sandy and barren. The tributaries of the Ohio in the State are the Great Miami, which touches its S. E. border, and its main affluent, the White Water, the Laughey, Indian Kentucky, Fourteen Mile, Silver, Buck Creek, Indian Blue, Great Blue, Little Blue, Oil Creek, Anderson's, Little Pigeon, Big Pigeon, and the Wabash; of these only the first and last are navigable or of much importance. The Wabash has its sources in O. Its course is N. W. to Huntington co., thence W. by S. to Amsterdam in Cass co., thence S. W. to Baltimore in Warren co., and thence S., bearing slightly W., till it enters the Ohio. Its prin. tributaries are—from the S. and E., the Salamonie, Mississinewa, Deer Creek, Wildcat Creek, Sugar or Rock, Big and Little Racoon rivers, Otter, Meron, Patoka, and Big creeks, and White River; from the N. and W., Eel, Tippecanoe, Little, Vermillion, Embarras, and Little Wabash, the last 3 being mainly in Ill. The E. and W. forks, which, uniting, form the White River, the largest affluent of the Wabash, have themselves a number of tributaries of considerable size. Among those of the E. fork are the Salt, Muscatatuck, Sand, Clifty, Flat Rock, Sugar, Lost, River, and Lick Creek, while the W. fork has Fall Creek, Big Indian, Bean Blossom, Richland, and Prairie creeks, and Eel River. The St. Joseph's and the St. Mary's unite to form the Maumee in the N. E., and the Mich. St. Joseph receives the Pigeon River and the Little and Big Elkhart in the State. The Kankakee has several small feeders in the State, and its prin. branch, the Iroquois, after a considerable course in I., unites with it in Ill. Deep and Calumet rivers, small streams which flow into Lake Michigan, run very near its shores. The State is well watered. There are numerous small lakes and ponds, but none of large size. Beaver Lake, the largest, is in Newton co., and covers about 10,000 acres. The S. shore has an extensive marsh. There are also several very pretty small lakes in Noble, Kosciusko, Marshall, Stark, and La Porte cos., and 3 or 4 in Knox co. in the S. W. part of the State.

Geology.—I. has not a great variety of geological forma-

tions on or near the surface. The Silurian system is the oldest in the State, and, proceeding in a direction about S. W. by S. from both Lakes Mich. and Erie, it appears in the extreme N. W. and S. E. of the State. In both cases it dips under the Devonian rocks, which occupy with their formations about $\frac{3}{5}$ of the surface of the State. In Benton co. the Illinois coal-field enters the State. The coal-measures extend from the Wabash River to Crawford co. on the Ohio. Their area is about 7700 sq. m. There are many different qualities and varieties of this coal. At Cannelton and other points on the river it is found high up on the river-bluffs as cannel coal, and is in great demand for river-steamers and for domestic purposes, and at various points along the Wabash and Erie Canal, from Evansville northward, seams of free-burning bituminous coal of good quality are worked. In Spencer co., and thence N. N. W. to Clay co. and above, the block coal (so named from its occurring in quadrangular blocks of varying thickness) is abundant. It is easily mined, and is found to be superior to any other coal known, and even to charcoal, for the production of pig iron and steel. Salt-springs are found along the borders of the coal-formation. There are also many quarries of white limestone of excellent quality for building purposes, a fine sandstone like the Chemung or Portsmouth (O.) sandstone, slate, brick, and porcelain clays. Some grindstones, small deposits of gypsum, and bog-iron ore are the other prin. minerals.

Vegetation.—The State in its earlier hist. was largely covered with forests, having much less open prairie than Ill., but under the influence of settlements, the demands of its R. Rs., and the requirements for fuel these forests are rapidly disappearing, and less attention is given to the culture of forest trees than should be. The total amount of woodland in the State is 7,541,145 acres. The forests are mainly deciduous trees, such as black walnut, white, red, burr, and black oak, hickory, sugar and red maple, ash, beech, linden, sycamore, elm, and tulip or whitewood. There is very little native pine, spruce, or hemlock in the State. The undergrowths are principally dogwood, papaw, wild plum, thorn, persimmon, crab-apple, etc. The mandrake and some of the species of sumach are found along the streams. Wild flowers are abundant. Wild animals, especially the Carnivora, are nearly extinct in the State; occasionally the raccoon, opossum, and skunk, as well as the woodchuck or ground-hog and the gopher, are found. Hares or rabbits and squirrels abound in the forests, and the smaller rodents are sufficiently plenty. The grouse or prairie-hen is comparatively scarce. Pigeons, partridges, and occasionally wild-turkeys are found.

Climate.—The climate is liable to sudden and frequent changes. The range of the thermometer each month is very great. The heat in summer is intense, and the winter's cold equally severe. These extremes are, however, greater in the N. than in the S. part of the State. Annual rainfall—Michigan City, 28.75; Logansport, 42.8; Indianapolis, 42.66; New Albany, 40.42.

Agricultural Products.—The heaviest staple raised is Indian corn, being 115,482,300 bushels, census of 1880; wheat, 47,284,853 bushels; oats, 15,599,518 bushels; tobacco, 8,872,842 lbs.; wool, 6,167,498 lbs.

Farm Animals.—Horses, 581,444; cattle, 1,360,760; sheep, 1,100,511; swine, 3,186,413.

Manufactures.—The pig-iron product of I. was 12,500 tons in 1880, though sometimes much larger; 1,449,496 tons of coal were mined. There are heavy manufactures of woodenware, machinery, metals, cotton, woolen, etc. The manufactures of iron and steel in 1880 (from U. S. census) were—establishments, 12; capital, \$2,283,000; hands employed, 2048; wages, \$864,921; value of products, \$4,551,403. Total manufacturing products of all kinds, \$148,006,411; capital invested, \$65,742,962; hands employed, 69,508; wages paid, \$21,900,888.

Railroads and Canals.—In 1880 I. had 5069 m. of R. R. in operation, costing \$213,462,348, with net earnings of \$9,700,000. Several of these are trunk lines, 37 different corporations being engaged in railway traffic. There are 2 canals in the State. The Wabash and Erie, from Evansville to Toledo, is 467 m. in length, 379 of which are in I. The White Water Canal is 75 m. in length, from Lawrenceburg on the O. to Hagerstown.

Finances.—The taxed value of property in 1880 was—real estate, \$538,683,239; personal, \$189,131,892; State tax, 1881, 30 cents on \$100; amount raised for State expenses, \$2,764,851; State debt, \$1,998,178. Total taxation, 1880, State and local, \$10,843,630; total debts, local and State, \$18,354,737.

Commerce.—I. has no foreign commerce except that transacted through the ports of Chicago, Ill., and of other adjoining States; the amount of this is very considerable, but not easily separable from that of the adjacent States. The inter-State commerce of the State is very large. The transportation of iron ores from Lake Superior and from Mo. to the blast furnaces of the block-coal region for smelting is a branch of commerce which has made great progress within the past 10 yrs., while the moving of its vast crop of cereals, its million or more of hogs for slaughter, and its immense droves of cattle task even the large capacity of its numerous railways. The return freights of manufactured goods, imported and domestic, add largely to the mighty aggregate. Indianapolis alone receives and ships about 13,000,000 bushels of corn and 8,000,000 bushels of wheat annually.

Banks, Etc.—I. had, in Oct. 1881, 93 national banks in operation, with cap. of \$13,093,500; circulation, \$8,767,700; bonds to secure circulation, \$9,969,800; deposits, \$23,790,821. There were also 24 State banks and trust cos., cap., \$1,308,220; deposits, \$2,291,526; 15 savings banks, with deposits of \$1,716,516, and 106 private bankers, with cap. of \$3,130,268 and deposits of \$11,870,164. Insurance cos. received \$1,700,000 in premiums in 1880.

Education, Etc.—The number of children of school age (6-21 yrs.) was 708,558 in 1880, of whom 511,283 were enrolled in public schools; average daily attendance, 320,577.

Amount expended for public schools, \$4,504,407, of which \$2,907,446 was for salaries of teachers. There were beside 12,112 taught in private schools. I. has 14 colls. and univs., with 137 instructors and 2545 students, paying \$29,488 tuition in 1880. There are numerous acads., sems., and insts. for education of both sexes. Number of newspapers and periodicals in 1880, 467, of which 40 were daily.

Misfortune.—The State has a well-conducted hospital for the insane. The 2 State prisons at Michigan City and Jeffersonville are self-supporting. There is a house of refuge, a reformatory inst. for women and girls, and a home for soldiers' orphans.

Churches.—I. has about 5000 chs., the Meths. taking the lead with 1584 chs., 505 ministers, 143,861 members; Christians (Disciples), 675 chs., 580 ministers, 78,950 members; Baps., 558 chs., 325 ministers, 40,950 members; Lutherans, 274 chs., 33,500 members; Presbs., 303 chs., 28,358 members; United Brethren, 339 chs., 24,784 members; R. Caths., 266 chs.; the other denominations number 25, with from 144 chs. down to 1.

Population.—In 1860, 1,350,428; 1870, 1,680,637; 1880, 1,978,301 (white 1,938,798, colored 39,503, including 29 Chinese and 246 Indians).

Principal Cities and Towns. Pop. 1880.—Indianapolis (cap.), 75,056; Evansville, 29,280; Fort Wayne, 26,880; Terre Haute, 26,042; New Albany, 16,423; Lafayette, 14,860; South Bend, 13,280; Richmond, 12,742; Logansport, 11,198; Jeffersonville, 9357; Madison, 8945; Vincennes, 7680; Michigan City, 7366; Elkhart, 6953; La Porte, 6195; Peru, 5280.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Adams	4-G	11,382	15,385	Deatur	1,905
Allen	3-G	43,364	54,763	Fort Wayne	26,880
Bartholomew	6-E	21,133	27,777	Columbus	4,813
Benton	4-B	5,615	11,108	Fowler	967
Blackford	5-G	6,252	8,020	Hartford City	1,470
Boone	6-D	25,593	25,922	Lebanon	2,625
Brown	8-E	8,681	10,264	Nashville	348
Carroll	4-D	18,346	22,132	Delphi	2,040
Cass	4-E	24,193	27,611	Logansport	11,198
Clarke	10-F	24,770	28,610	Jeffersonville	9,357
Clay	8-C	19,054	25,854	Brazil	3,441
Clinton	5-D	17,330	23,472	Frankfort	2,803
Crawford	11-D	20,293	22,356	Shawansworth	716
Daviess	10-C	16,747	21,552	Washington	14,323
Dearborn	8-G	24,116	26,671	Lawrenceburg	4,668
Decatur	8-F	19,053	19,779	Greensburg	3,138
De Kalb	2-G	17,167	20,225	Auburn	1,542
Delaware	5-F	18,030	22,926	Muncie	5,219
Dubois	10-C	12,597	15,992	Shelby	1,040
Elkhart	7-E	26,026	33,454	Goshen	4,123
Fayette	7-G	10,476	11,294	Connorsville	3,228
Floyd	11-F	23,300	24,590	New Albany	16,423
Fountain	6-B	16,339	20,228	Covington	1,920
Franklin	8-G	20,293	20,092	Brookville	1,813
Fulton	3-E	12,736	14,301	Rochester	1,869
Gibson	11-B	17,371	22,742	Princeton	2,566
Grant	4-F	18,487	23,618	Marion	3,182
Greene	9-C	19,514	22,986	Bloomfield	988
Hamilton	6-E	20,882	24,801	Noblesville	2,926
Hancock	6-E	15,193	17,133	Greenfield	2,013
Harrison	11-E	19,913	21,526	Corydon	763
Hendricks	6-D	20,277	22,981	Danville	1,598
Henry	6-F	29,986	24,016	New Castle	2,299
Howard	5-E	15,847	19,584	Kokomo	4,042
Huntington	9-E	19,036	21,805	Huntington	3,863
Jackson	9-E	18,974	23,050	Brownstown	849
Jasper	3-C	6,354	9,464	Rensselaer	968
Jay	5-G	75,000	19,282	Portland	1,694
Jefferson	9-F	29,741	25,977	Madison	8,945
Jennings	9-E	16,453	18,453	Spencer	616
Johnson	7-F	18,266	19,537	Franklin	3,116
Knox	10-B	21,562	26,324	Vincennes	7,680
Kosciusko	2-E	23,531	26,494	Warsaw	3,123
La Grange	1-F	14,148	15,630	La Grange	1,367
Lake	2-B	19,339	15,091	Crown Point	1,709
La Porte	2-F	27,062	30,985	La Porte	6,195
Lawrence	9-D	14,628	18,543	Bedford	2,198
Madison	6-F	22,770	27,527	Anderson	4,126
Marion	6-E	71,399	102,782	Indianapolis	75,056
Marshall	2-E	20,211	23,414	Plymouth	2,570
Martin	4-C	11,103	13,413	Shiots	705
Miami	4-E	27,052	24,083	Peru	5,280
Monroe	8-D	14,168	15,875	Bloomington	2,756
Montgomery	6-C	23,765	27,316	Crawfordsville	5,251
Morgan	7-D	17,538	18,900	Martinsville	1,943
Newton	3-B	16,829	8,167	Kentland	982
Noble	7-F	20,389	22,956	Albion	926
Ohio	9-G	5,837	5,563	Rising Sun	1,806
Orange	10-D	13,497	14,363	Paoli	696
Owen	8-C	16,137	15,901	Spencer	1,655
Parke	7-B	18,166	19,460	Rockville	1,684
Perry	11-D	14,801	16,997	Cannelton	1,834
Pike	10-B	13,779	16,383	Petersburg	1,193
Porter	2-C	13,942	17,227	Valparaiso	4,461
Posey	11-A	19,185	20,857	Mount Vernon	3,730
Pulaski	3-D	7,801	9,561	Winamac	835
Putnam	7-T	21,514	22,501	Greencastle	3,640
Randolph	6-G	22,862	26,435	Winchester	1,938
Ripley	7-G	20,977	21,627	Versailles	455
Rush	7-F	17,626	19,238	Rushville	2,515
St. Joseph	2-E	22,322	33,178	South Bend	13,280
Scott	10-F	17,874	8,348	Shelby	1,454
Shelby	7-F	21,692	25,257	Shelbyville	3,745
Spencer	12-C	17,998	22,129	Rockport	2,382
Starke	2-D	3,888	5,105	Knox	316
Steuben	1-G	12,654	14,645	Angola	1,280
Sullivan	9-B	20,345	20,326	Sullivan	2,161
Switzerland	9-C	12,134	13,336	Vevay	1,884
Tippecanoe	5-C	33,515	35,966	La Fayette	14,860
Tipton	5-E	11,953	14,407	Tipton	1,250
Union	7-G	6,341	7,673	Liberty	1,096
Vanderburgh	11-B	33,145	42,193	Evansville	29,280
Vermilion	6-E	16,340	19,025	Newport	591
Vigo	4-F	33,549	45,658	Terre Haute	26,042
Wabash	4-F	21,305	25,241	Wabash	3,800
Warren	5-B	10,204	11,497	Williamsport	913
Warwick	11-B	17,653	20,162	Boneville	1,182
Washington	10-E	18,955	18,955	Salmon	1,615
Wayne	4-G	34,048	38,613	Richmond	12,742
Wells	4-G	13,585	18,442	Bluffton	2,354
White	4-C	10,554	13,795	Monticello	1,193
Whitley	3-F	14,399	16,941	Columbia City	2,444
Total		1,680,637	1,978,301		

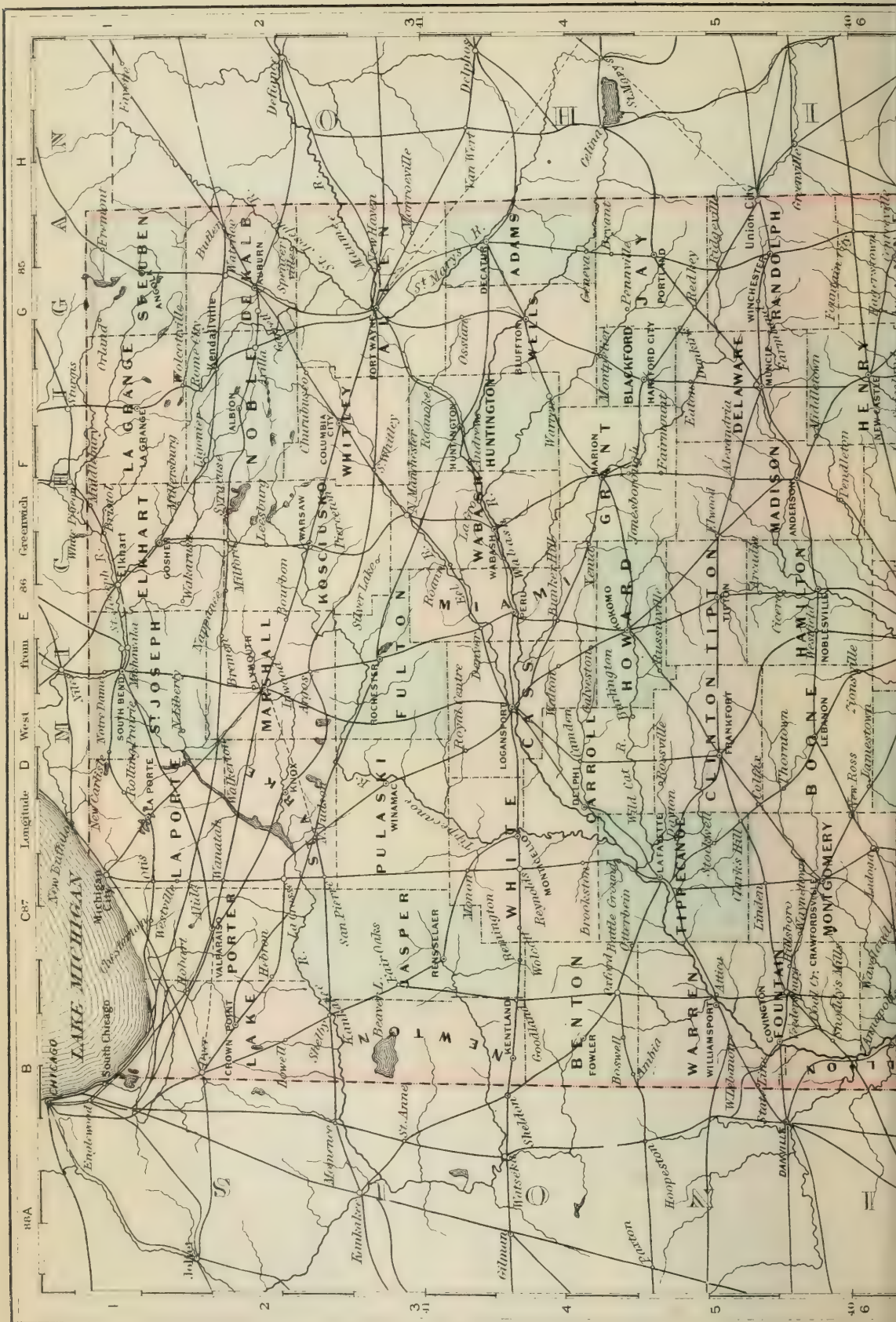
* Reference for location of counties. See map of Indiana.

History.—I. was originally a part of the Fr. possessions, and probably a Canadian Fr. colony had established one or more trading posts within its present boundaries before the close of the 17th century. In 1702 there was a fresh migration of considerable numbers, who settled at Vincennes, Corydon, and other points. They speedily made friends of the Indian tribes then inhabiting the country, and so far amalgamated with them as to adopt their habits and customs. Nothing was heard of them till the cession of the Terr. to the Eng. in 1763, when by the treaty their territorial rights were confirmed. By the treaty of 1783 this, as well as the whole N. W. Terr., was transferred to the U. S. In 1788 there was trouble with the Indians, and a local war ensued which caused great distress among the settlers at Vincennes. They were attacked at the mouth of the Tippecanoe by Gen. Wilkinson in 1791, and were compelled to submit. A time of greater peace followed. In 1795 the U. S. obtained several eligible tracts of land by the treaty of Greenville, and a considerable number of emigrants settled in the Terr. O. was erected into a separate Terr. May 7, 1800, and all the country W. and N. of it organized as the new govt. of Indiana. The same yr. there were 4875 inhabs. in the present limits of the State. Mich. Terr. was set off from it in 1805, and Ill. Terr. in 1809, leaving I. Terr. with its present boundaries. In 1810 the pop. had increased to 24,520. In 1811 the Shawnees, one of the largest tribes of Indians in the Terr., were excited to a complete frenzy by the eloquence of their prophet and leader, Tecumseh, and commenced a series of raids and outrages against the settlers. The govt. of the Terr., William Henry Harrison (afterward Pres. of the U. S.), assembled a force of regulars and militia at Vincennes, and on Nov. 6, 1811, marched to Tippecanoe, on the Wabash, and demanded the restoration of the property which the Indians had taken from the settlers. After a parley the Indians proposed a delay till the next morning, and gave intimations of their readiness to enter into an amicable arrangement. During the night, however, they made a sudden attack on the forces under Gov. Harrison, but, to their surprise, found them watchful and prepared. A short but sanguinary battle ensued; the Indians, under the shouts and encouragement of their prophet-leader, fought with the utmost desperation, but after a terrible slaughter they fled, thoroughly defeated, and soon after, their town having been burned and the surrounding country laid waste, the Shawnees sued for peace. The war with G. Brit. gave a fresh impulse to Indian hostilities, but the tribes were again thoroughly subdued, and after the peace of 1815 never molested the I. settlers again. In Dec. 1815 the subject of admission into the U. as a State began to be agitated throughout the Terr.; in Apr. 1816 an enabling act was passed by Congress; a convention was called, and the first const. of I. was adopted June 29, and on Dec. 11, 1816, I. was admitted into the U. Her growth from this time onward was very rapid. The completion of the Erie Canal and the building of the National Road stimulated immigration into the fertile and beautiful State, and more than 3,500,000 acres of govt. lands were purchased within the State in the 10 yrs. ending with 1830. Then commenced an era of wild speculation. Eight R. R. cos. were incorporated, the Wabash and Erie Canal was begun and driven forward with great rapidity, a State bank with 13 branches organized, and numerous other great enterprises fostered by the State and its banks. When the crash came, in 1837, there was general bankruptcy and a State debt of \$14,057,000. Yet in 1840 it was found that the pop. of the State had doubled. In 1846 arrangements were made for the resumption of interest on the State debt, and prosperity began to return. In 1850 the increase of pop. during the previous decade was found to be 44.1 per cent. In 1851 a new const. was adopted, and in 1853 a free banking law passed. The decade from 1850 to 1860 was marked by the completion of its great canal from the lakes to the Ohio, as well as by the execution of other important public works, and by the great increase of its R. R. facilities. The financial panic of 1857 produced far less disaster than that of 1837. In the late c. war I. sent her full quota to the field, and, though the machinations of those opposed to the war made necessary the assumption of unusual war-powers by the govt., the general record of the State for patriotism and efficient service was in the highest degree honorable to it. In two or three instances its legislature, under the influence of unwise and partisan leaders, has attempted something in the nature of a *coup d'état*, but the result of these efforts has so soon returned to plague and injure their contrivers that it is hardly possible that they will ever again be attempted. Like some of its sister States, I. has been agitated of late on the question of cheap transportation of produce, but it has not developed in that State so decided an antagonism between the R. R. cos. and the farmers as in some of the other States—mainly, perhaps, because her facilities for transportation are less dependent upon the R. Rs. than some, and in part, also, because her R. R. cos. have been less hostile to the producing classes from whom they derive their support. The National Cong. of Agriculture, which met at Indianapolis in May 1873, discussed this question very thoroughly and in an excellent spirit.

Governors.

TERRITORY.	Paris C. Dunning	1848-49
William H. Harrison	1800-11 Joseph A. Wright	1849-57
John Gibson (acting)	1811-13 Ashbel P. Willard	1857-61
Thomas Posey	1813-16 Oliver P. Morton	1861-67
STATE.	Conrad Baker	1867-73
Jonathan Jennings	1816-22 Thomas A. Hendricks	1873-77
William Hendricks	1822-25 James D. Williams	1877-81
James B. Ray	1825-31 Albert G. Porter	1881-85
Noah Noble	1831-37 Isaac P. Gray	1885-89
David Wallace	1837-40	
Samuel Bigler	1840-43	
James Whitcomb	1843-48	

REVISED BY A. R. SPOFFORD.





INDIANA

Drawn and Engraved on Copper-Plate

EXPRESSLY

FOR

JOHNSON'S CYCLOPEDIA

Scale of Miles 0 10 20 30

Indiana, on R. R. cap. of Indiana co., Pa., 72 m. N. E. of Pittsburgh. It is the seat of a State normal school. Pop. 1870, 1905; 1880, 1907.

Indianapolis, city and important R. R. centre, cap. of Ind. and of Marion co., near the geographical centre of the State, was first settled 1819, designated as the seat of govt. 1820, laid out 1821, occupied as the cap. 1824. Situated



New State Capitol, Indianapolis, Ind.

near the centre of the great corn-belt, it is the natural grain-market for a vast area; it also possesses peculiar advantages for manufactures of iron and wood. Immense forests, beds of coal, and mines of iron ore abound in the State. Excellent for fuel, the black coal is unrivalled for working iron and steel. The Central Canal, cutting a bend of White River, affords partial water-power. Here are State insts. for the deaf and dumb, the blind, and insane, the women's prison and reformatory inst., and numerous benevolent insts. There is a city library and reading-room supported by a State tax, open daily, and free to all. There are a univ., law school, 4 med. colls., and a Catholic theological sem. The free-school system is maintained by local and State taxation and by its share of the State school fund of over \$9,000,000, which is larger than that of any other State. Among the public buildings are the new State-house, built of oolitic limestone from Ind., except the white marble columns from Vt. in some of the corridors; the U. S. c-h. and P. O., of iron and dressed stone; a fine co. c-h.; Odd Fellows' Hall, the Masonic Hall, Acad. of Music, and Chamber of Commerce. Crown Hill Cemetery, 2 m. N. W. of the city, opened in 1864, incloses 400 acres. On an elevation E. of the city are the buildings of the U. S. arsenal, and in the State fair-grounds, N., is the Exposition building. I. is a port of entry, and has an immense trade in live stock and grain. Pop. 1870, 48,344; 1880, 75,056. [From orig. art. in *J. S. Univ. Cyclopedia*, by C. N. Todd.]

Indian Bean. See CACTACEA.

Indian Corn, or Maize [*Zea mays*, Linn.], the most important grain raised by Amer. farmers, belongs to the tribe Phalaridea of the natural order Gramineae, or grasses. It is indigenous to Amer., where it has always formed the chief food of the Indian races, from which the name is derived. It was introduced from Amer. to S. Europe, and to Asia and N. Afr. It is properly a sub-tropical plant, a native probably of the table-lands of Mex. or Peru. It thrives best under a hot summer sun, and its rapid growth and ripening give it a peculiar value for high N. lats., where the summer heat is as intense as the winter cold. In Eng. the summer heat is not sufficient to favor its production. Its chemical ingredients are chiefly starch and oil; it yields abundance of phosphorus, and is a most nutritious and healthful diet. There are many varieties, presenting great differences and possessing very unequal value. Being hardy and easily cultivated, it is the first grain planted by the new settler. The yield ranges from 10 bushels to the acre, which is the average on the worn lands of the Gulf States, to 200 bushels, which has been produced from carefully tended patches in Ky. and Tenn. In the Central States the average is from 25 to 30 bushels. The height of the full-grown corn varies, according to species and soil, from 3 to 18 ft. The average time of planting is May 20 to June 1.

Indian Fig. See CACTACEA.

Indian Hemp. See CANNABIS, HASHISH.

Indian Languages of America. At least $\frac{1}{3}$ of N. Amer. E. of the Rocky Mts. and N. of Mex. was occupied by tribes speaking dialects of 4 langs.—viz. the ESKIMO, ATHABASCAN, ALGONKIN, and SIOUX or DAKOTA. The ESKIMO was spoken near the shores of the N. Ocean, from the E. coast of Greenland to Bering's Strait, and it extended southward on the Atlantic to the Strait of Bellisle and the Gulf of St. Lawrence. S. of the Eskimos, the terr. between Hudson's Bay and the Rocky Mts., and stretching westward, between 50° and 60° N. lat., nearly to the Pacific, was occupied by the ATHABASCAN family in numerous tribes. E. of the Miss., and of a line drawn N. W. from the head-waters of that river to those of the Mississippi (Churchill's) River, was the terr. of the ALGONKINS, within the bounds of which was comprehended that of 2 groups of IROQUOIS tribes, speaking a different lang. When N. Amer. became known to Europeans the Algonkin country was bounded on the N. by the Athabascan, Hudson's Bay, and the Labrador Eskimos, E. by the Gulf of St. Lawrence and the Atlantic as far S. at least as Cape Hatteras, S. by an irregular line running westwardly from that cape to the confluence of the O. and Miss., or its vicinity. The fourth great N. Amer. family, the DAKOTA or SIOUX, claimed most of the region between the Miss. and the Rocky Mts., from the Saskatchewan on the N. to Arkansas River at the S.

Next after these 4 prin. families, those of the IROQUOIS, the CHARTA-MUSKOKI, and the CHEROKEE were the most considerable. The Iroquois-speaking tribes were, as has been stated, nearly inclosed within the terr. of the ALGONKINS.

The CHARTA-MUSKOKI family occupied the terr. now constituting the States of Ga., Ala., Miss., and Fla., with a portion of La. E. of the Miss. The *Cherokees* (*Tsalagi*) lived in v. along the Tenn. River and its tributaries, their country extending over the mountainous regions of E. Tenn. and the N. portions of Ga. and Ala.

The 7 families which have been mentioned were spread over more than $\frac{9}{10}$ of the terr. N. of Mex., E. of the Rocky Mts. Between these mts. and the Sierra Nevada the most important family is that of the SHOSHONE, occupying Ut., Nev., the S. part of Id. and Or., including the Kizh and Neta of S. Cal. and the Comanches of the prairies of N. M. and Tex., with the *Shoshones* or Snake Indians, Wihnasht, and Bannacks in the valleys of Snake and Owyhee rivers, and the several divisions of the Ute (Utah) nation. N. of the Shoshones, between 45° and 52° 30' N. lat., are 2 considerable families, the SAHAPPIN and the SELISH. The tribes W. of the Miss., on the Red River and between it and the Gulf, speak 4 radically distinct langs. (the Caddo, Adais, Chetimachas, and Attacapas). The YUMA lang. is spoken on both sides of the Col. River, above and below the junction of the Gila. The PIMA is spoken on the Gila and its S. affluents, and in the scattered v. of N. M. and Ari., near the Rio Grande, and between it and the Upper Col. 4 or 5 distinct langs. are spoken.

The picture-writings of the Aztecs, the incised symbols on the stones of Palenque, Copan, and Yucatan, with other evidences of a higher civilization than appears to have been attained by N. nations, impart peculiar interest to the langs. of Mex. and Central Amer. The most important family is that of which the Mex. proper, *Nahuatl* or *Aztec*, is the recognized type. This appears to have been spoken by the Nahuatlacs in the valley of Mex., and in the adjacent country to the E. and S., and in numerous dialects it extended throughout the Mex. empire. The OROMI or *Hia-hui*, spoken by tribes N. and W. of the valley of Mex., is utterly discordant from the gen. type of Amer. speech, and is probably of foreign origin. Other Mex. langs. of undetermined affinities are represented by the Tarasca, Tlapanece, Totonaco, Zapoteco and Mixteco, Zoqui, and Mixe. The Huasteco or Huastec is allied to the great MAYA family.

In S. Amer. the number and diversity of idioms are much greater than in the N., and the S. Amer. nations may be divided as follows: I. ANDO-PERTUVIAN, from the Isthmus of Darien to Cape Horn, comprising the *Peruvian*, the *Antisan*, and *South Andean*. II. E. NATIONS: *Tupi-Guaranian*, *Caribbean*, nations and isolated tribes speaking langs. which seem not to belong to the Tupi-Guarani or the Carib stock, but which have never been investigated. III. MIDLAND nations, including those on the Lower Paraguay and the great plain of Chaco, and the *Chiquitos* and the *Mozos*, between Potosi and the upper streams of the Parana.

The fundamental characteristic of the I. L. is a universal tendency to express in the same word not only all that modifies or relates to the same object or action, but both the action and the object, thus concentrating in a single expression a complex idea or several ideas among which there is a natural connection. All the other features of the lang. seem to be subordinate to that gen. principle. It may almost be said with truth that I. L.—pronouns and a few particles excepted—are all verbs. Every word may be conjugated by moods and tenses; every noun has its preterite and future, its indicative and subjunctive; and many nouns have active and passive voices. Every synthesis is predicative, and is built on a verbal theme and assumes one of the conjugation-forms of a derivative or compound verb.

Eliot, in his translation of the Bible into the Algonkin dialect of Mass., uses for "our lusts" the word *num-match-e-kod-tan-ta-moo-on-ga-nun-no-nash*. It was not easy to give an Indian the Puritan conception of lust as "sinful longing." Eliot's synthesis is a verbal, with the affixes of the double plural—i. e. of the pronoun and the action or desire. The verb *kodtantam* means "to long for, to greatly desire;" *matche-kodtantam* is "badly to desire;" *matche-kodtantam-oo-onk* is a verbal, "badly longing or desiring;" *num* (for *n'*) is the possessive pronoun "my," which becomes plural, "our," by the insertion of *-unnon* before the final *-ash*, which is the plural termination of the verbal. The whole expresses "our evil longings."

We no longer attribute to the imperfection of a lang. what belongs to the rudeness of the nation. It is acknowledged that almost everywhere the Indian idioms display greater richness and more delicate gradations than might be supposed from the uncultivated state of the people by whom they are spoken; and as evidence of this we observe that the *Idyls* of Theocritus have been translated, with graceful simplicity, into the lang. of the Incas, and that, excepting treatises on science and philos., there is scarcely any work of modern lit. that might not be translated into the PERUVIAN. [From orig. art. in *J. S. Univ. Cyclopedia*, by HON. J. HAMMOND TRUMBULL, LL.D.]

Indian Ocean, the vast sheet of water between Afr., Asia, and Australia, traversed by the equatorial current, flowing from E. to W. with a somewhat varying velocity, and forming a very rapid current on the E. coast of Afr.

Indianola, R. R. junc. and cap. of Warren co., Ia., 20 m. S. of Des Moines. It is the seat of Simpson Centenary Coll. Pop. 1870, 1428; 1880, 2146.

Indianola, port of entry, cap. of Calhoun co., Tex., on R. R. and Matagorda Bay, 10 m. from Gulf of Mex. Its harbor is commodious, and connected by steamers and sailing vessels with New Orleans, New York, and other ports. Pop. 1870, 1900; 1880, 361.

Indians, American. See AMERICAN INDIANS in APPENDIX.

Indian Summer, in N. Amer., is an expression applied to a short season of pleasant weather, which commonly occurs in Nov. or the latter part of Oct. During this period the atmosphere is hazy and dry, the sky is red, the temperature mild, and rain is absent for an unusual length of time.

Indian (ind'yan) **Territory**, a tract of land originally belonging to the La. purchase, and which was set apart by the govt. of the U. S. as a permanent home for such of the Indian tribes as could be induced to settle there: between 33° 35' and 37° N. lat., and 94° 30' and 100° W. lon. to lat. 30° 30', on which parallel its S. boundary runs W. to 103° W. lon.; bounded N. by Kan. and for 1° of lon. by Col., W. and S. by Tex., except for 35 m. on the W., where it joins N. M.; E. by Ark. and for a short distance by Mo.; its area is 64,690 sq. m. or 41,401,600 acres, mostly granted to different Indian tribes of the U. S.

Face of the Country.—There is a gentle declination from the foot-hills of the Rocky Mts., which occupy the extreme N. W. portion of this Terr., toward the Miss. River, and this gen. slope trends also somewhat toward the S. E., so as to reach the valley of the lower Red River. Between the Red and Canadian rivers there are several groups and ranges of mts. of no very great elevation, as the Washita Mts., the Poteau and the Sans Bois Mts. In the E. part of the Terr. the rivers have broad and fertile bottom-lands. The W. portion is arid and for the most part treeless. The Ark. and Red rivers, with their affluents, drain the Terr.; the Canadian River, the prin. tributary of the Ark., traverses the entire Terr. from W. to E., as do also its N. fork and the Cimarron or Red fork of the Ark. The prin. affluent to the Red River is the Washita, a large and long stream.

Geology.—E. of the 97th meridian most of the Terr. belongs to the coal-measures, but little coal has as yet been mined there. The barren and sandy table-lands of the narrow strip in the N. W. are often covered with saline efflorescence.

Vegetation.—The E. part of the Terr. has much rich and fertile land. A belt of forest, the "Cross Timbers," extends from the Ark. River to the Brazos, and separates the fertile prairie-lands from the sterile table-lands of the N. W. W. of these there are few trees, and the soil grows more and more arid, till at last there are only thorny cacti, yuccas, and the gray sage-bush to be seen.

Animals.—The buffalo, the antelope, and to some extent the wild horse; deer and other game abound; the black or brown bear is found in the "Cross Timbers," and the prairie-dog, the wild-turkey, the prairie-hen, the sage-hen, and a great variety of birds are found in all parts of the Terr. There are not many fish in the rivers.

Climate.—The climate is warm and inclined to drought. In the S. E. it is more moist, the average rainfall being 52 inches, but it is also hot, the mean annual temperature exceeding 60° F. In the central portion the mean annual temperature ranges from 57° to 59°, and the rainfall is 35 inches. In the N. W. the mean temperature is 55°, and the rainfall 20 inches.

Agricultural Products, Etc.—The crop of 1879 was 2,015,000 bushels of Indian corn, 565,400 bushels of wheat, and 176,500 tons of hay, beside oats, barley, and vegetables of considerable value, and 1200 bales of cotton. Among other products of Indian labor during the same yr. were 8,100,360 ft. of lumber sawed, 132,886 cords of wood cut, 200,600 shingles made, 387,000 lbs. of maple sugar made, 164,000 lbs. of wild rice gathered, 17,000 woollen blankets and shawls woven, 2530 willow baskets made, 3800 cords of hemlock bark peeled, 211,000 lbs. of wool clipped for sale, and 3600 barrels of fish sold. The Cherokees, Choctaws, Creeks, Chickasaws, and Seminoles were much broken up during the c. war, yet their property is now valued at over \$20,000,000.

Farm Animals.—Horses, 59,200; cattle, 249,110; sheep, 22,500; swine, 189,606.

There is one R. R. which traverses this Terr. from N. to S.—the Mo. Kan. and Tex. Railway—250 m. of it within the Terr. The Atlantic and Pacific Railway also extends from Seneca to Vinita, a distance of about 35 m. in the Terr., connecting there with the Mo. Kan. and Tex. Numerous other R. Rs. have been projected, but the Indians oppose them.

Education.—The schools are mostly confined to the Cherokees, Choctaws, Creeks, Chickasaws, and Seminoles, the other tribes caring little for schools. In 1880 there was expended for public school education \$186,359 among the 5 civilized tribes. The average daily attendance in schools was 3944, while the number of school children enrolled was 6098, and the whole number of school age was 11,444. Of the whole pop. in this Terr., not less than 35,000 can read. There are 3 weekly papers pub. in the Terr.—1 Eng. and Cherokee at Tahlequah, 1 Eng. and Choctaw at New Boggy, and 1 Eng. at Caddo.

Churches.—I. T. has about 190 chs., the Baps. ranking first, with 95 chs. and 5823 members; the Meths. have 5588 members; Presbs. (South), 1007 members; Cumberland Presbs., 527 members; Presbs. proper, 263 members.

Divisions of the Territory.—There are no cos. or tps. in the Terr., but all the civilized tribes, and some of the uncivilized, have their reservations. Some of the tribes, having diminished in numbers, had more land than they needed, and have ceded it back to the U. S. for a liberal sum of money, the income of which is applied to the use of the tribe.

Population.—In 1878 the Indian office reported the whole number of Indians to be 75,479. These are for the most part civilized or partly civilized Indians, capable of becoming citizens. This is especially true of the 5 leading tribes—Cherokees, Choctaws, Creeks, Chickasaws, and Seminoles.

Principal Towns (none large), pop. unknown.—Tahlequah, cap. of Cherokee nation; Caddo, Choctaw nation; Fort Gibson, Cherokee nation; Muscogee, Creek nation; Tishomingo, cap. of Chickasaws; Armstrong Academy, cap. of Choctaws; Okmukee, cap. of Creeks; We-wa-ka, cap. of Seminoles.

History.—The Terr. is a part of the La. purchase. It was selected by the U. S. govt. in 1832 as the home of the tribes E. of the Miss., and the Creeks, Choctaws, Chickasaws, and Cherokees were removed thither from 1833 to 1838, and the Seminoles and some fragments of other tribes a little later. During the c. war several of the more civilized tribes took the side of the South.

REVISED BY A. R. SPOFFORD.

Indian Tobacco. See LOBELIA.

India Rubber, Caoutchouc, koo'chook (from *cachuchu* of the S. Amer. Indians), or **Gum Elastic** (Ger. *Kautschuk*, *Federharz*; Fr. *caoutchouc*), a peculiar substance, composed of carbon and hydrogen, found in suspension in the milky juice of a great many different families of plants. It has been stated that all milky vegetable juices contain it, but this is not the case; many of these juices yield gum-resins free from caoutchouc. Most of the rubber of commerce is derived from S. Amer., from Pará, Central Amer., Mex., Carthagenia, etc.; smaller quantities from Java, Penang, Singapore, Assam, and Natal.

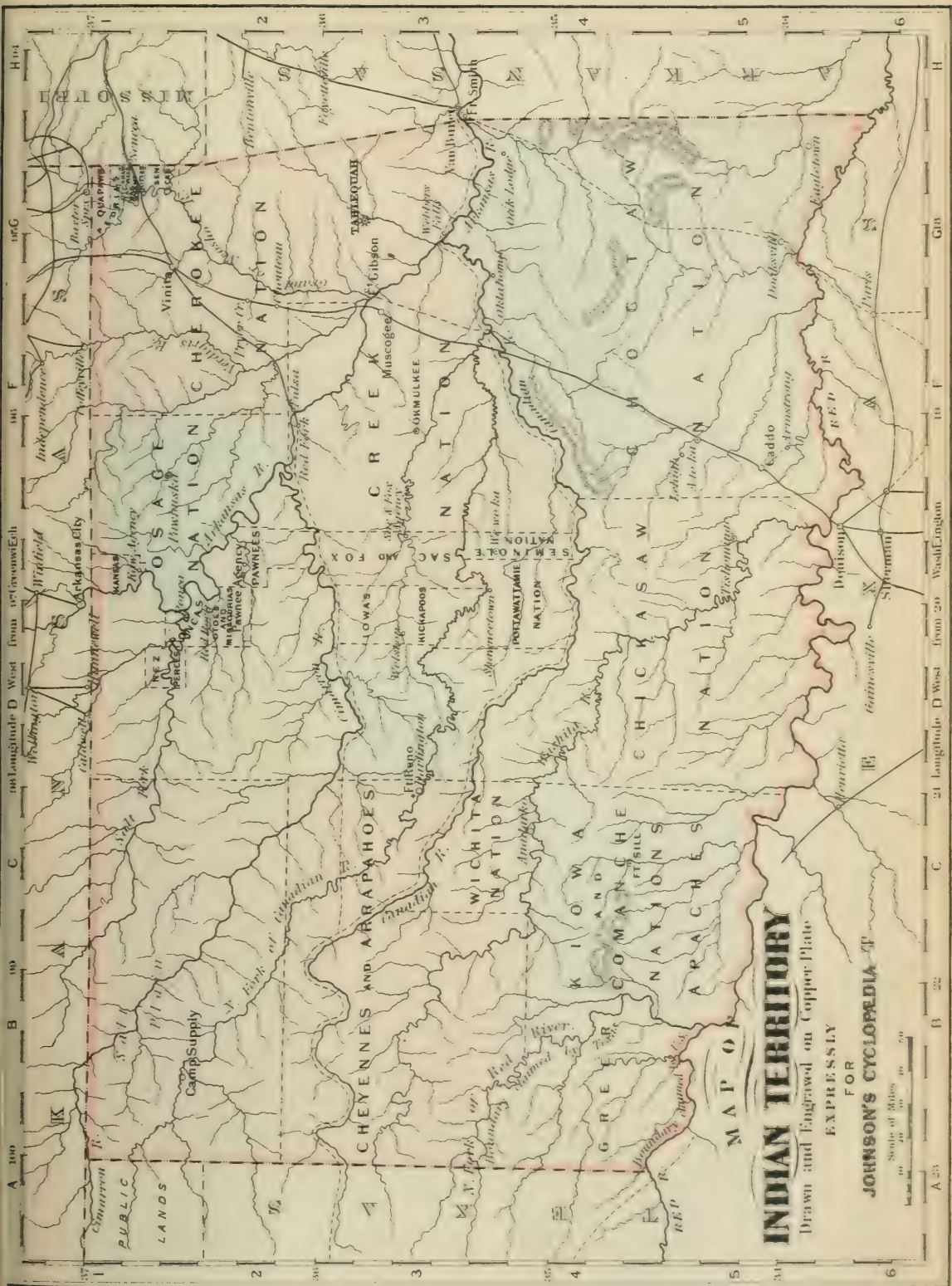
Preparation of the Crude Caoutchouc.—The juice is dried over a fire, when it becomes blackened by smoke, or in the sun, when it is very light-colored, on moulds of clay, paddles, or (formerly) on lasts imported from the U. S. for over-shoes. According to Mr. Edwards, the last, on the end of a stick, was dipped into the milk, and immediately held over the smoke to dry; it was then redipped, and the process repeated till the shoe was of sufficient thickness. When clay moulds are used, they are subsequently broken and shaken out of the rubber bottles produced upon them. The juice is sometimes evaporated by solar heat, a pellicle of rubber forming on the surface, and being renewed as fast as it is removed until all the rubber is removed. These sheets are rolled into balls and combined into masses. The purest from Pará is much more valuable than that from other localities. It appears in large bottles and thick plates, often entirely free from impurities, and very light colored within. The Carthagena gum comes in very large lumps, often weighing 100 lbs., and evidently formed by pressing thin sheets together. It is black within as well as without. The E. I. gum appears as a conglomerate of light and dark reddish-brown masses, often mixed with much wood, bark, leaves, gravel, etc. Crude impure rubber often undergoes a very injurious change, especially when exposed to the direct rays of the sun. It softens, becomes smeary and semi-fluid like tar. Afr. gum is said to be more liable to suffer in this way than any other. In the interior of many of the balls which come from Brazil and the E. I. spots are often found of a viscid, tarry matter, which when exposed to air seems to act like a ferment and decomposes the whole mass into a viscid, sticky, semi-fluid substance, good for nothing.

Physical Properties of Caoutchouc.—Pure caoutchouc freshly prepared is colorless and translucent. The dark color which it generally exhibits is attributed to soot and to aloetic and other impurities, and to the action of sunlight and oxygen. It is a bad conductor of heat and a non-conductor of electricity. It develops electricity by friction. Its specific gravity varies from 0.920 to 0.962. Its texture is not fibrous, but under the microscope it is seen to contain pores, irregularly rounded and very numerous, which communicate with each other, and become distended by capillary attraction in those liquids in which caoutchouc is not soluble. Thin sections of different qualities of gum, immersed in water during 30 days, absorbed from 18.7 to 26.4 per cent. It takes a very long time to eliminate water from thick masses of gum, since the exterior pores contract in drying, and thus retard the desiccation of the interior. Anhydrous alcohol, especially when warm, easily penetrates thin sections of caoutchouc. Freshly-cut surfaces adhere easily and firmly when pressed together—a property which is made available in forming tubes and vessels out of sheet caoutchouc. By cold or long quiescence it becomes hard and stiff, but not brittle; perfectly elastic, and is turbid and fibrous when strongly stretched.

Effect of Heat on Caoutchouc.—Below 0° C. it becomes hard and rigid. When heated it gradually softens, and at 120° C. (248° F.) begins to melt; when it is fused it remains greasy and semi-fluid after cooling, but if exposed to the air in thin layers gradually dries up, and recovers its original properties, provided it has not been heated much above its melting-point. If, however, it be heated to 200° C. (398° F.), it begins to fume, and is converted into a viscid mass which no longer dries up. If mixed in this state with half its weight of lime slaked to powder, it forms a tenacious non-drying cement, which serves admirably for attaching glass plates to vessels with ground lips, such as are used for preserving anatomical preparations, as it forms an air-tight but easily loosened joint; if a drying cement be required, a quantity of red lead may be added equal in weight to the lime. (Watts.) By destructive distillation caoutchouc yields an empyreumatic oil called *oil of caoutchouc*, which is a mixture of a considerable number of hydrocarbons. Ignited in contact with the air, it burns with a sooty flame.

Effect of Water on Caoutchouc.—Water, whether hot or cold, has no solvent action upon it, but by long boiling in this liquid it swells to some extent, in which state it is affected by some solvents with greater facility than in its ordinary condition. Exposed to the air, the caoutchouc resumes after a time its original form, though the desiccation proceeds very slowly. The absorption of water by thin sheets has been already alluded to. W. A. Miller noticed that a sheet of the best masticated rubber exposed in water, open to the air, to diffused light, finally absorbed 87 per cent. of water, becoming white, opaque, slimy, and sticky. In this condition water could be squeezed out of it. In seawater, under like conditions, it absorbed only 5 per cent.

Solubility of Caoutchouc.—In alcohol it swells and softens, but does not dissolve. Alcohol precipitates it from its solutions. Ether, freed from alcoholate by washing with water, dissolves caoutchouc in moderate quantity, leaving it on evaporation with its original properties, except that it adheres firmly like a sheet newly cut. "No solvent appears to make a complete solution of caoutchouc, but a mixture formed by the interposition of the dissolved portion between the pores of the insoluble substance, which is considerably swelled up, and has thus become easy to disintegrate. By employing a sufficient quantity of these solvents, renewed from time to time, without agitation, so as not to break the tumefied portion, the caoutchouc may be completely sepa-



INDIAN TERRITORY

Drawn and Engraved on Copper Plate

EXPRESSLY

FOR

JOHNSON'S CYCLOPEDIA

Scale of Miles

0 10 20 30 40 50

Scale of Miles

0 10 20 30 40 50

Scale of Miles

0 10 20 30 40 50

rated into 2 parts—viz. a substance perfectly soluble, ductile, and adhering strongly to the surface of bodies to which it is applied; and another substance, elastic, tenacious, and sparingly soluble. The proportions of these 2 principles vary with the quantity of the caoutchouc and the nature of the solvent employed. Anhydrous ether extracts from amber-colored caoutchouc 60 per cent. of white, soluble matter; oil of turpentine separates from common caoutchouc 49 per cent. of soluble matter having a yellow color." (*Watts*.) Chloroform, oil of caoutchouc, oil of turpentine, oil of lavender, and many other essential oils are solvents for caoutchouc. A mixture of 1 part of caoutchouc with 11 of oil of turpentine, worked up to a thin paste, to which is then added $\frac{1}{2}$ part of a hot concentrated solution of sulphide of potassium, leaves the caoutchouc on evaporation perfectly elastic and without viscosity. Bisulphide of carbon is one of the best solvents, particularly when mixed with 6 to 8 per cent. of absolute alcohol. "If the alcohol be mixed with a little water, a dough is obtained, from which the caoutchouc may be drawn out into threads and spun. Coal-tar, naphtha, benzol, coal and shale oil naphthas, and petroleum naphtha are all solvents for caoutchouc. The naphtha solution or varnish was used in preparing the waterproof cloth of Mackintosh, being placed between 2 thicknesses of the cloth. A mixture of 50 parts of benzol and 70 parts of rectified turpentine has been recently recommended as a solvent for 25 parts of caoutchouc. The crude gum must first be boiled in water to remove dirt, etc., cut under water into sheets about $\frac{1}{2}$ of an inch thick, rolled out into thin strips, and thoroughly dried in a heated room. The mixture of gum, etc. must be passed through a mill. The benzol and turpentine must be free from fat."

Action of Reagents on Caoutchouc.—Acids and alkalis have no effect on it when dilute, and little when concentrated unless heated. Ammonia, after a contact prolonged several months, seems to exert the curious influence of bringing it back to the state of an emulsion, in which form it may be used as a varnish, as it recovers its peculiar qualities on drying. Thoroughly kneaded with sulphur and exposed to heat for several hours, it is converted into *vulcanized rubber*, which, with less than 1 of sulphur to 4 of gum, is soft and pliable; with half its weight of sulphur, after exposure to a temperature above 280° F. it is hard and flexible, like whalebone—*vulcanite*. W. A. Miller has shown (*J. Lond. Chem. Soc.* 1865, p. 273), in an investigation on the *Decay of Gutta Percha and Caoutchouc*, that caoutchouc is liable to deterioration by exposure to the action of oxygen in the presence of solar light, but the gum is less rapidly injured by their influence when in the native state than when it has been previously masticated. When subjected to the action of air, excluded from light, it does not experience any marked change, even during very long periods. It is important to observe that the masticated rubber is much more porous than the unmanufactured caoutchouc. A sample of the best Pará rubber after 9 months' exposure had gained 2.8 per cent., had become brown and sticky, and yielded to alcohol 11.81 per cent. of a resin containing C. 67.23, H. 9.54, O. 23.23.

Chemical Composition of Caoutchouc.—Caoutchouc is composed wholly of carbon and hydrogen, containing 87.5 per cent. of carbon and 12.5 hydrogen. It is not, however, a simple proximate principle, but chiefly a mixture of 2 substances, one much more soluble in ether, benzole, and other liquids than the other.

Caoutchouc manufactures have of late yrs. acquired enormous importance, and are found in every dept. of the industrial arts. The caoutchouc is used (1) in blocks, cakes, sheets, etc.; (2) in tapes or threads in woven fabrics for the production of elastic tissues; (3) as a varnish between 2 surfaces of cloth or on one surface, for the production of waterproof fabrics; (4) in solution alone or combined with other substances as a cement; (5) combined with a small quantity of sulphur and mixed with other substances, as *soft vulcanized rubber*, for the manufacture of overshoes, boots, gloves, waterproof clothing, and other goods, life-preservers, gas-bags, steam and water packing, belting, fire-hose, tubing, springs, artificial sponge, etc.; (6) combined with a larger proportion of sulphur, and cured at a higher temperature, as *hard vulcanized rubber*, or *vulcanite*, for the manufacture of combs, pen and pencil holders, rulers, inkstands, buttons, canes, syringes, jewelry, and colored with vermilion for mountings for artificial teeth, etc.; (7) combined with asphalts, oils, sulphur, etc., and vulcanized, as the *kerite* of A. G. Day, for covering telegraph wire—a most valuable substitute for gutta-percha for air-lines, as it is not affected by atmospheric influences, which so quickly destroy the latter substance. C. F. CHANDLER.

Indicopleustes (COSMAS), an Egyptian trader in the 6th century; made extensive voyages in the E., visiting Syria, Ar., Ethiopia, Per., and India, observing the manners and customs of all the peoples with whom he opened a traffic. After many yrs. spent in this manner, Cosmas renounced the world, and entering a monastery, devoted himself to contemplation. In his old age he wrote in Gr. a work upon universal geog., usually cited by the Lat. title, *Topographia Christiana sive Christianorum Opinio de Mundo*, of which the object was to combat the opinion that the earth is a spherical body. According to Cosmas, the shape of the earth is shadowed forth in Script. by the description of the Jewish tabernacle. It is a vast oblong plain inclosed by the ocean, the length from E. to W. being just twice that from N. to S.

Indiction [Lat. *indictio*, "proclamation"], the name used in chronology for a method of reckoning time by periods of 15 yrs. This method was occasioned by a tax which was levied in the Rom. empire every 15th yr., and the point of time from which the I. began was Sept. 15, 312. Later on, when the method was adopted by the popes, Jan. 1, 313, was fixed as the starting-point, and this change was called the papal I.

Indictment, in-dit-ment [Lat. *indico*, to "show"], a written accusation of one or more persons of an indictable

offence, consisting of a felony or misdemeanor, preferred to and presented upon oath by a grand jury. A draught of the I. prepared by the atty.-gen., dist. atty., or other proper officer representing the govt., is laid before the grand jury when they are lawfully convened, and if 12 or more of them are satisfied, from the *ex parte* evidence presented to them, that there is *prima facie* reason to conclude that the alleged offender is guilty, the words "A true bill" are written upon the back of the draught, and the I. is then said to be "found;" and upon the basis of the charges therein contained the prisoner is placed on trial, at a regular session of the proper court, before a petit jury. The I. must contain a full and particular description of the alleged crime, and have such a degree of certainty and precision in the accusation that it may be seen by the court that the act charged, if true, would constitute a crime. The name of the prisoner should be stated, or if that is not known he should be so described as to be adequately identified. The time and place at which the offence was committed should also be alleged, though it is not generally necessary that allegations on these particular points should be proved exactly as charged. The place named must be within the jurisdiction of the court. Whenever an I. charges an offence created or declared by statute, it must be accurately framed in accordance with the provisions of the statute. There are also various rules of law which must be observed to prevent the allegations of an I. from being absurd, inconsistent, or repugnant. At common law the defendant was not, in cases of treason and felony, entitled to a copy of the I. This harsh rule has been abolished in many of the States of the U. by statute; for instance in N. H., Vt., N. Y., O., Ill., Mich., Wis., Ga., Tex., and a few other States. GEORGE CHASE.

Indies, East. See INDIA, INDO-CHINA, EASTERN ARCHIPELAGO, and EAST INDIES.

Indies, West. See ANTILLES and WEST INDIES.

Indigestion, in-de-jest'yun, or **Dyspepsia**, dis-pep'-se-a [Gr. *δυσ*, "bad," and *πείρω*, to "digest"]. I. has many forms, and includes groups of symptoms indicative of departure from one or many of the conditions of healthy digestion. The digestive process is complex, and is performed by the agency of the saliva, the gastric juice, and the intestinal, pancreatic, and biliary secretions. I. may be gastric or intestinal—often the 2 combined. It is either primary—an essential disorder of the digestive apparatus—or secondary and symptomatic of disease in other organs. Primary or idiopathic I. includes all cases in which careful investigation has failed to discover a dependency on other disease. It may be a simple functional disorder of digestion, or due to an organic cause in some part of the digestive tract. Functional dyspepsia is termed atonic. Organic dyspepsia, if mild and due to temporary and slight lesions of the secretory surface, is termed irritative; if severe, it is designated chronic gastritis, a condition which by associated symptoms and physical exploration may be found to depend upon ulcer, cancer, or inflammatory thickening. The majority of I. are the result of gross excesses of diet and violations of hygienic law, excess of food, too frequent meals, rapid eating with incomplete mastication and insalivation, food unfit for digestion or improperly and insufficiently cooked, the habitual use of condiments, rendering the peptic glands dependent upon their stimulus, the imbibition in excess of liquids, as water, tea, or coffee, at meals, causing dilution of the gastric juice. Tea, coffee, and tobacco impair the innervation of the stomach. The chief symptoms of gastric I. are sense of fullness, weight, distress, and dull pain over the stomach, coated or irritable tongue, foul breath, perverted appetite—usually poor in the morning, and often morbid and irregular—sometimes nausea and vomiting, eructations of gas, regurgitation of acid or alkaline liquids and of food, often constipation, and less often colicky pain, with irregularity and looseness. There may exist lassitude, mental inactivity, drowsiness, cranial oppression, headache, vertigo, sometimes clouded vision, diplopia or double vision, and numerous nervous symptoms and perversions of the senses may exist: shortness of breath, sighing respiration, precordial distress, palpitation and irregular action of the heart. There may be poor circulation, relaxed and pallid or sallow surface and complexion, cold hands and feet; in women, menstrual disorders. With the more marked and aggravated symptoms there may be mental depression, anxiety, despondency, and apprehension, constituting hypochondria. In aged persons a steady progressive loss of appetite, progressive inanition and emaciation, and death from slow asthenia, without other symptoms of I. or evidence of disease in other organs, result from degeneration of the gastric and intestinal tubules, the peptic glands.

In the treatment of I. regulation of diet alone often effects a cure. Drink of any kind at meals should be very limited. Attention to general regimen is essential. There must be out-door exercise, freedom from mental stress, from phys. fatigue, and dissipation in any form. Tendency of the food to decompose demands correctives. For the acid stomach, bicarbonate of soda; for alkaline fluid and gastric mucus, dilute mineral acids and acidulated drinks. When the stomach fails to digest albuminoids, pepsine may be given. Fermentation of food, with fetid products and foul breath, may be treated by the sulphate of soda; charcoal is also efficacious. In atony of the stomach, carminatives, as ginger, calamus, capsicum, and compound tincture of cardamum, stimulate glandular secretion; bitter vegetable tonics, chamomile, quassia, calumbo, gentian, wild cherry bark, cascarilla and cinchona barks, create appetite, and nuxvomica increases the muscular tone and activity of the stomach and intestines and prevents flatulence. Quinine and ferruginous tonics, as the citrate of iron and quinine, the lactophosphate and carbonate of iron, and Bland's pills, produce gen. vigor, improve the blood, and aid digestion. Laxatives are essential when constipation exists.

E. D. HUBBON.
Indigo (*Indicum* of the ancients), the most important blue dye known. It is obtained from several species of the

genus *Indigofera*, which grow principally in warm climates. It has also been noticed in morbid urine, and Dr. Schunck has shown that it may be obtained from the urine of healthy men and animals by the action of strong acids. It has also been observed in the milk of cows.

History.—This most valuable dyeing substance was used as a dyestuff in India and Egypt long before the Chr. era, and the Romans were acquainted with it, although they only used it as a pigment, not knowing how to render it soluble, and so available for dyeing. It is only since the 16th century, or from the time of the discovery of the passage to India round the Cape of Good Hope, that it has become generally known in Europe; and its employment as a dye was greatly retarded by the opposition it met with from the large vested interests of the wood-cultivators, who induced the Eng., Fr., and Ger. govts. to promulgate several enactments against its use. So severe were some of them that Henry IV. of Fr. issued an edict condemning to death any one who used that pernicious drug called the "devil's food." It is only since the yr. 1737 that the Fr. dyers have had the right of using I. without restriction. It was urged against this dye that it was fugitive, and even prejudicial to the wool. The Dut. were the first to introduce it.

Indican.—The plants do not contain the I. when they are gathered, but a peculiar substance, indican, which is a yellow, transparent, glutinous solid, soluble in alcohol, ether, and water. Indican is a glucoside, and is converted by fermentation or by boiling with sulphuric or hydrochloric acid into I.-blue, I.-red, etc., and a peculiar glucose-like body, indigluin. Indican has been found in human blood and urine.

The extraction of the indigo in Bengal is effected either from fresh or dry leaves. *From the Fresh Leaves.*—Two large stone cisterns are provided—the *steeper*, or fermenting vat, about 20 ft. square and 3 ft. deep, and the *beater*, standing lower, of the same width, but a third longer. The fresh plants, tied in bundles, are stratified in the steeper and fastened down by beams. They are then covered with water, when fermentation begins at once, and is completed in 14 or 15 hours. The liquid is at first yellow, but becomes dark green, and exhibits a blue scum. It is drawn off into the beater, and 4 men beat it with oars or shovels called *bisquels*. Paddle-wheels or dashers have been used. After being beaten for an hour and a half, if the previous fermentation has been satisfactory the I. agglomerates into flocks and settles as a precipitate. The object of the beating is to introduce oxygen. The precipitation may be hastened by the addition of lime-water, but this throws down extractive matter and makes the I. hard and red. The precipitate is allowed to subside, the supernatant water is drawn off, and the moist precipitate is strained through a coarse bag. It is then boiled to separate a yellow extractive matter and increase the density and intensity of its color. It is then sent to the *dripping* or filtering vat, which contains a perforated false bottom covered with cotton cloth. The drained magma is placed in a strong bag and squeezed in a press, and the moist mass is cut with a brass wire into cubes about 3 inches each way. The cubes are dried in the air, a white efflorescence which appears during the drying being removed with a brush: 1000 parts of the liquor from the steeping vat yield 0.50 to 0.75 indigo.

The commercial varieties of I. are very numerous. The Bengal I. ranks first in quality; it is classified as fine blue, fine purple and violet, fine red and violet, good purple and violet, middling violet, middling defective, consuming fine, middling and good, ordinary, and ordinary and lean trash. Some merchants recognize 16 distinct grades. Beside the Bengal, there occurs in commerce the Java, 21 grades. The Bengal and Java range from 40 to 80 per cent. of I.-blue; the remaining varieties vary from 10 to 37 per cent.; they are Coromandel, Oude, Madras, Manila, Egyptian, Guatemala, Caracas, and Mex.

Properties of the Crude Indigo.—The color is deep blue, with a shade more or less purple or violet. It is devoid of smell and taste. It may be dry or moist, hard or soft, compact or porous. Being always more or less porous, it adheres slightly to the tongue. Its fracture is dull and earthy. The streak produced by the nail is glossy and purplish-red in the best qualities; when it is dull, and the I. furrows on each side of the streak, the quality is poor. The best I. floats upon water.

Composition of Crude Indigo.—Beside I.-blue (indigotine), which is the characteristic constituent of I., and which varies in quantity from 10 to 80 per cent., a variety of other bodies are present, either derived from the plant or added intentionally.

The adulterants are starch (most common), rosin, Prus. blue, smalt, ground dyewoods, etc.

The purification of indigo is effected by boiling it successively with dilute acid, water, and alcohol. The pure indigotine may be extracted by changing it to soluble white I. by reducing agents, as explained further on, and subsequently reoxidizing it.

Indigo blue, indigotine, oxidized indigo, may be obtained nearly pure by exhausting I. by solvents as above mentioned. It may also be obtained (1) by sublimation, in crystals, mixing the powdered I. with plaster of Paris and water, spreading it on an iron plate to harden, and carefully heating the dry cake; (2) by solution in boiling aniline, which deposits it in crystals on cooling; (3) by reducing it to soluble white I. by contact with grape-sugar, soda-lye, water, and alcohol, or by contact with slaked lime, coppers, and water. The yellow solution obtained deposits indigotine as a blue powder when exposed to the air. Indigotine appears as blue crystals with a coppery lustre, or as a dark-blue powder, acquiring this lustre when rubbed with a hard body. It has neither taste nor smell, acid nor basic properties; sp. gr. 1.500. Heated in the open air, it melts, boils, and burns with a smoky flame. Heated in a current of air at about 550° F., it volatilizes without decomposition as a purple vapor. It is insoluble in water, in di-

lute hydrochloric and sulphuric acids, and in alkaline lyes, in cold ether, alcohol, oil of turpentine, and fatty oils. Its best solvent is boiling aniline. It is soluble to a greater or less extent in hot creosote, phenol, benzol, chloroform, alcohol, ether, essential oils, fatty oils, petroleum, amylic alcohol; in the acetates, chlorides, etc. of aniline, morphine, etc., beeswax, Japan wax, Canauba wax, paraffine, spermaceti, and stearic acid. It is soluble in anhydrous acetic acid to which a very small quantity of sulphuric acid has been added, and is precipitated from the solution by the addition of water. This is the only process known by which indigotine can be reproduced in its primitive state on fabrics, without previous reduction to soluble white I.

The action of sulphuric acid on indigo gives rise to 3 distinct compounds, the production of which depends upon the strength and ratio of the acid, the temperature, and the duration of the contact: it is difficult to conduct the reaction so as to prevent the formation of at least a small portion of each. If powdered I. is digested with oil of vitriol, and the deep-blue liquid poured into 40 or 50 parts of cold water, a purple powder remains undissolved which is (1) sulphophenic acid, while the deep-blue solution contains (2) sulphindigotic and (3) hyposulphindigotic acid. By forming the ammonium-salts of the last 2 acids, evaporating to dryness, and digesting with alcohol, the hyposulphindigotate only is dissolved.

Sulphophenic Acid, Sulphopurpuric Acid, Indigo-Purple, Phenacin.—This acid is best prepared by adding 1 part of I. to 4 parts of oil of vitriol, and heating from 30 minutes to an hour, or until a drop gives a deep purple color with a large quantity of cold water. The acid mixture is thrown into 40 to 50 parts cold water, and the beautiful purple precipitate is collected on a filter and washed with weak hydrochloric acid. It forms a blue mass or a purple-red powder. It is soluble in water, and soluble in strong sulphuric acid, especially in the fuming acid; both gradually change it into sulphindigotic acid, more rapidly if heated. It is insoluble in dilute acids. The salts of this acid are prepared by adding its solution to an aqueous solution of any salt. They appear as purple flocks, which are but slightly soluble in water. When dry they are red. Their solutions are blue; are reduced to yellow liquids by sulphydric acid, coppers, and lime, or by caustic alkalis, but become blue again on exposure to the air. Wool may be dyed with this acid by immersing it in an aqueous solution and adding a little hydrochloric acid. By passing the wool so dyed through a weak bath of carbonate of soda various shades of purple may be produced, a small quantity of sulphindigotic, which is always present, being removed, and the sulphophenicate of soda being formed, which is a faster dye than the acid.

Sulphindigotic Acid, Sulphate of Indigo, Soluble Blue Indigo, Sulphindigic Acid, Sulphocaralic Acid.—This acid is prepared by dissolving 1 part of I. in 10 or 12 parts of concentrated sulphuric acid (6 parts of fuming acid answer the same purpose), and heating the whole for several hours at 120° F. The operation is complete when a portion dissolves completely in cold water. The product is a mixture of this acid with hyposulphindigotic acid. To free it from this, and the impurities derived from the I., well-washed wool is allowed to absorb the dyes from the solution. This is washed in water and digested in a dilute solution of carbonate of ammonia, which dissolves both acids. On evaporating to dryness the 2 ammonia-salts may be separated by alcohol (83 per cent.) in which the sulphindigotate is insoluble. This separation is not resorted to in practice, the mixture of the 2 acids being used directly. The sulphindigotic acid may be freed from the excess of sulphuric acid by adding an excess of a solution of common salt. It is then obtained as a blue precipitate which may be drained on a filter. Sulphindigotic acid is very soluble in water and in alcohol, but not in strong saline solutions. Charcoal, especially that from blood, removes it completely from its aqueous solution, but yields it to alkaline carbonates. It is decomposed by an excess of caustic alkali, and the color cannot be restored. Reducing agents, as stannous and ferrous salts, sulphydric acid, nascent hydrogen, etc., decolorize it, the color being restored by exposure to the air. Sulphindigotates are formed by neutralizing the free acid or by double decomposition. They do not crystallize, are dark blue, with a coppery lustre, and taste feebly saline and decidedly of I. The alkaline sulphindigotates are slightly soluble in cold water, more so in hot water. The lime, magnesia, and alumina salts are freely soluble. The solution is blue by reflected light, red by transmitted light.

Alkaline sulphindigotates, indigo-carminé, blue carminé, soluble indigo, and precipitated indigo are prepared by adding alkaline carbonates to the diluted solution of the acid. They appear as precipitates, being insoluble in saline solutions; the alkaline sulphates formed at the same time are sufficient for the purpose. The potassium-salt dissolves in 140 parts of cold water, and in much less boiling water: 1 part of salt gives a blue color to 500,000 parts of water, about $\frac{1}{10}$ grain per gal. Water containing 1 per cent. of acetate of sodium does not dissolve it in the cold. It is soluble in sulphuric acid, insoluble in concentrated hydrochloric, and in alcohol of sp. gr. 0.800. The sodium-salt resembles the potassium-salt, and is used for similar purposes, much more extensively. It is more soluble in saline solutions. Beside being useful as a dye, the indigo-carminé is used as a water-color pigment, and made into balls with starch and a little gum-water it is used as washing blue.

Hyposulphindigotic Acid, Hyposulphocaralic Acid.—This acid, the composition of which is not known, has been already mentioned as always occurring in the solution obtained by treating I. with sulphuric acid. The acid differs little from sulphindigotic acid, and the salts are distinguished chiefly by their solubility in alcohol of 84 per cent.

Commercial preparations of indigo and sulphuric acid are mixtures of the 3 acids above mentioned or their salts.

There are 3 distinct kinds of preparation: (1) The simple solution of the acids in water, known as *Saxon blue*, *chemic*, *chemic blue*, *sour extract of indigo*, *sulphate of indigo*, etc. (2) The precipitated acids, *paste*, *sweet extract*, made by adding a strong solution of salt to the diluted and filtered solution of I. in sulphuric acid. (3) Neutral soda-salts, *indigo-carmin*, *soluble indigo*, *solid blue*, *chemic*, *cerulein*, *ceruleo-sulphate*, *extract of indigo*. This is made by neutralizing the solution of I. in sulphuric acid by carbonate of soda; being insoluble in saline solutions, it appears as a precipitate, which is washed on a filter with solution of salt, and sold as a paste or as a dry powder.

Artificial indigo has recently been prepared by Baeyer, and promises to be a commercial success. Cinnamic acid is converted by nitric acid into ortho-nitro-cinnamic acid; this by bromine into di-brom-nitro-phenyl-propionic acid; this by an alkali into ortho-nitro-phenyl-propionic acid; and this by reducing agents into I.-blue.

Uses.—I. is still extensively used in dyeing and calico-printing, though Prus. blue and aniline blues have largely replaced it.

C. F. CHANDLER.

Indigo Bird, *Cyanospiza cyanea*, one of our most beautiful native finches, is of a rich greenish-blue, feeds on seeds and insects, nests in the U. S., usually on a low bush or on tall grass, and winters in tropical Amer. The bird is nearly 6 inches long.

Indigotin. See INDIGO, by PROF. C. F. CHANDLER.

Indium [Gr. *indurion*, "dark-blue dye"], a metal discovered by means of the spectroscopic in Freiberg zinc-blende by Reich and Richter in 1863. It has since been found in various zinc minerals and in wolfram, also in the flue-dust of the furnaces in which zinc ores are treated, as well as in the zinc itself. It has a bluish-silvery lustre, and resembles lead in its softness and ductility. Its specific gravity is 7.421, atomic weight 113.4. It tarnishes slowly in air. Its melting-point is 176° C. (349° F.). Its very low fusion-point compared with other metals permanent in air is a striking peculiarity. It is not very volatile, and resists oxidation at temperatures considerably above its point of fusion. The spectrum consists of 2 blue lines.

E. WALLER.

Indo-China, Farther India, and Indo-beyond-the-Ganges are the names given to that portion of the S. E. peninsula of Asia bounded N. by Tibet and Chi., W. by the Gulf of Tonquin and the China Sea, S. and S. W. by the China Sea, the Strait of Malacca, the Gulf of Martaban, and the Bay of Bengal, and on the N. W. by Hindustan. Its area is about 850,000 sq. m., and the pop. is estimated at 25,000,000. Several adjacent islands belong to the Indo-Chi. peninsula.

Physical Features.—A chain of mts. run in a continuous ridge parallel with the coast, increasing in altitude as it approaches the city of Hué, the cap. of Cochinchina. The N. prov. of Tonquin consists of a vast plain watered by the Songkha River. Cochinchina proper stretches along the coast between 11° and 18° N. lat. The Méikhong, or Cambodia, the largest river of the peninsula, takes its rise on the frontiers of S'efan, where it is called Lan-Tsang; toward the S. it is renamed Kew-lung-Keang, or Nine Dragon River. It traverses Laos and Cambodia, and after a course of more than 1500 m. separates into several distinct branches before emptying into the China Sea. Cochinchina, from its many navigable rivers and excellent harbors, possesses extraordinary advantages for commerce. The chief town is Hué, or "the head," on a river navigable for ships of moderate burden. Udong, the present cap. of Cambodia, is about 4½ m. from that arm of the Méikhong which forms the great lake Tala-Sarp. A marshy plain covered with a dense forest stretches in an unbroken line almost to the very gates of the city. The Songkha, or "great river" of Tonquin, has a course of nearly 400 m., while Hué, the river of Cochinchina proper, flows through a cultivated country. The changes of climate in these regions are sudden. Heavy rains fall during the summer, which produce a gen. inundation at the end of Oct., after which the climate is pleasant for about 3 months.

Political Divisions.—Brit. Burmah, including all the W. or frontier lands, is under the direct control of Brit. authorities. The kingdom of Siam lies in the middle, and comprises some portions of the Malayan peninsula. To the E. and N. E. of the frontier of Brit. Burmah are found several tribes of Karens, some of which acknowledge Brit., some Siamese, and others Burmese suzerainty, while there are other tribes which are really independent. Approaching the N. portions of Cambodia, there are found the Shan states, tributary to Burmah. To the W. of these Shan states are other tribes substantially submissive to the Burmese, and beyond the Méikhong are other Shan states tributary to Chi. But there is a vast region occupied by Shan states whose allegiance to any of these 4 powers is ill defined.

Laos formerly included the Shan states, but since the 18th century the people have acknowledged a nominal dependence upon Siam. The Laos are a hardy, industrious, and peaceable people. The laws are severe; theft is punished by death, drunkenness by imprisonment. The persons of the females are held sacred; morality is nowhere better observed. The Laos are one of the most interesting of the Indo-Chi. races.

Fr. or Lower Cochinchina lies in the S. extremity of the E. portion of the peninsula, lat. 9° 5'-10° N., lon. 105°-107° E. This vast terr. has been gradually acquired by the Fr., who, after long wars, obtained in 1861 possession of 3 rich provs. and several islands off the coast. Further acquisitions were made in 1867, so that the Fr. colony included an area of about 21,000 sq. m., with a pop. of 1,592,302 (1878).

Cambodia was formerly a powerful and independent state, often at war with Anam and Siam. At last (about 1540) the king of Siam captured the cap. of Cambodia, put the king to death, placed a friendly prince upon the throne, and for some 300 yrs. the kings of Siam held the right to establish the rulers of Cambodia, receiving an annual tribute. In

1787 Ghalong, king of Anam, desirous of securing his throne against the joint armies of Siam and Cambodia, entered into a treaty with Louis XIV. of Fr., by whose aid he acquired the rule of Cambodia. After the death of Ghalong, and during the reigns of his 3 successors, Cochinchina was plunged in a succession of wars, in which Fr. became involved, the result being that in June 1864 Cambodia was declared an independent state; its ruler, Ph'ra Narodorn, being crowned in the presence of the Fr. and Siamese representatives and placed under Fr. protectorate.

Religion.—The religion of most of the inhabs. of the Indo-Chi. peninsula is a modification of the system of Booddha. A yearly contribution is levied by the govt. for the support of a number of temples, priests, and monasteries, in which the priests invoke the deity for the public welfare. Voluntary contributions of the people for the support of the priests are very great.

Races and Languages.—The chief characteristics of the various races inhabiting the Indo-Chi. peninsula are mainly 2: (1) they are more or less of Mongolian type; (2) they speak langs. classed as monosyllabic. These races are now divided into 7 groups, each comprising several subdivisions. The first group are those who inhabit Tibet proper; the second group are the Naga tribes, who are serpent-worshippers. All the various tribes which are found among the mt.-regions and river-valleys are probably the aborigines of the Indo-Chi. peninsula. The whole chain of mts. which extends from the N. of Tonquin to the S. of Cochinchina is inhabited by wild tribes speaking many different dialects. The Siamese, or rather the Thais ("free men"), are one of the most important of these Indo-Chi. nations. The Laos inhabit the interior. The Indo-Chi. langs. are of monosyllabic character. On the primitive lang. of the Anamites was grafted the Chi. All the other langs. of this group were originally dialects. In this sense the Cambodian, Siamese, and Burmese represent the most widely diffused form of the Indo-Chi. langs. But there is a marked difference between the speech of the Siamese, the Cambodians, and the Burmese. The alphabets of the Burmese and Siamese are very different. The Burmese use a round character, supposed to be derived from Ceylon. The Siamese use an upright character, borrowed from the anc. Cambodians, which is sometimes called Pali, which means simply writing, not lang. The Laos, in the N. of Siam, speak a dialect peculiar to themselves, but with many Siamese and Cambodian affixes, and the alphabet is like that of the Burmese. (See CRAWFORD, *Siam and Cochinchina*; MOCHOR, *Travels in Indo-China*.) [From orig. art. in *J.'s Univ. Cyc.*, by Mrs. A. H. LEONOWENS.]

Indra. The anc. Hindus, in the Vedic period of their religion, did not worship the Indian Triad or heroes, but deified the sky, the sun, fire, lightning, wind, etc. I. denoted the sky. The primitive Aryans of India believed that it was the sky which caused rain, and they therefore regarded I. as the chief of the gods. Water means wealth in the E., and I.'s compelling the clouds to drop their precious burdens on the earth was esteemed as the chiefest of his godlike exploits. The clouds which failed to give rain were regarded as *asuras*, or demons, with whom I. waged incessant warfare, slaying them with his *vajra* or thunderbolt. In all of these contests he was in the end victorious, so that he came to be regarded as the giver of victory.

As the sky, though changeable, constantly reverts to its perfection of cloudless beauty, so I. was celebrated as the "ever-youthful" and "the unfading." But as time went by his worshippers gradually regarded him as more a god of war than anything else, and so they passed on to anthropomorphize their deity, and imagined him at length to be a brave, impetuous monarch. I. afterward became less an object of worship than of admiration, and in the epic and Puranic period of Hindu lit. he was a subject for the extravagant eulogies of poets. These gradually invested him with a peculiar splendor. He was now represented as enthroned in a luxurious paradise, *Swarga*, as one of the 8 guardians of the world. In paintings and sculptures he possesses innumerable eyes, as the sky-god who discerns all. These eyes are represented as thickly covering his body. He has 4 arms, perhaps typical of the 4 quarters of the sky.

The later legends about I. are not all creditable to him. In Puranic times he became noted for his profligacy. He constantly sent the beautiful dancing-girls of his paradise to tempt ascetics, so that they might forfeit all the advantages which they had won by their austerities. [From orig. art. in *J.'s Univ. Cyc.*, by R. C. CALDWELL.]

Indulgence meant originally a release from the temporal penalties which remain due for a sin after the sin itself has been remitted by confession and absolution, and was at first granted by all bps. to infirm persons or to those penitents who showed extraordinary contrition. By degrees the practice of remitting punishment for money was introduced, the bps. allowing offenders to buy off the canonical penalties by bestowing gifts for some religious purpose; and from this time the popes began to reserve for themselves the right of granting, or rather selling, indulgences.

Indus, the great river of S. Asia which separates Hindustan from Afghanistan. It rises in the Himalayas, on the N. side of the Kailas, at an elevation of 18,000 ft. At Attock, 940 m. from its outlet, and at an elevation of only 1000 ft., it receives the Cabool and becomes navigable; 470 m. from the ocean it is joined by the Punjab; but at Migi, 75 m. from the ocean, it divides and forms a delta whose breadth along the coast is 130 m. It enters the Ar. Sea through a number of mouths, of which the Koree is the widest and deepest, but even that is not accessible for vessels of more than 50 tons, the channel being much encumbered by shoals and mud-banks.

Inebriety [Lat. *inebriare*, "to make drunk"], in the present acceptance of the term, denotes the diseased condition of the system produced by the habitual use of alcohol. (See DELIRIUM TREMENS, INTOXICATION, METHOMANIA.)

Infal'libilist [Lat. *in*, "not," and *fallible*, "capable of erring"], one who believes in the infallibility of the pope. The term is of recent origin, and was brought into use in 1870, during the Vatican Council, which at first was divided between *infallibilists* and *anti-infallibilists*, but at last decided that the pope was infallible—*i. e.* free from all error—in his official utterances, as the head of the Catholic Ch., on questions of faith and morals.

PHILIP SCHAFF.

Infallibility of the Pope, the doctrine that the pope, in all his official utterances addressed to the bps. of the R. Cath. Ch., or when he speaks *ex cathedra* on any topic of faith or discipline, is free from error, so that his decision cannot be reversed. This view was long disputed in the Rom. Ch. until it was finally settled by the Vatican Council and solemnly proclaimed as a dogma by Pius IX. In the Ch. of St. Peter, amid a fearful thunder-storm, July 18, 1870. The Old Catholics protested against the decree, and were excommunicated, but all the bps. who had first voted against it afterward submitted.

PHILIP SCHAFF.

Infant, in law, is a person who on account of youth and inexperience is incapacitated either wholly or in part from entering into contracts or performing specific acts. The incapacity may be natural or artificial, and is affected by rules of positive law. Thus, under some systems of law a person has not full capacity until attaining the age of 25; under the rules of the common law full capacity is attained at the age of 21; though by a special rule a marriage may be contracted by a male at the age of 14, and by a female at the age of 12. Wills of personal property may be made at the same age. These rules were borrowed from the ecclesiastical courts, where questions concerning the validity of marriages and of wills of personal property were disposed of. This matter in the U. S. is to some extent regulated by statute. A promise to marry is not binding unless the promiser is of full age. By an ancient rule which is still law a person becomes 21 on the day preceding the anniversary of his birthday. This is on account of the legal proposition that the law recognizes no fraction of a day, and as full majority would be reached at the close of the preceding day, it is attained by this rule at any time on that day. In some states females attain majority at an earlier age than males.

Infante [Lat. *infans*, "an infant"], in Sp. and Port. the title of the princes of the blood-royal, the princesses being called *infantas*. The heir-apparent to the throne, however, was not called an *infante*; in Sp. he was called *príncipe de Asturias*, or *el príncipe*, "the prince"; and in Port., until the separation of the Amer. colony, the prince of Brazil.

Infante (JOSÉ MIGUEL), b. in Santiago de Chili in 1778, was one of the leaders of the movement of 1810 which resulted in the independence of Sp. Amer.; was pres. of the provisional juntas of 1823 and 1825, member of the "congress of plenipotentiaries" 1831, and chief-justice 1843. D. Apr. 9, 1844.

Infanticide. See JURISPRUDENCE, MEDICAL.

Infantile Paralysis, paralysis of a muscle, group of muscles, a limb or side, coming on suddenly in an infant or young child. It is due to congestion of the brain or spinal cord, often excited by the irritation of teething, indigestion, or constipation. Most cases are temporary; others leave squint, club-foot, paralysis, and shortening of a limb. The affected member must be exercised by kneading and electricity, to prevent its wasting while time permits the lesion of the nervous centre to be removed. Cod-liver oil, iron, tonics, and out-of-door life are the requisites.

Infant Je'sus, Daughters of the, an order of nuns in the R. Cath. Ch., founded at Rome for the industrial instruction of poor girls. It was first acknowledged in 1673 by Clement X.

Infantry [Lat. *infans*, "child" or "servant," applied to servants who went on foot, and *infanteria*, to foot-soldiers generally] is that portion of a military establishment armed and equipped for marching and fighting on foot, in contradistinction to artil. and cav. It is the oldest of the "three arms" into which armies are conventionally divided; was the favorite of the Grs., the Gauls, the Gers., and the Franks, and was that mainly with which Rome conquered the world. It fell into contempt early in the Middle Ages, and did not emerge from that obscurity till the decline of the feudal system. It steadily increased in power from the first yrs. of the 14th century, and is now recognized as constituting the prin. strength of military organizations, because it can be used everywhere and under all circumstances. It is the self-sustaining arm in the field of battle, and is moreover less expensive, man for man, than its auxiliaries.

Grecian Infantry.—The primitive formation of heavy I. was massive, as is shown in the solid squares of 10,000 men portrayed in Egyptian hist., and this order was gradually reduced in depth till it reached the phalangeal systems of Sparta, Thebes, and Athens. These systems became homologous under the Macedonian empire, and the *phalanx* as it existed under that domination is now described. The foot-soldiers were divided into 3 classes—the *hoplites*, or heavy I., in complete armor and carrying a spear over 20 ft. in length; the *peltastes*, or light I., with shorter spears and less complete armor; and the *pilae*, or sharpshooters, who wore no armor and carried only missile weapons. The phalanx consisted nominally of 4096 hoplites, organized into what we may call brigades, regiments, and companies. The "company" combined 16 files, each file containing 16 men; and thus in line of battle the phalanx presented a nominal front of 256 men and a depth of 16. In marching order there were intervals of about 6 ft. between the files; in close order the spaces were reduced to about 3 ft.; and in the locked order the men closed shoulder to shoulder on the front rank, overlapping their shields, thus presenting an almost impenetrable hedge of steel to the enemy. Four of these elementary phalanges, with their complement of light I. and cav., formed the grand phalanx, or army corps.

Roman Infantry.—But a rival system, the *legion*, appeared in Rom. I. Originally, legionary I. was massed according

to the phalangeal method, but as early as 340 B. C. that formation had been superseded by a system of heavy lines so divided into tactical units, called *manipuli*, that while each line and each unit could act separately, they could execute combined movements with celerity and precision. The complement of I. for each legion gradually increased from 3000 to 6000, and in the details of equipment and organization changes were frequent. During the first Punic war it consisted nominally of 4200 *pedites*, and was formed in 3 lines, the first 2 lines being in 10 ranks and the third in 6; and in each company the space between ranks and files was about 3 ft., the men in rear of the front rank standing opposite the intervals of the rank next in their front. To this force was attached a corps of 1200 *velites* (skirmishers), who probably had neither company organization nor fixed position in the legion. All the heavy I. wore complete armor, and were armed with the short straight sword; a portion of them also carried heavy javelins or long spears.

In the Middle Ages I. continued to constitute the prin. strength of the dominant powers of Europe till the feudal system was established. Its last creditable appearance for several centuries was at the battle of Tours (732 A. D.). During the period of its abasement, war was pre-eminently the occupation of mankind, but military science was in abeyance. Cav. became the prin. arm, and for over 400 yrs. the man-at-arms trampled the despised I. But feudalism forced royalty into alliance with the commons; to curb the noble the king armed and disciplined the peasant. "Communal" militia was organized, and soon proved superior to the baronial followings, and as early as 1214 some of the Ger. I. is described as "very good, and trained to fight on the level *even against cavalry*." In the next century corps of pikemen and archers became essential elements in all military organizations. Cav. was still important, but was relegated to an auxiliary position.

Modern infantry is conveniently assumed to date from the gen. introduction of firearms, although these did not entirely supersede the bow till about the middle of the 16th century, and the musket did not become the sole arm of civilized I. till, at the beginning of the 18th century, it became, with the socket bayonet, a pyro-ballistic pike. The socket bayonet appeared in 1699, and within 6 years the pike virtually disappeared from the battle-field.

The division of I. into light and heavy troops, that had become nominal about the year 1700, was revived, first by placing the new arms, as muskets were improved in range and accuracy, in the hands of picked men from each battalion or in special corps, and subsequently by the introduction of rifled arms, which as first employed were deemed unsuitable for "troops of the line." But in the present day the distinction is again nominal. The rifle is universal, and all I. is really light I. In the U. S. A. the foot-soldier carries a knapsack with complete change of clothing, a blanket, great-coat, several days' rations in haversack, a canteen of water, and 60 rounds of ammunition.

Theoretically, the proportion of I. in all properly organized armies should be from $\frac{3}{8}$ to $\frac{3}{4}$ of the permanent establishment, but as efficient I. can be created more readily than serviceable artil. or cav., this proportion is rarely maintained in a peace establishment. In the U. S. service the proportion of the 3 arms is about—artil. $\frac{3}{8}$, cav. $\frac{3}{8}$, and I. $\frac{1}{2}$, but the exigencies of this service demand a constant interchange of duties between the 3 arms. [From orig. art. in *J.'s Univ. Cyc.*, by CAPT. ROBERT N. SCOTT.]

Infant Schools were originally charitable insts. that sprang up in the early part of the present century, simply to relieve the mothers of the laboring classes of the care of their little children when they are away at day labor. Their value was merely that they kept the children out of the streets and physically comfortable. The best thing taught in these I. S. was to sing hymns. Some of the disciples of Pestalozzi endeavored to develop something educational out of these charitable insts., introducing some object-teaching. But they were not even the germ of the *Kindergarten*, because their method was simply routine, which is the opposite of cultivating. [From orig. art. in *J.'s Univ. Cyc.*, by ELIZABETH P. PEABODY.]

Infection. See CONTAGION.

Inflammable-gas Engine. See GAS-ENGINE.

Inflammation [Lat. *inflammo*, *inflammationem*, to "kindle," *flamma*, "flame"], a morbid process characterized by heat, redness, pain, and swelling. When a part has once been the seat of I., it is very liable to be affected again under the slightest exciting cause. In infancy the parts most subject to become inflamed are the bowels, pharynx, larynx, and brain, whereas during adult life these parts are seldom affected, the favorite seat then being the lungs, heart, urinary apparatus, etc. Sex exerts a certain influence; a female is more apt to suffer from peritonitis, phlebitis, or cellulitis in consequence of the parturient act. So the temperament, food, occupation, climate, etc. all influence, to a greater or less extent, the susceptibility of the individual to be attacked by I. The duration and character of the I. vary with the condition of the part affected and the const. of the patient. When once fairly established, it may destroy life by exhaustion or by interfering with the function of some important organ, as the lungs or heart. It may also terminate in resolution, suppuration, or mortification. Resolution consists in the restoration of the affected part to its normal condition without suppuration having taken place. Suppuration consists of the formation of a fluid called pus; it is a yellowish liquid, in which float numerous small round granular corpuscles. When the pus is thin, dirty, and acrid, it is called *ichor*. When suppuration continues for any length of time it gives rise to a fever known as hectic fever. This is diurnal in character, commencing with a chill, followed by a fever, and then sweating. The inflammatory action may be so intense as to deprive the part of its proper supply of blood, and so cause ulceration and mortification (see GANGRENE).

Treatment of Inflammation.—The bowels should be freely moved once a day, and the skin and kidneys be made to act by the administration of diaphoretics and diuretics. Careful attention should be paid to the diet and regimen of the patient, and heat and moisture applied to the inflamed part, in the form of poultices or the hot-water bath. If the patient be plethoric and the pulse hard and full, it will be a great benefit at times to bleed him. This practice has been much decried of late, but surgeons are not very averse to local blood-letting, which may be done by scarifications with a lancet, by wet or dry cupping, or leeches. Cold evaporating lotions continuously applied are a great relief. They cause the capillaries to contract, and thereby diminish the afflux of blood. [From orig. art. in *J. s. Univ. Cyc.*, by E. J. BERNINGHAM, M. D.]

Inflammation of the Bowels. See PERITONITIS.

Inflammation of the Brain. See MENINGITIS.

Inflammation of the Kidneys. See BRIGHT'S DISEASE AND RENAL DISEASES.

Inflammation of the Lungs. See PNEUMONIA.

Inflammatory Rheumatism. See RHEUMATISM.

Inflorescence [Lat. *infloresco*, to "begin to blossom"], the term by which botanists designate the arrangement of flowers upon a plant. Flowers and branches are evolved from buds. Flower-buds, like leaf-buds, may terminate the stem or branches or may rise from the axils of leaves. The former are called *terminal*, the latter *axillary*. When one flower only occupies the summit of the stem, it is *terminal* and *solitary*; when only one occurs in the axil of a leaf, it is *axillary* and *solitary*. If several flowers are developed near each other, so as to form a cluster, the contiguous leaves are known as *bracts*. The stalk which supports a flower is its *peduncle*, and the stalk of each flower of a cluster, its *pedicel*. When flowers have no supporting stalks, they are *sessile*. The axis of *inflorescence* is that part of the stalk on which the flowers of a cluster are arranged. When it bears sessile flowers, it is called the *rachis*; when it is very much shortened and thickened, the *receptacle*. All forms of I. are referred to 2 types, or to a combination of the two: 1. *Indefinite inflorescence* is characterized by the springing of flowers from axillary buds, while the terminal bud of the stem develops as an ordinary branch. If approximated, and the leaves are diminished to bracts, they form a flower-cluster of the indefinite sort. Simple, indefinite clusters may have (1) the flowers borne on pedicels along the sides of an elongated axis (*raceme*); (2) along a shorter axis (*corymb*); (3) clustered on an axis which is so short that all the flower-stalks appear to spring from the same point (*umbel*). If the flowers are sessile and arranged along a lengthened axis, the cluster is a *spike*; if the axis is very short, a *head*. The *ament* or *catkin* is a scaly and usually drooping spike. The *spadix* is a fleshy spike or head with inconspicuous flowers, the whole frequently enveloped by a showy bract, a *spathe*. The *raceme*, *corymb*, and *umbel* may become compound. If the 2 former branch irregularly, they form a *panicle*; if this is crowded into a compact cluster, it is called *thyrsus*. The little clusters of a compound umbel are *umbellets*. Several bracts grouped at the base of a cluster constitute an *involucre*; if at the base of partial clusters, *involucels*.

2. **Definite Inflorescence.**—In this the main stem or each independent branch is terminated by a flower. The upper flowers bloom earlier than those which are below. Such a cluster is a *cyme*.

3. **Mixed Inflorescence.**—Indefinite and definite I. may occur in the same plant in 2 ways: first by centrifugal development of the branches which bear the heads, while the flowers of each head expand centripetally; second, the reverse of this, has the main axis producing, in centripetal order, clusters which develop centrifugally. [From orig. art. in *J. s. Univ. Cyc.*, by PROF. G. L. GOODALE.]

Influen'za [It.; as it produced by the influence of the stars], an essential, infectious, epidemic febrile disease, characterized by a variable degree of constitutional disturbance, especially nervous depression, and having a local expression in irritation and catarrhal inflammation of the air-passages and their appendages. It is also termed epidemic catarrh, epidemic bronchitis, and, better, epidemic catarrhal fever. It would appear to attack preferably women, next adult males, and lastly children. In some epidemics children are exempt. During the prevalence of I. the animal vitality is lowered, the type of other diseases is modified, assuming adynamic or typhoid forms, and tending to a greater gen. mortality. I. is not confined to man, but often extends its epidemic influences to the domesticated animals, especially the horse, and is known as the *epizootic*. The I. is first recorded in Amer. in 1577. The chief epidemics in Europe have extended to this country. The most noticeable ones are that at the close of the war of 1812, those of 1843, of 1872, and 1874-75. The advocates of the "germ-theory of disease" regard I. as due to the wide dissemination, by air-currents, of animalculæ or cryptogamic vegetable products—malarial emanations. Ehrenberg describes "dust-god currents" in the higher strata of the atmosphere, from which many genera of animalcules may be collected. The epidemic of I. occurs at all seasons of the yr. The usual duration, in one locality, of an epidemic is from 4 to 6 weeks, exceptionally much longer.

The symptoms vary in severity in different epidemics and in individual cases. The onset is sudden, announced in severe cases by a marked rigor, more often by chill and shivering, alternating with flashes of heat. Then follow gen. lassitude, debility, nervous prostration, soreness and stiffness of the limbs, pains in the neck, back, and loins, headache, frontal oppression, pain in the orbits, cheek-bones, and root of the nose, injection and sensitiveness of the eyes, with copious flow of tears—often heated, the "fiery tears" of the early records—sneezing and tingling, followed by watery and often acrid discharge from the nose, soreness of the tonsils, Eustachian tubes, and ears, experienced in swallowing, hoarseness, a short, frequent, harassing cough, with

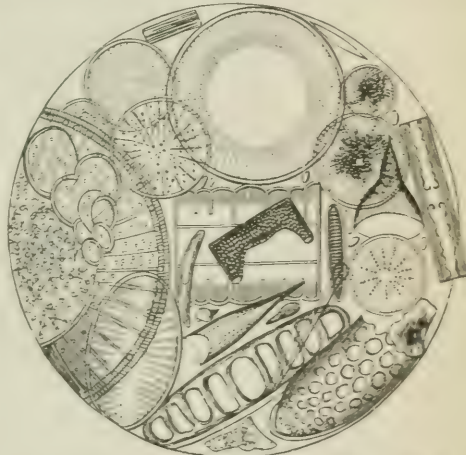
slight expectoration, and a slight fever of the remittent form, having its exacerbation toward evening. In other cases there is soreness, tightness, and pain beneath the sternum, dyspnea, sense of suffocation, and danger of capillary bronchitis or pneumonia. These unfortunate complications are the chief causes of death from I., and occur mainly in the aged, in invalids, and in delicate children. A purge at the outset may shorten their duration. More marked cases require a preliminary purgative, a low diet, the avoidance of exposure to cold, resort to hot draughts, as of lemonade or elder-bloom tea, to stimulating foot-baths, to the use of Dover's powder, Tully's powder, spiritus Mindereri, or other remedies to secure free perspiration, and the relief of bronchial congestion by inhalation of steam, by ammonia, or by stimulating expectorants. Quinine in doses of 5 grains 3 times a day, if taken at the beginning, may cut short the attack.

E. DARWIN HUDSON, JR.

Inform'er. This word is employed in law as a technical designation, denoting a person who brings suit or prefers an accusation against another for the violation of some penal statute. It is sometimes provided in a statute of this kind that the whole or a certain portion of the penalty recovered from the person who shall be convicted of violating its provisions shall be given to any one who will sue for the same, or who will give information of the offence to the proper prosecuting officer. Actions brought by an I. under such a statute, when the penalty is recoverable partly for himself and partly for the benefit of the state, are technically termed *qui tam* actions (*qui tam*, Lat. "who as well"), because the plaintiff is described in the suit as one *who sues as well* for the king or commonwealth as for himself. Statutes authorizing *qui tam* actions are more common in Eng. than in this country.

GEORGE CHASE.

Infusoria [Lat. *infundo*, *infusum*, to "pour over," to "make an infusion," because these organisms were first observed in infusions]. If organic substances are soaked in water, the liquid dissolves portions of the solid matter, forming an "organic infusion." If this be exposed to the air, a scum or pellicle forms upon the surface, in which minute organisms are developed. Among the most prominent of such are those called *bacteria*, *vibrio*, and *monads*. At one time by many persons these organisms were supposed to be produced spontaneously; but it is now well



Infusoria in mud of the Antarctic Ocean, greatly magnified.

known that they originate from germs disseminated through the atmosphere and in various solid substances. It is established that the bacteria and vibrio are algae, or the simplest kind of plant, while the monads are animals. They are never generated except in organic solutions. They are most abundant in fresh water wherever organic matter is held in solution. They also occur in the ocean. The higher forms are on stems of aquatic plants. [From orig. art. in *J. s. Univ. Cyc.*, by PROF. C. H. HITCHCOCK, PH. D.]

Ingalls (RUTTS), b. at Denmark, Me., 1820; grad. from the U. S. Military Acad. in 1843, and entered the army as brevet second lieutenant of rifles; transferred to the dragoons 1845, and to the quartermaster's dept., with the rank of capt. in 1848, rising through successive grades to be (1882) colonel and quartermaster-gen. U. S. army; served with his regiment on quartermaster duty almost constantly on the frontier, participating in the war with Mex. and various expeditions, up to 1860; on the outbreak of c. war in 1861 was called upon to assume responsible duties as chief quartermaster. His duties, constantly increasing in magnitude and responsibility, were discharged with great ability and despatch. Brevetted lieutenant-col. to major-gen. At the close of the war served at headquarters of the army, and in 1867 at New York as chief quartermaster of military division of Atlantic. Became quartermaster-gen. 1882. Retired, 1883.

Ingelow, in'je-ló (JEAN), b. 1830 at Boston, Eng.; has pub. several vols. of verse, beside prose works of fiction, including *Tales of Oprie*, *Stories for Students*, *Home Thoughts and Home Scenes*, *Off the Shallows*, etc.

Ingemann, ing eh-mann (BERNHARD SEVERIN), b. May 28, 1789, studied at the Univ. of Copenhagen; was appointed in 1822 prof. of Dan. lit. and lang. at the Acad. of Sorøe, which position he filled till his death, Feb. 24, 1862. Inspired by Walter Scott, he treated the most romantic period of the hist. of Den. in a series of romances—*Valdemar Seier*, *Erik Menred's Barndom*, *Kong Erik og de Fredløse*, etc.; and these

romances became truly popular. He produced an equal impression by his hymns and religious songs.

Ingersoll (CHARLES JARED), b. in Phila. Oct. 3, 1782; received a collegiate education; became a lawyer, and was M. C. 1813-14 and 1841-47, U. S. dist. atty. 1815-29, and held various important offices. He wrote *Chiomara*, a poem; *Inchiquin's Letters*, *Historical Sketch of the Second War with G. Brit.*, and several other works. D. Jan. 14, 1862.

Ingersoll (CHARLES ROBERTS), LL. D., b. at New Haven Sept. 16, 1821, grad. at Yale 1840, and at the Yale Law School 1844. He was elected gov. of Conn. by the Dem. party in 1873, was re-elected in 1874 and 1875.

Ingersoll (JARED), LL. D., b. in Conn. in 1749, and grad. at Yale in 1766. He studied law in Lond., and settled in Phila. He was M. C. 1780-81, and a member of the convention which framed the U. S. const. in 1787. He afterward held many public positions; was often atty.-gen. of Pa., and at the time of his death was presiding judge of the dist. court for Philadelphia co. D. Oct. 31, 1822.

Ingersoll (JOSEPH REED), LL. D., D. C. L., a son of the preceding, b. in Phila. June 14, 1786; grad. at Princeton in 1804, and became a prominent lawyer of Phila. He was M. C. 1835-37 and 1842-49, and U. S. minister to Eng. 1850-53. He wrote *Secession a Folly and a Crime*. D. Feb. 30, 1868.

Ingersoll (RALPH ISAACS), LL. D., b. at New Haven in 1788, grad. at Yale in 1808; studied law; was the Dem. leader in the Conn. legislature in 1819, and afterward until 1825, when he was chosen to Cong., remaining there 4 terms. In 1833 he declined a re-election in order to devote himself to his profession, which he continued to do for the remainder of his life, refusing all political appointments, except in 1846, when, at the solicitation of Pres. Polk, he was for 2 yrs. minister to Rus. D. Aug. 27, 1872.

Ingersoll (ROBT. J.), See APPENDIX.

Ingham (BENJAMIN), b. at Ossett, Yorkshire, Eng., June 11, 1712, ed. at Batley School and at Queen's Coll., Ox.; became associated with John and Charles Wesley, the founders of Methodism; accompanied John Wesley to Ga. in 1735, and in his visit to the Moravians in Ger.; founded several congregations of Moravian Methodists, otherwise "Inghamites," and in a few yrs. there were in Eng. 84 of these societies; removed to Abberford and evangelized the whole region, being elected a *general overseer* by the Ch. he had founded; in 1759, 3/4 of the societies, and finally I. himself, went over to the Sandemanians. D. in 1772.

Inglis (DAVID), D. D., LL. D., b. in Scot. June 8, 1825; was ed. in the Univ. of Edinburgh, where he completed his theological studies in 1844; in 1846 became pastor of the Presb. ch. of Bedford, N. Y.; in 1849 accepted a call to a ch. in Montreal, and in 1851 became pastor of a ch. in Hamilton, Ont. After a pastorate of 16 yrs. he removed to Toronto, having been called to the chair of systematic theol. in Knox Coll. He removed in 1872 to Brooklyn, L. I., and became pastor of Reformed (Dut.) ch. on the Heights. Wrote *Tricentenary and Thanksgiving Sermons*, *Systematic Theol. in its Relation to Modern Thought*, etc. D. Dec. 15, 1877.

Ingraham (DUNCAN N.), b. Dec. 6, 1802, at Charleston, S. C.; entered the U. S. N. in 1812 as mdpn.; rose to the rank of capt., and rendered himself famous in the Martin Koszta affair at Smyrna in 1853; for his conduct in this matter he was voted thanks and a medal by Cong. Afterward he was appointed chief of the ordnance bureau of the naval dept., which position he held until S. C. passed her ordinance of secession in 1860; he then resigned his commission in the U. S. N. and took service under the Confed. States, in which he rose to the rank of com. A. H. STEPHENS.

Ingraham (JOSEPH H.), b. in Portland, Me., in 1809; engaged in mercantile pursuits; afterward became an instructor in Washington Coll., Miss. He pub. *The South-West, by a Yankee*, which was followed by a number of romances. He took orders in the P. E. Ch., and was in charge of a parish at Holly Springs, Miss.; also wrote *The Prince of the House of David*, *The Pillar of Fire*, and *The Throne of David*. D. in 1861.

Ingres, angst (JEAN DOMINIQUE AUGUSTIN), b. at Montauban, Fr., Sept. 15, 1781. His passion for painting was early awakened; at 19 entered the studio of David; at 22 gained the first grand prize for the painting of *Achilles in his Tent receiving the Ambassadors of Agamemnon*, in the École des Beaux-Arts; in 1806 visited Rome, took up his residence there, and sent thence to Paris several canvases. I.'s fame dated from works executed in Florence—*The Entrance of Charles V. into Paris* and *The Vow of Louis XIII.* The artist was made successor of Baron Denon in the Acad. of Fine Arts. *The Apotheosis of Homer* and *The Martyrdom of St. Symphorian* excited much controversy among the critics. Sensitive to assault, the artist left Fr. for It., where he was made director of the Villa de' Medici. In It. his productive period returned. *The Venus Anadyomene*, *Jesus among the Doctors*, *Molière in his Library*, *Racine in Court Costume*, *Jean d'Arc at the Consecration of Charles VII.* were among his more celebrated compositions. Under Third Nap., I. painted on ceiling of Hôtel de Ville a great picture, *The Apotheosis of Nap. I.*, with the legend, *In nepote redivivus*. At the Exposition of 1855 the artist's works were displayed in a room devoted exclusively to them. A museum at Montauban bears his name. D. Jan. 14, 1867. O. B. FROTHINGHAM.

Inheritance. See HEIR.

Ink [*Fr. encre*; Ger. *Tinte*; Lat. *atramentum*]. Any colored fluid used in writing or printing is an ink.

I. WRITING INKS. **Black Inks.**—The black ink in common use in modern times is made from the action of infusion of gall-nuts upon green vitriol, exposing the product to the influence of air, and holding the precipitate in suspension by gum, sugar, or mucilage. This fluid is open to the objections that it corrodes steel pens, is prone to mould in warm weather, and to deposit a sediment on standing. The writing is also liable to grow yellow or brown with age, and to destroy the paper. But these difficulties are in great part capable of correction by skilful manufacture. The

fact that well made iron inks stain the substance of the paper with a stain difficult of removal, and speedily growing darker with age up to a certain time, has rendered their use very general in spite of their acknowledged defects.

Nut-gall Iron Inks.—Both gallic and gallo-tannic acids, which coexist in the infusion of galls, especially after considerable exposure to air, produce deep-black precipitates, with ferric salts, but with ferrous salts whitish precipitates, becoming black by exposure to air. As gallic acid produces a much deeper black with ferric salts than tannic or tannogallic acid, we see why it is advantageous to leave the infusion exposed for many days to air, in order that the tannic may be changed to gallic acid. Gum arabic or gum senegal is added to retain the precipitate in suspension, prevents the formation of a sediment, and adds a certain degree of lustre. To prevent the growth of mould, some essential oil, carbolic acid in small quantity, and rarely corrosive sublimate, are used. Other vegetables containing tannin are often substitutes for gall-nuts, chiefly from motives of economy, but only with a loss of quality. The imperfections inherent in the ordinary black ink from galls and iron salts became more manifest on the introduction of the steel pen, which, aside from its being corroded more or less rapidly, caused the ink to concrete and deposit its coloring-matter. These imperfections have been sought to be avoided by the introduction of various *fluid inks*, which are true solutions. Stark, after manufacturing and testing for 14 yrs. 229 different kinds of ink, gives as his final preference for the best ink: To each 1 gal., 12 ounces of best gall-nuts, 8 ounces of coppers, 8 fluid-ounces of sulphate of indigo, 4 to 6 ounces of gum arabic, and a few cloves. As metallic iron impairs the quality of all iron inks, he recommends that all legal and other important documents be written with a gold or quill pen.

Chrome ink is prepared by adding 1 part of chromate of potassa to 1000 parts of a saturated solution of logwood, made by boiling 23 lbs. of logwood in a sufficient quantity of water to give 14 gals. of decoction; to this menstruum, when cold, the chromate is gradually added and the mixture well stirred. The addition of gum is injurious. If care is taken not to permit the proportion of chrome salt to exceed 1 part for 1000 parts of decoction of logwood, a deep blue-black writing fluid is formed which drops no deposit, like the ordinary gallate-of-iron ink. Paper written upon with it may be washed with a sponge or be left 24 hours under water without the marks being erased. Weak acids do not destroy the writing, nor do they even change the shade, while that made from galls is effaced, and the ink made with logwood and sulphate of iron is turned red.

Vanadium Black Ink.—Berzelius advised the use of vanadate of ammonia with infusion of gall-nuts. A surprisingly small quantity of the vanadium salt suffices to produce a perfectly black ink. The writing obtained with this ink is perfectly black. No sediment forms from it. It flows readily from the pen, and does not corrode steel; is not attacked by dilute alkalis, but is turned red by acids.

For travelling expeditions it is convenient to have ink in *cakes* and *ink-powders*. A new kind of ink, convenient for travellers, is prepared by saturating white bibulous paper with aniline black, and then pressing several sheets together, so as to form a compact block. Other aniline colors may be employed for making red, violet, green, and other inks. A piece of the prepared paper, 2 or 3 centimetres square, will furnish sufficient ink for a long correspondence by simply steeping it in a little water.

Copying inks are only concentrated common inks, to which more gum and sugar or a portion of glycerine is added. If the body is good, 3 or 4 legible copies may be taken from the same writing by the copying-press.

Native Vegetable Inks.—The juice of *Coriaria thymifolia*, or ink-plant of New Granada, locally called *chavichi*, is at first of a somewhat reddish color, but becomes intensely black in a few hours. This juice can be used for writing without requiring any further preparation. The *Sequoia gigantea*, or "big trees," of the Sierra Nevada furnish a peculiar sort of tannin, highly colored and largely soluble in water, furnishing a strong deep reddish-black liquid which I find to be a quite tolerable natural ink when used alone, and with a steel pen the color is rendered much darker. There is quite a list of plants whose seeds give a lasting black color, as inks and dyes of silk and linen fabrics or hair. Such are *Amyris toxicaria*, *Camocladia integrifolia*, *C. dentata* and *C. punctulata*, *Cobulia alba* (or *Eclipta erecta*), the seeds of which the inhabs. of Cochín-China use to color their hair of a permanent black. *Ravolfia canescens* bears juicy berries, the juice of which alone can be used as ink, and leaves permanent stains on linen, etc.

Colored Writing Inks.—Red ink is usually made from either cochineal or Brazil-wood, the latter being the more permanent. But some of the aniline reds are rapidly replacing the former sorts. The cochineal inks are the brightest, but at the same time the dearest and most fugitive. The best is a solution of pure carmine in caustic ammonia; it must be preserved in well-stopped vessels.

Blue Inks.—The most familiar blue ink is Stephens's patent blue writing fluid, which is 30 parts of soluble Prus. blue (Paris blue) dissolved in 4 parts of oxalic acid in 1000 parts of water. Common Prus. blue is digested in successive portions of hydrochloric acid until the solution ceases to react for iron with ferrocyanide of potassium. It is then washed completely neutral with water, gently dried, and carefully mixed with oxalic acid in fine powder, drenched with pure cold water added in small portions at a time, making a solution more or less dense according to the intensity of color desired. The aniline blue inks are not quite equal to the color of a well made Berlin blue ink, showing usually of a little gray cast. But any one who knows the trouble it costs to make the Berlin blue ink, and how easily this aniline ink is made, will prefer the nearly equal indigo and blue-red aniline ink. To produce it take 1 part of *bleu de*

nuil (bleu de Paris) in 200-250 parts boiling water. If it shows the coppery sheen on the paper, add more water. In use this ink holds like the fuchsine ink. The alkali blue (5 B. or 6 B.) furnishes a blue ink of a most delicate shade, but this ink is rather costly. *Violet aniline ink* is most easily made of all aniline inks. Take 1 part of violet blue aniline to 300 parts of water. *Green aniline ink* is the finest color, but most costly of all these brilliant inks. Take 1 part of methyl green (methyl iodide), soluble in water, to 100-110 parts of boiling water. *Chrome green ink*, after Winckler: Dissolve 180 grains of bichromate of potassa in 1 fluid-ounce of water; add to the menstruum, while warm, $\frac{1}{2}$ ounce of spirit of wine; then decompose the mixture with concentrated sulphuric acid until it assumes a brown color. *Yellow aniline ink* is not to be commended.

Carbon and other so called Indelible Writing and Marking Inks.—The resistance offered by carbon to the action of chemical agents is well known, and it is hence the basis of the most permanent and unchangeable inks, chiefly printing inks, as carbon cannot be brought into solution. All inks on this basis must be, like Chi. or India ink, sediments held in suspension by some vehicle, and consequently less fluid than is desirable for easy and constant use with a pen of modern construction. Practical chemists and manufacturers have devised numerous carbon and other indelible or permanent inks, of which we will mention some of the most important. *Indian Ink or China Ink.*—This well known pigment is prepared from finely divided carbon, chiefly lampblack or the soot of the oil of sesame, formed into cakes by the use of some glutinous vehicle or adhesive substance, such as gum-water or glue. Authentic accounts of the manufacture of this famous ink by the Chi. state in substance as follows: The basis of all the different kinds and qualities of India ink is lampblack, the best of which is obtained from pig's foot and other oils, and sometimes from resins, while an inferior sort is made from pine wood. The materials are burned in a furnace about 100 ft. long, along the sides and top of which the smoke condenses. That most remote from the fire and nearest the top is the finest, and is carefully kept separate from the rest. Glue made from the skin of the buffalo of the country is soaked in water for a time until it is much swollen, and afterward completely dissolved. The lampblack is then introduced and worked in until it forms a soft paste. When the materials are thoroughly mixed a quantity of the oil of peas is added, and the temperature maintained for a time at from 110° to 140°, until the paste is homogeneous in character. It is then removed and separated into little cakes, which are allowed to remain for some time drying and becoming mellow, after which they are strongly compressed in wooden moulds, on the interior of which are engraved the characters which are seen upon the cakes. *The indelible ink of the Academy of Sciences of Paris* was prepared in 1835 by a commission called for by the minister of finance, charged with the duty of discovering a truly indelible writing ink for use on the public securities, bank-notes, etc. The result was an ink formed by dissolving Chi.-ink in dilute hydrochloric acid. *The Academy ink*, so called, is Chi. ink held in solution by about 1 per cent. of potassic hydrate. Henry Stephens's carbon ink has become famous, and is made by boiling shell-lac, or common resin, in carbonate of soda, potassa, or ammonia solution, in about equal proportions, until all the resin is dissolved. This solution is then mixed with finely levigated lampblack until it has the proper consistence. This alkaline liquid may also be mixed with other colors to form an indelible ink.

Indelible Marking Ink.—The juice of the anacardium nut contains an oily matter which by exposure to air gradually assumes an intense black color; this color is acted on neither by acids, alkalies, chlorine, nor cyanide of potassium. The powdered nut is treated in a closed glass bottle with gasoline, and after so digesting some time is left exposed to air for spontaneous evaporation. The remaining fluid, which is thickish, is used either by writing or stamping by a die upon linen or cotton. The color is at first dirty brown, but it becomes intensely black—an effect produced instantly by moistening the linen or cotton with liquid ammonia.

Indelible Blue Molybdenum Ink.—Dissolve 5 parts of oxide of molybdenum in the smallest necessary quantity of muriatic acid; also dissolve 2 parts of extract of liquorice and 6 of gum arabic in 240 parts of water. Mix the solutions, and write with them on the linen to be marked. After writing, moisten with a solution of chloride of zinc in water. This is an ink not only indelible in ordinary washing, but in acids and alkalies. It is said this ink cannot possibly be removed, except by destroying the article written upon. *Nitrate-of-silver marking inks*, although commonly called indelible, yield readily to the solvent power of cyanide of potassium (ammonia and chlorine). A good permanent ink may be made by mixing a strong solution of chloride of platinum with a little potash, sugar, and gum to thicken. The writing made therewith should be passed over with a hot smoothing-iron to fix it. An ink for writing on zinc plant-labels may be made by dissolving equal parts acetate of copper and sal-ammoniac in distilled water. Ink for marking copper and silver vessels may be made by boiling sulphide of antimony in strong potash lye, leaving the liquid to cool and filtering from separated kermes. *Ink for Writing on Glass.*—A solution of fluoride of ammonia is recommended as furnishing a ready means of writing with a pen of any kind upon glass, and is especially adapted for labelling bottles, cylinder-tubes, etc. in the laboratory.

Removal of Ink-Stains.—Dilute hydrochloric acid, dilute sulphuric acid, and oxalic acid will destroy and remove the color of most gall and logwood inks. Chlorine in solution or as bleaching powder acts in a similar manner. Potassic, sodic, and ammoniac hydrate attack many colors, and, alternated with the acids, destroy stains which are not removed from paper and tissues by either alone. But the application of chemical agents to paper requires that it should be free

from the binding of a vol. Ozone is a powerful bleaching agent, and has been recommended for removing stains from engravings.

Sympathetic inks are those fluids which, when used to write upon paper, are invisible until brought out by heat or the influence of some chemical agent. Ink which has become faded out by age may often be redeveloped by tracing the characters with a pencil wet with gallic acid. If the ink was an iron ink, it will be thus plainly developed. Ink which has been too long written to allow of copying by the press may be rendered transferable again by using water slightly acidulated with hydrochloric acid with which to moisten the copy paper. This method, however, fails on very old writing—e. g. a century. Such documents may be reproduced by using copy paper wetted with a dilute solution of glucose or honey instead of water. After pressing, this paper is exposed to the fumes of strong ammonia, which brings out clearly lines otherwise quite invisible.

Lithographic Writing Ink.—Two kinds of ink are used in the lithographic art—one, called lithographic crayons or chalk, forms the pencil with which the artist traces his designs. The Fr. crayons of Bernard and Delarue of Paris are made of best quality wax 4 parts, dry white tallow soap 2 parts, white tallow 2 parts, gum-lac 2 parts, lampblack 1 part, copal varnish 1 part. The wax is melted over a gentle fire, the lac broken small, added as it melts, then the soap in fine shavings, the tallow, and lastly the copal and lampblack, stirring all the time with a spatula. It is cast in brass cylindrical moulds.

II. PRINTING INK (Fr. *encre d'imprimerie*; Ger. *Buchdruck-erfarbe*).—Printer's ink is a carbon ink in an oily and resinous vehicle. The carbon is lampblack, sometimes ivory black, and with a little indigo or Prus. blue. The oil is generally boiled and burned linseed oil, or in some European countries nut oil. In addition to these chief ingredients, rosin and turpentine are used, more rarely balsam copaiba, and lastly soap (common yellow rosin soap) is a very essential ingredient. The conditions required of a good ink are chiefly—(1) that it distribute itself easily and well over the rollers and type; (2) it must give a sharp and clean impression, without adhering to the type tenaciously or blurring the paper with excess of oil; (3) it must dry rapidly on the paper, but remain soft upon the type and rollers; (4) it must be black, and not brown in color; and, lastly, it must be proof against all the ravages of time and the power of chemical agents. The linseed oil is clarified from the fatty matters, and the pure oil is boiled with great care at a carefully regulated temperature; and during the boiling the best pale yellow soap is added to give it consistency, and the required dryers are also now mixed with it. The best black is that obtained from the smoke of naphtha, the combustion being carefully regulated. This black is ground up carefully with the drying oil, which has assumed the character of a varnish, and the ink is complete. The oil is clarified from the fatty and useless matters, and is better if old, and must not only be long boiled, but burned by setting fire to the vapors floating over it, the flames being extinguished by a tight-fitting metallic cover shut over the boiler, which should never be more than half full. The ink used for copperplate printers differs in the oil, which is not so much boiled as to acquire the adhesive quality. This would render it less disposed to enter the cavities of the engraving, and more difficult either to be spread or wiped off. The black is likewise of a different kind. Instead of lampblack or sublimed charcoal, the Frankfort-black is used, which is a residual or denser charcoal, said to be made from vine-twigs. *Colored printing inks* are made by using in place of carbon any desired color to mix with the varnish. [From orig. art. in *J's Univ. Cyc.*, by PROF. B. SILLIMAN, M. D.]

Ink-berry (*Ilex glabra*), the popular name of an elegant shrub, generally from 2 to 4 ft. high, with slender and flexible stems, brilliant, evergreen leaves, leathery and shining on the surface and of a lanceolate form, with small black berries. It is found on the Atlantic coast of N. Amer.

Inkerman, a v. in the Crimea, near the E. extremity of the harbor of Sevastopol. It is built on the ruins of an anc. city, at the foot of a perpendicular hill, the heights opposite to which are the scene of a battle, fought Nov. 5, 1854, in which 14,000 Eng. and Fr. repelled 60,000 Rus.

In'man (HENRY), b. in Utica, N. Y., Oct. 28, 1801; d. in New York Jan. 17, 1846. His earliest inclination was toward a military life, when the sight of Westmüller's *Danaë* determined his bent to another career. He studied with John Wesley Jarvis; went to Boston as a portrait-painter in 1822; in 1832 removed to Phila.; from thence, chiefly in order to be in the country, he went to Mt. Holly, N. J.; returned to New York, but, being disabled by ill-health, was induced to visit Eng. with commissions to paint for Amer. friends portraits of Chalmers, Macaulay, and Wordsworth. In 1845, resisting strong professional and social temptations to remain in Eng., where his success had been eminent, he returned to his native land, to sickness again and die. I.'s reputation was established early, and continued to increase. His portraits were life size, cabinet size, and in miniature. The subjects of his other pieces were various—*Birnam Wood*, *Rydal Water*, *Lake of the Dismal Swamp*, *Trout-Fishing*, *The Newsboy*, etc. He executed much in crayon and with the pen, and did work in lithograph. He was a pleasing writer also of sketches and letters. O. B. FROTHINGHAM.

Inu (Lat. *Enus*), river of S. Ger., rises in the Lake of Longhino, Switz., nearly 7000 ft. above the sea; flows N. E., enters the Tyrol; then about 90 m. through Bavaria, thence N., and after a course of 315 m. falls into the Danube at Passau. It is the largest Alpine tributary of the Danube, and is navigable for much of its course.

In'nes (THOMAS), b. in 1663, of a noble Scot. family, ed. in the Coll. of Navarre in Paris; became a Catholic priest, and prin. of the Scotch coll. at Paris. Wrote *A Critical Essay on the Anc. Inhab. of the N. Parts of Brit.* and with his brother Louis the *Memoirs of James II.* D. Feb. 9, 1744.

Inness (GEORGE), b. in Newburg, Orange co., N. Y., May 1, 1825; took lessons in art; came to New York at 16, and studied engraving; was prevented by ill-health from pursuing his object; returned to his home in Newark, N. J.; emerged 4 yrs. later; spent a month with Regis Gignoux, and then began his career as a landscape-artist. I. has been called a disciple of Theodore Rousseau, whose pictures his own in sentiment resemble. His landscapes are touched with imagination and charged with poetic feeling. His themes are imaginative: *Peace and Plenty*, *The Sign of Promise*, *A Vision of Faith*, etc. His less ambitious works, *A Passing Storm*, *Summer Afternoon*, *Twilight*, etc., show a tender sympathy with nature.

Innocent I., SAINT, was elected bp. of Rome Apr. 27, 402; interceded with Arcadius, emp. of the East, in behalf of Chrysostom, who was banished; prevailed on Honorius, emp. of the West, to persecute the Donatists, who were excommunicated (405); made exertions to save Rome from Alarie and his Visigoths, who nevertheless sacked that city Aug. 24, 410; condemned the doctrines of the Pelagians and the Novatians; first practised the system of sending legates to represent the papal see in remote dists.; was vigorous in maintaining the right of his see to exercise appellate jurisdiction over other bishoprics, and enforced the celibacy of the clergy. D. March 12, 417.—**INNOCENT II.** (*Gregorio Papareschi*), b. in Rome about 1090; was chosen pope Feb. 14, 1130, but Peter de Leon (Anacletus II.) was put forward as pope by a minority of the electoral body; went to Cluny in Fr.; restored to power at Rome by Lothaire (1133); again driven from Rome, again restored by Lothaire (1137), finally recognized after the death of Anacletus (1138); convoked in 1139 the second Council of Lateran; condemned the opinions of Arnold of Brescia and of Abelard (1140); pronounced an interdict upon the kingdom of Fr.; an insurrection of the Romans restored the senate and the tribunes of anc. Rome. D. Sept. 24, 1143.—**INNOCENT III.** (*Lotario Conti*), b. in 1161 at Anagni; pope in 1198; enlarged the papal temporalities; greatly diminished Gr. authority in It.; excommunicated Philip Augustus of Fr. and placed the kingdom under an interdict 1200; compelled King John of Eng. to make his possessions the tributary fief of Rome; caused himself to be acknowledged suzerain of Sic., Bavaria, and Den.; proclaimed in 1208 the crusade against the Albigenses; sent out the crusade which founded the Lat. empire at Constantinople; convened the 4th Lateran Council 1215. D. at Perugia July 17, 1216.—**INNOCENT III.**, ANTIPOPE 1178–80, called *Lanctus*, was a Frangipani, and d. in prison.—**INNOCENT IV.** (*Sinibaldo de Fieschi*), pope 1243, d. 1254. His pontificate was characterized by warfare with the Ghibelline party, his opponents being Frederick II. of Ger. and Conrad, his son.—**INNOCENT V.** (*Peter of Tarantasia, Doctor Ramossissimus*), b. at Moustier, Savoy, in 1225; pope in 1276; d. June 12, 1276.—**INNOCENT VI.** (*Etienne Aubert*), b. at Mont, Limousin; pope at Avignon 1352–62; d. at Avignon Sept. 12, 1362.—**INNOCENT VII.** (*Cosmo Migliorati*), pope in 1404; d. Nov. 6, 1406.—**INNOCENT VIII.** (*Giovanni Battista Cibo*), b. in Genoa in 1432 of Gr. stock; a man of irregular life; obtained the papacy by simony in 1492; d. July 25, 1492.—**INNOCENT IX.** (*Giovanni Antonio Faccinetti*), b. at Bologna in 1519; pope 1591; d. Dec. 30, 1591.—**INNOCENT X.** (*Giovanni Battista Pamfilj*), b. at Rome May 7, 1574; pope 1644; extended the sway of the papacy; d. Jan. 6, 1655.—**INNOCENT XI.** (*Benedetto Odescalchi*), b. at Como in 1611; pope Sept. 21, 1676; undertook to revive the anc. discipline of the Ch.; had quarrels with Louis XIV. about the revenues of vacant benefices (1678), in which the Fr. bps. declared (1682) the authority of the pope inferior to that of a gen. council; condemned and burned the propositions of the Fr. bps. In 1687 he abolished the right of asylum as formerly exercised by foreign ambassadors; sanctioned the condemnation by the Inquisition of Molino's doctrine of Quietism; joined the League of Augsburg, and d. Aug. 12, 1689.—**INNOCENT XII.** (*Antonio Pignatelli*), b. at Naples Mar. 13, 1615; pope in 1692; d. Sept. 27, 1700.—**INNOCENT XIII.** (*Michel Angelo Conti*), b. at Rome May 15, 1655; pope 1721; d. Mar. 7, 1724. [*From orig. art. in J's Univ. Cyc.*, by CHARLES W. GREENE, M. D.]

Innocents' Day [in Old Eng. *Childermas*], the day (Dec. 28) on which the Catholic and Anglican chs. celebrate the massacre of the children at Bethlehem, who are called the *Holy Innocents* and considered as the earliest Chr. martyrs. In some Catholic countries the festival of the Holy Innocents is celebrated by playing practical jokes.

Innsbruck, or Innsbruck, town of Aus., cap. of the Tyrol, on the Inn. It is 1800 ft. above the sea, and is encircled by mts. from 6000 to 8000 ft. high. The cathedral contains a monument of Maximilian I., of marble and bronze, and also that of Andreas Hofer. It has a univ. Pop. 16,810.

Innuity. See ESQUIMAUX.

Ino, in Gr. mythology, was secretly married to Athamas, king of Orchomenus, to whom she bore Learchus and Melicertes. Having accepted from Hermes the young Dionysus to nurse, Here visited her and her husband with madness, when Athamas slew Learchus. I. fled with Melicertes in her arms and leaped into the sea, where she was changed into a sea-goddess, Lencothea.

Inocarpus edulis, a stately evergreen tree of the Pacific Islands, and of the order Thymelaceae, producing a nut which after roasting is a palatable and important food. The tree puts out from its trunk curious plank-like buttresses, which are very convenient to the natives for use as natural boards, after peeling off the bark.

Inoculation [Lat. *inoculo*, to "bud"], in gen. the conveyance of disease to an individual by means of the application of morbid material to his person, especially upon a wound; in particular, it signifies such a transfer of variola, or smallpox; which is also known by the more specific term of *variolation*. Inoculated smallpox differs from natural smallpox chiefly in its course being milder and

shorter. I. proved the source of disaster to the community, since inoculated smallpox was found to be as infectious as the natural disease. Owing chiefly to this fact, I. was rapidly supplanted by the announcement of Jenner's discovery of vaccination (1798), and has now fallen into complete desuetude.

Inquisition [Lat. *inquisitio*, a "seeking" or "searching for," "inquiring into," "examination"], in law, a seeking for proof in support of an accusation, a legal investigation, involving the examination of the inquisitors and the inquisitorial process. In hist., first a process of investigation, then a tribunal under various forms and modifications, then a fixed inst. of a twofold type, established in some parts of the R. Cath. states to search out and punish heretics, unbelievers, and certain classes of offenders against morals and the canon law.

I. *The Imperial Inquisition* was not a tribunal, but a civil process. The emp. Theodosius the Great (379–395) used inquisitors for the detection of the Manichæans. Justinian (525–565) employed similar officers to search for heretics in gen. The Chr. doctrines were acknowledged as part of the law, and heresy thus became a civil offence.

II. *The Diocesan Inquisition* was not a tribunal, but an ecclesiastical process or function. About 800 the civil powers committed the jurisdiction in inquisitorial cases to the bps. in their several dioceses. If a person found guilty remained obdurate, he was left in the hands of the secular court to be punished under the common law. This sort of function assumed a far wider significance in the 12th century.

III. *The Papal Legatine Inquisition*.—The disaffection toward the Ch. which marked the close of the 12th century spread, especially in portions of France. To Innocent III. (1198–1216) it seemed that the bps. were carrying on proceedings against these heretics too feebly. He sent papal legates into S. Fr. to give more energy to the repression of the Waldenses (1198). The legatine inquisitors held a court of their own, and tried, condemned, and inflicted penalties, and, with the concurrence of the magistracy, even death.

IV. *Rise of the Inquisition as a Permanent Institution*.—The official initiative in this work may be said to have been made by the Fourth Lateran Council (1215), Innocent III. presiding. It took the first steps in the direction of a permanent I. Condemned heretics were to be left in the hands of the secular power. Any prince declining to purge his land of heresy was to be excommunicated. If he persisted, the pope was to absolve his vassals from their allegiance. Those who joined in the crusade for the extermination of heretics were to have the same indulgence as the crusaders who went to the Holy Land. The Council of Toulouse (1229) adopted a number of canons tending to give permanent character to the I. Any one permitting a heretic to remain in his country, or who shielded him, was to be punished by forfeiture of property and official position. Men from the age of 14, and women from 12, were to make oath, and renew it every 2 yrs., that they would inform on heretics.

V. *Organic Establishment of the Inquisition*.—In Aug. 1231 Gregory IX. placed the I. in the charge of the Dominicans. Under its jurisdiction persistent heresy was treated with unsparing severity. But the Ch. might not shed blood with her own hands, and so it was necessary that princes should cower with her in carrying out the measures to repress heresy. This may properly be called an ecclesiastico-political tribunal.

VI. *Method and Laws of the "Ancient" Inquisition*.—When persons were suspected of heresy, their fellows in guilt, and even common convicts, were accepted as witnesses against them. The accused were to know nothing of them. Confession was wrung from them by torture, which was at the beginning applied by the civil authorities; but the I. subsequently took the matter into its own hands, under direction of Urban IV. (1261–64).

VII. *The Ecclesiastico-political Inquisition*.—1. *In France*.—The special sphere of the I. in the period of its earliest organization was in S. Fr. (1229–34). Its proceedings were marked with such severity that insurrections took place. Four of the inquisitors were put to death in Toulouse, and the pope was compelled to withdraw the I. from that place. It was again restored, and again fell into its earlier cruelty. In the 14th century it died out in Fr., although 2 centuries later an attempt was made to bring it into use against the Huguenots.

2. *Germany*.—In 1231 Pope Gregory IX. appointed Conrad of Marburg as grand inquisitor of Ger. His severity aroused gen. indignation, and the pope disavowed the excesses of his official. For more than a century the I. seemed robbed of its vitality in Ger.; but in the 14th and 15th centuries it was revived by several popes, notably by Innocent VIII. (1484). The Ref. broke the power of the I. in Ger. The Jesuits endeavored to restore it in Aus. and Bohemia. In Bavaria (1599) it was formally established, but it soon vanished from all parts of Ger.

3. *Italy—Rome*.—The I. was introduced into It. by Gregory IX. (1235). Its central tribunal at Rome was employed by Paul IV. (1555–59) against Protestantism. In conjunction with the I. stood the Congregation of the Holy Office. Sixtus V. (1585–90) enlarged the powers of the Congregation (1588). The chief inquisitor was always a Dominican. The pope himself met with the court at least once a week, and confirmed its decisions. The I. in It. was abolished by Nap. (1808), was sanctioned again by Pius VII. (1814), but was extinguished by the consolidation of the kingdom of It. 1870.

4. *Venice*.—The republic of Venice refused to receive from the pope an I. dependent on him, but instituted one under state control (1296). The I. of Venice was in the main an ecclesiastical tribunal, kept such by the state. While Sp. stimulated the I., and gave it the largest powers, Venice confined its jurisdiction to cases of heresy.

5. *Naples, Sicily, Tuscany*.—The I. proper was never established in Naples. That which was established under the control of the gen. inquisitor of Sp. was abrogated in 1782.

It was restored in Sard. by Gregory XVI. (1833), and stood until 1848. The Tuscan I. was suppressed by the grand duke Leopold II. (1824-59).

VIII. The "Molten" or "Spanish" Inquisition.—1. Spain.—The theatre of the most terrible form of the I. has been Sp. The whole strength of the Ch. and State has never been so centralized as there, in the repression of what was regarded as threatening the life of both. Jews and Mohammedans had been compelled (1391) to make a profession of Christianity. These converts were more than suspected of clinging in secret to the faith they had publicly renounced. A compulsory fidelity is the natural sequence of a compulsory profession. Of this compulsion the I. became the organ. An early movement in this direction was made (1470) by Cardinal de Mendoza, abp. of Seville, afterward of Toledo. About 1477 he sketched a plan by which the I. should be made a permanent ecclesiastical court, with larger powers and more effectual methods. This met the approval of Ferdinand and (after a temporary hesitation) of Isabella, and in 1480 was adopted by the Cortes at Toledo. This court began its official work (Jan. 2, 1481) by an edict in regard to the arrest of heretics, who were for the most part Jews who had professed conversion. Four days after, 6 of the condemned were burned, 17 more in Mar., and by Nov. 4, 278 had been sacrificed in the autos-da-fé of Seville. In that yr., or within several yrs., the number burned alive is computed at 2000. Many more were burned in effigy; 17,000 were reconciled—i. e. had the sentence commuted to imprisonment for life, confiscation, and other penalties. In 1483 Pope Sixtus IV. appointed Thomas de Torquemada, a Dominican prior, inquisitor-gen. of Castile and Aragon. The estimate of the number burned alive in the 18 yrs. of his ministry ranges from about 9000 to 10,000; between 6000 and 7000 were burned in effigy, which involved infamy to the dead, and to the living the loss of all that makes life dear. Nearly 100,000 were punished in other ways. Diego de Dega, a Dominican friar, abp. of Seville, succeeded Torquemada as grand inquisitor (1499). During the 6 or 7 yrs. of his administration 1664 were burned alive, 832 in effigy, and 32,456 punished in other ways. The third inquisitor-gen. was Cardinal Francis Ximenes de Cisneros (1507-17). In those 10 yrs. 2536 were burned alive, 1368 in effigy, 47,363 were punished in other ways; but in this estimate is included those who suffered in Aragon, whose I. was not subject to Ximenes. The I. in Sp. long maintained its original rigor. Philip II. (1555-98) used it to crush out Protestantism.

The procedure in the trials of the Sp. I. was thoroughly methodized. It was the business of subordinate officials, called "familiars," to arrest the heretics and bring them to the place of judgment. The immediate process was as follows: The person suspected or indicted was summoned 3 times by a public judicial citation. If he failed to appear he was excommunicated in *contumacia*, under reservation of a yet severer punishment. If he appeared, he was at once put under arrest. If he promptly confessed his guilt, he was spared the penalty of death. But even in that case he and his entire kindred were declared incompetent to bear any office of public trust. If he denied the charge, and the proofs were insufficient, he was dismissed, but remained under the surveillance of the familiars. The ordinary result of this was, that he was arrested the second time. If the prisoner refused to confess he was remanded to prison, and after several months was required to make oath that he would acknowledge the whole truth. If he refused to do this, he was condemned without any further evidence. He was not to know who were witnesses against him. Two hearsay witnesses counted as one eye-witness. The family of the accused were allowed to testify against him, but not in his favor. If he stood firm in his refusal to confess, he was subjected to the 3 grades of torture—the cord, the water, and the fire. If he was brought to confession, he was put to the torture a second time to ascertain his motives. A third time he was tortured to lead him to betray those who were his accomplices and sympathizers. After these confessions he was regarded as a penitent, but a solemn abjuration was required of him. Relapse was punished with death. If any one died under suspicion, or if suspicion was first excited after his death, the trial went on as if he were living. If the remains of the suspected dead could be found, they were burned; if not, the burning in effigy was substituted. When the various formalities had been gone through, the auto-da-fé was held. The feature most attractive was the burning to death of the condemned. But the autos-da-fé were not exclusively scenes of death. In some there were no executions. The autos-da-fé were to the people an epitome and anticipation of the Last Judgment. In the 17th, and yet more in the 18th century these "acts of faith" became rarer. The penalties were executed privately, and the tribunal lost more and more of its most dreadful characteristics. By an edict of Joseph Bonaparte (Dec. 4, 1808) the I. was abrogated. From the period of its introduction in its later form into Sp. (1481) to the time of its abrogation (1808) it is estimated that the I. had burned alive 31,912, in effigy 17,659, and had inflicted severe punishments of other kinds on 291,456 persons.

2. The Netherlands.—From Spain Charles V. (1516-56) and Philip II. (1556-98) endeavored to transfer the I. to the Netherlands, where the number put to death has been placed as high as 100,000 by competent authorities, and by none at less than 50,000.

3. America.—Soon after the discovery of Amer. the Spaniards introduced the I. into it. Mex., Cartagena, and Lima were the principal seats of its jurisdiction.

4. Portugal.—The I. was introduced into Port. under Sp. domination (1557). John IV. of Braganza, after the liberation of his country from the Sp. (1640), withdrew from it the right of confiscation. The Port. I. exhibited special severity in the E. I., where Goa was its centre. John VI. (1792-1826) abolished the I. both at home and in the colonies.

C. P. KRAUTH.

Insanity [Lat. *insanitas*, "unsoundness"], mental derangement or alienation, lunacy, madness, craziness.

Definition.—All the facts of science point to the brain as that organ the manifestation of whose activities we term mental phenomena. Mental activities vary with the nutritive changes of the brain, exhaustion following prolonged action, which is again recovered from after a period of complete or partial inactivity, during which time repair of cerebral tissue takes place. If we refer normal psychical phenomena to healthy cerebral action, we must necessarily attribute psychical derangement to disordered cerebral action; hence I. must be the manifestation of a diseased brain. But disease of the brain does not always produce I. A blow on the head may suspend consciousness, hemorrhage in the brain may interfere with the execution of voluntary movements, without serious impairment of the thinking faculties. The delirium of fever and intoxication are not ordinarily included under the term insanity. Tuke defines I. as "a disease of the brain affecting the integrity of the mind, whether marked by intellectual or emotional disorder, such affection not being the mere symptom or immediate result of fever or poison." He makes "the suspension or impairment of action of the healthy will" as an additional qualification to his definition for legal purposes. It should be clearly borne in mind, however, that I. from a scientific standpoint includes conditions which do not seriously impair mental responsibility.

Definition of Illusion, Hallucination, and Delusion.—An *illusion* is an incorrect perception of a real object; a *hallucination* is an incorrect perception of a sensation originating within the body not excited by an external object; *delusion* is a false belief. Mistaking a guide-post for a man would be an illusion of sight; hearing a voice when no one is speaking, seeing a face when the eyes are closed, are examples of hallucination, respectively, of hearing and seeing. If the individual is unable by his judgment to correct an illusion or a hallucination, he has a delusion, and in this case a delusion indicative of I. A delusion may be the result of a disordered imagination, not connected with illusions or hallucinations. While all these conditions may occur as symptoms of I., they do not of themselves always indicate it, though delusions are sufficient proof if they relate to circumstances which the individual ought to be able to reason correctly upon when in possession of his normal intellectual faculties.

Frequency.—Statistics respecting the frequency of I. in a community must be accepted with caution, so imperfect is the manner in which they are obtained, and so numerous are the modifying circumstances.

Age.—Dr. Pliny Earle's statistics show that between the ages of 20 and 30 I. is most frequent.

Sex.—Dr. Jarvis concluded from his collection of statistics that males are somewhat more liable to I. than females.

Marriage.—M. Parchepepe found that among 17,932 lunatics in various asylums, 49 per cent. were single, 40 per cent. were married, and 11 per cent. were widowed.

The proportion of the insane and idiotic to the population is stated by Bucknill and Tuke to have been in 1871: in Eng., 1 to 329; in Scot., 1 to 411; in Ire., 1 to 383; in Fr., 1 to 400; in the U. S., 1 to 622.

Causes.—So many factors are potent in the production of every case of I. that it is next to an impossibility to estimate their respective values. Causes of disease are commonly divided into *predisposing*, or those which render disease liable, and *exciting*, or those which actually induce the attack; some agencies may act in both ways. Hereditary predisposition is the most important cause of I.; not from the existence in ancestors of I. alone, but the transmission of an unstable nervous system leading to psychical degeneration. Drunkenness, emotional excesses, and a severe struggle for existence in one generation are among the most frequent predisposing causes of I. in the next, in which the same causes may act as predisposing and exciting. Adaptation of life to the ever varying surroundings resulting from modern civilization is an exceedingly important factor in predisposing to and exciting I. Bucknill and Tuke give the following enumeration of exciting causes in the order of their frequency: Domestic trouble and domestic grief, intemperance, epilepsy, affections of the head and spine, uterine disorders, religious anxiety and excitement, disappointed affections, sexual vice, fever and febrile diseases.

Classification of the forms of I. have been attempted on a *psychological* basis—i. e. according to the different mental faculties; on an *anatomical* basis—i. e. according to the structural changes which occur in the diseased brain; on an *etiological* basis—i. e. on the causes which produced the I. or the special bodily disease with which it may be associated; and on a *symptomatic* basis—being constructed from some special characteristics, as exaltation or depression, or representing the gen. picture of the disease according to the natural grouping of symptoms and bodily signs; being also known as the *clinical* method, from representing what is actually found at the bedside. We have followed, mainly, the classification of Kraft-Ebing.

A. **Arrest of Psychical Development.**—*1. Idiocy, or Cretinism.*—Congenital conditions, the result of perverted or arrested growth and development of the brain in both, and associated with peculiar bodily degenerations in the latter.

B. **Psychical Disease of the Developed Brain.**—*1. Psychoneuroses.*—Forms of I. which attack individuals whose cerebral functions were previously normal and without evident predisposition to disease, in contradistinction to those dependent on a defective psychical organization characterized by instability and predisposition to disease (psychical degeneration).

1. **Primary, curable conditions.**—*a. Conditions with depression of the emotions and difficult execution of psychical acts: Melancholia.*—In consequence of defective nutritive changes the brain can only produce feelings of a sad or painful character. Impressions of all kinds excite only a train of

thought which is sorrowful. The patient looks out upon a world of gloom, the reflex of his own gloomy interior. In mild expressions of the disease this sad disposition, combined with a slow association of ideas and reluctant voluntary effort, may be all that presents itself, leading to a sad expression, seclusion, and inactivity. In other cases delusions follow: strange morbid fears take possession of the patient; some great trouble which he cannot define is about to burst upon him; ruin stares him in the face; all is lost; even God has forsaken him. Self-accusation is the prominent feature of these delusions; he is persecuted, but not innocently, as in another form of I.; he deserves it all; it is a just punishment for unpardonable sins; he has brought ruin upon a relative or friend, who can only be saved from future damnation by the patient's death. Suicidal attempts follow such delusions. As a result of hallucinations and illusions, voices reproach him; frightful visions of monsters and devils torment him; odors of dead bodies or the brimstone fumes of hell fill his nostrils; his food is poisoned, or has a filthy taste. The details of delusions vary according to the sex, habits, education, and social surroundings of the patient, and the age in which he lives. While a passive, indifferent condition is a characteristic of melancholia, it sometimes passes into wild, active delirium, but even then not a gay delirium; it is still the outburst of unendurable distress; life is naught but a burden, from which he seeks to escape; this often becoming the one aim which even in passive states is followed with a persistence and cunning that may thwart the most vigilant attendant. Homicidal acts may be resorted to; thus, a mother may kill her child to save it from everlasting punishment. Beside these passive and active forms of melancholia, there is a form known as *melancholia with stupor*, often mistaken for dementia. The patient may remain speechless, expressionless, and inactive, though the mind may be active in this state and under the influence of delusions. All these forms may appear as stages in a single case, or one or the other may predominate. The delusions may be confined to a belief that bodily defects exist, this being known as *hypochondriasis*. (b) *Conditions with exaltation of the emotions and excessively active discharge of physical acts: Mania*.—We may subdivide mania into a mild form—*Maniacal Exaltation*—and a severe form—*Acute Mania*. In the first we may have nothing more than a general feeling of exhilaration similar to the effects of moderate alcoholic stimulation. The patient's surroundings appear to him to be all that is desirable, regardless of how gloomy they may be in reality. Logical reasoning is seldom destroyed in this form, but ideas flow fast and without effort; the bodily sensations and the emotions are pleasurable, and strongly expressed in muscular movements, as by talking, laughing, singing, dancing, gestures, and feats of strength. A feeling of power and joy beyond expression seems to pervade the mind; fatigue is unknown, and sleep of short duration. This picture may change to one of rage, perhaps provoked by restraint, perhaps the expression of a naturally brutal disposition, but the *ego* is still predominant; it is not the rage of despair. The animal propensities may show themselves, but the acts of the patient seldom become incoherent and purposeless. In the second form, ideas crowd upon each other in such rapid succession that confusion follows, no distinct conception resulting. Mania is sometimes ushered in by a melancholic stage, and mixed phases may occur which present phases of both mania and melancholia. The chances for recovery are better in mania, as a rule, than in melancholia. (c) *Conditions with temporary abolition of physical acts and an abnormal disposition: Stupidity or Curable Dementia*.—When these primary forms do not terminate in recovery they pass into: 2. *Secondary incurable conditions*, characterized by dissolution of the emotions, of the previous individuality, with its logical connections between feelings, conceptions, and volitions; briefly, a gradual decay of the ethical and æsthetic feelings and the intellectual faculties in general. According to whether this process remains partial or passes on to gen. psychical dissolution, we have: (a) *Secondary Monomania*; (b) *Terminal Dementia*.

II. *Psychical Degeneration*.—(a) *Affective or Emotional Insanity (folie raisonnante)*, characterized by the absence of illusions, hallucinations, and delusions, and the presence of an abnormally emotional state, usually of a depressive character, as irritability, discontentedness, and capriciousness; most frequent in women, who are often mistaken for quarrelsome, jealous wives, heartless and cruel mothers. (b) *Moral Insanity*.—It is commonly dependent on congenital defects, often the result of insanity, drunkenness, or epilepsy in the parents; when acquired later in life it is the result of some severe injury or degeneration of the brain. In both cases it is characterized by defect or absence of ethical ideas and æsthetic feelings, while the ordinary intellectual faculties appear unaffected. These moral idiots understand the difference between conventional right and wrong, but their moral feelings are so insensible that they have no desire to choose the right and avoid the wrong if their interests or inclination point otherwise. Often in childhood these monstrosities may exhibit defects in the ordinary childish affections, and in later yrs. show a cold, remorseless indifference to the finer feelings of social life, while the intellect is occupied in serving the lower animal propensities, which remain, exhibiting often the worst examples of alcoholic and sexual excesses. This is most astonishing when the individual has had the advantage of a good moral and intellectual education. Crime, if it will serve his purpose, possesses more attraction to him than virtue. Many of this class make up the veritable parasites of society, vagabonds and criminals of the worst sort; beyond redemption, for they are insensible to emotions which are the groundwork of higher ethical ideas. As those born blind have no true idea of color except by name, so these individuals can have no true conception of right and wrong in an ethical sense. As we may have all grades of these

defects, from moral feebleness to moral dementia, the milder forms may be difficult of recognition, and society is seldom willing to admit even the more decided examples. This form of I., however, is recognized by the highest authorities. It is denied by some, in the sense of being strictly without intellectual impairment. They claim that many exhibit an intellect of, to say the least, an inferior grade, while others may show, later in life, actual intellectual impairment. Hallucinations, illusions, and delusions are not found. (c) *Monomania (primäre verrücktheit)*.—This term is used as Esquirol employed it, and not in the popular sense, signifying I. on one particular subject, although it includes cases in which a certain fixed idea was prominent, yet not the only evidence of I. One of the largest and most important groups of I., it is also the most typical form of psychical degeneration, being almost exclusively the result of defective brain organization, in most cases hereditarily defective. It is characterized by hallucinations and delusions of a fixed nature, without a tendency toward dementia, often exhibiting, on the contrary, great brilliancy and acuteness of thought in reasoning on false premises. Many individuals on the borderland of the disease are noted for their eccentricities of character. They may exhibit in childhood convulsions from trifling causes, or become delirious in slight attacks of acute disease. The sexual functions frequently show abnormal development. They are often the precocious children set forth by fond parents as intellectual wonders, showing early tendencies to indulge in reveries; brilliant in ideas of an egotistical nature, weak in their execution; alternating between periods of gay expectation and melancholic depression. Living in an unnatural world of romance and phantasy, they fail to realize the true relations of their surroundings, and pave the way to the fully developed insanity of later life. Unnatural perceptions and ideas seem to spring up by unconscious mental processes, which at first are recognized as fancies and corrected, but which come again and again, displacing other ideas. The individual finds that all his perceptions in daily life are placed in thought in relation to this absorbing fancy, which colors everything, forming the background of his whole existence, even his acts varying in force with the swell of this uncontrollable dream. He is yet awake to the fact that it is a dream; finally, however, it becomes to him a reality; hallucinations strengthen the delusions, which are mostly delusions of persecution that he does not deserve; these often lead to homicidal acts. Ideas of grandeur are frequent, egotism prevailing—not the exaggerated ideas of a patient with paralytic dementia, who talks of having just devoured a thousand breakfasts or of ordering a dozen horses to ride at one time; the ideas of the former are more logical. They consider themselves monarchs, and conduct themselves as such: are great inventors, reformers, prophets, gods; the idea of persecution may still persist; the reformer is falsely imprisoned; some one is jealous of the inventor and seeks his life. Another frequent variety is that of religious I., the characteristics being often acquired early in life, developed during the excitement of revivals, from reading religious books, or through the influence of zealous priests or friends. The belief gains ground with them that they are called to enter a secluded life, to become religious reformers, or undertake missions; miracles are witnessed, visions of heavenly persons are seen. More frequently in women than in men, these religious ideas are closely connected with those of an erotic nature; they become holy virgins or the brides of Christ. The erotic tendencies may be present without the religious—an unsatisfied love for some ideal person, or one in a circle or station beyond attainment. In another group of cases true delusions do not appear, but persistence of a definite idea (*zwangsvorstellung*) exists which the individual cannot banish, or if dismissed it rises again. It may be a word or a question which incessantly repeats itself in the mind, or the repeated inquiry whether an act just performed was actually performed. The individual asks himself, "Did I lock the door?" finds, on examination, that he has done so, but the next instant the question comes again, "Did I really lock the door?" Sometimes he is urged on to an irresistible act—to steal, to burn, to murder—though usually the acts performed are harmless. In all these varieties of monomania recovery sometimes takes place, and many who are on its borders might be saved if they or their friends fully realized the situation, by turning their attention to the real facts of life and away from the day-dreams of a disordered imagination, which they are able to banish at a certain stage. (d) *Insanity Transformed from Constitutional Neuroses*.—1. Epileptic; 2. Hysterical; 3. Hypochondriacal. (e) *Periodical Insanity*, consisting of several variations, the most interesting being the so called "circular insanity," from having alternating attacks of melancholia and mania with lucid intervals between the changes, which may occupy weeks, months, or yrs.

III. *Cerebral Diseases in which Psychical Disturbances Predominate*.—(a) *Paralytic Dementia or General Paralysis of the Insane*.—An extremely frequent form of I. in modern times, and the only one whose morbid anat. is well understood, being dependent on inflammatory or degenerative changes of a chronic nature in the membranes, blood-vessels, and cortex of the brain, and frequently of other parts of the nervous system. The disease is characterized by a progressive failure of the intellectual faculties, with intercurrent melancholic and maniacal attacks, delusions of an exalted nature; progressive muscular tremor, incoordination, weakness, and finally paralysis, of an irregular distribution, and changes of the vascular system, finally reaching complete dementia, and terminating in death, on an average in about 3 yrs. Before the disease is fully established, beginning failure is observed in the mental faculties: loss of memory, change in habits, such as negligence, laziness, indifference, vulgarity, and lavishness, in the place of former cleanliness, activity, preciseness, modesty, and economy; the pen-

manship becomes changed: letters and words are omitted: old anecdotes are repeated again and again: irritability on the one hand or a remarkably happy state on the other may mark the emotional life. This prodromal stage may continue for months or yrs. Then follows in many cases a melancholic and hypochondriacal stage. The individual thinks that his business is ruined; he cannot meet his engagements; his heart has ceased to beat; moments may come when he is suddenly supremely happy, but this is replaced by the former ideas: there is a tremor, slowness, and incoordination of the speech, a dullness of the eye, a stupid appearance of the face; the lips and tongue are tremulous while speaking; there is inequality in the muscular tone of the two sides of the face and of the pupils; there is slow reaction, or no reaction of the iris to light; the finer movements of the fingers are made with difficulty; sleeplessness is common, and suicidal ideas may form, but the patient has not sufficient energy to execute them. This stage may last a week or months, after which the disordered ideas may disappear, the symptoms of intellectual and muscular weakness usually remaining until, in time, either gradually or by a maniacal outburst, wild, extravagant projects appear; he makes purchases beyond his means; he is enraged at opposition; recognizes no bounds. The delusions of extravagance become more incoherent, and often change from day to day, from hour to hour: he speaks thousands of langs.; controls all the govts. of the world; he is the god of gods; possesses millions, which he distributes lavishly on all his friends, and on strangers; he is the strongest, healthiest man in existence. The opposite of this *megalomania*—viz. *micromania*—may come for a moment: he will declare that he is but an inch in height, or weighs but an ounce. Convulsive attacks may follow, and the paralytic phenomena still increase. Even at this stage remissions may occur, the delusions disappearing; but dementia and paralysis continue to advance until the last rays of intellect and of emotion have faded away: voluntary power is dead, yet he still lives, vegetates; artificial feeding is necessary: bed-sores form; and finally starvation, a convulsive attack, or pneumonia puts an end to the sad scene. *b. Cerebral Syphilis; c. Chronic Alcoholism; d. Dementia of Old Age; e. Acute Delirium* are the remaining diseases of the group. A consideration of the morbid anat., diagnosis, prognosis, and treatment of the varieties of I. would carry us beyond the limits and design of this work.

Reform in the Care of the Insane.—There is no better evidence of the advance of society from a state of ignorant barbarism to intelligent humanitarianism than that shown by the hist. of the care of the insane. It is hardly a century since the phys. reclaimed the unfortunate lunatics from a superstitious priesthood, who by exorcisms commanded devils to come out of them, and, when this was not sufficient, had recourse to phys. torture. When Pinel unshackled the lunatics of Bicêtre, there were some who had been in chains for nearly 40 yrs.—without light or sufficient air; naked or in filthy rags; without food or fire; a cell floor for a bed; the whip of an attendant selected for his brutality to torment them; chained to a ring in the floor or confined in cages—could a more insane method of treatment have been instituted for I.? But this has gradually changed, and what was the rule then is the exception now; brutality and restraint have largely given place to kindness and personal freedom. Yet the great problems which remain to be solved respecting the rights, disposition, and care of the insane, both without and within asylums, call for the highest abilities of the phys. and the statesman. (See BUCKNILL and TUKE, *A Manual of Psychological Med.*; KRAFT-EBING, *Lehrbuch der Psychiatrie*; MAUDSLEY, *Physiology and Pathology of the Mind*.)

Insanity before the Law. The term insanity has received at law a convenient interpretation in the phrase *non compos mentis*. By this is meant a condition of mind, resulting from the influences of bodily disease, in which the individual has lost control of his faculties. The presence of the basic element of disease is the indispensable prerequisite to any legal recognition of insanity; and no other form of I. than that which springs from bodily disease is known to the law. Hence, it can take no cognizance of any forms of moral disorder, regarding them purely as varieties of depravity until they are shown to be the offspring of phys. disease. The modern phrase "mental unsoundness" is intended to cover the same ground as the varieties of *non compos mentis* did at common law. It is to be distinguished from the phrase "insanity," which implies the highest grade of unsoundness as tested in any particular direction. Thus, the term "partial insanity at law" is the equivalent of monomania in med., and imports limitation in the extent rather than in the degree of I. It is complete I. as far as it goes, and tends to nullify all civil acts infected by it.

Insanity, or Mania.—I. proper is distinguishable from the temporary delirium of fever, and is only recognized as a condition of legal incompetency when become an established habit of life. The common law takes no special cognizance of acute stages as set opposite to chronic, the problem to be solved in every inquisition of lunacy being simply that of *compos* or *non compos*. Little need be said to show that I. under whatever name recognized in med., has but one designation in law, and that designation is founded upon the fact that mental incompetency exists in such permanent form that there is continuous enslavement or duress of the reasoning faculties. Consequently, every act performed by such a mind which involves responsibility at law is voidable, although not necessarily void.

Partial Insanity.—It is demonstrated in med. that such a condition as that known under the name of monomania or partial insanity cannot exist *strictissimis verbis*. But, practically speaking, an insane person may do many reasonable things which, having no flavor of I. in them, the law will not set aside. To that extent, therefore, it legalizes a sane act by whomsoever committed. And if a person being notori-

ously insane is capable of doing habitually a majority of his acts in a reasonable way, and only a few in a persistently insane way, there seems to be no just objection in law to designating such person as *partially* insane. The simple question at law is this: To what extent are his acts rational? If they be so in the majority of instances, then in the majority of instances his acts do not differ from those of a sane man, and to that extent they deserve to be sustained. So in relation to responsibility for crimes committed by persons alleged to be partially insane or temporarily insane, the law has discarded all those terms of med. designation which imputed I. to the instincts alone. Regarding these as exponents either of voluntary depravity or as states of mental duress and loss of self-control arising from disease, it requires to know simply whether the party is capable of discerning the true nature and consequences of his acts, coupled with the power of acting or abstaining from acting in a particular way. And if not, why not? The true test of criminal responsibility before the law is the possession of reason and free-will. When both these are present the party is responsible; when either is absent, he is not.

Mental Unsoundness.—The condition known as mental unsoundness at law is one which is easily confounded with imbecility wherever the congenital character of this state is overlooked. But it will be seen upon reflection that a born imbecile does not necessarily present us with a case of unsound mind. What constitutes absolute mental health or absolute mental strength is a very difficult question to answer categorically. Mental unsoundness is frequently used also as synonymous with I., but at law there is a distinction between them, resting upon the fact that mental unsoundness frequently is due to other causes than disease, whereas I. has always a foundation of phys. disease to rest upon. Thus, mental unsoundness may arise from age, from vices producing precocious senility, or from a natural exhaustion of the mental powers as a consequence of inherited weakness, though unaccompanied by appreciable bodily disease. Its subjects not being necessarily dangerous to themselves or the community, it would be wrong to deprive them of their liberty or the control of their property from the simple fact of mental unsoundness, until it was first shown that some form of guardianship was necessary for their well-being.

In determining criminal responsibility in connection with mental unsoundness a different standard has to be employed. The peace and safety of society requiring that every individual should restrain his passions in their tendency to overpower his self-control, the mere fact of mental weakness is not an answer to an indictment for crime unless that weakness or unsoundness be the direct offspring of disease, and the disease overpower the reason and the free-will at the moment of committing the offence. A weak mind is not absolved from the duty of watching over its own conduct and restraining its evil propensities; and while it might not merit the same degree of punishment for offending as a strong one, it would be wrong to assert that it was wholly dispensable in law or *in foro conscientie*. [From orig. art. in *J.'s Univ. Cw.*, by PROF. JOHN ORDONAU, M. D., LL. D.]

Insanity before the Law (SUPPLEMENTAL). *Jurisdiction of Courts of Chancery as to the Custody and Control of Insane Persons.*—The court of chancery in Eng. has, from a very early period, exercised a gen. power of supervision and control in relation to the interests of persons of unsound mind, their custody, and protection. The chief objects for which this special jurisdiction of the court is exercised are the ascertainment of the fact of I. by a judicial investigation, the placing of a person judicially declared to be insane under the guardianship of one or more persons termed a "committee," and the subsequent control of the committee in the management of the insane person's property and the custody of his person. In making an inquiry in regard to a person's I. the practice is to issue a commission out of the court of chancery, upon a proper petition addressed to the chancellor, authorizing the coms. therein designated to examine into the person's mental condition with the aid of a jury, and commanding them to report to the court the result of the inquisition. This commission is said to be "in the nature of a writ de lunatico inquirendo." The coms. have power to summon witnesses and to examine the person himself who is supposed to be insane, if he thinks fit to be present. The degree of mental unsoundness which will justify the appointment of a committee need not be so great as to amount to idiocy or lunacy. Mental imbecility, resulting from age, infirmity, disease, or the decay of the natural powers, may be sufficient. The finding of the jury, however, must show that the person is to such an extent of unsound mind as to be incapable of governing himself and managing his property and directing his affairs. In the appointment of a committee, relatives of the person adjudged insane are usually chosen, though this is not necessary. It is the duty of the committee to manage the property intrusted to their charge carefully and prudently, to make such investments as may be necessary to keep the estate reasonably profitable, and to account for the manner of administration when required by the court. All gifts or contracts made by the insane person himself after the actual finding of the inquisition are utterly void. The power of the committee to deal with the property in the exercise of an independent discretion is very limited. In most instances special authority to charge or dispose of the property must be obtained from the court. In the management of the estate under the direction of the court the interest of the insane person is to be regarded rather than the interest of those who are entitled to the succession. So, in making provision for those who are dependent upon him, the same principle is followed, and expenditures may be made out of his property which he is not legally bound to incur if they are substantially for his advantage. After a proper allowance has been made for the maintenance of a lunatic and his family, any surplus remaining will be appropriated to

the payment of his debts. After the appointment of a committee, suits in behalf of the lunatic must be instituted in the name of the committee, who are responsible for the conduct of the suit. The lunatic, however, is usually joined as a party plaintiff. So suits against the lunatic are brought against the committee.

In this country courts of equity in some of the States exercise the same jurisdiction in relation to persons of unsound mind as the Eng. court of chancery. This is the case in N. Y. In other States such persons are placed under the charge of guardians appointed by courts of probate, as in Mass. The subject is usually regulated to a great degree by statute, but the same general principles prevail as in Eng. practice.

GEORGE CHASE.

Insect Fertilization. One of the most significant modern discoveries in vegetable physiology is that the services of insects are indispensable for the fertilization of certain flowers, which are mostly so constructed that the pollen cannot pass without external aid from the stamens to the pistils of the same plant, much less to those of other plants. Hence, these flowers produce nectar which attracts insects, and is so placed that to reach it they must first come in contact with the stamen, from which the pollen adheres to the insect's body and is carried to the pistil.

Insectivorous Plants capture insects and consume them. The clearest case is that of *Dionaea muscipula*. An allied plant, *Drosera*, or sundew, effects its captures by the aid of bristles. *Pitcher-plants* of different families attract insects to the open mouth of their hollow leaves. In the liquid of the hollow leaf insects are drowned, and soon decompose. Minute animals in water are entrapped by the leaf-appendages of *bladder-wort*. The mechanism for entrapping is elaborate; it is unlikely that the captures effected by it are not of service to the plant.

Insects. See ENTOMOLOGY.

Insolvency [Lat. *in* and *solvère*, to "pay"], the state of a person who is unable to pay his debts as they fall due or in the usual course of trade or business. This is the most comprehensive sense in which the term is used, but in the Eng. law until recently it was usually employed in a restricted meaning, and was carefully distinguished from bankruptcy. A bankrupt under the Eng. system was a trader or merchant who had become unable to pay his debts. Those only were termed insolvents who were not traders or merchants, and could not meet their obligations. In the legislation regulating the distribution of a failing debtor's property among his creditors, laws were termed bankrupt or insolvent laws according as they applied to one or the other class of persons. The additional distinction was also established that bankrupt laws operated to relieve a trader absolutely from his present indebtedness, while insolvent laws only discharged a debtor from imprisonment, but left his future acquisitions still liable to the claims of his creditors. In the U. S. the accurate discrimination between bankruptcy and *I.* which formerly prevailed in Eng. has never been observed in legislation. By the U. S. const. power is given to Cong. to establish a uniform rule on the subject of bankruptcies throughout the U. S. In pursuance of the authority given by this provision, statutes have from time to time been enacted by Cong. which have been designated distinctively bankrupt acts. State statutes of similar purport were generally termed insolvent laws by way of distinction from the legislation of Cong., even though there was no material difference in the gen. character of the provisions which they contained. This distinction, however, did not rest upon any substantial basis, and the terms "bankruptcy" and "insolvency" were often employed interchangeably. The power given to Cong. to establish a system of bankruptcy laws causes its legislation upon the subject to supersede that of the States. But when such a law of Cong. is repealed, the insolvent laws of the several States revive, and are applicable until Cong. passes a new law. This is the case at present (1882), the last bankrupt act of Cong. having been repealed in 1878. The laws of the different States were all enacted for the same gen. purpose, to secure the division of a failing debtor's assets proportionally among his creditors, though the regulations prescribed for the attainment of this object are somewhat diverse. The operation of the law of each State upon the subject is confined to its own limits, and a debtor's discharge obtained in one State may be of no validity in another.

It is not an uncommon practice for insolvent debtors to avoid the necessity of a resort to the methods of obtaining a discharge from their indebtedness established by bankrupt or insolvent laws, by a voluntary arrangement with their creditors, who agree to accept a part payment in full satisfaction of their claims, and grant the debtor a complete release. An agreement of this kind is technically termed "an agreement for a composition," or simply "a composition." This is usually made by deed termed a "composition deed," though when the indebtedness is based upon simple contract the agreement may be made by parol—i. e. either orally or by an instrument not under seal. The composition must in all cases be founded upon a sufficient consideration or it will have no validity. When the arrangement is made with a single creditor, there must be a new and independent consideration, or there must be a release under seal, which imports a consideration. But an arrangement for a composition made with more than a single creditor will be valid, though there be no independent consideration. The benefit which each creditor gains by the engagement of the others to forbear, and the consequent securing of a fund for the mutual benefit of all, is a sufficient consideration to sustain the agreement into which they mutually enter. The composition deed or agreement is not required to be of any special form. After a composition has been agreed upon with several creditors, every agreement or arrangement by which an advantage is secretly secured to any one of them which is withheld from the others is a fraud upon the creditors from whom it is concealed, and consequently invalid.

So, when there is an arrangement for a composition it is a fraud in any one creditor to sue the insolvent contrary to the terms of the compromise.

GEORGE CHASE.

Inspiration [from the Lat. *inspiratio*; Gr. *ἐμπνεῖσθαι*, from *ἐμψνέω*, to "breathe into" or "upon," to infuse into, to inspire (the soul) from a supernatural source], that superintending influence of the Holy Spirit over the minds of Script. writers which secures such a record as God designs.

I. THE SUPERHUMAN ORIGIN OF THE SCRIPTURES is evinced—1. From the fact that the O. and N. T. constitute a *unique book*, being (a) the product of many writers of different ages; and yet they present (b) a complete *unity* in doctrine and method; have (c) a thoroughly historic basis; (d) have been preserved in marvellous purity; and (e) can be translated into all langs., preserving their import and to a great extent their beauty. 2. From their *monotheistic* character, although written at a time when all nations were polytheistic. 3. From the character of the *morality* which they inculcate. 4. From their peculiar *religious teaching* and method: (a) In making God both human and divine; sinless, yet dying for sinners. (b) In teaching salvation by and in the incarnate Son of God. (c) While Christianity is an *exclusive* religion, yet (d) it allows no coercion, leaving its claims to the voluntary acceptance of all; but (e) it announces its certain future success. 5. That the human intellect could not produce a book so adapted to the wants of all, going hand in hand with the moral and intellectual cultivation of the species.

II. OBJECTIONS.—These may be divided into 3 classes: 1. (a) Why was the revelation so long delayed, and finally given to so few? (b) Why, if from God, has the Bible so many things insignificant or obscure? (c) How can a book coming from God sanction cruelty and injustice? This whole class of objections may be met by analogy. Similar and equally weighty objections lie against "the constitution and course of nature;" hence why should those who admit them object to the *word* of God because of what is found equally in the *system* of things which he has ordained and controls? 2. The *presumptive* objections against plenary *I.* arise from certain apparent discrepancies, inaccuracies, and seeming conflicts with science. These are met thus: (a) The lang. of sense, not of science, is alone adapted to all peoples and times, and the Script. writers have wisely adopted it. (b) If a mistake is really found, it can be corrected without *in so far* invalidating other parts. (c) Assumptions and hypotheses should not disturb the student until they are fully verified. (d) As in the past inquiry has lessened the number of supposed errors, we have reason to believe that it will be so in the future, and that science and religion will in the end be found not to conflict. 3. Objections from the nature of *I.* itself resolve themselves mainly into this: that men, being fallible, could not be the media of infallible truth. In reply to this, it is claimed for the Script. writers that, though themselves fallible, they are kept from error, *in that* for which they are employed, by the Divine Spirit.

III. SPECIFIC INSPIRATION.—1. The *presumptive* proof that the Bible possesses full *I.* may be thus summed up: (a) All the lines of argument indicated above show the Bible to be superhuman. (b) Revelation being granted, *I.* may be presumed. (c) If *I.* be denied, we have no *objective* standard for religious truth, binding upon all. (d) *I.* may be presumed from the harmonious blending of the prophetic and miraculous with the historic and didactic portions of the Bible. 2. The more *direct* proofs are: (a) The Script. writers distinguish between subjective *false* prophecy and the *true*, which has a valid ground outside of their own minds. (b) They imply their belief in the *organic unity* of Script. by quoting what others had said, often giving a pregnancy of signification to the original words. (c) In respect to the *I.* of the N. T. writers it may be said in gen. that they claim such *I.* (and if they are credible men their testimony should be received). In respect to the *I.* of the O. T. writers, those of the N. T. expressly recognize it in various ways; and, moreover, the O. T. contains in itself corroborative proof.

Such is the outline of proof, necessarily of a moral character, that in the Scripts. of the O. and N. T. we have an objective standard provided by God himself as an infallible guide to religious belief and practice. [From orig. art. in *J. s. Univ. Cyc.*, by REV. J. R. HERRICK, D. D.]

Inspired, The, or The Community of True Inspiration, a small sect who trace their origin both to the old Ger. Mystics and Pietists, and through the "French Prophets" to the Camisards of Fr. They reject the sacraments, practise to some extent communism in respect of property, and are evangelical in doctrine.

Instinct [Lat. *instinctus*, "incitement"]. An *I.* may be defined as an impulse to a particular kind of action which the being needs to perform as an individual or representative of a species, but which it could not possibly learn to perform before it needs to act. 1., as a gen. term, properly includes all the original impulses and that apparent knowledge and skill which animals have without experience. In its highest manifestations 3 things are involved—*impulse, knowledge, and skill*, or an *ability* that in action simulates both knowledge and skill. In the animal kingdom we find impulses to specific actions, and so much of apparent knowledge and skill belonging to each species as shall enable its members at birth to begin life successfully. As the phys. system develops, new *I.* are developed to secure the proper use of organs and the proper relations of the whole being to the world. Instinctive acts commend themselves to reason as the best possible for the being that performs them; and in the lower animals they so simulate intelligent action, and seem to be so intimately joined to it in man, that it is difficult to apply any test for distinguishing one kind from the other. Instinctive impulses appear in man, and the instinctive principle of action plays an important part even in his higher nature.

The prevailing theories in regard to instinctive action are 3: (1) That these impulses and capabilities were the direct gift of the Creator to each species. (2) That what we call

I. is simply the accumulated results of individual experience, fixed by repetition and received by the living races by inheritance. (3) Mr. Darwin, while allowing that some intelligent actions may become converted into I., and be inherited, claims for the greater number of complex I. an entirely different origin; that is, "through the natural selection of variations of simpler instinctive actions."

In the animal kingdom, as it now exists, the impulses find their expression through complex directing powers that supply for these lower animals the place of acquired knowledge and skill in man. While physiological forces carry on the growth within the body, instinctive forces adjust the relations of the animal to the external world. Through these impulses and activities all animals are urged on to their end in that course best for the species as a whole. In man the instinctive impulses are never wholly self-directive, but are conditional for the action of that rational nature through which man as a free agent seeks his own end. [From orig. art. in *J. S. Univ. (cyc.)*, by P. A. CHADBOURNE, LL.D.]

Institute of France, The. occupies a unique position among the learned societies and acad. of Europe. Its origin is to be found in a corporation of literary men suggested by Richelieu. The royal letters patent were issued early in 1635, and after 2½ yrs. more the sanction of the Parl. of Paris was obtained, and the *Académie Française* came into existence, the first learned society endowed and erected into a corporation. Several other acad. were founded from time to time, all of which were dissolved by the National Convention in 1794; but for the continuance of their work the same convention in 1795 called into existence the I., which was the heir of the older associations.

In its present organization the I. is made up of 5 distinct acad., each having its own officers, meetings, publications, etc.: (1) *The Académie Française*. The number of members is restricted to 40. The annual allowance from the state is about 85,000 francs, a good part of which goes in members' allowances. The prizes for eloquence and poetry absorb 4000 francs. By the Montyon prize for virtue 20,000 francs are yearly divided among poor persons who have distinguished themselves by some specially virtuous act. There are many other prizes. (2) *The Académie des Inscriptions et Belles-Lettres* has 40 ordinary, 10 honorary, 8 foreign associates, and 50 corresponding members. (3) *The Académie des Sciences*, having 65 ordinary, 10 honorary, 8 foreign, and 100 corresponding members. The most brilliant names in Fr. science have adorned the roll of this acad. (4) *The Académie des Beaux Arts* has 40 ordinary, 10 honorary, 10 foreign associates, and 40 corresponding members. It distributes a number of prizes and has pub. a dict. of the fine arts. (5) *The Académie des Sciences morales et politiques* has 40 ordinary, 6 honorary, 6 foreign associates, and 40 corresponding members. There is a fine and rare library attached to the I. Each member receives a salary of 1500 francs, and the *secrétaires perpétuels* have 6000 francs per yr. [From orig. art. in *J. S. Univ. (cyc.)*, by WILLIAM E. A. AXON.]

Insurance [from *in* and *sure*, is a contract whereby one agrees, for a sum of money, to indemnify another in case the latter shall suffer loss by certain specified risks. It is termed *marine* or *fire* according as it is applied to maritime or fire risks. It was unknown to the ancients, and had its origin in the exigencies of modern commerce. It was first applied to mercantile adventures. The fear of pecuniary ruin by the loss of ship or cargo checked the spirit of enterprise. Few were so wealthy as to be able to bear alone so great a loss, but by dividing the risk among many it was seen that the inconvenience to each of the proportion of loss which he assumed might become trivial. Thus originated the practice of I., which has for its purpose to break the force of the blow of calamity by increasing the power of resistance. The person who undertakes to pay in case of loss is termed the insurer; the danger against which he undertakes, the risk; the person protected, the insured; the sum which he pays for the protection, the premium; and the contract itself when reduced to form, the policy.

Insurance, Life. See LIFE ASSURANCE.

Integral Calculus. See CALCULUS.

Intellect. See MIND, by HON. W. T. HARRIS, LL.D.

Intemperance. See INEBRIETY AND INTOXICATION.

Intercourse (Right of) between States. This so called right can be made to include political and commercial I. with the right of transit. But there is really no such right by which one nation may force another to comply with its wishes. The 2 first rights imply mutual desire. How can 2 nations exercise them if one refuses to begin such intercourse? Yet the right of transit, for purposes of commerce, where the access to the rest of mankind is through another country, has very nearly the character of a right.

T. D. WOOLSEY.

Interdict [Lat. *interdictum*, a "prohibition"], in European hist., censure pronounced by the pope, by a synod, or by a bp., withdrawing from particular persons or places, or both, certain religious privileges. In the Dark Ages the I. was the most terrible of punishments. Hincmar's I. (869) was overruled. The first one not contradicted was in 994. Among the most celebrated I. were that laid upon all Fr. by Gregory V. in 998; that laid on Eng. by Alexander III. in 1171 as a punishment for the murder of A. Becket; that laid by the same pontiff upon Scot. in 1180; by Innocent III. on Fr., 1200; on Eng. in 1209 under King John; on Venice by Paul V. in 1606.

Interest [Lat. *interest*, "it is of advantage"], the compensation paid for the use of money borrowed. I. is always reckoned at a certain per cent. of a defined sum of money, which is called the *principal*; the per cent. paid is called the *rate*, and is usually stated as the rate per annum, though often payable at shorter intervals than a yr. The rightfulness of I. rests upon 2 facts: (1) The fact that capital is the result of past labor, preserved by self-denial in saving. (2) The fact that in the production of values present labor is crippled, almost fruitless, without the products of past labor

—i. e. capital—to work upon and to work with. An equitable loan is for the advantage of both borrower and lender, and so realizes the truth embodied in the etymology of the word *interest*. The gen. rate of I. in a community is determined by 3 considerations: (1) The average productiveness of industry; (2) the proportion between the supply of capital and the demand for it; (3) the degree of security given to contracts by the protection of law and prevalent moral sentiment. Hence the rate is lowest in an old country, where the accumulation of wealth is large, industry is active, exchanges are rapid, and men's integrity and honor are guarded by good laws.

A. L. CHAPIN.

Interest, Law concerning. In the comprehensive sense in which the word *interest* is popularly used, it denotes any compensation for the use of money which a debtor pays to the creditor, but in legal usage it has obtained also a technical meaning by which it is distinguished from usury, and denotes such a measure or rate of compensation as is allowed by law. Usury, on the other hand, is an excess of compensation above the rate established by law. Until within a few yrs. nearly all of the States of this country had laws prohibiting the taking of more than an established rate of I., and, though the prohibition has been removed in a few of them by recent legislation, in the majority of them such laws are still in force. In Eng. there was an established legal rate until 1854, but in that yr. all the laws against usury were repealed. In the U. S. the lawful rate generally prevailing is 6 per cent. upon the sum loaned, or prin. In some of the States there is a particular rate declared applicable to ordinary transactions in the absence of any special agreement, but the parties are allowed to stipulate for a higher rate if they desire. Laws to prohibit the taking of usury never prevent an agreement being made for a lower rate than that established by law, but only forbid the parties from stipulating for a higher rate. The obligation of a debtor to pay I. upon the sum which he owes may either arise out of contract, in which he expressly or impliedly agrees to its payment, or may be in the nature of a penalty imposed upon him for default in the payment of the prin. at the time when it was due, or for the misuse of trust funds committed to his charge. In the one case, I. is said to be payable by contract, while in the other it is given by way of damages, notwithstanding there is no agreement for its payment. A contract to pay I. may be either express or implied. It is *express* when there is a positive stipulation between the parties that the amount payable to the creditor shall bear I., and the time from which it shall be reckoned, the manner in which it shall be payable, and the rate at which it shall be estimated may be directly specified in the agreement. If no rate is mentioned, the legal rate is understood. A contract to pay I. is *implied* when an agreement is entered into of such a nature that an obligation to pay I. is naturally incidental to it, and is to be presumed as within the contemplation of the parties. Thus, it may be inferred from the course of dealing between the parties, as where I. has before been charged and allowed under like circumstances, or where it has been the uniform practice of the creditor to charge I., and this was known to the debtor at the time of the transaction by which the debt was incurred. So, where there is a gen. usage in any particular trade or branch of business to charge and allow I., parties having knowledge of the usage are deemed to contract with reference to it.

I. recoverable as damages is given by operation of law, and does not depend upon contract, express or implied. It is the gen. practice in the courts of this country to award I., computed at the legal rate, for default in the payment of any liquidated debt or claim at the time it becomes due. The time from which it is reckoned is the date when payment should properly have been made. I. will be given as damages whether the debt bore I. before maturity or not. In many instances the time when the debt originally becomes payable does not depend upon agreement, and must be determined by special rules. The gen. principle is that I. will be computed from the time when the creditor might have brought action to enforce his claim. Thus, when money is lent to another or paid to his use, I. accrues from the time of the loan or payment. When goods are sold, and no time of payment is specified or credit given, I. is computable from the day of the sale. A note payable on demand draws I. from the time of the demand. When credit is given, I. will be calculated from the expiration of the time of credit. Upon unliquidated demands I. is not, in general, collectible, since there is no specific sum upon which it can be reckoned until the amount of the claim is liquidated or ascertained, and usually no definite time at which payment is to be made and from which the I. can be computed. It is on the ground that a creditor's claim is unliquidated that I. is not generally given in actions for damages for tortious injury. In cases of the conversion of personal property, however, I. is usually recoverable upon its value from the time of conversion, since that value is in general readily ascertainable, and the retention of the property is a continued wrongful act from the time it taken or wrongfully detained. The same rule is also applied in some other cases of injury to property where the amount of the claim can be computed.

I. given by way of damages for the maladministration of trust funds depends, in the main, upon the same principles—viz. that the owner of the property or debt is entitled to the percentage which might be obtained upon it by a faithful administration of the trust, and that I. may be chargeable as a means of punishment. Thus, guardians, executors, and administrators, and trustees of every kind will be charged I. upon all trust funds in their hands which it is their duty to invest, upon failure on their part to do so within a reasonable time or with proper precautions against loss. Generally, simple I. will be charged against them, or the rate which would have been obtained by a judicious investment, but in cases of gross delinquency compound I. may even be recovered.

Compound I., by which is meant I. computed upon a sum consisting of the prin. and previously accrued I., is not in gen. recoverable at law. Even though there be an express agreement that compound I. shall be paid, the contract will not be usually enforceable for more than simple I. When, however, I. has already accrued and become payable, an agreement that it shall be added to the prin., and that I. shall be subsequently computed upon the new prin. thus formed, will generally be deemed valid. In like manner, compound I. may be payable in certain kinds of mercantile transactions by virtue of usage.

GEORGE CHASE.

Interference [Lat. *inter*, "between," and *ferire*, to "strike"], as between states, exists where one state, by force or in other ways, tries to prevent injury to itself from the measures of another state. The prin. occasions for it are—(1) preservation of the balance of power; (2) opposition to revolutionary measures of another state. The plea here is self-preservation. (3) It is also used when great inhuman atrocities are committed by foreign states, even against their own subjects.

T. D. WOOLSEY.

Interim, certain formulas or confessions of faith adopted by the Ref. in Ger., with the object of maintaining the *status quo* until a gen. council could decide all questions between Catholics and Prots. There were 3 such: the I. of Ratibon (1541), of Augsburg (May 15, 1548), and of Leipsic (Dec. 22, 1548), each being the result of conferences between Catholic and Prot. theols. No permanent result could be expected from such attempts at compromise. The Leipsic I. was resisted by arms, was abrogated by Charles V. in 1552, and was finally superseded by the Augsburg Confession, confirmed to the Prot. states in 1555 by diet of Augsburg.

Intermittent Fe-ver, Ague, Fever and Ague, a periodic fever resulting from infection of the blood by malaria or marsh-miasm. (See MIASMA.) I. F. is most prevalent and severe in the tropics, where vegetation is luxuriant, and a soil enriched by decaying plants and falling foliage is subjected to the extreme influences of alternate seasons of rain and drought. In temperate regions it is present in new dists., disappearing as the land is populated, cultivated, and drained. It may appear in cities by the exposure of marshy subsoil when excavating to build, or by the escape of malarial air from defective street-sewers constructed in a swampy substratum or emptying on a malarial water-course, whose tidal changes dam back marsh-miasm, to escape in the various quarters from which the sewers extend. I. F. occurs in paroxysms separated by intermissions or non-febrile periods. The paroxysms may recur daily, constituting the "quotidian" form, or, on alternate days, the "tertian" form, since it recurs on the third day, including the previous attack. There is also a "quartan" form. Febrile paroxysms usually recur at a definite hour each day or alternate day. A paroxysm has 3 distinct periods or stages: (1) cold stage; (2) hot stage; (3) sweating stage. During the fever the temperature of the surface may be 105° or 106° F. The duration of the hot stage is from 3 to 8 hours. The third or sweating stage at first is gradual; moisture appears on the face, soon on the trunk and extremities, and finally the body is covered with profuse perspiration. The paroxysms require no treatment other than warm drinks and blanketing during the cold stage, cooling drinks and sponging during the febrile or hot stage. The treatment for the prevention of the paroxysms is to be in the periods of intermission. The chief of remedies is Peruvian or cinchona bark, and alkaloids derived from it, quinine, cinchonine, quinidia, cinchonidia, and "chinoidine." Salicine, the alkaloid of willow bark, berberine, piperine, apiol, eucalyptus, and other vegetable substitutes are weaker and less efficacious than quinine. Fowler's solution of arsenite of potash is second only to quinine in power. E. D. HUDSON.

International Exhibition, 1876, was held in Philadelphia, in accordance with the act of Cong. of Mar. 3, 1871, providing that such an exhibition should be held in celebration of the completion of the centenary of Amer. independence. A commission for its management, consisting of 2 persons from each State and Terr., was appointed. A gen. invitation to all nations to participate was extended by the Pres. and Cong. The exhibition was opened on the 10th of May by the Pres., and it was closed by him on the 10th of Nov. It thus remained open daily, except Sundays, for 6 months consecutively. During this period there were upward of 10,000,000 admissions, over 8,000,000 paying (with a few exceptions) the uniform admission fee of half a dollar. Nearly all foreign countries were represented by coms. and by their raw products and manufactures. The total area of floor-space of the chief buildings was approximately 50 acres, and of the exhibition inclosure 236 acres, or 10,000,000 square ft. The financial portion of the work and the erection of the buildings were intrusted to a board which was authorized to issue stock to the extent of \$10,000,000, but the total subscriptions did not exceed \$2,500,000. Phila. appropriated \$1,500,000, the State of Pa. \$1,000,000 for the construction of buildings, and Cong. appropriated \$1,500,000 in aid of the work, beside the expenditure of a similar amount in the government display. Several of the States made large appropriations. The aggregate cost of the exhibition, exclusive of the expenditures by States and govts. and including the \$2,500,000 expended for the permanent structures, was about \$9,000,000. The receipts from admissions were about \$4,000,000, and from the sale of concessions and privileges \$500,000.

Probably no exhibition has been more productive of direct and prospective good. Politically the exhibition has made the people of all sections better known to each other. The crude resources of the country have been made known at home and abroad. Immigration in gen., and especially of skilled labor, has been stimulated. Industrially, the effects have been to thoroughly inform Amer. and foreign manufacturers of the relative merit of domestic and foreign products, showing wherein we excelled and wherein we were deficient. In a scientific point of view it has been

productive of great good in bringing together in a common field of labor so many of the leading minds of the time, thus greatly promoting the dissemination and unification of knowledge. It was object-teaching upon a large scale. By covering the whole range of natural products and of human effort, all classes of men found something to learn. [From *orig. art. in J's Univ. Cyc.*, by PROF. W. P. BLAKE.]

International Law, INTRODUCTION TO. I. L. is a collection of rules by which nations, and their members respectively, are supposed to be governed in their relations with each other. In its exact sense, law is a rule of property and of conduct prescribed by sovereign power. Strictly speaking, therefore, as nations have no common superior, they cannot be said to be subject to human law. But there is nevertheless a body of rules by which nations profess to regulate their own conduct toward each other, and the conduct of their citizens respectively. This body is sometimes also called public law or the law of nations. Its formation has been gradual, and its hist. is curious and instructive. The Amphictyonic Council enforced a kind of I. L. among the Grs., by which, among other things, an exchange of prisoners of war and a truce after a battle for the burial of the dead were enjoined. The Romans instituted a coll. of heralds for the declaration of war, and established that none but a soldier sworn into the service could fight the common enemy. Christianity wrought a great change in public law. The citizen of another state or the subject of another king was yet a brother in Christ, and the barriers which separated nations were thrown down. The influence of the Chr. Ch. upon the public law of the world cannot be overestimated. As soon as the brotherhood of man came to be accepted as a religious tenet, it was inevitable that the old doctrine of the natural antipathy of nations should disappear. In the earliest ages the stranger had been accounted an enemy, and even the victims of shipwreck might lawfully have been plundered. Such barbarities fell before the gospel; and others, which kept their hold in spite of the Bible and the Ch., gradually lessened in intensity and in number. As now existing, I. L. is a science of which the major part is generally understood and accepted. Regarded as a whole, it consists of 2 main divisions, one treating of peace, and the other of war. The portion of I. L. relating to peace is naturally subdivided into 2 divisions, one public and the other private. Public I. L. contains the rules respecting the relations of nations to each other, and to the members of other nations; private I. L. contains the rules respecting the relations of the members of a nation to the members of other nations. The tendency of the science is strongly toward amelioration. The oppression of standing armies, the tyranny of conscriptions, the burden of taxation to meet the interest of debts contracted for war, are all so many motives to modify and to define the rules by which nations are to be guided in their intercourse with each other. Of all the measures taken in our time for the civilization of international intercourse and the settlement of international differences, none is comparable to that of international arbitration. Amer. has the honor of having oftenest taught by precept and oftenest adopted in practice the closing of international controversies by the intervention of impartial arbiters. There are many instances of international arbitration, but the most memorable is the arbitration of Geneva between the U. S. and G. Brit. for the settlement of the dispute growing out of the depredations of the Alabama and other Confed. cruisers built and sent from Eng. during the c. war. This arbitration was preceded by a joint high commission of the 2 govts., by which a treaty called the Treaty of Washington was negotiated, and an arbitration at Geneva agreed upon, to proceed according to 3 rules of neutrality then first formally enunciated.

On Oct. 10, 1873, upon the invitation of an Amer. committee, a conference was held at Brussels, where was founded an association for the reform and codification of the law of nations. The 2 following resolutions were unanimously adopted: "I. The conference declares that an international code, defining with as much precision as possible the rights and duties of nations and of their members, is eminently desirable in the interest of peace, public order, and gen. prosperity. It is therefore of opinion that no effort should be neglected to obtain the preparation and adoption of such a code. The conference reserve the question as to how far the codification of I. L. should be simply scientific, and how far it should be incorporated into treaties or conventions formally accepted by sovereign states. II. The conference declares that it regards arbitration as the means essentially just, reasonable, and even obligatory upon nations, for the settlement of international differences which cannot be settled by negotiation. It abstains from affirming that in all cases without exception these means are applicable, but it believes that the exceptions are rare. It is convinced that no difference should be considered as insoluble until after a clear explanation of the matter in difference, a sufficient delay, and the exhaustion of all pacific means of accommodation." [From *orig. art. in J's Univ. Cyc.*, by HON. DAVID DUDLEY FIELD, LL.D.]

International Law. SUMMARY OF ITS PRINCIPLES.—We divide our subject into rights and obligations of nations in gen. (I.), or in the condition of peace, and when peace is affected or modified by war (II.). And we here remark (a) that the parties immediately concerned are only independent states. An individual man can only claim humane treatment. If he is injured by a foreign nation, his only protector is the nation to which he belongs; if he belongs to no nation within the circle of I. L., he is helpless. But courts in such cases can go back to the state of natural justice or the laws of humanity. Thus, when certain blacks, unlawfully imported from Afr. into Cuba, rose on the crew between 2 ports and finally brought the vessel into the waters of the U. S., the supreme court decided that if they had been slaves our treaty would have required their being delivered up, but that they were not slaves, and

hence not pirates. Thus, also, no dependent states, no members of a confederation, where the treaty-making power belongs to a central authority, has any more *status* in I. L. than a private man. They may sue for debts, but not make treaties. (b) Independent states, of whatever size, are sovereign and equal—i. e. they have no superior in the political sphere, and are equal in international rights. We unfortunately have conceived, in the U. S., of qualified sovereignty. But I. L. knows nothing of this. If one of the U. S. committed a crime against a foreign state, the U. S. would be responsible. (c) Every state capable of fulfilling the ends for which states exist, and especially of making political treaties with another such body, and actually fulfilling such ends, is a state *de facto*, and is legitimate. I. L. cannot go beyond the present, seemingly permanent, order of things. How it became such as it is does not matter. (d) A state exerts its independence chiefly in freely managing its own internal affairs. It can only interfere in the affairs of other states when safety and self-preservation or defence of violated rights require it. (See INTERFERENCE AND MONROE DOCTRINE.)

1. An essential right of a state is that of *property and territory*. A state owns public buildings, ships, unoccupied lands, etc.; it protects private property; and to fulfil its functions has the right of taxing, and has exclusive jurisdiction in certain terr., so that no other power can interfere. A state's terr. consists of all land and water within certain boundaries, determined by immemorial occupation and use, or by treaty. The sea-line to the distance of a marine league, including water inclosed by not very remote headlands, forms that part of the great seas which are private waters or terr. Here notice that (a) this rule of a marine league is a gen. understanding, dictated by self-preservation and by the interests of commerce. (b) There is no absolute rule as to the remoteness of headlands from one another. They should be near enough for vessels to know when they are in a certain jurisdiction, and a very large distance between such headlands would obstruct the freedom of the seas and be useless for national defence. (c) Outside of such limits the sea is free for all nations for commerce and fisheries; but curing and drying fish, except on desert coasts, do not follow as rights from the freedom of the seas. (d) Ships are not terr. in a foreign port, or even on the high seas, but are there under their country's exclusive jurisdiction, except for piratical acts. (e) Rivers bounding 2 states, unless treaty determines the contrary, are common to both; the prin. channel being the boundary-line. (f) Rivers, rising in one state and having their mouths in another, have heretofore been treated as exclusively under the jurisdiction of the state within whose limits their course was contained. But now all rivers, or nearly all, in Chr. states are free to states on their upper waters, and some of them to outside nations. And this is in clear accordance with justice.

2. *Status and Relations of Foreigners with a Country.*—Strictly, there is no absolute right of intercourse or commerce or transit between countries. Aliens (a) are subject to the law of the foreign country, unless exempted by treaty. (b) They have the right of property, and protection for it and for their persons by courts, but may be taxed; may in some countries be forced to serve in internal war; may make wills and be represented by consular agents, etc. (c) Certain persons have extraterritoriality, as sovereigns, crews of vessels on board of them in harbors, troops in permitted transit. (d) In some parts of the world, as Tur., Muscat, Chi., Japan, persons from Chr. states have been placed under the jurisdiction of their consuls. But this is likely to disappear. (e) Foreigners may acquire domicile. (f) By naturalization they may become citizens, with all or nearly all native citizens' rights. (See below.) (g) One person may be legally a citizen or subject of 2 states. Such collisions have been removed more or less by treaties. (h) Aliens, fleeing for crime, are generally extradited by treaty.

3. *Rights of Legation and Representation, or Ambassadors and Consuls.*—These belong to independent states only. A. The term *ambassadors* can include various kinds of diplomatic ministers, or may be used of the highest class of them. Other terms are LEGATES (which see), *nuncios* (the pope's envoys), *chargés d'affaires*, envoys, plenipotentiaries. This class of state agents, including heralds, were early regarded as sacred, inviolate persons; because, unless their persons were safe there could be no negotiations between states. Anciently legates or envoys were sent for temporary purposes; in modern times they generally reside in the foreign country, but a war is generally preceded by their withdrawal. The person who receives them or to whom they are accredited is the sovereign or his minister, or, in a republic, the chief executive officer. The head of the state *de facto*, not the claimant *de jure*, has ambassadors sent to him. The privileges of ambassadors are inviolability and extraterritoriality. What these terms include must be ascertained from the usage of the period. First, (a) the person of the ambassador is inviolable. But if he commit great crimes he may be sent, without violence if possible, beyond the borders, and private persons may defend themselves against him by force. (b) Extraterritoriality denotes exemption from operations, as far as possible, of foreign law. In both of these privileges it is implied that he is exempt from the criminal jurisdiction of the country where he resides. (c) He is exempt from civil jurisdiction also; and (d) his house and goods have the same immunity, but not to the extent of shielding transgressors of law belonging to the country, or even of shielding his own servants charged with crime. (e) His personal effects and articles needed from abroad are exempt from duties, but this is not to be broadly interpreted. (f) He has liberty of worship, but this worship is to be private, without bell or other sign, although his co-religionists are allowed to be at his chapel. (g) His family, his sec. of legation, and other officials in his train have the same exemptions, on the whole, which are conceded

to him. The same right belongs to his servants; but those who are subjects of the country, and political *suspects* especially, he can give up for trial, or can complain of to his own government. (h) His suite, if they commit crimes, are sent home for trial; formerly there were instances of his trying them and giving them up for execution to the authorities of the land. (i) Formerly ambassadors were sometimes merchants, and this double character gave rise to troublesome cases. Again, he might be an ambassador to his own govt. and commit illegal acts; but if he was thus accepted in his own country, it was really a waiver of jurisdiction while his office lasted. (j) The inviolability is relative. A state at war with his country could seize him, but not in a neutral ship or on neutral soil. (k) His rights begin when he enters, and end when he quits the soil where his office, so to speak, lies. On reaching his place of residence, he produces his letters, of credence especially, and his *full power*, showing on what he is authorized to treat. When his mission ends amicably, he presents his letters of recall; when his rank is raised, he presents a new letter of credence. (l) As for the rank of representatives of state, since the Congress of Vienna (1815) and the Congress of Aix-la-Chapelle (1818) the grades are: ambassadors, legates or nuncios; envoys, ministers, or others accredited to sovereigns; resident ministers; *chargés d'affaires* accredited to ministers of foreign affairs or to secs. of state. Precedence within a grade follows length of residence. B. Consuls have ordinarily no diplomatic power, and their special duties are determined by their own govt. The foreign govt. gives them an *exequatur*, as it is called, or authority to act, which can be revoked at pleasure. They are subject to the laws of their residence, but an insult to the consul's flag or his person would be a ground of complaint. They may be subjects of the state where they reside. Their gen. duty is, to look after the interests of commerce, to have a supervision of sailors, to take care of the property of persons belonging to the country which they represent who have died in their consular provs., etc. In some non-Chr. countries they have certain functions generally exercised by ambassadors.

4. *Treaties* are engagements by one or more sovereign powers made by sovereigns, representatives of the sovereign, or other authorized persons. We here notice (a) that the treaty-making power in a state depends on its especial const. In the U. S. treaties are made by the Executive, and need $\frac{2}{3}$ of the Senate for their ratification; but if they involve payments of money, the House of Reps. must consent to this or the treaty really becomes inoperative. So in G. Brit. the Commons could defeat a treaty by voting against payments of money for which it provides. It has been asked in this country whether a treaty could cede land belonging to a State. The answer seems to be that it cannot do this without a State's consent, unless in an extreme case. (b) A legitimate treaty-making power may by its agent make a treaty wickedly and corruptly. Is such a treaty valid? The answer is that an agent, acting under compulsion or transcending his power, cannot bind his prin. (c) An agreement to do wrong is of course void. (d) The word *treaty* may include various engagements, as treaties of peace, alliance, truce, conventions; and indeed all the relations of states either begin with or ultimately take this form. Treaties of guaranty (once common) mean little more than doing all which an honorable state can do in order to induce another state, for which it is a guaranty, to do its own duty. (See GUARANTY.) (e) Treaties take effect when they are signed, unless something is declared to the contrary. In ending a widespread war, it is common to fix on separate dates for the treaty to take effect in different quarters. (f) Is a treaty-making power bound to give its consent to a treaty made by its negotiator acting according to his instructions? The gen. answer now is that he is not, in any great change of circumstances, or where it is impossible, or when the parties are in error as to matter of fact. (Comp. WHEATON, b. iii. ch. 2, §§ 256-263.)

II. *International Relations, as affected by War.*—War is generally carried on by 2 parties, but may affect many nations. The natural divisions here are the mutual rights and duties of belligerents (A), the rights and duties of neutrals (B), and the just relations of belligerents and neutrals to one another.

A. (a) War is *armed contention* between organized communities, and a *just war* is waged for the purpose of attaining justice when it is denied. If a state can injure another, the injured must decide what steps to take for obtaining justice. No third state can interfere, except in extreme cases. (b) The particular *causes* of war are as many as the rights of states and protected individuals are; and even well-grounded apprehension of forcible injustice may justify striking the first blow. But war can seldom be justifiable unless, where it is possible, all peaceful means have failed to secure justice. In a league each ally must judge whether the *causa fœderis*, or case contemplated by the league, exists. (c) Nations often have sought justice in summary ways, without actual war. The prin. are *hostile embargoes*, *reprisals*, and *pacific blockades*. (a) Hostile embargoes are detentions of vessels in the ports of an injured country by way of offset for an alleged wrong. (b) Reprisals denote any seizure or detention equivalent to what an adversary has already made. (c) Pacific blockades are an invention of one or two modern nations, the object of which is to prevent neutrals from entering certain ports, although war does not exist—i. e. they do the work of war in peace, and hence are wholly unjust toward neutrals. (d) There are also measures in use which aim at *preventing war* between 2 friendly powers. One of these (commended at the Cong. of Paris in 1856) is *mediation*, or the intervention of a third power, offering its good services, which may of course be declined. Another is *arbitration*, either by a special court or through arbitrators agreed upon by the 2 parties who have a difference; and to these bodies the points of

difference and the rules to govern the decision are submitted. Such was that at Geneva in 1871-72, between G. Brit. and the U. S. It is much safer and less cumbersome than a standing court. (e) War, being an open public way of obtaining justice, began formerly almost always by a *declaration*; in Gr. through a herald, among the Romans by a formal act of a body called *fetiales*, in the Middle Ages by a challenge; but in modern times many wars have been begun without any such notice. This may be owing in part to the knowledge which nations have, through their ambassadors, of preparation for war in another country. Each knows how the other feels, and makes ready to meet an impending attack by striking the first blow. But this is not the more excellent way. It is also a frequent practice to issue to other courts a state-paper, justifying a war when it is resolved upon; and notice is given to the subjects of parties entering into war in foreign parts, that they may be on their guard. A vote of Cong. declaring war in the U. S. supersedes a direct declaration. (f) Proclamations of neutrality are sometimes issued by neutral powers at the beginning of a war, in order to maintain their own neutrality, and to warn their subjects against unneutral acts. (g) 1. *Effects of a State of War.*—The first is non-intercourse between individuals belonging to the states at war. Hence all relations of commerce, right of residence in the hostile country, unless expressly conceded, and even in strict theory present payment of debts, are suspended. In fact, debts due to subjects of the other belligerents and their shares in commercial houses are confiscable, but many treaties now stipulate that this shall not be done, as between the subjects of the treaty-making states. The treaty of 1794 ("Jay's treaty") protected commercial relations and private property in the 2 countries by a perpetual provision. The persons also of foreigners are often by treaty protected, and they are allowed to continue their business during war with their govt. Thus, debts and the like remain intact in the foreign country, but the courts are not open to the foreigner, unless a treaty concedes the contrary privilege, until peace. If the other belligerent's subjects are sent out from a country, time is given for their removal with their effects. 2. *Effects of a State of War on Precious Treaties.*—Provisions of a treaty relating to the rules of war are in their nature binding, and so are some others, such as previous recognition of a dynasty, or of a state's independence. But as it regards other treaties there is a difference of opinion. They are, as a gen. rule, suspended. G. Brit. in fact admits no exception. Private rights, however, resulting from rules of admitted justice, and debts due from one party in the war to the other are not suspended. Generally treaties after war renew the old treaties expressly. 3. *Active and Passive Enemies.*—The latter are rather in a state of non-intercourse than of hostility, if, as in an invasion, they continue their ordinary pursuits of life. Ships, however, and their cargoes belonging to the enemy's subjects have been lawful plunder; but in this age so many steps have been taken to render innocent traffic on the sea safe from capture that ere-long it must cease to be exposed to this peril. 4. Forces used in war are, on the land, standing armies, a militia, volunteers, perhaps a *levy en masse*; on the sea, public vessels and privateers. All of these are legitimate, but privateers have been hard to control. The argument for them was that they furnished employment for sailors in war, and saved the necessity of a large navy. Our prin. writers on public law, such as Kent, Franklin, Wheaton, condemn the practice; and in 1856 the declaration of the parties to the treaty concluded at Paris in 1856 passed for themselves 4 rules, one of which was that "privateering is and remains abolished." Other nations could assent to the 4 rules, but not to a part of them; they have been received by nearly all Chr. nations, but not by the U. S., for the reason mentioned above. These 4 rules put a new face on naval warfare; for neutral vessels, being by the rules mostly exempt from capture, take the place in trade, during the war, of belligerent ones. We add that these rules are reciprocal, not absolute. Thus, the parties to the 4 rules may use privateers against the U. S. in a war in which we are a party. 5. Gen. usages in war are sometimes vague, and depend to some extent upon the temper of the parties and of the commanding officer, but show a great progress in the humanity of the Chr. world. The principles are chiefly these: that war is a means of obtaining justice in the last resort; that it is the affair of govts.; that quiet inhabs. are to be treated with the greatest humanity consistent with the vigorous carrying on the war; that armed contests ought to cease as soon as justice is secured; and that, if retaliation is necessary, it cannot justify moral wrong. Some causes of the improvement have been the professional spirit of educated soldiers, the provisioning of armies without plundering innocent laborers, the use of weapons which are effective at a distance. The rules of war were codified by our govt. in 1863, in a manual prepared by Dr. Lieber for the use of our armies, and in 1881 the *Institut de droit international* prepared another code of rules, which may be widely adopted. Some of the leading provisions for preventing the excesses of war are (a) the means for injuring the enemy. Here much is vague. The modern conventions of Geneva (1864) and of St. Petersburg have opened a way for humane treatment of the wounded on the field, and for the prohibition of questionable weapons. Torpedoes are used at sea without scruple. (b) Troops like our Indians and the Turks are objectionable. Only trained soldiers are fit to do the work of war. (c) Perfidy and solicitations to crime are not allowable. (d) Prisoners of war must be humanely treated, as it respects food and quarters. Guerrilla troops, however, are generally harshly dealt with. (e) Private property must be respected, and levies of provisions receipted for. (f) Public property, as hospitals and museums, must be respected, unless their position makes the contrary indispensable. Booty taken on the field of battle belongs to the conquering army.

(g) In storming fortified towns, little restraint has been put on troops, but evil at such times can and ought to be prevented. (h) The rules of war make certain agents sacred, such as flags of truce and heralds, but the party visited must decide whether it is safe and best to receive them. 6. Passing by the treatment of pirates, slavers, and usages in internal or c. wars, where the same rules of humanity ought to be upheld as in external wars and invasions, we come—7, to the subject of *prize or capture*. Capture in war is justifiable on the ground of compensation for future wrongs, and, like conquest of terr., in order to provide security for the future. It has been also of great importance, but now, when to a great extent neutral ships can safely take the place of national vessels, its importance will be vastly lessened. Capture is not lawful without govt. authority. No property, taken from the enemy or a neutral, can be sold with a good title without some judicial decision; but in the interval the title vests presumptively in the captor's govt. The usage has been, during this interval, to burn ship and goods taken, if they cannot be carried into port. But this barbarous usage is dangerous in the case of captured neutral vessels. A better way of dealing with prizes is by letting them go on ransom contract, which is often secured by hostages, and is a contract respected by the law of nations, but not by all particular nations, which may prohibit their cruisers from making it. The contract secures the ransomed vessel from capture by other cruisers of the belligerent or of his allies, but not from perils of the sea. Salvage, or reward for saving a vessel on the sea, is allowed by the law of nations, but the reward depends on the municipal law of each country. 8. Recapture by a ship of a belligerent or of his ally has been treated under the form of the Rom. doctrine of postliminy, or return home from a state of capture. If a vessel is taken and carried *infra presidia*—i. e. to a place where capture cannot be made, and is there condemned as lawful capture by a court, the former owner's right in it ceases. If prisoners of war escape within a neutral port, they cannot be given up. If troops are recaptured, there is, if we do not err, no salvage paid for them. Recapture has effect when a captured vessel or goods are on their way to a place of security. They revert in that case to the owner, with liability to pay salvage. An analogous case to recapture is the recovery of an occupied dist. or country, recovered by the troops of the country or its ally. In this case the acts of the first conqueror in the exercise of legitimate power are valid; but no political changes have a claim to permanence, nor can the old govt., when restored, claim services or dues which were demanded by the temporary govt. during the intermission. 9. *Suspensions and Terminations of War.*—(a) Suspensions which have a temporary or local effect, such as licenses to trade, special conventions, arrangements affecting only certain persons, are of little importance. (b) Truce is a temporary suspension of all hostilities, or of operations at a particular place, and is made by govts. or, if authorized, by a military commander. These can begin or end at different times in different parts of the world. They do not require withdrawal of armies, but only a cessation of active warfare. In a siege a truce does not allow the besieger to add to his works, nor the besieged to repair his defences, at least where they would have been under the guns of the enemy. (c) *Treaties of Peace.*—These are often the most important acts of national hist. For example, the Peace of Westphalia, Oct. 24, 1648; of Nymwegen, 1678-79; of Ryswick, 1697; Utrecht and Rastadt, 1713-14; of Paris and Hubertsburg, 1763; of Paris and Versailles, 1814-15, etc. Treaties of peace are to be interpreted like other agreements. They go into effect when they are ratified, and bind individuals when the news of peace reaches them. Captures before the termination of hostilities but with knowledge of a peace are held to be invalid. (d) Peace implies oblivion or amnesty. No new war for the same causes is justifiable, although one might be justified for *similar* causes. If nothing is said to the contrary, the principle of *uti possidetis* or *status quo* must be followed.

B. *Rights and Obligations of Neutrals.*—(a) A neutral state is a friend to both belligerents who takes no part in a war, and must be impartial in rendering the same favors to both parties. But it must also keep its terr. and subjects aloof from the war as far as possible. It must be humane to both, receiving the vessels and troops of both into its terr. as an asylum, but disarming the latter, and preventing the former from doing aught to get ready for another hostile cruise. A neutral is not bound to let cruisers with prizes enter its ports, and ought not to allow them to procure military stores. Nor at the present age would a neutral allow transit to armies in a time of war through its terrs. (b) A neutral is not bound to keep its subjects from doing everything which may aid one of the parties, but if a subject lends money or exports articles to a blockaded port, or builds vessels for a belligerent, the neutral state cannot allow its courts to aid in any such transactions; yet they are, unless openly done or in violation of domestic law, not punishable. He can maintain a police also against all such proceedings. Laws of neutrality enforce the neutrality of a neutral's subjects, such as those of the U. S. in 1817 and of G. Brit. in 1870. The 3 rules also of the Treaty of Wash. in 1871 are a testimony of G. Brit. and the U. S. in regard to the duty of neutral states to prevent all hostile acts from originating on their soil or in their harbors. (c) Neutrals, again, can insist on the right that no captures be made or pursuit of hostile vessels be continued within their waters, and, if a vessel of a friend should do this, that satisfaction shall be made for such a proceeding. So, to enlist men in neutral terr. for purposes of war is highly illegal.

III. *Liabilities and Rights of Neutral Trade in War.*—(a) By a neutral here we mean one not resident in a hostile country, and by neutral property that which is not the product of hostile soil. Residence in neutral terr. of one whose cap. and business is in a hostile country does not give him a neu-

tral character. A hostile flag or hostile license to trade makes a ship hostile, and change of papers on a voyage is strong evidence of fraud. So, for carrying contraband or trying to break blockade would expose a vessel to penalties. But what may a neutral do? The trouble and disputes were great on this point until the 2d and 3d rules of the Declaration of Paris settled them, it is to be hoped definitely and forever, for those states who acceded to them, as between themselves. The rules are, that "the neutral flag covers the enemy's goods with the exception of contraband of war," and that "neutral goods, with the exception of contraband of war, are not liable to capture on an enemy's vessel." Unfortunately, the U. S. have never acceded to these declarations, although we had before insisted on the principles themselves. These rules will put an end to hostile capture on the sea, except of hostile goods on hostile vessels, for all who accede to the declaration. (c) Former rules as to capture conflicted with one another. The right depended on the nationality of the property or, it might be, of the vessel. The maxim "free ships make free goods" would cover enemy's property on board a vessel, and great naval powers, as G. Brit., resisted this. The rules prevailed that "neutral property is safe under any flag" and "enemy's goods unsafe under any flag." But the latter rule was not of importance, since goods would seek neutral bottoms. The rules of 1856 are more just than those which had prevailed before. (d) When a vessel, being neutral, was captured with hostile goods on board, freight was paid by the captor, and if a hostile vessel with neutral goods was captured, and the captor took them to their original destination, he was entitled to the freight, otherwise none was due. (e) *Contraband of War*.—Articles are so called which cannot be sent to a country in a state of war by a neutral without directly aiding a belligerent. Such articles are all means of offence or defence needed in war, among the rest, arms, belts and horses, materials for ship-building, ships ready for war, materials for steamships, and probably provisions sent where there is a probability of reducing an enemy by famine. Belligerents cannot add to the list, nor neutrals take away from it. Thus, *occasional* contraband is a false conception, although belligerents can allow importations of articles undoubtedly contraband to their enemies. The rule of *pre-emption* has been admitted into law, according to which articles not contraband may be taken by a belligerent, on the sea, if he pay the market price for it. The modern rule, when a vessel is captured with contraband articles on board, is to confiscate them and let the innocent articles go free, if there be any, unless the owner of the contraband owns the other goods also, or unless false papers show privity in carrying them. (f) Ships of war, or of transport with troops on board, or conveying military officers, are highly criminal, and in later times guilt has rested on carrying "despatches." But by this term is meant "official communications of official persons of a state in time of war concerning public affairs." Vessels, however, carrying letters on a stated route ought not to suffer while in their regular work. (g) It has been held that govts. are under no obligation to restrict private persons in their borders from sending to a belligerent country things contraband of war. The just rule seems to be that belligerent ships ought not to be allowed to get articles of war in a friendly country, but also that no vessels should carry contraband articles to the theatre of war, and that all vessels should be permitted to take thither innocent articles. (h) The English rule of 1756 prohibited trade closed in peace but open in war. This referred especially to *colonial* or coasting trade. Since the Declaration of Paris the rule has necessarily expired or become useless. (i 1) *Blockade* is the obstruction of a harbor or mouth of a river in a hostile country, in order to prevent ingress or egress. No one can say anything against this right any more than against that of besieging cities. But mouths of rivers cannot be so blockaded as to injure the commerce of a neutral riparian state. A blockade is a fact which neutrals ought to know; notification therefore is required. There are 2 ways of doing this: one by notifying govts., the other by giving notice at a harbor's mouth. The Fr. give both kinds of notice, the Eng. only the first, unless at the very commencement of a blockade. We have followed the latter rule. When a blockade is interrupted by a storm or hostile force or for other reasons, notice must be repeated. A new blockade, in fact, begins. (i 2) The force needed to constitute a valid blockade is of necessity somewhat indefinite. The 4th rule of the Declaration of Paris is that "blockades, in order to be binding, must be effective; that is to say, maintained by a force sufficient really to prevent access to the coast of the enemy." Suppose a ship should slip through: is access prevented in that case? All that can be meant is that a force is stationed at a harbor's mouth, which makes it really dangerous to run through. (i 3) The object of the rule was to put an end to "paper blockades," such as Nap.'s Berlin Decree, the retaliating Brit. Orders in Council, and his Milan Decrees—all of the year 1807. (i 4) If a vessel is taken in attempting to break a blockade by entering or leaving a harbor, it incurs penalty of confiscation, and the cargo shares the penalty, unless it can be proved to have been done against the owner's will. The liability of the vessel, according to Eng. doctrine, rests until the end of the return voyage. (j) *Continuous Voyages*.—The Eng. courts, in applying the rule of 1756, held that neutral ships could not evade the rule by stopping at a neutral port and getting a new clearance. It was really a voyage between the enemy's colony and the mother country. In the late war of secession our govt. applied this to ships stopping at Nassau or other W. I. ports, and taking a new start from there, or there putting their cargoes into blockade-running steamers to be sent to the S. coasts. Still more stringent was the application of the rule to goods bound to Matamoros, if it could be made to appear that their destination was to be sent across the Rio Grande into our terr. (k) *Search* is an admitted right, being necessary to carry out the rules of

war. It is annoying, and therefore rules settle its limits with precision. It applies only to merchant vessels. The effort of the N. European powers to protect their commerce by sending a public vessel as a convoy to a merchant fleet at the beginning of this century proved abortive. Search is also used against vessels suspected of piracy, which is war against all nations, and against vessels during peace, which are suspected of frauds against the revenue. A kind of search was exercised by G. Brit. over merchant vessels at the beginning of this century—that of boarding vessels, searching for Eng. subjects liable to do duty in the navy, and extracting them. This measure, without shadow of right, touched U. S. vessels almost only; it was exceedingly odious, and brought on the war of 1812-15 as much as any other cause, but has dropped into desuetude. A right of search against slavers was mutually conceded by G. Brit. and the U. S. under careful limitations in 1802. This of course was confined to these 2 powers.

We close what we have to say on I. L. with one or two brief remarks. We say: 1. I. L. is founded on justice, and contains the idea that world-wide justice can be realized. 2. Its prin. subject is war, but its prin. aim is to avoid war both by fixed rules of international conduct and by the possibility of arbitration. 3. Its hist. and progress is on the whole greatly encouraging. It has grown in definiteness, in humanity, in justice, and in the extent of its sphere of operation. 4. It will, however, become less important as the world grows in humanity: just as in a well trained household, where habits of well-doing are formed, prohibitory rules and penalties cease to be thought of.

THEODORE D. WOOLSEY.

International Private Law is the branch of jurisprudence which regulates the reciprocal relations of subjects (transiently or otherwise) of different states. The first and most general maxim of I. P. L. results directly from the independence of states, and is—Each state has an exclusive sovereignty and jurisdiction within its own terr. Consequently, the laws of every state govern all persons and all property within its limits. The second gen. principle is the converse of the former—No state can by its laws bind persons or objects outside its own terr. An important consequence of these 2 gen. principles, or converse sides of the same principle, is that all deference paid to foreign laws depends upon domestic regulations—upon the consent, express or implied, of the state where the foreign laws are applied. The applicability of a particular law to a given case mainly depends upon the connection of the person concerned with a certain legal terr. To determine this 2 criteria are contended for—nationality or domicile.

Nationality is the quality attaching by birth, or formal adoption into, a particular community. It has of late lost so much of its significance as to be considered by some solely of political moment. Nationality, however, remains of importance concerning rights not political—e. g. claims under treaty stipulations securing special rights to citizens, and the whole category of the disabilities of aliens.

Domicile may be defined as "a residence at a particular place, accompanied by positive or presumptive proof of continuing there for an unlimited time." Where it may be said of a person having 2 residences that he makes one his home, that is to be taken as his domicile. Minor children, if legitimate, take and follow the domicile of their father until competent to choose one for themselves. Illegitimate children generally follow the domicile of the mother. The domicile of a wife generally merges in that of her husband, unless he suffer for a crime or be under restraint for lunacy or like incapacity.

Status is the sum of special rights and duties belonging to a person, over and above the gen. rights and duties which he shares with all the members of the community. To determine the status of a person outside of the country of his domicile many theories have been proposed. The one most accepted is, that status is determined by domicile, with the qualification that in case of doubt laws favoring capacity are favored, and the contrary disfavored.

Ownership and Property.—Whether any particular thing be an object of ownership is admittedly determined by the law of the place of controversy. The capacity of a person to acquire and dispose of property generally depends upon the law of his domicile. A distinction which reconciles many embarrassing contradictions in the books is into a capacity to act and a capacity for rights. The former, proceeding from the personal status, depends upon the law of the domicile; the latter, upon the law of the situation—e. g. the inability of aliens in N. Y. to transmit property results from a local incapacity for rights.

Real Rights, or claims upon things obtaining against all persons are, for the most part, governed by the law of the place where the subservient property, movable or immovable, exists. Implied real rights are not favored internationally, and are not upheld unless recognized by the laws of both places.

Incorporeal Chattels—e. g. letters patent, copyrights, and trade-marks—are the creatures of local laws and clearly have no validity beyond the terr. of the authority conferring them, unless extended by treaty stipulations.

Obligations, in the sense of international jurisprudence, include all legally coercible duties, whether arising by act or accident, voluntarily or involuntarily, conformably to good morals or the reverse. Two palpable facts are distinguishable in every obligation—inception and fulfillment. The law of the place of inception under most circumstances regulates, according to very gen. agreement, the formal conditions of a transaction. It is commonly said, therefore, that an obligation valid at the place of its origin is valid everywhere. The law of the place of performance governs, according to most jurists, the obligation itself. Where other indications of an intended submission to a particular law are at hand, these are to be respected. Obligations arising from delicts or torts—wrongful acts as connected with private

redress—cannot, of course, be considered subject to a certain law because the same has been chosen by the obligor (wrong-doer, tortfeasor). Wherever a wrong is done, there the perpetrator of it, whether a transient passenger or a domiciled subject, is justiciable, and must answer for the consequences. The law of the place of commission of an admittedly wrongful act determines the measure of damages. The consideration of every valid obligation should be meritorious. To vitiate an engagement on its account the moving cause must offend against universally accepted views of public morals and public safety, and not be illegal only by reason of special statutes. What is intrinsically contrary to public morals is far from well settled.

Marriage is so hedged about, from reasons of moral and religious policy, by positive coercive statutes as to lose much of the nature of a contract, and become an inst. differing widely in different states. Admittedly, it must be a conjugal union between competent parties for life. The formal conclusion of marriage is regulated by the law of the place of celebration. The true seat of the relation (wherever contracted) is the domicile of the recognized head of the family, the husband. Mutual rights of property are fixed by the man's domicile at the consummation of the marriage, for it could not be endured that the husband should be able to change the rights of his wife over her own property by a change of residence. Laws restricting liberality during marriage depend upon the domicile at the time of the act; being intended for the protection of moral purity, they are designed to control all persons in the terr. Intestate succession between the spouses is regulated by the last domicile of the deceased.

Divorce is governed by law of the country where sought.

Paternal power over legitimate children depends upon the law of the domicile of the father at the time of the birth; over children legitimated by subsequent marriage, upon the domicile of the father at the time of filiation.

Guardianship is to be instituted under the law of the ward's domicile.

Succession, testamentary and intestate, to immovables is governed by the law of their situation. Movables commonly pass by the law of the decedent's last domicile.

Civil jurisdiction is called contentious or voluntary according as it is exercised in litigated causes and the execution of decisions, or in affording public authentication to matters not in controversy. Of the voluntary jurisdiction of magistrates and officials the foreigner may commonly avail himself equally with the native, and a compliance with formalities required by local law is accepted every other where as sufficient. In most countries, and saving such restrictions as giving security for costs, an alien can ordinarily contend in the courts on the same footing as a subject. Procedure is regulated solely by the place of suit; if a particular remedy be essential to the enforcement of a right, resort must be had to a court administering the remedy. Evidence is admissible or inadmissible according to the law of the country of the court, albeit tribunals are prone to admit foreign modes of proof when indispensable to the judicial establishment of facts. Foreign judgments have no effect unless sanctioned by domestic authority. If the competency of the court pronouncing them be unimpeachable, they may, as conclusive upon the merits, be enforced by new judgments of the same tenor or made directly executory.

Criminal jurisdiction depends upon the relation of the govt. to the place of the offence and to the person of the offender. [From orig. art. in *J.'s Univ. Cyc.*, by CHARLES F. MACLEAN, LL.D.]

Interpolation [Lat. *interpolo*], the operation of inserting a term between 2 consecutive terms of a tabulated function that shall conform to the law of the function. A table of the kind referred to is generally computed from a formula containing 2 variables—one of which is the *function*, and the other the independent variable, or, as it is usually called, the *argument*. The table is formed by giving successive equidistant values to the argument, computing the corresponding values of the function, and then writing the results in a table; this operation is called *tabulating* the function. Thus, to compute a table of logarithms, we assume some convenient formula expressing the relation between any number and the corresponding logarithm; in this case, the quantity that represents the number is the *argument*, and the quantity that represents the logarithm is the *function*. We next make the argument equal to all the successive natural numbers from 1 up to the limits of the table, and compute the corresponding values of the function; these results, when properly arranged, constitute a *table of logarithms*, from which we may, by simple inspection, take out the logarithm of any whole number within the limits of the table. We may find the logarithm of a mixed number, as $2\frac{1}{2}$, by the method of *L*. The theory and formulas for this operation are explained in *J.'s Univ. Cyc.* W. G. PECK.

Intestacy. See ADMINISTRATION AND EXECUTOR.

Intestinal Juice, the mucous secretion of the intestinal canal. It contains granulated cells and cell-nuclei, and usually fat and epithelium. When filtered it is a tolerably clear, mucous, alkaline liquid, which does not coagulate by heat. Its constituents are the same as those of mucus. *I. J.* converts starch into sugar, and digests albuminous substances, flesh, etc., though much more slowly than gastric juice. C. F. CHANDLER.

Intoxication [Lat. *in*, and *toxicum*, "poison"], the condition of a person who has been brought under the influence of *alcohol* by successive imbibitions during a short space of time, but should not be confined exclusively to the poisoning by alcohol; opium, stramonium, cannabis indica, and all the poisons belonging to the above-mentioned class will produce *I.* when taken in sufficient quantity. Alcohol, taken to a degree to produce *I.*, excites the vascular and nervous systems; all the secretions are at first arrested, and the temperature of the body is lowered, and not, as has been generally believed, increased. If taken by a person who is

not accustomed to it, it occasions derangement of the stomach, and nausea and vomiting are the result. The principal effect, however, is noticeable upon the nervous system. There is a general feeling of increased physical power, and the mental faculties are exhilarated. The patient at first talks rationally, but is very verbose and grows confidential. Incoherence follows upon this, and then delirium and sopor. The effect is also seen on the cerebellum by the impairment of the power of co-ordination, causing at first the staggering gait, and ending in complete loss of muscular power. When this stage occurs the individual generally falls into a deep sleep, from which it is almost impossible to waken him. When consciousness is restored there is a feeling of depression, which the patient seeks to relieve by a resort to stimulants. Little can be said of the palliative treatment of this variety of *I.* With the exception of the employment of emetics to unload the stomach, and the administration of ammonia and tea as antidotes, the patient should be allowed to "sleep it off." [From orig. art. in *J.'s Univ. Cyc.*, by E. J. BIRMINGHAM, M. D.]

In'ulin, a substance isomeric with and similar to starch. It is widely distributed in plants, occurring especially in the roots of elecampane, dandelion, chicory, feverfew, meadow saffron; in the tubers of the potato, the dahlia, and the Jerusalem artichoke; in *Serp manna*, in certain lichens, etc. It is prepared by washing the rasped root on a sieve, and allowing the *I.* to settle from the liquid, or by boiling the sliced root with water and filtering while hot; the *I.* separates on cooling. *I.* is a soft, white, tasteless, odorless powder, resembling starch, which it appears to replace in plants. Unlike starch, it exists in plants in a solution which has the consistency of a thin oil. If a slice of the plant is soaked in alcohol, the *I.* separates in spherical granules which can be recognized by the microscope. It is very hygroscopic, and adheres to the teeth and to moist paper. It is but slightly soluble in cold water, freely in boiling water, from which it separates, on cooling, without forming a jelly. It is insoluble in alcohol, which precipitates it from its solution in water. Heated with water, it is changed slowly to levulose (grape-sugar). Dilute acids change it to sugar even in the cold. *I.* is not altered by diastase nor by other ferments. It is colored brown by iodine, is soluble in cuprammonia and in nickelammonia, and it reduces salts of lead, copper, and silver. C. F. CHANDLER.

Inundations, Mar'itime. So terrible have been the disasters caused by the overflow of the ocean that even races of men date their origin from some great flood. The most noted of these are the floods of Axythrus, Ogyges, and Deucalion. The evidence in proof of the flood which is said to have insulated Eng. is only a vague statement by Ephorus (b. c. 350) and Clitarchus, that the Cimbrians were driven from their seats by a cataclysm of this kind.

The coasts of the Netherlands are the most exposed to the N. W. winds. Of the storms which have caused notable revolutions here, the first recorded in authentic hist. is that of 860, which carried away a great part of the W. coast of the Netherlands, and gave a more S. direction to one branch of the Rhine. On St. Michael's day, 1014, a great part of Eng. and of the Netherlands was flooded. In 1134 a part of Flanders was swallowed up. Of the coasts of Friesland a certain part disappeared during the St. Juliana's flood of 1164, and all the lowlands of the Elbe and the Weser were submerged. Still more disastrous was the All Saints' flood of 1170, the first of that name. In 1219 occurred the Marcellus flood, which was only of temporary character; in 1277 the gulf of the Dollart at the mouth of the Ems was formed; in 1362 the "men-drowning" flood overwhelmed more than 30 v. on the coasts of Schleswig. But the most disastrous flood by which in later times the S. Netherlands have been visited was the (second) St. Elizabeth flood, which submerged 72 v., and changed totally the lower course of the Rhine and Maas. This disaster resulted from the combination of a maritime and a fluvial inundation. In 1410 a flood occurred which formed in the Zuyder-Zee a practicable channel for vessels of heavy draught between Enkhuizen and Amsterdam, and thus gave to the latter town its commerce and its importance. From this time onward, though the floods increase in number, their effects are less disastrous. Thus, the flood of All Saints' day, 1570, though only surpassed in magnitude by that which occurred in 1170 on the same day, destroyed no land, though it submerged Bruges, Antwerp, Dordrecht, Rotterdam, Amsterdam, Bremen, and Hamburg, drowning at least 30,000 inhabs. Before the breaches of the dikes could be stopped new storms flooded the country, and within the 8 yrs. ensuing the provs. of Groningen and Friesland were not less than 6 times partially submerged. These continually recurring disasters must be attributed in great measure to the bad state of repair in which the dikes were kept.

In 1607 the county of Somerset, Eng., was partially flooded, but a more serious calamity befel the Dan. domains in 1634. Part of the coast, called Nordland and its v., was swept away, together with 11,038 people and 66,397 cattle. Hamburg, Bremen, and the coast of Oldenburg were also much injured. The great Christmas flood of 1717 covered the whole N. coast, and even some parts of Eng. The yrs. 1718, 1719, and especially 1730 saw these countries flooded again. The most recent *I.* of importance was that of 1825. This flood in several respects differed from any recently observed before, and on that account it has been ascribed to a submarine earthquake. The sea-water was very muddy, and seemed as if boiling; the waves were not high, but short and eddying; the wind was not violent; and finally the position of the moon was not such as to favor an extraordinary tide. Facts corresponding to these had been observed during the floods of 1600 and 1665, during the Christmas flood of 1717, and finally in 1755 during the famous earthquake of Lisbon. The principal effect of this most recent flood was the insulation of the N. part of Jutland. [From orig. art. in *J.'s Univ. Cyc.*, by P. CALAND.]

Inundations and Floods of Rivers. These 2 terms are often used as synonymous, but they are conveniently distinguishable. Perhaps the nearest approach we can make to precision is to say that a flood becomes an I. when the stream rises sensibly above its mean high-water level and spreads in considerable vol. beyond the limits of its natural channel. It is, however, impossible to draw any sharp line of discrimination between floods and I. as applicable to the whole course of rivers, because a river may be confined by high banks at one point, bordered by low flats at another, and these conditions may be alternated many times in the same stream; and hence it may be simply at flood in certain parts of its channel, in I. at others.

I. of great rivers, when they are of regular character in vol. and in periodic recurrence, are often not merely advantageous to human interests, but even essential to the permanent occupation of their banks by man. Of such rivers the Nile is the type. The more irregular I. of smaller rivers sometimes render similar service, but with few exceptions river I. are destructive. While floods are to be promoted, I. are to be controlled and as far as possible prevented.

The means of defence against river-I. are divisible into the preventive and the remedial. The immediate cause of river-I. is the discharge of water into river-channels faster than those channels can carry it off. The insufficiency of the channel for this function may be occasioned—(a) by excess of supply; (b) by obstructions in its bed; or (c) by the reduction of its inclination. High water rarely occurs at the same time in all the tributaries of large rivers, but there are instances, as the Seine and the Po, where the floods of the affluents are usually contemporaneous, not successive, and I. of rivers are generally destructive in proportion to the degree of coincidence in the floods of their tributaries. A preventive system applicable to the whole course of a stream would commence at or near the sources of the tributaries, and its gen. aim in this division of the work would be first to check the discharge of surface-water into those tributaries by planting the declivities of the valleys with trees or shrubs, terracing their hillsides, running low embankments across sloping grounds, collecting the water in small reservoirs, and in short by any measures which tend to detain the water of precipitation a certain time upon the surface. The flow of the current in the lesser affluents should be retarded by dams, barriers, or traverses, heaps of rocks, etc.

Thus far the immediate aim is to retain the water on the surface or in the beds of small affluents, but when we come to larger tributaries, and especially to the main trunk, the direct object is reversed, and increased velocity, and of course delivery, quite down to the point of ultimate discharge, is sought to be promoted. This is effected by the removal of obstructions in the bed, by confining the channel to narrower limits at convenient points, and by excavating a deeper canal within it, and especially by cutting off loops and bends in its course. Various plans have been suggested for this purpose, among which the creation of great reservoirs for receiving the overflowing waters is one of the most species.

Remedial Measures.—The method of reservoirs is capable of only exceptional application, and in the present state of our knowledge and our means we must, in most cases, content ourselves with such palliatives as are afforded by dikes or embankments high and solid enough to protect the grounds they inclose, or rather front, against encroachment by high water. Embankments have been employed from time immemorial in the E., and the recently constructed dikes or levees of the Miss. are among the grandest modern works of hydraulic improvement. Many engineers are now of opinion that the system of high continuous embankments ought to be abandoned, and low dikes, barely sufficient to keep the current from overflowing at every slight elevation of its level, substituted. In great I., then, all the lowlands along the banks would be overflooded, and both enriched and gradually raised by the sediment deposited by the water. This plan is recommended by powerful reasons, and ought, no doubt, to be adopted.

GEORGE P. MARSH.

I'o, in Gr. mythology, was a daughter of Inachus; was transformed into a white heifer by Zeus, who was enamored of her, and wished to conceal the affair from his wife. She, however, became suspicious, and set Argus with the hundred eyes to watch her; and when Hermes slew Argus, she sent a gad-fly, which pursued I'o from place to place all over the earth, until at last she found rest in Egypt.

Iodine, *I'o-din* (Gr. *ἰώδης*, "violet-like," from *ἰώ*, "a violet," and *είδος*, "form"), an element discovered by M. Courtois of Paris in 1812 in the mother-liquor from the kelp or ash of sea-weed which had been burned in order to obtain sodium carbonate. It has since been found in many mineral waters, in sea-water, in sea-weeds, in sponges, oysters, and other forms of marine life. Cod-liver oil contains from 0.03 to 0.04 per cent. of I. It is found also in many land-plants, as tobacco and water-cresses, and even in potatoes, beans, barley, and oats. Certain minerals also contain it, as iodyrite, or silver iodide, and coccinite, or mercury iodide.

Preparations of Iodine.—The sources from which the I. of commerce is derived are kelp and Chili saltpetre. The carbonization of the sea-weed is usually conducted in closed vessels, in order to prevent loss by volatilization. The kelp is lixiviated, and the liquors are concentrated and cooled, in order to crystallize out the sulphates, chlorides, and carbonates of potassium and sodium; and from the mother-liquor the I. is extracted either by heating with concentrated sulphuric acid, or by precipitation as copper subiodide by iron and a salt of copper; from which product the I. is expelled by treatment with sulphuric acid and manganese dioxide. Chlorine is also sometimes used to precipitate the I. from the mother-liquors. Washing and a second sublimation of the I. is usually resorted to in order to purify the product for market.

Properties.—Commercial I., especially when obtained from

kelp, often contains cyanogen iodide. It is sometimes adulterated with coal, charcoal, plumbago, or manganese dioxide. I. is a dark crystalline solid, with a color and lustre resembling plumbago. Its odor is like that of chlorine. It fuses at 107° C. (= 224.6° F.), and boils between 175° and 180° C. (347–356° F.). It is volatile at ordinary temperatures, the vapor having a fine violet color. In a state of vapor it is one of the heaviest vapors known, its gravity referred to air being 8.716. It dissolves in alcohol, ether, and carbon disulphide, also in water containing soluble iodides or ammonium chloride or nitrate. In pure water it dissolves only in the proportion of 1 part in 1000. With starch it forms an intensely blue compound, and the color is apparent when but 1 part of I. is present in 450,000 of water. It is displaced from its compounds by chlorine and bromine. It destroys vegetable colors but slowly; its action on organized tissue is more rapid. Taken into the stomach in large quantity, it produces ulceration of the mucous membrane, and death.

Compounds.—I. combines with hydrogen, forming hydriodic acid, which has very similar properties to hydrochloric (muriatic) acid. It also combines directly with metals, forming iodides. The prin. compounds with oxygen and the metals are the iodates and periodates. Cadmium iodide is used in photography, usually in conjunction with iodide of potassium, for sensitizing collodion. One of the most important applications of I. is in the manufacture of some of the aniline colors. [From orig. art. in *J's Univ. Cyc.*, by E. WALLER, Ph. D.]

Iodine, Medicinal Uses of. I. is used in med. in simple solution in alcohol or dissolved in water by the aid of potassium iodide (Lugol's solution). Locally I. is a powerful irritant, and its solutions stain the skin yellowish brown. Inhaled, its vapor is irritant to the mouth, throat, and air-passages. Internally, in single dose, the effects vary according to the quantity swallowed, from mere uneasiness in the stomach to severe gastric pain, with vomiting and purging, headache, giddiness, and, though rarely, even gen. prostration and death. Preparations of I. are used locally as counter-irritants, and internally they have some unknown influence over nutrition. For internal administration, however, the alkaline iodides, especially potassium iodide, are now far more frequently used than solutions of I. These salts are free from the irritant local effect of I. Medicinally, they are used in the same conditions as I., and in tertiary syphilis, chronic mercury and lead poisoning. They are often given in large quantities.

Iodoform, a methenyl ether formed by the mixing of alcoholic solutions of potassa and iodine. It is in the form of small glittering, scaly, yellow crystals of a sweet taste, and strong, peculiar, very persistent saffron-like odor. It is slowly volatile, nearly insoluble in water, but soluble in alcohol, ether, and oils. It is decomposed by alkalis and by a heat of 250°. I. is a valuable med., being anæsthetic like chloroform.

Io'la, city and R. R. junc., cap. of Allen co., Kan., 78 m. S. of Lawrence. It is furnished with abundant water-power by the Neosho River. There is also an artesian well, which affords mineral water and large quantities of inflammable gas. Pop. 1880, 1096.

Io'la'us (Gr. *Ἰόλαος*), in Gr. mythology, the charioteer and companion of Hercules.

I'olite, a mineral, essentially a silicate of alumina, magnesia, and protoxide of iron; in color it occurs of various shades of blue. It is sometimes used as a gem, being the *sapphire d'eau* of jewellers.

I'on, in Gr. mythology, was a son of Apollo and Creusa, the daughter of King Erechtheus of Athens; he was brought to his father's temple at Delphi, where he was ed.

I'on, a native of the island of Chios, ranked as one of the 5 prin. tragic poets of the Athenian canon. He was contemporary with Æschylus, Sophocles, and Pericles, and on one occasion carried off both the dithyrambic and the tragic prizes. The number of his tragedies is variously stated.

Io'na, or **Icolmkill**, an island of the Hebrides, 3 m. long by 1½ broad, was colonized in 563 by St. Columba of Ire. with 12 disciples, it having been granted him by the kings both of the Scots and of the Picts. He built there the monastery, which was regarded by the Picts as their mother-ch., and from which Christianity was introduced into Scot. and the N. of Eng.

Io'nia, the anc. name of a portion of the W. sea-coast of Asia Minor. It was named from its inhabs.

Ionia, city and R. R. junc., cap. of Ionia co., Mich., on Grand River. Pop. 1870, 2500; 1880, 4199; 1884, 4643.

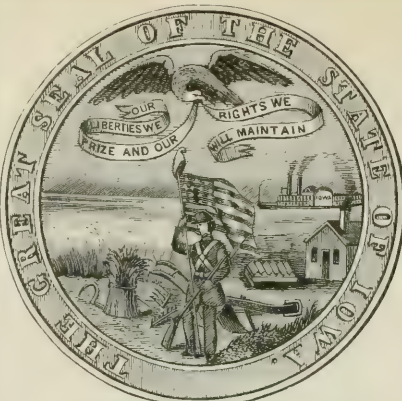
Io'nian Islands, a chain extending along the W. and S. coast of Gr., of which the largest are Corfu, Paxo, Santa Maura, Theaki, Cephalonia, Zante, and Cerigo. From the commencement of the 15th century to 1797 they belonged to Venetia. From 1797 to 1815 they changed masters 5 times, but then became a republic under Eng. protection. In 1864 they were annexed to Gr. Area, 1041 sq. m. Pop. 244,433.

Io'nians (Gr. *Ἰωνες*, sometimes lengthened into *Ἰάωνες*), a race of Gr. descent who resided chiefly in Asia Minor and the adjacent islands. According to the legend, their ancestor was Ion (*Ἰών*), the son of Apollo and Creusa. The I. were always a maritime race, and some recent writers urge that they came to Attica from the E., and that their migration to the shores of Asia Minor was a remigration to their original abode.

Ionian Sea is that part of the Mediterranean which lies between I. to the W. and Tur. and Gr. to the E.

Ion'ic Order, in Gr. arch., is regarded as of Asiatic origin. Its prin. seat was in Asia Minor. The temple of Diana at Ephesus, that of Apollo at Miletus, the temple of Wingless Victory and the Erechtheum at Athens, and the temples at Teos, Priene, and Sardis, were among the most famous examples of this style. In its perfect form the I. column has a height of 9 diameters, a base of very varied form, 24 flutes on the shaft, separated by fillets, and a cap. formed by volutes.

Iowa, a central State of the upper Miss. Valley, lying between the Miss. and Mo. rivers, between 40° 36' and 43° 30' N. lat. and 89° 5' and 96° 31' W. lon.; bounded N. by Minn., E. by the Miss. River, which separates it from Wis. and Ill.; S. by Mo., the Des Moines River being the boundary for a short distance; W. by Neb. and Dak.; area, 56,025 sq. m. or 85,856,000 acres; greatest length from N. to S., 208 m.; greatest width from E. to W., a little more than 900 m.



Face of the Country.—Its average elevation above the sea is between 800 and 900 ft. Yet within the State is the great watershed dividing the streams flowing into the Mississippi from those flowing into the Mo. This watershed passes through the N. N. W. portion of the State in a direction nearly S. by E., turning in Adair co. sharply to the S. E. A secondary watershed, somewhat higher at points than this, continues S. from Adair co. There is therefore not only a gradual slope of the whole State from the N. to the S., but E. and W. drainage-slopes from this great watershed toward the Miss. and Mo. rivers. The rivers have worn valleys sometimes through the earthy material, and sometimes through some of the underlying rocky strata beneath; these valleys have in many places abrupt and rocky bluffs along the river-banks, thus giving an appearance of hills, which, strictly speaking, do not exist, as these steep banks are rather valley-sides than hillsides, being in all cases depressions below the gen. level. The plain or plateau of which I. forms a large portion is at all points considerably elevated above the sea. The surface of the Miss. at low water, at the S. E. corner of the State is 444 ft. above the sea, at the N. E. corner of the State it is 660 ft., showing a descent in the river of 216 ft., or about 1 ft. to a mile. The surface of the Mo. at low water at the S. W. corner of the State is 954 ft.; of the Big Sioux at low water at the N. W. corner of the State, 1344 ft.; the surface of the great watershed at the N. State boundary, near Spirit Lake in Dickinson co., is 1604 ft., and at the S. State boundary, in Ringgold co., about 1230 ft. The descent from the highest point in the State (near Spirit Lake) to the lowest point in the S. E. corner of the State does not exceed 5 ft. 7 inches per m., and in most directions it is not more than from 2 to 4 ft. per m. The whole country is eminently adapted for the construction of good roads and R. Rs. Most of the State was originally what the settlers call "rolling prairie"—i. e. it had long wave-like depressions and elevations, resulting from the drainage of the surface water into the upper branches of the rivers. It is now losing much of its prairie character, the prevention of the annual fires having caused the forest trees to encroach upon the prairies, and the settlers also having planted many trees.

Rivers, Lakes, Etc.—All the rivers and streams of the State are affluents of either the Miss. or the Mo.; the former, draining the widest terr. in the State, has tributaries of greater length and larger volume than the latter. Among the streams flowing into the Miss. within the State are the Upper Iowa, Turkey River, Maquoketa and Wapsipinicon rivers, Iowa River, Cedar Riv., Chequamegon or Skunk River, and the Des Moines, a large and navigable stream. The rivers of the W. drainage-slope, falling into the Mo., are generally small. Several of them, as the Chariton, Grand, Platte, the Nodaway forks, and Nishnabotona rivers, rise in I., but flow southward into Mo., and enter the Mo. River in that State; the Little Sioux and Floyd are streams of moderate size and with broad fertile valleys, with few or no rocks or boulders in their course. The Big Sioux, which rises in Dak. and forms a considerable portion of the W. boundary of I., is a large stream, with high and steep bluffs along a portion of its course, but without rocks. The Miss. has 2 stretches of rapids opposite I.—the lower, called the Des Moines Rapids, from Keokuk to Montrose, and the upper, from Davenport to Le Claire. The lakes are mostly small; the prin. are Spirit Lake and Okoboji Lake; the latter is of horseshoe form, and drains Spirit Lake. It is narrow, but the outside of the horseshoe is about 15 m. in length. Clear Lake, in Cerro Gordo co., is 4 m. long and 2 wide. Storm Lake, in Buena Vista co., is still smaller, having only 5 sq. m., but of great beauty. There are also 2 or 3 yet smaller lakes in Wright and Sac cos., which have barriers of boulders, sand, and peat, which have given them the name of Walled Lakes.

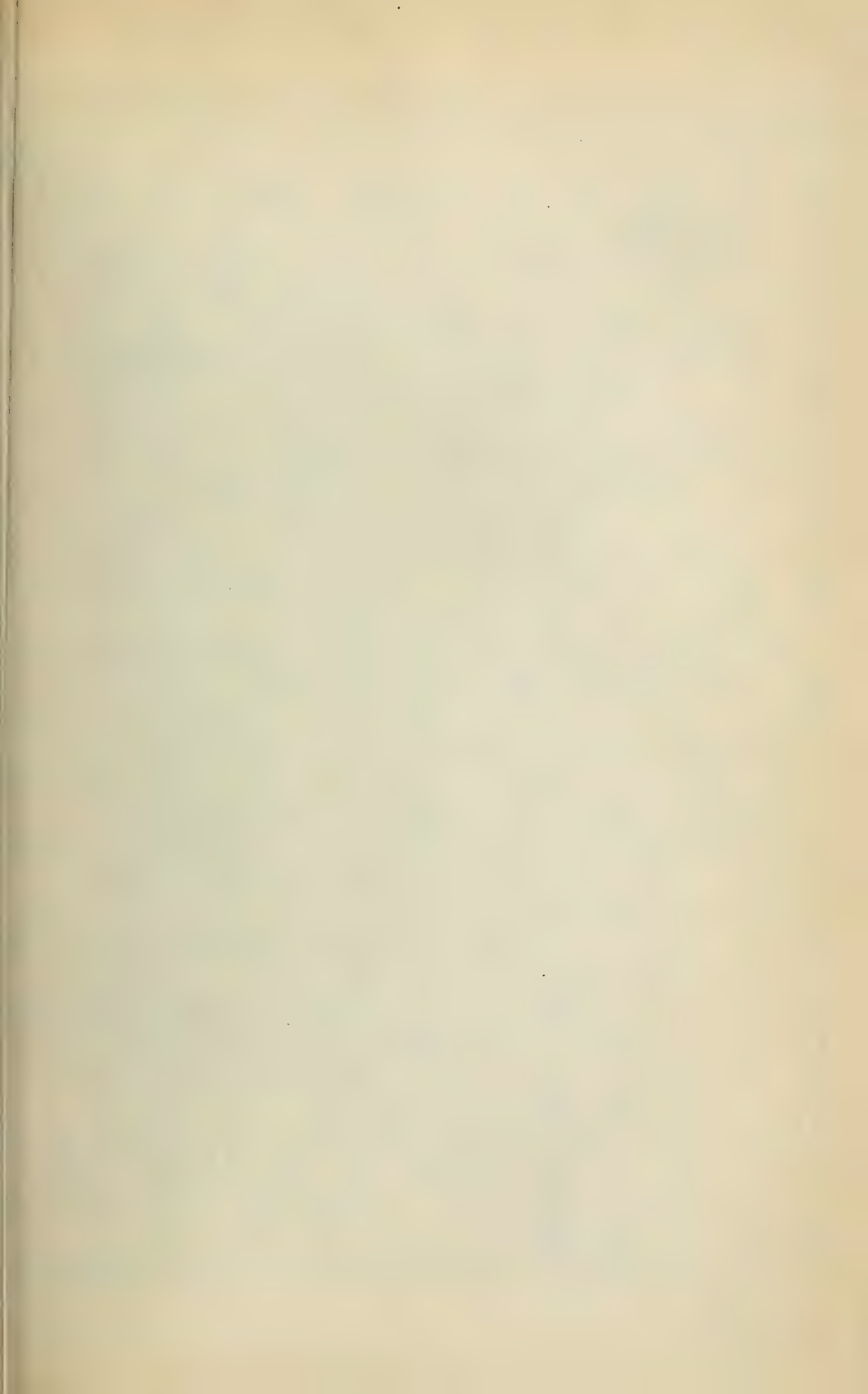
Geology.—With the exception of the river-valleys and some small tracts, the surface of the State is covered to a greater or less depth with diluvial or drift deposits, and these again in some sections, as in the river-bottoms of the great rivers, with alluvium or loam. But an examination of the bluffs and rocky strata of the river-channels indicates that there are accessible at least 20 different geological formations, all of them occurring in regular succession from the N. E. to the S. W. portion of the State, and being

inclined at such an angle or dip that each formation laps over the one next below it in very regular order. In the N. E. there is a tract extending from the sources of the Turkey River to the mouth of the Maquoketa which belongs wholly to the Lower Silurian system. The groups of Lower Silurian here developed are represented successively by the Potsdam sandstone, Lower Magnesian limestone, and St. Peter's sandstone; the Trenton group, represented by the Trenton limestone and the Galena limestone. The Upper Silurian system extends on the Miss. from just above the mouth of the Maquoketa River to Davenport. But one group and one formation of this system is represented—viz. the Niagara limestone. A broader band, extending on the Miss. from Davenport to Muscatine, and running diagonally to the N. boundary of the State, consists of the Hamilton limestone and shales. This, in turn, is overlapped by the Sub-carboniferous group. This extends from Muscatine to the Des Moines River, and, following the Skunk River valley to the source of that stream, stretches westward from Clear Lake, in Cerro Gordo co., through Butler, Franklin, Wright, and Humboldt cos. The Lower and Middle Coal-measures, which come next, occupy a broad belt in the middle of the State, being divided into 2 nearly equal portions by the Des Moines River. They yield large quantities of bituminous coal of good quality. The Upper Coal-measures occupy the whole S. W. portion of the State except a tract in Montgomery and Cass cos., where there is an outcrop of the Nishnabotona sandstone, the lowest member of the Earlier Cretaceous group. In Woodbury and Plymouth cos. there is also an outcrop of Cretaceous rocks, consisting of the Woodbury sandstone and shales; and in Guthrie and Greene cos. there are 2 others, in which the chalky beds are very prominent.

Mineralogy.—The I. coal-field contains at least 7000 sq. m. The amount of coal mined in 1880 was 1,442,333 tons. The coal is bituminous; cannel coal has occasionally been found, but is too impure to be of any value. Lead, the argentiferous galena ore, found in the galena limestone, is mined in great quantities at Dubuque and its vicinity, and smelted at the mines. There is lead also in the Lower Magnesian limestone on the Upper Iowa River, but not in sufficient quantity to make mining profitable. There are few other metals in I. The iron ore met with in various parts of the State is of good quality, but the quantity is small and the mining unprofitable. Gypsum is found in very great quantities at Ft. Dodge and its vicinity in the condition of stratified rock, and quarried like ordinary limestone. It is largely exported. Building-stone of fair quality is found E. of the Des Moines River. The Hamilton limestone, the sandstone of the Kinderhook beds at Burlington, the Keokuk limestone, and the gray St. Louis limestone, all furnish very good building-material. Gypsum is also used for this purpose as it comes from the quarries. Lime is manufactured largely from the limestones and from the chalky beds. Brick-clay, potter's clay, and good building-sand are plentiful.

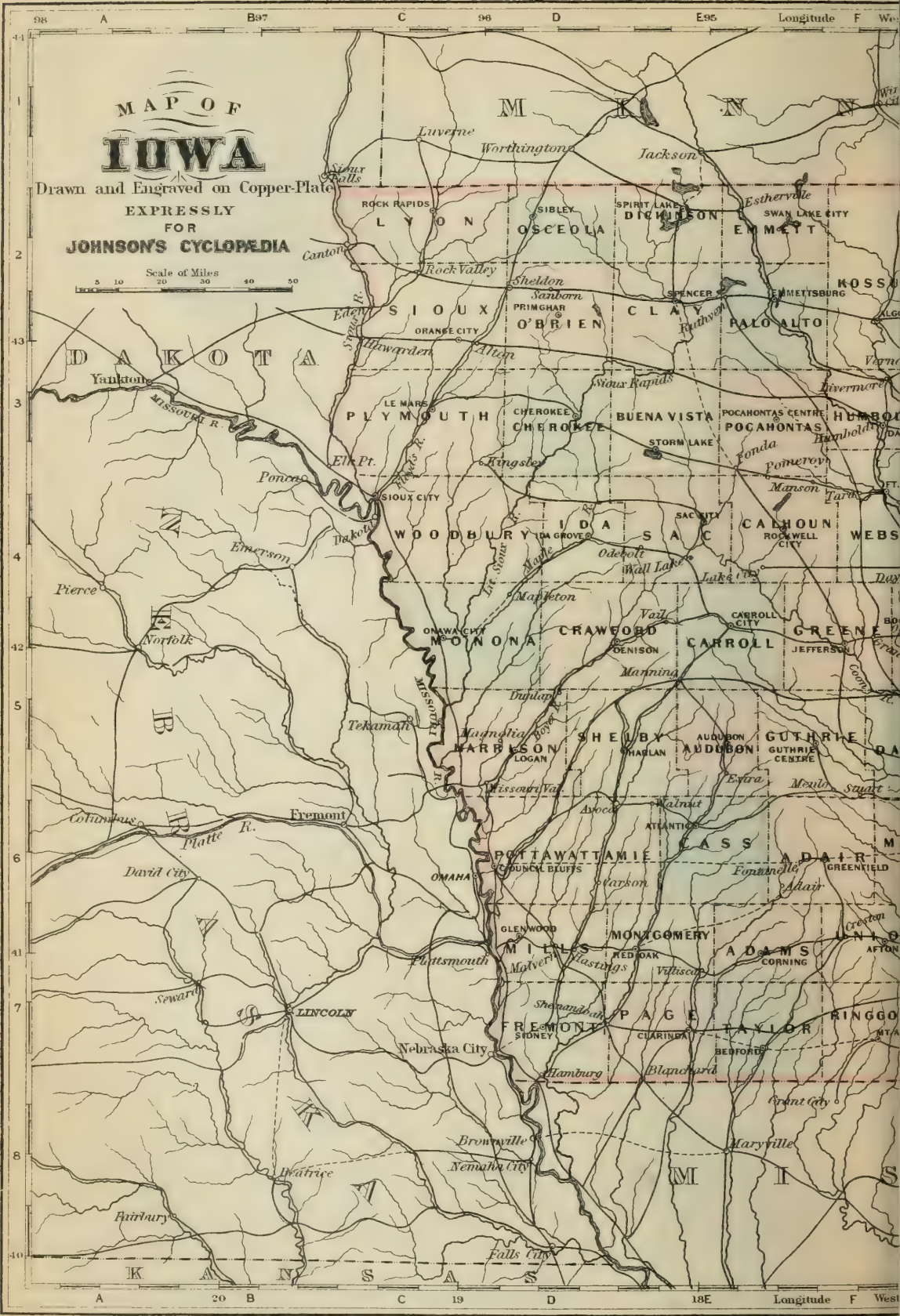
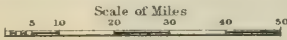
Vegetation.—With the exception of the small portion occupied by rivers, lakes, ponds, and rocky bluffs, the whole surface is arable and yields everywhere liberal crops. The surface is so nearly level that agricultural machinery can be used everywhere. There are 3 descriptions of soil in the State, all fertile, yet differing somewhat in their characteristics: (1) The drift soil, formed of the surface portion of the drift or diluvial deposit, consists of a dark loam from 1 to 3 ft. deep, and is found mostly on the prairies. There are no stumps and very seldom any stones in it. It is so fertile that in many places, after 20 yrs. cultivation without manure, it still yields abundant crops; it contains considerable clay. (2) The bluff soil is the surface portion of the bluff deposit; it is very fine, contains less clay than the drift soil, and no stones or boulders. (3) The alluvial soil, found in the river-bottoms, consisting of the soil and decomposed vegetable and animal matters brought down by the floods, is the richest and most productive and durable soil in the world. The area occupied by forests and woodland in I. is 4,985,668 acres. The most common forest trees are 4 or 5 kinds of oak, the common elm, cottonwood, black walnut, hickory, sugar-maple, soft maple, and linden. The buckeye, aspen, water-birch, wild-cherry, ash, box-elder, white walnut or butternut, sycamore, and slippery elm are less abundant. There are a few pine trees in Eastern I. on the sandstone bluffs, and some red cedar in similar situations. The prin. native fruits are wild grapes, plums, crabapples, cherries, blackberries, raspberries, gooseberries, and strawberries, and among the nuts are hickory and hazel nuts, black walnuts, butternuts, and a few pecan nuts in the S. E. cos. The prairie-grass is of fair quality, and used for pasturage and for hay. There is also a wild rice in the shallow ponds of N. I. The cultivated crops are, among the grains, corn, wheat, oats, barley, rye, and buckwheat. Hay, principally timothy and red clover, is extensively made, and blue grass and white clover are cultivated for lawns and pasturage. Flax, hemp, and hops are crops of considerable importance. Sorghum is not so largely cultivated as formerly. Potatoes are raised in great quantities. Sweet potatoes are grown successfully in the S. part of the State. Garden vegetables of all kinds grow well in all parts. Among cultivated fruits, apples are very abundant and of excellent quality. Pears grow well. Grapes are grown successfully in all parts of the State, the Catawba and Concord being the most common varieties. Plums succeed well. The small fruits, gooseberries, raspberries, currants, and strawberries, are cultivated with great success. Much attention is paid to tree-culture. The Osage orange is much used for hedges in S. I.

Zoology.—Deer are occasionally found in the wooded dists., but they are not plentiful. The large gray wolf and the wild-cat are very rare, and the prairie wolf is fast disappearing. There are a very few beavers and otters in some of the rivers, and muskrats, minks, raccoons, foxes, and opossums are not very rare. The birds common in all



MAP OF
IOWA

Drawn and Engraved on Copper-Plate
EXPRESSLY
FOR
JOHNSON'S CYCLOPEDIA





the N. States are plentiful in I., and there are a few which are rare in other States. Ravens are occasionally seen in the N. cos., the yellow-headed blackbird in the N. W. part of the State, and paroquets in the S. tier of cos.; wild-turkeys and partridges or ruffed grouse are often found in the wooded dists., and prairie-hens in great number in the prairies which are as yet un reclaimed. Quails, snipe, and woodcock are plentiful in their season, and some curlews are found. Geese, swans, and ducks visit the ponds and rivers of the State in spring and autumn in great numbers. The rivers of the State yield great quantities of excellent fish, among which are found the salmon, the lake-trout, white-fish, brook-trout, troutlet, brown and common cat-fish, perch, roach, etc.

Climate.—The mean average temperature is found to be 48°. Less snow falls in I. than upon the Atlantic coast, but there is sufficient for several weeks' sleighing every winter. Both the Miss. and Mo. generally freeze over opposite I. and remain closed for 2 or 3 months in the winter. All the small rivers freeze over solidly every winter. The average rainfall is about 40½ inches, and of snow 30 inches (equivalent to 3 inches of rain), making a total of 43½ inches. I. is within the zone of variable winds. In 32 yrs. the wind blew on an average 70 days from the N. N. E., 76 from the E. S. E., 105 from the S. S. W., 114 from the W. and N. N. W., making 219 days of westerly winds and 146 of easterly winds. The average time of the first flowering of apple trees at Muscatine is May 6; at Dubuque, about 15 N. May 12. I. ranks high among the healthiest States of the U.

Agricultural Products.—I. is a great grain-raising State, ranking second in Indian corn production and sixth in wheat, among the States. The census of 1880 showed 275,014,247 bushels of corn harvested; wheat, 31,154,205 bushels; oats, 50,610,591 bushels; barley, 4,022,588 bushels; rye, 1,518,605 bushels; wool, 2,971,975 lbs.

Farm Animals.—There were, in 1880, horses, 792,322; cattle, 2,612,036; sheep, 455,359; swine, 6,034,316, the latter being about 1,000,000 in excess of any other State. There is a greatly increasing demand for cattle for dairy farming. At the recent national dairy fairs and congresses I. has taken the first prizes for butter, and has attained high rank for the production of the best cheese.

Manufacturing Industry.—The increase in manufactures in I. has been very rapid. There are numerous flouring-mills working on a large scale, and the State has extensive smelting works, agricultural implement and machine works, carriage, wagon, and car works, creameries, cheese factories, plaster mills, sorghum mills and sugar refineries, cotton, woollen, and silk mills, etc. In 1880 there were 6921 manufacturing establishments, employing 28,372 hands; wages paid, \$9,725,992; capital invested, \$33,987,886; aggregate product, \$71,045,926.

Railroads.—There were operated, in 1880, 5235 m. of railway, costing \$89,236,600, and paying bonded interest and dividends to the amount of about \$3,000,000.

Finances.—The assessed valuation of property was, 1880, real estate, \$297,254,342; personal, \$101,416,909; total, \$398,671,251; State tax, 50 cents on each \$100; amount of State debt, 1880, \$370,435; amount raised for State expenses by taxation, \$827,285. Total taxation, State and local, \$10,261,605; total debts, local and State, \$7,962,767.

Commerce.—I. has no direct foreign commerce. Internal trade and transportation are heavy, consisting largely of cereals, cured meats, and merchandise.

Banks, Savings Banks, Insurance Companies, Etc.—In Oct. 1881 I. had 76 national banks, with capital of \$5,950,000; circulation, \$4,144,103; U. S. bonds to secure circulation, \$5,049,500; deposits, \$15,841,995. There were 58 State banks and trust cos., with capital of \$2,655,731 and \$7,975,671 of deposits; 3 savings banks, with \$228,281 deposits; and 276 private bankers, with \$10,888,843 deposits.

Education.—The number of children of school age (5-21 yrs.) in 1880 was 586,556, of whom 426,057 were enrolled in public schools; average daily attendance, 260,813; number of school-houses, 11,148; amount expended, \$4,347,119, of which \$2,907,446 was for teachers' salaries. There is a State univ. at Iowa City, and a State agricultural coll. There are 17 other colls., with 199 instructors and 3061 students. There were pub., in 1882, 539 newspapers and periodicals, of which 36 were daily and 471 weekly.

Churches.—The M. E. Ch. takes the lead, embracing 764 chs., 512 ministers, and 77,962 members. The Lutherans number 342 chs. and 42,250 members; Baps., 411 chs., 24,815 members; Presbys., 344 chs., 20,281 members; Christians (Disciples), 207 chs., 19,200 members; Congregationalists, 224 chs., 15,566 members; R. Caths., 160 chs.; other denominations, about 900 chs. and 70,000 members.

Population.—In 1860, 674,913; 1870, 1,194,020; 1880, 1,624,615 (white 1,614,600, colored 10,015, including 33 Ch. and 466 Ind.).

Principal Cities and Towns. Pop. 1880.—Des Moines (cap.), 22,408; Dubuque, 22,254; Davenport, 21,831; Burlington, 19,450; Council Bluffs, 18,063; Keokuk, 12,117; Cedar Rapids, 10,104; Clinton, 9052; Ottumwa, 9004; Muscatine, 8295; Sioux City, 7366; Iowa City, 7123; Marshalltown, 6240; Creston, 5081; Oskaloosa, 4598; Mt. Pleasant, 4410.

COUNTIES.	Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Adair.....	6-F	3,982	11,667	Greenfield.....	684
Adams.....	7-E	4,614	11,888	Corning.....	1,526
Allamakee.....	2-J	17,668	19,791	Waukegan.....	3,350
Appanoose.....	7-H	16,456	16,636	Centerville.....	2,475
Audubon.....	5-E	1,212	7,448	Audubon.....	792
Benton.....	5-I	22,454	24,888	Vinton.....	2,906
Black Hawk.....	4-I	21,706	22,913	Waterloo.....	5,630
Boone.....	5-G	14,584	20,838	Bonesborough.....	1,438
Bremar.....	2-I	12,538	14,081	Waverly.....	2,345
Buchanan.....	4-J	17,034	18,546	Independence.....	3,128
Buena Vista.....	3-E	1,585	7,537	Storm Lake.....	1,034
Butler.....	3-H	9,951	14,293	Allison.....	.....
Calhoun.....	4-F	1,602	5,595	Rockwell City.....	90
Carroll.....	5-E	2,451	12,951	Carroll.....	1,385

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Cass.....	6-E	5,464	16,943	Atlantic.....	3,662
Cedar.....	5-K	19,731	18,836	Tipton.....	1,299
Cerro Gordo.....	2-H	4,722	11,461	Mason City.....	2,510
Cherokee.....	3-D	1,967	8,240	Cherokee.....	1,593
Clark.....	2-I	16,180	14,534	New Hampton.....	1,765
Clarke.....	7-G	8,745	11,513	Oscola.....	1,410
Clay.....	2-E	1,523	4,248	Spencer.....	824
Clayton.....	3-J	27,771	28,499	Elkader.....	851
Clinton.....	5-K	35,357	36,763	Clinton.....	9,052
Crawford.....	5-D	2,330	12,413	Donnell.....	2,413
Dallas.....	5-F	17,019	18,746	Donnell.....	949
Davis.....	7-I	15,585	16,468	Bloomfield.....	1,531
Decatur.....	7-G	12,018	15,236	Leon.....	1,367
Delaware.....	4-I	17,432	17,550	Manchester.....	2,275
Des Moines.....	5-F	27,336	33,098	Burlington.....	19,450
Dickinson.....	2-E	1,389	1,901	Spirit Lake.....	277
Dubuque.....	4-K	38,869	42,996	Dubuque.....	22,254
Emmet.....	2-E	1,392	1,550	Swan Lake.....	66
Fayette.....	3-J	16,973	22,258	West Union.....	1,551
Floyd.....	9-H	20,768	14,671	Charles City.....	2,491
Franklin.....	3-H	4,738	10,249	Hampton.....	1,599
Fremont.....	7-D	11,174	17,652	Sidney.....	855
Greene.....	5-E	4,627	12,727	Jefferson.....	1,444
Grundy.....	4-H	6,399	12,639	Grundy Centre.....	950
Guthrie.....	5-F	7,061	14,394	Guthrie Centre.....	571
Hamilton.....	4-G	6,055	11,292	Webster City.....	1,245
Hancock.....	2-G	999	3,453	Commodore.....	17,764
Hardin.....	4-H	13,884	17,807	Eldora.....	1,584
Harrison.....	5-C	8,931	16,649	Lugan.....	644
Henry.....	7-I	20,463	20,986	Mt. Pleasant.....	4,160
Howard.....	2-I	6,282	10,837	Cresco.....	1,875
Humboldt.....	3-F	2,596	5,341	Dakota.....	248
Ia.....	4-D	226	4,382	Ia Grove.....	759
Iowa.....	5-I	16,644	19,221	Marengo.....	1,738
Jackson.....	2-H	20,619	25,771	Magueta.....	2,491
Jasper.....	5-H	25,116	25,963	Newton.....	2,507
Jefferson.....	7-J	17,839	17,469	Fairfield.....	3,086
Johnson.....	5-J	24,898	25,499	Iowa City.....	7,123
Jones.....	4-K	18,731	21,052	Amosua.....	2,083
Keokuk.....	6-I	19,454	21,258	Sioux City.....	7,355
Kossuth.....	2-F	3,351	8,175	Algona.....	1,199
Lee.....	7-K	37,210	34,859	Ford Madison.....	4,679
Lincoln.....	5-J	31,080	37,237	Marion.....	1,939
Louisia.....	6-K	12,977	13,142	Wapello.....	928
Lucas.....	7-H	10,388	14,530	Chapin.....	2,977
Lyon.....	2-C	221	1,968	Rock Rapids.....	.....
Madison.....	6-F	13,884	17,224	Winterest.....	.....
Mahaska.....	6-I	22,508	25,202	Oskaloosa.....	4,598
Marion.....	6-H	24,436	25,111	Knoxville.....	2,577
Marshall.....	7-E	17,576	22,752	Marshalltown.....	6,240
Mills.....	7-D	8,718	14,137	Glenwood.....	1,793
Mitchell.....	2-H	9,582	14,364	Osage.....	2,012
Monona.....	5-C	3,654	9,055	Onawa.....	882
Monroe.....	7-E	12,734	13,719	Albia.....	2,435
Montgomery.....	7-E	5,934	15,895	Forest Oak.....	3,735
Muscatine.....	6-K	21,688	22,170	Muscatine.....	8,295
O'Brien.....	2-D	715	4,155	Pringhar.....	.....
Osceola.....	2-D	.....	2,219	Sibley.....	301
Page.....	7-E	9,975	19,667	Clairina.....	2,011
Palo Alto.....	2-E	1,386	4,131	Emmettsburg.....	.....
Plymouth.....	3-E	3,199	8,568	Le Mars.....	1,595
Pocahontas.....	3-F	1,446	3,713	Pocahontas.....	37
Polk.....	5-G	27,857	42,395	Des Moines.....	22,408
Pottawattamie.....	6-D	16,893	39,850	Council Bluffs.....	18,063
Poweshiek.....	7-F	15,381	18,936	Marquette.....	.....
Ringgold.....	7-F	8,691	12,085	Mount Airy.....	1,275
Sac.....	4-E	1,411	8,774	Sac City.....	595
Scott.....	5-L	38,599	41,266	Davenport.....	21,831
Shelby.....	5-D	2,540	12,896	Harlan.....	1,304
Sioux.....	2-C	576	5,428	Orange City.....	2,581
Story.....	5-G	11,651	16,806	Nevada.....	1,541
Tama.....	5-I	16,131	21,585	Toledo.....	1,026
Taylor.....	7-E	6,989	15,635	Reftord.....	1,763
Union.....	7-F	5,996	14,980	Afton.....	1,231
Van Buren.....	7-J	17,672	17,043	Keosauqua.....	2,491
Wapello.....	7-J	22,346	25,285	Ottumwa.....	9,004
Warren.....	6-G	17,980	19,578	Indianola.....	2,146
Washington.....	6-J	18,952	20,374	Washington.....	2,949
Wayne.....	7-G	11,287	16,127	Corydon.....	801
Webster.....	4-F	10,484	15,321	Fort Dodge.....	3,386
Winnebago.....	2-G	1,562	4,917	Forest City.....	.....
Winnebush.....	2-J	23,570	23,938	Decorah.....	2,951
Woodbury.....	4-C	6,172	14,996	Sioux City.....	7,366
Worth.....	2-H	2,892	7,953	Northwood.....	244
Wright.....	3-G	2,392	5,062	Clarion.....	147
Total.....		1,194,020	1,624,615		

* Reference for location of counties. See map of Iowa.

History.—The whole region lying between the Miss. and Mo. rivers in the N. W., as well as much of the country S. of the Mo., was claimed by the Fr. on the ground of Marquette's discoveries in 1673, and was transferred to Sp. by treaty in 1763. In 1800-01 Sp. ceded it back to Fr., and it was sold as part of the La. purchase to the U. S. in 1803. In 1805 the La. dist., which included what is now the State of Iowa, was organized as a distinct Terr., with a govt. of its own. In 1812 the name was changed to Mo. Terr. In 1834 all that part of Mo. Terr. N. of the State of Mo. and W. of the Miss. was placed under the jurisdiction of Mich. Terr. In 1836 Wis. Terr. was organized, and I. made a dist. of it, with the seat of govt. for the whole Terr. fixed at Burlington. In 1838 I. Terr. was organized, and in 1839 the cap. of the Terr. was removed to Iowa City. The Terr. was admitted into the U. S. as a State Dec. 28, 1846. In 1857, at the time of the adoption of the new const., the cap. was removed from Iowa City to Des Moines, where it now resides. The first settlements of whites permitted by the U. S. govt. within the present limits of I. were made in 1833-34 at Ft. Madison, Burlington, and Dubuque. Since its admission to the U. the growth of I. has been rapid.

Governors.

TERRITORY.		William M. Stone.....	1864-68
Robert Lucas.....	1838-41	Samuel Merrill.....	1868-72
John Chambers.....	1841-46	Cyrus C. Carpenter.....	1872-76
James Clark.....	1846	Samuel J. Kirkwood.....	1876-77
STATE.		Joshua G. Newbold.....	1877-78
Ansel Briggs.....	1846-50	John H. Gear.....	1878-82
Stephen Hempstead.....	1850-54	Buren R. Sherman.....	1882-86
James W. Grimes.....	1854-58		
Ralph P. Lowe.....	1858-60		
Samuel J. Kirkwood.....	1860-64		

REVISED BY A. R. SPOFFORD.

Iowa, a river in the State of the same name, rises in Hancock co., near the Minn. line, flows S. E. for 300 m., passing by Iowa City, the former cap. of the State, and enters the Miss. 35 m. N. of Burlington. It is navigable for small steamers to Iowa City, 80 m. from the mouth.

Iowa Agricultural College, The, was established by an act of the State legislature passed in 1858, providing for the purchase of a farm, for the erection of the coll. buildings, and for experiments in agriculture. In 1859 the trustees selected and secured a section of land near Ames, Story co., for the coll. farm, and on Mar. 20, 1869, the main coll. building was formally opened, and students of both sexes were enrolled. There are 4 courses of study, requiring 4 yrs. each—viz. (1) the course in agriculture, embracing practical farming, farm engineering, stock-breeding, horticulture, and forestry; (2) the course in mechs., embracing civil and mechanical engineering; (3) the ladies' course; (4) the course in gen. science.

Iowa City, city and R. R. centre, cap. of Johnson co., Ia., at the head of navigation of the Iowa River, 130 m. E. of Des Moines. It was (1839-55) the cap. of Iowa Terr. and State, and the buildings and grounds of what was formerly the capitol are now occupied by the State Univ. Pop. 1870, 5914; 1880, 7123.

Iowa College was founded in 1847 by an association of Congregationalists and Presb., and established at Davenport. The latter withdrew in 1852. A freshman class was formed in 1850, ladies admitted 1857, a 4 yrs.' scientific course established 1867. In 1860 the coll. was removed to Grinnell, Poweshiek co., in the centre of the State, and the commodious central coll. building was erected in 1872. The scientific course contains some studies usually deemed post-graduate. Classes in the ladies' course recite with coll. classes to the coll. profs. There is a classical acad. preparing for both courses.

Iowa Falls, city and R. R. junc., Hardin co., Ia., 143 m. W. of Dubuque, on the Iowa River, which here has a succession of rapids. It was founded in 1850, and incorporated as a city in 1870. Pop. 1880, 955.

Iowa State University is located at Iowa City, on R. R., 57 m. W. of Davenport. It was founded in 1855, and organized on its present basis in 1860. It comprises 4 depts.—academic, law, med., and civil engineering.

Ipecac, the dried root of *Cephaelis Ipecacuanha*, a small shrubby perennial plant, natural order Rubiaceae, growing in damp, shady forests in Brazil. The root is slender, from 4 to 6 inches long, and marked with annular ridges. It yields a fawn-colored powder of peculiar smell and acrid bitter taste. Its active principle is an alkaloid, *emetia*, which, when pure, is a white uncrystallizable powder, difficultly soluble in water, but soluble in alcohol. I. is used in small doses as a stomachic tonic, in somewhat larger as a relaxer of the dry and stiffened condition of the respiratory mucous membrane in the first stage of a catarrh, and in still larger doses as an emetic. Powdered I. and opium, 1 part each, and potassium sulphate, 8 parts, form the "compound ipecac powder" or "Dover's powder."

Iphicrates, i-fik'-ra-téz, b. about 419 B. C., was an Athenian gen. in the Corinthian war (395-387 B. C.), who routed the Lacedæmonian army near Corinth in 392 B. C. After the peace of Antalcidas he went to Thrace; fought in the service of Cotys, whose daughter he married; founded the city of Drys. In 377 he commanded the Gr. auxiliaries who followed Pharnabazus, the Per. satrap, on his campaign against Egypt. A disagreement arose between the Gr. and the Per. commanders, and I. fled to Athens, where Pharnabazus tried to arraign him for treachery, but failed. In the social war I. commanded the Athenians, but was again accused and acquitted. D. about 350 B. C.

Iphigenia, the daughter of Agamemnon and Clytemnestra. When the Gr. fleet was detained at Aulis, through the anger of Artemis, I. was brought thither to be sacrificed to the goddess, but Artemis herself carried her away to Tauris, where she officiated as priestess to the heaven-fallen image of the goddess. She fled with Orestes, her brother, carrying away with them the divine image.

Ipomoea. See JALAP.

Ipsambul. See ABU SAMBUL.

Ipsus (Gr. Ἰψους or Ἰψος), town of Phrygia, Asia Minor, where was fought (301 B. C.) a battle between King Antigonus and his son, Demetrius Poliorcetes, and combined forces of Cassander, Lysimachus, Ptolemy, and Seleucus, in which Antigonus was slain and his dominions conquered.

Ipswich, on R. R., Essex co., Mass., 27 m. N. E. of Boston, on Ipswich River, 3 m. from the sea. It has a sem. and an insane asylum. Pop. tp. 1870, 3720; 1880, 3699.

Iran. See PERSIA.

Iranians [from *Iran*, the native name of Per.], a branch of the Aryan or Indo-European family, now comprising the Pers., Armenians, Afghans, Kurds, and several isolated tribes in Beloochistan and India. Their original seat appears to have been near the sources of the Oxus, whence they spread in various directions, especially occupying the great plateau of Per. and the mountainous region of Armenia. For the partial recovery of the anc. Iranic lang. we are mainly indebted to our knowledge of the Sans. The name *Zend* has been improperly applied to it; recent philologists style it the Old Bactrian.

Iredell (JAMES), b. at Lewes, Sussex co., Eng., Oct. 5, 1751, and settled in N. C. in 1768; admitted to the bar in 1770, took an active part in the cause of independence, was elevated to the judicial bench in N. C. in 1777, and in 1790 was appointed one of the associate justices of the supreme court of the U. S. He was a man of extensive learning and great ability. He pub. in 1790 the *Laws of N. C.* 1715-90. D. Oct. 20, 1799. A. H. STEPHENS.

Iredell (JAMES, JR.), son of James Iredell, b. in N. C. Nov. 2, 1788, at Edenton; grad. at Princeton; member of the State legislature for a number of yrs., and speaker of the house part of the time. In the war of 1812 he com-

manded a co. of volunteers who went to repel a threatened Brit. invasion at Norfolk, Va. In 1819 he was appointed to the circuit court bench of his State. In 1827 he was elected gov. of N. C., and was U. S. Senator 1823-31; was a reporter of decisions of the State supreme court; pub. law and equity reports. D. Apr. 13, 1853. A. H. STEPHENS.

Ireland, the second largest of the Brit. isles, is washed on 3 sides by the open Atlantic, and separated from G. Brit. by the Irish Channel or Sea. Its area is 32,285 sq. m.

Relief.—By far the greater portion of the island consists of an undulating plain, consisting to a great extent of bogs, which are incapable of cultivation. The most extensive of these bogs is that of Allen. The hills rise in isolated groups near the sea. The most elevated of these hills are in S. W. I. (Carn Tual 3404 ft.).

Hydrography.—The rivers of I. flow for the greater part through plains, enlarging into lakes, and several of them navigable almost to their source. The Shannon is the most important among them. I. abounds in lakes, the most important of which is Lough Neagh (158 sq. m.).

Climate.—The mean temperature in winter is 41.5°, in spring 47°, in summer 60°, and in autumn 51° F. The temperature is thus even more equable than that of the Brit. Isle, a feature to be traced to the influence of the Atlantic, which is likewise answerable for the greater amount of rain which falls throughout I., and for the greater moisture of the air. These circumstances are most conducive to a luxuriant vegetation.

Geology.—I. may be divided geologically into 3 regions—viz. the great central plain, N. I., and S. I. The former is occupied by Carboniferous limestone, covered with drip, peat-moss, and fresh-water marl. In N. I. the Silurian formation is the most prominent, intruded by granite and basalt, the latter forming the Giant's Causeway on the N. coast. Permian, Cretaceous, and Triassic rocks likewise occur in that part of the country, the latter containing beds of gypsum and rock-salt. S. E. I. consists mainly of Cambrian rocks, upon which the Lower Silurian strata (flags and slates) rest unconformably. In Kerry and Cork the sandstones and slates of the Devonian age are represented.

Agriculture.—The climate of I. is more favorable to cattle-breeding than to the cultivation of cereals. The system of cultivation leaves much to be desired. The Irish refer their inferiority in these respects to absentee landlords and the uncertainty of tenure; and although due weight should be given to these causes, there is no doubt that local causes, such as the excess of small buildings as well as difference of race, have had some effect.

Fisheries.—The Irish fisheries were far more important formerly than they are now. The decrease is due to emigration and the great demand for seamen.

Manufactures.—I. is not a manufacturing country. The only manufacture of any extent is that of linen, of which Belfast is the centre.

Commerce.—The direct trade with foreign countries is comparatively trifling, as the greater part of the trade is carried on through Eng. and Scotch ports. The direct imports of foreign and colonial merchandise have a value of about £12,000,000; the direct exports of Irish produce do not exceed £180,000. The prin. seaports are Dublin, Cork, Belfast, Waterford, and Limerick.

Religion.—About 75 per cent. of the pop. are R. Caths., 12 per cent. Episcopalians, and 11 per cent. Presbs.

Education.—A system of national education was inaugurated in 1845, but as these national schools are not denominational, they have never been supported as heartily by the ministers of different religious bodies as they ought to have been, and the education of the people has suffered accordingly. Among the superior schools, Trinity Coll. at Dublin and the Queen's Colls. at Cork, Galway, and Belfast are the most important. There is a R. Cath. univ. Maynooth Coll. is the prin. inst. for education of priests.

Population.—In 1881 there were 5,159,839 inhabs. There was an increase in the pop., slow at first, and then rapid, 1801-1841, and a decrease, more rapid than the previous increase, 1841-1871. Emigration has gone on steadily increasing. The total number of natives of I. who left the Irish ports from May 1, 1851, to Dec. 31, 1879, was 2,541,670. In 1880, 93,641 emigrants left the ports. Eng. is spoken throughout the country, but Irish is still spoken by about one million persons. About 100,000 persons speak Irish only.

History.—We know next to nothing respecting I. for any period antecedent to the 4th century. At that time the inhabs. of the island were known as Scoti. Christianity was introduced in the course of the 5th century by St. Patrick. At this early period I. appears to have been divided among numerous clans, who owned allegiance to 4 kings, and to an ardrigh, or monarch, to whom the central dist. called Meath was allotted. The incursions of the Scandinavians checked the progress of civilization of I. They established themselves on the E. coast, until they were overthrown at the battle of Clontarf, near Dublin (1014), by Brian Borumha, the "monarch" of I. From the 8th to the 12th century Irish scholars enjoyed reputation for learning, and the arts were cultivated. In 1172 Henry II. of Eng. made his first descent upon I. He received the homage of a number of chiefs, and authorized certain Norman adventurers to take possession of the entire island in his behalf. In the course of the 13th century these Norman barons had succeeded in establishing their power, but in the course of time their descendants identified themselves with the natives. At length the power of Eng. became limited to a few coast-towns. In 1541 Henry received the title of "king of Ireland" from the Anglo-Irish Parl., and several of the native princes acknowledged him as their sovereign. The attempt to introduce the Reformed faith led to repeated revolts, which were suppressed, and the lands of the rebellious chiefs parcelled out among Prot. Scotch and Eng. settlers. In 1641 the Irish rose in rebellion and massacred the Protos., but they were most severely punished by Crom-

well (1649). At the Revolution the native Irish generally sided with James II., the Eng. and Scotch "colonists" with William and Mary. Penal statutes were then passed against the Catholics, and the dissatisfaction gave rise to a rebellion in 1798, suppressed 1800. On the 1st of Jan. of the following yr. the Irish Parl. was incorporated with that of G. Brit. From that yr. dates the United Kingdom of G. Brit. and I. [From orig. art. in *J. S. Univ. Cyclopedia*, by E. G. RAVENSTEIN.]

Ireneus, one of the early Ch. Fathers, b. in Asia Minor or Syria between 120 and 140 A. D.; enjoyed the instruction of Polycarp, the disciple of John. He went afterward to Gaul, and was a presbyter at Lyons in 176. In 177 Photinus, bp. of Lyons, suffered martyrdom, and I. succeeded him in the episcopal office. His energy in building up the Chr. Ch. in Gaul is praised, but more particular events of his life are not recorded. Of his writings only the *Adversus Hæreses* has come down to us. D. about 202.

Irene [Gr. *Eirēnē* "peace"], empress of Constantinople, b. at Athens about 752; became wife of Leo, heir of Constantine V., and upon his death in 780 ruler during the minority of their son, Constantine VI. In 786 she called a council at Constantinople to restore the images which had been banished from the chs.; but this being interrupted by the soldiery, she summoned another at Nicea in Bithynia, at which the veneration of images was declared to be consonant with Script. Her son was induced by his favorites to throw off the maternal yoke. I. was secluded in one of her palaces, but conspiracies were formed for her restoration. In 797 an attempt was made to assassinate Constantine, who escaped to Phrygia, but his mother persuaded him to return to Constantinople, where he was seized and his eyes put out. I. then ruled for 5 yrs., but the eunuch Nicephorus, secretly invested with the purple, arrested I. and banished her to Lesbos (802), where she gained a scanty livelihood by spinning. D. Aug. 15, 803.

Ireton (HENRY), b. at Attenton, Nottinghamshire, Eng., in 1610; studied law at Ox., took part in the great c. war as one of Cromwell's gens.; in 1646 married Bridget, daughter of the future Protector; was taken prisoner at Naseby by Prince Rupert, but rescued the same day; signed the death-warrant of Charles I., and accompanied Cromwell to Ireland in 1649; in 1650 the prosecution of the conquest of Ireland was intrusted to I. D. Nov. 15, 1651.

Iridaceæ [so named from the typical genus, *Iris*], an order of the petaloideous division of monocotyledonous or endogenous plants, distinguished by having only 3 stamens, alternate with the inner divisions of the adnate perianth and exstrose anthers; and the leaves are almost always equitant. The juice in all is acrid. The prin. economical products of the order are orris-root, from one or more species of *Iris*, and saffron, the deep orange-colored stigmas of *Crocus sativus*. *Iris*, *Gladiolus*, *Tigridia* (or tiger-flower), *Crocus*, etc., are the genera which produce common ornamental flowers in our gardens. ASA GRAY.

Iridium, one of the rare metals of the platinum group. It is found in combination with osmium, platinum, and palladium, in grains associated with native gold.

Iridosmine, a native alloy of iridium and osmium, of great hardness and weight. It is used for tipping the nibs of gold pens.

Iris [so named from its various colors], in the eye, is a thin contractile curtain, nearly circular in outline, suspended in the aqueous humor between the cornea and the lens. It is perforated by an aperture called the pupil, circular in man and most of the Mammalia, elongated in the cat, the fox, the owl, and some other vertebrates. Its substance is partly fibrous, partly cellular (pigmentary), and partly muscular.

Iris [Gr. *Ἴρις*], in classic mythology, the daughter of Thaumas and Electra and sister of the Harpies. In the Homeric poems she appears as a goddess, who acts as messenger of the gods and as conductor of female souls to the shades. She is the personification of the rainbow as the messenger of peace.

Iris [named for the goddess or the rainbow], the fleur-de-lys, the leading genus of the order Iridaceæ, consists of numerous species of perennial herbs dispersed over the temperate regions of the N. hemisphere, all with showy flowers, several of them familiar and ornamental in gardens. They spring from root-stocks or tubers. Their leaves are equitant and sword-shaped, and the flower is peculiar in having the 3 outer divisions recurved, while the 3 inner are incurved or erect, and the 3 branches of the style are large and petal-like, overarching the 3 stamens, which lie hidden underneath them. The violet-scented orris-root is from *I. Florentina*, and no less from *I. pallida* and *I. Germanica*. There are several indigenous species in the U. S.; *I. versicolor*, the common blue flag, is most abundant. ASA GRAY.

Iris (now *Kasabmak* or *Yekil Imrak*), the classical name of one of the largest rivers of Pontus in Asia Minor.

Irish Language and Literature. The Irish or Gaelic lang. is spoken in Ire., in the Hebrides and Highlands of Scot., and in the Isle of Man. It belongs to the Celtic group of the Indo-European tongues. It is related to Welsh in about the same degree that Eng. is related to Ger. Irish historians mention works written in pagan times in Ire., and of these the most famous is the *Saltair of Para* by Cormac Mac Airt, king of Ire. (227-266). Of this and other early works no more than the titles remain. The earliest existing examples of I. are glosses, chiefly on Lat. MSS. of the Scriptures, found in codices of the 8th century. The glosses illustrate completely the gram. of the Gaelic lang. at that remote period, or of Old I. The next period is called the Middle I. To it the earliest complete works now existing belong. It fades gradually into the modern form of the lang., which has been established for about 400 yrs. The oldest book in the I. lang. is called *Leabhar na h-Uidhri*. The original composition is referred by historians to the 6th century, and to St. Ciaran, abbot of Cluain-mic-Nois. It is a collection of heroic tales, with an account of the royal

burying-places of Erin, a sermon on the Resurrection, and one on the day of judgment. From the 13th century onward MSS. exist in large numbers. They are usually collections of treatises made by learned individuals or by communities. The *Leabhar Breac*, or "Speckled Book," written by the Mac Egan, the *Book of Leinster* and the *Book of Ballymore* are examples. The period of collections of this kind is succeeded by that of separate works. The *Annala Rioghachta Eireann*, commonly called the "Annals of the Four Masters," Dr. Keating's *Hist. of Ire.*, and the several works of Mac Firlis are examples in the 17th century.

I. lit. is found to have a wide range. A great collection of sermons and of hymns, and innumerable lives of saints, exist. In this class 2 examples may be mentioned—the *Amhra Choluim Chilli* and the *Féilire of Aengus*. The former was composed in the 6th century by Dallan Forgaill, chief poet of Ulster, and is a poem on the death of St. Colum Cille. The latter is also a poem, and recounts the saints of Erin and some of the greater saints of the Ch. The old MSS. contain a large number of legal treatises. The best known are the *Senchus Mór* and the *Book of Aicill*. In historical romance I. lit. is rich. The most famous of the old tales is the *Tain Bo Cuailgne*. It tells of a war originating in strife about the finest white bull in Ireland. The *Togaid of Maelduin's Corach* describes an early voyage and discovery of land in the far West. Of history, one of the earliest works is *Cogadh Gaedhel re Gallaibh*—the "war of the Irish with the Danes." The *Annals of the Four Masters* is a hist. based upon anc. records. In the last century and the one before a great many songs were written, and a few novels. The I. lang. has for centuries been systematically attacked by the Eng. rulers of Ire., and these efforts have at length succeeded in putting an end to its production of lit. [From orig. art. in *J. S. Univ. Cyclopedia*, by NORMAN MOORE.]

Irish Moss. See CARRAGEEN.

Irish Sea, The, between Ire. and G. Brit., and connected with the Atlantic, S. by St. George's Channel and N. by the N. Channel. Its greatest width is 120 m. It contains the Isle of Man and Anglesey, beside some smaller islands.

Iron (i'urn) as a Metal. Pure I. is practically unknown, and we speak of the compounds of I. and carbon as wrought I., steel, malleable I., and cast or pig I., the last containing most carbon.

PHYSICAL PROPERTIES. *Color.*—Pure I. is silvery white, with a mild but brilliant lustre. Foreign elements modify the lustre rather than the color, except carbon; as that increases the color becomes more gray, till in pig I. with free graphite it is black.

Fracture.—Wrought I. is fibrous and crystalline. The purer the metal, the more it has been worked, the more fibrous it is, and the more gradual the break the longer and more silky the fibres. Steel and cast I. are crystalline, the fracture of steel becoming conchoidal when hardened.

Specific Gravity.—Electro-deposited I., 8.139; worked cast steel, average, 7.833; hammered I., 7.76 to 7.798; rolled I., 7.76 to 7.754; puddled bar, average, 7.4; cast I. castings, average, 7.10.

Conduction of Heat and Electricity.—Silver being 100, wrought I. conducts heat as 11.9, electricity as 12 to 14.8.

Expansion by Heat.—From 32° to 212° cast I. expands 0.0033 in bulk, wrought I. 0.0036, the latter expanding linearly $\frac{1}{1000}$ for each degree up to 572° F. Heated cast I. becomes permanently expanded by $\frac{1}{16}$ to 3 per cent. linear.

Fusibility.—Pure I. is at least as refractory as platinum; cast steel, 4000° F.; cast I., 2700° F.

Tenacity, on original areas:

Pounds to sq. inch.

Hard cast steel.....	132,000
Medium ".....	110,000
Soft ".....	95,000
Steel.....	72,000
Steel plate.....	95,000
Bessemer steel (rails).....	89,500
Spring steel.....	72,500
Puddled steel.....	62,769
	71,500
Ingot or homogeneous iron.....	43,000 to 60,000
Iron wire.....	50,000 to 60,000
Wrought iron.....	50,000 to 60,000
Bar iron.....	45,000 to 55,000
Plate iron.....	45,000 to 55,000
Unwrought puddled iron.....	30,000
Strong cast iron (gun).....	30,000 to 45,000
Cast iron.....	16,500
Average ".....	16,500
Weak ".....	13,400

Ductility.—That of I. is only exceeded by gold, silver, and platinum. I. wire is made 0.01 inch diameter and 49,000 ft. long unbroken.

Hardness.—Hardened steel is the hardest of metals, white cast I. nearly as hard, good cast I. 3 to 5 times as hard as copper, while wrought and homogeneous I. are often nearly as soft as copper.

Value.—Neither I. nor steel is necessarily good because strong, but should also be ductile. Steel stretches 5 to 30, and I. 20 to 50 per cent., according to hardness. Under these circumstances the elastic limit will be between $\frac{2}{3}$ and $\frac{1}{2}$ the tenacity.

CHEMICAL PROPERTIES.—I. is distinguished from other metals by forming fusible compounds with carbon. It represents a most important group of metals combining with oxygen, etc. in both odd and even proportions.

The salts of I. have an inky, astringent taste; they are distinguished as follows: (1) *Ferrous Salts.*—Pale green color; alkalis cause greenish-white precipitates, quickly oxidizing and becoming brown. Potassium ferricyanide (red prussiate of potash) forms a bright blue precipitate in neutral or acid solutions. (2) *Ferric Salts.*—In solution yellow or yellowish-brown. Alkalies throw down a reddish-brown precipitate, insoluble in excess of alkali. In neutral or acid solutions red prussiate causes no precipitate. Ferric salts

neutralized till a permanent precipitate begins to form are completely decomposed by boiling, the I. being precipitated as a sub-salt. The ferrous oxide and salts are magnetic, while the peroxide and ferric salts are not.

Copperas (*Meqanterite*; *protosulphate*) is a disinfectant and most important mordant. I. pyrites furnish commercial sulphuric acid. I. in combination with cyanogen and hydrogen forms brilliant blues—one Prus. blue. Neutral ferric salts treated with tincture of galls yields a precipitate, remaining in partial solution as writing ink.

METALLURGICAL CHEMISTRY. Iron and Oxygen.—Compact I. rusts or oxidizes slowly in air, owing to the presence of carbonic acid and moisture, but I. sponge burns readily cold, and solid I. at a high heat. Protoxide of I. is a powerful base, in metallurgical operations, having great affinity for oxygen and the power of decomposing water. Magnetic oxide of I. as "scale" is an important product and a powerful agent, as a source of oxygen, in puddling.

Iron and Carbon.—I. combines readily with carbon up to about 6 per cent., when manganese is present, a small change of carbon producing extraordinary modifications of properties. About 2 per cent. carbon is the lowest limit for cast I.; the metal is not malleable nor weldable, and graphite will not separate under the slowest cooling. With 1.75 per cent. carbon the metal (steel) can barely be welded, but at 1.5 per cent. the properties of steel develop clearly—viz. fusibility, combined with weldability and capacity to harden. With 0.4 carbon, steel can barely be hardened enough to give sparks on flint, and below 0.25 cannot be practically hardened at all. Below 0.2 ingot I. is most decidedly toughened, and if cold short, made more ductile by the most powerful attempts to harden it. Below 0.4 the metal is called "steely I.," "puddled steel" and "wrought I.," below 0.25 per cent. carbon it is now invariably called "ingot I.," "weld I.," or "wrought I." Bessemer rails are usually true steel, but much Bessemer and Martin (ingot) I. is made for wire and boiler-plate. The softest wrought I. rarely contains less than 0.08 per cent. carbon.

Carbon is present in I. as both graphite and combined carbon, the total of both in cast I. being usually 3.2 to 4.7 per cent. With much graphite the I. is "gray I.," with little or none, "white I.," with the free and combined carbon about equal, "mottled I." The grades of pig I. are in this country usually 5—No. 1 foundry, No. 2 foundry, No. 3 gray forge, No. 4 mottled, and No. 5 white. White I. containing manganese is called "spiegel I.," and with 30 to 60 per cent. Ferro-manganese.

Iron (Carbon) and Manganese.—Manganese is seldom found in wrought (weld) I. In cast I. it increases combined carbon and diminishes silicon. In steels, from 0.1 to 1.0 per cent. improves their working.

Iron (Carbon) and Sulphur.—Sulphur diminishes carbon, hinders separation of graphite, and increases strength in cast I. In steel and I. 0.1 per cent. causes "red-shortness." Copper acts similarly, but less strongly.

Iron (Carbon) and Phosphorus.—Almost always present. In cast I. it increases hardness, also the fluidity when hot, but weakens the cold metal; 0.25 per cent. in I. and 0.1 per cent. in steel cause brittleness—"cold-shortness"—though the metal works easier when hot, counteracting sulphur.

Iron (Carbon) and Silicon.—White cast I. seldom contains over 1.0 per cent., while gray has sometimes 5.0 per cent. Ordinarily it does not injure cast I., but a small amount renders I. rotten, and 0.1 per cent. is injurious when other impurities are present.

Iron and Carbon combine with tungsten, titanium, chromium, and tin; tungsten increasing toughness, chromium rendering steel less liable to injury from overheating. Tin, even 0.2 per cent., gravely injures I.

ANALYSES OF IRON.

	Gray foundry (McCreath)	Nearly white (Fluckner)	Soft steel (Dick)	Best wrought (McCreath)	Bessemer 6 Pdr. 1848 (Riley)
Comb. carbon.....	0.110	3.06	0.47	0.045	0.014
Graphite.....	2.970	0.43	.....	.....	.....
Silicon.....	3.114	1.29	0.24	0.148	0.004
Slag and oxide of iron.....	.....	.....	.....	2.164	.....
Sulphur.....	0.101	0.10	0.07	0.002	0.052
Phosphorus.....	0.999	0.95	0.02	0.248	0.046
Manganese.....	1.037	2.99	0.10	0.020	none
Copper.....	0.130	.....	.....	0.056	trace
Cobalt.....	0.081	.....	.....	0.078	.....
Aluminum.....	.....	.....	0.01	.....	.....
Iron.....	91.458	91.18	99.09	97.239	99.884
Total.....	100.000	100.00	100.00	100.000	100.000

IRON ALLOYS.—We scarcely know pure I., and few of those with carbon are of practical importance. With zinc in great excess its alloy is used as a coating, to galvanize, as practised at Rouen 1786. A similar alloy with tin is used as a coating (tin plates) preventive of rust. JOHN B. PEARSE.

Iron, Ores of. These are the oxides of the metal mixed with clayey or siliceous impurities. Commercially, over 20 per cent. of I. is necessary.

ORES OF IRON.

Name.	Composition.	Iron in 100 parts.
1. Magnetic iron ore.....	Iron and oxygen.....	72 ⁴¹ /100.
2. Red hematite (specular).....	Iron and oxygen.....	70.
3. Brown hematite.....	Iron, oxygen, and water.....	61 ⁶ /10 (water 12).
4. Spathic iron ore.....	Iron, oxygen, and carbonic acid.....	48 ² /10.
5. Argillaceous iron ore.....	Iron, oxygen, carbonic acid, and clay.....	Average 33.
6. Black-band.....	Iron, oxygen, carbonic acid, clay, and carbonate matter (coal).....	Variable, 20 to 35 (10 to 25 coal).

Native I., meteorites, and minute particles in basaltic rocks—a curiosity.

(1) **Magnetic Iron Ore.**—Sesquioxide 69, protoxide 31—100. I. black in color, leaving black streak; specific gravity, 4.9 to 5.2; often strongly magnetic, sometimes with polarity. Found mostly in primary crystalline rocks, massive (weathered as sand or ochre), and most abundantly in metamorphic rocks in beds. Impurities, titanite acid, apatite, and iron and copper pyrites.

(2) **Specular Iron Ore, or Red Hematite.**—I. 70, oxygen 30—100. Specular variety, dark steel gray in color, blood red by transmitted light; earthy ore (red hematite) red; each kind leaves a red streak. Not limited to any geological period, without characteristic impurities, and the best I. ore except massive spathic.

(3) **Brown Hematite, or Hydrated Sesquioxide of Iron.**—Sesquioxide 85.6, water 14.4—100. Found massive, earthy, ochreous, also containing fossils (one kind of fossiliferous iron ore), and loose or porous as bog ore. Specific gravity, 3.6 to 4, and its streak is yellowish-brown. It is the result of alteration of other ores or I. minerals by water, air, etc., and is still being formed as "lake ore," for instance in Swe. and ponds of E. Mass. It is mixed with sand, clay, etc., and its impurities are principally manganese (helpful), organic matter, and phosphates of iron (injurious).

(4) **Spathic Iron Ore.**—Protoxide 62.1, carbonic acid 37.9—100. Specific gravity 3.7 to 3.9; color light yellow, turning brown when weathered; before exposure the streak is white. Part of the I. usually replaced by manganese (yielding then spiegeleisen), and it is found pure, crystallized in vast conformable beds, also in globular masses and earthy with clay or sand; in latter state forming clay ironstone ores.

(5) **Clay Ironstone, or Argillaceous Iron Ore.**—A miner's name for a class of ores with little in common except mixture with clay or sand. It includes brown clay ironstone, massive or in nodules; argillaceous hematite, a hard, heavy ore, reddish-brown to red, sometimes of oolitic structure, when it is called fossiliferous iron ore; and spathic clay ironstone, an earthy or siliceous carbonate of iron, often called simply carbonate ore, which is characteristic of the coal formations. Here it is found in continuous strata, alternating with beds of coal and limestone or in irregular masses under shales or limestones (nodular and buhrstone ore), also loose in clays, as in tertiary formation in Md., etc. Its color varies from gray to brown, and its percentage of I. from 30 to 40, average 33, in Pa. 34. In Eng. clay predominates as impurity, in Amer. sand; always phosphates.

(6) **Black-band Ore.**—Clay ironstone with coaly matter in excess of 10 per cent.; becomes dark-brown or black and often shaly, resembling canal coal. It occurs in all coal-measures more or less, and is valuable, as it roasts or burns itself, thereby increasing the percentage of I. to 50 or more. It carries phosphorus and pyrites.

Franklinite is strictly an ore of zinc, found only in N. J., but, owing to its large percentage of manganese, used to make spiegel I. after extraction of the zinc.

Roasting improves all ores, but it is necessary for carbonates and any sulphurous ore. It removes water, carbonic acid and sulphur partly, and increases the I. and therefore the furnace yield. The loss of weight varies from 10 to 35 per cent., and coal-slag required to roast is 5 to 10 per cent. of the ore, except black bands.

DISTRIBUTION OF IRON ORES.—In Rus. the magnetic ores (of the Ural Mts.) furnish the most I., while in Swe. and Nor. they are substantially the only ores. Aus. has much magnetic ore in Hungary and the Banat, earthy red hematites in Bohemia, and vast deposits of spathic ore in Styria and Carinthia. Prus. (Ger. empire): in Silesia brown hematite and spathic clay ironstone with black band; in Prus. bog ore; in Westphalia black band and carbonate clay ironstone; in Rhénish Prus., Siegen, and Nassau, spathic ore proper with some specular, furnishing Krupp and the Ger. steel-works largely; in Sax. magnetic and specular ores, commonly siliceous, and some bog ore; W. of the Rhine coal-measure, carbonates are the prin. ores. Fr. is poor in I. ores; mines principally earthy-brown hematites with some earthy red hematite, but imports from Elba, Sp., and Algeria. Belg. smelts principally earthy-brown and oolitic red hematites, all quite lean, and imports largely. It has magnetic ore in the Alps and vast deposits of specular ore at Elba, but exports mostly. Algeria: great deposits of red hematite in Constantine. Spain: deposits of compact red hematite near Bilbao of great purity, and earthy and manganiferous red hematites in the S. very largely support the Bessemer steel trade of Eng. and the Continent. Most G. Brit. the argillaceous carbonates are by far the most important ores, fully $\frac{2}{3}$ of the entire product of the United Kingdom being made from them. They are worked in all coal-fields as clay band or black band (in Scot.) and in the Cleveland dist. Brown hematite is worked in the Forest of Dean and in Cornwall, where also a spathic deposit occurs at Perran. In Lancashire and Cumberland great deposits of red hematite support a large steel manufacture. Canada: the prin. ores worked here are magnetic, and in N. S. some red hematite and brown hematite.

U. S.: the magnetic ores supply fully $\frac{1}{3}$ the pig I., probably more; the specular ores perhaps nearly $\frac{1}{2}$, and all the other ores the rest, but constantly increasing in importance as new dists. are worked in the S. and W. Magnetic ores are principally worked on lakes Champlain and Superior, in N. J., at Cornwall, Pa. (red short), also somewhat in N. C. (Unaka Mts.). The prin. deposits of specular ore are vast ones on Lake Superior, also in Mo. and in Tenn., with extensive strata of fossil ore (red hematite) in W. N. Y. and in Mich. E. Pa. and Md. are rich in brown hematite in clay, but the great deposits of this ore lie in Va., Tenn., and Ala., in close proximity to coal. This ore in N. Y. Conn., and S. O. furnishes most of the charcoal car-wheel I. Spathic ore is principally mined on the Hudson River. A carbonate

ore (Triassic) occurs in nodules in clay on W. coast of Chesapeake Bay, but the carbonate ores amount to nothing in the anthracite measures, and to little in the bituminous except in O., where in the Hocking Valley region they are extensively worked. Bog ore is scarcely worked, as better I. is demanded, as the minimum, than it usually makes.

PURITY OF IRON ORES.—There are 2 kinds of impurity, one a mixture of sand or clay and the other a chemical impurity. All ores are so in the first sense, and are classed as argillaceous, silicious, and calcareous, being mixed with each other or limestone to best promote fusion and yield. Probably the average yield of all I. ores will not exceed 42 per cent., and the lowest economical limit is 20 per cent., when the ore can be enriched by roasting; at present in the U. S. about 33 per cent. is the lowest remunerative limit. As to the other class of impurities, the brown hematites and clay ironstones make the worst (*i. e.* cold-short) I., on account of phosphorus, though good for the foundry in mixture; magnetic and specular ores the purest I., with a tendency to red-shortness; the massive spathic ores make the best I. Red-short and cold-short ores "neutralize" each other by reducing the percentage of sulphur and phosphorus in the product below that of either.

ASSAYING. *Dry.*—The ore, mixed with charcoal and subjected in a crucible to a high heat, yields a button of I., which absorbs carbon, and therefore the result is somewhat high. *Wet.*—The ore is dissolved and I. reduced to ferrous state, when it is oxidized by a solution, usually bichromate of potash, of known strength by vol., until red prussiate of potash shows no ferrous oxide; the vol. used indicates percentage of I.

JOHN B. PEARSE.

Iron, Manufacture of. I. reduced from ore at a single operation is said to be made by the "direct process," but by the "indirect process" when converted from pig I. by any method.

The direct processes are all varieties of the *Catalan forge* or *blooming* and the *iron sponge* processes. The ores used are prepared by roasting and leaching (removing sulphur), and by stamping and mechanical separation of quartz, apatite, etc. The Catalan processes are used where ore is rich, charcoal cheap, and quality of product the main object, but they are wasteful. It requires very special care in the operator to make I.; he often does not know whether the product will be I. or steel. The difference is only very thorough oxidation for I. and a very mild one for steel.

The earliest bloomeries in Asia were simply holes in a mass of clay, with blast from a goat-skin bellows, the small lump of I. being got by breaking the clay. They were improved in Catalonia and Arriege. As used in the Pyrenees since 1293, they were about 2 ft. high, with a small conical hearth 11 inches deep flaring upward, and 2 tuyeres near its top. The lumps were 35 lbs. each, and 140 lbs. were made in 5 hours. In the 18th century a strong blast from the "trompe" increased the depth of hearth to 20 inches and the output to 300 lbs. in 5 hours. A rectangular hearth is now used in the Pyrenees, about 24 by 26 inches, with a tapping-hole at the bottom, and a tuyere 26 inches above it projecting 8 inches into the fire at an angle of 40°. The lining is slag and charcoal glazed at a high heat, and the ore, fed in coarse lumps on the side away from the tuyere, is reduced by the carbonic oxide from the charcoal fed on the back of the hearth. The slag is tapped every hour, and about every 6 hours a lump of 350 lbs. is pried out, hammered under a 1400-lb. helve hammer, and cut up into 3 pieces, which are reheated in the next operation. One ton of bar I. requires 3 tons of ore and 2½ to 3 tons of charcoal.

Later in Alsace the Gers. charged alternate layers of fine ore and charcoal, thus making the process more continuous and the product greater. This *German blooming* method has reached its highest development in the Adirondack region. They are distinguished by the use, since 1844, of hot blast to 550° F. The hearths average 32 inches square by 13 deep, with sides and bottom of cast-iron plates 2 to 3 inches thick; the fire is open at the front, the single tuyere is at the side, and the hot-blast oven lies over the fire. Slag is run out more or less frequently, according to the quality of metal desired, but the billets are usually steel with fine-grained fracture and largely used for remelting. The "lumps" are "dug up" every 3 hours and "shingled" under 1½ to 2-ton helve hammers. In 1 day, per fire, 8 heats and 2400 lbs. of blooms are made. For "billets" the lump is reheated and forged, but "slabs" for boiler-plate are finished at once. A ton of blooms requires 1½ tons dressed, or 2 to 4½ tons raw ore and 270 bushels or 2½ to 3 tons of charcoal.

The *sponge processes* aim at making comparatively pure I. by short methods of direct reduction by carbonic oxide and simple welding the product without having melted it in any stage. Chenot (1831) is the type of all, but they have hitherto all failed on account of excessive cost of reduction, great loss of I., and small product, except the plans of Siemens and Wilson. The latter is going over old ground with improved apparatus, using the blooming process; but Siemens has developed a new method with far greater product, intended as auxiliary to the open-hearth furnaces. He reduces the melted ore in a rotative furnace, with coal, to a mass of pure I. and cinder, brought out as a cylindrical bloom, which quickly dissolves in the bath of the open-hearth furnace. The Siemens-Anderson Steel Co. are now the exclusive users, at Tyrone, Pa., on brown hematite ore.

The indirect processes of making I. are worked in (a) the *finery forge*; (b) *puddling*, which includes refining and puddling proper, boiling, and rotary puddling; (c) *Bessemer process*; (d) *open-hearth process*. As early as the 16th century it was found best to make cast I. in a blast furnace, and then use it as a raw material for further conversion. It is well to use none grayer than No. 3, for the less carbon the easier the conversion.

In the finery forge, called here simply "forge," air burns out the carbon from pig I., the reverse of the blooming, in which charcoal burns out the oxygen of the ore. Both

kinds of hearths are alike, except in that the forge is shallower below the tuyeres—say 8 inches deep. One or two tuyeres are used, according to size of hearth, and the blast is sometimes hot, but usually cold. Most of the varieties of the process have disappeared, except the Lancashire or Walloon methods used in Wales, Swe., and substantially in Pa. Since 1840 almost the exclusive product of our forges has been slabs for best boiler-plate, of the Swe. forges bars of I. and steel for cast steel and wire, and of the Welsh forges tin-plate I.

In the Pa. forges about 230 lbs. of pig I. are melted, and then kept exposed to the blast by turning the tuyeres down on it and stirring it with a bar till the mass becomes pasty, when the heat is raised and the metal worked into a ball as free from cinder as possible. A forge works 13 hours a day, making 6 lumps or half a ton, or say 3 tons per week. With refined iron or scrap a forge makes 1 ton daily. A ton of slabs requires 0.9 ton charcoal and 24 cwt. pig I. In 1880 there were 36 forges, producing some 32,000 net tons.

In Swe. the warm blast to 220° is used, and the charge is 190 to 200 lbs.; the work is continuous for 6 days, producing 6 to 14 gross tons of blooms. The waste of I. is 13 per cent., and the charcoal required 1220 to 2064 lbs. per ton.

In Wales the I. is melted with coke in a melting finery, and 250 lbs. run into the charcoal finery. The blast is cold, and the I. becoming soon pasty is worked for 1½ hours, cinder being frequently tapped. A ball is then taken out, hammered, and broken into "stamps" of 26 lbs. each. These are piled on a porter bar; 80 lbs. are welded and forged into a bar 6 inches wide by 3 inches thick, which is deeply nicked in the middle, bent on itself and welded, thus making both outsides alike. The billet is then cut off the porter bar and rolled into plates. These are washed in dilute acid, then in alkali, and when bright and clean are dipped into melted tin for the coating. The first part of the process is mainly that used in the U. S. under the name *knobbing fire*.

Refining lessens subsequent waste by removing silicon, thus enabling the primary use of poor pig I. The *refinery* or *run-out fire* probably originated in the Eifel Mts. at Eislerfey, where for centuries pig I. has been refined (as *invented* by Kelly) in the hearth of the charcoal blast furnace by turning the tuyeres sharply down into the I. before tapping. The modern refinery is a rectangular box 42 by 66 inches and 12 to 18 inches deep, holding 1½ to 2 tons of I. The sides and one end are water-cooled I. blocks, while the bottom and the other end, where the I. is tapped, are refractory sand. Four to 6 water-tuyeres are used, and the I. is run in molten. It is covered with coke, and the blast burns out silicon largely, and carbon, with some sulphur with ebullition. The sufficiently refined I. is let into a long iron trough, where it cools and is broken up into plate I. A refinery makes 100 to 160 tons refined metal per week, with a loss of 10 per cent. recoverable from the cinder, and uses about 4 cwt. of coke per ton of melted I. supplied.

Puddling proper, or *dry puddling*, requires white I., usually made by refining. It was first effected on a sand-bed by Cort. As the heated I. crumbled into a sandy mass the flame oxidized the carbon, etc. with comparatively little working, but a waste of 7 to 10 per cent., no cinder being tapped and little made. S. B. Rogers designed a cast I. bed cooled by air, which increased the product from 8 tons to 20 or 24 tons per week.

Boiling, or *wet puddling*, was introduced by Hall. It consists in charging gray forge pig I. with puddle or roll cinder, which melts into a liquid bath, the protoxide of I. in which becomes the vehicle to transfer oxygen from the flame to the carbon, etc. of the I. The furnace used, except for rotary puddling, is such as to have a working chamber 60 inches long by 48 inches by 20 to 24 high, with an area of bed about 20 square ft., and a grate area of 7 to 10 square ft., according to quality of coal. An arched roof sloping downward from over the grate to the flue "reverberates" the flame upon the bed. The flue lies very low, with an area ½ that of the grate, and passes into a stack about 20 inches square in clear and 40 ft. high, with a damper. The draught is usually forced by a fan. The bottom of working chamber is of I. plates 3 inches thick covered by a layer of cinder fused on at a high heat, and the sides, lined with ore, are repaired every day. A door about 20 inches square, at the middle of one side, is made for charging, with a "stopper hole" or notch, for the rabble, on its lower edge. A boiler over the furnace utilizes waste heat.

A charge of 500 to 600 lbs. pig I. with 100 lbs. cinder is melted at a high heat, then slightly chilled with fresh scale or water, that the I. and cinder may be well mixed, and then the heat raised again with an oxidizing flame. The oxides in the cinder reacting on the carbon, etc. keep the bath *boiling* until bright white spots of I. appear and the cinder seems to sink away. The I. sponge thus "brought to nature" is broken up under a reducing-flame, thoroughly worked with the rabble, and finally made into 6 balls, partially freed from cinder by squeezing with the rabble. These are taken to a squeezer or hammer for thorough consolidation and welding, and usually put at once, without reheating, through a train of rolls to be rolled into flat *muck* or *puddle bar*, ¾ to 1 inch thick and 3 to 6 inches wide.

Boiling is preferred for good I., and in the U. S. puddling is seldom done. With gray-forge pig I. 6 heats of 480 lbs. are boiled in 12 hours, but with ½ refined I. in the charge, 7 heats of 540 lbs. are made in the same time. An average of 2436 lbs. pig and 2548 lbs. refined I. boil into 2240 lbs. of muck bars, with 4 to 12 per cent. waste and ¾ to 1½ tons of coal. In Wales a single furnace makes 8 heats daily, or 18 tons per week, and a double furnace 36 tons. Puddling dry requires 2300 to 2400 lbs. refined I. to 2240 lbs. of bars. A single furnace averages in Wales about 23 tons per week, with ½ to ¾ ton of coal per ton.

Rotary puddling is the only successful method of avoiding the extremely severe labor involved in working the charge. As best carried out in the Banks furnace, the bed

is the interior of a cylinder, rotating on its horizontal axis, lined with powdered I. ore and pure lime, and surrounded by a water-jacket to keep the lining cool. A charge of melted refined metal of about 1600 lbs. is puddled in 35 minutes, or a ton in 40 minutes, with a product of 50 to 85 tons per week; 1000 lbs. coal and 1000 lbs. ore are used per ton of muck bars, with no waste of I. The method is now comparatively little used, owing to expense of repairs and great size of the balls and consequent great first cost of plant; but as a worker of metals the Danks furnace has no equal, and 9 furnaces belonging to Graff, Bennett & Co. made in single turn, during 37 days, 194 heats or 755 gross tons of muck bars, doubling the product of the puddling furnace.

Open-hearth and Bessemer Iron.—We have described above "weld I." in its ordinary forms containing cinder and oxide of I. The cinder may be so thoroughly worked out in good brands as to be invisible, and practically absent. But it may also be removed by melting, though never perfectly, oxide of I. remaining persistently. The product of melting is called "ingot I.," a term generally adopted in connection with those of weld I., weld steel, and ingot steel, to distinguish the classes of products made of late yrs. In 1800 Mushet melted "I. per se" in the crucible, but it has been done on the large scale in the open-hearth furnace since 1869, and in the Bessemer converter since 1875. About the latter date the successful manufacture of ferro-manganese enabled the destruction of oxide of I. in the metal without introducing much carbon, and Bessemer I. has since been made with 0.12 per cent. carbon for wire, and homogeneous metal for boiler-plate, etc., with even less carbon. Neither has any of the properties or uses of steel of any kind, and the homo-metal is rejected, if it harden, as it would endanger life if used for a boiler-plate.

Merchant iron and forgings are the result of piling and re-welding the products described above (by the rolling-mill and steam hammer), with the object of attaining uniform structure, a clean surface, or a mass, like a rail, having different properties in different parts. Fig. 1 is a good Amer. rail pile, the top bar rolled thrice, the rest twice. Fig. 2 is average Amer., the top and bottom bars twice rolled; those next them of old rails and the rest muck bars. The average reduction of area is about 10 in the pile to 1 in the rail, as shown in the centre of Fig. 1.

Beams are similarly made, but from their large size the shape of pile must follow more or less that of the product, as in Figs. 3 and 4, where 4 is the "Phoenix" pile for the beam 3.

For bar I. muck bars about $\frac{3}{4}$ inch thick and $\frac{3}{4}$ inches wide are cut into 4 ft. or 5 ft. lengths, piled 5 to 7 layers thick, brought to welding heat in a heating furnace, and rolled in a small train into bars, to be sold as "best refined" I. or flats to pile for repeated rolling. Angle I., T I., rounds, squares, octagon, and fancy shapes are all thus made of best refined grade. Finer grades in this country have special brands. The more I. is rolled up to the 6th re-rolling, the more fibrous, homogeneous, and free from cinder it becomes; hammering has the same effect, but occasions a more granular structure.

JOHN B. PEARSE.

Iron, History of. The Scripts. ascribe the discovery of working I. to Tubal Cain, while Egyptian tradition credits it to Hephaestus, the king preceding Osiris, possibly identical with Tubal Cain. The Egyptians made I. in the dist. between the Nile and the Red Sea, but mostly imported it from Assyria, where it was very freely used. The Chalybes of Pontus hardened I. for tools, and used coal. Aristotle said (322 B. C.) their I. was made from iron-sand put into the furnace with coal. The Romans got I. from G. Brit. (A. D. 25, Strabo), but mostly from Noricum, now Styria.

In 55 B. C. the Britons exported I. to the Continent in their own ships. The Romans, A. D. 120, had a great forge at Bath supplied from the Forest of Dean. In 1355 the export of I. was stopped, and in 1483 of forms made in Eng. was forbidden. Before 1756 wood was so scarce that I. was sought in N. Amer. In 1616 Dud Dudley succeeded in using coke; Darby used it regularly in 1735. Cort's rolls in 1784 made 15 tons of bars in 12 hours, in which time the hammers made 1 ton of $\frac{3}{4}$ -inch square bars. His puddling furnaces made 5 tons a week. By using hot blast Neilson made 2.65 tons raw coal replace 8.5 tons coked coal to 1 ton of I. At Ynescedwin by hot blast, anthracite could be used alone for short intervals. Steel has been made in bloomeries from time immemorial, and in finery forges as Ger. or natural steel; afterward I. converted into "blister steel" was welded up into "shear steel." Huntsman in 1740 melted blister steel, in pots, into best cast steel. Heath used poorer material, in 1836, by introducing not more than 3 per cent. carburet of manganese. By the use of manganese puddled steel was made by Riepe in 1850. In 1856 the process known as Bessemer's was perfected by Mushet, Kelly (U. S. 1856) having approximated it in the blast furnace, making pig blooms. The Siemens regenerative furnaces melted steel, and even I., and Martin introduced, in 1866, mild steel so made. The recent removal of phosphorus by using "basic" linings of lime, etc. affords the prospect of cheaper as well as perhaps better steel from ordinary pig I. formerly inapplicable.

The first I. in Amer. was made in Va. in 1622, on the James River. In 1724 Spotswood, Washington, and others built charcoal blast furnaces and exported pig I. to Bristol,

Eng., at a cost of £3 to £4, selling at £6 per ton. In Md. much bar I. was made, beginning at Principio 1717, to be sold in Eng. at £10 to £16 per ton. In Mass. there was an "iron-mill" at Lynn in 1631, a blast furnace at Hamersmith in 1644, a forge at Braintree in 1646, and bar I. was sold at about £20 per ton. Jenks cast I. pots at Raynham in 1646, and made our first saws in 1652. Bar I. cost in 1727 about £12 10s. per ton. In 1702 the first charcoal furnace was built in Plymouth to work 25 per cent. bog ore into hollow-ware, at a cost of \$49.77 per ton. In Conn. a furnace at New Haven used Eng. ore in 1637, and G. Eliot made blister steel before 1750. In New York the first works were at Stirling, in 1751, where the 186-ton chain to bar the Hudson was made in 1778. In N. J. Col. Morris built a bloomery in Monmouth co. in 1685, but Hasenclever and his London Co. did most for the trade, beginning at Ringwood in 1762. In Pa. the first forges were those of Hall, Nutt, and Rutter on the Schuylkill in 1717, and the first furnace was built on the Christina River in 1726 by Sir W. Keith. The Pa. trade was distinguished by the use of "finery" forges; 9 of them and 10 furnaces were built before 1750. The forges made 60 tons yearly, the furnaces 20 to 25 tons a week, stopping in summer. Between 1717 and 1770 the colonies exported about 150,000 tons pig and bar I. to Eng., most of it before 1750, when the making of bar I. and steel was absolutely prohibited, by Parl., as a common nuisance.

Coke was first used here in the blast furnace by Oliphant, at Fayette, Pa., in 1836; anthracite at Mauch Chunk in 1839, by Baughman, Giteau & Co., and raw coal by Wilkeson & Co. at Mahoning in 1846. Before 1840 our forges had almost ceased to make bar I., and had been superseded for common grades by the puddling furnace, which in its turn has been superseded, for rails, by the Bessemer converter.

The modern hist. of the I. trade thus resolves itself into various epochs: (1) The perfection of mechanical art to enable blast furnaces to be used, 1580 to 1621. (2) The gen. use of coke as fuel, 1735-50; and the use of cast-I. blast cylinders, 1760. (3) Application of steam-engine in I.-works first to blowing-engines, 1769. (4) Inventions of rolling and puddling by Cort, 1783-84. (5) Use of hot blast and application of waste gases, 1828-36. (6) Economy of fuel by improved apparatus and processes, and perfection of works, engineering, 1856 to present time; extended use of steel.

Iron, Statistics of. The invariable trade custom is to deal in gross tons. The product of G. Brit. may be summed up as follows for 141 yrs., in gross tons:

PIG IRON.

Year.	Charcoal.		Coke.		Raw coal.		Total, gross tons.
	No. furnaces.	Tons.	No. furnaces.	Gross tons.	No. furnaces.	Gross tons.	
1740	59	17,350					17,350
1788	26	14,500	59	55,200			69,700
1796			121	125,079			125,079
1806	11	7,800	222	250,406			258,206
1823			259	442,066			442,066
1830			370	678,417			678,417
1839	2	800	323	1,051,021	54	196,960	1,247,981
1847			493	1,459,640	130	539,968	1,999,608
1852			511	2,026,000	144	775,000	2,801,000
1854			568	2,673,234	156	796,604	3,469,838
1857			*504	2,741,447	*124	918,000	3,659,447
1873	*1	ca. 700	*557	5,572,751	*123	993,000	6,566,451
1879			*400	5,063,337	*963	932,000	5,995,337

* "In blast;" previous figures meaning "total furnaces."

U. S. statistics of I. manufacture, in gross tons:

In 1810.		
153 charcoal furnaces—pig iron	53,908 tons.	
330 bloomeries and forges—bar iron	24,541 "	
34 rolling and slitting mills—nails, rods, etc.	6,500 "	
In 1830.		
202 charcoal furnaces—pig iron	183,343 tons.	
Bar iron (including 3533 tons "bloomed" from ore)	112,366 "	
14 steel-works—steel, all kinds	1,600 "	
In 1840.		
450 furnaces (av. product, 772 tons ea.)—pig iron	347,700 tons.	
797 bloomeries, forges, and rolling-mills—bar, rod, etc.	197,233 "	
In 1845.		
523 charcoal furnaces—pig iron	441,000 tons.	
17 anthracite " "	45,000 "	
954 bloomeries, forges, rolling and slit- bar, plate, etc.	291,600 "	
ting mills " " blooms	30,000 "	
In 1849.		
303 charcoal furnaces—pig iron	379,624 tons.	
57 anthracite " "	151,331 "	
7 raw coal " "	7,800 "	
10 coke " (estimated)	25,000 "	
552 bloomeries, forges, and rolling-mills—bar iron	278,044 "	
In 1856.		
416 charcoal furnaces—pig iron	347,954 tons.	
121 anthracite " "	396,509 "	
19 raw coal " "	25,073 "	
24 coke " "	44,481 "	
204 bloomeries—iron and steel	38,633 "	
189 forges—iron	53,244 "	
209 rolling-mills—iron	498,081 "	
10 steel-works—steel	7,230 "	
In 1873.		
287 charcoal furnaces—pig iron	515,237 tons.	
208 anthracite " "	210,228 "	
56 raw coal " "	264,641 "	
111 coke " "	568,597 "	
37 bloomeries " iron and steel	65,807 "	
339 rolling-mills—iron	1,638,957 "	
51 steel-works, crucible, etc.—steel	44,600 "	
10 Bessemer works—steel	140,044 "	

In 1880—U. S. Census.

29 charcoal furnaces—pig iron.....	388,384 tons.
2 2 anthracite.....	1,630,818 "
56 raw coal.....	33,497 "
230 coke.....	1,019,250 "
Castings direct.....	8,775 "
Total pig iron.....	3,375,694 "
188 bloomeries (from ore)—iron and steel.....	35,000 "
118 forges (from iron)—iron.....	31,182 "
324 rolling mills (from iron)—iron.....	2,101,098 "
27 machine steel works (2001 not holes)—steel.....	67,209 "
10 Bessemer works (24 vessels)—iron and steel.....	1794,550 "
26 open hearth works (25 o. h. furnaces including those at Bessemer works)—iron and steel.....	785,062 "

* Of this, 416,890 tons were rails. † 663,031 tons rails. ‡ 8129 tons rails.

The Amer. Iron and Steel Association stated that for the same period the production of pig I. was 3,831,500 gross tons, an excess of 13½ per cent.; and that the production of Bessemer steel for same period was 1,073,331 gross tons, of which 818,492 gross tons were rails, an excess of 35 per cent. Both sets of figures were reported by the sec. of the Amer. I. and S. Association, but those for the census under a law insuring accurate reports.

In connection with the statistics of I., 2 very striking facts appear. First: that the cost of I. consists almost entirely of wages paid for labor. A ton of pig I. requires 10 to 13 days' labor of one man. Second: that the quantities of raw materials used are so great that the I. trade requires more transportation than any other industry. It is estimated that in 1874 the I. trade freight of this country amounted to about 37½ out of a total of 175 million tons moved over all our R. Rs., or more than 21½ per cent. More than ½ of all coal mined in the U. S. is required for the manufacture of I. and steel.

JOHN B. PEARSE.

Iron, Medicinal Uses of. Iron is an important ingredient of the substance of the red blood-corpuscles, and its administration in some unknown way directly induces an increased formation of these bodies. In health this effect takes place only to a limited extent, but in the morbid condition known as *anæmia*, where from any cause the blood is unnaturally poor in red corpuscles, this action of iron is more striking, and the normal proportion of these elements is often rapidly restored by its influence.

Ironclads. See SHIPS, IRON-CLAD OR ARMORED.

Iron Crown, the anc. diadem of the Lombard kings, is a jewelled circlet of gold, containing a fillet of iron said to have been made of one of the nails of the true cross, presented by Pope Gregory I. to Theodelinda, wife of King Anthario, in 590. It was used at the coronation of Charlemagne and of many others, among whom was Nap. I.

Iron Mask, The Man with the, a mysterious prisoner of state who was in 1679 confined by the Fr. govt. at Pignerol in Savoy; was removed in 1681 to Exilles; in 1687, to the island Ste. Marguerite in the Mediterranean; in 1698, to the Bastille, in which he d. Nov. 19, 1703. He always wore a mask of black velvet. His identity is unknown.

Iron Mountain, Mich. See APPENDIX.

Iron Mountain, or Iron Mount, on R. R., St. Francois co., Missouri, 81 m. S. W. from St. Louis. Here is the famous Iron Mountain, 228 ft. high and covering 500 acres. It consists chiefly of an iron ore which yields 55 or 60 per cent. of excellent iron. Pop. 1870, 2018; 1880, 1243.

Ironton, city and R. R. junc., cap. of Lawrence co., O., on O. River, 140 m. above Cin. It is the centre of "Hanging Rock Iron region." Pop. 1870, 5686; 1880, 8857.

Iron-wood, a name in the U. S. of the 2 species of hornbeam. The I.-W. of commerce is from *Metrosideros vera*, a myrtle of E. Asia. *Sideroxylon pallida* is found in Fla.

Irrawaddi, river of Farther India, rises in Thibet, and flows, after a course of about 1200 m., into the Bay of Bengal. In lat. 17° N. it separates, and between its E. branch, the Rangoon, and its W. branch, the Bassain, it forms a delta intersected in all directions by its minor branches, comprising an area of 10,000 sq. m., covered with forests and jungles. It is navigable for vessels of 200 tons 400 m.

Irrigation. Irrigating canals are usually derived from rivers. The water is raised to the required level by a weir or dam, and the head of the canal is placed above the dam. Where the ground to be irrigated is little above the level of the water in adjacent portions of the rivers, the problem is solved at much less expense than where the river flows along the lowest line of the valley, and the adjacent lands rise from the river-banks on either side. In this latter case it is necessary to fix the head of the canal at a considerable distance above the land to be irrigated, and consequently a line of canal, often making many miles, must be made to bring the water out on the level of the ground.

The quantity of water required for any given area will depend upon the amount of rainfall in the irrigated dist., and upon its distribution, both as to quantity and as to time; upon the temperature in the growing season; the kind of cultivation; and finally upon the character of the soil, whether retentive of moisture or sandy and easily drained. One cubic ft. of water each second for 24 hours will cover 4 acres with a trifle less than 6 inches of water, and supplied for 100 days it will cover 400 acres with 6 inches, or 200 acres with 12 inches of water. In Cal. 12 inches of rain, with timely application, suffice to insure a crop of cereals.

Having determined the capacity of the canal, which should exceed by 15 or 20 per cent. the estimate for I., in order to make up for loss by absorption, evaporation, and waste, we may proceed to determine its dimensions and the slope of its bed. Many irrigating canals are arranged for navigation. New conditions, more or less incompatible with those pertaining to mere irrigating canals, are thereby introduced. In particular cases the conflicting conditions of I. and of navigation are measurably harmonized. The velocity of the water ought not to be so great as to cause erosion of the bed and banks of the canal, and it ought to be great

enough to prevent the growth of water-plants, which interfere with the service of the canal. A stiff clay soil will stand under a mean velocity of as much as 4 ft. per second, and where the bed is of shingle, a higher velocity may be permitted with safety. In a light sandy soil 3 ft. per second is a maximum velocity. If the water is laden with earthy particles in suspension, deposits will occur unless the initial velocity is maintained. If the silt is of a fertilizing character, it is desirable that it be transported to the cultivated fields. When it is deposited along the line of the canal, periodical closures become necessary to effect clearance.

The natural drainage of the country should remain unimpaired. Even when this much is accomplished, stagnant water is very liable to result from irrigating operations. The waste water at the end of the canal or in the minor channels should have free passage into the natural drains, or if none such exist, artificial drainage should be provided. For economy of construction the canal should be partly within and partly above the soil, and for facility of I. this arrangement is equally desirable.

In *J.'s Univ. Cyc.* a detailed description is given of the system pursued in irrigating the plains of the San Joaquin valley in Cal. Its essential features are that the water passes from the main canal into primary ditches, from which it is delivered into secondary ditches, which in turn pass it into irrigating furrows, which are its immediate dispensers to the land; and finally, having done its duty, it is conveyed away by a drain to irrigate again below, or else it escapes into the natural drainage-lines. The main canal in this case has a fall of 1 ft. to the m., while the fall of the primary ditches is 8 ft., and of the secondary ditches from 3 to 5 ft. to the m. The primary ditches are 1 m., and the secondary ditches ¼ m. apart. The irrigating furrows are 40 yards apart. The primary ditches, when full, will carry 50 ft. per second, and 1 primary ditch will supply 3 secondary ditches. Each secondary ditch waters 80 acres, in which there are about 5 m. of furrows and 4 m. of checks.

I. has been little practised in the U. S., but it has had more development in the sections of Amer. which were once under the dominion of Sp. It., Sp., Egypt, and India present extensive operations of this nature. The Eng. have been extending irrigating facilities in India for the past few yrs. on a grand scale. The arrangements of the native inhabs., which have existed for centuries, are also extensive.

The increase of production which results from I. in warm climates, where the rainfall is insufficient to produce a crop, is quite sufficient to justify the large expenditure which is required to put the system into operation. It is estimated that the canals and primary ditches, including dams, head-works, and all necessary arrangements, excepting the secondary and other minor ditches, can be constructed on the plains of Cal. for from \$10 to \$20 per acre. It must be borne in mind, however, that the features of the country are in gen. extremely favorable. The minor ditches, it is estimated, may cost from \$5 to \$10 per acre, which makes the total probable outlay to vary between \$15 and \$30 per acre. The simplicity of the irrigating system which is practicable on the plains of Cal. is in strong contrast to the intricacies which have been developed in It.; but space is wanting for the development of these, and its practical value in our own country is doubtful. [From orig. art. in *J.'s Univ. Cyc.*, by COL. G. H. MENDELL.]

Ir'tish, river of N. Asia, rises in the Altai Mts., in lat. 47° N., lon. 89° E., flows N. W. through the Chi. prov. of Songaria and the Rus. govts. of Tomsk and Tobolsk till it joins the Obi, after a course of about 1700 m., 180 m. N. of Tobolsk. Its navigation is much impeded by shoals and shifting sand-bars.

Irvine (WILLIAM), b. at Fermanagh, Ire., Nov. 3, 1741, studied at Dublin Univ.; became surgeon of a Brit. ship; came to Amer. and settled at Carlisle, Pa.; was a member of the provincial convention of Pa. in 1774; appointed col. of the Pa. line in Jan. 1776; was taken prisoner in June of that yr., and paroled, but not exchanged until May 1778; was a member of the court-martial for the trial of Gen. Charles Lee in 1778; appointed brig.-gen. in 1779; in 1781 took command of the defences of the N. W. frontier; was State com. for the distribution of public lands to the soldiers 1785; member of old Cong. 1786-88, and of Federal Cong. 1793-95; took part in the campaign against the insurgents in the "Whiskey Insurrection" in 1794; supt. of military stores at Phila. 1801, and pres. of the State Society of the Cincinnati. D. July 29, 1804.

Irving (REV. EDWARD), b. at Annan, Scot., Aug. 4, 1792, grad. at the Univ. of Edinburgh; in 1822 went to Lond. as minister of a Presb. chapel, and became famous as a pulpit orator; devoted himself to the study of prophecy, and about 1831 came to hold a belief in the speaking of "unknown tongues"; was dismissed from his charge, but some of his congregation adhered to him. His followers style themselves the "Catholic Apostolic Church," and are sometimes called Irvingites. D. Dec. 8, 1834.

Irving (PETER), M. D., b. in New York Oct. 30, 1771; studied med., but never practised; founded in 1802 the *Morning Chronicle*, a Dem. paper which advocated the presidential candidacy of Aaron Burr; travelled in Europe 1806-08; aided his brother Washington in the earliest part of the *Knickerbocker*; resided in Europe 1809-36; pub. a novel, *Giovanni Shogarro*. D. June 27, 1838.

Irving (REV. THEODORE), LL.D., nephew of Washington Irving, b. in New York in 1809, grad. at Columbia Coll. 1837; studied law and lit. in Europe; was prof. of hist. and belles-lettres in Geneva Coll. 1839-39, and afterward in the New York Free Acad.; in 1854 took orders in the P. E. Ch. Wrote *The Fountain of Living Waters*. D. Dec. 20, 1880.

Irving (WASHINGTON), LL.D., b. in New York Apr. 3, 1783. His school education was not protracted beyond his 16th yr., when he began to study law. In 1802 he printed in the *Morning Chronicle*, then edited by his brother, a series of local sketches under the *nom de plume* of "Jonathan Old-

style." In 1804 he sailed for Europe, and travelled through Fr., It., Switz., Hol., and Eng. Returning to New York in Mar. 1806, he completed his legal studies, and was admitted to the bar, but never practised. Early in 1807 he commenced, in connection with his brother William and James K. Paulding, the serial *Salmagundi*, which had an immediate success. In 1808, with some assistance from his brother Peter, he wrote *Knickerbocker's Hist. of New York*, and in 1810 a biography of the poet Campbell, prefixed to an Amer. ed. of his works. He was much absorbed at this time by a mercantile business in which he engaged with 2 of his brothers. In 1813-14 he reappeared in lit. as ed. of the *Analectic Magazine*, pub. at Phila. Early in 1815, upon the conclusion of the war with G. Brit., he hastened to make another tour in Eng., Wales, and Scot., which proved to be an absence of 17 yrs. from Amer. About the close of 1817 the commercial house in which he was a partner failed, and he was thrown upon his pen for a subsistence. He sent the essays composing the *Sketch-Book* to New York, where they were printed in pamphlets in 1818, over the signature of "Geoffrey Crayon." The *Sketch-Book* laid the foundation of the permanent fame of I.; the legends of *Sleepy Hollow* and *Rip Van Winkle* at once took rank as modern classics. *Bracebridge Hall* (1823) brought the author £1000; *Tales of a Traveller* (1824) brought him £1500. In 1825 his attention was called to Navarrete's collection of documents upon Columbus and the early explorers of Amer., then appearing at Madrid. He proceeded to that cap., intending to make a translation of the work of Navarrete, but changed his plan and produced his *Hist. of the Life and Voyages of Christopher Columbus* (1828), to which was added (1831) its continuation, the *Companions of Columbus*. For the former work he was paid 3000 guineas for the copyright, and a gold medal of 50 guineas was awarded him as a prize given by George IV. for excellence in historical composition. In 1828-29 I. travelled through the S. of Sp. and in the latter yr. pub. the *Conquest of Granada*, and in 1832 *The Alhambra*. I. returned in July 1829 to Lond., having received the appointment of sec. of legation in Eng. In 1831 the Univ. of Ox. conferred upon him the degree of LL.D. In 1832, after 17 yrs.' absence, he returned to his native land. The same yr. he accompanied Com. Ellsworth in his journey for removing the Indian tribes to the W. of the Miss., and narrated his observations in his *Tour on the Prairies* (1835), pub. in the series called the *Crayon Miscellany*; to which were added in another vol. *Abbotsford and Newstead Abbey*. In 1836 he wrote *Astoria*, a narrative of the exploration of Or.; in 1837 the *Adventures of Capt. Bonneville*; and in 1839-41 contributed to the *Knickerbocker Magazine* a series of articles afterward pub. (1855) in the vol. entitled *Walter's Roast*. In 1842 I. received the appointment of minister to Sp., a post which he filled for 4 yrs. In 1849 he reprinted with large additions a biography of Oliver Goldsmith. In 1850 he pub. *Mahomet and his Successors*. He was thenceforth occupied upon the *Life of Washington*, of which the first vol. appeared in 1855, and the fifth, concluding the work, in Aug. 1859. I. resided during the closing yrs. of his life at Sunnyside (Tarrytown) on the Hudson. He was never married. D. Nov. 28, 1859. PORTER C. BLISS.

Irving (William), b. in New York Aug. 15, 1766, was brother of Washington Irving; became an Indian trader on the Mohawk from 1787 to 1791. In 1793 he married a sister of James K. Paulding and settled in New York as a merchant. His contributions to *Salmagundi* would, if separately pub., have given him a distinct place among Amer. humorous writers. He was M. C. 1813-19. D. Nov. 9, 1821.

Irvingites. See IRVING (EDWARD).

Irvington, N. Y. See APPENDIX.

Irwin, Pa. See APPENDIX.

Irwin (Jared), b. in Mecklenburg co., N. C., in 1750; moved with his parents when a boy to Burke co., Ga.; took an active part in the cause of independence during the Revolutionary war; was a member of the first legislature of Ga. after independence was achieved; a member of the State convention which ratified the U. S. const. of 1787; gov. of the State 1796-98, and again 1806-09, and pres. of the State convention that formed the const. of 1798. It was his honor as gov. in 1796 to sign the act abrogating the famous Yazoo fraud, which had been perpetrated by a previous corrupt legislature. D. Mar. 1, 1818.

Isaac, יִצְחָק [Heb. "laughter"], son of Abraham, b. 2063 B. C., in the extreme old age of both his parents. He was brought by his father as a sacrifice to Mt. Moriah, in obedience to the divine command, but his life was spared in consequence of a heavenly interposition. When 40 yrs. of age he married Rebekah, who bore him twin sons, Esau (or Edom) and Jacob (afterward called Israel). The former was the first-born and the favorite of his father, but Jacob, by the aid of his mother, obtained the birthright. D. 1883 B. C.

Isaac I., Comnenus, a Byzantine emp., descended from the family of Comnenus, but was ed. by the emp. Basil II., and raised to the throne in 1057 by a conspiracy. Being prostrated by a violent fever, he abdicated in 1059, and retired to a monastery. D. 1061.

Isaac II., Angelus, a Byzantine emp., descended from the family of Comnenus, and was raised to the throne by a revolution in 1185. In 1195 his brother, Alexis III., compelled him to abdicate, and deprived him of his sight, but in 1203 the crusaders once more placed him on the imperial throne, whence he again was driven in 1204 by Alexis Duca, who put him to death.

Isaac Levi'ta, b. at Wetzlar, Ger., in 1515; became a Jewish rabbi; joined the R. Cath. Ch. in 1546; became prof. of Heb. and Chaldee at Louvain, and in 1551 took the corresponding chair at Cologne. Author of *Defensio Veritatis Hebraeae Sacrarum Scripturarum Introductio* to the Hebrew *Gram.*, etc. Date of death unknown.

Isabel'ta I., THE CATHOLIC [Sp. *Isabel*], b. at Madrigal, Old Castile, Apr. 22, 1451, daughter of John II., king of Castile. She was married to Ferdinand of Aragon Oct. 19, 1469. Her brother, Henry IV., dying soon after, I. was pro-

claimed queen of Castile Dec. 13, 1474. Ferdinand, who had received the honorary title of king of Castile, succeeded to the throne of Aragon as Ferdinand V. In Jan. 1479, thus effecting a virtual union between the 2 prin. states of the Iberian peninsula, which was consolidated in the succeeding reign of Charles V., and laid the foundation of modern Sp. hist. One of the earliest acts of the reign of I. was the establishment of the Inquisition in Castile (Jan. 2, 1481); in the same yr. commenced the war with the Moors of Granada which ended by the extinction of their sovereignty in 1492. On this occasion Ferdinand and I. received from the pope the title of "Catholic sovereigns." Beside the establishment of the Inquisition, another dark stain rests upon the memory of I.—the expulsion of the Jews from Castile. I.'s chief title to fame rests upon the well known part she took in promoting the great project of Columbus, and in the New World, at least, her memory will be immortal. D. Nov. 26, 1504. (See Prescott's *Hist. of the Reign of Ferdinand and Isabella the Catholic*.)

Isabella II., Luisa, of Sp., b. at Madrid Oct. 10, 1830, succeeded her father, Ferdinand VII., in 1833, under the guardianship of her mother. In 1843 she was declared of age; married her cousin, Don Francisco, in 1846, and after a reign disturbed by many violent revolutions was deposed in 1868, and in 1870 abdicated in favor of her son, who in 1875 succeeded as Alfonso XII. I. was very unpopular in Sp.

Is'abey (JEAN BAPTISTE), b. at Nancy Apr. 11, 1767; d. Apr. 18, 1855; studied under David, but made the painting of portraits a profession; was a favorite of the Nap. I. and court-painter. The marshals, princes, and dignitaries of the First Empire, with the chief personages of Europe, sat to him. The pieces in which many personages are grouped together, as *Tableau des Marshals* and *Conference at Vienna*, almost rise to the dignity of historical painting.

Is'arus, b. at Chalcis in Gr., flourished in the first half of the 4th century B. C.; went to Athens, composed orations, and founded a school of rhetoric, in which Demosthenes is said to have been a pupil. He was one of the so called 10 Artic orators; 64 orations were ascribed to him.

Isaiah, יִשְׁעָיָה [Heb. *Yeshayah*, "saved by the Lord"], the Esalas of the N. T., one of the prin. or greater prophets of the Hebs.; received his prophetic calling in the yr. in which King Uzziah d. (759); lived at least until after the invasion of Judah by Sennacherib. He was married and had children. During his lifetime he pronounced the word of Jehovah on every important occasion. He was the greatest of all the prophets for the vigor of his eloquence and the strength of his faith. His divine oracles being despised, he reduced them to writing, as probably Hosea, Joel, and Amos had already done. Primarily, they were discourses adapted for immediate and popular effect. Prediction appears in them only as a warning of consequences, a promise of the favor of God and a secure and happy future if, or when, the true kingdom of righteousness should be established.

Ischia. See APPENDIX.

Is'h'mael, son of Abraham and Hagar, the Egyptian handmaid of Sarah, was expelled, together with his mother, from his home when Sarah gave birth to Isaac. The Bedouin tribes of N. Ar. are said to descend from I.

Ishpeming, city and R. R. Junc., Marquette co., Mich., 16 m. W. of Marquette. It has extensive quarries and excellent iron ore. Pop. 1880, 6309.

Is'idore of Charax, a native of Charax on the Tigris, was a distinguished geog. of the 1st century A. D. His *Purthian Itinerary* is an important source of information upon Asiatic geog.

Isidore of Seville, or **Isidorus Hispalensis**, b. at Cartagena between 560 and 570; was appointed bp. of Seville about 600. He established schools, and harmonized the moral and doctrinal system of Christianity with the insts. of the various races which at that time composed the Hispano-Gothic kingdom. He presided over the second Council of Seville (619), and over the Council of Toledo (633). His works form an encyclopædia of the knowledge of his time. D. Apr. 4, 636.

Isinglass, a gelatine prepared from the swim-bladder of sturgeons and other fish. It is used in preparing jellies, confections, etc., in fining wines and liquors, as a test for tannic acid, as an ingredient in court-plaster, as a size for delicate fabrics, etc.

Is'is, an Egyptian goddess named Hes, daughter of Seb or Cronos, and Nut or Rhea, sister and wife of Osiris, and locally one of the tetrad of Abydos, which consisted of Osiris, Isis, her sister Nephthys, and Horus. During the absence of Osiris from his kingdom she ruled over the state. After the murder of Osiris by Typhon on the 17th of the month Athor, in the 28th yr. of his reign, I. was informed of the death of Osiris, and cut off one of the locks of her hair. She also searched for Anubis, the god of embalming, the son of Osiris and Nephthys. The chest in which the corpse of Osiris was inclosed was carried to Byblos and lodged in the branches of a tamarisk tree, in which perched the phoenix (*benax*), the soul of Osiris. The king of Byblos had made the trunk of the tree into a pillar of his house. Ingratiating herself with the queen's women, whose hair she plaited, and subsequently engaged by the queen as wet-nurse for the king's son, she suckled the boy with her finger, and laid him on burning coals to make him immortal, while she herself, transformed into a swallow, hovered round the pillar, and when her proceedings were discovered, obtained it by request from the monarch. Opening the trunk, she took it with her into the desert, and opening the lid threw herself in grief on the dead body of her husband; and when the king's son approached her she turned round and killed him with a glance. Returning to her son Horus, she left the chest at the city of Butus in an unfrequented place, where, however, it was discovered by Typhon in the moonlight, who tore the body into 14 or 26 pieces, and scattered them about, apparently in the river. These I. collected, apparently from the river, upon which she went for the purpose,

and found all except one piece, which had been devoured by the oxyrhynchus fish. In the war which ensued between Horus and Typhon at Kar (or the Egyptian Babylon) on the 6th of the month Thoth, and which endured for 3 days and nights, the gods changing during the battle from the human to animal forms, I. chained both combatants. Subsequently she liberated Set or Typhon from his chains, and Horus, enraged at this act, cut off the head of I., which Thoth subsequently replaced by the head of a cow. She appears as goddess of the lower world, for Rhampsinitus (Rameses III.) descended to Hades and played at draughts with her, winning a golden napkin, with which he returned to earth. *From orig. art. in J.'s Tric. Cyclopedia, by S. BIRCH, LL.D.*

Isis, the classical Lat. name for the river Thames in Eng. (Tham-*esis* = "the broad Isis"). The prin. tributary of the Thames which passes by Ox. is also called Isis.

Iskanderoon, Scanderon, or Alexandretta, seaport town of N. Syria, on the E. coast of the bay of the same name, anciently the Bay of Issus. It is the prin. outlet of Central Asiatic Tur., being the port of Aleppo, and has the best harbor on the Syrian coast. Pop. 2000.

Islam. See MOHAMMEDANISM.

Isle of France. See MAURITIUS.

Isle of Man. See MAN, ISLE OF.

Isle of Pines. See PINES, ISLE OF.

Isle of Wight. See WIGHT, ISLE OF.

Ismelelah. See ASSASSINS AND ISMAILIS.

Ismail (is-mah-el') **Pasha**, or **Ismail I.**, b. at Cairo Dec. 31, 1830, was fifth ruler of the dynasty of Mehemet Ali, appointed gov. of Egypt in 1866, and who made himself, in 1811, absolute master of the country by force of arms. The position of Ismail I. was recognized by the imperial hattisharif of Feb. 13, 1841, issued under the guaranty of the 5 great European powers, which established the hereditary succession to the throne of Egypt, under the same rules as those to the throne of Tur. The title given to Mehemet Ali and his successors was the Tur. one of "vali" (viceroy), but this was changed by an imperial firman of May 21, 1866, into the Per.-Arabic of "khidiv-el-misr," or king of Egypt. By a firman of May 27, 1866, obtained on the condition of the sovereign of Egypt raising his annual tribute to the sultan's civil list from £376,000 to £720,000, the succession to the throne of Egypt was made direct, from father to son, instead of descending, after the Tur. law, to the eldest heir. By a last firman, issued June 8, 1873, the sultan granted to Ismail I. the hitherto withheld rights of concluding treaties with foreign powers and of maintaining armies. I. acquired great wealth by cultivation of cotton, and was a zealous promoter of the Suez Canal project. But under pressure of the Brit. and Fr. govts. he was forced to abdicate Aug. 8, 1879. His son, Mohamed Tewfik (b. Nov. 19, 1852), succeeded him.

ALFRED FLINCH.

Ismail'is, a sect of Mohammedan free-thinkers, were originally Shiites, but their doctrine spread throughout the Mohammedan world. Their outward practice was devout, but their esoteric doctrines led to universal negation, atheism, and indifference, and their morality was of the worst. They originated in the 9th century.

Isocrates, a celebrated Attic orator, b. at Athens a. c. 436, and d. of voluntary starvation a. c. 338. He was a disciple of Socrates, and attained popularity as the founder of a school of rhetoric at Athens. The Alexandrian critics assign him the fourth place in the canon of Gr. oratory. 21 of his orations are preserved.

Isometrical [Gr. *isos*, "equal," and *μέτρον*, "measure"]. Isometrical projection is a species of orthographic projection in which but one plane of projection is employed. It is used by engineers and archs. in delineating structures whose prin. lines are parallel to 3 rectangular axes. The plane of projection is taken so as to make equal angles with these axes; consequently, the projection of any line parallel to either axis bears a constant ratio to the line itself. The 3 axes are called co-ordinate axes, and the planes of these axes, taken 2 and 2, co-ordinate planes; one is usually taken horizontal, and is called the *horizontal plane*; a second is taken in front of the point from which the object is viewed, and is called the *frontal plane*; and the third is taken to the left of the point of view, and is called the *lateral plane*. The plane of projection passes through the point of intersection of the axes, which point is then called the *centre of projection*. The projections of the co-ordinate axes pass through the centre of projection, and make equal angles with each other; these projections are the *directing lines* of the projection. If we construct a scale of equal parts on either axis, its projection on the corresponding directing line will be a scale of equal parts, which is the scale of that directing line; the scales of all the directing lines are the same, and may be assumed at pleasure.

W. G. PECK.

Isphahan, city of Per., on the Zendarud. Among its monuments are the bridge over the Zendarud, 1000 ft. long, resting on 34 arches and bearing arched galleries; the palace of Chehel Sittou ("forty columns"), whose front is formed by a double range of columns 40 ft. high, and with a base formed of the united backs of 4 lions in white marble; the mosque of Mesjid Shah, whose dome rises among a forest of spires, towers, minarets, and open galleries. But these and many other monuments are decaying, and are surrounded by ruins. Miles of streets have no inhabs. The city is situated on the main commercial route between India and Europe, and its manufactures of gold, silver, silk, velvet, glass, weapons, and earthenware enjoy a high reputation. Pop. estimated at between 60,000 and 100,000.

Israel, iz'-ra-el [Heb. *Yisrael*, "a prince with God"], the name bestowed upon Jacob when he wrestled with an angel at Peniel. It afterward became the distinctive name of his descendants.

Israelites. See JEWS, by PROF. FELIX ADLER.

Is'sus [Ισῶς], an anc. city of Cilicia, near the mouth of the river of the same name, at the head of what is now the

Gulf of Scanderoon. Here Alexander (333 B. C.) gained a great victory over Darius.

Isthmian Games. See GRECIAN GAMES.

Italian Architecture. See RENAISSANCE.

Italian Language and Literature. The vernacular speech of the I. people embraces a great number of provincial dialects, widely differing from each other in articulation, but descended chiefly from a cognate linguistic group comprising Lat., Umbrian, Oscan, and perhaps Etruscan. These dialects are not corrupt *patois*, but many of them are refined, and they are habitually used in familiar intercourse, not only by the middle and inferior ranks, but by persons of social and literary culture. So the native inhabs. of different I. provs. cannot freely communicate with each other without resorting to Tuscan. This dialect, the lang. of Tuscany and parts of the adjacent provs., is the common property of the whole I. people. Most of the I. provincial dialects have been reduced to writing; some of them, Venetian and Sic., for example, were largely employed in lit. before the supremacy of Tuscan was recognized; there still exists among the peasantry a stock of old unwritten dialectic prose and verse, which is orally transmitted from generation to generation by popular reciters; new dramatic pieces are constantly represented in *dialecto* in all the great cities, and every yr. gives birth to a considerable amount of popular poetry in the more important provincial speeches. But the lang. employed in serious literary composition, in religious teaching, in all branches of the public administration, in correspondence, and in gen. social circles is exclusively Tuscan. The critical study of the I. dialects has until lately been much neglected, and at present we know little of the hist. of these dialects at any period previous to the 13th century. Down to that period Lat. was the only *written* tongue employed in It., but there is evidence that through the whole historical era there have been great diversities of *speech* in the I. terr. Even after the subjection of the entire Peninsula to Rome, Gr., Celtic, Etruscan, Oscan, and Umbrian were long employed in provincial dists. Centuries must have elapsed before the mother-tongues of the conquered tribes could be stamped out by the iron heel of Rom. despotism. Even where the triumph of Lat. was most complete, the hereditary orthoepical habits of the pop. could never have been altogether extirpated, and the provincial articulation of Lat. must have been modified everywhere by local influences. The old Italic dialects were closely cognate with Lat., and readily became fused with it in vernacular provincial forms, and we are authorized to conclude that Lat. was spoken with great provincial diversity, and there is no reason to suppose that classical Lat. ever became the gen. lang. of anc. It. to a greater extent than Tuscan is the universal tongue of the It. of modern times. The modern provincial dialects are consequently to be regarded as descended not from classical Lat., but from the old rustic jargons which grew out of the clash of more or less conflicting elements.

The fact that the *lingua comune* is not the gen. vernacular of It., and the almost universal familiarity of I. writers with Lat. models have protected literary Tuscan from the debasement which popular use, in the fervent national life of our democratic age, tends to introduce into lang. No one of the great European tongues has changed so little within the last 6 centuries as I. On the other hand, the circumstance that Tuscan has always been a sort of sacred dialect, set apart for elevated uses, has prevented the enrichment of the vocabulary. As a gen. rule, agricultural operations, industrial art, and the practical applications of science, descriptive geog., nat. hist. and physics, commerce, internal improvements, mining, the machinery of representative govt., popular insts., and judicial proceedings have but lately entered deeply into the habitual thought of educated Its., and have scarcely yet exerted a sensible influence on the diction of lit. The beneficent political and moral revolutions of which It. has been the theatre during the last 25 yrs. have brought more diversified influences to bear upon her lang., and have made enlarged demands upon its capabilities of expression. Hence, the *lingua comune* is naturally, and without any gen. effort for that purpose, undergoing changes visible even to a foreigner.

As we have said, every prov. has still its popular lit., oral and recorded. But there is no provincial Dante, or Petrarch, or Ariosto, or Tasso, or Villani, or Varchi, or Macchiavelli, and the tongue through which the It. states have acted on each other, and It. on the world, is exclusively the *lingua comune*, or Tuscan, which alone reflects and represents the mind and voice of It. in the European republic of letters. The early hist. of this lit. is obscure, for, though there were I. bards and *cantastorie*, or saga-men, early in the 13th and doubtless in the 12th century, yet their works are known to us only as disguised by copyists of later ages. It is only from the yr. 1300 that we feel ourselves to be treading on safer ground. The earliest I. poems which have come down to us, even in a modernized shape, are amatory or religious. In some cases it is difficult to say to which of these 2 classes they belong, for it is not always clear whether the lady celebrated in them was a real person or only a personification of a Chr. idea. There are also extant certain prose compositions of the same century, and in some few instances originals of these productions still exist. In the MSS. of the 13th century we have sufficient means of pronouncing upon the gen. grammatical and lexical character of the Tuscan dialect in the latter half of the 13th century. The real importance of this century in I. literary hist. is not in the merit of its productions, but in the fact that they prove the existence of the *lingua comune* as a written tongue at that period. In point of antiquity, the first place among the Tuscan poets is usually ascribed to Folcacchiero dei Folcacchieri, b. at Siena 1150, and many critics have claimed the poems of Ciullo d'Alcamo, the emp. Frederick II. and his sons, Enzo, Enrico, and Manfredi, Pier delle Vigne, Ranieri, Ruggerone, and Inghilfredi da Palermo, Guido

delle Colonne, Jacopo da Lentini, as belonging to the lit. of the *lingua comune*, though the diction of all of them is marked by Sicilian provincialisms. The Bolognese Guido Guinicelli and Onesto Bolognese are also ranked with Tuscan writers, though not Tuscan by birth. Guittone d'Arezzo, Guido Cavalcanti, Dino Frescobaldi, Dino Compagni, are Tuscan poets of merit. Jacopone of Todi in the pontifical terr. wrote much in Tuscan verse, and is supposed to be the author of the Lat. Ch. hymn *Stabat Mater dolorosa*.

The most important I. prose works of the 13th century are the chronicles of Matteo Spinello, of the prov. of Bari, and of Ricordano and Giacotto Malispini, the first Tuscan annalists. The *Moral Treatises* of Albertano da Brescia, written in Lat. about 1250, were translated into I. by Andrea da Grosseto in 1268. This translation, pub. in the *Collezione di Opere Inedite* in 1873, is pronounced by the ed. to be, "in respect to antiquity, the most important document of the lang. in literary prose." The *Novellino*, or *Cento Novelle antiche*, is believed to belong to the 13th century. The *Conti di Antichi cavalieri* is affirmed to exist in a MS. of the 13th century. The *Libro di Culo*, the *Fiore di Rettorica* of Guidotto da Bologna, the letters of Guittone d'Arezzo, translations of the romance of the Round Table and of the treatise of Egido Colonna, *Del Governo dei Principi*, Bono Giamboni's translations of the *Tesoro* of Brunetto Latini. We come now to the 14th century—the age of Dante, Petrarch, and Boccaccio. The I. poetry of the 14th century is far from being copious in amount, while the prose lit. is voluminous and of almost unsurpassed perfection. In neither form of composition were the Lat. classics of real value, except as a stimulus. Both in form and in substance whatever is excellent in the productions of the *auveo trecento* is, in the highest degree, original and independent. Dante ascribes to the study of Virgil "Lo bello stile che mi ha fatto onore," but if in this expression he referred to the poems and not to his prose writings, he confounded the first impulse with the character and direction of the movement, which were determined by far other agencies. The Lat. works of Petrarch are deservedly forgotten, and the classic constructions which Boccaccio thought the chief ornaments of his prose style are its greatest defects. In all incipient lit., at least, the true bard "singet wie der Vogel singt." Dante's great poem shaped itself as it grew, in accordance with the law of his nature. The most prominent features of the poem were the inspiring passions of life, his pure and ardent love for Beatrice, and his bitter resentment against his political opponents. The knowledge of Dante was vast for the period, and his influence on the intellect of his age can scarcely be overrated. Dante has been made accessible to Eng. and Amer. readers by Mr. Longfellow in the best existing translation of his great poem. The canzoni of Petrarch and the poems of Boccaccio are too widely known to need to be more than mentioned. The prose lit. of this century deserves a higher reputation than foreign scholars have conceded to it. Benvenuto da Imola and other early commentators on Dante have not only furnished explanations and historical illustrations of his works, but they have shown a critical ability rare in that age. The chronicles of Giovanni Villani and his continuators, and the hist. of Dino Compagni are valuable repositories of fact. The saintly legends and romances of chivalry of this period are conspicuous for purity and beauty of style. Two works of this century deserve special mention—the novels of Sacchetti, which contain faithful pictures of the manners of the age, and the letters of St. Catharine of Siena. In point of style, the *Letters* of Catharine of Siena are not surpassed, if equalled, by any other European prose compositions of the 14th century. The *Fioretti di San Francesco* are believed to be the truest possible expression of the simple beauty of the Tuscan familiar speech of the period we are considering. The increasing cultivation of classical lit. in the 15th century absorbed the intellectual activity of the age, and left little time or taste for original production. In it the study of Gr. and Lat. was gen. among the better classes, in all ranks and both sexes. Women who were educated at all were taught Gr. and Lat. and I. ladies filled professorships in both native and foreign univs. In this century It. acquired an intellectual culture which gave her an immense and a long-enduring influence over the mind of the rest of Europe. Still, this century produced great I. writers in both poetry and prose, as well as great geniuses in politics and art. The most conspicuous poetical works of the age were the *Morgante Maggiore* of Luigi Pulci, the *Orlando Innamorato* of Bojardo, the *Favola d'Orfeo*, a drama, and other small works of Poliziano, lyrical compositions by Gasparo Visconti, Accolti, and others. In prose are the chronicles of Colennuccio Corio and numerous other valuable sources of historical information. To the 15th century belong the works of Leon Battista Alberti on arch., sculpture, and painting, and most of the writings of Leonardo da Vinci. In this age lived 2 of the grandest characters and sublimest geniuses in the records of human hist.—Columbus and Savonarola—both Its. and both martyrs.

From about the middle of the 13th century to the overthrow of the liberties of Florence in 1530 Florence was the city of the world most conspicuous for intellectual and phys. achievement. In narrative and in lyric poetry the most celebrated I. writers of the 16th century are Trissino, Luigi Alamanni, Ariosto (*Orlando Furioso*), Tasso (*Gerusalemme Liberata*), Berni (who gave his name to a peculiar class of light satirical verse), Frenzuola, Ruccellai, Tansillo, Davanzati, Pietro Aretino, Bembo, Annibale Caro, Michelangelo Buonarroti, Vittoria Colonna, and Folengo, the writer of macaronic verse. It was in the 16th century that the drama first acquired a status in I. lit. Many plays were written in Lat., many of a popular character were sketched in outline and more or less filled up by improvisation by the actors. Niccolò Correggio Visconti produced a pastoral drama, and the *Pastor Fido* of Guarini still has a high repu-

tation. The foundation of the musical drama was laid in this century, and Rinuccini is regarded as the first author of a regular opera. Tragedies were produced by Del Carretto, Trissino, Ruccellai, Andrea dell'Anguillara, and Pietro Aretino. Numerous novels and romances appeared in this age. The collection of Bandello is well known. The didactic dialogue of Baldassare Castiglione, *Il Cortigiano*, is still not forgotten. The political and historical lit. of this age is voluminous and highly celebrated. Macchiavelli's fame is universal. In philos. the greatest names are Cardano, and especially Giordano Bruno.

The 17th century is chiefly remarkable for its cultivation of phys. science. The great names are those of Galileo (who was compelled by an ecclesiastical tribunal to retract his astronomical theories, if not by actual torture, at least, indubitably, by the threat of torture), Torricelli, Borelli, Cassini, Viviani, Castelli, Riccioli, and Grimaldi. Campanella, who wrote chiefly in Lat., was noted as a philos.

After the recovery of the Ch. from the first effects of the Ref., followed the Catholic reaction of the latter half of the 16th century, and the influence of Rome has ever since been hostile to all progress. This is plainly seen in the *belles-lettres* lit. of the 17th and 18th centuries, though in other fields of intellectual effort there was in the 18th century a revived activity. In poetry and the drama, the most eminent writers were Gozzi, Parini, Goldoni, Maffei, Casti, Metastasio, and Alfieri. The founder of historical criticism, Giambattista Vico, the philosophical jurists, Filangieri and Beccaria, and the physicists and naturalists, Volta, Galvani, Scarpa, and Spallanzani, have acquired the greatest celebrity. As a means of gen. culture the I. lit. of the present century has not the importance which circumstances have given to the productions of Ger. and Fr. intellect, but its deserts are greater than its European reputation. The Its. do not do themselves justice in this respect; if they have not received justice at foreign hands, it is because they have been too modest in claiming it. Another reason why I. lit. is little known abroad is that the literary lang. is extremely difficult for foreigners. Since the year 1800 the I. press has been fertile in products of high merit, though few have risen to such a decided superiority over their contemporaries as to warrant us in predicting for them a lasting place in literary hist. With few exceptions, the writers best known abroad have owed their reputation to the political tendency of their writings not less than to the genius by which their productions have been distinguished. It is too soon to separate the inherent from the accidental elements of their success, and to assign to them their rank as agencies in effecting the revolutions through which It. passed between the yrs. 1820 and 1870. Still, there are great names in the I. lit. of the 19th century.

GEORGE P. MARSH.

Italy is the name of the great peninsula that projects from the mass of Central Europe far to the S. into the Mediterranean Sea. The Tyrrhenian Sea forms its limit on the W. and S., and the Adriatic on the E. To the N., where it joins the main continent of Europe, it is separated from the adjacent regions by the chain of the Alps, which sweeps round in a semicircle from the head of the Adriatic to the shores of Nice and Monaco. The area of the present kingdom of I. is 114,300 sq. m.

Internal Divisions, Provinces and Compartments.—The kingdom of I. is divided into 69 provinces, subdivided into 197 circuits and 97 dists., which together comprehend 8882 *communes* or *tps.*, distributed over the following sections: (1) In N. I.—Lombardy, between the Ticino, the Mincio, the Po, and the Alps; Venetia, lying E. of Lombardy, between the Mincio and the Adriatic, the Alps, and the Po; Piedmont, on the W., between the Ticino, the Alps, and the Apennines; Liguria, between the Apennines and the sea; Emilia and Romagna, on the S. of the Po, between Piedmont on the W., the Adriatic on the E., and the Apennines on the S. (2) In Central I.—Tuscany, between the Apennines and the Tyrrhene Sea; Latium, S. of Tuscany, in the middle and lower basin of the Tiber; Umbria and the Marches, the first in the upper basin of the Tiber, the second between the Apennines and the Adriatic. (3) In S. I., the ex-Neapolitan states, which comprise all the region S. of the Tronto on the E. coast, and S. of Terracina on the W. By the census of Dec. 31, 1881, the pop. of the kingdom had increased to 28,459,451.

PHYSICAL GEOGRAPHY. A. Seas and Coasts of Italy.—That part of the Mediterranean which washes I. and her islands is divided into 5 prin. arms: (1) The Tyrrhene or Lower Sea, between the Peninsula and the islands of Corsica, Sard., and Sic. (2) The Adriatic or Upper Sea, between I. and the terr. of the Slavs. (3) The Ionian Sea, between I., Sic., and Gr. (4) The Afr. or Libyan Sea, between Sard., Sic., and Afr. (5) The Ligurian Sea, between Liguria, Corsica, Sard., Fr., and Sp. The coast of the It. Peninsula has a linear extension of 3337 m. The coast-line of the larger islands measures 928 m. Setting out from the extreme W. boundary, we come first to the spacious artificial harbor of Genoa (about 320 acres, or $\frac{1}{2}$ sq. m. of water-surface), and to the Gulf of Spezia, the great naval arsenal of I. To this succeeded the Tuscan coasts, with the little port of Viareggio and the shallow roadstead of Leghorn. Following a monotonous line of coast, we come upon the harbor of Civita Vecchia, and the well known Rom. sea-coast formed by the alluvium of the Tiber. From Terracina the Neapolitan coast commences with the Gulf of Gaeta, and 25 m. farther to the S. the Bay of Naples, the islands of Ischia and Capri, capes Mesa and Miseno, the Gulf of Baia, the port of Pozzuoli, the headland of Posilipo, the harbor of Naples, Castellamare, and Cape Campanella, where the Neapolitan gulf terminates and that of Salerno begins, itself ending at Cape Licosa. Next at the S. E. we meet the Gulf of Policastro, which terminates at Cape Serervo; passing this, we enter the Gulf of Santa Eufemia. Then follows the Gulf of Gioia, to the W. of which lie the Lipari or Eolian Islands. Crossing the Strait of Messina we find ourselves in the Ionian Sea,

having first passed the famous rocks of Seylla and Charybdis. Then coasting along Reggio, we round Cape Spartivento; the latter being passed, the shore curves eastward, forming the Gulf of Squillace. With Cape delle Colonne opens the vast Gulf of Taranto, terminated by Cape Santa Maria di Luca, to the E. of which we enter the Adriatic. In this sea, after passing the deep inland harbor of Otranto, the beautiful Bay of Brindisi opens, and farther on the Gulf of Manfredonia and the great promontory of Gargano, which forms the spur of the It. boot. The valleys of Comacchio, between the mouths of the Po and the terr. of Ravenna, form an immense pool, in which the famous lagoon fisheries are carried on. Having passed the many mouths of the numerous arms of the Po, and afterward of the Adige, we reach the mouth of the Tagliamento.

B. and C. Mountains, Valleys, and Rivers.—I. *The System of the Alps* is divided into 3 main groups. 1st Group: the W. Alps, from S. to N. and N. to E., from the Col di Tenda to Mont Blanc, and comprising the Maritime Alps, which extend to Monte Viso (12,566 ft.); the Cottian Alps, to Mont Cenis (11,457 ft.); the Graian or Gr. Alps, to the Col du Bon Homme on the Little St. Bernard (7,190 ft.). The triangular knot of lofty peaks known as the Grand Paradis group may be regarded as an offshoot from the Graian Alps. It contains the 2 highest summits lying wholly in It.—the Grand Paradis (13,300 ft.) and the Grivola or Corne de Cogne (13,028 ft.). 2d Group: the Central Alps, from the pass of the Bon Homme to the peak of the Tre Signori; they comprise the Pennine Alps, which include Mont Blanc (15,784 ft.), Monte Rosa (15,217 ft.), the Matterhorn (14,815 ft.). Along their course of 62 m. open the passes of the Great St. Bernard (8,169 ft.) and the Simplon (6,595 ft.). They comprise the Helvetic or Lepontine Alps, from Monte Rosa to the St. Bernardino, with the pass of the same name (6,769 ft.); that of the St. Gothard (6,936 ft.); that of the Splügen (6,946 ft.); the Rhetico-Trentine Alps, from the St. Bernardino to the Picco dei Tre Signori (10,118 ft.), including the passes of the Brenner (4,659 ft.) and of the Stelvio (9,176 ft.). 3d Group: the E. Alps, comprising the Norican Alps, which extend for 35 m. from the Tre Signori to the Gross-Glockner (12,957 ft.); the Carnian Alps, terminating at the Col di Tarvis; the Julian Alps. The declivities of the Alps, while they descend gently on the N. side, are rocky and precipitous toward I. From Mont Blanc to the Tyrol 400 glaciers are counted, and the whole of the chain abounds in them. II. *The System of the Apennines* separates itself from the Maritime Alps at the pass of Cadibona; then, after following a line from W. to E., turns S. and S. E., dividing the Peninsula into 2 great slopes, the E. and the W. The Apennines are composed of 3 groups: 1st, the N. Apennines, which, beginning at Cadibona, skirt the Gulf of Genoa, describing an arc. Between the sea and the Tuscan Apennines, N. of the Arno, rises an isolated group of mts. which are called the Apuan or Panian Alps. 2d, the Central Apennines. These begin at the Cimone and end at the Velino, dividing Tuscany from the Emilia, and crossing Umbria, the Abruzzi, and the Samnite terr. The highest peaks are the Gran Sasso d'Italia, (9,312 ft.), Mont Amaro or Majella (9,311 ft.), Monte Velino (8,180 ft.). 3d, the S. Apennines, which extend from Monte Velino to the extremity of I., dividing themselves into 2 branches, the W. and the E. III. *The Sardo-Corsican System*, parallel with the Apennines, culminates in island of Corsica. I. has but a single great plain, inclosed within the S. slope of the Alps and the N. slope of the Apennines, and determined by the course of the Po and of the other rivers which flow into the Adriatic. In fertility of soil, in facility of communication, in wealth, in civilization, and in density of pop. this plain has no rival in the world.

D. Lakes.—The lakes are divided into 2 groups—the Alpine and the Apennine lakes: I. *The Alpine Lakes* are—1st, Lake Maggiore, which receives the waters of the Ticino. It is 36 m. in length and in many places 7 or 8 m. broad. Its waters find their outlet through the Ticino, the richest tributary of the Po. The Borromean Islands are in this lake. 2d, Lake Como: this lake receives the waters of the Adda. It has the form of a Y, with the tail turned toward the Alps; its length is 30 m., with a maximum width of 3½ m. 3d, Lake di Garda: this lake is 45 m. long and from 4½ to 16 broad. The Mincio flows out of it. II. *The Apennine Lakes.*—These are almost all craters of extinct volcanoes, and may be subdivided into, 1st, the upper or central It. lakes, those of Massaciuccoli, Bientina, Chiusi, Montepulciano, of Trasimeno or Perugia, of Bolsena, and of Bracciano; 2d, the lower or S. It. lakes, those of Fondi, of Celano or Fucino, etc.

E. Rivers.—I. *Tributaries of the Adriatic.*—In the upper basin of this sea we find the Isonzo, which marks the extreme E. boundary between Upper I. and Istria; the Tagliamento; the Piave, which rises in the Carnian Alps; the Brenta and the Bacciglionne, which rise in the Trentino and traverse the Venetian lagoons; the Adige, formed by the union of the emissaries of 3 small lakes at the pass of Finis-terre (Reschen), and of many rivulets which descend from the Rhetian, Norican, and Carnian Alps. The Po (Padus or Eridanus) is the chief of the It. rivers; its length, including its windings, is 330 m. It takes its rise on Monte Viso at a height of 6,560 ft. above the sea; it crosses Piedmont, divides Lombardy from Parma, Modena, and Ferrara, then enters Venetia; at Serravalle it divides into 2 branches: the prin. arm (Po Maestro) falls into the Adriatic 28 m. S. of Venice; the other (Po di Goro) enters the sea 15 m. farther to the S. S. W. The 2 arms are about 30 m. in length, forming a delta furrowed by secondary channels. At Turin the Po is inferior in size to several of its lower affluents, but after its confluence with the Dora Baltea, which brings to it the waters of Mont Blanc, it assumes imposing dimensions. Having received the Sesia, which brings with it the waters of Monte Rosa, the Po begins to spread itself over its own alluvium, branching out between many islands; above Valenza it unites again in a single winding bed, but only to ramify anew and to form new islands after receiving the

tribute of the Tanaro; it again collects itself near the mouth of the Ticino; from the confluence of the Tidone till its junction with the Adda it once more divides into separate channels; below the Oglio its waters are re-collected within narrower limits, and thus it continues its course to the sea. The waters of the Po are always turbid from the great quantity of earth which they transport. II. *Tributaries of the Ionian Sea.*—These are the small streams of the anc. Lucania and of Calabria. III. *Tributaries of the Mediterranean.*—These are the Var, the Arno, the Ombrone of Siena, the Tiber, the Volturno, and other smaller ones.

Geology and Mineralogy.—The centre of the Alpine region is generally of granite rock, often intermixed with amphibolite formations or with calcareous formations. The slopes are covered with Tertiary strata. The Apennines, as far as Calabria, are of calcareous and serpentine rock and of graywacke, upon which lie deposits from the Jurassic period, composed of gypsum, with beds of sulphur. Farther from the central axis of the chain, upon the opposite slopes rest vast Tertiary deposits. The more S. of the Apennines are composed of granite rock covered with secondary deposits. The most noteworthy geological feature of I. is its volcanic system. The only active volcano on the European Continent is Vesuvius with its Campi Phlegrei. But the giant of the It. volcanoes is Etna in Sic., 10,830 ft. in height, with a base 112 m. in circumference. The Lipari or Eolian Islands are also volcanic; among these Stromboli is in perpetual eruption. Gaseous, saline, and limous eruptions also abound in I., as well as thermal springs. The calcareous and metamorphic rocks of the Alps and Apennines furnish the most beautiful marbles. We notice the alabaster of Volterra, the porphyries and rock-crystals of Aosta, the agates and chalcodones of Tuscany, the lavas and basalts of the volcanic dists., the sulphur and the alum. Lignite and peat are abundant. Pozzolana is found near Rome and Naples; iron especially in the island of Elba; lead and galena in Sard.; fossil salt; also thin veins of gold, silver, mercury, zinc, antimony, etc.

Climale.—Ingen, the coldest month is Jan., and the warmest month is July. Observing certain different stations, we find that the annual mean varies between 56° and 60° F.

PUBLIC ECONOMY. A. Agriculture.—There are 3 great distinctive agricultural dists. in I.: (1) The plain of the Po—very fertile, with regular and systematic cultivation; (2) the declivities and valleys of the Apennines, on the 2 slopes of the Peninsula—the region of the olive; (3) the pasture-lands, which, in their turn, are subdivided into alpine pastures and the pastures of the plains; in the latter the grass-lands are often interspersed with rice-fields and marshes, the malaria from which depopulates the country. The productivity of the soil might be greatly increased if the agricultural methods and tools employed were less antiquated, and if the whole country would keep pace with the progress already made in Lombardy and Piedmont. Of cereals, wheat, maize, rye, barley, oats, and rice are raised; to these should be added chestnuts, potatoes, vegetables. The products which have the most commercial importance are silk, wine, and oil. Oranges, lemons, citrons, and other fruits, both dried and fresh, are exported. Among the animal products, beside the silkworm, the butter and cheese are valuable. Cattle do not abound in I.

B. Manufactures.—The great industries are—(1) silk (with velvet); (2) woollen manufactures, of which there are important establishments in Piedmont and in Venetian Lombardy; (3) cotton manufactures, flourishing in Liguria, Piedmont, Lombardy, and Friuli. The straw industry (chiefly straw hats) is prosperous in Tuscany. The artistic or æsthetic manufactures are those for which I. is especially distinguished abroad—the filigree of Genoa, the glass and beads of Venice, the coral of Naples and of Leghorn, the wrought marbles of Carrara and of Lucca, perfumery of Tuscany, paper, hats, gloves, etc. One of the most flourishing industries is naval construction, particularly in Liguria.

C. Commerce and Navigation.—With an importation of about \$252,409,000, the exportation is only \$220,193,000. The commercial marine in 1883 consisted of 7720 sailing vessels, and steamers with an aggregate tonnage of 990,004.

D. Canals and Roads.—The canals of I., navigable as well as for irrigation, have been her boast from anc. times. The prin. of these are in the valley of the Po. The total length of the navigable canals is 435 m. The communal high-roads have a total length of 61,221 m.; the provincial roads, 12,373 m.; the national roads, 3970 m. The total length is 77,560 m.

Railways.—The total length of railways opened for traffic in 1882 was 5484 m.

Post-offices and Telegraphs.—Number of post-offices, 3430; 168,878,086 letters and post-cards delivered. 61,713,852 parcels, 154,562,446 newspapers; revenues, 26,998,785; expenditures, 23,659,072 lire. Length of telegraph lines, at the commencement of 1883, 17,253 m.

Government and Public Institutions.—The govt. of I. is a constitutional monarchy, with a senate appointed for life, and a chamber of 508 deputies, elected by a free and broad suffrage. The freedom of the press and the right of association is secured. The prefects or govs. of the provs, and the syndics or mayors of the towns are govt. appointees; otherwise the elective system generally prevails in all the insts. of the administrative hierarchy.

Administration of Justice.—At the foot of the It. magistracy stand the conciliatory judges, who perform the double office of conciliating litigants and of deciding small disputes involving an amount not exceeding \$6. The pretors, 1811 in number, have jurisdiction of offences punishable with imprisonment not exceeding 3 months and by fines not exceeding \$60. The pretors also decide civil questions not involving more than \$300. The tribunals take cognizance, on appeal, of questions civil, commercial, and penal decided by the pretors; they have original jurisdiction of all matters not belonging to the conciliatory judges and to the pretors, and they also decide questions of correctional

police. From the sentence of the tribunals appeal may be made to the courts of appeal, and from these, when it is a question of law, to the courts of cassation.

Education and Instruction.—Under the new It. govt. a great part of the property confiscated from the monastic establishments has been devoted to the cause of public education, for which, beside, an annual credit of \$3,000,000 is voted by Parl. But notwithstanding these great aids to instruction, education stands still very low in the kingdom.

Army and Navy.—The army in 1881, including the territorial and active militia, had a total nominal strength of 1,718,933 men on the war-footing. The navy, in 1880, was 67 vessels of war; 20 of the ships are iron-clad.

HISTORY.—The history of I. may be divided into 4 great periods: I. *Conquest and Feudalism.*—The barbarians, having passed the confines of the empire, had entered into I.; under Alaric they had sacked Rome; under Attila they had destroyed Aquileia; under Odoacer they had put an end to the empire (476), but Theodoric, king of the Ostrogoths, came from the Danube (489), vanquished Odoacer, and founded (493) a glorious monarchy, although it was soon broken up by the Grs. (553). Under Alboin the Lombards descended from Pannonia (Hungary), and established the most lasting govt. which had existed in I. (568-774). Summoned first by Gregory III., then by Stephen II., the Fr. came into I. under Pepin, who founded the State of the Church (754); then, invited by Adrian I., Charlemagne made war upon the Lombards under Desiderius, and put an end to their kingdom (774). In 800 Charlemagne was elected emp. of the Roms, and crowned by the pope. Charlemagne being dead (814), I. was first under the rule of Bernard, nephew of the great emp., then of Louis, then of Lothair, then of Louis II., then of Charles II. the Bald, then of Carloman, and finally of Charles the Fat (879-888). On the dethronement of this last sovereign 5 or 6 ft. feudal lords laid claim to the power, but Berengarius I., marquis of Friuli, prevailed over the rest (924). Under his reign, that of Hugh, duke of Provence (966), and that of Berengarius II., lord of Ivrea, I. was desolated by c. wars, by invasions from Hungary and from the Saracens, by corruption, and by barbarism. II. *The Communes and the Republics.*—Otho I. came to the throne (962) with 3 great ideas: to reduce the number and the authority of the vassal nobles, to favor the growth of the cities, to diminish the papal power. The conflicts between the papacy and the empire having reached their height under Gregory VII. and Henry IV. (1073-85), brought upon I. the curse of the Guelph and Ghibelline factions, the White and the Black, etc. Among other causes of the aggrandizement of the free communes were the Crusades, which, unsuccessful as religious and political enterprises, excited commercial activity. Representing the imperial principle against republicanism, Frederick Barbarossa descended into I. (1154), assisted Pope Adrian, received in reward the imperial crown, and returned into Ger. But the pope soon broke away from the imperial alliance, and Frederick crossed the Alps again (1158). Against his barbarity the Guelph cities concluded the Lombard League. Frederick met the confederates at Lignano, where the Its. defeated the imperial host in a great battle. The peace of Constance (June 25, 1183) confirmed the triumph of the free cities, which were thereafter governed by 2 consuls. But in S. I. the republican spirit was overshadowed, first by the Norman monarchy founded by the brave Roger, and then by the Swabian. An illustrious and heroic descendant of this latter house, Frederick II., with the help of Pope Innocent III., wrenched the imperial crown from Otho IV.; but the pontiff soon after turned against him. At Cartenova Frederick defeated the new Lombard League formed at the instigation of the pope (1239). Frederick dying in 1250, the papal hatred followed his race, and was never appeased until Charles of Anjou, at the invitation of Pope Urban IV., put an end to the Swabian dominion in I. (1266-68). The new Fr. rule, however, was overthrown, partly by an insurrection headed by John of Procida, and yet more by the revolution of the Sicilian Vespers (1282). Meanwhile internal discords were bringing ruin upon the republics in other parts of I. At Florence the Buondelmonti and the Amedei, at Bologna the Geremei and the Lambertazzi, at Genoa the Grimaldi and the Fieschi on one side, the Doria and the Spinola on the other, rivalled each other in their efforts to destroy the liberty of their fellow-citizens. The maritime towns, in their disputes for the dominion of the sea and for commercial superiority, ruined each other by turns. Everything was on the decline in I., which had become the battle-field in which foreign ambition exercised its worst passions. In vain Cola da Rienzi struggled for a moment (1347) to rekindle the spirit of a dying civilization. III. *The Decadence.*—The cause was the lack of a military spirit in the It. people, so that she was at the mercy of domestic and foreign ambition. Hence the origin of the companies which overran and plundered the country with impunity. The house of Savoy alone, in the midst of all this corruption, maintained itself uncontaminated. It was also a misfortune that while the W. and N. nations were shaking off the yoke of the Romish Ch. by a great reformation, I. suffered the movement of Savonarola to fail, thus postponing for 3 centuries that moral regeneration which is the basis of political progress. The Florentines preferred the splendor of the court of Lorenzo the Magnificent to the austere doctrines of the Reformers, and they allowed the merchant-monarchy of the Medicis to thrive until it extinguished even the very desire of liberty. In the mean time the power of the Turks was increasing in the E., and the fall of Byzantium (1453) sealed the ruin of the colonial power of the Its. Not long after, the discovery of the New World diverted commerce from its old channels, depriving It. navigators of the palm, and bestowing it upon more W. nations. Nothing remained to I. but the glory of letters, of arts, and of science, but in these she shone without a rival. Meanwhile the crooked policy of Ludovico il Moro again brought a foreign power into I. Charles VIII.,

king of Fr., overran the peninsula from one end to the other (1495). The Fr. and the Sp. disputed the dominion of I. The papal throne was made infamous by Alexander VI. Almost all Europe united in the League of Cambray against the republic of Venice (1508), whose forces were defeated (1509), and Julius II. formed the Holy League in order to drive out the Fr. (1511), who were obliged to abandon I. But soon after Francis I. descended the Alps. Then followed the great conflicts between this king and Charles V., of which I. unfortunately was the prin. theatre; the pontificates of Leo X. and of Clement VII.; the siege of Florence; the siege and sack of Rome (1527); the peace of Crespy (1544); then that of Cateau Cambresis, which established despotism rather than peace in I. and in all Europe (1559); the battle of Lepanto (1571), by which the final blow was given to Tur. power. During the 17th century the house of Savoy arose with new splendor through the deeds of her 3 Charles Emmanuel and of Victor Amadeus. IV. *The Regeneration.*—To these crowned heroes belongs the boast of having given the signal for the uprising of I. But a long and stormy period was still to be passed through, the wars of the republic and of the first Fr. empire, and then the Peace of Vienna (1815), which sacrificed I. to the Holy Alliance. Frequent insurrections were forerunners of that great revolution which, begun in 1848, when king Charles Albert granted the const., was completed in 1870, when united I. made Rome its cap. [From orig. art. in *J's Univ. Cyc.*, by PROF. G. BOCCARDI.]

Itasca Lake, in Minn., is regarded as the source of the Miss. It receives, however, several streams, one of which is several miles in length. Its elevation is 1575 ft. The Miss. leaves the lake with a breadth of some 12 ft., and is ordinarily less than 2 ft. deep at this point.

Itch. See SCABIES.

Itasca, Mich. See APPENDIX.

Itasca, R. R. centre, cap. of Tompkins co., N. Y., near the head of Cayuga Lake. It is an important centre of the Pa. anthracite coal-trade, and is the seat of Cornell Univ. and of Sage Coll. for ladies. Pop. 1870, 8462; 1880, 9105.

Iturbide, e-toor-be'de, de (AGUSTIN), b. at Valladolid (now Morelia), Mex., Sept. 27, 1783; was an officer of Sp. army in the war against the Mex. revolutionists of 1810, but in 1820 he decided to make an attempt for the independence of Mex. under a monarchy. Obtaining command of the Sp. forces in the S. of the prov. of Mex., he promulgated, Feb. 24, 1821, the "Plan of Iguala." The essential features of this plan were known as the "three guaranties"—i. e. the maintenance of the Catholic religion, union of Mexicans and Spaniards, independence with a monarchy under a prince of the Sp. Bourbon dynasty. The plan had success. After several months of hostilities, I. concluded a treaty at Córdoba (Aug. 24, 1821) with the new Sp. viceroy, O'Donoju, by which his "plan" was accepted, and he made a triumphal entry into the city of Mexico Sept. 27. A junta of government was established under the presidency of I., and negotiations were begun with Sp. for obtaining a prince who should be crowned emp. of Mex. Through the fatuity of Ferdinand VII. the treaty of Córdoba was rejected by the Sp. govt., and the successful movement for independence was treated as rebellion. Afterwards vacillation I. was proclaimed emp. May 18, 1822. He was crowned July 21, but experienced great opposition. In Dec. Gen. Santa Anna proclaimed the republic in Vera Cruz, and by Apr. 1823 the situation had become so hopeless that I. resigned the crown and was allowed to embark for Europe and enjoy a pension of \$25,000. He sailed for It. May 11, thence went to Eng., and in May 1824 chartered a vessel in which he returned to Mex., ostensibly to tender his services as gen. against an invasion by Sp. forces. Meanwhile a republican govt. had been formed in Mex., which issued a decree that I. should be treated as an outlaw. Ignorant of this decree, I. secretly landed, was taken before the state legislature, by whose orders he was shot at Padilla, Tamaulipas, July 19, 1824. His family resided at Phila., where the ex-empress d. Mar. 21, 1861.

Ivan the Terrible, the 4th grand duke of Rus. having the name Ivan (John), and the first czar of that country, b. in 1539; succeeded his father Basil in 1533; assumed the title of czar 1543; pub. a new code 1550; carried on wars with the Tartars; in 1568 acknowledged the sovereignty of Jédiguer the Tartar; carried on wars with the Poles and Swedes; introduced civilization in Rus., but ruled with cruelty. D. Mar. 19, 1584.

Iverson (ALFRED), b. in Burke co., Ga., Dec. 3, 1798, grad. at Princeton in 1820; was 3 yrs. member of the house in the State legislature, and 1 yr. of the senate; was elevated to the bench of his judicial circuit; was one of the electors at large for the State on the Dem. ticket in the Presidential election in 1844; was M. C. 1847-49, and U. S. Senator from Ga. 1855-61. He became brig.-gen. Confed. army. D. Mar. 4, 1873.

A. H. STEPHENS.

Ives (Dwight), D. D., b. at Holyoke, Mass., Sept. 20, 1805, grad. at Brown Univ. 1835; was ordained to the ministry in 1836, and preached in Lower Alton, Ill.; supposed to have been the first Bap. preacher in the State who gave his entire services to one ch., receiving from them a salary competent for support. He was settled also at Suffield, Conn., being both sec. and pres. of the board of trustees in the Conn. Literary Inst. in that place. D. Dec. 22, 1875.

Ives (ELI), M. D., b. at New Haven, Conn., Feb. 7, 1779, grad. at Yale 1799; studied med. with his father, Dr. Levi Ives, and with Prof. B. Silliman founded in 1813 the med. dept. of Yale Coll., in which he was prof. of materia medica until 1829, and then until 1853 of the theory and practice of med. He was at one time pres. of the National Med. Association. D. Oct. 8, 1861.

Ives (RT. REV. LEVI SILLIMAN), D. D., LL.D., b. at Meriden, Conn., Sept. 16, 1797; worked on his father's farm; served a yr. in the war with G. Brit., and was ed. at Lowville Acad. and Hamilton Coll. He was at first a Presb. In 1822 he received deacon's orders in the P. E. Ch., and in 1825 married a daughter of Bp. Hobart. He held pastoral charges

in Phila., in Lancaster, Pa., and in New York, and in 1831 was consecrated bp. of N. C. In his diocese he labored much for the good of the slaves and for the cause of education. In 1832 he visited Rome, where he joined the R. Cath. Ch. He was afterward prof. in the theol. sem. at Fordham, N. Y., and subsequently devoted much attention to the founding of an asylum for destitute children at Manhattanville, New York city. He wrote *Triumph of a Mind in its Progress to Catholicism*, etc. D. Oct. 13, 1867.

Ivory (Old Eng. *ivorie*, from the Fr. *ivoire*; Middle Lat. *ebor*; Lat. *ebur*) has been defined as simply the tooth of the elephant, but it is in reality a substance between bone and horn from the teeth or tusks of many animals. I. is for the most part the material of the tusks of the elephant. The teeth of the hippopotamus give a finer variety, but can only be employed for small objects. The large marine animals, such as the walrus, narwhal, and spermaceti whale, also yield varieties of I. The fossil I. of Siberia consists of the tusks of mammoths and elephants of extinct species. The elephant I. of the present time comes from Afr. and Asia. I. is difficult to cut, requiring extremely sharp and very hard tools, but yields readily to the saw, lathe, and rasping tools or files. When finished it is polished with different powders. Its natural whiteness is exquisitely delicate, but it soon assumes a yellow tone when exposed to the air. The yellow tint of old I. may be removed with finely levigated pumice-stone.

Ivory (Sir JAMES), F. R. S., b. at Dundee, Scot., in 1765, ed. at the Univ. of St. Andrew's, along with Sir John Leslie. In 1804 was appointed prof. of math. in the Royal Military Coll. of Marlow (now at Sandhurst). He was a self-taught math.; resolved the problem of attraction for every class of ellipsoidal bodies; wrote on the attraction of spheroids and the theory of the figure of the earth. Next to the theory of attractions, that of atmospheric refraction and that of the possible equilibrium of a spheroid with 3 unequal axes engaged his attention. D. Sept. 21, 1842.

Ivory Black. See BONE BLACK.

Ivory Coast, a part of the coast of Upper Guinea, W. Afr., between the so called Grain Coast and Gold Coast. It extends from Cape Palmas to the river Assinie, and has towns which traffic in ivory, gold-dust, and palm oil.

Ivry-la-Bataille, a v. of Fr., 40 m. W. of Paris, on the river Eure, where Henry IV. gained a victory (Mar. 14, 1590) over the army of the League under the duke of Mayenne. An obelisk to commemorate this victory was removed during the Fr. Revolution, but renewed by Nap.

Ivy [A. S. *ifig*], the *Hedera helix*, a climbing, shrubby Old-World plant, sparingly cultivated in the U. S., where it nowhere thrives as in Europe, being impatient of the cold of winter and the dryness and heat of summer. It succeeds best in the Middle Atlantic States. It belongs to the order Araliaceæ. It abounds in Europe. There are several varieties. The so called "German ivy," common in house culture, is not an I. at all, but a Senecio from S. Afr. (For the "poison ivy" of the U. S. see Rhus.)

Ixion, a mythical character, supposed to have been a Thessalian prince and king of the Lapithæ. He was espoused to Dia, daughter of Hesioneus (or Deioneus), but he cruelly murdered his father-in-law. Jupiter purified him, but I.'s attempt to seduce Juno was frustrated by Jupiter's substitution of a phantom resembling her, and I. became the father of the Centaurs. He was condemned to be chained to a fiery wheel perpetually revolving, consisting of 4 spokes in the form of a cross.

Ixtapalapa, town in Mex., 10 m. S. E. of the cap. At the time of the conquest it was the residence of a brother of Montezuma, and was the scene of many of the important incidents of the siege of the cap. A hill adjoining I. to the S. W., called Star Hill, was the most sacred spot known to the Aztec religion. At the expiration of each 52 yrs. all the fires throughout the empire were extinguished, and the new fire was obtained by friction of pieces of wood over the body of a human victim placed upon the altar on the summit of this hill. All the Aztec priests and magistrates set out from Tenochtitlan (Mexico) at midnight, and the new fire was carried in every direction by swift messengers. Some remains of the anc. altar and temple may still be traced. Pop. about 5000.

Izalco, Mount, called the "light-house of San Salvador," a volcano which burst forth Feb. 23, 1770, in what is now the republic of San Salvador, Central Amer. It stands near a large group of extinct volcanoes, and has an eruption every 16 minutes. It burst out during an earthquake, and has since grown to a height exceeding 4000 ft. Its light is visible far at sea.

Izard (RALPH), b. near Charleston, S. C., in 1742, and grad. at the Univ. of Cambridge, Eng. After the outbreak of the Revolution was appointed by Cong. as com. to Tuscany, but he fixed his residence at Paris, where he opposed the policy of Franklin and Silas Deane and favored that of Arthur Lee. He pledged his estate to purchase ships of war: was delegate to Cong. 1781-83, and U. S. Senator 1789-95. D. May 30, 1804.

Izcoatl, fourth king of Mexico, and substantially the founder of the Aztec empire. He reigned from 1425 to 1436, embellished and fortified the cap., and built the temple to the god Huitzilopochtli and the goddess Chihuacatl; he also framed a const. that much improved the political system.

Izdubar, a mythical or semi-mythical king and hero of the earliest Babylonian annals, whose name has become celebrated since the discovery, in 1872, of some fragments of the Chaldean traditional account of the Deluge, embodied in one of a series of 12 "Legends of Izdubar," so called from the hero who plays the prin. part in them all. I. appears in the cycle of legends as a giant residing in the country of Accad, a subduer of great animals, a mighty conqueror who acquired the sovereignty, which he exercised in Erech or Uruk, the earliest capital of Babylonia. He was deified after his death.

J.

J, a consonant, another form of *I*, with which it was once interchangeable. *J*, originally and properly a vowel, came in time to stand sometimes for the half-vowel, half-consonant sound of initial *I*, as now in Ger. Afterward it acquired the *zh* sound it possesses in Fr., and eventually the power it ordinarily possesses in Eng.

Jabirú [Brazilian], the name of several birds of the



Jabirú.

the stork family, and of the genus *Mycteria*, found in Australia, Afr., and S. Amer. The species are few. *M. Australis* is the best known. These birds, unlike true storks, have an upturned bill, and one species found in S. Amer. has the head and neck bare; those of the Old World have these parts of the body clothed with feathers.

Jablon'ski (DANIEL ERNST), D. D., b. near Dantzic Nov. 26, 1660, ed. at the Univ. of Frankfurt-on-the-Oder; became famous as a pulpit-orator; was appointed court-preacher; labored for a union of all the Prot. chs.; became a bp. among the Moravians in 1698; elected pres. of the Royal Acad. of Sciences at Berlin 1733; pub. eds. of Talmud and of Heb. Bible (1699). D. May 25, 1741.

Jablonski (PAUL ERNST), son of the above, b. at Berlin in 1693; distinguished for his knowledge of Oriental langs. Wrote on Oriental hist., mythology, and antiquities, especially an Egyptian glossary, and the *Pantheon Egyptiorum sive de diis eorum commentarius*, etc.; was a prof. of theol. at the Univ. of Frankfurt-on-the-Oder. D. 1757.

Jaborandi [Brazilian, Guarani], a drug recently introduced into medicinal use, consists of the leaves and twigs of *Pilocarpus pinnatus*, a tree (?) of Brazil, and of the order Rutaceæ. Four or 5 grammes of the bruised drugs are infused in boiling water. Soon after this is swallowed, whether warm or cold, a most powerful sialagogue and diaphoretic effect is produced. Streams of perspiration flow, and so much saliva and mucus are produced in the mouth and air-passages that speech is difficult.

Jacamar [Brazilian, *jacamarica*], a name applied to a number of S. Amer. and W. I. zygodactyle birds, of the family Galbulidæ, Jacamaralcyon, and Jacamerops, and which approximate most nearly the Barbets, Toucans, and the bee-eaters. They are small, and mostly of bright and quaint but not very handsome plumage. The red-tailed *J. (Galbula ruficauda)* is found in Trinidad, W. I.

Jacaná, the *Parra jacaná*, an abundant S. Amer. bird of the family Parridae, remarkable for its very long toes, which enable it to walk with ease upon floating water-plants. Related species are found in Asia, Afr., and Australia.

Jacaré, a genus of S. Amer. loricate reptiles, resembling the alligator and cayman. The *J. sclerops* (spectacled cayman, common J.) is one of the largest of Amer. Crocodilidæ, but though very voracious he rarely attacks man. Four or 5 other species are reported.

Jackal [Sp. *chacal*; Per. *shacal*], the *Canis aureus*, a wild dog of Asia, S. E. Europe, and Africa, which hunts in troops, is a carrion-eater, and is easily domesticated. It is regarded by some authorities as specifically identical with the dog and the wolf.

Jackdaw. See DAW.

Jack'son, city and important R. R. centre, cap. of Jackson co., Mich., 76 m. W. of Detroit. It is the site of the Mich. State prison; has productive coal-mines and large manufactures. Pop. 1870, 11,447; 1880, 16,105; 1884, 19,136.

Jackson, city, R. R. centre, cap. of Miss. and of part of Hinds co., 183 m. N. of New Orleans, 45 m. E. of Vicksburg, and on the W. side of Pearl River. Among its public buildings are the State capital and State penitentiary, while within the city limits are insts. for the blind and for the deaf and dumb; 1 m. to the N. stands the lunatic asylum. Pop. 1870, 4234; 1880, 5204.

Jackson, or **Jackson Court-house**, cap. and R. R. junc. of Jackson co., O. It has important coal-mines, iron furnaces, and a large trade in coal and iron. Pop. 1870, 2016; 1880, 3021.

Jackson, city, R. R. junc., cap. of Madison co., Tenn., is near the centre of W. Tenn., 72 m. N. E. of Memphis. It is the seat of W. Tenn. Coll., and has a large cotton trade. Pop. 1870, 4119; 1880, 5377.

Jackson (ABNER), D. D., LL.D., b. about 1811, grad. at Trinity Coll., Hartford, Conn., in 1837; was appointed tutor there, and afterward prof. of ethics and metaphysics. In 1858 he became pres. of Hobart Coll., and in 1867 pres. of Trinity Coll. D. Apr. 19, 1874.

Jackson (ABRAHAM REEVES), M. D., b. in Phila. June 17, 1827, grad. in 1846 at Phila. Central High School, from which he subsequently received the degree of A. M.; studied med. and received the degree of M. D. from the med. dept. of Pa. Med. Coll. in 1848; practised at Stroudsburg, Pa., until 1870, when he removed to Chicago, Ill.; founded the Woman's Hospital of the State of Ill., of which he became surgeon-in-chief. In 1872 he was elected to the chair of diseases of women by the faculty of Rush Med. Coll.; in 1874 was elected ed. of the *Chicago Med. Register* by the Chicago Medico-Historical Society, and has written numerous papers upon surgical and medical topics.

Jackson (ANDREW), LL.D., 7th Pres. of the U. S., b. at the Waxhaw Settlement, N. C. (then supposed to be in S. C.), Mar. 15, 1767. His parents had emigrated from Ire. in 1765. The father d. not long before the birth of Andrew. In 1790 he and an elder brother volunteered to serve in the Revolutionary war under Sumter. The boys were made prison-

ers, and were brutally treated. Robert, the elder brother, d. soon after being released, and their mother soon followed. Andrew worked for a time in a saddler's shop, afterward taught school; commenced the study of law at 18, and was admitted to the bar in 1786. In 1788 he removed to Nashville, then in N. C. Two yrs. later the Terr. of Tenn. was formed, and J. was made U. S. atty. for the new dist. In 1791 he married Mrs. Rachel Robards, whom he supposed to have been divorced by an act of the legislature of Va. It afterward appeared that the divorce had not become legal until 1793, and it was not until Jan. 1794 that Mr. and Mrs. J. were legally married by a second ceremony. J. acquired considerable property in land, and was chosen a member of the convention which framed the const. of the new State of Tenn. (1796), and was elected in that yr. its first rep. in Cong. The following yr. he was chosen to the U. S. Senate, but resigned in 1798 to accept a seat on the bench of the supreme court of Tenn. In 1804 he settled on the plantation which he called the "Hermitage," near Nashville, set up a cotton-gin, and traded to New Orleans. He was about this time engaged in several personal rencontres, and in 1806 was severely wounded in a duel, his opponent being killed. In 1805 Aaron Burr visited Nashville and was a guest of J., with whom he corresponded on the subject of a war with Sp. Burr repeated his visit in Sept. 1806, when he was warmly received by J., at whose instance a public ball was given in his honor at Nashville, and contracted with the latter for boats and provisions. Early in 1807, when Burr had been proclaimed a traitor by Pres. Jefferson, volunteer forces for the Federal service were organized at Nashville under J.'s command, but his energy and activity did not shield him from suspicions of connivance in the supposed treason.

On the outbreak of war with G. Brit. in 1812, J. tendered his services, and in Jan. 1813 embarked for New Orleans at the head of the Tenn. contingent. In Mar. he received an order to disband his forces, but in Sept. he again took the field in the Creek war. In May 1814 J. was appointed a maj.-gen. of the U. S. A., and commenced a campaign against the Brit. in Fla., conducted the defense of Mobile (Sept. 15), seized upon Pensacola (Nov. 6), and immediately transported the bulk of his troops to New Orleans. Martial law was declared in La.; engagements were fought Dec. 23, and 28, and the victory of Jan. 8, 1815, crowned J.'s fame as a soldier. In 1817-18 he conducted the first war against the Seminoles of Fla., during which he seized Pensacola and executed by court-martial 2 Brit. subjects, acts which might have involved the U. S. in war with Sp. and G. Brit. The peril was averted (1819) by the cession of Fla. to the U. S., and J. was appointed (1821) gov. of the new Terr.

In 1823 J. was elected to the U. S. Senate and nominated for the Presidency. He received (1824) the largest popular vote among the 4 candidates, though J. Q. Adams was elected by the House of Reps. In 1828 J. was elected Pres. over Adams. Inaugurated on Mar. 4, 1829, he at once removed from office all the incumbents belonging to the opposite party. The first term of J. was characterized by the beginning of his war upon the U. S. Bank, and by his vigorous action against the partisans of Calhoun, who in S. C. (1832) threatened to nullify the acts of Cong. establishing a protective tariff. In 1832 J. received 219 out of 288 electoral votes, his competitor being Mr. Clay. In 1833 Pres. J. removed the govt. deposits from the U. S. Bank, thereby incurring a vote of censure from the Senate, which was, however, expunged 4 yrs. later.

For many reasons the administration of J. formed an era in Amer. hist., political, social, and industrial, and he succeeded in effecting the election of his friend Van Buren as his successor. At the close of his second term he retired to his home at the Hermitage, and during the closing yrs. of his life was a devout member of the Presb. ch. D. June 8, 1845. (See, for biography, the monograph of W. G. SUMNER, and PARTON'S *Life of Andrew Jackson*; for political hist., BENTON'S *Thirty Years' View*.)

PORTER C. BLISS.

Jackson (CHARLES), LL.D., b. at Newburyport, Mass., May 31, 1775, grad. at Harvard in 1793; studied law, and, removing to Boston in 1803, soon attained an eminent position at the bar; was judge of the Mass. supreme court 1813-24, member of the constitutional convention in 1820, and chairman of a commission to codify the State laws in 1833. He wrote a treatise on *Pleadings and Practice in Real Actions*, which is a recognized authority upon the law of property. D. Dec. 13, 1855.

Jackson (CHARLES DAVIS), D. D., b. in Salem, Mass., Dec. 15, 1811, grad. at Dartmouth in 1833, and at Andover in 1838; was for a time prof. in Lane Sem. and a teacher in Petersburg, Va., and afterward in Flushing, N. Y.; in 1842 took priest's orders in the P. E. Ch.; held the rectorships of St. Stephen's, N. Y., St. Luke's, Staten Island, and St. Peter's, Westchester, N. Y. He wrote several vols. of sermons and of works on education. D. June 28, 1871.

Jackson (CHARLES THOMAS), M. D., b. at Plymouth, Mass., June 21, 1805; studied med. and geol. in Amer. and Europe; became State geologist of Me., R. I., and N. H., and was U. S. surveyor of mineral lands in Mich. 1847-49. He wrote geological and chemical reports, and a *Manual of Etherization*. (See ANÆSTHESIA.) D. Aug. 29, 1880.

Jackson (CLAIBORNE F.), b. in Fleming co., Ky., Apr. 4, 1807; removed in 1822 to Mo.; was a capt. in the Black Hawk war, and was 1 yr. speaker of the house in Mo. In 1861 was chosen gov., but deposed by the State convention in the same yr., and became a Confed. gen. D. Dec. 6, 1862.

Jackson (HENRY), M. D., LL.D., b. in Moreton-Hempstead, Devonshire, Eng., July 7, 1778; brought to this country in the 12th yr. of his age by his brother, Gov. James Jackson of Ga.; thoroughly ed. at the Pa. Univ. in Phila., where he first took the degree of M. D., and commenced the practice of med. in association with Dr. Grimes of that city. In 1811 he was called to the professorship of natural philos. in the Univ. of Ga. When William H. Crawford was sent minister to Fr. in 1814, Dr. J. accompanied him as sec. of

legation. When Mr. Crawford returned he remained at Paris as Amer. *chargé d'affaires* until 1818. On his return he resumed his professorship, but from domestic affliction was compelled to resign in 1827. D. 1840.

Jackson (HENRY R.), b. at Athens, Ga., June 24, 1820, grad. at Yale in 1839; studied law, settled in Savannah, Ga., and was made U. S. dist. atty. in 1843; col. of a Ga. regiment in the Mex. war 1846; circuit court judge 1849-53; *chargé d'affaires* to Aus., and raised to the grade of minister 1854; while there the Koszta affair occurred. He figured in Charleston Dem. convention of 1860; favored secession, and became brig. gen. in Confed. army. He has pub. a book of poems. Became U. S. Minister to Mex. Mar. 23, 1885.

Jackson (ISAAC W.), LL.D., b. at Cornwall, N. Y., 1804, grad. at Union Coll. 1826; was appointed tutor in math. at Union Coll. in the same yr., and shortly after prof.; wrote math. school-books. D. July 28, 1877.

Jackson (JAMES), b. in Moreton-Hempstead, Devonshire, Eng., in 1758, and migrated to Ga. in 1772; took part in the war for independence; was made brigade-major in 1778, and in 1781 commanded the legationary corps of Ga. Upon the evacuation of Savannah by the Brit. (July 12, 1782) he received the keys. In consideration of his many services during the war, the gen. assembly of the State presented him with a house and lot in the city of Savannah. After the war was over he engaged in the practice of law. He was elected a member of the first Cong. of the U. S., which assembled under the new const. in 1789. He was soon after chosen U. S. Senator from Ga., which position he held until 1795, and then resigned upon the passage of the Yazoo bill by the legislature of his State, which bill he succeeded in getting repealed. In 1798 he was elected gov. of the State, which position he held until 1801, when he was again returned to the U. S. Senate. D. Mar. 19, 1806. In politics he was of the Jeffersonian school. A. H. STEPHENS.

Jackson (JAMES), b. in Jefferson co., Ga., 1819, grad. at the State Univ. in 1837; studied law, and admitted to the bar in 1840; was elected sec. of the State senate in 1842, and was a member of the State legislature 1845-47; 1849-57 was on the circuit court bench of the State; became a member of the 35th Cong.; was again elected to the 36th Cong.; resigned his seat in the house when Ga. passed her ordinance of secession in 1861. Since the war he has confined himself to the practice of law at Macon, Ga. For many yrs. he has been a trustee of the Univ. of the State. Chief-justice of the supreme court of Ga. 1880.

Jackson (JAMES), M. D., LL.D., b. at Newburyport, Mass., Oct. 3, 1777, grad. at Harvard in 1796; studied med. in Europe, and began practice in Boston in 1800. He was the first phys. of the Mass. Gen. Hospital; in 1810 became prof. of clinical med. in the Mass. Med. School, and in 1812 prof. of theory and practice. He wrote *On the Brunonian System*, *On the Effects of Dentition*, *Letters to a Young Phys.*, etc. D. Aug. 27, 1867.

Jackson (JOHN), D. D., b. at Lond. Feb. 22, 1811, grad. at Pembroke Coll., Ox., in 1833. In 1836 he became headmaster of the proprietary gram. school at Islington, in 1846 rector of St. James's, Piccadilly, in 1847 chaplain to the queen, in 1852 canon of Bristol, and in 1853 bp. of Lincoln. Dr. J. was a select preacher before the Univ. of Ox. in 1845, 1850, 1862, and 1866, and delivered the Boyle Lectures in 1853. He became bp. of Lond. in 1869. D. Jan. 6, 1885.

Jackson (JOHN DAVIES), A. M., M. D., b. at Danville, Ky., Dec. 12, 1834, grad. from Centre Coll. in 1854; received his med. degree from the Univ. of Pa. 1857; served as a surgeon in the Confed. army; wrote or translated *An Operative Manual*, *The Black Arts in Med.*, etc.

Jackson (JONATHAN), b. at Boston June 4, 1743, grad. at Harvard Coll. 1761, and became a wealthy merchant at Newburyport. Member of Provincial Cong. of Mass. in 1775, rep. in 1777, M. C. in 1782, and State senator in 1789. He was the author of *Thoughts upon the Political Situation of the U. S.* (1788). D. Mar. 5, 1810.

Jackson (SAMUEL), M. D., b. in Phila. Mar. 22, 1787, grad. at Rutgers Coll. 1812; was 1835-63 prof. of the institutes of med. at the Univ. of Pa. His chief work was the *Principles of Med.* D. Apr. 5, 1872.

Jackson (THOMAS), D. D., b. at Willowing, Eng., in 1579, was ed. at Ox.; became pres. of Corpus Christi Coll. in 1630, prebendary of Winchester in 1635, and dean of Peterborough in 1638. He was a voluminous writer, and his *Commentary on the Apostles' Creed* is still highly valued. D. in 1640.

Jackson (THOMAS), D. D., b. at Sancton, Yorkshire, Dec. 12, 1783; ed. of *The Wesleyan Magazine*, then theological tutor in the Wesleyan coll. at Richmond. His works are *The Institutions of Christianity*, *Life of Charles Wesley*, *The Centenary of Methodism*, etc. D. Mar. 11, 1873.

Jackson (THOMAS), M. A., b. at Preston, Eng., in 1812, grad. at St. Mary's Hall, Ox., in 1834; took holy orders; became prin. of the Normal Coll. at Battersea and canon of St. Paul's. In 1849 was appointed bp. of New Zealand, but returned without having been consecrated; was preferred to the rectory of St. Mary, Stoke Newington. His educational publications are numerous.

Jackson (THOMAS JONATHAN), ("Stonewall"), b. at Clarksburg, W. Va., Jan. 21, 1824, grad. at W. Pt. 1846; served with distinction during the war with Mex., and was brevetted as major. In 1852 he resigned from the army, having been previously appointed prof. of natural and experimental philosophy andartil. instructor at the Va. State Military Inst. at Lexington, Va., a position which he filled when Va. declared for secession, and in which he was chiefly notable for intense religious sentiment, coupled with personal eccentricities. He was appointed col. by the gov. of Va., and seized the U. S. armory at Harper's Ferry May 3, 1861. Relieved by Gen. J. E. Johnston (May 23), he fell in command of the brigade afterward famous as the "Stonewall brigade." The junction of the forces of Johnston and Beauregard having taken place in the rear of Bull Run, J., previously made a brig.-gen., came prominently into public

view with the battle of Manassas, where he acquired the sobriquet of "Stonewall." Made a major-gen. (Sept. 1861), he was soon placed in command of the Confed. forces in the lower Shenandoah Valley. Here he gave to a comparatively petty force that mobility which enabled him to deliver so many opportune blows, with the effect to neutralize an aggregate of nearly 70,000 Federal soldiers. Fresh from such successes, J. was now called to add his corps to the main Confed. army at the moment crowded back upon Richmond. Then was made that notable flank movement which ended in the decisive stroke upon McClellan's right at Cold Harbor (June 27, 1862), a movement executed under orders, but in its manner J.'s own. Gen. Pope having been called from the West and placed in command of a large U. force, which he pushed to the Rapidan, while McClellan still threatened Richmond, J. was detached by Lee to confront the fresh menace with 3 divisions, and fought the battle of Cedar Run (Aug. 9). Gen. Lee deciding to take the offensive in the same direction, J. was charged with the lead in the operation, which resulted in one of the most brilliant feats of the war, and he was the conspicuous figure in the actions of Aug. 29-30, 1862. In the invasion of Md. that followed, J. was detached for a special operation, and was soon able to announce that Harper's Ferry had been surrendered into his hands. But this success was dearly gained, for it entailed the inopportune absence of $\frac{3}{4}$ of Lee's best troops so much longer than was anticipated that, thrown meanwhile upon the defensive, his offensive plan of campaign was virtually foiled, while his adversary was enabled to force battle at Antietam. In that action, however, J. was present with 2 of his divisions. In Burnside's attack on Lee at Fredericksburg (Dec. 11, 1862), J. held the Confed. right, with no marked opportunity for the display of his capacity. When, on the eve of the operations that ended at Chancellorsville, Gen. Hooker made a feint of passing the Rappahannock below Fredericksburg, Lee, forecasting Hooker's real plan, detached J. with 3 divisions in the direction of Chancellorsville. At J.'s own suggestion, he was now intrusted with his last flank operation—a swift march around and descent upon the U. right and rear, and he fell suddenly upon the 11th Federal corps on the afternoon of May 2, and completely routed it. Pressing the advantage he was carried far in advance of his men, until urged to return. Doing so, after nightfall, he and his suite, mistaken for Federal cav., received the fire of several Confed. regiments, and J. fell with 3 wounds, from which he died, May 10, 1863. [From orig. aut. in J. S. Lane, *Conf.*, by GEN. THOMAS JORDAN.]

JACKSON WILLIAM, b. in Cumberland co., Eng., Mar. 9, 1759; came to Charleston, S. C., in boyhood; was liberally ed., and served creditably in the Revolution, attaining the rank of major as aide-de-camp to Washington. In 1781 he was sec. to Laurens in his mission to Fr., in 1782-83 assistant sec. of war. In 1787 sec. to the U. S. constitutional convention, private sec. to Washington during his first Presidency, surveyor of the port of Philadelphia 1796-1801 and sec. of the Society of Cincinnati from 1800 until his death, Dec. 17, 1828. He pronounced the funeral oration upon Washington at Phila., where in 1801 he started one of the first daily papers in Amer., *The Political and Commercial Register*.

JACKSONVILLE, city and R. R. centre, cap. of Duval co., Fla., on St. John's River, 25 m. from its mouth. It is the centre of business and travel for this section of the State. Pop. 1870, 6912; 1880, 7650.

JACKSONVILLE, city and important R. R. centre, cap. of Morgan co., Ill., near Mauvassette Creek, an affluent of the Ill. River, 30 m. W. of Springfield. It has State insts. for the insane, deaf and dumb, feeble-minded children, and the blind; of incorporated insts., the Ill. Coll. (Congl.), Ill. Female Coll. (Meth.), Jacksonville Female Acad., Young Ladies' Athenaeum, Ill. Conservatory of Music, and a combined acad. and business coll.; of private insts., the Lutheran orphan asylum, a retreat for the insane, and a surgical infirmary. Pop. 1870, 9209; 1880, 10,927.

JACKSONVILLE, Or. See APPENDIX.

JACK TREE, the *Artocarpus integrifolia*, a tree which originated in the E. I. and is naturalized throughout a large part of the tropical world. It produces abundantly a fruit resembling but much larger than the bread-fruit, to which it is closely related. Though its taste is unpleasant, the lower classes of India eat it as food. Its wood is extensively employed in Europe for inlaying, carving, and fancy joinery.

JACME (JAYME or JAUME) EN I., king of Aragon and count of Barcelona, b. in 1207 or 1208 at Montpellier, and d. at Xativa in 1276. To his inherited states he added by conquest the Moorish kingdoms of Majorca, Valencia, and Murcia, and he imposed tribute on Granada, Tunis, and Tlemcen. Hence he is generally styled the *Conqueror*. His life and exploits are recorded in *Libre dels Feys estevinguts en la rida del mall alt Sanyar Rey En Jacme lo conqueridor*.

JACME (or JAYME) II., called the JUST, king of Aragon and count of Barcelona, b. about 1259, was grandson of the preceding, and second son of Pedro III. on whose death, 1285, he became king of Sic., and on the death of his brother, Alfonso III., 1291, succeeded him on the throne of Aragon, leaving the govt. of Sic. to his brother Frederic. He maintained wars with Naples, Genoa, Pisa (conquering Sardinia and Corsica), and the Moors of Granada and Tripoli; founded the Univ. of Lérida; expelled the Knights Templars, and d. at Barcelona in 1327.

JACOB, or ISRAEL, in biblical hist. the immediate ancestor of the Heb. nation, being the son of Isaac, grandson of Abraham, and father of the 12 patriarchs from whom the tribes of Israel deduced their origin. In consequence of a quarrel with his twin-brother Esau, J. was sent by his parents to his uncle Laban, at Haran in Padan-aram, where he married his cousins Leah and Rachel, and resided 20 yrs. He then returned to Canaan with his family and his riches. Arriving near home, he became reconciled with his brother Esau. His old age was embittered by the conduct of his sons, who sold his favorite, Joseph, as a slave to the Midian-

ites, who took him to Egypt. Many yrs. later, when Joseph had become viceroy of Egypt, the whole family of J. was established in Egypt, where he died. On his death-bed he pronounced a blessing upon each of his sons, and commanded them to bury him with his fathers in the cave of Machpelah in the land of Canaan.

JACOB (JOHN), GENERAL, b. at Woolavington, near Bridgewater, Eng., in Jan. 1812; distinguished for his gallantry in India, for his influence over the natives of the N. W. frontier, and for the invention of the Jacob rifle. Wrote *Views and Opinions*. D. at Jacobabad Dec. 5, 1858.

JACOB of Edessa, a Syrian theol., flourished in the second half of the 7th century. About 651 A. D. he became bp. of Edessa; annotated the Syriac version of the O. T., and translated Gr. works into Syriac. D. June 5, 708.

JACOB of Hungary, called THE MASTER, a religious fanatic in Fr. hist. in the time of the 7th Crusade. In his youth he was reported to have been a Cistercian friar, to have learned magical arts from the Sp. Moors, and to have embraced Islamism. After the surrender of St. Louis to the Mussulmans of Egypt, he went through the provs. of Fr. preaching a crusade for the liberation of the king. He laid claim to divine inspiration, and gathered about him in Flanders some 30,000 shepherds and peasants, at whose head he started for Paris. At Amiens the mob obtained arms and recruits, and it numbered 100,000 when it presented itself before the walls of Paris; when admitted into Paris it began to commit depredations, while J. assumed priestly faculties. He divided his followers into several bands, and sent them by different routes toward the Holy Land. At Orleans they massacred the priests, at Bourges the Jews. These excesses caused the *Shepherds* to be excommunicated, and J. was killed while preaching.

JACOB of Vitry, b. at Vitry, Fr., in the second half of the 12th century, was a parish priest at Argenteuil; became a zealous apostle of Maria of Oignies, a woman who was supposed to possess supernatural gifts; preached a crusade against the Albigenes; devoted himself to the interests of the Holy Sepulchre at Jerusalem, travelling through Fr. to collect alms; appointed by Pope Honorius III. (1217) bp. of Acre, and by Pope Gregory IX., in 1229, cardinal-bp. of Tusculum, and papal legate of Fr., Babat, and the Holy Land. Wrote *Historia Orientalis*, called *Hist. of Jerusalem*, and *Historia Occidentalis*, a *Life of the Blessed Mary of Oignies*. D. Apr. 30, 1230.

JACOB'AN LIL'Y (*Amaryllis formosissima*), a beautiful S. Amer. flower acclimated in the U. S. Its bulb is large, dark-colored, and long-necked protruding above the surface of the ground; the flowers, which appear before the leaves, are large, irregular, and of a brilliant crimson color.

JACOBI (ABRAHAM), M. D. b. in Westphalia May 6, 1830; grad. at Bonn in 1851, and came to the U. S. in 1853 in consequence of political persecutions in Ger. He has become a leading authority upon the subjects of obstetrics and diseases of women and children, having been prof. of these branches at the New York Med. Coll. (1860-69) and the Coll. of Phys. and Surgeons. Wrote *Definition and its Derangements*, and other works, and edited *Amer. Journal of Obstetrics and Diseases of Women and Children*.

JACOBI (FRIEDRICH HEINRICH), b. at Düsseldorf Jan. 25, 1743, and received a commercial education at Frankfurt and Geneva, in which latter city he spent 3 yrs. In 1763 he was placed at the head of the paternal firm, and conducted the business of the house for 7 yrs. with great conscientiousness and with success. In 1770 he retired from mercantile affairs, having been appointed a councillor of finance for the duchies of Julich and Berg. In 1794, on the invasion of the Fr., he removed to N. Ger. and lived for 10 yrs. mostly in Eutin. In 1804 he was called to Munich as a member of the newly erected Acad. of Science, of which he became pres. in 1807. In 1813 he resigned this position, and d. Mar. 10, 1819. His talent as a writer was half poetical, half philosophical. Of greatest interest are his *Ueber die Lehre des Spinoza*, *David Hume über den Glauben*, *Sendeschreiben an Fichte*, *Von den göttlichen Dingen*, and *deber Offenbarung*.

JACOBI (MARY PUTNAM), M. D. b. in Lond. in Aug. 1842, of Amer. parents; came to New York in 1848; was ed. in the 12th st. gram. school by Prof. G. W. Greene, and in the Woman's Med. Coll. in Phila., and was the first woman who grad. from the Coll. of Pharmacy in New York. In 1868 she went to Paris, and was the first woman admitted to the Paris Ecole de Médecine, from which she grad. in 1871, receiving the second prize, a bronze medal, for her graduating thesis; returned to New York, commenced practice, and was made prof. of materia medica in med. coll. established by Elizabeth Blackwell, M. D. In 1873 she was married to Dr. A. Jacobi. Many of her papers have been pub. in *Medical Record* and *Journal of Obstetrics*.

JACOBI (MORITZ HERMANN), b. at Potsdam Sept. 21, 1801; prof. of civil engineering at the Univ. of Dorpat in 1835, member of the Acad. of Science in St. Petersburg in 1847. D. in St. Petersburg Mar. 10, 1874. He was the inventor of the galvanoplastic art, and wrote *Die Galvanoplastik*.

JACOBINS [Lat. *Jacobins*, "James'"], members of a Fr. political society, founded 1789 by deputies from Brittany during the session of the States-General at Versailles. It was at first called the "Breton Club," which name was soon changed to "Société des amis de la Constitution." In 1789 the club established itself in an old Dominican monastery in the Rue St. Honoré, Paris. The Fr. Dominicans were commonly called Jacobins, from the fact that a ch. dedicated to St. James had been given to them in the 13th century, and this name was adopted by the new club. Many distinguished persons were among its members, and its power increased rapidly. As its influence spread, its principles became more democratic, so that in Apr. 1790 the moderate members withdrew. The J. dictated every govt. measure. Through Robespierre they ruled during the Reign of Terror, and after his downfall in July 1794 they were overthrown. In Nov. the club was suspended, and the hall where it had met

was closed. The term *Jacobin* is still sometimes applied to persons of extreme revolutionary principles.

Jacobites, 1. An Oriental Chr. sect, monophysitic in doctrine, deriving their name from Jacob Baradaï, "the ragged," a monk and presbyter who became bp. of Edessa 541 A. D., and d. 578. He took upon himself the gen. superintendence of Monophysites in the E., and brought their number up to about 100,000. They are now very much reduced.—II. In G. Brit., partisans of King James II., de-throned in 1688. They were strongest in Scot.

Jacobs (MICHAEL), D. D., one of the founders of Pa. Coll. at Gettysburg, prof. of math. and of the phys. and natural sciences in it; b. near Waynesboro', Pa., Jan. 18, 1808. In early boyhood he was left an orphan; entered the preparatory dept. of Jefferson Coll. 1824; grad. with the valedictory 1828; taught for 5 months in a Presb. school at Belle-Air, Md.; came to Gettysburg to assist his brother, Rev. D. Jacobs, 1829; was prof. 1832-71; was licensed by the W. Pa. synod 1832, ordained 1834, pres. of synod 1849-51, sec. of gen. synod 1845; received the title of D. D. simultaneously from Jefferson and Wittenberg Colls. 1859. His *Notes on the Rebel Invasion*, some 8 articles in the *Ev. Review*, 2 in *U. S. Service Magazine*, and a number in *Linnean Record and Journal* comprise all his publications. D. July 22, 1871.

Jacobson (WILLIAM), D. D., b. in Norfolk in 1803, grad. at Lincoln Coll., Ox., in 1827, with high honors; obtained a fellowship at Exeter Coll. in 1829; was vice-prin. of Magdalen Hall from 1832-48, when he became regius prof. of divinity. In 1865 was appointed bp. of Chester. Edited the *Remains of the Apostolic Fathers*, Nowell's *Catechism*, the *Collected Works of Bp. Sanderson*, etc.

Jacobus (MELANCTHON WILLIAMS), D. D., LL.D., b. at Newark, N. J., Sept. 19, 1816; grad. at the Coll. of N. J. in 1834, and in 1838 at Princeton Theological Sem., where he was assistant teacher in Heb. 1838-39. In 1839 he was settled in Brooklyn, N. Y.; in 1853-51 travelled in Europe and the E., and in 1851 was made prof. of Oriental and biblical lit. in the theological sem. at Allegheny, Pa. He received the degree of D. D. from Jefferson Coll. in 1852, and of LL.D. from the Coll. of N. J. in 1867. In 1869 he was moderator of the Gen. Assembly. Pub. *Notes on the N. T.* also 2 vols. on *Genesis*. D. Oct. 28, 1876. R. D. HITCHCOCK.

Jacoby (LUDWIG SIGISMUND), D. D., b. at Alt-Strelitz, Mecklenburg, Oct. 21, 1811, of Jewish parents. Converted to Christianity when about 21 yrs. of age, he came to Amer. some yrs. later and joined the M. E. Ch., in which he became a preacher about 1840. After being for several yrs. presiding elder of Ger. dists. in the W. States, he returned to Ger. in 1849 to introduce Methodism in that country. Through his labors missions were established and a publishing-house and theological sem. at Bremen under his own superintendence. In 1872 he returned to Amer. and became pastor of a ch. in St. Louis, Mo. Among his writings are a *Concordance of the Bible* and a *Hist. of Methodism in the Whole World* down to 1869.

Jacotot, zhab-ko-to' (JEAN JOSEPH), b. at Dijon, Fr., Mar. 4, 1770; appointed prof. of Lat. and Gr. lit. at his native place when barely 19 yrs. of age; entered the army in 1792, becoming capt. of artil. in the invasion of Belg.; assisted the board established at Paris for the manufacture of gunpowder by extraordinary methods; was made prof. of math. at the Ecole Normale; then of Rom. law; a director of the Polytechnic; filled at Dijon the chair of scientific method, in which he introduced an original system. Exiled in 1815 for having supported Nap. in the Chamber of Deputies during the "Hundred Days," he retired to Belg., where he became prof. of Fr. at the Univ. of Louvain and director of the military school, introducing his new system, the precursor of the methods of Hamilton and Olendorff; returned to Fr. in 1830. D. July 30, 1840.

Jacquard, zhab-kar' (JOSEPH MARIE), b. in Lyons, Fr., July 7, 1752; invented the loom which has made his name a household word; in 1804 he was mobbed by the operatives of Lyons, acting under the belief that the new loom would be ruinous to their class. This circumstance led to the purchase of the invention by the govt., and Nap. (1806) declared it public property. D. Aug. 7, 1834.

Jacquard Loom. See Loom, by W. E. A. Axon.

Jacqueline (zhahk-len') of **Bavaria**, b. in 1400, daughter and heir of William VI. of Bavaria, count of Hol. and Hainault, and of his wife, Margaret of Burgundy. In childhood she was betrothed to Prince John of Fr., who d. by poison in 1417, in which yr. she succeeded to her father's estates. After refusing to marry the duke of Bedford, J. wedded her cousin John IV., duke of Brabant, but abandoned him, and in 1420 went to Eng., where Humphrey, duke of Gloucester, sought her hand. After the death of Henry, the antipope, Benedict XIII., annulled her first marriage, and in 1423 Gloucester obtained the coveted prize. He sailed for Hainault with 5000 troops to reconquer his wife's estates, seized by the dukes of Burgundy and Brabant. After many vicissitudes of fortune, J. was imprisoned at Ghent, escaped to Hol., repudiated her husband, made war on her own account, and ceded her estates to the duke of Burgundy to purchase the liberation of her new husband, Francis of Borselen. D. in 1436.

Jacquerie, **Insurrection of the**, a war of the Fr. peasantry against the nobles, which broke out May 12, 1358, during the imprisonment of John II. the Good in Eng. The oppressions of Charles the Bad of Navarre and the tyranny of the nobles were the causes. For some 3 weeks the peasants were successful, but they were overthrown on June 9, at Meaux. The name "Jacquerie" signifies the "Jacks" or clowns.

Jade, a hard green stone, highly prized in the E. and by anc. races for ornaments.

Ja'de, a fortified seaport of Ger., on the N. Sea, was formed since 1853. At that time Prus. bought the coast dist. from Oldenburg for 500,000 thalers, and it has since spent a large amount in order to transform the Bay of Jade

into a good naval harbor. Since 1869 the place is called Wilhelmshaven.

Ja'fa, Yafa, or Joppa, town of Asiatic Tur., on the Mediterranean, 33 m. N. W. of Jerusalem. In the times of David and Solomon it was the port of Jerusalem. During the Crusades it was the landing-place of the Chr. armies. Now its harbor is nearly sanded up. Pop. 5000.

Ja'trey (GEORGE), b. at New Castle, N. H., Nov. 22, 1682, grad. at Harvard Coll. 1702; became councillor, judge, treas., and chief-justice of N. H. D. May 8, 1749.

Jaganatha. See JAGGERNAUT.

Jagellons, the name of a dynasty which reigned from the 13th to the 17th century in Poland, and during much of the time in Lithuania, Hungary, and Bohemia. The founder of the family was Jagellon or Jagiello, b. about 1354, grand duke of Lithuania, who married Hedwig, daughter of Louis the Great, king of Poland and Hungary. He became king of Poland under the name of Ladislas II.

Jag'gar (THOMAS AUGUSTUS), D. D., b. in New York June 2, 1839; was ed. by a private tutor; grad. at the Gen. Theological Sem. of the Epis. Ch.; ordained deacon in 1860 and presbyter in 1863; became rector of Trinity, Bergen Point, in 1862, of Anthon Memorial ch., New York, in 1864, of St. John's, Yonkers, in 1868 (founding there the St. John's Riverside Hospital), and of Holy Trinity in Phila. in 1870. He was made a D. D. by the Univ. of Pa. in 1874; was elected bp. of S. Ohio Jan. 14, 1875, and was consecrated to that office in May 1875.

Jaggernaut', or **Puri**, town of Orissa, on the Bay of Bengal. Its name is a corruption of the Sans. *Jaganatha*, "king of the world" which it received from an idol of Krishna, the lord of the universe, which it possesses—a wooden block in the shape of a cucumber, whose upper extremity represents a hideous human face. Around this idol has been erected a magnificent temple, or rather a city of temples, and hundreds of thousands of pilgrims visit the place every yr. Pop. 19,825.

Jag'gery [Hindu, *jākrī*; Prakrit, *sakkara*; Lat. *saccharum*; Eng. *sugar*], the sugar obtained in India from various palm trees, notably the cocoanut palm (*Cocos nucifera*), the toddy palm (*Phoenix sylvestris*), and the jagery palm (*Calypota urens*). The quality of the sugar is poor, but its quantity is very great, and it is now exported to Eng., and there refined more cheaply than ordinary sugar. After refining the sugar is identical with cane and beet-root sugar.

Jaguar, jag-u-ar' [Braz. *Jaguará*], the largest of the cat family of Amer., found from Tex. to Patagonia, generally inhabiting forests by preference, and being largely arboreal in its habits. It is exceeded in size by the lion and tiger. Its hide is often of a rich yellow, spotted and ringed with black. The skins are of considerable commercial value. The animal is ferine.

Jahn (FRIEDRICH LUDWIG), generally known under the name of *Turnvater Jahn*, b. Aug. 11, 1778; studied theol. at Halle and Göttingen; in 1805 enlisted in the Prus. army as a soldier. His ideas of preparing a tremendous uprising of the Ger. nation by a return to the old, genuine Ger. civilization of the times of Hermann, and by a perfect phys. training, were utterly fantastic. But his "turn-art" was, nevertheless, a good thing. It formed immediately numerous centres around which the Ger. patriotism gathered and developed, and later it exercised a salutary influence on the whole system of education. D. Oct. 15, 1852.

Jail Fever, a form of TYPHUS (which see).

Ja'inas, a Hindu religious sect, remarkable for respectability, influence, and opulence. Jaina doctrines began to be successfully promulgated about the beginning of the 6th century A. D. They revered certain holy mortals who had acquired by practices of self-denial and mortification a station superior even to the gods worshipped by the Brahmans, and thus they conciliated the Buddhists. On the other hand, they were strict in avoiding the destruction of any animal life, recognized caste, and thus they conciliated the Brahmans.

The term *Jaina* is derived from the Sans. *Jina*, signifying "one who is a victor." The saints worshipped by the J. were *Jinas*—those who had conquered all human passions, desires, aspirations, and infirmities, and had attained to a state of perfect apathy. They venerated 72 saints, 24 of whom were of a past age, 24 of a present, and 24 were to come. The worship of the last 2 of the present era eclipsed the veneration paid to all other Jinas in Hindustan.

The J. were divided into laymen and clerics—viz. *Sravakas* and *Yatis*. The Yatis received alms from the Sravakas, who assembled in the Jaina temples to worship the *Tirtha Karas*, or perfected Jinas. The Yatis never actually officiated as priests; that was left to the Brahmans, whom J. acknowledged to be the orthodox priestly caste, thereby conciliating the Hindus.

Jaina doctrines arrange themselves under 9 *Tattwas*, or first principles. Briefly they are—(1) *Jīva*, life; (2) *Ajīva*, lifeless; (3) *Punya*, good, or merit; (4) *Pāpa*, ill, or demerit; (5) *Asrava*, source of acts; (6) *Samrava*, that by which acts are collected or impeded; (7) *Nirjara*, sin-destroying religious practice; (8) *Bandha*, association of life with acts; and (9) *Moksha*, final spiritual liberation from the bonds of action, exemption from the incidents of existence, and freedom from the necessity of being born again. Jaina lit. consists of *Purānas*, hist., legends, books of prayer and ritual, and treatises on med., astron., arith., and gram. One of the greatest Jaina writers was Hemachandra, who may have flourished at the end of the 12th century. The earliest Jaina writing of any note cannot probably be assigned an earlier date than the beginning of the 10th century A. D. [From *orig. art. in J.'s Univ. Cyc.*, by R. C. CALDWELL.]

Ja'lap [Sp. *Jalapa*, from the city of that name], the dried root of *Ezootium purga*, a climbing plant growing in the mts. above the city of Jalapa, Mex. The root is turnip-shaped or radish-shaped, varying in size from that of a walnut to that of a pear. Its active principle is a resin, con-

sisting of a hard and a soft portion, both apparently equally effective medicinally. J. is one of the milder of the drastic cathartics. The "compound jalap powder" is a mixture of J. and cream of tartar. J. is an ingredient of the "compound cathartic pill" of the Pharmacopœia.

Jalapa, ha-lah'pah, city of Mex., on the slopes of the Cordilleras, 4500 ft. above the sea. 60 m. N. W. of Vera Cruz and 140 E. of the city of Mexico. Situated within a few miles of the snow-capped Orizaba and the peak of Perote, half way between the *tierra caliente* of the sea-coast and the *tierra templada* of the central table-land, J. enjoys one of the finest climates in the world. It was founded in the time of Cortez; cap. of State of Vera Cruz. Pop. about 10,000.

Jalisco, ha-lis'ko, a state of Mex., bounded by Sinaloa, Durango, Zacatecas, and Aguas Calientes on the N., Guajalato and Michoacan on the E., Colima on the S., and the Pacific on the S. W. J. was known as the kingdom of Nueva Galicia during the period of Sp. dominion, and was as a prov. distinct from New Sp. or Mex. It is traversed by the river Toluolotan or Santiago, and includes the lake of Chapala and the volcano of Colima. The surface is diversified by rugged mts., with vast ravines or *barrancas*, the riverbeds sometimes lying between perpendicular walls nearly 1000 ft. high. Precious metals are abundant, but are mined upon a comparatively small scale. The inhabs. are in great part Indians of several distinct tribes. Area, about 50,000 sq. m. Pop. about 1,000,000.

Jamaica, ja-mā'ka, an island of the W. I., one of the Great Antilles, belonging to Eng., and lying off the Bay of Honduras, between the Caribbean Sea and the Gulf of Mexico, lat. 17° 40' and 18° 30' N., and lon. 76° 15' and 78° 25' E., 90 m. S. of Cuba. Area, 4,193 sq. m. The island is traversed from E. to W. by the Blue Mts., from 7000 to 8000 ft. high, which to the N. slope quite gently down toward the coast, while to the S. they present a range of wild and precipitous cliffs along the shore; they send a great number of small, rapid rivers down both sides, of which only one, the Black River, is navigable. The S. E. part of the island is lower and more level, and here are the prin. plains, which are mostly occupied with sugar-plantations. The climate of J. is hot and unhealthy along the shores and in the depths of the valleys; yellow fever visits these regions every yr. The rainy seasons occur in Apr. and May, and in Sept., Oct., and Nov. Earthquakes are also frequent, and have sometimes been very destructive, as, for instance, in 1692 and 1780. But at an elevation of 1500 ft. the climate is healthful and very agreeable. It is so mild that coffee can be cultivated at an elevation of 5000 ft., and sugar, indigo, and other tropical plants flourish in the valleys. The forests are rich in bread-fruit trees, mahogany, and cedar; the prin. palms are the cabbage-palm and the cocoa-nut tree. Of wild animals only the agoutis, iguanas, some species of monkeys, and alligators are numerous. But the domesticated animals of Europe, which have been introduced, thrive well. J. was discovered by Columbus May 3, 1494, and the first Sp. settlement was made there in 1509. In 1655 it was taken by the Eng., who retained it by the treaty of Madrid in 1670. In 1807 the slave-trade was abolished, and in 1833 the slaves were emancipated. The island is divided into 3 counties; its cap. is Kingston. It is governed by a capt.-gen., appointed by the Crown, and an assembly of 47 members, elected by the people. Pop. 1881, 580,804.

Jamaica, R. R. junc. and cap. of Queens co., N. Y., on L. I., 10 m. E. of New York. Pop. 1870, 3791; 1880, 3922.

James, the son of Zebedee [Lat. *Jacobus*; Gr. *Ἰάκωβος*], called THE GREATER, one of the 12 apostles, and brother of John. He was a fisherman on the Lake of Galilee when called to follow Jesus, and with Peter and John formed a group distinguished from the other apostles by being the chosen witnesses of several of the chief incidents in the ministry of Christ. James and John appear at one time to have entertained false views of the nature of Christ's kingdom, and to have aspired to a sort of primacy, which was rebuked by Jesus; who on another occasion gave the brothers the appellation of Boanerges ("sons of thunder"). James was the first martyr among the 12, having been killed by King Herod Agrippa, A. D. 44.

James, the son of Alphaeus, called THE LITTLE, one of the 12 apostles. His mother's name was Mary, who is called "the wife of Cleophas," and is referred to as a "sister" of Mary, the mother of Jesus. Whether this James is the same as "James the Lord's brother" spoken of by Paul has been much discussed. James the Lord's brother became the head of the Ch. at Jerusalem, and is generally believed to be the author of the Epistle known by his name.

James, Epistle of, one of the canonical books of the N. T., the first of the so-called catholic Epistles. It is ascribed to "James the Lord's brother," who is generally identified with James the Less, though many commentators contend that he was distinct from both the apostles bearing the same name. The Epistle is believed by the majority of critics to have been written several yrs. before the destruction of Jerusalem by the head of the Jewish Ch., and addressed to the Chrs. of Asia Minor. The "doctrine of works," which forms its chief topic, has occasioned more controversy upon this Epistle than upon almost any other book of the canon. Though Luther and his immediate followers rejected this Epistle, modern Prots. think it represents faithfully the practical teaching of Christ, and find many analogies with the Sermon on the Mount.

James I. of G. Brit. (VI. of Scot.), b. at Edinburgh Castle June 19, 1566, son of Mary, queen of Scots, by her husband, Henry Stuart, Lord Darnley; crowned at Stirling July 29, 1567. During the yrs. of his childhood the regency was successively in the hands of the earls of Murray, Lennox, Mar, and Morton, until, on the overthrow of the latter in 1577, J. took the govt. into his own hands, which was confirmed by Parl. in 1578. Earl Morton regained power for a short time, but was beheaded in 1581, after which Arran and the duke of Lennox ruled until Aug. 1582, when the no-

bles seized the king at Ruthven Castle, imprisoned Lennox, and banished Arran. The c. war and court intrigues went on; J. made a treaty with Elizabeth, receiving from her a pension (1585), unsuccessfully interceded for his mother's life (1587), co-operated with Eng. against the Sp. Armada (1588), went to Den., where he married the princess Anne (1589), carried on war against several Catholic lords from 1590 to 1597, and by the death of Elizabeth in 1603 succeeded to the throne of Eng. He presided at the Hampton Court Conferences in Jan. 1604; exiled Jesuits and sem. priests; assumed the title of "king of Great Britain, France, and Ireland" Oct. 24, 1604; discovered the "Gunpowder Plot" 1605; instituted the order of baronets 1611; lavished honors upon the unworthy favorites by whom he was directed. Great efforts were made by J. to obtain the alliance of Sp. through the marriage of Prince Charles with a Sp. princess, and on the failure of negotiations in 1624 declared war against that power, but d. soon after at palace of Theobalds Mar. 27, 1625. The king, whose education had been directed by George Buchanan, wrote *Essays of a Precedent in the Divine Art of Poetry, Demonology, True Law of Free Monarchies*, etc.

James II. of G. Brit., a son of Charles I., b. in Lond. Oct. 15, 1633; became duke of York; escaped in 1648 from the Parliamentarians and fled to the Low Countries; succeeded Charles II. 1685. The events of his reign were the insurrections of Argyle and Monmouth (1685), the attempts of the king to overthrow constitutional govt. and to establish the R. Cath. religion, the violation of the privileges of the univs., the imprisonment of the bps. for petitioning to be excused from reading a royal proclamation, the establishment of new and illegal tribunals, the maintenance of a standing army without legal warrant. The whole nation became aroused; William, prince of Orange, a cousin of the king, and Mary, princess of Orange, the king's eldest daughter, were called by common consent to the throne; J. abdicated Dec. 11, 1688, and fled to Fr., but in 1689 invaded Ire., and in 1690 was defeated at the Boyne; retired to Fr. D. at St. Germain Sept. 16, 1701.

James I. of Scot., son of Robert III., b. in 1394 at Dunfermline; captured by the Eng. while on his way to Fr. 1406, and imprisoned; wrote the *King's Quhair* and other poems while in confinement; went in 1417 to Fr. with Henry V.; married Joanna Beaufort, granddaughter of John of Gaunt, 1424; was liberated, proclaimed king, and crowned at Scone 1424; restored order to Scot.; used so much rigor toward the turbulent nobles that he was murdered by their emissaries at Perth Feb. 21, 1437.

James II. of Scot., son of James I. and Queen Joanna Beaufort, b. in 1430, crowned at Edinburgh 1437; assumed the govt. 1444; made war with Eng. 1448; married Mary of Gueldres 1449; murdered William, 8th earl of Douglas, with his own hand 1452; defeated an insurrection headed by the 9th earl; made a treaty with Henry VI. of Eng. in 1459, by which he acquired the counties of Durham and Northumberland. Killed by the bursting of a gun at the siege of Roxburgh, Aug. 3, 1460.

James III. of Scot., son of James II. and Queen Mary of Gueldres, b. June 1, 1452, and crowned 1460. The govt. after the death of the queen-mother (1463) and of Bp. Kennedy (1466), fell into the hands of the Boyd family; Henry VI. of Eng. had taken refuge in Scot. in 1461, and involved the Scotch in the war of the Roses, but in 1464 a 15 yrs. truce was concluded. J. married the Princess Margaret of Den. in 1469, thereby acquiring the Orkney and Shetland islands; dismissed the Boyds from power, and came under the influence of the Hamiltons; experienced several insurrections; had to wage war against the nobles, who had placed at their head his son, Prince James (1487), and was killed at Sanchie, near Bannockburn, June 1488.

James IV. of Scot., son of James III. and Margaret of Den., b. Mar. 17, 1472; joined the nobles against his father in 1487; was crowned at Scone in June 1488; suppressed an insurrection headed by Lords Forbes and Lyle 1489; favored Perkin Warbeck, whom he received at his court as king of Eng. (1493), on whose behalf he made war upon Eng. (1496-97), but concluded a truce, and in 1503 married Margaret, daughter of the Eng. king, Henry VII.; took offence, 1513, at an insult from his brother-in-law, Henry VIII., invaded Eng., and was slain at Flodden Field, Sept. 9, 1513.

James V. of Scot., son of James IV. and Margaret of Eng., b. at Linlithgow Apr. 10, 1512; succeeded to the throne under his mother's regency 1513; assumed the govt. 1528; married Madeleine of Fr. 1537, and on her death Mary of Lorraine, daughter of the duke of Guise, 1538; met with defeat from the Eng. at Solway Moss 1542. D. at Falkland Palace Dec. 14, 1542.

James (CHARLES T.), A. M., b. at W. Greenwich, R. I., in 1804; studied mechs. while working as a carpenter, and became an expert constructor of machinery for cotton-mills, of which he erected many in N. Eng. and Middle and S. States; U. S. Senator from R. I. 1851-57, after which he devoted himself to inventing firearms. D. Oct. 17, 1862.

James Francis Edward Stuart, b. in Lond. June 10, 1688, being the son of King James II. by Queen Mary of Modena. In the yr. of his birth James II. was driven from power, and his rights were ignored by his sisters Mary and Anne. The exiled family found asylum at the court of Louis XIV., who recognized the prince as king of G. Brit. under the title of James III. Under the *nom de guerre* of the Chevalier of St. George he took part in the Fr. campaigns of 1708-09 against the Eng. in Flanders. The prince's sister, Anne, designed to restore him to the order of succession, and numerous statesmen of Eng. favored his cause, but his refusal to renounce Catholicism was fatal to his prospects. In 1715 the Pretender was invited to Scot. by the earl of Mar, landed at Peterhead in Dec., passed through Aberdeen, made a public entry into Dundee, and occupied the royal palace at Scone. The enterprise, however, failed. The remainder of his life was passed chiefly in It., he having married in 1719 a princess Sobieski of Poland, by whom he

had a son, Charles Edward, b. 1730, the "Young Pretender" of 1745. J. d. at Rome Jan. 2, 1766.

James (Sir HENRY), F. R. S. b. at Rose-in-Vale, near St. Agnes, Cornwall, in 1803, ed. at the Royal Military Acad. at Woolwich; entered the army as lieutenant of engineers; became col. in 1857, and maj.-gen. in 1868; was appointed in 1852 supt. of the ordnance survey of the United Kingdom, and in 1857 chief of the topographical and statistical depts. of the war office; was knighted in 1860; is known for his efforts to introduce applications of photography into the service of the exact sciences; in 1860 he availed himself of the experiments of M. Poitevin and others for applying the new processes of photolithography to the reproduction of improved ordnance surveys; has since invented a modification of this process, known as photozincography. Wrote *On the Figure, Dimensions, and Mean Specific Gravity of the Earth, as derived from the Ordnance Trigonometrical Survey of G. Brit.*; on *Photozincography and other Photographic Processes*; *Account of the Prin. Triangulation of the United Kingdom*, etc. D. June 14, 1877.

James (HENRY), b. at Albany, N. Y., June 3, 1811. He studied in Union Coll. and Princeton Theological Sem.; went to Europe, where he acquired Sandemanian and Swedenborgian views, and afterward returned to the U. S. Among his works are *What is the State?* *Lectures and Miscellanies*, and *The Secret of Swedenborg*. D. Dec. 19, 1882.—His son, HENRY JAMES, JR., has acquired repute as an author.

James (HORACE), A. M., b. at Medford, Mass., May 6, 1818, grad. at Yale 1840; studied divinity at New Haven; held pastorates (Congl.) in Wrentham and Worcester, Mass., 1843-63; chaplain 25th Mass. Inf. 1861-64; capt. and A. Q. M. and com. of freedmen in N. C. 1864-66; pastor of First ch., Lowell, Mass., 1867-70; Second ch., Greenwich, Conn., 1871; afterward an ed. of *Congregationalist*. D. June 9, 1875.

James (JOHN ANGELL), b. at Blandford, Dorset, Eng., June 6, 1785, ed. at Gosport Coll.; entered the ministry when 17 yrs. old, and was (1805-59) pastor of Congl. chapel, Carr's lane, Birmingham; was an able preacher and writer, and exercised a large influence in Europe and Amer. by his numerous religious works, of which the best known are *The Anxious Inquirer*, *Christian Fellowship*, and *Christian Professor*. D. Oct. 1, 1859.

James (ROBERT), M. D., b. at Kinverston, Staffordshire, Eng., in 1703, ed. at Ox.; practised as a phys.; pub. a *Med. Dict.*, and invented the antimonial powder, composed of oxide of antimony and phosphate of lime. D. 1776.

James (THOMAS), an Eng. navigator who in 1631 was sent by a company of merchants of Bristol to search for a N. W. passage; explored Hudson's Bay, and from him the S. portion is still called James's Bay; reached lat. 65° 30' N., and pub. *The Strange and Dangerous Voyage of Capt. Thomas James for the Discovery of a N. W. Passage to the S. Sea*.

James (THOMAS CHALKLEY), b. at Phila. in 1766, studied med. at the Univ. of Pa. After taking a trip to the Cape of Good Hope as surgeon, he studied at Edinburgh and Lond. 1790-93, and founded after his return a school of midwifery in Phila.; was phys. at Pa. Hospital 25 yrs., and prof. of midwifery at Univ. of Pa. 1811-34. D. July 25, 1835.

James (THOMAS L.), LL. D., b. at Utica, N. Y., 1831, where he learned printing business; ed. *Madison County Journal* at Hamilton, N. Y., nearly 10 yrs., first as a Whig and then as a Republican organ; inspector of customs in 1861 in New York city, weigher in 1864, and deputy collector in warehousing dept. in 1869; appointed P. M. of New York city by Pres. Grant in 1872, and P. M.-gen. by Pres. Garfield, Mar. 1881, also Oct. 27, 1881, by Pres. Arthur; resigned 1881.

Jameson (CHARLES DAVIS), b. at Gorham, Me., Feb. 24, 1827; engaged largely in the lumber business. On the outbreak of c. war he was appointed col. of the 2d Me. Volunteers, the first to leave the State, which he commanded at the first battle of Bull Run, leading to his appointment in Sept. as brig.-gen. of volunteers. In Peninsular campaign in Va. 1862 he commanded a brigade. D. Nov. 6, 1862.

Jameson (JOHN ALEXANDER), LL. D., b. at Irasburg, Vt., Jan. 25, 1824, grad. at the Univ. of Vt. in 1846; was tutor there 1850-53, after which he removed to Ill.; practised law, and became in 1865 judge of superior court in Chicago. He has pub. several legal works.

Jamesone (GEORGE), b. at Aberdeen, Scot., in 1587, studied painting under Rubens. Vandyck was his fellow-pupil, and J. has been called the "Vandyck of Scotland." Charles I. sat to him in 1633, and he was patronized by the Scotch nobility. D. in 1644.

James River of Va., formed by the union of the Jackson and Cowpasture rivers, passes through the Blue Ridge, and pursues a devious course as far as Scottsville, whence its direction is about E. S. E. At Richmond it falls 100 ft. in 6 m., affording a grand water-power. Above this point the J. R. and Kanawha Canal extends, following the course of the river, and embracing extensive reaches of which as slack-water navigation to Buchanan, 196 m. The tide comes up to the Rocketts, just below Richmond. This is the head of navigation for steamboats and schooners of 130 tons. Shipping of the first class comes up to City Point, 40 m. below, at the mouth of the Appomattox. Below City Point the river is a broad, deep, tidal estuary, 66 m. long. The J. R. flows into Chesapeake Bay through Hampton Roads, the grandest harbor upon our Atlantic coast. The entire length from Covington, Va., to Old Point Comfort is some 450 m.

James town, Dak. See APPENDIX.

Jamestown, R. centre, Chautauqua co., N. Y., at the outlet of Chautauqua Lake, on which steamboats ply to Mayville. The outlet affords constant and extensive water-power. Pop. 1870, 5336; 1880, 9357.

Jamestown, dist. of James City co., Va., the first permanent Eng. settlement within the limits of the U. S.; was founded in 1607 on a peninsula 32 m. from the mouth of James River. It has now become an island by the action of the current, which has carried away a portion of the site of the anc. town. Only the ruins of the ch., the fort, and of 2 or 3

houses mark the spot. J. soon became the cap. of an extensive colony, and in 1619 (June 29) a house of burgesses, the first legislative assembly ever convened in Brit. Amer., met here. After the seat of govt. was removed to Williamsburg J. began to decline; it was burned by Nathaniel Bacon during the rebellion of 1676, and never rebuilt. It was the scene of an engagement between the forces of Wayne and those of Lord Cornwallis in 1781. Pop. of dist. 1870, 1068; 1880, 1235.

Jamieson (JOHN), D. D., b. in Glasgow Mar. 3, 1759; was ed. at the univ. of that city; became a minister of the Secession Ch. in Forfar, and was called to Edinburgh in 1797. Pub. an *Etymological Dict. of the Scot. Lang. and Supplement*. The doctorate of divinity was conferred upon him by Princeton Coll., N. J. D. July 12, 1838.

James (EDMUND STORER), D. D., b. in Sheffield, Mass., Apr. 27, 1807. Having received a common-school education, he spent about 6 yrs. (1824-30) in teaching. He studied law during 3 of these yrs., but joined the Meth. itinerant ministry, taking his first appointment in the Phila. conference in 1830. He occupied important pulpits in the Phila. and New York conferences till 1840, when he was elected financial sec. of the Amer. Bible Society. In 1844 he was elected bp. of the M. E. Ch. D. Sept. 18, 1876.

James (E. H.), M. D. See APPENDIX.

Jamesville, city, R. centre, cap. of Rock co., Wis., on both sides of Rock River, 70 m. W. S. W. of Milwaukee. It has a very large water-power, and is the seat of the State inst. for the blind. Pop. 1870, 8789; 1880, 9018.

Jane'way (JACOB J.), D. D., b. in New York in 1776, grad. at Columbia Coll. in 1794; was ordained a minister of the Presb. Ch. in Phila. in 1799; was for some time pres. of the W. Theological Sem. at Allegheny City; afterward settled at New Brunswick, N. J., as pastor of the Reformed (Dutch) ch. and v.-p. of Rutgers Coll. He was one of the early promoters of Princeton Theological Sem., of which he was for 40 yrs. a director. He wrote several theological works, among which are the *Exposition of the Acts and Internal Evidence of the Bible*. D. June 27, 1858.

Jan'zaries [Tur. "new troops"], a former corps of Tur. foot-soldiers, first organized in 1329 from young Chr. captives, who were compelled to embrace Mohammedanism. For more than 3 centuries the corps was forcibly recruited from Chr. subjects, though many Turks voluntarily joined it, and in the 17th century they numbered about 100,000 serving in the line, beside nearly 400,000 Jakams, or irregular troops, attached to the corps. Endowed by Amurath I. with remarkable privileges, they became at one time virtual masters of the empire, deposing several sultans. In 1826 Mahmoud II. led the rest of his army to attack them. They were defeated: 8000 of them were burned in their barracks, and some 15,000 killed in the streets. Over 20,000 were banished during the next few months, and the force was formally dissolved.

Jan'ney (SAMUEL M.), a philan. and Hicksite Friend, b. in Loudon co., Va., Jan. 11, 1801. In 1869 he was appointed by Pres. Grant one of the supts. of Indian affairs. He has written several works, among which are *Life of Penn. Life of For.* and *Hist. of the Friends*. D. Apr. 30, 1880.

Janse (ANNEKE) came to this country in the yr. 1630, with her husband, Roeloff Jansen of Maesterlandt in Hol. She subsequently removed to New Amsterdam (now New York) with her husband, where in 1636 they obtained, jointly, a grant of 62 acres of land on the W. side of Broadway, extending from about Warren to Christopher street, in the city of New York, now in possession of Trinity ch. Roeloff Jansen dying, his widow married, in the spring of 1638, the Rev. Everardus Bogardus, minister of the Dut. ch. of said city, who was drowned on his passage to Hol. in 1647, leaving her again a widow, with 8 children—4 by each husband. In 1654 J. obtained a patent in her own name of the farm above mentioned W. of Broadway, about which time she returned to Albany, where she d. in 1663.

Jan'sen, or Jansenius (CORNELIUS), b. at Acqui, near Leerdam, Hol., Oct. 28, 1585, of humble parentage; ed. at the Univ. of Utrecht; studied Catholic theol. at Louvain in Flanders; went to Paris in 1604 or 1605; became the head of a coll. recently founded at Bayonne. In 1617 J. returned to Louvain; was made prin. of a coll., and in 1630 prof. of scriptural interpretation. At Louvain he became (1621) the chief exponent of Jansenism; was chiefly remarkable for polemics and contests with the Jesuits, whom he succeeded in expelling from their position as teachers of philos. in the univ. In connection with this quarrel J. twice went to Sp. (in 1624 and 1625). In 1635 he pub. *Mars Gallicus*, in defence of the rights of Sp. against Fr. in the then impending war, and was rewarded by the bishopric of Ypres, at which place he d. of the plague, May 6, 1638. He wrote *Augustinus, seu Doctrina Augustini de Humana Nature Sanitate, Aegritudine et Medicina, adversus Pelagianos et Massilienses*.

Jan'senism, a school in the Fr. Ch., so called from Cornelius Jansen. It represents a controversy which, existing in its elements from the time of Augustine, broke out more openly near the middle of the 16th century, and continued for a century and a half to agitate the Romish Ch. It arose from the difficulty of harmonizing Augustine's doctrine of grace with the Romish and monkish scheme of work-righteousness. In the 17th century this controversy culminated in the school of Jansen, who wrote a work, pub. after his death, setting forth the doctrines of Augustine and Pelagius from their own writings.

The Jesuits assailed the work, and secured its prohibition by Pope Urban VIII. (1640). It found, however, many defenders, among whom were Jean Duvergier Hauranne, abbot of the Benedictine monastery of St. Cyran, and Anthony Arnauld, an able teacher in the Sorbonne. The latter soon became involved in a controversy with the Jesuits, who persuaded Innocent X. to condemn 5 Jansenist theses as heretical. The defenders of J. did not assail the pope's decision, but denied that the theses condemned were found in his book in the sense in which they were condemned. Arnauld

was expelled from the Sorbonne and took refuge with his sister Angelica, abbess of the Cistercian nunnery of Pt. Royal, near Paris. Through her influence Pt. Royal became a centre of religious life and thought for Fr., and gathered around itself a corps of talented young men who admired Augustine, detested the Jesuits, and were devoted to the liberties of the Gallican Ch. In sympathy with these men, Blaise Pascal pub. in 1656 his *Provincial Letters*, in which he exposed the moral casuistries and theologic sophisms and infamous confessional of the Jesuits. They procured a papal bull declaring that the propositions condemned were found in the book of Jansen. The J. contended that the pope, however rightly authoritative in matters of doctrine, was not infallible in decisions of questions of fact. But Louis XIV. and the pope insisted that all ecclesiastics should take the oath of acknowledgment of the bull and of condemnation of the J. heresy (1665). Those refusing were banished, and the Jesuits pursued Pt. Royal till in 1709 the inst. was abolished. Meantime the J., though in the Augustinian doctrines of grace in Calvinistic theol. manifesting an affinity with the Prot. reform, were strenuous in repelling all suspicion of union with Prots., and asserting their own loyalty to the Catholic Ch.

A new measure of violence renewed the J. controversy in 1713. It was directed against an ed. of the N. T. pub. by Quesnel. The Jesuits obtained a bull from Clement XI., condemning as heretical 101 propositions from Quesnel's book. The issuing of this bull divided the Fr. Ch. into 2 parts—the "Acceptants," or receivers of this "constitution," and the "Appellants," who appealed from it to a gen. council. Louis XIV. and the pope determined on its enforcement and the extermination of the J. The death of Louis and the indifference of the regent, the duke of Orleans, gave the Appellants free scope, and the bull of excommunication issued against them in 1718 was without effect. Subsequently the duke and afterward Louis XV. were led to persecute the Appellants, and in 1730 the "constitution" was registered by Parl. as a law of the nation.

Under these persecutions a fanatical tendency manifested itself among the J. Francis, an abbé of Paris, d. in 1727, and numerous miracles were reported to be effected at his tomb near Paris, which became the resort of a multitude of pilgrims. These were wrought to a wild fanaticism, manifesting itself in convulsions and contortions of the body and in raving prophecies against the Ch. and State. Thousands of *convulsionnaires* were thrown into prison, and the sacraments were refused to the dying who were not "acceptants" of the const. Under these severities J. gradually declined. *From orig. art. in J.'s Univ. Cyc., by T. M. Post, D. D.*

Januarius, SAINT, b. Apr. 21, 272: bp. of Benevento about 303; during the persecution by Diocletian was beheaded as a martyr at Pozzuoli Sept. 19, 305. Two phials filled with his blood and the body were ultimately brought to Naples, where these relics are still shown. St. J. is the patron saint of Naples.

January [Lat. *Januarius*, from *Janus*], the first month of the yr. in the Gregorian calendar; according to Rom. tradition first added to the calendar by Numa, along with Feb. It had originally 29 days, to which 2 more were added by Julius Caesar when he reformed the computation of time. In Eng. J. was made the first month of the yr. by act of Parl. of 1751.

Janus [for *Dianus*, from *dies*, "day"] and **Ja'na** [for *Diana*], 2 gods of anc. Rome, were originally personifications of the sun and moon. J. was early identified with the Etruscan two-faced god. Hence J. *Bifrons*, "the two-faced Janus." J. presided over the beginning of all things. There was a famous gateway containing a statue of J. Bifrons, and leading from the Palatine to the Quirinal Hill. This passage was closed only when Rome was at peace with all nations. This closure occurred but 4 times in all the Rom. hist.

Janvier, zhon-ve-ä' (Lévi), D. D., b. at Pitts Grove, N. J., Apr. 25, 1816, ed. at Lafayette and Princeton colls. and Princeton Theological Sem.; went to India as a missionary of the Presb. Board in 1841; settled in N. India; soon acquired the Urdu lang., and translated books and tracts into it. With Dr. Newton he compiled a Panjabhi dict., and pursued a career of usefulness until he was assassinated by a fanatic Sikh Mar. 25, 1864.

Japan lies in the N. W. part of the Pacific Ocean, and consists of 4 large islands and a great number of smaller ones. It is separated on the W. from Corea by a strait which is about 100 m. wide. The largest of the islands which compose the empire is commonly called *Nipon* or *Nippon*; the second is *Yesso*, the third *Kiusiu*, and the fourth *Sikok*. The total length of the empire is 1600 m., its greatest breadth 200; number of islands, 3850; area estimated at about 150,000 sq. m. The sea-coasts are bold and rocky, and much indented. The empire is partitioned into 5 *kies*, or depts., which surround the imperial cap., and 8 *adcs* or large divisions. The divisions, which in this country are called counties, number 1315. In 1868 the empire was divided into 3 political depts., the first of which embraced 3 *foccs*—viz. Saikio, or the W. cap.; Tokio or Yedo, the E. cap.; and Osaka; the second consisted of 38 *kens*, the third of 350 *hans*. Extending from one extremity of J. to the other, across all its prominent islands, are mts., many of them of volcanic origin and of great elevation. The rivers are numerous, but short, on account of the mts., which send the waters in different directions. The only fresh-water lake is 10 geographical m. wide and 35 m. long, and is called Biwakko or Lake Omi. Small lakes or ponds abound, and hot springs are to be found in various parts of the island of Nipon. The cities of J. are numerous. Two of them have become famous because selected as caps.—Miako or Saikio, the W. cap., and Tokio, commonly called Yedo, the E. cap. The other prin. cities are Osaka, Yokohama, Nagasaki, Neigata, Kobe, Hakodate, and Saki. The climate of J. is unequal, but the central portion is mild and agreeable. In the extreme S. the heat is often oppressive, while in the island of Yesso the

mercury occasionally sinks far below zero, and snow falls to a great depth. The sun in hottest days is much less debilitating than on the coast of Chi, or in India, and as to gen. conditions of salubrity the empire is highly favored.

The most anc. name by which the empire was known was *Yamato Zima*, meaning "east of the mountains." Its present name is a corruption of Jipunquo, which is of Chi. origin, and means the "Country at the Root of the Sun," or the "Land of the Rising Sun." The true origin of its people is lost in tradition or fable. The first man of note connected with the empire was Zimmu, who is represented as civilizing the nation and reforming the existing laws and govt. He established his cap. at Kasiwabara in Yamato, but the location of the cap. was frequently changed, and after 1464 yrs. from the time of Zimmu it was fixed at Saikio, or Miako, but after the revolution of 1867 it was located at Tokai or Yedo. The total number of emps. who have reigned over J. in an unbroken line is 124. From the earliest times down to the present they were called mikados. In the person of the mikado Zimmu, the founder of the line, vested the office of high priest, representative of Heaven, and emp., and hence the modern idea of calling him the spiritual head of the nation. From the earliest period in the hist. of the empire mention is made of 3 things which necessarily appertained to the person who sat upon the throne—viz. a sword, a mirror, and a ball of crystal. The emp. Su-jin-tenno, who lived in B. C. 97, was the last ruler of J. prior to the commencement of the Chr. era. His successor was Sui-nin-tenno, who ascended the throne A. D. 6. This ruler devoted his attention to agriculture, and during his reign 800 canals and ponds were built in different parts of J. for irrigation. The next man of note was Keko-tenno, who reigned between the yrs. 71 and 130 A. D., who caused the arable lands of the empire to be surveyed, and, with a view of guarding against famine, caused the establishment of granaries in all the larger towns of the empire. The emp. Senmu-tenno reigned from A. D. 131 to 190, creating the office of daijin, the second position of honor and power in the realm. Chinal-tenno, who was the son of Yamato Daki, reigned for 8 yrs., from A. D. 192 to 200. The next ruler was an empress, Jingū Kogu, the wife of Chinal-tenno, whose life and deeds of heroism are commemorated by the painters of J. and in the popular lit. of the country. Osin-tenno, the son of Jingū Kogu, ascended the throne in A. D. 270, and reigned about 43 yrs.; his reign has always been looked upon with national pride by the Japanese. The next man of note was Jintoku-tenno. During his reign (313-399) extensive inundations led to the construction of dikes along the rivers, and rice-houses and mills for cleaning rice were for the first time built. Lichu-tenno came to the throne in 400, and under the patronage of Yuriyaku-tenno (479) mulberry trees were planted throughout the empire, and special attention was first given to the manufacture of silk. About this time also carpenters were induced to immigrate from Corea, and an embassy was sent to that country to make certain collections of Chi. lit. The first event of importance connected with the era beginning with the yr. 500 was the introduction of the Buddhist religion into J., which was destined to take the place, to a great extent, of the Sinto religion and the moral instruction of Confucius. In 794, the gen. govt. having been divided into 8 boards after the manner of the Chi., the central power of the empire was fixed at Miako; and about this time was pub. the *Rits Rio*, a code of laws which are partly in force at the present time. Another event of this period was the introduction of an alphabet called the Hira Kana, to facilitate the reading of Chi. During the reign of the emp. Itsisio (987-1012) 2 terrible plagues visited the empire.

The 500 yrs. which follow A. D. 1000 are of greater importance than the preceding era, and may be written in the successive rise to power of individuals connected with the peerage of the realm, and especially the families of Fusi-wara, Sungawara, Minnamoto, Tatchibanna, and other names regarded as illustrious and held in veneration to the present day. From this time forward the leading events in Japanese hist. multiplied with increased rapidity. The 16th century brought no cessation from intestine war and assassination. In 1541 Antony Mora, Francis Zaimor, and Anthony Pexot, 3 Port. merchants, were wrecked upon the coast of Kiusiu, and the firearms which they had with them caused a profound sensation throughout the empire, and the fact was noted in the national calendars. In 1543 the Port. merchants came back again, bringing with them Jesuit missionaries, and from that time the hist. of the empire was chronicled in the lit. of Europe. Francis Xavier visited the country in 1549. About 1557 the military chieftain named Nobu Nanga made his appearance on the stage of public affairs, and for more than 30 yrs. was the master-spirit of the empire. Under his encouragement the Jesuits rose to favor and power at court, and in 1581 they claimed to have in J. 200 chs. and not less than 150,000 Chrs. He was reputed a brave, ambitious, and able man, and not without many moral virtues, and he laughed at the worship of the gods, and considered the bonzas as impostors. When he died the tide of prosperity turned and ebbed until it gradually swept the whole Jesuit priesthood from the shores of J. After the death of Nobu Nanga, the man who had once been his servant and afterward his chief military assistant, became the military ruler or shiogoon. His name was Taikosama. In 1583, with his permission, the Jesuit fathers induced 4 young noblemen to visit the pope in Rome, which expedition lasted for 8 yrs. In 1585 he became an earnest supporter of the Jesuits, although he would not accept their religion for himself; but when his plans had ripened, and the Jesuits were confident of increasing success, he suddenly gave them notice to quit the country within 20 days, forbidding them to preach their religion on pain of death. The threat was not carried out, and the Jesuits continued in the country, and he was charged with changing his policy because he desired to use their ships in a pro-

ject to invade Corea. In 1592 2 envoys from Manila and the Philippines were received by Taikosama, the first of which brought with them 4 recollects of St. Francis to enter the missionary service. Among their presents was a Sp. horse, whose blood has probably affected the breed now known in J. In 1596 a comet was visible in the empire, and on its disappearance a terrible earthquake occurred, which seemed to prognosticate the death of the shogun. While winking at the stealthy operations of the Jesuits, he caused 25 of them to be punished by the death of the cross. But notwithstanding this hostility, when he became sick in 1598 he admitted a Romish priest to his bedside, and then d. The yr. 1599 is given as that in which the Eng. and Dut. ships visited the country. Dut. pilots had already for several yrs. been navigating the surrounding seas, and William Adams, the Eng. pilot of the Dut. fleet of 5 sail which left Texel in June 1598, did not reach Boongo until Apr. 1600, when his crew was found to be reduced to 9 or 10 men.

The great event which characterized the beginning of the 17th century was the accession to power of Iyeyas Mikawa-no-kami. He acquired great power, one secret of which seems to have been that when he once made a promise he never broke it, the most perfect reliance being therefore placed upon his word. He was reputed a true lover of his country, and was never accused of being personally ambitious. He was a friend to all kinds of internal improvements, ruled with wisdom and discretion, and was honored with the title of *Se-i-dai-Shogoon*, or "tranquillizer of barbarians and commander-in-chief." The most important event of his reign was the promulgation of a code of laws, 100 in number, which he bequeathed to his descendants in power. These laws have had a paramount influence with the rulers of J. ever since the death of Iyeyas, and their effect upon the nation was blessed with an uninterrupted peace for more than 200 yrs. after the death of Iyeyas. For about 20 yrs. prior to the yr. 1614 the Jesuits had obtained such a footing in J. that they claimed to have made more than 100,000 converts. Although they entered the country as missionaries, they were denounced as preachers of sedition. The opposition which they called forth soon became so bitter that in 1636 the govt. issued an order that the image of the Saviour as it appeared on the copper medals should be periodically desecrated by being trampled under foot. After such demonstrations it cannot be thought strange that when the time came for driving the Jesuits out of the country the expulsion should have been attended with many acts of cruelty. Various attempts, at long intervals, were made by different foreign nations to reopen a trade with the country. The Dut., as well as the Japanese, bitterly opposed all such measures—the former from cupidity, and the latter from self-defence. In 1854 Sir James Stirling, an Eng. admiral, concluded a treaty with J., and in 1858 it was proclaimed by the Japanese that they had concluded treaties with the Amer., Eng., Dut., Rus., and Port.

As to the events which have taken place in that empire during the last 20 yrs., they resemble the stories of romance and are among the marvels of the age. During these the Japanese govt. resumed its work of reform, the prominent ideas being the education of Japanese students in foreign countries and the establishment of diplomatic relations with Amer., Eng., Rus., Ger., Aus., and Fr.; and in 1872 the great embassy, headed by Tomomi Iwakura, visited the U. S. and Europe, the calendar of the W. nations was substituted for that of old J., and the empire rapidly became an important member of the family of nations.

The people of J. are divided into 8 classes, as follows: the Koonngays, or Mikado nobility; the Daimios, or Yedo nobility; the Hattamotos, or lower daimios; the Hiakshos, or farmers without rank or title; the Shokonoris, who are artisans; the Akindos or merchants; the Kiveiamonos, or actors and beggars; and the Yaytas, who are turners, shoemakers, and manufacturers or dealers in leather. In the island of Yesso are to be found a people called Ainos, who resemble the Indians of N. Amer. The religions of the empire are 2, Sinitism and Buddhism, while the higher classes seem to be partial to the moral teachings of Confucius. The lit. of the country is quite extensive; cheap books and instructive art-productions are always in great demand, a very large proportion of the people are able to read and write, and a love of drawing and painting is very common. The food upon which they subsist is rice, the chief production; fish, and a great variety of vegetables; and among their leading productions may be mentioned silk, tea, cotton, hemp, salt, gold, silver, iron, copper, coal, and lead. Tobacco is manufactured in large quantities. Their fruits are numerous, and their knowledge of horticulture and the secrets of the soil is extensive. Their skill in manufacturing is of the highest order. One of the most striking illustrations of intellectual activity among the Japanese is found in the use they are making of the press; books and newspapers, both in the Japanese and Eng. langs., are multiplying every day. All the religious machinery has been abolished by imperial decree; the 2 colls. in the metropolis of Yedo contained 563 pupils, but have greatly increased since 1872; there were also 13 hospitals and almshouses; the imperial army consists of 35,560 men in peace, and in war 50,230; a number of Japanese officers and sub-officers were in recent yrs. instructed by Fr. military men at Yokohama. The navy of J. consisted in 1883 of 29 vessels with 196 cannons and 4073 men, of whom 568 were officers of good military training. The first line of railway, from Hiogo to Osaka, 25 m., was opened June 12, 1875. At the end of June 1883 there were open for traffic 42 kil. of railway, besides several important lines being in course of construction. The ports of Hiogo-Osaka, Nagasaki, and Hakodate are connected with each other and with Europe by lines of telegraphs. There are 5169 post-offices in J., handling 29,018,659 letters, 13,511,740 post-cards, 11,312,643 newspapers. There were telegraphs of a length of 7435 kil. at the end of 1882. The system of govt. of the Japanese empire is that of an absolute mon-

archy. The power of the mikado is absolute and unlimited. He acts through an executive ministry, divided into 8 depts. At the side of the ministry stands the "Sain" or senate, composed of 30 members, and the "Shoin" or council of state, of an unlimited number of members, both nominated by the mikado, and consulted by him at his pleasure. The reigning emp. is Mutsu Hito, b. at Yedo Sept. 22, 1852; succeeded his father 1877; married Dec. 28, 1868, to Princess Haru-ko, b. Apr. 17, 1850, daughter of Prince Itchidgo.

Commerce of Japan.—The latest complete accounts are for the yr. 1879. In 1888 the total value of exports amounted to \$35,700,000 and of imports to \$28,458,000. The commercial intercourse of J. is carried on mainly with 2 countries—viz. G. Brit. and the U. S., the former absorbing more than 3/4 of the whole. The staple article of export is raw silk; the other chief exports are rice, tea, and tobacco. The staple article of imports consists of cotton goods; beside these the imports consist chiefly of woollen fabrics and of iron, wrought and unwrought.

Imperial Mint.—The coinage of gold, silver, and copper, founded on the plan of the U. S., was commenced in 1871, since which time the old and various styles of Japanese money have gone out of existence. The coin called a *yen* is equivalent to the Amer. dollar, and is made of both gold and silver; the *sen* is equal to the Amer. cent, and the *rin* is the same as the Amer. mill.

Minerals.—The mineral wealth of J. has hitherto been very extensive, and the future developments, conducted by modern inventions connected with mining, are likely greatly to increase the wealth. Copper, silver, and gold have been exported on a large scale ever since 1545. Lead ores are abundant, but that mineral has never been popular among the Japanese. Iron ores of many kinds are found, also superior varieties of coal, and within the last few yrs. special attention has been given to the development of these important sources of wealth.

Population.—The total pop., 1883, was 37,011,964. The whole number of foreigners in 1882 was 6187.

Legislative Information.—The govt. is organized on a basis which is partly European. The mikado is, theoretically, an absolute sovereign, who reigns and governs, but the work of govt. is carried on by the Great Council, which is divided into 3 sections, denominated Centre, Right, and Left. The Centre is composed of the prime minister, vice-prime minister, and 5 advisers. The Left is made up exclusively of the council of state, the functions of which are analogous to those of the Fr. Conseil d'Etat, so far as the preparation and discussion of laws is concerned. The Right includes all the ministers and vice-ministers of the 8 depts. The ministers decide all ordinary questions, but points of real importance are reserved for the Great Council, presided over by the mikado. The local administration in the provs. is in the hands of prefects, one of them residing in each of the 75 dists. The powers of these prefects are far more extensive than those of any similar functionaries in Europe. There is, however, a limit to their judicial action, for they cannot execute sentences involving banishment or death until they have been confirmed by the minister of justice.

Japanese Literature.—The Japanese possess a copious lit., have a fondness for reading, and indulge themselves in study to a remarkable degree. The native books are divided into 3 gen. classes, as follows: *Kanagaku*, or Chi. classical lit. In this class may be included works on Buddhism, written in Chi., and the form of verse known as *Shi*; *Wagaku*, or native books upon Japanese subjects, such as hist., geog., art, and anc. legends written in verse; and *Kesaku*, or novels, tales, and historical romances. Of this class they possess an immense variety. Among the more noted of the older writers may be mentioned Kiosan, Kioden, Sekku, Samba, and Hokuba, whose productions range from romantic hist. to very romantic fiction. Some of the more popular writers of later times are Bakkin, whose tales embodied real names; Tanehiko, who described his own times, just before the advent of Europeans; Tamenaga, a popular novelist; Rei Sanyow, noted for his histories; Seigan, a poet, writing in Chi.; Motoori, a writer on lang.; Atstane, an essayist; Oguni Takamasa, a poet; and Nakamura and Fukugawa, both of whom are Eng. scholars, but stand at the head of the more useful writers of the present day. [From orig. art. in J.'s Univ. Cyc., by CHARLES LANMAN.]

Japan Clover (*Lespedeza striata*), a plant introduced into the S. U. S. before 1845 from E. Asia, and which has spread with wonderful rapidity. It is a low annual, growing to the height of little over a foot on the poorest soils, and is readily eaten by cattle.

Japan'ning, the art of applying a varnish as practised in Japan. The varnish is the resinous product of the bush *ourousi no ki*, or varnish plant. It is at first cream-like, but becomes black by exposure. A fine powder of charred wood is added after it has become black. It becomes glass-like in its hardness, and is extremely tough, so as to resist the action of boiling water. It is then polished. When applied to papier-mache the varnish forms a *binding* like an enamel. The excellence of the coating is improved by multiplying the coats, and in some cases 20 or more are applied. Japanned or patent leather is made in the greatest perfection in Japan, and next in Fr. It is effected by applying to thin leather a composition of linseed oil and turpentine colored with burnt umber and ivory or lampblack. The term japaning is improperly applied not only to simple lacquering and varnishing, but also to different kinds of mineral and glass or porcelain glazing, or in fact to vitrification.

Japheth (Heb. *Yepheth*, "widespreading" or "fair"), one of the 8 sons of Noah, and the progenitor to whom is ascribed the peopling of the N. portion of Asia Minor, and perhaps Thrace. Most of the nations of Europe are usually deduced from J., who is supposed to be identical with the Gr. Iapetos, the father of Prometheus. J. seems to have been born 100 yrs. before the Flood.

Japu'ra, Hyapura, or Caquet'a, a river of S. Amer., rises in the Andes of Ecuador, runs between Ecuador and New Granada, then through Brazil, and enters the Amazon at lat. 1° 30' S. and lon. 72° 30' W., after a course of about 1000 m. Its navigation is impeded by rapids and cataracts.

Jarves (JAMES JACKSON), b. in Boston, Mass., Aug. 30, 1818. Weakness of the eyes compelling him to desist from study, he travelled extensively on this continent, and resided for some yrs. at Honolulu, where he pub. the *Polyesian*, the first newspaper printed there. Soon after his return from these journeyings he went to Europe, where he has since made his chief residence, mostly in Paris and Florence, devoting himself to the study of art and to the collection of a gallery of pictures illustrating the different schools of painting. The collection, a large and interesting one, was exhibited in New York and after various fortunes it found temporary refuge in the Fine-Art Gallery of Yale Coll. at New Haven, Conn. Mr. J. has written *Scenes and Scenery of the Sandwich Islands*, *Scenes and Scenery in Cal.*, *Panoramic Views and Fr. Principles*, etc.

Jarvis (ABRAHAM), D. D., b. at Norwalk, Conn., May 5, 1739, grad. at Yale in 1761; was ordained deacon and priest in the P. E. Ch. in Lond. in 1764, in which yr. he became rector of Christ ch., Middletown. In 1737 he was consecrated bp. of Conn. to succeed Seabury, and settled at New Haven. D. May 3, 1813.

Jarvis (EDWARD), A. B., A. M., M. D., b. Jan. 9, 1803, at Concord, Mass.; grad. in 1825 at Harvard Univ., and at the med. coll. of same inst. in 1830; practised in Northfield and Concord, Mass., Louisville, Ky., and 32 yrs. in Dorchester, Mass.; devoted himself to the study of vital statistics, the laws of life and health, insanity, etc. His prin. writings are *Physiology and Health*, *Report on the Number and Condition of the Insane and Idiots of Mass.*, *Report on the Mortality of the U. S. in the Census of 1870*, beside numerous essays in journals and magazines. In 1852 he became pres. of the Amer. Statistical Association.

Jarvis (JOHN WESLEY), b. at S. Shields, on the Tyne, Eng., 1780; passed his infancy with his uncle, the celebrated John Wesley; came to Amer. at the age of 5; his father left the lad in Phila., where he obtained such instruction as he could; he came to New York as an engraver, executed profiles on glass in black and gold leaf, painted miniatures, but soon undertook portraits in oil, and rapidly rose to eminence. J. painted portraits of the heroes of the war of 1812. His portraits of Hull, Perry, Bainbridge, Swift, Brown, and McDonough are in the City Hall, New York; those of John Randolph, Robert Morris, Daniel D. Tompkins, and Egbert Benson are in the gallery of the New York Historical Society. J. painted with success in Baltimore, Charleston, Richmond, and New Orleans, where some of his best work is to be seen. D. Jan. 12, 1840.

Jarvis (SAMUEL FARMER), D. D., LL.D., b. at Middletown, Conn., Jan. 20, 1786, being a son of Bp. Abraham Jarvis. He grad. at Yale in 1805, entered the Episcopalian ministry in 1810; was prof. of biblical criticism in the Gen. Theological Sem. 1819; rector of St. Paul's, Boston, 1820-26, when he went to Europe, and remained there 10 yrs. Returning to Amer. in 1835, he became prof. of Oriental lit. in Trinity Coll., Hartford, and in 1838 was appointed historiographer to the Amer. Epis. Ch. Among his writings are a *Chronological Introduction to the Hist. of the Ch.* and *A Discourse on the Religion of the Indian Tribes of N. Amer.* D. Mar. 26, 1851.

Jas'her, Book of, a Heb. work twice cited in the O. T. (Josh. x. 13 and 2 Sam. i. 18), but no longer extant. The former citation is the apostrophe of Joshua to the sun and moon, the latter the elegy of David upon Saul and Jonathan.

Jas'mine, Yellow, an indigenous twining plant (*Gelsemium sempervirens*, natural order Loganiaceae) growing in rich damp soil in the coast-dists. from Va. to the Gulf. It is a beautiful plant, with large, deep-yellow, sweet-smelling flowers, and climbs trees in the S. forests. The root is used in med. under the name *gelsemium*, and contains as its active principle an alkaloid, *gelsemia*. It is a nerve-poison, causing motor and sensory paralysis, and may be fatal in overdose through paralysis of respiration.

EDWARD CURTIS.

Ja'son (Gr. *Ἰάσων*, "healer" or "atoner"), a fabulous hero of the earliest Gr. mythology, who led the Argonauts (see ARGONAUTÆ) to Colchis for the recovery of the Golden Fleece, which he secured through aid of MEDEA (which see).

Jason, a tyrant of Phærg in Thessaly, came into power about B. C. 395, and undertook to reduce all Thessaly under his dominion. In B. C. 375 he had succeeded in conquering all the cities except Pharsalus. Soon afterward he was chosen dictator of Thessaly, took part in the wars between the states of Gr., but was assassinated B. C. 370.

Jas'per, Ind. See APPENDIX.

Jasper (Gr. *ἰάσπης*), a mineral, of the quartz family, occurring in veins and large masses, imbedded in rocks, sometimes as a rock itself, and often in the shape of pebbles. It is characterized by opacity and by numerous colors. It is exceedingly hard and takes a fine polish. It was the 12th stone inserted in the breastplate of the Jewish high priest, and the first of the 12 used in the foundation of the New Jerusalem; it was also the material of the wall, and the glory of the Divine Being is compared with a J.

Jasper (WILLIAM), b. in S. C. about 1750; enlisted at the commencement of the Revolution, became a sergeant, and distinguished himself in the attack upon Ft. Moultrie by a Brit. fleet, June 28, 1776, by leaping through an embrasure under a galling cannonade to recover the flag of the State, just shot off. Gov. Rutledge gave J. his own sword, offered him a commission as lieutenant, which he declined, and employed him thereafter upon outpost and picket duty, in which he frequently distinguished himself by deeds of eccentric daring. In the assault upon Savannah (Oct. 9, 1779) J. accompanied D'Estatig and Lincoln in their attack upon the Spring Hill redoubt, and was killed while attempting to fasten to the parapet the colors of his regiment. A square in the city of Savannah and a co. in Ga. bear his name.

Jas'sy, the cap. of Moldavia, which since 1861 forms a part of Roumania, on a tributary of the Pruth. It is poorly built; fine ecclesiastical buildings and splendid palaces alternate with miserable huts. Pop. 90,000.

Jats, or Jauts, a race inhabiting N. W. India between the Indus and the upper waters of the Ganges, variously considered as descendants of Getae, Dacians, Huns, Avars, or other anc. races. They are divided in religion between Mohammedanism, Brahmanism, and the Sikh doctrines.

Jaubert, zho-bair' (CHEVALIER PIERRE AMÉDÉE), b. at Aix in Provence, S. Fr., June 3, 1779; studied Oriental langs. under Sylvestre de Sacy; at the age of 19 accompanied the Fr. expedition to Egypt as interpreter; was sent to Per. in 1805; imprisoned several months by the pasha of Bajazid; became in 1815 *chargé d'affaires* at Constantinople; in 1818 travelled to India with the object of bringing to Fr. a herd of Cashmere or Thibetan goats; became a prof. of Oriental langs. at the Coll. of Fr., member of the Acad. of Inscriptions, peer of Fr. and councillor of state; pub. his travels in Armenia and Per., a Tur. gram., a Berber gram. and dict., and a Fr. translation of the Arabian geog. Edrisi. D. at Paris Jan. 28, 1847.

Jaundice, jahn'dis. This is a greenish-yellow color of the skin which is produced by the presence of the coloring-matter of the bile in the blood. We may have J. produced in 2 ways—either from suppression or retention of bile; the former is due to some disease of the liver which incapacitates it for performing its function. J. from retention of bile is produced in this way: The bile, having been already formed, is prevented from making its way into the intestines by some obstruction in the bile-ducts, as a biliary calculus. (See GALL STONES.) The indications for treatment are to improve the patient's gen. condition by a proper and nutritious diet and remove constipation. After the removal of the obstruction we may hasten the disappearance of the J. and the annoying itching which accompanies it, by steam and alkaline baths.

Java, jah'va, an island in the Malay Archipelago, the third largest of the Sunda group, belonging to the Netherlands, and bounded N. by the Sea of Java, E. by the Strait of Bali, S. by the Indian Ocean, and W. by the Strait of Sunda, which separates it from the island of Sumatra. Area, 49,730 sq. m. In the N. part of the island lie some tracts of low, level land, mostly consisting of mangrove swamps, and presenting a coast unsafe for navigation, and containing very few landlocked harbors, such as those of Batavia and Surabaya, though affording several good roadsteads. Otherwise, the whole island is mountainous, traversed from E. to W. by several ranges of mts., of which the southernmost forms a rough and broken coast-line, washed by a heavy surf. The highest points are Semiriu, 12,250 ft., and Slamati, 11,320 ft. These ranges are of volcanic formation; active volcanoes and violent eruptions are of frequent occurrence. The volcano Papandayang covered in 1 night in 1772 an area of 7 m. radius with a layer of ashes 50 ft. thick, and in 1822 Galunggung caused still greater destruction by a single eruption. But the most dreadful eruption was that of Aug. 1883. The mts. are generally clad to their very tops with splendid forests, and enclose beautiful, exceedingly fertile, and well-watered valleys, numerous rivers flowing down to the sea from both sides, generally rapid and shallow, but sometimes navigable, as, for instance, the Solo, Kediri, and Tjimanok. Although gold-dust is found in several rivers, and coal and rock-salt in some mt. tracts, and although mineral springs of different kinds abound all over the island, yet the Javanese mts. are devoid of minerals suitable for mining. The climate is unhealthy in the N. marshes, but at a little elevation it is not only healthy but agreeable. The wet season, with its westerly winds, lasts from Oct. to Mar., but even during this time dry periods with fair weather occur. Vegetable life is developed to an astonishing degree. Rice is the prin. cereal, and in places where irrigation can be effected it is raised in 2 crops annually. Coffee is the staple product of the country, and is cultivated under the supervision of the govt. in plantations situated at an elevation of 2000 ft. Sugar and spices of superior quality are raised without difficulty. Cotton is also grown, from which a coarse fabric is made. The largest part of the island is covered with vast forests of the most valuable trees—the fig tree, the dammar pine, and, first among all, the tear tree, which yields the best timber known. Equally abundant is animal life. Buffaloes are generally used in agricultural labor, and are more numerous than oxen and horses. The wild ox and 2 kinds of wild hogs are common; also the royal tiger, the one-horned rhinoceros, numerous kinds of apes, immense bats 5 ft. across the wings, the peacock, and a great variety of fish. The natives belong to the Malayan race, but in capacity for civilization they surpass all other branches of this family. In the 15th century they embraced Mohammedanism; before that time Booddhism was their religion, and many Booddhist temples are found in the island, as, for instance, the Boro Buddar. In 1511 the Port. first visited J., and in 1595 the Dut. made the first settlements here. In 1677 the whole island became a Dut. colony, and since 1830 it has been governed as a prov. of the kingdom of the Netherlands. Pop. including MADURA (which see), 19,298,804.

CLEMENS PETERSEN.

Javelle Water. See EAU DE JAVELLE.

Jaxar'ies, or Sir Darya, river of Toorkistan, rises in the Thian Shan Mts., flows through the Khirgheez dominions, and divides into 2 branches, of which the N. and largest, forming the boundary between Rus. and Toorkistan, falls into the Sea of Aral, while the S. loses itself in some small lakes in the steppes.

Jay, a name given to many birds of the family Corvidæ. The typical species is the *Garrulus glandarius*, or common jay of Europe. The common blue jay of the E. U. S. is *Cyanopax cristata*. The U. S. have also many other species representing various genera.

Jay (JOHN), LL.D., b. in New York Dec. 12, 1745, grad. at King's (now Columbia) Coll. in 1764, and was admitted to the bar in 1768. He first became conspicuous as a member of the "committee of correspondence" appointed May 16, 1774, by the citizens of New York to represent their views upon the questions growing out of the Boston Port bill; was the supposed author of the suggestion for the convocation of a Continental Cong., of which he was elected a member. He was the author of the address to the people of G. Brit. adopted by the first Cong. (Oct. 1774), and of that to the people of Canada adopted by the second Cong. (May 1775); was a member of the committee of correspondence "with European friends of Amer. Liberty," and in Apr. 1776 was chosen a member of the Provincial Cong. of N. Y.; was author of its chief public documents, and on its dissolution was appointed chief-justice. In 1778 he was again elected to the Continental Cong.; became its pres., and was appointed in the following yr. minister to Sp. He remained at Madrid 2 yrs.; was a colleague with Franklin and Adams in the commission which negotiated peace with G. Brit. (Nov. 30, 1782), and on returning to Amer. in 1784 was chosen by Cong. sec. for foreign affairs—a post which he held until the establishment of the Federal govt. under the const. (1789). He was one of the writers in the *Federalist*; took a leading part in the N. Y. State convention, which gave its adhesion to the const. (1788), and was appointed by Washington (1789) the first chief-justice of the U. S. He was sent as minister to Eng. in 1794, and signed (Nov. 19) the instrument known as "Jay's treaty." During his absence in Eng. he was elected gov. of N. Y., an office which he held for 6 yrs.—and in 1801 withdrew from public life, declining a second appointment as chief-justice of the U. S. supreme court, for which he was nominated by Pres. Adams and confirmed by the Senate. For the remainder of his life he kept aloof from political contests, but taking a lively int. in religious and philanthropic movements. As early as 1785 he had been pres. of a society in New York for promoting the emancipation of slaves, and it was under his auspices that slavery was abolished in N. Y. in 1799. (See his *Life*, by his son, William Jay.) D. May 17, 1829.

Jay (WILLIAM), LL.D., son of the preceding, b. in New York June 16, 1789; grad. at Yale in 1807, and studied law, which he never actively practised. He was prominent in the temperance, anti-slavery, peace, and Bible societies; became in 1818 a judge of the common pleas, and was 1820-42 first judge of Westchester co., N. Y., but lost the place because of his anti-slavery views. He wrote a *Life of John Jay, a View of the Action of the Federal Govt. in Behalf of Slavery*, etc. D. Oct. 14, 1858.

Jebail, or **Jubell**, the modern name of *Gebal* or *Byblos*, one of the most anc. cities of Phœnicia, noted in mythology for the birth of Adonis, and in biblical hist. for having furnished the artificers (Giblites) of Solomon's temple. Gebal is thought to have been the metropolis of the Phœnicians before the rise of Sidon. It is now a small v. on the sea-coast 20 m. N. of Beyroot; it contains a castle which was noted in the annals of the Crusades.

Jeddo. See **Yeddo**.

Jefferson (New Jefferson sta.), cap. of Greene co., Ia., 50 m. N. W. of Des Moines, on R. R. and Coon River. Pop. 1870, 779; 1880, 1444.

Jefferson, on R. R., cap. of Ashtabula co., O., 13 m. S. of Lake Erie. Pop. 1870, 869; 1880, 1008.

Jefferson, city and R. R. centre, cap. of Marion co., Tex., at the head of navigation on the Big Cypress Bayou, which connects with Red River. Vast beds of iron and coal are found in the vicinity. It was settled in 1843, and has a large trade in cotton, etc. Pop. 1870, 4190; 1880, 3260.

Jefferson, city, on R. R., cap. of Jefferson co., Wis., 26 m. N. N. E. of Janesville, at the junction of Rock and Crawfish rivers. It is the seat of Jefferson Liberal Institute. Pop. 1870, 2176; 1880, 2115.

Jefferson (THOMAS), LL.D., 3d Pres. of the U. S., b. in Albemarle co., Va., Apr. 13, 1743. His family, of Welsh extraction, was settled in Va. before 1619. His father, Peter Jefferson (d. 1757), a surveyor and planter, married, in 1738, Jane Randolph, of the Va. Randolphs, by whom he had 9 children, Thomas being his 3d child and eldest son. He entered William and Mary Coll. in 1760, remained 2 yrs., began the study of the law at Williamsburg under George Wythe in 1763, and in 1767 was admitted to the bar. He obtained at once a large and profitable practice, his professional income being estimated at £500 a yr., and increased his estate to 5000 acres of land. He married, 1772, Martha Skelton, a young widow, daughter and heiress of John Wayles, whose death the next yr. doubled J.'s estate. Elected a member of the house of burgesses in 1769, he served in that body till the Revolution, a firm supporter of liberal measures, and noted for his disapproval of slavery.

He took his seat as a member of the Continental Cong. June 21, 1775, the day on which the news of the battle of Bunker Hill reached Phila. and Washington left that city to take command of the army at Cambridge. Although he was no orator, he acquired great influence by his readiness in composition, his knowledge of law and usage, his moderation of tone, and his warm devotion to the country's cause. After serving on several leading committees and drawing important papers, he was chosen to draft the Dec. of Ind. In Sept. 1776 he resumed his seat in the Va. legislature, where, in conjunction with George Wythe and James Madison, he spent 3 yrs. in adapting the laws of Va. to the new order of things, and in other patriotic labors. He effected the abolition of entail and primogeniture, and drew the law—the first ever passed by a legislature or adopted by a govt.—which secured perfect religious freedom. June 1, 1779, he succeeded Patrick Henry as gov. of Va., an office which he resigned after holding it 2 yrs. One of his own estates was ravaged and plundered by Cornwallis, and his house at Monticello was held for some days by Tarleton's cav., J. himself narrowly escaping capture. Sept. 6, 1782, his wife d., leav-

ing 3 children. He now accepted an appointment as plenipotentiary to Fr., which he had declined in 1776. Before sailing he served for some weeks in Cong. at Annapolis, where he succeeded in carrying a bill establishing our present system of decimal currency. Reaching Paris in June 1784, he remained until Oct. 1789. He was filled with horror at the condition of Fr., and attributed the gen. misery chiefly to the bad govt.

Beside performing the usual duties of his place, he pub. his *Notes on Virginia*, sent to the U. S. seeds, plants, and shrubs, enriched Buffon's collection with Amer. specimens, forwarded literary and scientific news, and gave useful advice to La Fayette and the other revolutionary leaders. Nov. 18, 1789, he landed in Va., having obtained a 6 months' leave for the purpose of bringing his daughters home. He was met by a letter from Pres. Washington appointing him sec. of state. He entered upon its duties at New York in Mar. 1791, and held the office until Jan. 1, 1794, when he resigned. During his tenure of this office the 2 political parties became sharply defined, and J. was recognized as the leader of the Republican party. In 1796 he was elected V.-P. of the U. S., and was sworn in Mar. 4, 1797. In 1800 he was elected to the Presidency, being inaugurated Mar. 4, 1801. He selected an able cabinet—James Madison, sec. of state, and Albert Gallatin, of treas. Administering the govt. in unbroken harmony with his ministers, he gradually won to his support a majority of the people, and was re-elected in 1804. Having declined to accept a nomination for a 3d term, he retired to private life Mar. 4, 1809, and spent the remainder of his days at his beautiful seat, Monticello. Many of his later yrs. were employed in founding the Univ. of Va. D. July 4, 1826, the 50th anniversary of the Dec. of Ind., a few hours before his contemporary and friend, John Adams. (See his *Works, Memoirs, and Correspondence*, by his grandson, T. J. RANDOLPH; *Biographies*, by his granddaughter, SARAH N. RANDOLPH, and by JAMES PARTON.) [From orig. art. in *J.'s Univ. Cyc.*, by JAMES PARTON.]

Jefferson City, R. R. centre, cap. of Mo. and seat of justice of Cole co., on the S. bank of the Mo. River, 125 m. W. of St. Louis, and near the geographical centre of the State, in a fertile region abounding in coal, iron, and glass-sand. Among the public buildings are the State capitol, the executive mansion, State armory, penitentiary, Lincoln Inst., a normal school for colored youth, and a female sem. It is the seat of Jefferson City Coll. (P. E.). Pop. 1870, 4420; 1880, 5271.

Jefferson College. See WASHINGTON AND JEFFERSON COLLEGE.

Jeffersonia (*J. diphylla*), a vernal plant of the order Berberidaceæ, popularly known as twin-leaf, from its two-parted leaves, which rise in a tuft from the roots. The *J.* is indigenous to the N. Central States of the U. S., but is cultivated in Eng.

Jeffersonville, city and R. R. centre, Clarke co., Ind., on the O. River, opposite Louisville, Ky., with which it is connected by a R. R. bridge. The falls of the O. here afford a noble water-power. It contains the Southern State penitentiary, and is the seat of an extensive govt. depot of supplies. Pop. 1870, 7254; 1880, 9357.

Jeffreys (GEORGE), BARON, b. at Acton, Denbigh, Wales, in 1648; studied law in the Middle Temple; was called to the bar in 1669; practised chiefly at the Old Bailey, where he acquired ferocious brutality; was common sergeant of Lond. 1671; affected Puritanism, but was knighted in 1677 and made solicitor to the duke of York; recorder of Lond. 1678-80, king's sergeant and chief-justice of Chester 1680, baronet 1681, crown counsel against Lord Russell, and became chief-justice of the king's bench 1683; sentenced Algernon Sidney 1683, tried Baxter and Titus Oates 1685, received a peerage 1685, and held the Bloody Assize for the trial of Monmouth's adherents, for which service he was made lord chancellor; was a party in the misdeeds of James II.; was seized by a mob and confined in the Tower 1688; d. there Apr. 18, 1689.

Jeffries (JOHN), M. D., b. at Boston, Mass., Feb. 5, 1744, grad. at Harvard in 1763; studied med. at Lond. and Aberdeen; returned to Boston to practise his profession, and, accompanying Brit. forces on their withdrawal to Halifax in 1776, was appointed surgeon-gen. In 1779 he became surgeon-major to all the Brit. forces in Amer., but soon retired to Eng., where he devoted much attention to scientific experiment. In 1785 he crossed the Channel from Dover into Fr. in a balloon; in 1789 he returned to Boston. He delivered in 1789 the first public anatomical lecture ever given in N. Eng., but a popular sentiment existing against dissections he was compelled to discontinue his course of instruction. D. Sept. 16, 1819.

Jehoshaphat ("Jehovah's judgment"), the 4th king of Judah, was the son of Asa, whom he succeeded in 912 B. C., and reigned to 857 B. C. Although he experienced several reverses, his reign was generally very fortunate. He worked successfully to extirpate idolatry, kept the nations on the borders in awe, and agriculture and commerce prospered under his rule.

Jehovah [Heb.] occurs only 4 times in the A. V. of the Bible. This phenomenon arises from the fact that while the consonants of the name (the Heb. alphabet having originally had no signs for vowels) have been faithfully preserved by transcription, the Jews for ages have refrained from pronouncing the name on account of its sacredness; so that the original pronunciation has been lost. The proper form of the sacred name seems to have been Yahveh or Yahweh. As to its significance, since it expresses existence emphatically as the characteristic of God, we may say that it denotes the perfection of existence. Hence, eternity, self-existence, sovereignty, unchangeableness, and especially personality, are conceptions fairly to be inferred as embodied in the name. Jehovah, rather than Elohim, is God as revealing himself, as a *living*, as inspiring *prophecy*, as the faithful one, as the object of *worship*, as the *living* God, as the re-

warder of good and punisher of evil. In gen., Elohim may be called the God of nature, and Jehovah (Yahveh) the God of revelation.

Jehu [Heb. *Yehú*, meaning uncertain], the 11th king of Israel, and founder of the 4th dynasty in the N. kingdom; reigned a. c. 883 to 855. In his youth J. was one of the guards of Ahab, and in the reigns of Ahaziah and Jehoram had become one of the chief military leaders. He was anointed by one of the prophets under Elisha's directions, and proceeded to the massacre of King Joram, his mother Jezebel, his guest Ahaziah, king of Judah, 70 brothers of Joram, 42 brothers of Ahaziah, and, in gen., of all the prophets, priests, and worshippers of Baal. The reign of J. was not marked by any further remarkable events.

Jejeebhoy (Sir JAMSETJEE), BART., b. at Bombay, India, July 15, 1783, belonged to that Parsee race which is the present representative of the anc. Zoroastrians and Fire-worshippers of Per. He commenced life in poverty, made several commercial voyages to Chi., and succeeded so well as to be able in 1822 to release all the debtors held in prison in Bombay by paying their debts. In recognition of his princely benefactions he was knighted by Queen Victoria in 1842, and made a baronet in 1857. D. at Bombay Apr. 14, 1859.

Jellachich von Buzim, yel'ah-kik fon boot'sim (Count JOSEPH), b. at Peterwardein, on the military frontier of Hungary, Oct. 16, 1801; entered the army at an early age; when the Magyar revolution broke out in 1848 he threw his influence with the Slavic pops. into the scale in favor of the Aus. empire; was appointed ban of Croatia, Slavonia, and Dalmatia. This title gave him an almost independent sovereignty, which he used by assembling a Slavic diet, and organizing the S. Slavonians against the Hungarians. The emp. became alarmed at his proceedings, deprived him of his new rank, and summoned him to answer for his conduct. But the ban of Croatia understood the situation; after a visit to the imperial family, he invaded Hungary, effected a junction with Windschgrätz, aided in the reconquest of Vienna, and participated in the important campaigns of the ensuing yr. In 1850 J. pub. a vol. of poems; commanded in 1853 an army of observation on the Bosnia frontier; received the rank of count in 1855. D. at Agram May 20, 1859.

Jelly-Fish. See ACALAPHS.

Jem'ison (ROBERT, JR.), b. in Ga.; in early life removed to Ala., where he was long a member of the legislature. He was made pres. of the State senate in 1863, and soon after entered the Confed. Senate, though a strong anti-secessionist; was the founder of the financial system of Ala. (1847), of the State insane asylum, and of the Alabama and Chattanooga R. R. D. Oct. 16, 1871.

Jen'a, town of Ger. on the Saale. Its univ., founded in 1558, was 1787-1806 the most celebrated in Ger. On Oct. 14, 1806, Nap. totally defeated the Prus. army on the heights outside of J., which battle for many yrs. decided the fate of N. Ger. Pop. 10,337.

Jenckes (THOMAS A.), b. at Providence, R. I., in 1818, grad. at Brown Univ. in 1838; studied law, and became a prominent member of the R. I. bar; was clerk of State legislature 1840-45, and member of 38th, 39th, 40th, and 41st Congs. He was the author and advocate of the bill which established a uniform system of bankruptcy throughout the U. S., and in the 40th Cong. introduced a bill to regulate the civil service of the U. S. and to promote the efficiency thereof. D. Nov. 5, 1875.

Jengis (or **Jingis**) **Khan**. See GENGHIS KHAN.

Jenisel. See YENISEI.

Jen'kins (CHARLES J.), b. in the dist. (now co.) of Beaufort, S. C., Jan. 6, 1805; was ed. partly at the Ga. Univ. and partly at Union Coll., Schenectady, N. Y., where he grad. in 1824; studied law, and opened an office in the city of Augusta, Ga. In 1830 was elected to the legislature; in 1831 was elected atty.-gen. of the State; was returned to the legislature 1836 to 1850, ranking among the most eloquent of the house, and being speaker thereof whenever his party was in the majority. In politics he was reared in the Jeffersonian State Rights school, but supported Harrison for Pres. in 1840, and Clay in 1844. He was a member of the Union convention of the State in 1850, and the author of the celebrated Ga. platform adopted by that body. In 1860 he was appointed one of the judges of the supreme court of the State. He was a member of the constitutional convention of the State called under the proclamation of Pres. Johnson in 1865, and in the same yr. was elected gov. without opposition under the new const. This position he held until superseded by Gen. Thos. H. Ruger of U. S. A. in 1868. He was an influential member of the board of trustees of the State Univ. D. June 14, 1883.

Jenkins (THORNTON A.), U. S. N., b. in Va. Dec. 11, 1811; entered the navy as a mdpn. 1828; passed mdpn. 1834, lieutenant. In Coast Survey office 1834-42, commander 1855, capt. 1862, com. 1866, rear-admiral 1870; retired from active service Dec. 11, 1873. Previous to the c. war he served in many positions at sea and on shore. Commanding a hydrographical party of the Coast Survey 1848-51, he framed the organic law under which the present light-house establishment has been created and is now administered. He commanded sloop-of-war Wachusett in James and Potomac rivers 1862, second division of Farragut's fleet off Mobile 1862-63, fleet-capt. and chief of staff to Farragut 1863-64, senior naval officer in command at the surrender of Port Hudson July 1863; wounded at College Point, below Ft. Donelson; commanded the sloop-of-war Richmond and the second division of Farragut's fleet blockading Mobile 1863-65; from 1865 to 1869 chief of bureau of navigation; 1850-58, 1860-62, and 1869-71, naval sec. of light-house board; 1871 to his retirement, in command of fleet in the E. I.

Jenks (JOSEPH), b. near Lond., came to Lynn, Mass., about 1645; was the first founder who worked in brass and iron in Amer. He received from the Mass. gen. court, 1646, a patent "for the making of engines for mills to go by water," and for making scythes and other edged tools, with a

new-invented saw-mill, of which latter process he patented an improvement in 1655. He is said to have made the dies for the silver coinage of the colony in 1652; contracted in 1654 with the selectmen of Boston "for an engine to carry water in case of fire," and in 1667 asked the gen. court for aid in wire-drawing. D. 1683.

Jenks (WILLIAM), D. D., LL.D., b. at Newton, Mass., Nov. 25, 1778, grad. at Harvard 1797; was pastor of a Congl. ch. at Bath, Me., 1805-23; prof. of Eng. and Oriental lit. in Bowdoin Coll. 1815-18; afterward became a teacher in Boston; was pastor of the Green st. ch., Boston, 1826-45. He wrote several works, among which is a *Comprehensive Commentary*. D. Nov. 13, 1866.

Jen'ner (EDWARD), M.D., F. R. S., b. at Berkeley, Gloucester, Eng., May 17, 1749; studied surgery at Sudbury and Lond. 1771-73; appointed naturalist on Cook's second expedition; retired to his native town in 1773. In 1796 he made his first successful arm-to-arm inoculation with the virus of cowpox as a preventive to infection with smallpox. In 1798 he announced his discovery, but was denounced by phys. and clergy. He pub. a series of *Inquiries* upon the subject. The importance of his discovery was finally conceded. D. Jan. 26, 1823.

Jenner (Sir WILLIAM), BART., F. R. S., b. at Chatham in 1815; was ed. at Univ. Coll., Lond.; became in 1848 prof. of pathological anat., in 1857 of chemical med.; was appointed phys. to the queen, and attended Prince Albert in his last illness; established the difference in kind between typhus and typhoid fevers; attended the Prince of Wales during a dangerous illness.

Jen'nings (THOMAS REED), M.D., b. in Steubenville, O., 1805, grad. at Washington Coll., Pa., and in med. in Baltimore. He came to Tenn. in 1828, where, during the invasion of Asiatic cholera in 1833, he obtained a large practice. He opened dissecting-rooms in Nashville 1838, and was the first who taught anat. in Tenn. For 3 yrs. he was a senator in the legislature of Tenn. In 1854 he was elected prof. of the insts. of med. and clinical med. in the Univ. of Nashville, and in 1856 filled the chair of anat. D. July 7, 1874.

Jeph'tah, 9th judge of the Israelites, was a natural son of Gilead of the tribe of Manasseh. After the death of his father he was expelled from his home by his brothers, and withdrew to the land of Tob, where he became the chief of a band of brigands. When the tribes beyond the Jordan resolved to oppose the Ammonites, they invited J. to become their commander. His victory was complete, and he ruled the country for the rest of his life—from 1256 to 1250 B. C. When setting forth against the enemy he made a vow that if he returned home victorious he would offer up for a burnt-offering whatsoever first "came forth from the doors of his house" to meet him. On his return his daughter, an only child, came first out with her companions to greet him. At this sight he rent his robes and cried out in despair, but his daughter encouraged him "to do with her according to this vow," and so, after 2 months, he did.

Jequitinhonha, zhá-kee-teen-yón'yah, river of Brazil, after a course of about 750 m., first N., then N. E., falls into the Atlantic in lat. 15° 50' S. Its upper course runs through a mountainous region, and has rapids and cataracts, of which the Salto Grande is one of the most magnificent falls of Brazil. Its lower course is broad and smooth, but rather shallow, and its mouth is obstructed by sand-bars.

Jer'boa [Ar.], a name of small rodents of the family Dipodidæ, remarkable for their progression, which is accomplished by long leaps in the air, after the manner of kangaroos. The Egyptian J. (*Dipus sagitta*) is the typical species.

Jeremi'ah [Heb. "raised up by the Lord"], the second of the greater prophets of the Heb. canon, began his work about 628 B. C. He survived the fall of Jerusalem (588), so that his work lasted over 40 yrs. His life covered the catastrophe of the hist. of Judah. He was imprisoned for speaking words of opposition to the prevailing policy. His warnings were unavailing, and when all was lost he fled to Egypt, where he d. J. also wrote the book of Lamentations.

Jerez. See XERES.

Jerzafalcon. See GYRFALCON.

Jer'icho, one of the most flourishing towns of anc. Pal., a few m. N. E. of Jerusalem. At the time of Christ it was the residence of Herod the Great, but during the Crusades it was destroyed, and was never rebuilt.

Jericho, *Rose of* (*Anastatica Hierocelandina*), a prostrate, branching annual, of the cruciferous family, inhabiting the deserts of Egypt and Pal. After death the softer green parts disappear, leaving the ligneous framework; this rolls up into a ball in drying. When wetted the branches expand hygrometrically, so that the plant seems to revive; hence its name, from the Gr. *ἀνάστασις*, "resurrection."

Jerked Beef [Chilian, *charqui*], prepared in the pastoral regions of N. and S. Amer. and Australia. The flesh of the ox is taken off in thin strips and dried, either with or without salt. It will keep for a long time, and if well cooked is very palatable.

Jerobo'am, the name of 2 kings of Israel.—**JEROBOAM I.** was a son of Nebat. By Solomon he was made supt. of public works, but having been informed that according to divine appointment he should become king over the 10 tribes, he entered into conspiracies, and was compelled to flee to Egypt (980 B. C.). When Solomon d. (973 B. C.) he headed the deputation appearing before Rehoboam, and when their demands were refused the 10 tribes chose him for their king. The aim of his govt. was to make the breach between the 2 kingdoms as wide as possible. He forbade his subjects to resort to the temple at Jerusalem, and established shrines at Dan and Bethel, where "golden calves" were set up as symbols of Jehovah. D. 951 B. C.—**JEROBOAM II.**, the 14th king of Israel, the son and successor of Jehoash, reigned 823-782 B. C. He carried on successful war against the Syrians, from whom he took Damascus and Hamath; Ammon and Moab were also conquered. But he kept up the idolatry of the golden calves.

Jerome', SAINT (SOPHRONIUS EUSEBIUS HIERONYMUS), b. about 345 at Stridon, a town on the confines of Dalmatia and Pannonia; received a very careful education; travelled in Gaul; was baptized; lived for some yrs. at Treves and Aquileia; went in 373 to the East, where he visited Antiochia; retired in 374 to the desert of Chalcis; ordained a presbyter by Bp. Paulinus of Antioch, he repaired to Constantinople in 379 to hear Gregory Nazianzen. In 382 he returned to Rome, where he lived in intimate connection with Bp. Damasus; Paula, a rich Roman lady, followed him in 384 to Bethlehem, where she built 4 convents; he d. here about 420. During his residence in Rome he commenced a critical revision of the Lat. translation of the Bible, the Vulgate; this, which he finished in Bethlehem, is his chief work.

Jerome of Prague, b. about 1375, was descended from the noble Bohemian family FAULFISCH; studied in his native city, in Paris, Cologne, Heidelberg, and Ox.; became acquainted with the writings of Wycliffe, and espoused his ideas. On his return to Prague he allied himself to the Bohemian reform party under the leadership of Huss. When he heard that Huss had been imprisoned in Constance he hastened to his rescue. But finding himself unable to do anything to aid Huss, he returned home, when (Apr. 25, 1415) he was seized at Hirschau in Swabia. The indignation which the execution of Huss (July 6, 1415) excited made the council hesitate in the case of J., but on May 30, 1416, he was sentenced and burned at the stake, and his ashes were strewn on the Rhine.

Jérôme Buonaparte. See BONAPARTE (JÉRÔME).

Jer'old (DOUGLAS WILLIAM), b. in Lond. Jan. 3, 1803, the son of the manager of a theatre; became mdpn. in the navy 1813-15, and was apprenticed in 1816 to a printer. His first play, *More Frightened than Hurt* (1818), was successful. The comedy *Black-Eyed Susan* (1822) established his reputation. *Rent Day, Men of Character, The Caudle Lectures*, and numerous other plays, sketches, and tales extended his fame as a humorist. He twice failed as a publisher of newspapers, and once as a theatrical manager, but his connection with *Lloyd's Weekly* was successful. D. June 8, 1857.

Jerrold (WILLIAM BLANCHARD), eldest son of Douglas Jerrold, b. in Lond., Eng., in 1826; studied for an artist, and illustrated some of his father's articles, but later gave his attention to lit.; long prominently connected with the Lond. press. Wrote several comedies and farces, also *London*, illustrated by Doré, and *Life of Nap. III.*

Jer'ry (REV. JOHN L.), b. in N. C. May 11, 1793. When a missionary in St. Augustine, a priest threatened him with punishment if he did not desist preaching; pointing to the Amer. flag, he said, "No Inquisition where that flag waves!" He entered the S. C. conference in 1818, and was a member of the Fla. conference at time of death, July 11, 1859.

Jersey, the largest of the Channel Islands, in the Eng. Channel, 13 m. W. of the coast of Fr. and 35 m. S. of the coast of Eng. Area, 39,580 acres. The natives speak a kind of Norman Fr., as the island originally belonged to the Fr. prov. of Normandy. Pop. 1881, 52,372.

Jersey City, important R. R. and commercial centre, cap. of Hudson co., N. J., on W. bank of the Hudson River, at its entrance into New York Bay, and opposite the S. portion of New York city, with which it is connected by ferries. The Morris Canal connects it with E. Pa. It is the terminus of several European steamship lines and the seat of considerable foreign commerce. Here are located large stock-yards and slaughter-houses for the supply of the New York city market. J. C. is in reality a suburb of New York. At the beginning of the century there was no settlement on Paulus Hook, as the locality was then called. A company chartered in 1804 laid out the grounds of Paulus Hook. It was but a v. in 1820, when incorporated as "City of Jersey," and was still only a v. when reincorporated in 1838 as "Jersey city." Pop. 1870, 82,546; 1880, 120,722.

Jersey Shore, Pa. See APPENDIX.

Jerseyville, city and R. R. junc., cap. of Jersey co., Ill., 50 m. N. of St. Louis. Pop. 1870, 2576; 1880, 2894.

Jeru'salem. I. THE NAME.—The name *Jerusalem* is the Gr. form, as found in the Septuagint, of the Chaldee *Jerushalem*. In the N. T. it is written both as in the Septuagint and also *Jerosolyma*. The Heb. name is *Jerushalaim*, *Yerushalaim*, or *Yerushalayim*.

II. THE HISTORY.—*First Period* (B. C. 1450-B. C. 1048).—The first appearance of the place in hist. is in Josh. xv. 8, where it is called the "shoulder" of the Jebusites, a Canaanitish tribe, who held it as their stronghold. After Joshua's death the Israelites captured and burned a part of it, but the Jebusites kept apparently quiet possession of the upper city for nearly 4 centuries. David, in the 8th yr. of his reign over all Israel, organized an attack upon J.; the strong citadel was taken, and called afterward "the city of David." From David's conquest of J. dates its fame.

Second Period (1048 B. C. to 586 B. C.).—David immediately turned his attention to the reconstruction and strengthening of his conquest, and when this work was accomplished the ark of God was brought with great jubilation to the royal city. David's conquests extended his empire to the Euphrates on the N. E. and to the Red Sea and Mediterranean on the S. and W., making his dominion at that time the most conspicuous of the world. Of this empire J. was the central seat. Under Solomon the city grew into magnificence. What war had before done, commerce now accomplished, and J. received a vast stream of wealth from its relations with rich and distant countries. With the wealth thus acquired, and that laid up by his father, Solomon erected the temple on the rocky height opposite Zion, completing the work in 7 yrs. He also erected a palace of corresponding grandeur for himself, which occupied 13 yrs. in its construction. The walls of the city were extended around suburbs, increased in height, and strengthened with towers. The whole apparatus of the Solomonian court was on a style of unparalleled extravagance and splendor. Solomon was succeeded by Rehoboam, who soon began to experience the evil results of his

father's extravagant policy. The kingdom was divided, Jeroboam became king of the N. realm, and J. was left the metropolis of the tribes of Judah and Benjamin only, and of the subject countries at the S. and E. In the 5th yr. of the reign of Rehoboam, Shishak, king of Egypt, invaded Judah. The fortified cities fell one after another, and a treaty was made by which the kingdom became tributary to Egypt. Abijah, the successor of Rehoboam, by his great victory over the kingdom of Israel, helped J. to recover from this blow, but it was not till more than 30 yrs. after that J. regained her independence and dignity by the complete overthrow of the Ethiopian Zerah, by Asa, Rehoboam's grandson. Soon afterward Asa took the treasure, which he had placed in the temple, and gave it as a bribe to Benhadad, king of Syria, that he might attack Baasha, king of Israel. The prosperity which Asa brought to J. continued for 50 yrs., which was followed by a century of disaster. Hazael, king of Syria, took Gath, and then turned toward J., defeating the Judaean army on the way. King Joash purchased deliverance for the royal city only by giving up the sacred vessels which had been accumulated since Asa's day, 100 yrs. before, together with all the treasure in the city. The first actual capture of J. was made by the Israelitish monarch Joash, who obtained entrance into the city, which he plundered, about 826 B. C., more than 2 centuries after David's conquest of the Jebusite stronghold. Then followed the long and not unprosperous reigns of Uzziah and Jotham. Ahaz, Jotham's son, called upon Tiglath-pileser, king of Assyria, to come to his aid against the victorious kings of Syria and Israel. This alliance was purchased by despoiling the temple and royal palace. Ahaz also introduced idolatry, and defiled the temple itself with idolatrous rites. Hezekiah, succeeding his father Ahaz, restored everything to its original service. During his reign occurred the invasion of Sennacherib, king of Assyria. Although the kingdom was devastated, the city was saved, yet with a new stripping of temple and palace as a tribute to the conqueror. Manasseh, Hezekiah's son, brought back all the idolatries which his father had removed, and was for a while a captive in Babylon. Josiah, Manasseh's grandson, purified the temple precincts, and made utter havoc of all the idolatrous shrines which Solomon had erected, and which had been allowed to stand for 400 yrs. After a reign of 31 yrs., he was killed in a battle with Pharaoh-necho, king of Egypt. Then followed the sad reigns of the 3 sons of Josiah, and of his grandson. The last monarch of Judah was Zedekiah, youngest son of Josiah, who was placed upon the throne by Nebuchadnezzar, against whom he revolted, and brought upon J. its destruction by Nebuchadnezzar, 586 B. C. The walls were levelled, the whole city was burned and plundered. Zedekiah's sons were slain before his face, and then his own eyes were put out, and he was carried away to Babylon. The bulk of the people were deported, only a few being left to be vine-dressers and husbandmen.

Third Period (586 B. C. to 70 A. D.).—J. lay waste until the Per. monarchy absorbed the Babylonian. One of Cyrus's first acts was to send back to J. all the Jews who wished. Less than 50,000 returned. This return, under Zerubbabel of the royal house and Jeshua the high priest, occurred probably in B. C. 536. The rebuilding of the temple went on while Cyrus reigned, but was interrupted under Cambyses and Smerdis, being finally completed under Darius Hystaspes (516 B. C.). In 445 Nehemiah, acting as Per. gov., visited J. and aroused the people to build the walls of the city, which had been prostrate for 140 yrs. The Per. monarchy was overthrown by Alexander the Great, who in 332 B. C. visited J. and confirmed the Jews in their peculiar laws. The period between Alexander's death and the settlement of the empires of Syria and Egypt was a chaotic and stormy one. Ptolemy Lagi acquired possession of J., and for more than a century Judaea was a tributary prov. of Egypt under a high priesthood. In 199 B. C. Antiochus III. of Syria wrested J. from the Egyptian empire. With a brief exception of a yr. J. remained a prov. of Syria until the Maccabean revolt. In B. C. 175 Antiochus IV. (Epiphanes) succeeded to the throne of Syria, and began to plan the extinguishment of all the peculiarities of the Jewish people. All the Jewish ritual was forbidden, and fearful punishments were visited on those who dared to uphold their anc. faith. Under the guidance of the Asmonean family the Jews organized a gen. revolt. In B. C. 165 they entered J. and dedicated the temple anew, the citadel being still held by the Syrians. Fortune wavered between the Jews and the Syrians till the death of Judas called Maccabæus, B. C. 161. In 142 B. C. Simon the high priest, brother of Judas, captured the citadel which had held out against the Jews for more than 20 yrs. He then entered into alliance with the Romans, who had already overwhelmed Macedonia. In B. C. 107 Hyrcanus, son of Simon, d., and was succeeded by his son Aristobulus, who assumed the title of king. The hist. now becomes a series of fierce and bloody strifes, which at length brought Pompey, the Rom. gen., into the Jewish hist. He captured the temple (B. C. 63) and destroyed the city walls. Antipater, an Idumæan, was soon made procurator of Judaea. In B. C. 43 Antipater was murdered, and great disturbances arose, the result of which was that Herod, a son of Antipater, with Rom. aid, captured J. after a siege of 5 months. He cultivated the friendship of the Romans and sought to win the esteem of the Jews, by building a new temple, rivaling the edifice of Solomon in its richness and grandeur. For 32 yrs. he held firm sway over Judaea as king, beautifying the city and restoring its importance—loved by none, feared by all. In the yr. B. C. 4 of the common reckoning Herod d., a few months after the birth of our Lord in Bethlehem. Ten yrs. later his son and successor, Archelaus, was deposed and Judaea made a Rom. prov. The Rom. gov't of Judaea was on the whole peaceful, for many yrs. In A. D. 41 Herod Agrippa, grandson of Herod the Great, was again king of all Pal. by the emp. Claudius. On his death Rome again made Judaea a prov., and a list of reckless procurators fol-

lowed till the final fall of the Holy City. Insurrections and disturbances broke out until, in the yr. 66, Cestius Gallus, prefect of Syria, attempted, with the aid of the high priest and a peace party to put down the insurgents. Gallus was beaten, and Rome now began the war in earnest. First, Vespasian, and afterward his son Titus, conducted the war. The dissensions among the Jews, the sufferings of the besieged, the destruction of more than 1,000,000 Jews, the enslaving of all the youth, the entire demolition of the city, form one of the gloomiest pages in the annals of man.

Fourth Period (70 A. D. to this time).—In Hadrian's reign (A. D. 118-138) we next hear of an attempt to rebuild J. and establish the Jewish polity. Bar Cochba for 3 yrs. kept the power of Rome at bay. Hadrian razed Jerusalem, and then built a new city on the spot, which he peopled with Romans, and called *Elia Capitolina*. No Jew was allowed to enter the new city, and this prohibition continued in effect till the empire became Chr. Constantine restored the old name, *Jerusalem*. Julian (A. D. 363) vainly attempted to rebuild the Jewish temple and restore the Jewish worship as a part of his design against Christianity. For the first Chr. centuries J. occupied the position of a venerable and sacred relic. Bps. presided over the Ch. there, and emps. from time to time built or repaired the holy edifices. The first disturbance of this peaceful condition was when the Per. monarch, Chosroes II., took the city by storm in 614. In 637 Omar made J. the first grand conquest of the rising Mohammedan power. In 1099 the crusaders appeared before J. In 6 weeks the city was in their hands, and Godfrey of Bouillon elected its king. It remained in the hands of the Chrs. till Saladin, the sultan of Egypt, reconquered it in 1187. In 1517 it fell into the hands of Selim, the Tur. conqueror of Egypt, and remains in possession of his successor, the sultan, to this day.



Jerusalem at the time of King Herod. (Sketch showing approximately the line of walls: 1, Temple of Solomon; 2, Palace of Herod; 3, Addition to Herod's; 4, Extension of the tower of Antonia; 5, Antonia (the Citadel); 6, Cloisters joining Antonia to Temple; 7, Vestibule; 8, Acropolis; 9, Zohaleth; 10, Lower City; 11, Upper City of Josephus; 12, Herod's Palace; 13, Bethesda, or Struthion; 14, Bridge built by Herod; 15, the Lower City, called sometimes Akre; 16, British Cemetery, A. D. 1870.)

III. TOPOGRAPHY.—The E., S., and W. limits are accurately defined by the deep ravines of the Kedron and the Ben-Hinnom, and beyond these the Mount of Olives, the Hill of Evil Council, and the W. heights remain as David must have seen them, so far as their natural features go. On the N. there are no such marked topographical features. The modern city walls, built only 300 yrs. ago by Suleiman, probably inclose the area of the anc. city of David's day, with the exception of the S. portion of Zion and Ophel, which are now without the walls. The positions of Zion and Moriah seem to be thoroughly determined. (For a full account of the topography of J., see *J's Univ. Cyc.*, art. JERUSALEM.)

J. is in lat. 31° 46' 35" N. and lon. 35° 18' 30" E., lying on the very summit of the great mt.-ridge which extends from the plain of Esdraelon to the S. desert, the ridge itself being higher farther S. near Hebron, where it reaches an elevation of 3000 ft. above the Mediterranean. At J. (Mount of Olives) the elevation is 2700 ft. The highest part of the city itself is 2600 ft. (Kasr Jalud). From the Mount of Olives the descent is rapid to the Jordan valley. In 10 m. one descends 3700 ft. Westward the descent is more gradual to plain along Mediterranean coast, about 2500 ft. in 15 m. Pop. about 20,000. (See MILMAN, *Hist. of the Jews*; ROBINSON, *Biblical Researches*; WARREN, *Recovery of Jerusalem*; From orig. art. in *J's Univ. Cyc.* by HOWARD Crosby, D. D., LL. D.)

Jerusalem Artichoke, a species of sunflower (*Helianthus tuberosus* of Linnaeus, order Compositae), which bears subterranean tubers of the same nature as potatoes. The tubers got the name of artichokes from a resemblance in taste to the true ARTICHOKE (which see), while the name

"Jerusalem" is a curious Eng. corruption of *giyewola*. It, for "sunflower." The plant probably reached Eng. by way of It. or Sp. The Fr. name is *topinambour*. It has been cultivated in Europe ever since the beginning of the 17th century, and doubtless came from Amer., the native country of the whole genus, probably from N. Amer., and not from Brazil, as is commonly stated. The tubers, boiled or stewed, are of delicate flavor and are much esteemed in Europe. In the U. S. they are more commonly pickled, or used as food for swine. A. GRAY.

Jerusalem Cherry, the popular name of species of *Solanum* cultivated as ornamental house-plants, introduced into Eng. from Madeira about close of 16th century; grows only 2 or 3 ft. high, and bears berries about the size of cherries. It is uncertain how it came by name Jerusalem.

Jervis (Sir JOHN), b. at Meaford, Eng., Jan. 9, 1734; entered the navy at 10 yrs. of age; became post-capt. in 1760, rear-admiral in 1787, and admiral of the blue in 1795; defeated a Sp. squadron of twice his strength (Feb. 14, 1797) off Cape St. Vincent; created earl of St. Vincent; was first lord of the admiralty 1801-04. D. Mar. 15, 1823.

Jervois (Col. Sir WILLIAM F. D.), R. E., K. C. M. G., b. in 1821; ed. at the Royal Military Acad. at Woolwich; served in Afr. (1841-48), and in the Kafir war (1846-47). Made capt. in 1847, he received the brevet of major in 1854; in 1856 he was appointed assistant inspector-gen. of fortifications, and subsequently deputy director of fortifications. In this capacity he prepared in 1858, by direction of the sec. of state for war, a memoir relating to the gen. defence of the country, in which a system of fortifications for the security of the vital points was proposed in detail, and a plan for the defence of Lond. was suggested. The commission appointed in 1859, of which Major J. was sec., adopted the arguments and principles contained in the memorandum submitted by him to the sec. of state for war in the previous yr. This report is in striking harmony with the reports of our own board of engineers which inaugurated our system of defence against maritime invasion. Promoted to be lieut.-col. in 1862, he became a full col. in 1867. In 1863 he was nominated a companion of the Bath, and appointed knight commander of the order of St. Michael and St. George. In 1875 he became gov. of the Straits Settlements.

Jesamine, the common Eng. name for species of *Jasminum*, a genus of erect or climbing shrubby plants, natives of the Old World, of which several species are cultivated for ornament, the flowers being both beautiful and fragrant. The common species are *Jasminum officinale* (white J.) and *J. odoratissimum* (yellow J.), and in conservatories *J. Sambac* of tropical India, which exhales a powerful fragrance at evening. Belongs to a tribe of the olive family. The so called J. of the S. U. S., *Gelsemium sempervirens*, equally beautiful and fragrant, belongs to a related family; its root is used in med. A. GRAY.

Jes'up (WILLIAM), LL.D., b. in Southampton, N. Y., June 21, 1797, grad. at Yale in 1815; removed to Montrose, Pa., in 1818; admitted to the bar 1820; presiding judge of 11th judicial dist. of Pa. 1838-51. D. Sept. 11, 1863.

Jesuits, or **The Society of Jesus**, a religious order of the R. Cath. Ch. It was founded by Ignatius Loyola, and established by Pope Paul III. Sept. 27, 1540. It was Loyola's idea to form a monastic order with a definite practical purpose. To the vows of chastity, poverty, and obedience, he added that of missionary activity; and as he was a military man by profession, he conferred upon the religious order he founded his military ideas, of training, subordination, and implicit obedience. But under its second gen., James Laynez (1558-65), the order freed itself to a great extent from its monkish apparel. Its prin. object became the maintenance of the absolute dominion of the pope against anything which showed an independent tendency.

At the death of Loyola the society numbered 1000 members in 12 provs.; at the celebration of its first centennial jubilee, 13,112 members in 32 provs.; at the time of its suppression, one century later, 23,589 members, 24 professed houses, 669 colls., 179 sems., 61 novitiates, 335 residences, and 275 missionary stations in heathen or Prot. countries. In It., Sp., Port., and Aus. the order took root immediately. In the Thirty Years' war it was Father Lamormain, the confessor of Ferdinand II., who defeated Wallenstein, and it was the J. who kept alive the league between Aus. and Bavaria. In many countries they actually controlled all education; at the R. Cath. univs. of Ger.—Cologne, Munich, Treves, Augsburg, etc.—they held chairs a few yrs. after the establishment of the order. Still more decided was their success as missionaries to the pagans. They penetrated into Japan in 1549, and into Chi. in 1584. They had flourishing stations in Cochín—China, Tonquin, Hindostan, Ceylon, Madagascar, and on the coast of Afr. In Paraguay they christianized the whole nation. Brazil, Mex., and N. Amer. are also in debt to them, for they carried civilization with them wherever they went. In the Prot. countries, however, they never got a foothold, though they tried very hard in Eng. and Swe. In Fr. their situation was generally precarious. The Sorbonne, the bps., and even the Parl. were opposed to them. After the attempt of Chatel, a former pupil of theirs, on the life of Henry IV. in 1594, they were even expelled, though only for a short time; in 1603 they were allowed to return. Richelieu and Mazarin showed them considerable favor, and under the reign of Louis XIV. they gradually grew in power. But in their contest with Jansenism they were the losers in spite of their great dexterity in theological dispute, and when, in 1656, Pascal pub. his *Lettres Provinciales*, a blow was inflicted on them from which they never recovered. An insurrection in Paraguay against Port., in which the J. were implicated, gave Pombal an opportunity in 1758 of bringing them before the courts. While the trial was going on an attempt was made to assassinate the king, and (Sept. 3, 1759) a royal decree expelled the society from the Port. dominions and confiscated their property. In Fr. not only public opinion, but also the court,

especially Madame de Pompadour and the prime minister, Choiseul, were against them, and in 1764 a royal decree expelled the society from Fr. Apr. 2, 1767, all the J. in Sp. and in the Sp. colonies were arrested at the same hour and sent to the papal dominions; and July 21, 1773, a papal bull dissolving the whole order, on the request of Fr. Sp., Port., Parma, Naples, and Aus., was issued. Its property was confiscated, but in most countries its members received annuities and were allowed to live as private persons. Frederick II. of Prus. showed them much kindness, and Catherine II. even permitted them to exist as a society in Rus. under the head of a vicar-gen. In 1801 Pope Pius VII. confirmed this branch of the order, and immediately after the fall of Nap. (Aug. 7, 1814) he re-established the society in its old form. During the exhaustion and reaction which prevailed throughout Europe between 1815 and 1848 the J. succeeded in penetrating all countries, with or without the acknowledgment of the govts.; but in 1852 they were again expelled from Ger., and in 1879 from Fr. CLEMENS PETERSEN.

Jesuits' Bark. See CINCHONA.

Jesus Christ. This name consists of the proper name Jesus, and the official designation Christ—Jesus the Christ. Jesus is the Gr. form of the Heb. Joshua or Jehoshua, and means "Jehovah his salvation," or the "Salvation of Jehovah." Christ is equivalent to the Heb. Messiah, and means the Anointed.

There is much difference of opinion in regard to the chronological order of events in his life, but there is gen. agreement as to the most important facts. Jesus was born in Bethlehem, about 6 m. S. of Jerusalem. The home of his mother, Mary, was Nazareth in Galilee, but she had come to Bethlehem with her husband, Joseph, in obedience to a decree of enrolment and taxation. The date of the Nativity is uncertain. On the 8th day after his birth he was circumcised, and on the 40th day he was taken to the temple, when offerings of purification were made. The visit of certain "wise men," who came probably from Per., excited the jealousy of Herod, who issued orders for a massacre of young children at Bethlehem. Jesus was taken to Egypt in time to escape the destruction. After the death of Herod the holy family returned to Nazareth. Twelve yrs. later Joseph and Mary took Jesus with them to Jerusalem to keep the Passover, but he lived at Nazareth for 18 yrs. longer.

When Jesus was about 30 yrs. old his kinsman, John, began to announce the approach of the kingdom of God, and to call his countrymen to prepare for it by a moral reformation. Jesus appeared among the throngs which gathered about John the Baptist, and insisted on being baptized by him. After his baptism Jesus withdrew into the wilderness, where he overcame a series of temptations addressed to him by Satan. A few of John's disciples now attached themselves to Jesus. The first of his miracles was wrought at Cana, where water was changed into wine. Soon after he began his public ministry in Jerusalem, at the Passover. He announced himself as a messenger of Heaven by expelling from the temple court those who had been allowed to carry on traffic in it. For a few months he carried on a work in Judæa similar to that in which John the Baptist was engaged. Attempts being made to create dissensions between his followers and those of John, he retired to Galilee. He next presented himself at Jerusalem, on the occasion of a feast, probably the Passover, raised an issue with the Jewish hierarchy, and offended them by the way in which he spoke of his own relation to God.

Near the time of this second Passover, John the Baptist was imprisoned by Herod Antipas. Jesus now entered on a new stage of his work, to be carried on in Galilee. He fixed his residence at Capernaum, on the Lake of Tiberias, and from that point made a series of circuits through Galilee, where he speedily attracted crowds of hearers. He chose 12 of his disciples to be, under the name of apostles, his companions, and by degrees his associates in labor. Proofs were multiplying of the indisposition of Israel as a whole to profit by the mission of Jesus of Nazareth. His own relatives misapprehended him, and even John the Baptist sent a message which expressed his perplexity at the course which Jesus was pursuing. Nevertheless, the end of his work in Galilee was practically secured. As the next Passover drew near, John the Baptist was put to death by Herod. From this time Jesus began to withdraw as much as possible from public notice in Galilee, and to devote himself to the instruction of the 12 apostles, but some great miracles were wrought during this period. In Oct., about 6 months after the death of John the Baptist, Jesus began his second attempt to gain a hearing from the representatives of the nation at Jerusalem. He appeared at the Feast of Tabernacles, and by miracles and discourses succeeded in awakening new interest in his movements. It may be inferred that he then returned to Galilee. Seventy disciples were sent, two by two, to the various towns which he designed to visit, and he followed them, preaching and working miracles. The scene of these new labors must have been Peræa, the country E. of the Jordan. That intense excitement did follow Christ's appearance here is clearly indicated in the Gospels. In Dec., at the Feast of the Dedication, Jesus was again at Jerusalem. He was met by questions about his Messiahship, but his answers only provoked fresh hostility, and he narrowly escaped being stoned as a blasphemer. His home during these visits was probably the house of Lazarus at Bethany, 2 m. E. of the city. On his return to Peræa Christ fixed his abode at Bethabara (or Bethany), near the scene of his baptism. Hence he was summoned to Bethany in Judæa by the dangerous illness of Lazarus, and wrought the greatest of his recorded miracles by restoring his friend to life. This act led the Heb. council to resolve on the destruction of the Galilean prophet. Jesus now for a time concealed himself, taking refuge in Ephraim, 20 m. N. E. of Jerusalem. Another Passover approached, and Jesus prepared to attend it. The suburbs of Jerusalem were reached, probably, on the evening before the sabbath. Christ and his followers

stopped at Bethany. On the first day of the week Jesus entered the Holy City, riding on an ass never before used, and surrounded by an intensely excited throng. The multitude hailed him as "Son of David" and "King of Israel." On the following day he went to the city again, and repeated the act by which he had announced himself and his mission 3 yrs. before—the cleansing of the temple. The third day, Tuesday, was also spent in the temple. The next day seems to have been passed in retirement. Meanwhile Christ's enemies, not daring publicly to arrest him, resolved to get him into their power after the feast should be over. On the evening of Thursday he kept the Passover with his disciples in Jerusalem. While they were at the table he indicated to Judas, as also to John and Peter, his knowledge of the intended betrayal. At the close of the paschal supper he instituted the Chr. feast of bread and wine commemorative of his own impending death, and the company set out on their return to Bethany. On the way they turned aside to the garden of Gethsemane, where he passed through a fearful inward struggle in view of the sorrows before him. Judas entered the garden, guiding a band of armed men, with some members of the council. Jesus was arrested, and led to the city for trial before the Sanhedrim. The charge was blasphemy, but no evidence was produced on which the party of the high priest could call for an unfavorable verdict from the council. The prisoner was then required to criminate himself. When solemnly appealed to by the high priest, he not only avowed his Messiahship, but asserted that he was the Son of God and the future judge of the world. The Sanhedrim then condemned him as a blasphemer. After the formality of a fresh trial at daybreak the priests led Jesus to the Rom. procurator, Pontius Pilate, to obtain authority for the execution. Pilate made several efforts to rescue Jesus without exasperating the Jews, but was intimidated by the danger of a riot, and the implied threat of accusing him to the emp. as in sympathy with a pretender to the Heb. throne. He then gave the order for the death of Jesus by crucifixion, having previously subjected him to scourging. The sentence was promptly executed, and for 6 hours, or from about 9 in the morning until 3 in the afternoon, he endured the punishment allotted to the basest criminals, and with a convicted felon on either side of him. From time to time he spoke briefly. He died in the act of commending his soul to God. The body was given by Pilate to Joseph of Arimathea, and laid in a tomb outside the walls.

On the day but one succeeding, or Sunday, some of the Galilean women went to Joseph's garden. As they approached they saw that the tomb had been opened, and one of them, Mary Magdalene, hurried away to tell John and Peter. In the mean time the other women saw a vision of angels, who told them that the Lord was risen, and bade them instruct his friends to meet him in Galilee. While the message was on its way across the Mount of Olives, Mary came with John and Peter. They examined the tomb, and returned, leaving Mary behind them. There the Lord "appeared first" to her, and intrusted her with a message respecting his ascension. As she went to deliver it, her late companions saw their Lord coming toward them. He renewed the charge which the angels had given them. Five distinct appearances are recorded as occurring on this day. They returned to Galilee, and there saw their Master more than once. His principal appearance is supposed to have taken place in the presence of the whole body of disciples, more than 500 in number. After a few weeks the apostles went again to Jerusalem, and on the 40th day after his resurrection the Lord Jesus, having led them forth toward Bethany, left them, passing visibly upward till a cloud concealed him from their sight. While they looked after him, two angels brought them another message—that he should "so come in like manner." (See NEANDER, *The Life of Jesus Christ*; RENAN, *Life of Jesus*; FARRAR, *The Life of Christ*. [From orig. art. in *J.'s Univ. Cyc.*, by S. J. ANDREWS, D. D.]

Jet, a black mineral, capable of high polish, is sometimes a kind of pitch-coal or albertite, and sometimes a very black lignite. It is employed for mourning ornaments.

Je'ter (JEREMIAH BELL), D. D. b. in Bedford co., Va., July 18, 1802; entered the ministry in 1822, and removed to the "northern neck" of Va. in 1827; 1836-49 was pastor of the First Bap. ch. in Richmond, in 1849 of the Second Bap. ch. in St. Louis, 1852-70 of the Grace st. Bap. ch. in Richmond. After 1865 he edited the *Religious Herald* at Richmond. He wrote *Memoir of Rev. N. W. Clifton, Campbellism Examined*, etc. D. Feb. 18, 1880.

Jet'ty [Fr. *jette*, from Lat. *jacere*, to "throw," and implying "projecting" or "jutting"], a dike, pier, or embankment projecting into the sea, whether constructed of timber, earth, fascines, stone, etc., or a combination thereof. The most common application is to the mouths of rivers or at the entrance to tidal harbors, whereby to narrow the channel, concentrate the current, and thus increase the depth over the entrance bars. Most of the HARBORS or AMERICAN LAKES (see that head) are the mouths of rivers or "creeks" thus treated. In G. Brit. the mouths of the Liffey, Blyth (Ire.), Esk, Wear, Dee, Slaney, Ayr, are so made, and the tidal harbors of Howth, Kingston, Leith, Donaghadee, and Ramsgate so improved. Also the tidal harbors of Gravelines, Dunkirk, Calais, Boulogne, Dieppe, Fécamp, etc. (Fr.), of Ostende (Belg.), and many others owe their existence to J. To the Oder, the Vistula, and many river-mouths of the Baltic, J. have been applied with more or less success. The most noted instance, however, is the Sulina mouth of the Danube, which, a permanent depth of 20 ft. having been attained where was but an average of 9 ft., instead of being the worst harbor, at once took rank among the best harbors in the Black Sea. Another instance of signal success is the improvement of ship-navigation to Rotterdam by making a new mouth to the Maas through the Hook of Hol., and prolonging the new outlet into the sea by J. (See HARBOR; also Prof. *Papers Corps of Engineers U. S. A.*, No. 22.) This great work is a double success, inasmuch not

only that the jettied entrance has thus far fulfilled expectations, but that the *method of construction* of fascines and stone, for the first time applied to open sea-exposures, has realized all anticipations and established a certain and economical way of constructing these sea-works on sand-cornets. (See HARBOR.)

Jevons (WILLIAM STANLEY), b. at Liverpool, Eng., in 1835; grandson of William Roscoe, the historian; ed. at Univ. Coll., Lond.; held an appointment in the Australian royal mint at Sydney 1854-59; returned to Eng. via the U. S.; became fellow of his coll. in 1864; appointed prof. of logic, mental and moral philos., and Cobden lecturer on political economy in Owens Coll., Manchester (1866); wrote *Value of Gold*, *The Coal Question*, etc.

Jewell, or **Jewell** (JOHN), D. D., b. at Buden, Devonshire, Eng., May 24, 1522; studied at Ox., and during the reign of Edward VI. became a Prot. minister. In the reign of Mary he was expelled from Ox. by the Romanists; went to Strasburg at the invitation of Peter Martyr, and engaged in teaching. Returning to Eng. after the accession of Elizabeth, he aided in the re-establishment of Protestantism; bp. of Salisbury in 1560; the most eloquent defender of the accomplished Ref. Wrote *Apologet Ecclesie Anglicane*. D. Sept. 22, 1571.

Jewell (MARSHALL), b. at Winchester, N. H., Oct. 20, 1835; was bred a tanner, and afterward engaged in telegraph construction in the S. W. States. In 1850 he began business at Hartford, Conn., where he manufactured leather belting. He was chosen gov. of Conn. in 1869, 1871, and 1872; U. S. minister to Rus. 1873-74; P. M.-gen. 1874-76. D. Feb. 10, 1883.

Jewelry and Jewels, terms used in a confined sense for precious stones set in gold or silver and worn as personal ornaments, but more generally applied also to ornaments made only of the precious metals. Paris is in this branch of industry the great factory for the world. Only 3 grades of gold are allowed, and these are set forth by official stamps. The Eng. also endeavor to secure a standard of value for their J., but recent revelations have shown that the "Hall mark" is not to be depended upon. Silver J. is an extensive branch of industry; that of Rus. inlaid with enamel and chased) is of remarkable beauty. There are in Paris 141 manufacturers of silver ornaments. Two grades of silver only are permitted. Steel J. is extensively made in Fr. and Ger. For this soft or malleable iron is at first employed, the surface of which is case-hardened. Ivory J. is now made in immense quantities in Fr., Ger., and Eng. Tortoise-shell J. is generally set off with spots and small plates of gold. Of mourning J., some consists of gold and black enamel, the greater part being made of jet, human hair, and vulcanite. Amber has of late become a fashionable material for personal ornaments. It is principally manufactured in Ger. [From *orig. art. in J. J. Univ. Cyclopedia*, by CHARLES G. LELAND.]

Jewett (CHARLES COFFIN), b. at Lebanon, Me., Aug. 12, 1816, grad. at Brown Univ. in 1835; was for a time student and librarian of the Andover Theological Sem.; in 1843 catalogued the library of Brown Univ., where he remained as librarian and prof. of modern langs. until 1848. He became librarian and assistant sec. of the Smithsonian Inst., and was 1858-68 sup. of Boston Public Library; wrote a report on public libraries of U. S., and brought forward an improved plan of cataloguing books. D. Jan. 9, 1868.

Jewett (MILO PARKER), LL.D., b. at St. Johnsbury, Vt., Apr. 27, 1808, grad. at Dartmouth in 1828, and at Andover Theological Sem. in 1833; was a prof. in Marietta Coll., O., 1835-38; left the Presb. and joined the Bap. denomination, and became pres. of Vassar Coll., Poughkeepsie, N. Y. He was author of a work on baptism. D. June 9, 1882.

Jewfish, a name of several fishes of the family Serranidae, attaining a weight of several hundred lbs.; that of Fla. is the *Promicropus quasa*, of which a specimen in the Smithsonian Inst. weighed 700 lbs.; that of Cal. is *Stereolepis gigas*.

Jewish Literature. The most ancient monuments of Heb. lit. are contained in the Bible, the historical portions of which are designed to show the workings of Divine Providence in the destinies of the chosen people; while rhetoric becomes a vehicle of inspiration, poetry is devoted to the glorification of God, and philos. is busy on the questions of good and evil. The contact of the Heb. and Gr. spirit took place both in Pal. and in Alexandria. In Alexandria philos. and inspiration joined forces, and the words of the Bible were interpreted so as to express metaphysical tenets; there also the first translation of the Bible into Gr., known as the Septuagint, was effected. In Pal. the attitude Judaism assumed against Hellenism was hostile. The Heb. always resists any attempt to interfere with the observance of those practical commandments of his faith which he regards as its essential feature. Such an attempt was made by the Grs. who ruled in Syria in the time of Antiochus Epiphanes. Judaism retired upon itself, Gr. culture and heterodoxy came to be synonymous terms, and the authority of Script. was more than ever secured in the affections of the people. None the less, innovation became a necessity. All the biblical laws were no longer applicable to the altered conditions of a new age. The teachers of the people thus became doctors of the law, and they were enabled to read from the letter of the Heb. Bible whatever meaning they desired to read into it, and to fortify their own injunctions by referring them to a divine origin. A few of the leading rabbins were Hillel, shortly before the birth of Christ; Johanan b. Sakkal, at the time of the destruction of the temple; Akiba, in the days of Hadrian; Juda the Holy, the compiler of the Mishna; R. Meir, Aba Areka, called Rab, Raba, Rabbah, and others. The elaboration of the Talmud continued down to the 6th century. The commentaries grounded on Talmud and Mishna are known as the Gemaras of Pal. and Babylon.

When the Arabs received, through Syrian channels, the treasures of anc. Gr. thought, a new spirit of inquiry was awakened among them, and was soon communicated to the Jews. As early as the 7th century works on math., astron.,

and astrology began to appear among them. Exegetical studies received a powerful impetus from the new sect of Ananites or Karaites, founded about 750 A. D., who, rejecting the authority of tradition as represented by the rabbins, professed to return to the letter of the Heb. Bible as the sole standard of faith. Anan himself, Benjamin Nahawendi, and Nissi b. Noach may be mentioned among the earliest authors of their sect. The mystical tendencies of this period found expression in the *Book of Creation*, a production of the 8th or 9th century. It employs the method of the Neo-Pythagoreans, seeking to solve the problem of creation with the help of numbers and letters. In the same epoch arose the poetanic school of writers, with Elasar b. Kalir at their head. In the first half of the 10th century arose the Gaon Saadias, b. in Faimum, Egypt. His main work is entitled *Emunoth we Deoth*—"Faith and Knowledge." In it he seeks to reconcile the commandments of the Bible with the dictates of reason. In the latter half of the 10th century the supremacy was assumed by Sp. Moses, a captive Talmudist, sold as a slave to Cordova, was ransomed by the Jews of that city, and placed at the head of their Talmudical school. Under the patronage of Chasdai Shaprut, the trusted adviser of Abderrahman III., letters flourished. Menahem b. Saruk prepared a Heb. lexicon; Dunash b. Librat applied the metrical forms of the Arabs to Heb. poetry; Chajuz discovered the system of triliteral radicals which forms the basis of Heb. gram., while Abulwalid elaborated a complete Heb. gram. and a lexicon. The 11th century is illustrated by Baehia b. Joseph, author of *Duties of the Heart*; by the poetic vezir of Granada, Samuel ha. Nagid ("the prince"); by the philos. Solomon Gabirol, and by Hai, who assumed an attitude hostile to all liberal culture. In Chr. Sp. a poet arose in the beginning of the 12th century (Jehuda ha. Levi, b. in Castile 1080 A. D.). A contemporary of his was Abraham Aben Esra, b. in Toledo 1093, d. in Rome 1167. His great renown is due to his commentaries on the books of the Bible.

The high-water mark of J. lit. in the Middle Ages was reached in the writings of Maimonides, b. in Cordova in 1135. His chief works are his commentary on the Mishna and the *Mishneh Torah* ("Repetition of the Law"), and the *More Nebuchim* ("The Guide of Those that are Gone Astray"), in which he proposes to harmonize the principles of religion as laid down in the Bible with those metaphysical conceptions which the age ascribed to Aristotle. Among the Jewish authorities at this period in Germany may be mentioned Gershom, surnamed "the Light of the Exile" (end of the 10th and beginning of the 11th century). In the second half of the 11th century lived in Troyes R. Solomon b. Isaac, known as Rashi, a man whose commentaries on the Bible may still be read with interest; Samuel b. Meir (Rashbam) followed in the footsteps of Rashi; his brother, Jacob Tham, was among the earliest of the so called Tossafists, who exhausted the power of dialectics in subtleties of little real value; Simon Darshan is the author of a compilation known as the *Jalkut*. In Ir. Shabthai Donolo gained distinction as a phys. At the end of the 11th century R. Nathan b. Jehiel of Rome prepared a lexicon of the Talmud, Targum, and Midrash. In the S. of Fr. we find in the 12th century, beside a number of Talmudists, such scholars as Abraham b. Chija, the math., the Kimchis, and Thibbons. In the 13th century flourished the poet Charisi, whose imitations of the Ar. Hariri are esteemed. At this time the writings of Maimonides became the apple of discord between the friends of liberal culture and the conservatives. In this struggle philos. goes out, mysticism steps into its place. It was crystallized into a system by Mose de Leon in the latter half of the 13th century. His chief book, the *Solar* ("Radiance"), is written in Chaldaic, or rather Syriac, and has remained the standard work of the Mystics down to the present day.

In the mean time we observe how Jewish writers took part in the popular lit. of the different countries to which they belonged. We refer to Ibn Sahal, whose erotic poetry was the delight of the Arabs; to Santob de Carrion, the Castilian; to Süsskind of Trimberg, the Ger. Minnesänger; and to Manoello, or Immanuel, who was admitted to the circle of Dante's friends. In the beginning of the 15th century Chasdai Crescas wrote a philosophical treatise entitled *Or Adonai* ("Light of God"). His pupil, Joseph Albo, is the author of *Icarim* ("Fundamental Principles"). Ibn Shem-tob's views, laid down in his *Kebed Elohim* ("Glory of God"), are equally worthy of attention. The attempt of converted Jews, like Paulus de Santa Maria, Geronimo, and others, to destroy the faith of their brethren, provoked sharp and frequent discussions. In the 17th century free Hol. afforded an asylum to the Jews. But the lit. of the Ger. and Port. settlers is not of any high order of merit. The congregation of Amsterdam was infected with the spirit of the Inquisition, from which they had suffered in their former home. They had become narrow and bigoted, and the best men that arose among them, Uriel da Costa, Benedict Spinoza, were persecuted. In Poland the attention of scholars was absorbed in discussions on barren themes, and high gifts were wasted on questions of Talmudical casuistry. Ger. was inundated with Polish rabbis, and seemed to have lost all productive power of its own. It alone continues to contrast with the gloom that had settled on the Jewish world. Leon Modena called for a purification of public worship. Joseph Delmedigo, the pupil of Galileo, was exalted above the bigotry of his age. The end of the 17th century was marked by the great Messianic movement, with the impostor S. Zewi as its leader. The fever spread from the E. to the W., and left traces in the writings of the time. In the eighteenth century the poet Ch. D. Luzzatto caught the contagion, and ruined a career by his devotion to mysticism. The evil was at its worst when the time of change was near. Already, at the beginning of the century, Jehiel Heilprin had written his *Seder ha. Doroth* ("Order of Generations"), which showed an awakening desire for the

cultivation of historical pursuits. At last, with Moses Mendelssohn, the new era fairly began. He was the first to render the Pentateuch into pure Ger., and thereby created a desire for change among his brethren. But the benefit which the modern reform movement has conferred on J. lit. lies in the application of scientific methods to its study. Ger. has broken its silence, and the labors of its scholars have brought order into the mingling of confused elements which the lit. of the Jews presented to the scholar 50 yrs. ago. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. FELIX ADLER, Ph. D.]

Jewish Sects. *Sadducees and Pharisees.*—The Syrian king having attempted to introduce the worship of images in Judaea, the Jews became more closely attached to the religion of their fathers. Even before the Maccabean war a party had been formed among them who, to insure a stricter observance of the Mosaic law, withdrew from the society of the surrounding peoples and their own less scrupulous brethren. These were known as "Nibdalim" (separatists), or, in the Aramaic dialect, Perishin—i. e. Pharisees. In the war of independence the reigning family of priests had lost the confidence of the nation, and a new dynasty, that of the Hasmonians, assumed the crown. The power of the priesthood, however, was regarded with suspicion. The Hasmonians had headed the war against Antiochus and his successors. But no sooner were they seated on the throne than they allied themselves with the enemies of the separatist party, which had identified its interests with those of the people, and began to develop democratic tendencies. The whole people are priests, they said, and they attempted to extend the character of sanctity to every member of the community. Thus the laws of purity, hitherto incumbent on the servants of the temple only, were declared universally obligatory. Every house was designed to be a temple, every hearth an altar. This would aid in explaining the code of ceremonies embodied in the Talmud. The Sadducees are the priestly party, in opposition to which Phariseism arose. Their name is derived from Sadok, a distinguished priest of the first temple. The Sadducees are an aristocracy; the Pharisees champions of popular rights; the former the party of conservatism, the latter of religious reform.

Essenes.—They lived in communistic societies, led a quiet and secluded life, enjoined celibacy, observed moderation in speech and action, wore garments of spotless white. They shut themselves off from the society of the world, finding it impossible to maintain that purity which they aspired to in the midst of social influences that exposed them to contamination.

The *Chasidim* arose in the last century. It has numerous adherents among the Jews of Poland, Rus., and Hungary. The authority of their rabbis is supreme. They delight in ecstasy and vision; and mysticism not unfrequently leads to immorality. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. FELIX ADLER, Ph. D.]

Jews.—a people of Semitic origin, known also as **Hebrews** or **Israelites**, inhab. of Pal., were the bearers of the monotheistic idea. In the light of that idea their hist. began with the Creation; they had no need of coveting the honor of having sprung from the soil of Canaan. Abraham came from Ur, in Chaldea. On reaching Pal. he erected altars on those spots which in later times became the prin. seats of cults. In the 100th yr. of the patriarch, Isaac is b. His beloved son being wedded to his kinswoman, and the danger of intermarriage with idolaters being warded off, Abraham "is gathered to his people," having reached the good old age of 175 yrs. The birth of Jacob and Esau introduces a permanent element of discord into the family of their parents. Jacob, although a peaceful shepherd, seems to have given the first occasion of their quarrel. He flees to Mesopotamia, and remains for 20 yrs. in the employ of his uncle Laban. He marries both his cousins, though the first 14 yrs. of his service were devoted to Rachel alone, and then continues for 6 yrs. longer to undertake the care of Laban's herds. In the mean time, his family having largely increased, Israel chooses the future residence of the kings of Israel, raises an altar, and buys land at Shechem. Removing thence, his beloved wife Rachel presents him with a son, Benjamin, and dies by the wayside. Jacob has now twelve sons and one daughter, Dinah. Joseph, the eldest son of Rachel, the favorite of his father, is sold as a slave to Egypt. There his skill in interpreting the dreams of Pharaoh raises him to the dignity of viceroy of Egypt. He sends messages to his father, which induce him, though already far advanced in yrs., to remove his family to the dist. of Goshen, which the king has provided for him and his. After Jacob had passed away, and with the death of Joseph the guardian of their interests was removed, the sons of Israel, who had largely increased in the mean time, became the slaves of the Egyptians. At length the period of their bondage drew to a close. The children of Israel prepared the Passover sacrifice, and in the night, while all the first-born of the land perished, they marched forth laden with silver and gold, and under Moses' guidance turned in the direction of the Red Sea. Instead of taking the shortest road to Pal., by way of Philistia, Moses now led the people about in the desert for about 40 yrs. The events of the succeeding 38 yrs. of their wanderings are wrapped in obscurity. We may marvel how so vast a concourse of human beings could support life for so long a period in the barren desert. When at last a new generation had grown up, the Israelites once more direct their march toward the Jordan. With Moses as their leader, they defeat the armies of Sihon and Og, subjugate some of the most fertile pasture-lands E. of the river, and spread far and wide the terror of their name. In the plains of Moab the assembled people receive the parting monitions of Moses. Then he died.

The work which Moses had left unfinished was taken up by Joshua. He led the people across the Jordan, and erected a monument of 12 stones in commemoration of their safe passage. Before his death, Joshua distributed

the conquered and unconquered terr. among the tribes, and exhorted the people to choose between Jehovah and the idols. In the succeeding period disorder and distrust prevail. Mutual jealousies excite fierce conflicts among related clans; almost the whole tribe of Benjamin is exterminated; Abimelech kills 70 princes on one stone; lust and treachery run riot. Gideon after his victory proceeds to make a golden idol; Jephthah sacrifices his own daughter; Samson marries a heathen woman; while a Levite consents to superintend the worship of images. The last of the judges marks an important epoch in Israel's hist. Samuel was born of pious parents, and early dedicated to the service of God. He became the acknowledged leader of the people, and during all his lifetime is said to have overawed the Philistines and secured the peace of the land. The sons of Samuel were unworthy to succeed their father, and the people clamored for a king. Samuel resisted their persistent demands to the utmost, but at last gave way, and anointed Saul of Benjamin. Saul's hope of founding a dynasty of kings was not to be fulfilled. He was rejected of God, and a new king was now to be chosen. Samuel selected a shepherd-boy, David, the son of Jishai. The suspicions of Saul were soon aroused against David, but the prowess of the latter defeated the schemes that were laid for his destruction. In the mean time the incursions of the Philistine forces continue to endanger the political existence of Israel. In a great battle the hosts of Israel are routed by the Philistines, Saul falls on his sword, and his sons perish with him. David was now recognized as king. After a reign of 40 yrs. he died. Solomon succeeded to the throne. With the aid of his ally, the Phoenician king, he reared the temple on Mount Moriah, and he illustrated his reign with the magnificence of regal display. Trade flourished, and Jerusalem was adorned with palaces. But the people were burdened with taxes, and hardly had Solomon breathed his last when the people rose in revolt. His son, Rehoboam, provoked the resentment which justice called upon him to allay. Ten tribes under the leadership of Jeroboam seceded; Joseph and Judah were separated. Jerusalem remained the cap. of Judah; Shechem, Tirzah, Samaria became in turn the residence of the kings of Israel. Jeroboam's rule was the beginning of a series of disastrous reigns. In the reign of Pekah the whole land of Naphtali was overrun by Tiglath-pileser, king of Assyria, and its inhabs. carried away into captivity. Too late his successor, Hosea, implored the aid of the Egyptian Pharaoh. The army of Salmanassar attacked Samaria. A siege of 3 yrs. ended in the capture of the capital and the downfall of the kingdom of Israel (s. c. 721). The 10 tribes were settled in distant dists. of the Assyrian empire, and lost among its inhabs. For more than a century Judah continued to brave the storms that threatened her own existence. In the reign of Rehoboam, Shishak, king of Egypt, plundered the temple and palace of Jerusalem. His successors proved little better than the rulers of Israel. In the reign of Joiahi, Nebuchadnezzar, king of Babylon, came upon Jerusalem. The king was carried captive to Babylon, and Zedekiah appointed in his stead. Zedekiah rebelled. For 2 yrs. Jerusalem withstood the siege of the Babylonians. At last Zedekiah was overtaken, and Jerusalem was in ashes. A remnant of the people was left in Pal. under Gedaliah as gov., but the great majority had been led into exile. Babylonia proved for the J. the crucible from which they came forth for the first time wholly aglow with the spirit of monotheism. In the yr. 538 Cyrus permitted them to return to their country. About 50,000 availed themselves of this permission; they proceeded to re-erect the fallen temple, and in the yr. 515 the building of the second temple was finished.

The period until after the death of Alexander the Great is wrapped in obscurity. Judaea had no history, and may therefore be supposed to have been happy. After the death of the Macedonian conqueror, Ptolemy Lagi captured Jerusalem, and for almost a century Pal. was held in subjection by the Ptolemies. Many of the J. had settled in Alexandria, where their industry raised them to the position of merchant princes. A rich lit. arose in the midst of this Egyptian colony, and the Septuagint (the Gr. translation of the O. T.) was composed. In the beginning of the 2d century b. c. Judaea had transferred its allegiance to Syria. In return Antiochus Epiphanes commanded them to abjure their religion. This outrage provoked a "thirty years' war." Antiochus was aided by the party of the Hellenists. The cause of the people was espoused by the family of the Maccabees, who were the main stay of the revolution. After the death of Jannaeus Maccabee a feud began to rage between his sons, Hyrcanus and Aristobulus, and the Rom. eagle was called in to judge between the brothers. Scaurus at first decided in favor of Aristobulus, but (63 b. c.) Pompey reversed his decision. The temple was stormed, Hyrcanus reinstated, and Aristobulus carried captive to Rome. The independence of Pal. was forever lost. A native prince was still permitted to assume the shadow of authority, but the Roms. appointed or dismissed the rulers of the Holy Land. King Herod rebuilt the temple, erected amphitheatres, introduced the games of the arena. But this outward splendor could not conceal the real misery of his reign. After his death the kingdom was divided among his sons, Archelaus, Antipas, and Philip. By the favor of the emp. Claudius, his grandson, Herod Agrippa, once more united the principalities under one sceptre. But in the days of Agrippa II. the power of the last Jewish dynasty had lost all substance. The extortions of Antonius Felix and Gessius Florus urged the people to the verge of despair. A republican party long since subsisted among them, and encouraged by the destruction of the army of Cestius Gallus (A. D. 66) the patriots at last dared to raise their head; the revolution began, but the disciplined legions under Vespasian were met by rude bands of guerrillas, and the arts of war baffled by the obstacles of nature and the frantic courage of despair. On Vespasian's departure the completion

of the war was intrusted to his son Titus. In the spring of A. D. 70 Titus opened his works against Jerusalem. The attack was directed against the castle Antonia, which was captured. Then began the last struggle of the defenders for the sanctuary itself. At last a Rom. soldier threw a firebrand into the outer halls of the temple. The woodwork caught; the temple stood in flames. Jerusalem was an utter ruin; the Jewish state had fallen to rise no more.

With the loss of its political existence the integrity of Judaism as a religion remained unimpaired. Prayer took the place of sacrifice, the synagogues replaced the temple, and the Beth-Din became a centre of authority to reunite the people. The Beth-Din was presided over by a *nasi* (prince) and 2 other officers. It was composed of 70 academic members, of such as had been ordained to act as teachers, and of their disciples. The questions discussed in this and the similar acads. at Sepphoris, Tiberias, and elsewhere affected the entire religious, political, and social life of the J. Through the agency of such schools the work of extending and modifying the provisions of the law and of anc. tradition (*Cabala*) to suit the altered circumstances of the time was successfully carried on. The political position of the Jewish citizens of the Rom. empire varied with the character of the reigning sovereign. The last powerful insurrection of Judæa followed in the days of Hadrian. Their Messianic prince, Bar-Cochba, led the insurgents in more than 50 battles against the Roms.; half a million of J. are reported to have fallen in them. With the taking of Betar the war came to an end. Jerusalem now became a Rom. town, under the name of *Elia Capitolina*; the J. were forbidden to enter its precincts. The close of the 2d century is rendered memorable by the compilation of the Mishna under the auspices of the patriarch R. Jehuda, who is called *Ha-Kadosh* ("the saintly"). This work was intended to present in an authentic and codified form the decisions of the Beth-Din, which had accumulated during several centuries. Its commentaries, the *Gemaras* of Babylon and Pal., explain its provisions.

In the reign of Diocletian the J. seem to have been exempt from persecution. Their gen. condition in the Rom. empire at this time was at least tolerable, but this changed when Christianity in the person of Constantine ascended the throne. Julian (361) granted them the full blessings of his favor. Theodosius I. was just in his dealings with an oppressed people, but in the reign of Theodosius II., Cyril of Alexandria expelled the J. from that city. The emp. himself deprived them of valuable rights, such as the rebuilding of synagogues. The Jewish patriarchate, about the beginning of the 5th century, expired. In the following century the code of Justinian excluded them from all honorable offices, imposing upon them the duties while depriving them of the privileges of the citizen. Meantime the centre of authority in what concerned the internal affairs of the J. had been gradually transferred from Pal. to Babylon. About the time of the compilation of the Mishna, Abba Areka (Rab) and Mar Samuel founded schools of learning on the banks of the Euphrates and the Tigris. In them the *Gemara* of Babylon (compiled about 500) was elaborated, and the yoke of the Magi was light when compared with that of the priests in Chr. countries. While the power of the Sassanids declined in the country of Babylon, a new faith rose on the Ar. peninsula whose conquering arms were soon carried over a great part of the civilized world. The Per. empire succumbed before Omar, the second of the caliphs. To him are ascribed those enactments which define the status of J. and Chrs. in countries subject to Mohammedan rule. They may be compared to the canonical laws of the Chr. Ch., only that they have less of that spirit of intolerance which is characteristic of the latter. When the caliphate of Bagdad succumbed before the advancing Mongols, the J. shared the gen. fate of their countrymen. But the religious tolerance of the conquerors protected them from special acts of hostility.

The condition of the J. in Asia has remained down to the present day one of utter misery. In the N. of Afr. under the rule of the Fatimides, their position was on the whole hardly more favorable. Turning to Europe, we find, on entering the period of the Middle Ages, that the more or less friendly relations which until then subsisted between the J. and their neighbors were disturbed by the bitterness of religious hate. The progressive advance of intolerance which marks the 7th century reached its climax when, in 694 the J. of Sp. were declared slaves. Thus it is not surprising that Taric was hailed as a deliverer, and that the J. became the friends and allies of the Arabs in their conquest of Sp. Under the benign light of the Crescent they entered upon the brightest period of their hist. since the destruction of Jerusalem. The same kindly policy which guided the Arabs in their conduct toward the J. was adopted by the rulers of Chr. Sp. In Castile they were placed on the same level with the nobility and the clergy. They were devoted to their country, and prepared to risk life and fortune in its defence. Meantime the Almohades, conquering N. Afr., crossed over into Sp., and Cordova fell into the hands of the victors. The J. of Andalusia were forced to follow the example of their Afr. brethren, and either fled the country or acknowledged with the lips the prophetic mission of Mohammed. Toledo, the new Chr. cap. of Castile, now became a refuge to large numbers of the fugitives. Here they increased rapidly in wealth and power, and monuments of both are still extant. In the mean time the seeds of hatred, which the Ch. had long been disseminating, took root. Toward the end of the 14th and at the beginning of the 15th century outbreaks of fanaticism became frequent. The marriage-bells of Ferdinand and Isabella rang out a funeral dirge for the liberty of the J. of Sp. In 1480 the tribunal of the Inquisition was established at Seville, and those who perished in the flames were soon numbered by thousands. In 1483 Torquemada was appointed grand inquisitor, and the doom of the Sp. J. was sealed. From the palace of the

Alhambra the decree of their exile went forth. On Aug. 2, 1492, they left the inhospitable land. For a time many of them found refuge in Port. But in the days of João II. this changed. He broke the promises he had made them, and many of them were sold as slaves. With the close of the 15th century the last remnant of the J. had disappeared from the soil of Port.

The comparative quiet which the J. of Fr. and Ger. enjoyed in the earlier part of the Middle Ages was broken in upon by the Crusades. In the first Crusade the banks of the Moselle and the Rhine were the chief theatres of persecution. In the second Crusade, Peter Venerabilis in Fr. was instrumental in causing the plundering, and in some cases the massacre, of the J. The third Crusade proved disastrous to the J. of Eng. In 1215 the fourth Lateran Council enacted that no J. should appear in public without a conspicuous badge attached to his garments. From that time the wearing of the J.'s badge was generally enforced in Chr. countries. About 1330 the belief had become general that the J. were commanded by their religion to drink the blood of Chr. children, in order properly to celebrate the festival of the Passover. In 1336, 5000 peasants, under the leadership of Armleder, began the sacred work of destroying "the children of Satan" (the J.) in Alsace and along the Rhine. In the middle of the 14th century the Black Death traversed the continent of Europe: 25,000,000 of its inhabs. were carried off by the plague. The J. were made responsible for the ravages of the scourge. From Toledo, it was said, a horrid concoction had been distributed among them, with which they were ordered to poison the wells in every county of their abode. The fire and the executioner's axe could no longer be checked. And during the 15th century we find the fact illustrated that whenever Catholicism was forced to contend against the rise of a heresy, the J. were made to suffer from the religious fervor which the struggle evoked.

The main interest at the commencement of the 16th century concentrates upon the Reuchlin-Pfefferkorn controversy in Ger. John Pfefferkorn, a converted J., a tool in the hands of the Dominicans of Cologne, declared the Talmud to be the main obstacle to the conversion of the J., on account of its blasphemous utterances against the Chr. religion. He won the ear of Kunigunde, the sister of the emp. Maximilian. John Reuchlin was called upon by Maximilian to pronounce upon the charges. He declared the accusations groundless, and rebuked the accuser. This roused the fury of Pfefferkorn and his supporters against him. They desired every copy of the Talmud to be confiscated. At last Hochstraten, the inquisitor of Cologne, ordered Reuchlin to appear before him in Mayence for trial. The plans of the Dominicans were foiled at the last moment by the intervention of Abp. Uriel. The question of Reuchlin's heresy in defending the Talmud was next referred by the pope to a commission that met at Spire. Their verdict was in favor of Reuchlin, and Hochstraten was condemned to pay costs. The interest which the controversy excited in Jewish lit. proved beneficial to its correct preservation. In 1530 Daniel Bomberg began the publication of the Talmud in an ed. which for accuracy has not been equalled. In 1567 Joseph Kara, a rabbi of Safet in Pal., pub. a digest of the rabbinical laws, which became supreme authority in matters of religion. The same tendency appears in the synods of Poland, which began to be held toward the end of this century. In Sp. and Port. many of the more faint-hearted of the J. had assumed the mask of Christianity to escape the necessity of leaving their country. The position of these miserable ones was truly deplorable. Frequently discovered in the exercise of forbidden rites, they fed the flames of the Inquisition. The successful revolution of the Netherlands at last opened to them a haven of security. Free Hol. invited them to its shores. The Jewish congregation of Amsterdam soon became one of the most influential of all Europe. From among them Spinoza went forth. In the middle of the 17th century the J. of Poland were visited with a calamity from which they have never recovered. The Cossacks, led on by the fierce Chmielnicki, succeeded in reducing them to a condition of utter and abject degradation. Chmielnicki and his soldiery are reported to have slain between the yrs. 1648 and 1658 about 250,000 Polish J. Those that were spared emigrated in great numbers, and inundated the countries of Central and S. Europe. In 1655 Cromwell invited the J. to visit Eng., and they there found active sympathy among many of the Puritan leaders.

In 1665 a native of Smyrna, Sabbathai Zewi, was proclaimed the Messiah of the J. The Cabala had inspired him and paved the way for his success. The tidings spread from the Orient to the Occident, and everywhere the new evangel found believers. S. Zewi taught that in him the "God of Israel," the Third Person of the Godhead, had become flesh and blood. He ended his Messianic career by assuming the turban in Constantinople for fear of being put to death. But the contagion of his views spread throughout Europe, and while the outward position of the J. was improving, their mental condition was inferior to what it had been in the Middle Ages. The great elector of Brandenburg received a number of those Jewish families whom the emp. Leopold had driven from Vienna. In 1751 a conflict arose between Jonathan Eibenschutz, the rabbi of Hamburg, and Jacob Emden, in which the former was charged with Cabalistic practices, especially the writing of magic talismans in the name of the Messiah, Sabbathai Zewi. Soon after the sect of the Frankists arose in Poland. Frank, their leader, pretended to be the successor of S. Zewi, and, like his model, ended by abjuring his religion.

The modern epoch is marked by the name of Mendelssohn. His Ger. version of the Pentateuch became the groundwork of reform. Lessing's *Nathan the Wise* rebuked the prejudice of the Chr. world. Dohm labored to secure the civil emancipation of the J. The Fr. Revolution broke down the walls of their ghettos. It cost many struggles until freedom was

finally secured. The "Hep, hep" cry raised in Ger. in 1819, and other calamities have shown that the embers of bigotry have not yet completely died out. But a gen. conflagration need no longer be feared. Under the influence of liberty the J. have rendered signal service in almost every dept. of science and art. I mention among the philos. M. Mendelssohn, Maimon, Herz; in political economy, Ricardo and La-salle; in lit. Börne, Heine, Auerbach, Grace Aguilar; in music, Mendelssohn-Bartholdy, Meyerbeer, Halévy; among the prominent statesmen, Disraeli, Lasker, Crémieux. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. FELIX ADLER, PH. D.]

Jez'ebel [Heb. *Izebel*], daughter of Ethbaal, king of Tyre and Sidon, and wife of Ahab, king of Israel, exercised a great influence upon her husband, leading him into idolatrous worship of Baal. She was murdered by Jehu about 883 B. C., at the same time as her son, King Jehoram.

Jez'irah [Heb. *Sepher Yetsirah*], or **Book of Creation**, one of the 2 chief cabballistic works of the Jews. Its date is assigned to the 1st, 8th or 9th century.

Jika'daze, or **Shikatzé**, town of Thibet, in an elevated and dry plain, encircled by lofty mts., and contains a monastery, in which reside one of the chief lamas and his suite of above 4000 persons. It consists of a number of palaces, temples, and tombs of a most striking arch., and ornamented with gold and precious stones. Pop. 100,000.

Jinn [Arabic, pl. of *jinni*, the "invisible"], among Mohammedan peoples, a race of imaginary beings made out of fire and capable of assuming any form at will. They inhabited the earth long before man was created, but for rebellious conduct were finally expelled. The good J. are called *peri* (fairies).

Jiquil'ite, the native indigo of Central Amer. *Indigofera disperma*, which produces large quantities of indigo.

Jo'ab, a son of Zeruiab, the sister of David, by whom he was made commander of the whole Heb. army. When David tried to rid himself of him by giving the command to Amasa, J. plunged his sword into Amasa's heart while embracing him. He took part in the demonstration in favor of Adonijah, but Solomon seized him and put him to death.

Joachim, jo'a-kim, called the PROPHET, b. at Selico, in It., about 1145; employed at the court of Roger, king of Sic.; made a pilgrimage to Jerusalem; became a Cistercian monk, abbot of Corace in Calabria; founder of the monastery of Floris near Cosenza. D. Mar. 30, 1202. Left a reputation as a miracle-worker. His doctrine was that the Chr. era would close A. D. 1260, after which a new providential dispensation would begin; condemned by the Council of the Lateran in 1215, and by that of Arles in 1260. *Joachimites* were numerous in the 13th century.

Joan, jôn, PORE, a fabulous personage who was long believed to have occupied the papal chair (853-856, as John VIII. The report was that J. was b. in Ger., the daughter of an Eng. priest; falling in love with a monk, she entered a convent in male attire at Fulda, and then went with her paramour to Athens and Rome, where she was chosen pope. One day in the street, at the head of a procession, it is said that the pope was delivered of a child, soon after which she died.

Joan of Arc [Fr. *Jeune Darc*], the Maid of Orleans, b. Jan. 6, 1412, at Domremy, in Lorraine, of parents who were reduced to the state of serfdom. When she was 13 yrs. old Fr. was overrun by the Anglo-Picard troops of the duke of Bedford, regent of Henry VI. J. conceived that she heard voices from Heaven calling her to deliver Fr. In 1429 she gained an audience with the dauphin, who in Apr. gave her command of the Fr. troops, who were inspired with belief in her mission. She assumed male attire, threw herself into Orleans, of which she raised the siege; beat the Eng. at Meun, Jargeau, Beaugency, and Patay; caused the dauphin to be crowned at Rheims. She now demanded to be released from further service, but the king would not consent. In the subsequent attack on Paris she was wounded, and she and her family were ennobled. On May 23, 1430, she was captured by the Burgundians and was sold to the Eng. (who feared her as a witch) for 16,000 francs; pronounced guilty of witchcraft, she was burned at the stake May 30, 1431.

Joanna I., queen of Naples from 1343 to 1382, b. in 1327, a daughter of Charles and granddaughter of Robert of Anjou, was married when 7 yrs. old to Andrew of Hungary, her second cousin. The idea of this marriage was to ally the 2 branches of the family of Anjou together, but the contest between the 2 branches became only fiercer. In 1345 J. had her husband strangled, and when his brother, Louis the Great of Hungary, invaded Naples to avenge him, she had to flee. By the mediation of the pope she returned soon after, and married successfully Louis of Taranto, James of Aragon, and Otto of Brunswick. But a rebellion took place in Naples. J. was seized and delivered over to the king of Hungary, who had her put to death. — Her grand-niece, JOANNA II., queen of Naples from 1414 to 1435, b. in 1370, was married first to William of Aus., and after his death to Jacques de Bourbon. She was noted for her dissolute life.

Jo'ash, or **Jeho'ash** [Heb. *Yoush* or *Yehoash*, "given by Jehovah"], the name of 2 kings. — I. Of Judah, son of Ahaziah, b. about A. C. 884. His father having d. in his infancy, all his brothers were massacred by his grandmother, Athaliah; J. was saved by the wife of the high priest, who brought him up within the temple until his 8th yr., when a revolution was made, and the young prince was placed on the throne. During his minority, and for many yrs. thereafter, his govt. was good, but fell into idolatry, when his kingdom was ravaged by Hazael of Damascus. He was murdered by his servants about A. C. 837. — II. Of Israel, became king about A. C. 838, successfully resisted the Syrians, and defeated Amaziah, king of Judah. D. about A. C. 823.

Job, The Book of, one of the books of the O. T., narrating the story of Job, who dwelt in the land of Uz. At an advanced age he is visited with loss of estate, of family, and of health, but endures all without a sinful word of complaint. At last his faithfulness receives an ample reward.

Job's friends insist that his adversity is proof of sin, and exhort him to humility and submission. Against them he defends his integrity. After a protracted debate, God himself intervenes and decides in Job's favor. This poem is a wonderful specimen of literary art. Probably an historical fact lay at the basis, but the writer has used it so independently that it has disappeared.

Job's Tears (*Coix lachryma*), a grass, a native of India, where it often grows to the height of 8 ft.; it resembles somewhat maize both in appearance and habits. Its name is derived from its "seeds," or rather indurated husks, which are bony, shining, bluish-white globules.

Jo'el [Heb. "The Lord is his God"], one of the minor Heb. prophets, concerning whom little is known. He lived at Jerusalem, and his prophecies relate to Judah. One of the visitations of locusts which occur from time to time in the Orient happened in his time, and proved a great national calamity. The prophet called the people to penitence, public fasting, prayer, and righteousness, and turned their attention to God's great day of visitation and judgment.

Jo'hann (NEPOMUK MARIA JOSEPH), king of Sax., b. Dec. 12, 1801, and d. Oct. 29, 1873; was a finely ed. man, whose youth was devoted to art and science; from 1839 to 1849 he pub. at Leipsic a translation of Dante with critical and historical notes. His elder brother having become coregent in 1830, Prince J. took part actively in public life and acquired thorough knowledge of the administration. At the death of his brother he became king of Sax., Aug. 9, 1854. He was active and successful in the introduction of trade freedom, in the extension of railway lines, and in the conclusion of commercial treaties between Ger. and other countries; showed himself an unconditional adherent of Aus. and an adversary of progressive Prus. The war of 1866 between Aus. and Prus. was brought about by King J. and his minister, Beust. The idea was that by a participation in the humiliation of Prus., Sax. should extend its own sphere of power. But after the defeat of the Aus.-Sax. army the sovereignty of King J. was saved only by the intervention of Nap. III. In the difficult time of the war with Fr., Sax. was a true member of the N. Ger. Confederation.

John the Baptist was a son of the priest Zacharias and Elisabeth, a cousin of the mother of Jesus, and was born 6 months before him. In the 15th yr. of the reign of Tiberius he began to preach in the deserts of Judea, announcing the coming of the Messiah, admonishing to repentance, and baptizing as a symbol of purification from sin. He was imprisoned and put to death by Herod Antipas.

John the Evangelist. 1. *Life.* — John was b. in Galilee, probably at Bethsaida. He was a fisherman, together with his father Zebedee, his brother James, and his 2 friends and associates, Simon (Peter) and Andrew. As soon as John the Baptist announced the approach of the kingdom of God, John and James hastened to him and remained with him as his disciples. Jesus first met with them on his return from the temptation in the desert, and took them back with him to Galilee; and as he himself had not yet separated from his family, he sent them also back to theirs; but on the approach of the next Passover feast he called them to follow him permanently as his disciples, and repaired with them to Jerusalem, where he inaugurated his public ministration. From this moment John accompanied him through all the incidents of his earthly life. Together with Peter and James he formed a closer circle around Jesus; but of the three he was the friend of the heart of the Lord. In the foundation of the Ch., John, compared with Peter and James, performed only a secondary part. It was not until after the death of Peter and Paul, and after the destruction of Jerusalem, that the activity of John assumed its grand proportions. According to a unanimous tradition in the chs. of the 2d century, he went to Asia Minor, where Paul had founded a magnificent circle of chs. All historical testimony points to Ephesus as the place of his residence. Clement of Alexandria represents the apostle as visiting the chs. of Asia Minor for the purpose of appointing bps. and regulating their affairs. Polycrates, 7th bp. of Ephesus, speaks of the incontestable fact that among the founders of the Ch. of Ephesus was John, the disciple who had leaned on the bosom of the Lord, and that he was buried at Ephesus. Jerome represents how the old apostle, in the last days of his life, was carried into the assemblies of the Ch., but confined himself to the repetition of the command, "Little children, love one another," and how, when asked, "Why do you never say anything more?" he answered, "Because when this is done, enough is done," and he adds that he died in extreme old age, "in the 66th yr. after the death of the Lord."

2. *Writings.* — Of the 27 writings of the N. T., 5 are attributed to the apostle John by the more or less unanimous tradition of the primitive Ch. — the 4th Gospel, 1 large and 2 smaller epistles, and the Revelation. The fourth Gospel shows a character of its own. It opens with an introduction in which is given the essence of the hist. that follows: (1) The glory of the creative Word; (2) the crime and misery of the Jews who have rejected it in its humiliation; and (3) the fortune of the Ch. which has received in faith the incarnate Son of God. These 3 ideas of the introduction are also the fundamental ideas of the whole Gospel: Jesus makes his glory manifest by his words and acts; presently the world is divided, some taking part against him, others for him. Thus, the *Glory of Jesus*, the *unbelief*, and the *faith* are the three facts on which the whole narrative rests. No other name than that of John has ever been inscribed in the title of this work. It bears a formal testimony of itself in the last words of chap. xxi., affixed by the eds. of the book, according to which the author was the disciple whom Jesus loved, and who was still living at the time when the publication took place. But in our days the authenticity of the book is attacked with particular eagerness. It seems that John wrote the Gospel in Ephesus, and between 80 and 90. The larger Epistle bearing the name of John is evidently by

the same author as the Gospel. It contains the celestial philos. which the author has drawn from the teaching, the labor, and the person of Jesus. This he opposes to the heresy already breaking in, and he offers it to the Ch. as the ideal of Chr. life. The 2 small Epistles seem to have spread very slowly in the Ch., on account of their smaller importance. In the first, John praises the firmness of a Chr. lady called *Kyria* in breaking with the preachers of heresy; in the second he praises the charity of his beloved Gaius, whose house is always open to the preachers of the Gospel.

3. Character and Influence.—John seems not to have possessed either the bold initiative of Peter or the penetrating dialectical power of Paul. The part which he plays up to his residence in Asia Minor indicates a character which must arrive at a sure feeling of its own maturity before it can act in the external world. But this trait reveals a profound nature. By giving to John and James the surname of "Boanerges" (that is, "the sons of thunder") Jesus has unveiled the mystery of their characters. St. John was not charged either with the foundation of the Ch. among the Jews and the Gentiles, or with the emancipation of the N. T. from the O. through a profound and penetrating study. His mission was to place the crown on the work of his two colleagues. He gave to the Ch. of Asia Minor that powerful organization which enabled it to stand against the floods of heresy in the beginning of the 2d century, and made this Ch. the centre of the whole Ch. during this epoch, on account of the power of its spiritual life. By his writings he led the Ch. to a perfect understanding of the salvation which is in Christ, developing in his Gospel the idea of the *Redeemer*; in his Epistle, that of the *Christian*; and in the Revelation, that of the *Church*. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. FREDÉRIC GODET, D. D.]

John I., SAINT, POPE, a Tuscan; chosen pope in 523; in 525 compelled by Theodoric the Ostrogoth to visit Constantinople and intercede for the Arians. On his return he was imprisoned, and d. at Ravenna May 26, 526. — **JOHN II.,** a Rom., pope by simoniacal means in 532; acknowledged by Justinian; d. May 26, 535. — **JOHN III.,** a Rom., pope 560; d. July 13, 573. — **JOHN IV.,** a Dalmatian, pope 640; d. Oct. 11, 642. — **JOHN V.,** a Syrian, pope 685; d. Aug. 1, 687. — **JOHN VI.,** a Gr., pope 701; d. Jan. 9, 705. — **JOHN VII.,** a Gr., pope 705; d. Oct. 18, 707. — **JOHN VIII.,** a Rom., pope in 872; his reign was vexed by the incursions of the Saracens into It.; murdered Dec. 15, 882. — **JOHN IX.,** b. at Tibur, became a Benedictine; pope 898; d. Nov. 30, 900. — **JOHN X.,** bp. of Bologna and abp. of Ravenna; pope in 914; a man of impure life, but an able prelate. He led in person the armies which routed the Saracens; imprisoned by the infamous Marosia; d. in 929. — **JOHN XI.,** natural son of Marosia, probably by Pope Sergius III., was made pope in 931 by his mother; d. (by poison) in 936. — **JOHN XII.,** son of Alberic and grandson of Marosia; pope in 955 when 16 yrs. old; a man of licentiousness; condemned by a council for murder, incest, sacrilege, idolatry, and witchcraft; d. May 14, 964. The most important event of his reign was his coronation of Otto I., the first Ger. emp. — **JOHN XIII.,** a Rom. bp. of Narni; pope 965; d. Sept. 5, 972. — **JOHN XIV. (Peter),** bp. of Pavia, a native of Pavia, arch-chancellor to Otto II., who made him pope in 964 in place of Boniface VII., who returned soon after; d. in prison of starvation. — **JOHN XV.** became pope in 986; remarkable for avarice and nepotism; d. Apr. 996. — **JOHN XVI. (Philagathus),** a Gr., and bp. of Piacenza; pope in 997 in opposition to Gregory V., who killed him. — **JOHN XVII. (Sicco),** b. at Ripa Jani, in the March of Ancona, of noble family; d. June 9, 1003. — **JOHN XVIII. (Phasianus),** pope in 1003; abandoned the papal chair for a monk's cell in May 1009. — **JOHN XIX.,** a son of the count of Tuscany, succeeded his brother, Benedict VIII., in 1024; remarkable for avarice; d. Nov. 8, 1032. — **JOHN XX.,** was a rival of Gregory VII. — **Benedict IX.,** and Sylvester III. There were at one time (1045) 3 reigning popes at Rome. — **JOHN XXI. (Pedro),** b. at Lisbon, studied at Paris; won great applause by his learning; became cardinal-priest, abp. of Braga, first phys. to Gregory X.; pope in 1273; d. May 16, 1277, at Viterbo. — **JOHN XXII. (Jacques d'Esses),** b. at Cahors about 1244; bp. of Fréjus 1300, abp. of Avignon 1310, cardinal-bp. 1312, pope 1316. — **JOHN XXIII. (Balthazar Cossa),** b. at Naples; cardinal 1402, succeeded Alexander V. 1410, convoked the Council of Constance 1413, deposed 1415; d. Nov. 22, 1419. [From orig. art. in *J.'s Univ. Cyc.*, by CHARLES W. GREENE, M. D.]

John I. (JUAN), king of Aragon, b. Dec. 27, 1350; married in 1384 Yolande, granddaughter of John II, the Good of Fr.; succeeded to the throne 1387; recognized Clement VII. as pope at Avignon; sent a deputation to Fr. to enlist the most famous troubadours; founded at Barcelona an acad. of poetry on the model of the Floral Games of Toulouse; repelled the invasion of the count of Armagnac 1390; reconquered the island of Sard. 1392; d. May 19, 1395.

John II. (JUAN), king of Aragon and Navarre, b. June 29, 1397, son of Ferdinand the Just; married in 1419 Blanche, daughter of Charles III. of Navarre, and succeeded to the throne of that kingdom in right of his queen Sept. 1425; in 1428 aided his brother, Alfonso V. of Aragon, in a war against Castile; accompanied him in an expedition against Naples, in which both kings were taken prisoners by the Milanese 1424. Released shortly after, he administered the gov't. of Aragon in his brother's absence. Queen Blanche having d. Apr. 3, 1441, Carlos claimed the throne of Navarre in his mother's right, but J. refused, thereby giving rise to a family feud. J. invaded Castile 1445; was defeated at Olmedo; married in 1447 Joanna Henriquez, daughter of the admiral of Castile; suppressed a revolt in Navarre in 1452, taking prisoner his son, Prince Carlos; disinherited that prince 1455, and defeated him at Estella in 1456; J. succeeded to the throne of Aragon July 5, 1458; declared Sic. and Sard. annexed to Aragon; had new troubles with his son, whom he recognized as heir, but afterward threw into prison (1460), and whose sudden death (1461) was the pretext for a revolt in Catalonia. He had similar troubles with his

daughter Blanche, who d. in prison at Orthes Dec. 2, 1464; took Barcelona in 1472; made war in Roussillon against Louis XI. of Fr. in 1473, and d. at Barcelona Jan. 19, 1479.

John I. (JUAN), king of Castile and Leon, b. at Epila Aug. 20, 1358; married Leonora of Aragon in 1375; succeeded to the throne on the death of his father, Henry II.; crowned July 25, 1379; convoked the Cortes, who recognized the Avignon claimant to the papacy (Clement VII.). John of Gaunt, duke of Lancaster, having assumed the title of king of Castile in right of his wife, a daughter of Peter the Cruel, and Ferdinand of Port. having entered into an alliance with the Eng. duke, J. attacked Port., but concluded peace by marrying Beatrice, then aged 10 yrs. Ferdinand, however, dying in 1383, John of Castile waged another war in support of the rights of Beatrice. His defeat next yr. at Aljubarrota was fatal to her claims. After several yrs. delay the duke of Lancaster invaded Castile in 1386, but peace was made the following yr. by the marriage of Prince Henry to the daughter of the Eng. duke. J. created his son prince of Asturias 1388, convoked Cortes 1390, and d. Oct. 9, 1390.

John II. (JUAN), king of Castile and Leon, b. Mar. 6, 1405, succeeded his father, Henry III., in Dec. 1406, under the regency of his mother and his uncle Ferdinand, afterward king of Aragon; crowned at Segovia Jan. 15, 1407; married his cousin, Mary of Aragon, in 1418 or 1420, and fell under the influence of Alvaro de Luna, whom in 1423 he created constable of Castile. Prince Henry of Aragon, brother of the queen, endeavored to gain possession of supreme power (1420) by seizing upon the persons of the king and the favorite. After a struggle for power between Luna and the infantes of Aragon, the former was beheaded at Valladolid June 7, 1453. J. meanwhile had made wars against the Moors (1431 and 1435), and the princes of Aragon and Navarre, who were inciting the nobles of Castile to revolt. D. July 21, 1454.

John, king of Eng., surnamed LACKLAND, b. at Ox. Dec. 24, 1166, the son of Henry I.; declared lord of Ire. by papal authority, his short-lived gov't. of that country was a failure; during the reign of his brother, Richard Lionheart, he was guilty of treason. Nevertheless Richard appointed him his successor. J. became king in 1199; an expensive war with Philip Augustus of Fr. ensued, in which J. lost the best part of his Fr. terrs. Soon after followed the controversy concerning investitures with Innocent III., who deposed J., laid an interdict on Eng., and let loose the armies of Fr. upon the king. But J. was compelled to yield and become the vassal of the pope. In Wales, Scot., and Ire. his arms were successful. A rising of his barons compelled him to sign Magna Charta (1215); the aid of the pope enabled him to repudiate that charter and make head against the barons, but during the war he d., Oct. 19, 1216.

John II., king of Fr., surnamed THE GOOD (LE BON), b. Apr. 26, 1319, succeeded to the throne Aug. 22, 1350. The chief event of his reign was the war with Eng., in which he was defeated and taken prisoner by the Black Prince at Poitiers, Sept. 19, 1356. His captivity was brought to an end by the peace of Brétigny (May 1360), which surrendered several provs. to the Eng. in addition to a ransom of 3,000,000 crowns. His son, the duke of Anjou, was left in Lond. as a hostage for the fulfilment of the treaty, but it was rejected by the States-General. The prince having escaped, J. returned to Lond. as a prisoner early in 1364, and d. there Apr. 8 of the same year.

John II., Casimir, king of Poland (1648-68), b. Mar. 21, 1609, the second son of Sigismund III.; entered in 1640 the order of the Jesuits, and was made a cardinal. On the death of his elder brother he succeeded to the throne, and married his widow, Maria Gonzaga. His reign was unhappy. To Swe. he lost, by the Peace of Oliva (1660), Esthonia and Livonia, and to Rus., by the Peace of Andrussov (1667), White and Red Rus. In the interior his gov't. was distracted by the feuds of the nobles; entirely unable to master the situation, he abdicated Sept. 16, 1668. D. at Nevers Dec. 16, 1672.

John III., Sobieski, king of Poland 1674-96, b. June 2, 1624; distinguished himself in the wars against the Swedes, Rus., and Transylvanians; in 1687 was made commander-in-chief of the whole Polish army. King Michael Korybut, having made a humiliating treaty with the Turks, Sobieski had it rejected by the Polish diet, met the Turks, and routed them at Khotin (1673). Shortly after Michael Korybut d., and Sobieski was elected king of Poland (May 21, 1674). In 1683 the Turks besieged Vienna with an army of 300,000 men. With hardly 50,000 men Sobieski attacked the Turks Sept. 12, 1683, and after a frightful contest he defeated them and pursued them into Hungary. The latter part of his life was disturbed by domestic troubles. D. June 17, 1696.

John (JOAM), the name of 6 kings of Port. — **JOHN I. THE GREAT,** b. at Lisbon Apr. 1357, a natural son of Peter I. and brother of Ferdinand, at whose death, in 1383, he became regent, and seized upon the throne, in violation of the rights of the infanta Beatrice, married to John I. of Castile. The war which ensued was decided by the victory of Aljubarrota (Aug. 14, 1385) in favor of the former; made an expedition into Afr.; took Ceuta (1415) from the Moors. Under his reign the islands of Madeira, Cape Verde, the Canaries, and Azores were discovered, and the coasts of Afr. explored as far as the Gulf of Guinea. D. Aug. 14, 1433. — **JOHN II. THE PERFECT,** b. at Lisbon May 8, 1455; married Leonora of Lancaster in 1471; took part in an Afr. campaign the same yr.; conspicuous for bravery at the battle of Toro (1476); succeeded his father, Alfonso V., Aug. 29, 1481; put to death the duke of Braganza and his brother-in-law, the duke of Viseo, for conspiracy (1483-84). Under his auspices a series of great navigators explored the coasts of Afr.: B. Diaz discovered the Cape of Good Hope, Da Gama visited India. He refused the services of Columbus, but after the discovery of America he sent a fleet thither (1493). The conflicting claims of the crowns of Port. and Castile were decided by

Pope Alexander VI (1493). D. 1495.—**JOHN IV.**, b. at Villaviciosa Mar. 19, 1604; duke of Braganza; by a successful revolution overthrew the Sp. usurpation in Port. (1640). His reign was passed in hostilities with Sp. D. in Lisbon in 1656.—**JOHN VI.**, b. at Lisbon May 13, 1767; married Charlotte (Carlota), infanta of Sp.; 1785; prince of Brazil 1788; governed the kingdom in consequence of his mother's illness 1789; assumed the title of regent 1799, and after wars with Sp. and Fr. removed to Brazil in Nov. 1807, on the approach of the Fr. army; became king on the death of his mother, Mar. 16, 1816; returned to Port. 1821; modified the const. 1823; recognized the independence of Brazil 1825. D. Mar. 10, 1826.

John of Austria, generally known under the name of DON JUAN DE AUSTRIA, was a son of Charles V. and the beautiful Barbara Blomberg, a daughter of a wealthy citizen of Ratisbon, where he was b. Feb. 24, 1545, but was taken to Sp. soon after his birth, and his parentage was kept a secret for many yrs. He received an excellent education, however, in the house of the imperial steward, Don Luis Mendez Quixada, and after the death of Charles V. in 1559, Philip II. publicly acknowledged him as a brother, and established a princely household for him, first in Valladolid and then in Madrid. In 1568 he led with great success an expedition against the Afr. pirates. In 1569 he subdued the Moorish rebellion in Granada, and gave striking proofs not only of personal valor but also of tactical skill. In 1571 he commanded the magnificent Sp.-It. armament against the Turks, and routed their fleet completely in the battle of Lepanto (Oct. 7, 1571), the greatest military exploit of the century. In 1573 he conquered Tunis, and in 1576 he was made viceregent in the Netherlands. Here he did not succeed in managing the prince of Orange, William the Silent. He was foiled by him in his political measures, but when it came to an open rupture he defeated him at Gembours (Jan. 31, 1578). His sudden death in his camp at Namur (Oct. 1, 1578) gave rise to a quite gen. suspicion of his having been poisoned by the Spaniards. CLEMENS PETERSEN.

John (JUAN) of Austria, b. at Madrid in 1629, a natural son of Philip IV. of Sp.; a distinguished gen., having commanded in Naples 1648, in Catalonia 1652, in Flanders 1656, in Port. 1660; defeated by Turenne at the Dunes, June 14, 1658; afterward viceroy of Aragon and minister under Charles II. D. at Madrid Sept. 17, 1679.

John of Gaunt (*Ghent*), duke of Lancaster and Aquitaine, titular king of Castile, son of Edward III., b. at Ghent in 1339; married Blanche, daughter of the duke of Lancaster, 1359; became duke of Lancaster 1362; served under the Black Prince; married the daughter of Peter the Cruel of Castile (1370); served in wars in Scot. and Fr.; invaded Castile 1386, in pursuance of his claim to that kingdom; married his daughter to Henry of Castile 1388; was the defender of Wickliffe; ancestor of the Lancastrian and Tudor families of Eng. kings. His third wife, Catharine Swynford, was the ancestress of the Beauforts and Tudors. D. Feb. 3, 1399.

John of Leyden (JOHANN BOCKELSON), b. at Leyden in 1510, was a tailor by profession, a poet and actor by talent and business. Having come in contact with the Anabaptists, he was caught by religious fanaticism, and started as a strolling preacher. In 1533 he came to Münster, and succeeded in overthrowing the const. of the city; crowned as king of Zion; appointed ministers, coined money, introduced polygamy, married 15 wives, lived in royal splendor; in 1535 the city was conquered by the neighboring princes and reduced to order. J. was tortured to death by hot pincers, and his body was hung in a cage on the tower of St. Lambert's ch.

John of Salisbury, b. at Salisbury 1110, went to Fr. 1136; studied under Abelard; returned 1151; sec. to Thomas à Becket; bp. of Chartres 1176; d. Oct. 24, 1182. Wrote *Policraticus* and *Metaphisus* and *Vita et Passio S. Thomæ*.

John of Swabia (JOHANNES PARRICIDA), b. in 1289, a son of Rudolf of Swabia, a grandson of Rudolf of Hapsburg. When he attained majority he demanded his inheritance from his uncle, the emp. Albert I., but Albert refused. J. then formed a conspiracy, overtook the emp. (1306), and murdered him.

John, Prester ("Priest John"), a semi-mythical character who figured in the Middle Ages. According to gen. belief, there was somewhere in the interior of Asia or Afr. a kingdom which had been converted from Islam to Christianity, governed by a priest-king named John, who was anxious to open intercourse with the Ch. of Rome. Numerous embassies were during 2 centuries sent to Central Asia, and even to Abyssinia (1481-95), in search of the lost Chr. nation, but the search proved fruitless.

John Scotus. See ERIGENA.

John the Constant, elector of Sax., b. June 30, 1467; succeeded his brother, Frederick the Wise, in May 1525; took part in a war against the Hungarians; put an end to the Peasants' war in his own dominions; formed an alliance with the landgrave, Philip of Hesse, and with other states and free cities, in support of the principles of the Ref.; protested (1529) against the decision of the Diet of Spires adverse to the Ref.; was influential in causing the proclamation of the Augsburg Confession; helped to form the "League of Schmalkald." D. Aug. 16, 1532.

John Frederick, the Magnanimous, elector of Sax., b. at Torgau June 30, 1503, son of John the Constant, on whose death, in 1532, he became administrator of the govt. in the joint name of himself and his younger brother, John Ernest; gave official sanction to the Ref. throughout his states 1533; recognized as elector by the emp. at Vienna in 1534; was at the head of the armies of the Schmalkaldic League in the contest with Charles V. (1546); was put under the ban of the empire 1547; defeated at Mühlberg, being taken prisoner and condemned to death (May 10), but his life was spared on condition of renouncing his claims to the electorate. He was liberated in 1552 through the interposition of his cousin, Maurice of Sax. J. F. succeeded to the

full title by the death of his brother, John Ernest (1553). D. at Weimar Mar. 3, 1554.

John George I., elector of Sax., b. Mar. 5, 1585; succeeded his brother, Christian II., in 1611; supported the emp. Ferdinand against the Bohemians in 1620, at the outset of the Thirty Years' war; formed an alliance with Gustavus Adolphus (1631); contributed to the victory of Leipsic; took Prague (Nov. 11), but lost it, with all Bohemia, to Wallenstein 1632; made peace with the emp. at Prague (1635); declared war against Swe.; defeated by the Swedes at Domnitz and at Wittstock (1636); aided the imperialists against Fr. in the battle of Dülzlingen (1643). D. Oct. 8, 1656.

John (JOHANN BAPTIST JOSEPH FABIAN SEBASTIAN), archduke of Aus., b. at Florence Jan. 20, 1782, son of Leopold II. and Maria Louisa of Sp.; was believed by his family to be possessed of great military talents, and commanded the Aus. armies in 1800, 1803, 1805, and 1809. But he was always beaten, and when at the battle of Wagram he failed to bring his brother, the commander-in-chief, the proper support, he resigned his command and lived in retirement in Grätz. The ill favor with which he was considered by the court made him very popular, and in 1848 he was believed by the people to be possessed of great political virtues. He was chosen Reichsverweser by the Parl. of Frankfort. But he was a most obstinate defender of the interests of the house of Aus., and as these did not coincide with the interests of the Ger. people, he resigned 1849. D. Mar. 10, 1859.

John, King of Saxony. See JOHANN.

John, von (FRANZ), BARON, b. in 1815 at Bruck, Lower Aus.; entered when 20 yrs. old the inf. as lieutenant. In the war of 1848 against the revolution in It. he accompanied Radetzky as a capt.; was chief of staff (1849-57) of the Aus. army of occupation in Tuscany and the papal states; in 1861 was created a maj.-gen.; in 1866 was appointed chief of staff of the S. army under Archduke Albrecht, and created a field-marshal-lieut. on the day after the victory at Custozza; and when Archduke Albrecht was appointed commander-in-chief of the whole Aus. force, J. became chief of his staff. After the war he was appointed minister of war, but retired in 1868; in 1869 made commander-gen. of Styria, Carinthia, Carniola, and Littoral. In 1874 was made master of ordnance and chief of staff of whole army. D. May 25, 1876.

Johns Hopkins University, Baltimore, Md., was founded by Johns Hopkins of Baltimore Aug. 24, 1867, and at his death (Dec. 24, 1873) endowed by a bequest of over \$3,000,000. The only condition he imposed was that the prin. should not be used for building. Clifton, the late residence of J. H., just outside the city, containing 330 acres, is to be the site. Prior to the erection of buildings at Clifton, chemical, physical, and biological laboratories, lecture and recitation rooms, library, etc. were provided in Baltimore. The philosophical dept., comprising the chairs of anc. and modern langs., chem., phys., biology, hist., etc., was opened Oct. 3, 1876. The faculties of law and med. were yet to be organized. The univ. is entirely unsectarian in its character, and designed to promote special advanced study, which it is enabled to do by its large endowment. In order to give young men opportunities to carry on their studies, the trustees have offered to coll. graduates from any place 20 fellowships or graduate scholarships for special excellence in either philology, lit., hist., ethics, and metaphysics, political science, math., engineering, physics, chem., or nat. history. These are valued at \$500, in addition to free tuition, are tenable for a yr. and renewable. Numerous scholarships, freeing the holder from tuition, are open to students. Mr. H. also left \$3,000,000 to establish a hospital, which he desired should co-operate in the advancement of med. science and education. Daniel C. Gilman is the first pres. of the univ.

Johnson (ANDREW), LL.D., 17th Pres. of the U. S., b. at Raleigh, N. C., Dec. 29, 1808. In his 11th yr. he was apprenticed to a tailor, and did not learn to read until late in his apprenticeship. He removed in 1826 to Greenville, Tenn., where he worked at his trade; entered into politics, and was alderman and mayor (1828-32); was elected to the State legislature 1835 and 1839, to the senate 1841, to Cong. for 4 successive periods, 1843-53; gov. of Tenn. 1853 and 1855, U. S. Senator 1857. When the election of Lincoln had brought about the first attempts at secession he took in the Senate a firm attitude for the U., and in May 1861, on returning to Tenn., was in imminent peril of suffering from popular violence. He was the leader of the Loyalists' Convention of E. Tenn. (May and June), and was active in organizing relief for the loyal refugees from that region. In Mar. 1862 he was appointed by Pres. Lincoln military gov. of Tenn. In 1864 he was elected V.-P., and by the assassination of Pres. Lincoln (Apr. 14, 1865), he became Pres. He retained the cabinet of Lincoln, and exhibited considerable severity toward "traitors" in his earlier acts and speeches, but soon inaugurated a policy of reconstruction, proclaiming a gen. amnesty to the late Confeds., and successively establishing provisional govts. in the S. States, which accordingly claimed representation in Cong. in the following Dec. The credentials of the S. members-elect were laid on the table, a civil rights bill and a bill extending the sphere of the Freedman's Bureau were passed over the executive veto, and the 2 highest branches of the govt. were soon in open antagonism. The action of Cong. was characterized by the Pres. as a "new rebellion"; the cabinet was reconstructed in July, and in an excursion to Chicago in Aug. Pres. J., accompanied by several members of the cabinet, passed through Phila., New York, and Albany, in each of which cities he made speeches justifying and explaining his own policy and violently denouncing the action of Cong. In the ensuing winter session the breach between the Pres. and Cong. grew wider, and important acts were passed over his veto. On Aug. 12, 1867, Pres. J. removed Mr. Stanton, the sec. of war, replacing him by Gen. Grant. The sec. retired under protest. The Pres. issued several proclamations, one of which, pub. Sept. 7, relieved nearly all the participants in "the late

rebellion" from the disabilities thereby incurred, on condition of taking an oath to support the const. and laws. In Dec. Cong. refused to confirm the removal of Sec. Stanton, who thereupon resumed the exercise of his office, but on Feb. 21, 1868, Pres. J. again attempted to remove him. Stanton refused to vacate his post, and was sustained by the Senate. On Feb. 24 the House voted to impeach the Pres. for "high crimes and misdemeanors" (yeas 126, nays 47, not voting 17), and presented (Mar. 5) 11 articles of impeachment. The impeachment trial began Mar. 23, and resulted in acquittal May 16 and 26, the votes on the 2 leading articles standing 35 guilty to 19 not guilty, thus lacking 1 of the $\frac{2}{3}$ required for conviction. On the accession of Pres. Grant, Mar. 4, 1869, J. returned to Tenn. Unsuccessful in 1870 and 1872 as a candidate respectively for U. S. Senator and Representative, he was finally elected to the Senate in 1875, and took his seat in extra session of March. D. July 31, 1875.

PORTER C. BLISS.

Johnson (BUSHROD R.), b. in O. Sept. 6, 1817, grad. at W. Pt. in 1840; served in the Fla. and Mex. wars; resigned in 1847, and at the outbreak of the c. war was prof. in the Nashville Military Univ. He became a brig.-gen. in the Confed. army; was captured at Ft. Donelson, but soon escaped; was severely wounded at Shiloh; became maj.-gen. in 1864, and commanded a division under Lee at the time of the surrender at Appomattox C.-H. D. Sept. 11, 1880.

Johnson (CAVE), b. in Robertson co., Tenn., Jan. 11, 1793; became a lawyer and a circuit judge; was M. C. 1839-37 and 1839-45, P. M.-gen. during Mr. Polk's Presidency, pres. of the Bank of Tenn. 1850-59, and during the c. war was elected to State senate as a Unionist, but on account of feeble health never took his seat. D. Nov. 23, 1866.

Johnson (EASTMAN), b. in Lovell, Me., July 29, 1824. Took up drawing regularly at about 15; in 1845 went to Wash., had a room in the capitol, and made many portraits of distinguished men. In 1846 established himself in Boston, and made crayon portraits of Longfellow and his family, Sumner, Felton, Hawthorne, and Emerson. In 1849 went to Düsseldorf; studied a yr. in the Royal Acad. In 1851 spent a few weeks in Lond.; thence to the Hague to copy a head by Rembrandt; stayed there 4 yrs., and sent thence his first pictures of consequence, *The Card-Players* and *The Savoyard*. Spent 2 winters in Wash. and 2 summers on Lake Superior among the Indians. Came to New York in the fall of 1858, with his picture *The Old Kentucky Home*. Mr. J. is a painter of genre pictures, but in a broader style than that term indicates. He has also been successful in portraits. The war furnished him subjects for his best known works—*The Drummer-Boy*, *The Pensioner*, *Clarin-Angel*, *The Boyhood of Lincoln*. Among his works are also *The Kitchen at Mount Vernon*, a reminiscence of old times, *The Chimney-Sweep*, and *Lady at Prayer*.

Johnson (FRANK GRANT). See APPENDIX.

Johnson (HERMAN MERRILLS), D. D., LL.D., b. at Butternuts, N. Y., Nov. 25, 1815, grad. at the Wesleyan Univ. in 1839; was 1839-42 prof. of anc. langs. in St. Charles Coll., Mo.; in 1842 was called to the same chair in Augusta Coll., Ky.; held the professorship of anc. langs. and lit. in the O. Wesleyan Univ. 1844-50, and was for a part of the time its acting pres.; in 1850 became prof. of Eng. lit. in Dickinson Coll., and was its pres. 1860-68. He edited *Orientalia Antiquaria Herodoti*, also an edition of *Clio* of Herodotus, and wrote much for periodicals. D. Apr. 5, 1868.

Johnson (HERSCHEL V.), b. in Burke co., Ga., Sept. 18, 1812, grad. at the State Univ. 1834; admitted to the bar and entered the arena of politics in 1840, rising rapidly to high distinction; served a term in the U. S. Senate 1848, and on the circuit court bench in 1849; elected gov. of Ga. in 1853, and re-elected 1855. In 1860 was candidate for V.-P. of the U. S. with Stephen A. Douglas for Pres. Was in the State secession convention in 1861; opposed the policy adopted by that body with great ability, but after its adoption went with his State. Was chosen Confed. State senator; was chosen pres. of the constitutional convention of the State in 1865; was then elected to the U. S. Senate, but was refused admission. After the removal of disabilities he again occupied a seat on the circuit court bench, which position he filled with ability until his death, Aug. 16, 1880.

Johnson (ISAAC), b. at Clipsham, Eng., about the close of the 16th century; married the Lady Arbella, daughter of the earl of Lincoln, and associated himself with Winthrop in the settlement of N. Eng., being the wealthiest of the colonists. He is considered one of the chief founders of Boston, where he d. Sept. 30, 1630.

Johnson (JAMES), b. in Robinson co., N. C., in 1811. His father moved to Ga. and settled in Macondonough when he was but a boy. After an academic course in this v., he grad. with high honor at the State Univ. in 1832, taught school for a short time, and then commenced the practice of law as a profession, in which he soon attained high eminence; was M. C. from Ga. 1851-53. Being a strong Union man, and opposed to secession, though he went with his State during the war, at its close in 1865 Pres. Johnson appointed him provisional gov. of Ga. This position Mr. J. held until the State was restored to the Union. In 1866 he was appointed collector of the customs at Savannah, which office he resigned in 1869. Soon after he was placed on the circuit court bench of the State. A. H. STEPHENS.

Johnson (JOHN), LL.D. See APPENDIX.

Johnson (JOSEPH), M. D., b. at Charleston, S. C., June 5, 1776; studied med. at the Univ. of Pa., and practised at Charleston. From 1818 to 1835 was pres. of the U. S. branch bank at Charleston, was active in literary, professional, and political associations, pres. of the S. C. Med. Society from 1807 for many yrs.; mayor of Charleston, com. of schools, and leader of U. party in nullification troubles.

Johnson (MANUEL JOHN), F. R. S., b. in Eng. in May 1805; studied at Addiscombe Military School; joined the E. I. Co.'s artill. at St. Helena in 1821, where he cultivated astron. and prepared a catalogue of 606 stars of the S. hemi-

sphere; returning to Eng., he entered Magdalen Coll., Ox., and grad. in 1839, when he was immediately appointed Radcliffe astron.; extended the lists of stars by annual catalogues; introduced improved astronomical instruments. His observations of double stars with the great heliometer and his photographic registration of stars were important. D. Feb. 28, 1859.

Johnson (MARY ANNE), first wife of Oliver Johnson, b. in Westmoreland, N. H., Aug. 24, 1808. For 3 yrs. (1844-47) she was associated as assistant matron with Mrs. Eliza W. Farnham in the effort to reform the State prison for females at Sing Sing. She subsequently became a lecturer to her own sex upon anat., physiology, and the laws of health. D. June 8, 1872.

Johnson (OLIVER), b. in Peacham, Vt., Dec. 27, 1809; served an apprenticeship to the printing business; Jan. 1, 1831, became ed. of the *Chr. Soldier*, and was up to 1865 engaged in the anti-slavery cause as a lecturer and as an ed., manager, and contributor to newspapers. During the next $\frac{1}{2}$ yrs. he was the managing ed. of the *Independent*; at the end of 1870 became ed. of the *Weekly Tribune*, resigning in 1872 to become managing ed. of *Chr. Union*.

Johnson (PERCIVAL NORTON), F. R. S., b. in Eng. about 1793; son of a Lond. assayer, early acquired skill in the same profession; was the first to determine the exact proportions of gold and silver in bullion; introduced into Eng. the alloy known as Ger. silver, extracted palladium and platinum from gold bullion, and manufactured them for commercial purposes; invented several pottery colors, especially the much admired "rose-pink." D. June 1, 1866.

Johnson (REVERDY), b. at Annapolis, Md., May 21, 1796, son of Chancellor John Johnson of that State; ed. at St. John's Coll.; admitted to the bar in 1815; removed to Baltimore in 1817, and was shortly after appointed deputy atty.-gen. of Md.; was a State senator 1821-25, resigning in the latter yr. to attend to the increasing duties of his profession. In 1845 he was elected to the U. S. Senate from Md., and in 1849 Pres. Taylor appointed him atty.-gen. of the U. S., which office he held until the death of Pres. Taylor, when he resumed the practice of his profession; was member of the peace commission in 1861, U. S. Senator 1863-68, U. S. minister to Eng. in 1868, and negotiated a treaty for the settlement of the Alabama claims, which was rejected by the U. S. Senate. Recalled in 1869, D. Feb. 9, 1876.

Johnson (RICHARD MENTOR), b. in Ky. Oct. 17, 1780, was ed. at Transylvania Univ.; studied law and was admitted to the bar; in 1823 was elected to the legislature, and was M. C. 1807-19; in 1812, after the declaration of war by G. Brit., he raised a regiment of Ky. mounted riflemen, which he commanded on the Canadian frontier during the fall of that yr. After the adjournment of Cong., Mar. 1813, he raised another mounted regiment of volunteers, with which he guarded the Indian frontier during the summer months, and joined Gen. Harrison in time to render brilliant service in the battle of the Thames on Oct. 5. In this engagement Col. J. was desperately wounded. He was, however, able to resume his seat in Cong. in Feb. ensuing; in 1819 was elected to the U. S. Senate, and remained a member of that body until 1829; after this he was again a member of the House 1829-37; in 1836 was run for the Vice-Presidency of the U. S. in most of the States, on the same ticket which supported Mr. Van Buren for the Presidency. He received 147 of the electoral votes, but this was a few votes short of a majority of the whole. In this state of things the choice for V.-P. devolved on the Senate. In the discharge of this duty the Senate, in Mar. 1837, made choice of Col. J. for the office of V.-P. for the 4 yrs. ensuing. In Mar. 1841 he returned to his home in Ky. He was again returned a member to the State legislature, and while holding this position d. at Frankfort, Ky., Nov. 19, 1850. He was the author of the law abolishing imprisonment for debt in Ky.

Johnson (RICHARD W.), b. in Livingston co., Ky., Feb. 7, 1827, grad. at W. Pt. 1849; entered inf.; transferred to the cav. 1855 as first lieu.; promoted to be capt. 1857, major 1862; engaged in campaigns against Indians in Tex. 1849-51; brig.-gen. of volunteers Oct. 1861, and in command of a division of inf. at Stone River, Liberty Gap, Chickamauga, Missionary Ridge, and all the battles from Nashville to New Hope ch., near Atlanta, Ga., where he was severely wounded; subsequently commanded a division of cav. at the battle of Nashville. Received successive brevets from lieu.-col. to maj.-gen. U. S. A.; retired on the full rank of maj.-gen. Oct. 1867, on account of wounds; reduced to the rank of brig.-gen. under a subsequent law of Cong. Military prof. in the Univ. of Mo. 1868-69, Univ. of Minn. 1869-70. G. C. SIMMONS.

Johnson (ROBERT W.), b. in Ky. in 1814; moved to Ark., and was M. C. from that State 1847-53; he was then elected to the U. S. Senate, in which body he was a member until, in 1861, he was elected a member to the provisional Cong. of the Confed. States; in 1862 he was elected Senator from Ark. to the Confed. States Senate. He was a leading member of that body to the close of the war, when he pursued the practice of law in the city of Wash. D. July 26, 1879.

Johnson (SAMUEL), D. D., b. in Guilford, Conn., Oct. 14, 1696; at 14 entered the coll. at Saybrook, in which he became tutor, and was a chief agent in securing its establishment at New Haven as Yale Coll.; in 1720 was ordained pastor of the Congl. ch. at West Haven; declared for episcopacy, and in 1722 sailed to obtain holy orders in the Ch. of Eng.; returned to Conn. and settled at Stratford as a missionary of the Society for the Propagation of the Gospel in Foreign Parts. For a long time he was the only Epis. clergyman in the colony. Was a friend of Berkeley, from whom he secured for Yale Coll. the donation of many valuable books and a deed of his farm at Newport for the founding of scholarships. The Univ. of Ox. conferred upon him in 1743 the degree of D. D. When the project was entered upon to found a coll. in Phila., Franklin urged him to assume the presidency, which he declined, but he accepted the presi-

gency of King's (now Columbia) Coll., N. Y. He resigned the position in 1763, and resumed the charge of his old parish in Stratford, Conn. He wrote *Elementa Philosophica*, and an *Eng. and Heb. Gram.* D. Jan. 6, 1772.

Johnson (SAMUEL), LL.D., b. at Lichfield, Eng., Sept. 18, 1709, the son of a bookseller of limited means; commenced the study of the classics at the age of 10 at the Lichfield free school; spent 2 yrs. in his father's shop, during which he laid the foundation of that store of miscellaneous knowledge for which he was distinguished; when 19 he found an opportunity to enter Pembroke Coll., Ox. (1728); produced a Lat. translation of Pope's *Messiah*. In 1731 he was compelled by want of resources to leave Ox.; was employed for some time as usher in a school at Market Bosworth, Leicestershire, and afterward lived some time at Birmingham, writing for a newspaper and publishing 1 or 2 books translated from the Lat. In 1736 he improved his circumstances by marrying a widow who had £800 in the funds, and opened a private acad. near Lichfield. After a brief experience in teaching, J. went to Lond. in 1737, accompanied by his pupil Garrick. His first employment was on Cave's *Gentleman's Magazine*. The publication of *London*, a satire, and of 2 or 3 political pamphlets brought him into public notice. In 1740 J. undertook to report the debates in Parl. for the *Gentleman's Magazine*, and acquired celebrity by his practice of improving upon the real utterances of the speakers; in 1744 appeared his *Life of Savage*, in 1749 *The Vanity of Human Wishes and Irene*; in 1750-52 he wrote the *Rambler*, a semi-weekly series of literary essays. From 1747-55 he was occupied upon his great work, the *Dict. of the Eng. Lang.* His wife had d. in 1752, his mother in 1759, and it was to pay the expenses of the latter's funeral that J. wrote *Rasselas* within a single week. The *Idler* appeared in 1758-60. About 1762 J. acquired a pension of £300. He now became an authority on all points of erudition, and his conversational powers began to attract the attention of a circle which in 1764 formed the nucleus of the famous Literary Club. It was in 1763 that he first met James Boswell, and in 1765 that he made the acquaintance of the Thrale family. In 1773 he visited Scot. and the Hebrides, accompanied by Boswell, publishing in 1775 the *Journey to the Western Islands and Tazewell no Tyranny*. His last literary work was the *Lives of the Poets* (1779-81). D. Dec. 13, 1784.

Johnson (SAMUEL), b. at Salem, Mass., Oct. 10, 1822, grad. at Harvard in 1842 and at the Divinity School in 1843; became in 1853 pastor of a "Free" ch. at Lynn. He was prominent in the anti-slavery movement. In 1846 he compiled, in connection with Samuel Longfellow, *A Book of Hymns*, some of the finest of which were his own. In 1868 he pub. *The Worship of Jesus*. Of his *Oriental Religions* the first vol. has appeared. D. Feb. 19, 1882.

Johnson (SAMUEL WILLIAM), A. M., b. at Kingsboro', N. Y., July 3, 1830; studied in the Yale Scientific School and at Leipsic and Munich. In 1856 he became prof. of analytical and agricultural chem. in the Sheffield Scientific School at Yale Coll. He has written *Essays on Manures, Peat and its Uses*, *How Crops Grow*, beside translating Fresenius's *Qualitative Chemical Analysis*, and the same author's *Quantitative Chemical Analysis*.

Johnson (WALTER ROGERS), b. at Leominster, Mass., June 21, 1794, grad. at Harvard in 1819; was a teacher in Framingham and Salem, Mass., and in Germantown, Pa., and the Phila. High School; 1839-43 prof. of physics and chem. in the Univ. of Pa. He made an official report (1844) to Cong. on the character of the varieties of coal; was engaged (1845) in examining the proposed sources of water-supply for Boston, Mass.; was the first sec. of the Association for the Advancement of Science; became in 1848 connected with the Smithsonian Inst., and in 1851 with the World's Fair, Lond. His prin. works are *Use of Anthracite*, *Report on Coals*, *Coal Trade of Brit. Amer.*, and *Memoir of L. D. von Schweinitz*. D. Apr. 26, 1852.

Johnson (SIR WILLIAM), BART., b. at Warrentown, Ire., in 1715; came in 1738 to Amer., and settled among the Mohawk Indians, being the earliest white resident of that region. He learned the Mohawk lang., and was made an honorary chieftain of that tribe. In 1743 he was appointed supt. of Indian affairs for the prov. In the Fr. war of 1755 he was commissioned as commander-in-chief of the provincial forces in the expedition against Crown Point; defeated Dieskau at Lake George, and destroyed his army in Sept. 1755; was severely wounded, and received the thanks of Parl., a grant of £5000, and a baronetcy. From 1756 to 1760 Sir William was engaged in important transactions. For all these services he received from the king a grant of 100,000 acres of land N. of the Mohawk, long known as "Kingsland" or the "Royal Grant," and in 1764 he built Johnson Hall, around which soon sprang up the village of Johnstown, the cap. of Tryon co., which embraced all Central and W. N. Y. Here he passed the rest of his life, giving great attention to improvements in agriculture, and introducing the first sheep and blood-horses into the Mohawk Valley. (See his *Life*, by W. L. STONE.) D. July 11, 1774.

Johnson (WILLIAM), LL.D., b. at Charleston, S. C., Dec. 27, 1771, grad. at Princeton in 1790; studied law at Charleston; was a member of the legislature for 3 terms, being speaker the last term; was elected judge of circuit courts, and appointed by Jefferson a justice of the supreme court, with jurisdiction in S. C. and Ga. He edited *Life and Correspondence of Maj.-Gen. Nathaniel Greene*. D. Aug. 4, 1834.

Johnson (WILLIAM SAMUEL), LL.D., son of Samuel Johnson, first pres. of Columbia Coll., b. in Stratford, Conn., Oct. 7, 1727; grad. at Yale in 1740; studied law, and rose to the highest rank in his profession. In 1761 he was chosen to the lower house of the gen. assembly, and was one of the upper house when he was selected to attend the first Colonial Cong. (1765) to consider the Stamp Act. He drew up the petitions and remonstrances which were sent to the king and 2 houses of Parl. At the Oct. session of the gen. assembly of Conn. (1766) he was appointed to proceed to

Eng. and defend in a cause concerning the title to a large tract of land obtained for the colony from the Mohegan Indians. After the battle of Lexington he and another were deputed to wait on Gen. Gage, then in command of the Brit. forces at Boston, with a letter from the gov. of Conn., the object of which was to stay hostile proceedings. The embassy was unsuccessful. Retiring from the council after the Dec. of Ind., he set himself down to his studies at Stratford, but when the independence of the colonies was established he resumed the practice of his profession. He was a delegate from Conn. to the convention which framed the Federal const., and pres. of the committee of 5 appointed to revise the instrument and arrange its articles. He was elected the first Senator from Conn., Oliver Ellsworth being his colleague. After King's Coll., N. Y., became Columbia under the new organization, he was chosen to the presidency, an office which his father had filled. After 1800 he lived in retirement at Stratford. D. Nov. 14, 1819.

Johnston (ALBERT SIDNEY), b. in Ky., in 1803, grad. at W. Pt. 1826. After serving in the Black Hawk war he resigned from the army, and in 1836 emigrated to Tex. Entering the Tex. army as a private, he was soon promoted to succeed Gen. Felix Houston in chief command, in consequence of which a duel occurred in which J. was wounded. He held the office of senior brig.-gen. till 1838, when he was appointed sec. of war of Tex., and in 1839 organized an expedition against the Cherokees, who were totally routed. In 1840 he retired from public life and settled upon a plantation. He was an advocate for the annexation of Tex. to the U. S., and in 1846 was made commander of the Tex. volunteer rifle regiment. Subsequently he served as inspector-gen. on the staff of Gen. W. O. Butler, and distinguished himself at Monterey. In 1849 Pres. Taylor reappointed him in the army as paymaster with the rank of major, in which capacity he served until 1855, when he was appointed col. U. S. Cav. In 1857 he commanded the U. S. forces sent to coerce the Mormons into obedience to Federal authority, conducting the expedition to Salt Lake City, and commanded the dept. of Utah. For his conduct of this expedition he was brevetted brig.-gen. In 1860 he was assigned to the command of the dept. of the Pacific. In May 1861 he resigned from the service and travelled to the seat of the Confed. govt. He was at once appointed a gen. in the Confed. army, and assigned to an important command in the West. At battle of Shiloh was commander-in-chief, and on first day of that battle was killed, Apr. 6, 1862.

Johnston (ALEXANDER KEITH), b. at Kirkhill, Scot., Dec. 28, 1804; travelled, and studied the prin. modern langs. to avail himself of their resources in geographical data, and pub. a *National Atlas* and a *Phys. Atlas of Natural Phenomena*. Mr. J. was chosen a member of the geographical societies of Paris and Berlin, and appointed geog. to the queen for Scot. D. July 9, 1871. His son succeeded him in his geographical enterprises.

Johnston (GABRIEL), b. in Scot. about the end of the 17th century; ed. at the Univ. of St. Andrew's; became prof. of Oriental langs. in the same inst.; appointed gov. of N. C. in 1734, and held that office till his death in Aug. 1752. He was esteemed the ablest of the colonial gov's.

Johnston (JOHN), LL.D., b. Aug. 22, 1806, at Bristol, Me., grad. at Bowdoin in 1832; after being prin. of a sem. at Cuzenovia, N. Y., he became connected in 1835 with the Wesleyan Univ. at Middletown, Conn., first as assistant and subsequently as prof. of natural science. He wrote several text-books on chem. and natural philos., an elaborate hist. of his native town, and contributed largely to various periodicals. D. Dec. 1, 1879.

Johnston (JOHN TAYLOR), b. in New York Apr. 8, 1830; was ed. partly in New York and partly in Edinburgh; grad. at the University of the City of New York in 1839; was admitted to the bar in 1843, and became interested soon after in the control of R. Rs. He became pres. of the council of the Univ. of the City of New York, and also pres. of the Metropolitan Museum of Art.

Johnston (JOSEPH ECCLESTON), b. in Prince Edward co., Va., Feb. 1807, grad. at W. Pt. 1829. Until 1837 he served mainly on garrison duty, being, however, actively engaged for some 2 yrs. in Fla. against Seminole Indians. In 1837 he resigned his commission, but re-entered the service July 7, 1838, as first lieu. of topographical engineers, and for former gallantry in Fla. was brevetted capt. Until the outbreak of the war with Mex. he was engaged upon river and harbor improvements, surveys of Tex. boundary-line and that between the U. S. and the Brit. provs., etc. At the siege of Vera Cruz (Mar. 1847) he served on engineer duty; was appointed Apr. 9 lieu.-col. of voltigeurs, and at Cerro Gordo on the 12th received severe wounds and was brevetted major and col. In the subsequent battles of Contreras, Churubusco, Molino del Rey, Chapultepec, and the final assault of the city of Mex., he participated, and was wounded at the latter assault. Upon the disbandment of the voltigeurs in 1848, J. returned to duty as capt. of topographical engineers; in 1855 was appointed lieu.-col. of cav., and was engaged in frontier duty and on the Ut. expedition as inspector-gen. On June 28, 1860, he was appointed quartermaster-gen. with the rank of brig.-gen., which position he resigned Apr. 22, 1861. Appointed maj.-gen. in the Confed. army, he commanded the force which occupied Harper's Ferry May 1861, and subsequently reinforced Gen. Beauregard in his position about Manassas. At the battle of Bull Run J. waived his right to command in favor of Beauregard. In the Peninsular campaign he was in command of the Confed. army, and at the close of the first day's fighting at Fair Oaks (May 31, 1862) was severely wounded, being succeeded by Gen. R. E. Lee. Upon his recovery he was assigned to command the S. W. dept., with the rank of lieu.-gen., and during the siege of Vicksburg made several ineffectual attempts to relieve that place. In Dec. 1863 J., now a gen., succeeded Gen. Bragg in command of the Confed. army of Tenn.; but failing to prevent the invasion of Ga. by the U. forces of

Gen. Sherman, he was superseded July 17, 1864 by Gen. J. B. Hood. In 1865 he was restored to command in the Carolinas to collect and command an army to oppose the advance of Gen. Sherman, but upon receiving intelligence of the surrender of Lee entered into correspondence with Gen. Sherman, which led to the surrender of his army at Durham Station, N. C., Apr. 26, 1865. In 1874 he wrote a *Narrative of Military Operations*. Member of 46th Cong. *From orig. aut. in U. S. Univ. Lib., by G. C. SIMMONS.*

Johnston (RICHARD M.), b. in Hancock co., Ga., Mar. 8, 1822; grad. at Mercer Univ. with the first honor of his class in 1841; studied law and was admitted to the bar, and entered upon the practice at Sparta in 1843. In 1857 he accepted a professorship of *belles-lettres* in the State Univ. This position he held until 1861. He then established a select classical school at Rocky in his native co., which became famous in the S. States; in 1867 he moved his school to Chestnut Hill, 2 m. N. of Baltimore, Md., where it is now known as Pen-Lucy Inst. Wrote *Eng. Classics* and the *Dukesborough Tales*. A. H. STEPHENS.

Johnston (SAMUEL), LL.D., b. at Dundee, Scot., Dec. 15, 1739; was brought in infancy to N. C., where his father acquired large landed estates; was chosen to the assembly in 1769; was an active member of the first 2 provincial Congs., and presided over the 3d and 4th. In 1775 he was chairman of the provincial council; was a member of the Continental Cong. in 1781-82; gov. of N. C. 1788-89, presiding over the State convention which adopted the Federal const.; was U. S. Senator 1789-93, and justice of the supreme court 1800-03. D. Aug. 13, 1816.

Johnston (WILLIAM FEEAHE), b. at Greensburg, Pa., Nov. 29, 1808; was admitted to the bar in 1829. In the State legislature he early won distinction by his financial ability. In 1847 he became pres. of the senate. On July 9, 1848, Gov. Shunk died, and J. became gov. *ex officio*; but the statutes and the State const. being in apparent conflict, he ordered a new election, and was himself chosen gov. He afterward was an iron and salt manufacturer and oil refiner, and was for a time collector of the port of Phila. D. Oct. 25, 1872.

Johnstown, on R. R., cap. of Fulton co., N. Y., 4 m. N. of Fonda, on Cayadutta Creek. Pop. 1870, 3282; 1880, 5013.

Johnstown, Cambria co., Pa., on the Pa. Canal and R. R., 79 m. E. of Pittsburgh; has a large rolling-mill and Bessemer steel-works. The surrounding mts. are rich in iron, bituminous coal, limestone, cement, and fire-clay. The Conemaugh River flows on the N. and Stony Creek on the S. of the town. Pop. 1870, 6028; 1880, 8380.

Joint Firs (Gnetaceæ), a small natural order of exogenous plants (gymnogens) closely allied to the Coniferae. They are small trees and shrubs of the genera *Gnetum* and *Ephedra*, found in tropical and warm countries. Their stems are jointed, their juices not resinous, but very watery, or sometimes even gummy. Several grow in the far West.

Joint Ownership. As employed in a comprehensive sense in law, J. O. denotes the ownership of property, whether real or personal, by two or more persons. But it is more appropriately applied to personal property, and is, by this restriction of meaning, distinguished from joint tenancy, which is customarily used with reference to real estate, of which only can tenure be properly predicated. By a still further qualification of meaning, J. O. is distinguished from ownership in common, and joint tenancy from tenancy in common, the interest of a number of owners being characterized strictly as joint when the property, whether real or personal, is held by them with a unity of interest, of title, of time, and of possession, and with a right of survivorship; while it is termed common when the only unity is that of possession, and there is no survivorship. Only ownership of personal property has here been considered.

There are 4 unities which, as has just been stated, are necessary to constitute J. O. By unity of interest is meant that the interest of each owner in the property should be, by its original limitation, for the same duration and of the same nature and quantity. Unity of title exists when the title of each is derived from the same instrument or from the same act of transfer of interest. That there may be unity of time, the interest of each should vest at the same moment; while unity of possession requires that each owner should be entitled to the possession of the whole property and every parcel, and that it should not be divided in separate portions between them. All property held in J. O. is subject to the right of survivorship. In the application of this doctrine, whenever one of the owners dies, the survivors take the entire interest, to the exclusion of his personal representatives. The creation of a joint interest in personal property may either be by the use of express lang. to that effect in the instrument of transfer, or it may result from necessary implication, as where chattels are given to 2 or more persons without the use of any words indicating a severance of interest. In this country the tendency of legislation is to do away with the incident of survivorship, except in the case of legacies and where persons are appointed co-executors or co-trustees.

Every kind of personal property may be held in J. O. Thus, there may be joint owners of stock, of a legacy, of a promissory note, of a patent right, or of a lease for yrs., which is termed a chattel real, as well as of a horse, furniture, etc. The interest of any owner cannot be disposed of by will, but will pass to the survivor unaffected by the bequest. J. O. in chattels, like a joint tenancy in lands, may be terminated by destroying any one of the 4 requisite unities except that of time, and may thus be changed into an ownership in severalty or in common. In ownership in common of chattels, as in tenancy in common of real property, there is but a single unity, that of possession, and there is no right of survivorship. Each owner has an undivided share, and upon his death this passes to his executor or administrator, to be administered in the same way as the rest of his personal estate. Ownership in common may arise by a gift or transfer of chattels, which by the terms of the limitation are

to be held in common; or it may result from the disposal of his interest to a third person by one of several joint owners. An owner in common may dispose of his interest as freely as an owner in severalty. The purchaser becomes an owner in common with the other owners. Ownership in common may be destroyed by a division of the property among the various owners according to the extent of their respective shares. As a gen. rule, joint owners and owners in common must unite in all actions for injuries to the gen. property by third persons, as in actions of trespass and trover. In some instances one co-owner may maintain an action against another for a misuse of or wrongful interference with the joint or common property. A partition of the property held in common cannot be obtained by any form of proceeding at law, though sometimes courts of equity will decree that a division be made. When the property is severable in its nature, and of the same common quality, any owner may separate a portion equal to his share, if it can be ascertained by weight or measurement, and appropriate it to himself. GEORGE CHASE.

Joinville, ZHOUENÉ, FRANCIS FERDINAND PHILIPPE LOUIS MARIE D'ORLÉANS, PRINCE DE, the third son of Louis Philippe, b. at Neuilly Oct. 14, 1818. At the age of 13 he commenced his naval career; was appointed a lieut. in 1836, and in 1838 commanded the corvette *La Créole* of the fleet of Admiral Baudin before Vera Cruz. In 1840 he, in command of the frigate *La Belle Poule*, was charged with conveying the remains of Nap. from St. Helena to Fr. In 1843 he married the princess Francesca di Braganza, sister of the present emp. of Brazil. Made at the same epoch (1843) *contre-amiral* (rear-admiral), he in 1844 commanded the fleet which bombarded Tangiers and seized Mogadore. The revolution of 1848 found the prince still commanding the fleet off Algiers, near his brother, the duc d'Aumale, gov. of the Afr. possessions and commander of the military forces in Afr., numbering 80,000 men. Yielding to the popular will, the 2 brothers relinquished their commands, and in company embarked for Gibraltar. On the breaking out of the Amer. c. war in 1861, he embarked for New York, bringing with him his son, the duc de Penthièvre (who entered as a cadet the U. S. Naval School, then at Newport), and accompanied by his nephews, the comte de Paris and the duc de Chartres. The latter received military commissions from the gov., and were members of the personal staff (A. D. C.) of Gen. McClellan during the latter part of the yr., and during what is known as the Va. Peninsular campaign against Richmond (Apr., May, June 1862). Immediately on his return to Fr. he communicated to the *Revue des Deux Mondes*, under the non de plume of "A. Trognon," an able sketch of the events of the campaign under the title of *L'Armée du Potomac*, etc. When the Fr. armies had been almost annihilated the prince and his nephew, the Duc de Chartres, disappeared from the family reunion at Claremont to find their way to serve their country. Repelled by the gov., he was finally compelled to return to Eng., where he remained until the edict of banishment resting upon his family was abrogated by decree of the Fr. assembly (1871).

Joinville, de (JEAN), SIRE, b. at the château of Joinville in Champagne about 1224; at an early age attached as seneschal to the court of the count of Champagne, afterward to that of the king of Navarre. In 1248 he took part with St. Louis in his first crusade; was a companion of the king in his battles and his captivity, becoming his friend and counsellor. Returning to Fr. in 1254, he was for many yrs. employed at court. His *Mémoires* have ever been a favorite Fr. classic. D. in 1318.

Jokai (MOG), b. at Komorn, Feb. 19, 1825, studied law at Pesth, but did not practice, devoted himself to literature, and founded in 1863 the *Hon* ("Fatherland"), the most widely circulated paper in Hungary. All his novels have been translated into German; *The New Landlord* also into English by A. Patterson, London, 1865.

Jokjoker'ta, the name of a former kingdom of Java, now a Dut. presidency. Its cap. Jokjokerta or Mataram, has 50,000 inhabs., many European settlers and insts., and a most curious palace of the sultan.

Joliba, See NIGER.

Joliet, city and R. R. centre, cap. of Will co., Ill., on the Aux des Plaines River and the Ill. and Mich. Canal, 36 m. S. W. of Chicago. It is built mainly in the river-valley, but partly on bluffs on either side. Fine calcareous building-stone underlies the whole city and vicinity. Cement, gravel, and fire-clay are largely obtained. Near the city is the State penitentiary, built of stone. Its wall, averaging 35 ft. in height, incloses 164 acres. Pop. 1870, 7269; 1880, 11,657.

Joliet (LOUIS), b. at Que. in 1645; was ed. in the Jesuits' coll., but engaged in the fur-trade. Commissioned to explore the Miss. River, he started in 1673 up the Fox River and down the Wis. and Miss. rivers to a point below the mouth of the Ark., returning to Green Bay via the Ill. River. Thence he proceeded alone to Que. and prepared a map and narrative of the expedition. He was appointed royal hydrographer, and received the island of Anticosti of which he was dispossessed by the Brit. In 1697 the seigniorship of J. in Canada was granted to him. D. 1700.

Jomini, zho-me-ne' (HENRI), BARON, b. at Payerne, canton of Vaud, Switz., Mar. 6, 1779; entered the Fr. army in 1804 with the rank of major; served as aide-de-camp to Marshal Ney in Ger. and Sp.; was made a brig.-gen. in 1808, and distinguished himself on the retreat from Moscow in 1812; when Nap. refused to promote him after the victory at Bautzen, J. left the Fr. army and entered the service of the emp. Alexander, who made him his aide-de-camp, but he took no part in the campaign against Fr. In the R. service he distinguished himself in the war against the Turks in 1828, and was very active in the foundation of the Military Acad. of St. Petersburg. D. Mar. 24, 1869. Wrote *Histoire critique et raisonnée des principes de la Révision, l'art militaire et militaire de Napoléon*, etc.

Jo'nah [Heb. a "dove"], a Heb. prophet, who lived about 800 B. C. The book of Jonah does not contain his prophecies, but an incident from his career. Some assert that the story is purely mythical, others that it has an historical foundation, others that it is a poetical invention.

Jon'as (JESUS), b. June 5, 1493, at Nordhausen, in the Prus. prov. of Sax.; studied law, and was prof. of jurisprudence, first at Erfurt and then at Wittenberg, where in 1521 he became prof. of theol.; ecclesiastical supt. at Halle in 1541, and at Coburg in 1546. D. Oct. 9, 1555. He was one of the most prominent among the Ger. Reformers.

Jon'athan [Heb. *Yonathan*], a son of Saul, king of Israel, b. near the close of the 12th century B. C.; became, on the establishment of the kingdom, a leader in the war against the Philistines. His attachment to David is the best known feature of his career, and has made his name a synonym for disinterested friendship. He was killed in battle against the Philistines at Mt. Gilboa, about B. C. 1053.

Jonathan ben Uzziel, b. in Pal. in the 1st century B. C.; was a pupil of Hillel, and became one of the most celebrated expositors of the books of the O. T. He was the author of a Chaldee paraphrase or translation of the prophets, and to him is attributed the authorship of a Targum known by his name, and also of the *Five Megilloth*.

Jones (ANSON), b. in Mass. Jan. 20, 1798; began the practice of med. in 1820. Being of a migratory disposition, he subsequently resided for a while in Phila. and New Orleans; then visited S. Amer., and finally (in 1833) settled at Brazoria, Tex. When the troubles between Tex. and Mex. broke out in 1835, he was a zealous advocate of the independence of the colony. In the war that ensued he acted as a private soldier as well as a surgeon in the Tex. army. After independence was achieved he was a member of the Tex. Cong. In 1838 he was minister from that republic to the U. S. Subsequently he was senator in the Tex. Cong., and then for 3 yrs. sec. of state. In Sept. 1844 he was elected pres. of Tex., which office he held until Tex. became one of the U. S. D. by his own hand, Jan. 7, 1858. A. H. STEPHENS.

Jones (CHARLES COLCOCK), D. D., b. at Liberty Hall, Ga., Dec. 20, 1804; studied at Andover and Princeton; was ordained in 1830, and went as a missionary to the negroes in Ga. From 1836 to 1838 and from 1847 to 1850 he was prof. of ch. hist. in the sem. at Columbia, S. C., having in the interval returned to his labors among the negroes. In 1850 he removed to Phila., and became sec. of the Presb. Board of Domestic Missions; returned in 1853 to Ga. He wrote a catechism on *Script. Doctrine and Practice*, several pamphlets on the *Religious Instruction of the Negro*, and a *Hist. of the Ch. of God*. D. Mar. 16, 1863.

Jones (CHARLES COLCOCK, JR.), b. in Savannah, Ga., Oct. 28, 1831; ed. by private tutors at Montevideo and Maybank, Liberty co., Ga.; his freshman and sophomore yrs. were spent at S. C. Coll., Columbia. The junior and senior yrs. of his collegiate course were passed at Nassau Hall, Princeton, N. J., where he grad. with high distinction in 1852. After this he studied law in Phila. 1 yr., and then went to Dane Law School, Harvard Univ., Cambridge, Mass., where he took the regular degree in the law dept. of that inst. in 1855. Returning to his native State, he was admitted to the bar at Savannah, Ga., in 1856, and rose to the first rank in his profession. In 1860 he was elected mayor of the city. Soon after the beginning of the late war he entered the Confed. States military service and became lieutenant-col. of artill. He was under Gen. Joseph E. Johnston at his surrender in Apr. 1865. After the war Mr. J. moved to the city of New York, where he resumed the practice of law. Wrote *Historical Sketch of the Chatham Artill. during the Confed. Struggle for Independence*, *Antiquities of the S. Indians*, particularly of the *Ga. Tribes*, etc. A. H. STEPHENS.

Jones (GEORGE W.), b. in King and Queen co., Va., Mar. 15, 1806; was a member of the legislature of Tenn. (in the house or senate) from 1835 to 1842, and was M. C. from 1843 to 1861. Though a U. man of the Jackson school, after the secession of Tenn. he went with his State, and was a member of the Confed. Cong. After the war he took no prominent part in politics. D. Nov. 13, 1884.

Jones (SIR HARRY DAVID), G. C. B., b. 1792; lieutenant royal engineers 1808; served in the Peninsula campaigns 1810-14, on special duty in Amer. 1815, in the allied occupation of Paris 1815-16; brig.-gen. July 1854, maj.-gen. Dec. 1854; in command of royal engineers at Sevastopol 1855, lieutenant-gen. 1860, col.-commandant of royal engineers 1860, gov. of Royal Military Coll. at Sandhurst 1856-66. D. Aug. 2, 1866.

Jones (INIGO), b. in Lond. in 1572; d. there July 21, 1652; spent several yrs. in Ger., Fr., and It., and received his chief impulse from the works of Palladio in Venice; in 1605 returned to Eng.; in Ben Jonson's prime as poet-laureate was court arch. and decorator; became a person of importance, a favorite with the court, and held a high rank among the archs. of his generation. The river front of Somerset House, Shaftesbury House, Ashburnham House, the W. front of old St. Paul's, and Covent Garden were admired examples of his skill. His designs for the palace of Whitehall, the banqueting-house of which only was built, are regarded as his masterpieces. He was also an author, as well as a builder and designer, an excellent math., and a good classical scholar.

Jones (JACOB), b. near Smyrna, Del., in 1770; entered the U. S. N. as midpn. in 1799; was captured in frigate Philadelphia in 1803 near Tripoli, where he was held a prisoner 20 months; commanded the U. S. sloop of war Wasp in 1812, in its capture of the Brit. sloop Frolic, and was himself captured the same day with both those vessels by the Brit. ship Poictiers. He was voted a gold medal by Cong.; was promoted to post-capt. in the squadron under Decatur. After the war he commanded squadrons in the Mediterranean and Pacific. D. Aug. 3, 1850.

Jones (JAMES), M. D., b. in Georgetown, D. C., 1806; received M. D. from the Univ. of Pa., and became resident phys. in the Phila. almshouse. Was ed. of the *N. O. Med.*

and Surg. Journal in 1857, prof. of obstetrics and diseases of women and children, and then prof. of practical med. and dean of the faculty in the Univ. of La. 1857-66. D. 1873.

Jones (JAMES CHAMBERLAIN), b. in Davidson co., Tenn., Apr. 20, 1809; was elected gov. of the State over James K. Polk in 1841 and 1843, and was one of the U. S. Senators from Tenn. from 1851 to 1857. D. Oct. 29, 1859.

Jones (J. GLANCY), b. in the valley of the Conestoga, Pa., Oct. 7, 1811; was ed. for the ministry, but became a lawyer; was 3 times sent to Cong. between 1850 and 1858; was the founder of the court of claims, and for a time chairman of the committee of ways and means; U. S. minister to Aus. 1858. D. Mar. 24, 1878.

Jones (JOEL), LL.D., b. at Coventry, Conn., Oct. 25, 1795, grad. at Yale in 1817; was a lawyer of Easton, Pa. In 1835 he became judge, and afterward presiding judge, of the Phila. dist. court. He was (1847-49) the first pres. of Girard Coll., and in 1849 mayor of Phila. Wrote reports of the revision of civil code of Pa., *Pa. Land Law*, *Jesus and the Coming Glory*, and for the religious press. D. Feb. 3, 1860.

Jones (JOHN), M. D., b. at Jamaica, L. I., in 1729; studied med.; was surgeon to Sir William Johnson's expedition against Crown Pt. in 1775; prof. of surgery at the med. school of the Coll. of New York 1767; retired from New York during the Brit. occupation; was elected to the State senate; served in the med. dept. of the army in 1780; was chosen phys. to the Pa. Hospital, and in 1787 v.-p. of the Coll. of Phys. He was the family phys. of Franklin and Washington, and stood at the head of his profession in Amer. A vol. of his med. writings was pub., with a memoir, by Dr. Mease. D. June 23, 1791.

Jones (JOHN PAUL), whose true patronymic was JOHN PAUL, b. at Arbigland, Scot., July 6, 1747. At 12 he was apprenticed to a shipmaster engaged in the Amer. trade. His first voyage took him to Va., where his brother William had settled and prospered. He was for a time mate of a slaver. Taking passage from Jamaica for Kirkcudbright in 1768, the death of both master and mate occurred on the passage, and he was forced to assume command of the vessel, subsequently becoming her master, making several voyages to the W. I. In 1773 he came to Va. to arrange the affairs of his brother, who had d. Here he added the name of Jones to his own. Upon the outbreak of the Revolution he offered his services to Cong., and was, on Dec. 22, 1775, appointed senior lieutenant in the navy, and assigned to the flagship Alfred. J. with his own hands hoisted the Amer. flag, the occasion being the first on which it was ever displayed. Placed in command of the sloop Providence, during a cruise of little more than 6 weeks he captured 16 prizes. Appointed to command the Alfred, he led an expedition, which sailed Nov. 2, 1776, to break up the Cape Breton fishery and capture the coal fleet, in which he was partially successful. In June 1777 Cong. appointed him to the command of the Ranger (18), in which he sailed from Portsmouth, arriving at Nantes Dec. 2, 1777. In Apr. 1778 he sailed from Brest, and made a daring descent upon the town and shipping of Whitehaven. He then conceived the idea of capturing the earl of Selkirk, hoping to make him the instrument of obliging Eng. to agree to a system of exchanges. The absence of the earl from his estate caused the scheme to fail. During this cruise he fell in with the Drake, a vessel superior in crew and armament, which he captured. The Ranger subsequently returned to Amer., J. being retained in Fr. at the request of the Fr. minister of the marine. He was without a command until Feb. 1779, when the Fr. minister appointed him to the command of an old merchantman converted into a war-vessel, which J. obtained permission to name Bon Homme Richard in honor of Franklin. The Richard when completed mounted 42 guns, and on the 14th of Aug. 1779 J. departed from Lorient in command of a squadron of 7 vessels. In a month they had captured or destroyed 26 vessels. On Sept. 23 the squadron, consisting of the Richard, the Alliance, the Pallas, and the Vengeance, sighted a fleet of 41 sail, which proved to be the Baltic fleet under convoy of the Serapis (50) and the Countess of Scarborough (20). About 7½ P. M. the Richard came up with the Serapis. At the commencement of the action 2 of the Richard's guns burst, disabling their crews. The Countess of Scarborough surrendered to the Pallas after a short action, and the Alliance now approached the scene of conflict between the Richard and Serapis, but, instead of supporting the Richard, her commander, an envious Frenchman, opened a raking fire on the Richard. Notwithstanding that the Richard was in a sinking condition, J. maintained the conflict until shortly after 10 o'clock, when the Serapis struck. The Richard, being on fire in 2 places and in a hopeless condition, was abandoned, and about 10 A. M. of the 25th she went down. J. was received throughout Fr. with the greatest honors, the king bestowing upon him the cross of the order of Military Merit, which Cong. permitted him to accept. He arrived at Phila. Feb. 18, 1781. Cong. gave him a vote of thanks and the command of the new frigate America (74); but as this vessel was subsequently presented to Fr., J. never saw active service at sea again. He was subsequently (1783) sent to Paris as agent to recover the moneys due for prizes taken under his command. In 1787 he came to Amer., and Cong. voted him a gold medal. He soon after returned to Europe, and in 1788 was appointed rear-admiral in the service of Rus., and rendered important service against the Turks. He became the object of personal enmity among favorites at court, and was allowed to retire on a pension, which, however, was not paid. He d. in Paris July 18, 1792. [From orig. art. in *J.'s Univ. Cyc.*, by G. C. SIMMONS.]

Jones (JOHN TAYLOR), D. D., b. at New Ipswich, N. H., July 16, 1802, grad. at Amherst in 1825; studied theol. at Andover and Newton; became a Bapt. in 1828; went in 1830 as a missionary to Burmah; was transferred in 1833 to Siam. He prepared a Siamese N. T. D. Sept. 13, 1851.

Jones (JOHN W.), b. in Montgomery co., Md., in 1806; studied med., took his degree at Jefferson Coll., Phila., and

moved to Ga., where, after serving in the State legislature, he became M. C. 1847-49, and subsequently one of the profs. in the med. coll. of Atlanta. D. in 1852.

Jones (JOHN W.), b. in Chesterfield, Va., grad. at William and Mary Coll. in 1803; represented Va. in Cong. 1835-45, and was speaker during his last term. D. Jan. 29, 1848.

Jones (JOSEPH), M. D., b. in Liberty co., Ga., Sept. 6, 1833, grad. at Princeton and at the med. dept. of the Univ. of Pa.; was prof. of chem. in the Med. Coll., Savannah, 1858-59; prof. of natural sciences Univ. of Ga. 1858-59; prof. in the Med. Coll., Augusta, 1859-60; chemist to cotton-planters' convention, Ga., 1860; surgeon in army Confed. States 1862-65; prof. of chem. and clinical med., Nashville Univ., 1868-69; prof. of chem. and clinical med. Univ. of La., and visiting phys. to its charity hospital.

Jones (NOBLE WIMBERLY), M. D., b. near Lond., Eng., 1724; emigrated to Ga.; a member of the colonial legislature in 1761; was a leading revolutionist in 1774, and was a member of the 2d Cong. of the colonies 1775; afterward became connected with the army, and was made prisoner at the capture of Charleston in 1780. After being exchanged he was again returned to Cong. He practised med. during the intervals of public life; pres. of State convention of Ga. by which the const. was amended in 1795. D. Jan. 9, 1805.

Jones (OWEN), b. in Wales 1809; best known by his studies of the Alhambra in Granada, to which he devoted much time and labor. He decorated the interior of the Exhibition building in Hyde Park (1851) and of the Crystal Palace at Sydenham. In 1852 he was made director of decorations for the Crystal Palace Co. St. James's Hall, Piccadilly, was erected by him. Wrote *Plans, Elevations, and Sections of the Alhambra, An Attempt to define the Principles which should Regulate the Employment of Colors in Decorative Arts, The Gram. of Ornament*, etc. D. Apr. 19, 1874.

Jones (GEN. ROGER), b. in Westmoreland co., Va., 1789; appointed second lieut. in the marine corps in 1809; transferred to the art. in 1812, with rank of capt.; assistant adjutant-gen., with rank of major, 1813; served during the war with Gr. Brit., winning brevet of major at Chippewa and of lieut.-col. at Ft. Erie; adjutant-gen., with rank of col. 1818, and retained in the art. in 1821. In 1825 was appointed adjutant-gen. of the army. In 1832 he was brevetted brig.-gen., and in 1849 maj.-gen. D. July 15, 1852.

Jones (SAMUEL), LL.D., b. in 1769, a son of Chief-Justice Samuel Jones; grad. at Yale in 1790; studied law in his father's office; was a member of the N. Y. assembly 1812-14, recorder of New York 1823, chancellor of the State 1826, chief-justice of the superior court in New York 1828, and judge of the supreme court of the State 1847-49. D. Aug. 8, 1853.

Jones (GEN. SAMUEL), b. in Va. in 1820, grad. at W. Pt. 1841; first lieut. 1847, and capt. 1853; 1841-45 was on frontier duty and in garrison; 1845-51 at W. Pt. as prof. and instructor; again on garrison and frontier duty 1851-58, when he was assigned to duty in Wash. as assistant to the judge-advocate; resigned Apr. 27, 1861, and entered the Confed. service as col., rising to the grade of maj.-gen. 1862, and in 1864 commanded the dept. of S. C., Ga., and Fla.

Jones (SEABORN), b. in Augusta, Ga., 1788, ed. in Princeton Coll.; studied law, and was admitted to the bar by special act of the legislature before he was 21 yrs. of age; was solicitor-gen. of his judicial circuit in 1823; was M. C. 1833-35 and 1845-47. D. in 1874.

Jones (SIR WILLIAM), M. A., F. R. S., b. in Lond. Sept. 28, 1746, ed. at Hartow and Ox.; was tutor to Lord Althorp 1765-70; pub. a Fr. translation of the (Per.) *Life of Nadir Shah, a Per. Gram.*; was made F. R. S. 1772; in 1774 was called to the bar and pub. *Commentaries on Asiatic Poetry*; became com. of bankrupts 1776; translated in 1780 the *Modlakat*, from the Arabic; became in 1789 a knight and judge of the supreme court of judicature of Bengal; founded the Asiatic Society of Bengal at Calcutta; wrote largely for the *Asiatic Researches*, etc. D. Apr. 27, 1794.

Jones (WILLIAM), F. R. S., generally called of NAYLAND, b. at Lowick, Eng., July 30, 1726; was ed. at the Charterhouse and at Ox., where he became a convert to the Hutchinsonian philos.; was ordained in 1749; became successively curate of Finedon, vicar of Bethesda, rector of Pluckley, of Paston, and of Hollingbourn, and perpetual curate of Nayland in Suffolk. Wrote *The Catholic Doctrine of the Trinity, Physiological Disquisitions, Art of Music*, etc., and founded the *Brit. Critic* (1793). D. Feb. 6, 1800.

Jonesborough, Ark. See APPENDIX.

Jonesborough, Tenn. See APPENDIX.

Jonesville, R. R. junc., Hillsdale co., Mich. It is 4½ m. N. W. of Hillsdale, the co.-seat. Pop. 1880, 1445.

Jonquill [Fr. *jonquille*, a dim. of Lat. *juncus*, a "rush"], a name given to *Narcissus jonquilla* and *odoros* (order Amarillidaceæ), garden plants blooming in spring. They are natives of the S. of Europe. The flowers of the fragrant sorts are employed in perfumery.

Jon'son (BENJAMIN), generally known as BEN JONSON, b. at Westminster, probably June 11, 1574. He enlisted in the army, and made a campaign in the Low Countries. On his return he entered St. John's Coll., Cambridge, and studied classical langs. and lit. In his 20th yr. he went upon the stage, and tried to become an actor. In 1596 appeared his *Comedy of Humors*, and in 1598 it was recast and brought out with great success in the Globe Theatre under the title *Every Man in his Humor*. Then followed in 1599 *Every Man Out of his Humor*; in 1600, *Cynthia's Revels*; in 1602, the *Poetaster*, which involved him in a very sharp controversy with Decker; in 1603, *Sejanus*, a tragedy; 1604, *Eastward Hoe*, written in connection with Chapman and Marston, for which he was imprisoned and threatened with having his nose and ears cut off; in 1605, *Volpone*; in 1609, *Epicene*, or the *Silent Woman*; in 1610, *The Alchemist*; in 1611, *Catiline*, a tragedy; in 1616, *The Devil is an Ass*; in 1629, *New Inn*, or the *Light Heart*. D. Aug. 6, 1637, and was buried in Westminster Abbey. CLEMENS PETERSEN.

Jonsson (FINN), b. at Hitardal, Iceland, Jan. 16, 1704, studied at the Univ. of Copenhagen; was appointed in 1754 bp. of Skalholt, where he d. July 23, 1789. Wrote *Historia Ecclesiastica Islandica*.

Joodpoor, Joudpour, or Marwar, a tributary state of India, in the N. W. Provs. The larger portion is chiefly waste, being an extension of the desert of Sindh; the smaller portion is fertile. It is under a native prince called *maharajah*, who pays tribute to Brit. govt., which is virtually ruler through the agent residing at court. Area, 35,672 sq. m. Pop. about 1,800,000. The cap., also called Joodpoor, has a pop. variously stated at from 80,000 to 150,000.

Joplin, city and R. R. centre, Jasper co., Mo., has smelting furnaces, which produce much lead and zinc. Pop. 1880, 7098.

Joppa. See JAFFA.

Jordaens, yor'dahns (JACOB), b. at Antwerp May 19, 1594, was a pupil of Adam van Oort. He liked to fill a large canvas with mythological and bacchanalian scenes, but his pictures are less powerful in conception, less vigorous in design, less brilliant in coloring than those of Rubens. D. Oct. 16, 1678.

Jordan [Heb. *Yarden*; Gr. *Ἰορδάνης*], the prin. river of Pal., has 3 prin. sources: the *Leddun*, rising from a great fountain at the base of the hill *Tell-el-Kady*; the *Banias*, rising at Banias, 4 m. E. of Tell-el-Kady; the *Hasbany*, rising at Hasbeia, 12 m. N. of Tell-el-Kady, from a pool at the foot of a basalt cliff. The latter is the smallest of the streams, but is the longest and rises from the highest perennial source, 1700 ft. above the sea. The 2 higher torrents unite with the Leddan 4 or 5 m. below its source, forming the J. proper, which, 6 m. below, falls into Lake Huleh, from which the J. descends over a rocky bed, falling nearly 800 ft. within 11 m., and enters the Sea of Galilee. The former lake is 120 ft. above the sea, the latter 650 ft. below. In its remaining course from the Sea of Galilee to the Dead Sea the J. falls nearly 700 ft. more. The whole lower stream, or J. proper, is many hundred ft. below the sea-level. The valley, now called *El-Ghor*, is about 6 m. wide at the N. end, expanding to 12 m. at the S., is shut in between steep mts. from 3000 to 5000 ft. high. Small portions in the N. are alone cultivated, the rest is desert. The S. section, known as the Plain of Jericho, is covered with a white nitrous crust. In the midst of this plain the J. has cut a ravine varying from 200 yards to ½ m. in breadth and from 40 to 150 ft. in depth. Five m. below the Sea of Galilee it receives its largest tributary, the *Sheriat-el-Mandhur*. There are only 2 bridges over the J. now in existence, but there are several fords. At its mouth the J. is 540 ft. wide and 1316 ft. below the level of the sea. The valley of the lower J. abounds in slime-pits, and thermal springs are frequent, with many other indications of former volcanic or igneous action. (See ROBINSON, *Biblical Researches*; STANLEY, *Sinai and Palestine*; MCGREGOR, *the Rob Roy on the Jordan*, and the *Bulletins of the Pal. Exploration Society*.) PORTER C. BLISS.

Jordan, Onondaga co., N. Y., on R. R. and the Erie Canal, 17 m. W. of Syracuse; has fine water-power. Pop. 1870, 1263; 1880, 1344.

Jordan (CAMILLE), b. at Lyons Jan. 11, 1771; took part in Fr. politics during the Revolution and the Restoration; was a decided enemy of the republican govt. and one of the promoters of the insurrection of Lyons. After the fall of that city (1793) he fled to Switz., whence he went to Lond. Having returned to Lyons in 1796, he was elected a member of the Council of Five Hundred, but had to flee a second time after the revolution of Sept. 4, 1797. He went to Ger. In 1800 he was recalled and opposed the First Consul. After restoration of the Bourbons he at first sided with the govt., but when in 1820 attempt was made to suspend the liberty of the person, to suppress the freedom of the press, and to change the elective system, J. became the leader of the opposition. D. May 19, 1821.

Jordan (DAVID STARR). See APPENDIX.

Jordan (THOMAS), b. in Va. Sept. 30, 1819, grad. at W. Pt. 1840; in the war with the Seminoles (1842) captured their leading chief, Tiger Tail; in the war with Mex. engaged at Palo Alto and Resaca de la Palma; capt. and quartermaster Mar. 3, 1847, serving as such on the Pacific coast 1852-60. Resigned May 1861 and entered the Confed. service as lieut.-col.; assigned as adjutant-gen. of forces assembling at Manassas Junction. As chief of staff accompanied Beauregard to Tenn. and was appointed brig.-gen.; became ed. of the *Memphis Appeal* 1866. Invited to organize the military resources of the Cuban revolution, was made second in command, then chief Dec. 1869; resigned Feb. 1870. Became ed. of N. Y. *Mining Record*.

Jornan'des, or Jordanes, the historiographer of the Goths, was a Goth by birth, and lived in the middle of the 6th century; converted to Christianity, he became a monk and bp. of Crotona. He wrote *De regnorum ac temporum successione* and *De tractatu sive Gothorum origine et rebus gestis*. The latter is invaluable.

Jor'tin (JOHN), D. D., b. in Lond. Oct. 23, 1698; studied at the Charter-house and at Jesus Coll., Cambridge, of which he became a fellow after graduating in 1719. While at coll. he made extracts from Eustathius for the use of Pope in his translation of Homer, and became noted for his facility in Lat. verse (*Lusus Poeticus*). Taking orders in the Ch. of Eng., he was presented to the living of Swavesey near Cambridge (1726); removed to Lond., became a pulpit-orator, rector of Eastwell (Kent), of St. Dunstan-in-the-East, domestic chaplain to the bp. of Lond., prebend of St. Paul's, rector of Kensington, and archdeacon of Lond. (1764). Wrote *Truth of the Chr. Religion, Life of Erasmus, Sermons*, etc. D. Sept. 5, 1770.

Joruli'o, a volcano of Mex. From a plain having an elevation of 2800 ft. it was suddenly lifted to a height of 4265 ft. on Sept. 28, 1759. Several of its cones soon subsided. It is now nearly extinct, and is almost covered with forests.

Joseph [Heb. *Yoseph*, "increaser"], the elder son of

Jacob and Rachel, b. at Haran, in Syria, about n. c. 1913; was the favorite son of his father, and envied by his brethren on that account. They sold him as a slave to Midianite traders, by whom he was carried into Egypt and sold to Potiphar, an officer of the king. He acquired the confidence of his master, but having repelled dishonorable proposals made to him by his mistress, she caused him to be thrown into prison, whence he was summoned by king Pharaoh, to interpret 2 dreams which portended 7 yrs. of prosperity followed by 7 of famine. The king adopted all his suggestions, and appointed him ruler over the whole land. The measures taken by J. secured an abundant provision for the time of famine. This calamity led to the brethren of J. being sent into Egypt to buy corn. He recognized his brethren, and the whole family was brought into Egypt. J. had 2 sons, Manasseh and Ephraim, who became the progenitors of the tribes bearing those names. He preserved his authority until his death, which occurred b. c. 1802, at the age of 110.

Joseph, the husband of Mary and reputed father of Jesus, was a resident of Nazareth in Galilee, though a descendant of David, and connected with Bethlehem in Judah. Except that he was a carpenter, little can be ascertained of his character or personal hist.

Joseph, king of Naples and Sp. See BONAPARTE (Jos.).
Joseph (FATHER), b. in Paris Nov. 4, 1757, his original name being FRANÇOIS LECLERC DU TREMBLAY. He belonged to a distinguished family, travelled much in his youth, and served in the army under an assumed name, after which he took holy orders and attained a high position as a Capuchin friar. Attracting the attention of Cardinal Richelieu, that statesman made Father J. his sec. and confidential adviser. In this capacity he despatched missionaries to Canada and the E., advocated a crusade against the Turks, left memoirs, which are still in MS. in the National Library of Paris. A cardinal's hat was obtained for him by Richelieu, but before it was actually conferred he d. at Vienna Dec. 18, 1838.

Joseph I., Ger. emp., b. at Vienna July 26, 1767, was crowned king of Hungary 1687; king of the Romans 1690; succeeded to his father, Leopold I. 1705. The great events of his reign were the putting of the electors of Cologne and Bavaria under the ban (1706) and the seizure of their states; the conquest of Naples under Daun, the revival (1707-08) of the imperial claims to the fiefs of It., the victories of Marlborough and Eugene in the war of the Sp. succession. D. Apr. 17, 1711.

Joseph II., of Ger., b. Mar. 13, 1741, son of Francis I. and Maria Theresa; became a professed philan.; succeeded his father in 1765; took part in the first partition of Poland 1772; succeeded his mother in Hungary and Bohemia 1780; attempted the reformation of all his kingdom by edicts abolishing serfdom, declaring for religious liberty, the reform of jurisprudence, the abolition of monasteries, etc.; but as the means employed were violent, and the changes but ill adapted to the feelings of the people, nearly all classes joined in the opposition, and the emp. was compelled to yield (1790). D. Feb. 20, 1790.

Josephine, Jo-ze-fee'n', empress, first wife of Nap. I., originally named MARIE JOSEPH ROSE DE TASCHER DE LA PAGERIE, b. at Trois Islets, in Martinique, W. I., June 24, 1763; was married in 1779 in Fr. to the Vicomte de Beauharnais, in consequence of an early betrothal by her father. She became the mother of Eugene Beauharnais and of Hortense, the mother of Nap. III. The vicomte was executed by the Jacobins in 1794, and J.'s life was saved by Madame Tallien, who rescued her from prison in 1794. In 1796 she married Gen. Napoleon Bonaparte. The match was a union of happiness to both. In 1804 she was crowned empress, and her wisdom and talents strengthened Nap.'s position in Fr. But the fact that the union was childless was fatal to Nap.'s ambition, and in 1809 she was divorced. D. May 29, 1814.

Josephus (FLAVIUS), b. at Jerusalem in 37 or 38 A. D., of a wealthy family; after passing through the schools of 3 different Jewish sects, and spending 3 yrs. in the desert with the hermit Ananus, he adopted the views of the Pharisees, and attained a prominent position in Jewish society. In 63 A. D. he was sent to Rome on a diplomatic errand, and was introduced to the empress Poppæa by a Jewish actor belonging to the troupe of Nero. He accomplished his mission with success. During the Jewish revolution he commanded in Galilee, and escaped the massacre after the capture of Jotapata. He fell into the hands of the Romans, but saved himself by predicting the future elevation of Vespasian to the imperial throne. He was present in the Rom. army at the destruction of Jerusalem, and accompanied Titus to Rome, where he resided for the rest of his life. As long as the Flavian family occupied the throne he lived in splendor. D. after 100 A. D. Wrote Περὶ τοῦ Ἰουδαϊκοῦ πολέμου, a hist. of the Jewish war from 170 B. C. to the destruction of Jerusalem; Ἰουδαϊκὴ Ἀρχαιολογία, a hist. of the Jews from the Creation to 66 A. D.; Βίος, an autobiography, and a work against Apion.

Joshua [Heb. Yehoshua, "Jehovah his helper"], originally called Hoshua, the successor of Moses and the conqueror of Pal. He was of the tribe of Ephraim, b. in Egypt. In the account of Moses' ascent of Sinai for the tables of the law, J. appears as his "servant" or "minister." He was one of the 12 spies sent to explore the land of Canaan, and one of the two who reported favorably upon the country. Moses was divinely directed shortly before his death to confer upon him the chief authority over the people. In his 85th yr. he led the chosen people dry-shod through Jordan. In 6 yrs. he overran Canaan and divided "the land among the tribes. After judging the people 22 yrs. he convoked an assembly of the elders, and caused them to renew their covenant with Jehovah. D. 1593 n. c., at the age of 110.

Joshua, Book of, the 6th canonical book of the O. T. It may be divided into 2 parts, called respectively the historical and the geographical—the first containing the record of the conquest, the second the division of the land among the tribes. Early commentators usually assigned the book

to J. himself, except the last chapter, which records his death. By modern orthodox critics it is generally assigned to an unknown writer of a period immediately subsequent to the death of J.

Josiah [Heb. Yoshiyah, "healed by Jehovah"], the 16th king of Judah after its separation from the kingdom of Israel, the son and successor of Amon. He began to reign at the age of 8 yrs., about b. c. 640, and "did that which was right in the sight of the Lord." At 20 yrs. of age he began to take vigorous measures against idolatry. Six yrs. later he undertook the repair and renovation of the temple, which had been so long neglected that the holy books had fallen into oblivion. The high priest Hilkiah found in the sanctuary the "Book of the Law," and the people were convoked to hear it read in the temple, after which the anc. covenant vows were renewed, and a Passover celebrated with such pomp as had not been seen for centuries. In the 31st yr. of J., Pharaoh-necho, king of Egypt, landed an army in N. Pal. to make war against the Assyrian empire. J. attacked him at Megiddo, was defeated with great slaughter, and was himself mortally wounded. D. about b. c. 609.

Jos'selyn (JOHN), a native of Kent, Eng., visited N. Eng. in 1638, and again in 1663, remaining there 5 yrs. Returning to Eng. in 1671, he pub. 3 works on Amer.: *N. Eng.'s Rarities Discovered*, *An Account of Two Voyages to N. Eng.*, and a *Chronological Table of the most Remarkable Passages from the First Discovery of the Continent of Amer. to 1673*.

Jo'tuns, or Jettens, form the evil principle in Scandinavian mythology. They were giants, and immensely strong, yet they could be conquered even by men, for they were only half intelligent. Their intelligence arose from their native malignity, and assumed generally the form of witchcraft. From Jotunheim or Nifheim, the home of darkness and dulness, they waged perpetual war against the Æsir, the bright gods of Valhalla; and although they always were defeated, great calamities to the human race ensued from this warfare. Odin slew Ymer, the first Jotun, and built the world from his body. At the end of time Ymer's offspring will take revenge, slay all the Æsir, burn Valhalla, and destroy the earth, after which the All-father will restore the universe and establish a higher and nobler rule.

Joubert, zhoo-bair' (BARTHÉLEMY CATHERINE), b. at Pont-de-Vaux, dept. of Ain, in 1769; signalized himself by his republican convictions, and was considered as the only man able to counteract Bonaparte's ambition, and to become the chief of a definitely established republic of Fr. But he was killed at the age of 30, at the battle of Novi, where his army was defeated by Suwarow. J. had enlisted in 1791 as a volunteer, and was promoted on the battle-field, in 1795, to the rank of gen. of brigade.

Jougs, Joggs, or Jugs, an instrument of punishment in which an iron collar was placed around the culprit's neck and fastened by a padlock. A chain ran from the collar to a tree, wall, or building—often the parish ch.

Joule, jool (JAMES PRESCOTT), D. C. L., LL.D., b. at Salford, Eng., Dec. 24, 1818, the son of a brewer, and was associated with his father in business until 1854. He became fond of scientific research, and at the age of 19 had manufactured an electro-magnetic engine. In 1841 he gave in a lecture at Manchester the results of experiments made by himself and Jacobi of St. Petersburg into the magnetic forces as a motive-power. These experiments led in 1843 to ascertaining the exact proportion between the mechanical powers of steam and electro-magnetism, and the equivalency of heat with mechanical force. With Prof. Thomson he commenced in 1852 a series of researches upon the thermal effects of fluids in motion, which were continued for many yrs. With Dr. Playfair he carefully investigated the vols. of space occupied by the same bodies in a solid and in a liquid state, the results leading to important modifications of the theories of molecular physics.

Jourdan, zhoo-don' (JEAN BAPTISTE), b. at Limoges, Fr., Apr. 29, 1762. In 1778 he entered a regiment of inf., and fought in Amer. under D'Estaing. Having returned in 1784, he opened a milliner's store, but at the outbreak of the Revolution became capt. of the national guard of Limoges. He was made a gen. of division in 1793, and commander-in-chief of the army of the N., defeating the Aus. at Wattignies and Fleurus, and driving them across the Rhine. Sept. 6, 1795, he crossed the Rhine, but on Oct. 11 he was defeated at Höchst. In June 1796 he again crossed the Rhine, but having been defeated at Würzburg, Sept. 3, he resigned his command. Nap. never gave him an active independent command, but appointed him gov. of Piedmont in 1800, and made him a marshal in 1804. Louis XVIII. made him a count in 1815 and peer of Fr. in 1819. Wrote *Opérations de l'Armée du Danube et Mémoires pour servir à l'Histoire de la Campagne de 1796*. D. Nov. 23, 1833.

Jourdan (MATHIEU JOUVE), called COUPE-TÊTE ("head-cutter"), b. near Puy, Fr., in 1749, and was guillotined May 27, 1794, by the order of the Committee of Public Safety and the Revolutionary Tribunal as throwing discredit on the Revolution by his excesses. He is historically known as the organizer and leader of the massacre perpetrated in 1793, called the "Massacre of La Glacière," at Avignon.

Jovianus (FLAVIUS CLAUDIUS), a Rom. emp., was capt. of the life-guards of the emp. Julian in the Per. campaign, in which the latter was killed (June 26, A. D. 363), and was proclaimed as his successor; declared himself a Chr.; surrendered to the Per. king Sapor all the provs. beyond the Tigris; promulgated edicts re-establishing Christianity as the dominant religion, but protecting the pagans; admitted his infant son Varronianus as a colleague in the imperial rank; was found dead in his bed at Dadastana, a small v. in Galatia, Feb. 17, 364.

Jowett (BENJAMIN), D. D., b. at Camberwell, Eng., in 1817; was ed. at Ox., where he became a fellow in 1838, tutor in 1842, and regius prof. of Gr. in 1855. He was ordained in 1842. Became in 1849, and again in 1853, examiner of classical schools, and in 1854 a member of the commission

on examinations for the Indian civil service. He pub. a commentary on Paul's Epistles to the Thessalonians, Galatians, and Romans, and contributed to the *Essays and Reviews* an article on *The Interpretation of Script.* Put forth *The Dialogues of Plato translated into Eng. with Analyses and Introductions*, and a translation of Thucydides with notes. Became master of Balliol Coll. in 1870.

Joy (CHARLES A.), Ph. D., b. at Ludlowville, N. Y., Oct. 8, 1823, grad. at Union Coll. 1844; received the degree of LL.B. at Harvard Law School 1847; appointed in 1847 on the first govt. survey of the copper-region of Lake Superior; attended the Univ. of Berlin 1849; received the degree of Ph. D. at Göttingen 1852; attended lectures at the Sorbonne, Paris, 1853; appointed same yr. prof. of chem. in Union Coll., and in 1857 to the same chair in Columbia Coll., New York. His prin. contributions to chem. have been analyses of minerals and meteoric iron, researches into the compounds of glucinum, and papers on the combination of alcohol radicals with selenium. He has contributed largely to scientific journals and newspapers. Has been pres. of the Lyceum of Nat. Hist. of New York, pres. of the Amer. Photographic Society, and chairman of the Polytechnic Association of the Amer. Institute.

Juan' Fernan'dez, or **Mas-a-Tierra**, an island in the Pacific, 400 m. off the coast of Chili, to which it belongs. It is 18 m. long, 6 m. broad, mountainous, but fertile. It is inhabited by a few settlers. The story of Alexander Selkirk, a Scotch sailor, who was at his own desire put ashore on this island, and lived there 4 yrs. in solitude, is supposed to have suggested De Foe's *Robinson Crusoe*.

Juan' y Santac'ila (Jorge), b. at Nobelda, Sp., Jan. 5, 1713; studied at Malta and at the marine coll. of Cadiz; in 1733 commanded a small exploring vessel sent to the coast of Amer., and in 1734 was associated with Ulloa in the command of a scientific corps sent to S. Amer. to measure a degree of the meridian at the equator. J. and Ulloa remained in Peru several yrs., and accumulated a vast store of observations in geog. and physics, which they pub. in 1748 in 5 folio vols. J. wrote other works on nautical science, and was an efficient officer of the S. navy, in which he attained the rank of vice-admiral. D. June 21, 1773.

Juarez, joo-ah'rez (BENITO PABLO), b. of pure Indian parentage at Ixtlan, near Oaxaca, Mex., Mar. 21, 1806. He spoke only the Zapotecan lang. until his 13th yr., when a Franciscan lay brother taught him to read and write. He entered the Inst. of Oaxaca in 1827, became prof. of physics, and was licensed to practice law in 1834. Having espoused liberalism, he had previously (1831) been elected a member of the city council. Charged with revolutionary affiliations, he was imprisoned in 1836, but in 1842 was appointed a judge of the civil court of Oaxaca; in 1845 became sec. to the gov.; subsequently was made atty.-gen. of the superior court. In Aug. 1846 the legislature of Oaxaca delegated the executive powers to a triumvirate, of which J. was one. Soon after he was elected a deputy to the federal cong. called to provide means for the war with the U. S. He supported the measure to raise \$14,000,000 by sale or loan upon the Ch. property. Oaxaca again in revolt, J. became gov. for several yrs. Santa Anna rose again to power, and J. was banished. Alvarez was proclaimed Pres. Oct. 1855, and J. was appointed minister of justice. His measures did not suit Comonfort, to whom Alvarez soon yielded his office, and J. returned to Oaxaca as gov. In 1857 he was elected chief-justice of the federal supreme court, and was appointed minister of the interior. He was soon called to head the movement against the military party, and as acting Vice-Pres. was proclaimed Pres. Jan. 1858. A c. war ensued, lasting till Jan. 1861, when J. got the better of his opponents and was elected Pres. in Mar. In Dec. 1861 began the Fr. attempt to place Maximilian on the throne of Mex., which was brought to a close by the execution of the so-called emp. June 19, 1867. A gen. election was held in Aug., and J. was declared by Cong. to have been re-elected Pres. He set about the establishment of the govt., but was encountered by violent opposition from chieftains of his own party, who excited insurrections, and during this whole term of office (1867-71) he was able to retain power merely because of the lack of concert among his opponents. At the gen. election of 1871 he had a plurality, not an absolute majority, of votes, but was elected by Cong. The result was the revolution headed by Diaz and Trevino. The tide was turned in favor of J. by the victory of Gen. Rocha at Zacatecas (Mar. 2), but the N. states were still unsubdued when he d. July 18, 1872. [From orig. art. in *J.'s Univ. Cyc.*, by GEN. THOMAS JORDAN.]

Juar'ros (DOMINGO), b. in Guatemala about the middle of the 18th century, is the author of a historical work upon Central Amer.—*Compendio de la Historia de la Ciudad de Guatemala*, etc. He d. about 1830.

Ju'ba, king of Numidia, succeeded his father Hiempsal after 62 b. c. The tribune Curio having proposed to make Numidia a Rom. prov., Pompey opposed the plan, and thus secured the good-will of J. In 49 b. c. J. defeated and killed Curio, took part in the Afr. war against Cæsar (47), and after the battle of Thapsus took his own life (Feb. 4, 46 b. c.).—His son, JUBA, graced Cæsar's triumph at Rome, 46 b. c., and became the friend of Augustus, who gave him in marriage a daughter of Antony and Cleopatra, and restored him to his kingdom 30 b. c. In 25 he exchanged Numidia for Mauritania, and the former became a Rom. prov. Mauritania under his tranquil sway, supported by the Rom. arms, rose to great prosperity. He wrote grammatical works, hist. of Afr., Ar., and Rome, etc. D. about a. d. 18.

Ju'bilee (Heb. *yobel*, a "glad sound"; Lat. *jubilatio*, to "rejoice"), among the anc. Hebs., the 50th yr., during which all lands lay fallow, all Heb. slaves were set at liberty, and all lands reverted to the heirs of the original owners. In the R. Cath. Ch., Boniface VIII. (1300) established a J. to be held once a century; Clement VI. (1350) ordered it to be held once in 50 yrs.; Urban VI. (1389) once in 35 yrs.; Sixtus IV. (1475) fixed the interval at 25 yrs.

Jubilees, **Book of**, a pseudepigraphical book, originally written in Heb., probably about the birth of Christ. This book is regarded as canonical by the Abyssinian Ch. It pretends to be a revelation made to Moses, and is named from the fact that it treats of biblical hist. in *jubilees*, or periods of 50 yrs.

Judæ'a, or **Judea**, was first used in anc. geog. as the name of the kingdom of Judah, in contradistinction to that of Israel, but after the return from the Captivity, and up to the times of the Romans, it denoted the whole of Pal. The Romans used it partly in a gen. sense, signifying land of the Jews; partly in a restricted sense, for the S. prov. of Pal.

Ju'dah (Heb. *Yehudah*, "celebrated"), the 4th son of Jacob by Leah, b. at Haran in Syria, about a. c. 1916; was the progenitor of the tribe of the same name, which in time gave its name to the kingdom of Judæa, and ultimately to the whole race of the descendants of Abraham (Jews). J. appears to have exercised a kind of leadership among his brothers. He left 3 sons, from the second of whom (Pharez), David, and ultimately Christ, were descended. Of the life of J. in Egypt nothing is known except that he was still living at the time of his father's death.

Judah ben Samuel, called **HA-LEVI**, or "The Levite," and known among Arabic writers as **ABUL HASSAN**, b. in Castile about 1080, was one of the most distinguished mediæval Heb. writers. He excelled as a phys., a theol., and a poet. His prin. work was in Arabic, *Ku'zari*, being discourses on religion between a king of the Khazars, a race of the Crimea, and a Jewish rabbi. He made a pilgrimage to Jerusalem, and, according to tradition, was assassinated by a Mohammedan in the Holy Land about 1140.

Ju'das Iscar'iot (Gr. *Ἰσκαριώτης*), one of the 12 apostles, and the betrayer of his Master, was a son of Simon. Iscariot probably means "man of Kerioth," a v. in Judæa. He was the treasurer of the apostles, participated with the others in the mission to preach the gospel and in receiving power to work miracles; was a witness of the whole career of Jesus up to the Last Passover, in which he took part, and betrayed Christ to the chief priests for 30 pieces of silver, shortly after which he hanged himself in remorse for his crime.

Judas Maccabæus. See **MACCABEES**.

Judas Tree, of Europe and Asia, is the *Cercis Siliquastrum*, a small leguminous tree, having rose-colored flowers and handsome wood used in joinery. There was anciently a dispute as to whether Judas Iscariot hanged himself on this or the elder tree. The J. T. or red-bud of the U. S. (*C. Canadensis*) is similar. Its abundant flowers, of a peach-blossom color, are very beautiful in spring.

Judd (G. P.), M. D., b. at Paris, N. Y., Apr. 23, 1803; studied med. and went in 1828 to Honolulu as phys. in the service of the Amer. foreign mission. In 1842 he dissolved his connection with the mission and became interpreter to the govt. of Kamehameha III. In 1843 he organized the first ministry which had ever been formed in the state, and held office as minister of finance till his death, July 12, 1873.

Judd (NORMAN B.), b. at Rome, N. Y., Jan. 10, 1815; was admitted to the bar in 1836, and engaged in the practice of law in Chicago; was a prominent politician of Ill., in which State he held important public offices. He was U. S. minister to Prus. 1861-65, M. C. 1867-71, and became a R. R. pres. D. Nov. 11, 1878.

Judd (ORANGE), b. near Niagara Falls, N. Y., July 26, 1822, grad. at the Wesleyan Univ., Middletown, Conn., in 1847; was for some yrs. engaged as a teacher and lecturer; studied chem. 1850-53 at Yale; became in 1853 ed. of the *Amer. Agriculturist*, of which he became sole proprietor in 1866; was agricultural ed. of the *New York Times* 1855-63; in 1869 the firm-name was changed to the "Orange Judd Co." He was a liberal benefactor of Wesleyan Univ., of which he compiled the first *Alumni Record*.

Judd (SYLVESTER), b. in Westhampton, Mass., July 23, 1813, grad. at Yale in 1836; was 1840-53 pastor of a Unit. ch. in Augusta, Me. He is best known by his romance *Margaret*, His *Philo*, a poem, *Richard Edney*, a romance, and a vol. of discourses on *The Church*, all illustrate the strong purposes of their author's life. D. Jan. 20, 1853.

Jude, or **Judas** (with the surname **THADDEUS** or **LEBBEUS**), one of the 12 apostles. Of his life nothing is known with certainty.

Jude, The Epistle General of St., was written against heretics and false teachers by Judas (Judah), called also Lebbeus and Thaddeus, one of the 12 apostles.

Judge (THOMAS J.), a native of Ala., entered public life in 1843 as a solicitor in a State circuit court, and afterward became a lawyer and politician; in 1861 was com. from Ala. to the U. S. govt., but was not received as such by Mr. Buchanan; served in the c. war as a private, then as col., and afterward as judge of a military court 1862-65; was judge of the State supreme court 1865-68. D. Mar. 4, 1876.

Judge's, The Book of the, a book of the O. T., the 7th in order of the canonical books. It derives its name from a class of chiefs who ruled in Israel. The 12 tribes after entering Canaan formed only a loose confederation, without any regular head. In emergencies men (or women) of talent and energy took the lead, their only authority being their ability. They were regarded as "raised up" or divinely sent. In some cases, as in that of Samson, the judge became a popular hero and the subject of song and poetry. Such records of this time as remained are collected in the book of Judges.

Ju'dith (Heb. *Yehudith*, feminine form of "Judah"), the heroine of one of the apocryphal books of the O. T. She is represented as inhabiting Bethulia, a town of Samaria, when it was besieged by an Assyrian army under Holofernes, and as having by stratagem cut off the head of that gen. and thus delivered her people from destruction.

Jud'son (ADONIRAM), D. D., b. at Malden, Mass., Aug. 9, 1788, grad. at Brown Univ., R. I., in 1807, and at Andover Theological Sem., Mass., in 1810. Feb. 6, 1812, he was or-

dained as a missionary to Burmah, under the auspices of the A. B. C. F. M. He married Ann Hasseltine, teacher in the acad. at Bradford, Mass., and with her sailed for Calcutta Feb. 19, 1812. On the voyage his views regarding the ordinance of baptism underwent a change, and reaching Calcutta he identified himself with the Bap. denomination. This led to the formation of the society now known as the American Baptist Missionary Union. Under the auspices of this society he became the founder in Burmah of one of the most successful missionary enterprises of modern times. Settling first at Rangoon, J. labored for nearly 40 yrs. in Burmah, 2 of which he spent in prison, manacled and daily expecting execution. He translated the Bible into Burmese, and at his death had nearly completed a dict. of that lang. Mrs. Judson d. Oct. 24, 1826, and in Apr. 1834 he married Mrs. Sarah H. Boardman, who d. Sept. 1, 1845. In June 1846 he married Miss Emily Chubbuck, who d. June 1, 1854. He d. at sea Apr. 12, 1850.

Ju'el (NIELS), b. May 8, 1629; entered early into the Dut. service. Having been placed at the head of the Dan. navy, he gave it a new and thorough organization, and by his brilliant victories over the Swe. fleets in 1677 at Kolberg-heide and Kjöge, and by his conquest of Gotland in 1676 and Rügen in 1678, made the Baltic a Dan. water. D. at Copenhagen Apr. 8, 1697.

Juggernaut. See JAGGERNAUT.

Jugurtha, king of Numidia, was an illegitimate grandson of Masinissa; was adopted by his uncle, King Micipsa, in 149 B. C. Sent with a Numidian force into the Rom. service (134), he gained fresh distinctions, and after the death of Micipsa murdered Hiempsal, the king's oldest son, and put Adherbal, a younger son, to flight. Adherbal appealed to the Rom. senate, but the bribes of J. secured (117) for him the larger and better part of the kingdom. In 112 he captured Cirta and murdered his rival. The consul Calpurnius Bestia was sent to attack J., who bribed the consul to grant a peace (111 B. C.). Summoned in the same yr. to Rome, he murdered Massiva, his enemy, and was expelled from It. War with Rome followed; in 110 J. defeated Aulus Postumius, and sent his army under the yoke; in 109 was beaten by Cælius Metellus; was again defeated by Marius in 107; was taken prisoner by Sulla 107; was carried to Rome to adorn the triumph of Marius (104), where he was starved to death in prison.

Ju'ube, the fruit of *Zizyphus vulgaris*, of the buckthorn family, a small tree of S. Europe and Afr. Its fruit was formerly used for making "jube paste." J. syrup and dried J. have useful pectoral qualities, and make a pleasant drink for the sick.

Jukes (JOSEPH BEETE), F. R. S., b. near Birmingham, Eng., Oct. 10, 1811, grad. at St. John's Coll., Cambridge, in 1836, and devoted himself to geology. In 1839 he was appointed geological surveyor of Newfoundland, and from 1842 to 1846 was engaged in the survey of the great barrier-reef along the E. coast of Australia. Having joined in 1846 the geological survey of G. Brit., he wrote for it important memoirs on several dists. In 1850 he became director of the geological survey of Ire., and was for many yrs. prof. of geol. to the Royal Dublin Society and the Royal Coll. of Science at Dublin. His investigations on coral reefs, the distribution of mollusca, and the formation of river-beds were important contributions to science. He wrote several elementary works on geol., and contributed largely to the journals of learned societies. D. July 29, 1869.

Ju'lian (GEORGE WASHINGTON), b. in Centerville, Ind., May 5, 1817; was several yrs. a teacher; admitted to the bar 1840, elected to the legislature in 1845, Rep. in Cong. 1849-51, and nominated for V.-P. by the Pittsburg convention of "Free Democrats." He was in 1856 prominent as a founder of the Rep. party, and was again M. C. from 1861 to 1869, being during the last 2 terms chairman of the committee on public lands.

Julian the Apostate (FLAVIUS CLAUDIUS JULIANUS), Rom. emp., b. at Constantinople Nov. 17, 331 A. D., was the son of Julius Constantius. In infancy he was imprisoned by Constantius II., but was well ed. and trained in the Chr. faith; was allowed in 355 to reside at Athens, and in the same yr. was proclaimed Cæsar, married to Helena, daughter of Constantine the Great, and was sent to govern Gaul. In 360 his troops saluted him emp., and Constantius beginning to interfere in the affairs of Gaul, J. marched toward Constantinople. Constantius d. in 361, and J. was hailed as emp., and soon after avowed himself a pagan. He tolerated all the sects, at the same time decidedly favoring paganism by his edicts and closing the Chr. schools. In Mar. 363 he set out upon his Per. expedition, and after defeating the enemy in many engagements was mortally wounded in battle. He left many writings in Greek. D. June 26, 363.

Ju'lideæ, family of myriapods of the division Chilognatha, including the millipeds or thousand-legs. They are slow in movement, and can roll themselves up in a coil.

Julius I., SAINT, bp. of Rome, was consecrated in 337, and took part with Athanasius in his struggle for the Alexandrian bishopric. D. Apr. 12, 352.—**JULIUS II.**, POPE, b. at Albizzola in 1441, became a cardinal in 1471, and succeeded to the pontificate in 1503. His career henceforth was chiefly military, his prin. aim being to drive the foreigners out of It. and free the Holy See from the domination of the great secular powers. He was a liberal patron of Raphael, Michael Angelo, and the other great artists of his time, and laid the corner-stone of St. Peter's ch. at Rome. D. Feb. 21, 1513.—**JULIUS III.**, b. at Arezzo Sept. 10, 1487, became a cardinal in 1536; went as papal legate to the Council of Trent 1545; was chosen pope 1550. D. Mar. 23, 1555.

Ju'lunder, town of the Punjaub, in the plain between the Sutlej and the Beas; formerly the cap. of a powerful Afghan principality; has many magnificent monuments. Pop. about 40,000.

July' [Lat. *Julius*, named by Mark Antony in honor of Julius Cæsar], the 7th month of the Gregorian calendar.

Jum'na, river of Hindostan, and the prin. affluent of the Ganges, rises at an elevation of 10,849 ft. It flows first S. and then S. E., and after a course of 680 m. joins the Ganges at Allahabad.

Junker (HENRY DAMIAN), D. D., b. in Lorraine, Fr., 1810; came in youth to the U. S., and in 1834 took priest's orders in R. Cath. Ch.; served chiefly among the Gers. of O.; became in 1857 bp. of Alton, Ill. D. Oct. 2, 1868.

Junction City, R. K. junc., cap. of Davis co., Kan., at the confluence of the Smoky Hill and Republican rivers, which unite to form the Kansas River. It has excellent water-power and extensive quarries of magnesian limestone, easily worked. Pop. 1870, 2778; 1880, 2684.

June [Lat. *Junius*, for *Junonius*, because it was sacred to Juno], the 6th month in the Gregorian yr. During this month the sun reaches the N. solstice, which is marked by the first point of the sign Cancer. Hence the tropic is called the tropic of Cancer.

June-berry (*Amelanchier Canadensis*), of the pear family, a small tree found throughout the U. S. and in Canada, with many varieties. The fruit is of purple color, sweet, and about the size of the largest currants. Various names are given to the tree in different localities, such as shad-bush, service-berry, and mountain whortleberry.

Jung (JOACHIM), b. at Lübeck, Ger., Oct. 22, 1587; was prof. of math. at Giessen 1609-14; studied med. at Padua, graduating in 1618; settled at Rostock as a phys., becoming a prof. there in 1624, and rector of the Johanneum at Hamburg in 1629. He was ranked by Leibnitz in philos. with Copernicus, Galileo, and Descartes. D. 1657.

Jungfrau [Ger. "Maiden"], one of the most remarkable mts. of Switz.; height, 13,670 ft. Its top has been reached only by a few, among them by Agassiz in 1841.

Jungle [Sans. *jungala*], in the E. I., a name applied to tracts of land where the vegetation is rank. The term is used with latitude, and much country which is sparsely settled, but by no means a wilderness, is thus designated.

Jungmann (JOSEF JAKOB), b. at Hadlitz, Bohemia, July 16, 1773; studied at the Univ. of Prague; became teacher at the gymnasium of Leitmeritz in 1799, and prof. in 1815 at Prague. He wrote a hist. of the Bohemian lang. and lit. and a Bohemian-Ger. dict. D. Nov. 14, 1847.

Jung-Stilling (JOHANN HEINRICH), b. at Grund, in Hesse Nassau, Sept. 12, 1740. He was successively a charcoal-burner, schoolmaster, tailor, private tutor, etc. A R. Cath. priest gave him a secret remedy for certain eye-diseases, and in 1771 he succeeded in going to Strasbourg to study med. and get a diploma. He now settled at Elberfeld as an eye-phys. From 1787 to 1806 he held a chair in political economy at Marburg and Heidelberg. The last part of his life he spent at Carlsruhe, at the court of the grand duke of Baden, who gave him a pension. The most interesting of his works is his autobiography. D. Apr. 2, 1817.

Junia'ta River, in Pa., rises 1155 ft. above sea-level, and flows some 150 m. through the mts. of S. Central Pa., which rise from 800 to 1500 ft. above the valleys (the latter often from 200 to 400 ft. above the stream). It falls into the Susquehanna 345 ft. above the sea.

Ju'ni-per, a genus of Coniferae, sub-order Cupressineæ (cypress family), characterized by having its small cone transformed into a berry. The common J. (*Juniperus communis*) is a small evergreen shrub, native of Europe and the U. S., where it grows from N. J. to Me. and along the great lakes. It is important for its fruit, which is a bluish-purple berry about the size of a pea, of a pleasant aromatic odor and sweetish taste. It is a gentle irritant, being in proper dose cordial to the stomach, and specially exciting to the function of the kidneys, and is used as a diuretic, but generally only to assist the action of more potent drugs of that class. In overdose it may cause great irritation of the urinary organs, with strangury and suppression of secretion. J. berries are largely used in the manufacture of gin, to which spirit they give the peculiar flavor and diuretic action. *Juniperus Virginiana*, or red cedar, is an evergreen tree growing on dry rocky hills in all parts of the U. S.

Junius. From the middle of the yr. 1767 to the middle of 1772 the Brit. public was delighted or exasperated by a series of letters on political affairs in the *Public Advertiser* newspaper, displaying a pungency, a vehemence, an intrepidity, and a power of invective such as had never before been shown by any Eng. political writer. These letters (undoubtedly of the same authorship), bore various signatures, the most usual one being "*Junius*." Their subject may be briefly defined as the vindication of the public liberties. "The submission of a free people," so begins the first "*Junius*" letter, "to the executive authority of government is no more than a compliance with laws which they themselves have enacted." This strikes the key-note of the whole. Every leading political occurrence of the day is turned to a vindication of popular liberty. It is now generally admitted that either the authorship remains an impenetrable enigma, or that it belongs to one whose name was not mentioned in connection with it for 40 yrs. subsequently—Sir Philip Francis. (See TAYLOR, *Junius Identified*; MERRIVALE, *Life of Sir Philip Francis*.) [From orig. art. in *J.'s Univ. Cyc.*, by R. GARNETT.]

Junius (FRANCIS), b. at Heidelberg in 1589; went to Eng. in 1620, and became librarian to the earl of Arundel. He was a student of the Teutonic and A.-S. dialects, on which he wrote valuable works. D. Nov. 19, 1677.

Junius (FRANCISCUS), otherwise called FRANÇOIS DU JON, b. at Bourges, Fr., in 1545; studied classical philology and Prot. theol. at Geneva; was pastor of a Walloon congregation at Antwerp, and became in 1568 chaplain to the prince of Orange. In 1573 he was called to Heidelberg by the elector to aid in a translation of the O. T.; he was also prof. of theol. at Heidelberg, and afterward at Leyden. His prin. work was the translation of the O. T. into Lat. in conjunction with Tremellius. D. 1602.

Jun'kin (GEORGE), D. D., LL.D., b. near Kingston, Pa.,

Nov. 1, 1790, grad. at Jefferson Coll. in 1813; studied theol. in New York, and was for many yrs. pastor of chs. at Milton and McEwensville, Pa.; was pres. of Lafayette Coll. 1832-41, and again 1844-48; of Miami Univ. 1841-44, and of Washington Coll., Lexington, Va., 1848-61, leaving the latter post at the outbreak of the war on account of his loyalty to the U. He was a prominent champion of "Old School" Presbyterianism, and wrote several theological and controversial treatises. D. May 20, 1868.

Juno, the third in order of discovery of the asteroids. It was found by Harding at the Lillenthal observatory, near Bremen, Sept. 1, 1804. It shines as a star of the 8th or 9th magnitude, and is of a whitish color, and not nebulous. Its sidereal revolution is performed in 1592.66 mean solar days. Its orbit is inclined to the ecliptic $13^{\circ} 1' 20''$. Its diameter and magnitude are not well known.

Juno [Lat. gen. *Junonis*], in Roman mythology, the queen of heaven and the wife of Jupiter, identified with the Etruscan Cupra, and later with the Gr. Hera. She presided over womanhood, the marriage-bed, maternity, and chaste wedlock, and over new-born children; and in public affairs she guarded the finances and public justice.

Junot, zhu-nô' (ANDOCHE), duke of Abrantes, b. at Bussy-le-Grand, Fr., Oct. 23, 1771; studied first law, but entered in 1792 a battalion of volunteers; accompanied Nap. as aide-de-camp in It. and Egypt, and was made gen. of division and commander-gen. of Paris in 1800. Somewhat displeased at the prodigality which he and his wife showed, the emp. sent him in 1805 as ambassador to Lisbon, but he soon repaired to the army in Ger., and distinguished himself at Austerlitz. In 1806 he was once more made commander-gen. of Paris, but in the next yr. Nap. was compelled to send him and his wife away again. He was placed at the head of a small army corps destined to invade Port., and his success was so brilliant that Nap. made him duke of Abrantes. Having been defeated at Vimeiro by Wellington, he concluded the convention of Cintra with the Eng., which highly displeased Nap. In 1813 he was made gov. of Illyria, and his mental derangement now became apparent. He was brought to Fr., and at Montbard he threw himself out of a window, and d. July 22, 1813.

Junot (LAURE), duchess of Abrantes, b. Nov. 6, 1784, at Montpellier, Fr., of a merchant family of the name of Permon. Having married Junot in 1800, she became one of the most brilliant ladies of the Fr. court. Nap. called her *La petite peste*. After the death of her husband and the fall of Nap. she still maintained her social position in Paris and Rome. She wrote *Mémoires sur Napoléon*, *Mémoires sur la Restauration*, and *Souvenirs d'une Ambassadrice en Portugal*. D. in a house of charity in Paris, June 7, 1838.

Jupiter, the 5th planet in order of distance from the sun, and far the largest and most massive of all the members of the solar system. J. travels at a mean distance from the sun of 475,692,000 m. The eccentricity of his orbit is 0.048239, so that the distance of the centre of his orbit from the sun is equal to 22,947,000 m., and his greatest and least distances from the sun are respectively 498,639,000 m. and 452,745,000 m. The plane of his path is inclined $1^{\circ} 18' 40.3''$ to the ecliptic, the rising node lying in lon. $98^{\circ} 55' 54''$. As the rising node of the invariable plane is in lon. $102^{\circ} 57' 54''$, less than 5° from J.'s rising node, and its inclination $1^{\circ} 35' 54''$, differing less than $17'$ from J.'s, we see that the plane of J.'s orbit very nearly coincides with the invariable plane of the solar system. J. completes the circuit of his orbit in a mean sidereal period of 4332.5843 days, or roughly 11 yrs. 10 months 9 days. His mean diameter = 85,000 m.; his greatest about $1/30$ more; his least about $1/30$ less; his polar compression being about $1/15$. Thus, his equatorial diameter = 87,800 m., and his polar diameter = 82,200 m. His vol. exceeds the earth's 1233 times, but the mean density of his substance being only equal to about $1/4$ the earth's, his mass does not exceed hers more than 301 times.

J. is surrounded by a system of 4 satellites. These were discovered by Galileo in the yr. 1610. Their distances from J.'s centre are equal, respectively, to 6.05, 9.62, 15.35, and 26.99 radii of J., and their sidereal periods of revolution are respectively 1 d. 18h. 20m., 3 d. 13h. 4m., 7 d. 3h. 43m., and 19d. 16h. 32m. Their diameters have been estimated at 2352, 3099, 3436, and 2926, taking them in the order of distance. It has been found that his globe is surrounded by belts variable in width and color. Usually the equatorial region is occupied by a yellowish-white belt, the bands bordering this belt on either side being darker and usually tinged with brown. Toward the poles the belts are commonly less marked in color, and slightly tinged with a bluish hue. From the movements of spots on these belts it is inferred that the planet rotates on an axis inclined only about 3° from perpendicularity to the plane of J.'s orbit, and that his rotation period is 9h. 55m. 26s. The great depth of the Jovian cloud-layers, their variability in shape and color, the rapid motions implied by their change of aspect, and the small density of J.'s vast orb, all suggest the belief that his condition resembles rather that of the sun than that of the earth. [From orig. art. in *J.'s Univ. Cyc.*, by R. A. PROCTOR, F. R. A. S.]

Jupiter, Juppiter, or Diespiter (gen. *Jovis*), in Rom. mythology, the king and father of the gods and the just ruler of men; later identified with the Gr. Zeus. He gave the rain, the thunder and lightning, the storm and calm; was the protector of public justice and private virtue, the leader of armies, and sender of instructive portents; god of air and light, and especial patron of Rome and her people.

Jupiter Ammon. See AMMON.

Jura, the name of a system of mt.-ranges, generally from 3000 to 6000 ft. high, which cover parts of Fr., Switz., and Ger. They consist of a peculiar kind of limestone, called the Jura limestone, and are generally covered with fine pine forests. The highest peaks are the Crêt de la Neige, 5653, Reculet de Thoiry, 5643, and the Dôle, 5505 ft.

Juras'sic, *The*, is the "period" in the earth's hist.

that intervenes between the Triassic and the Cretaceous, and thus the second or middle division of the Mesozoic Age. The term is also applied to the group of rocks that were formed during this period, and is derived from the Jura Mts., between Fr. and Switz., in which an extensive series of these rocks occurs. In the U. S., in addition to strata doubtfully assigned to this period on the Atlantic border, there occur true J. strata full of characteristic fossils about the Black Hills and the Laramie Mts., and also at the base of other ridges in the Rocky Mts. The paleontology of the J. is of exceeding interest to the student, who here finds himself on a borderland, with the palaeozoic types of fossils rapidly disappearing on the one hand, and on the other forms appearing which usher in existing life, and amid all a fauna thoroughly characteristic of Mesozoic times. Every great group of the animal kingdom is represented in the J. period.

Jurien de la Gravière (JEAN BAPTISTE EDMOND), b. in Fr. Nov. 19, 1812; entered the navy in 1828; became capt. of a corvette in 1841; was engaged in the Chi. war in command of the Bayonnaise; was promoted to a full captaincy in 1850; served in the Black Sea during the Crimean war; was made rear-admiral Dec. 1, 1855. In Oct. 1861 he received command of the squadron sent against Mex. by alliance between Fr., Eng., and Sp., and as imperial com. adjusted with govt. of Pres. Juarez the treaty of Soledad, which was repudiated by Nap. III. He became vice-admiral in 1862, and wrote *Voyage en Chine*.

Jurisprudence is both the *philosophy* and the *science* of law. It comprises not only a study of what the law is and has been, but of what it would be if the principles to be extracted from it were correctly worked out. It permits us to test those principles by our abstract notions of what is right and reasonable, by our observation of what is useful, by the visible wants and tendencies of society.

The nature of man points out the ends and objects of his existence on earth, and the means furnished by external nature by which, in the exercise of his activities in society, they may be attained, and in the progressive exercise of these activities establishes the various relations which bind together and classify mankind in a social order. The study of human nature gives rise to the conception of a *moral order*, the realization of which constitutes man's highest good, and the pursuit of which employs all his activities. Whatever conforms to that moral order is *right*; whatever violates it is *wrong*. Subsidiary to that conception of universal moral order, and forming parts of it, are subordinate conceptions of the human reason declaring and defining the relations of men with each other in society, of men with each other in relation to external nature, and to the universe of things, material, intellectual, and moral. The duties resting on all to render to each his rights are called *obligations*, the violation of them, *wrongs*; the relations between men thus established are distinguished as *jurid.*

Rights differ from other moral claims of men upon each other in this—that the latter are *duties*, depending for their fulfilment altogether upon the *good-will* of those bound by them; the former carry with them a claim to be enforced by physical compulsion. But the *rights* which are susceptible of being enforced must be such only as constitute claims upon the *external conduct* or *overt acts* of others; and the physical force required for their enforcement is furnished by the *public authority*, organized in every separate independent community constituting a *state* or *nation*. There are no legal limits to sovereign power, for it declares what the law is; it is bound only by moral restraints, but the const. of a state may impose *legal limitations* upon the govt.; and this gives rise to *public* or *constitutional law*.

There is, however, a *supreme law* which binds and restrains the sovereignty of individual states. It is the *law of nations*, or *international law*. It consists of a body of rules regulating the relative rights and duties of independent nations in that mutual intercourse demanded by the progressive advancement of human society. It is developed by diplomatic discussions and state papers, by the decisions of judicial tribunals in private controversies, by the treatises of philosophical jurists, and is embodied in a traditional code of international usage and the modifying legislation of treaties and conventions.

Each individual member of human society is under a *moral necessity* to conform to the universal moral order. The liberty of each man's will in the pursuit of his highest good is limited by the proper exercise of the wills of all others. The perfection of civil order consists in the largest liberty of *individual action* compatible with the *equal liberty* of all others; and the question requiring solution in every case as it arises or is foreseen, is, To what extent is the public authority justified in imposing phys. restraint upon, or applying phys. coercion to, individual action? Every system of civilized J. will be found to contain 2 elements—one deduced by the public reason from the gen. principles of natural justice; the other dogmatically fixed by recognized custom or by express legislation, and affected by the peculiarities of national character, hist., and situation. The latter is arbitrary, accidental, and positive; the former is its rational element and unchangeable foundation.

J. includes—1. *Natural Law*, or that theory of human relations, and the rights and obligations implied in them, deducible from the nature of man and of the things around him. 2. *International Law*, or that body of rules deducible from the relations of man, organized into separate and independent communities. 3. *Public or Constitutional Law*, or that body of customary or enacted rules which form the frame of political govt. or const. of the state. 4. *Municipal Law*, or the domestic law of particular states, prescribing the relative rights and obligations of all persons subject to its jurisdiction as members of that community. (See HENNECIUS, *System of Universal Law*; LIEBER, *Political Ethics*; AUSTIN, *Prov. of J.*; WHEATON, *International Law*; From orig. art. in *J.'s Univ. Cyc.*, by HON. STANLEY MATTHEWS.)

Jurisprudence, Medical, may be defined as the science which treats of the application of the laws of nature to the administration of justice and the preservation of the public health. The application of M. J. to the admeasurement of phys. facts affecting the civil or criminal responsibility of persons amounts practically to this only, that med. furnishes the lights of her experience, and law applies them according to established rules. Med. and the phys. sciences furnish the principle, law the rule for its application to the artificial relations of civil life. Although M. J. as a science is of comparatively recent origin, one of its depts., that of public health, has always engaged the attention of lawgivers.

From the incorporation of sanitary observances into the religion of a country, it followed that priests became the earliest custodians of public health, and, it may be truly said, the first med. jurists on record. In the whirlwind of savage customs which ruled Europe during the Dark Ages legal med. could hope for no positive recognition. In its stead, ordeals by fire, water, or the judicial combat were introduced as so many direct interrogations of the Deity. Human responsibility was judged, even before courts of justice, by the haphazard results of chance, and superstition usurped the place of reason. It is now generally admitted that the application of med. knowledge to jurisprudence, and the practical recognition of a science of forensic med., commenced about the middle of the 16th century.

The philos. of M. J. is founded in the necessity of frequently applying the laws of nature to the administration of justice, no less than in employing them in the preservation of the public health. While it treats of the whole realm of nature so far as it applies to man in society and to govt. as the arbiter of human differences, it is usual for convenience' sake to classify its subjects into divisions founded upon their practical applications. The following is a synopsis of these topics in their legal aspects and under the complexion they assume before courts.

Personal Identity.—The necessity at law of proving personal identity is of such a variable character as to render it impossible to enumerate all the circumstances under which it may become indispensable to establish it. In homicide, burglary, arson, bigamy—in fact, in every variety of crime—the identity both of the perpetrator and the victim must be proved. In heirship, in payments of checks, and in scores of similar civil transactions, the same necessity often arises. The sources whence proofs of personal identity are obtained are such as belong partly to our phys. and partly to our mental constitution. Identification of the *dead* as well as the living is often necessary. This is of course more difficult in proportion to the length of time the person has been dead. But even skeletons can be and have been identified when a sufficient amount of bones can be found to reconstruct by anatomical theory the missing parts. Great skill is of course required for such an investigation, and in cases of homicide the proof of the *corpus delicti* should rest upon something more than conjecture.

Abortion.—There are occasions when it is lawful to commit abortion as a med. necessity, to save the mother's life in preference to that of the fœtus. Of this necessity phys. are the only proper judges, and in order to purge the act from all suspicion it should be performed as the result of consultation with and concurrent opinion of others. But whenever it is done without any pre-existing med. necessity, and solely with the intent of destroying the child, it is a crime in the eye of the law. Not only is abortion when criminally accomplished a crime, but even the administration of drugs to pregnant women with intent to produce it, although unsuccessful, is a high misdemeanor.

Infanticide.—The killing of a new-born child is at law a crime, subject to the same rules as belong to any other form of homicide. There are some difficulties in the way of obtaining precise evidence of live birth as a *sine quâ non* to the fact in issue. But when this is once established, and it is proven that the child had an independent existence of its own, then the crime can be subjected to the rules of ordinary evidence. Infanticide may be of 2 kinds—viz. either by *omission* to take necessary precautions to protect the child against exposure, hunger, and accidents, or by *commission*, meaning thereby the direct application of means feloniously employed for the purpose of destroying its life. It has also been held that if a child upon whom an act of abortion is commenced dies subsequently to birth from injuries received while in the womb, the act becomes a homicide.

Rape.—This crime consists in the carnal knowledge of a female forcibly and without her consent. In law, certain persons have no legal capacity to assent to such an act, and when done to them it is always unlawful in the perpetrator. Thus, children under 10 yrs., idiots, and the insane can have no assenting minds. Force may be either *express* or *implied*, the former implying any direct threats or personal violence; the latter, duress, either by moral fear, fraudulent imposition of person, deceitful representation of the nature of the act, magnetic sleep, anæsthesia, or narcotics. It is agreed by all authorities that the resistance of any woman should be, so far as her condition will allow, sincere and continuous throughout the act.

Impotence and Legitimacy.—Marriage is at law a consensual contract entered into by two competent parties for the purpose of procreating children. As fraud vitiates every contract into which it enters, it follows that the marriage of an impotent person is voidable, provided no laches be shown in the party wronged. If one knowingly marries an unfruitful person, he can claim no remedy at law, nor can a party plead his own impotence as a ground for a sentence of nullity. It follows from the necessary consequences of marriage that children born in wedlock have a presumed character of *legitimacy*. And so far is this doctrine pushed at common law that every child born in wedlock, no matter how soon after the marriage of its parents, is legitimate. But this presumption may be rebutted by showing either the

impotence of the husband or his continuous absence from the country, with the simultaneous *crim. con.* of the wife. Whether, therefore, a child was begotten *in or out of* wedlock where the marriage precedes the birth, the presumption of paternity will be the same, and the like evidence is required to bastardize the issue.

Wounds.—The only legal aspect under which wounds can be considered is that which connects them with assaults terminating in maiming or homicide. All the authorities agree that the party inflicting the wound is responsible for its immediate consequences; and even though a mortal disease was present, and the wound only accelerated the death, the act is still homicidal.

Poisons.—Poisons, in legal significance, are substances which act not *quantitatively*, but *qualitatively*, to the destruction of health or life, by reason of their inherent deleterious properties. Restricting ourselves only to their legal aspects, the questions to which they give rise before courts are, like wounds, such as tend to show their criminal connection with a person's death. To constitute the offence of administering poison, some portion of it must be taken by or applied to the person of the one receiving it, but it need not be swallowed. So if poison intended for one person be accidentally taken by another, it is still murder in the giver, for the *intent* of homicide inheres. Where death ensues from alleged poisoning, it is not necessary to prove the particular substance used, nor the quantity required to destroy life, nor is it necessary to prove that such a quantity was found in the body after death.

Malpractice.—It is a principle of law that every professional man in offering his services as such to the public impliedly covenants to bring to their discharge the ordinary skill of his vocation. The errors committed by professional men, whether due to want of skill or negligence, are termed *malpractice*, and for such they are amenable in damages to any person who has been injured thereby. Mere errors of judgment are not considered malpractice in themselves. There may be malpractice by *omission* as well as *commission*. The law knows no difference between systems of med. All it requires in any practitioner is ordinary skill and a faithful discharge of his duties.

Medical Evidence of Experts.—In law there are 2 classes of witnesses—viz. *ordinary* and *skilled*. The former testify to what they know; the latter give opinions upon facts in issue. To these witnesses the term *expert* is applied. Experts may give opinions either upon *direct* or *hypothetical* facts, but not upon conclusions of law. They may refresh their minds from memoranda, but cannot use them as substitutes for memory, nor quote from professional books, nor give opinions upon the merits of any case.

Life Insurance.—The only aspect under which M. J. considers life insurance is that which springs out of the *suicide* of the party insured. The question there being whether the party intended to take his life in fraud of his contract with the insurers, and was a legally responsible being at the time, the whole problem turns upon the fact of his mental condition. If sane, then the act was felonious and the policy should be avoided; but if insane, then the act was not *his* in legal contemplation, but that of a being under the coercion of disease. All authorities agree that suicide of itself does not prove insanity in the perpetrator. Decisions have been very conflicting in the conclusions of law to which they have arrived, some permitting the moral responsibility of the suicide to weigh in the balance of justice, and some, again, excluding it.

Survivorship.—Where two persons perish in a common calamity, it is often important to be able to determine which died first, with reference to the rights of succession to an estate. Many times it is impossible to arrive at any satisfactory conclusion, and courts are driven to the necessity of advising a compromise between the parties. The following are the 2 divisions into which all questions of survivorship may be included—viz. 1st, as to the survivorship of mother and child where both die during delivery; 2d, as to the survivorship of persons of different ages and sexes perishing by a common accident.

Insanity.—This topic, under all its various legal aspects, will be found treated in its appropriate alphabetical place.

There are other topics belonging to the domain of M. J., like *viability*, *feigned diseases*, the *Cæsarion section*, *hermaphroditism*, *deaths by heat*, *sunstroke*, *lightning*, *starvation*, and *cold*, and *spontaneous combustion*, which have few if any special legal aspects. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JOHN ORDRONAU, M. D., LL.D.]

Jus gentium was defined in Rom. law as the rules of justice common to all nations, as opposed to *jus civile*, or Rom. law. *Jus inter gentes* is a modern term for the law of nations.

Jussieu, ju-su', de, the name of a family of Fr. botanists and phys., the most noteworthy of whom were: (1) ANTOINE, b. at Lyons July 8, 1686, d. Apr. 22, 1758. (2) BERNARD, b. Aug. 17, 1699, d. Nov. 6, 1777. (3) JOSEPH, b. 1704, d. Apr. 11, 1779. (4) ANTOINE LAURENT, b. at Lyons Apr. 12, 1748; studied med. in Paris, where he was an academical and botanical prof.; was the first to introduce the natural system into botany, disposing all known genera in defined natural orders. His *magnum opus* is the *Genera Plantarum*. D. Sept. 17, 1836. (5) His son ADRIEN, b. Dec. 23, 1797, succeeded his father in 1826 as prof. at the museum; became prof. of organography in 1845, and was a brilliant lecturer and one of the first botanists of his time. D. June 29, 1853.

Justice comes from the Lat. *justus*, which is connected with *jubeo*, "bid," "ordain," *jus*, "right," "system of right," or "law." Slavery was held to be contrary to natural J. by the Romans, although allowed by *jus civile* or civil law. *Just* and *righteous* agree in part, but *righteous* has the meaning of conformity to the law of right in the soul as well as in the life. J. inclines more to the external. Plato's leading definition of it is "the doing of one's own business," or keeping within one's own sphere of action. The Stoics, and

Cicero after them, define it as that which assigns to each one his due or worth. According to the modern doctrine of personal or subjective rights, each person is a centre of powers, and all others are bound not to interfere with his exercise of these powers. A just man is one who fully respects the rights of others; a just state defines personal rights justly; a just judge decides in a particular case what those rights are. But a state meaning to be just may be unjust, and the maxim *Summum jus est summa injuria*, or "the strictest justice according to law is the highest injustice," brings us naturally to *equity* as a higher conception than *J.*, because law in the hands of a finite being follows gen. rules and is incompetent to make allowances in particular cases.

Penal *J.* is the awarding of outward evil, or punishment, to an evil person according to his due. But here the sense of *J.* is different from what it is in the sense of such phrases as distributive *J.* The *due* is the claim of absolute law, or of society under the law of God, that he who does evil ought to suffer.

T. D. WOOLSEY.

Justin I. (JUSTINUS), emp. at Constantinople, by birth a Gothic shepherd of Moesia, b. 450 A. D.; went to Constantinople to seek his fortune; enlisted in the imperial guard; became commander of the guard; induced the army to salute him emp. after the death of Anastasius (518 A. D.). He could not read or write, but under the advice of the quaestor Proclus his reign was advantageous to the empire. D. Aug. 1, 527.

Justin II. (FLAVIUS ANICIUS JUSTINUS), emp. of the E., succeeded Justinian I., his uncle, in 565. His reign was characterized by the defection and death of Narses and the occupation of nearly all of It. by the barbarians. In the N. the Avars gained great advantages, and in the E. a bloody war went on with the Pers. D. Oct. 5, 578.

Justin (JUSTINUS), the author of an historical work, *Historicarum Philippicarum libri XLIV.*, treating of Macedonia, extracted from a work by Trogus Pompeius, who lived in the time of Augustus. It seems rather to be a collection of extracts than an abridgment, and in it much important information has been preserved from oblivion. Nothing is certainly known of Justin, who is sometimes called Justinus Frontinus, at others Junianus Justinus, but he probably lived in the 4th century A. D.

Justinian the Great. FLAVIUS ANICIUS JUSTINIANUS, Rom. emp. at Constantinople, b. of Gothic peasant ancestry at Tauresium, in Moesia, probably in 483 A. D.; went in youth to Constantinople, where his uncle, afterward the emp. Justin I., was in high favor. In 520 he was appointed commander of the Asiatic armies, and in 521 consul, and soon after married Theodora, an actress and courtesan. His gens., Belisarius, Narses, and Germanus, carried the Rom. arms into Afr., where the Vandal kingdom was overthrown; into It., where the Goths and Lombards were conquered; into Per., where, after a 20 yrs.' struggle, Per. obtained a nominal triumph but Constantinople gained the real victory. Huns, Avars, Arabs, Gepidae, were repelled; Constantinople and the whole empire were adorned with splendid buildings, of which the present mosque of Santa Sophia is the most famous. Silk-culture was introduced, manufactures, agriculture, and commerce appeared to prosper. His greatest monument is the *Corpus Juris Civilis*, the work of Tribonian and his assistants, but one which J. planned. In his later yrs. he was a Nestorian, and persecuted heathenism and certain heretical sects. D. Nov. 14, 565.

Justinian II., surnamed RHINOTMETUS, b. 669, succeeded Constantine IV., his father, in 685. Notwithstanding some splendid successes in Syria, Sic., and among the Slavi, he abandoned the fruits of his victories; in 695 was seized, his nose cut off, and he was banished to the Crimea; in 705 he returned and took vengeance upon his adversaries. His reign was one of shameful excesses. During the insurrection of Philipicus Bardanes the emp. was killed, Dec. 711 A. D.

Justin Martyr (FLAVIUS JUSTINUS), b. at Flavia Neapolis, the anc. Shechem, in the modern Nablous, in Pal., about 105 A. D.; studied philos. in the schools of Asia Minor, Gr., and Egypt; embraced Christianity about 132. Of his life nothing is known with certainty, but it seems probable that he resided at Rome during the latter part of his life, and suffered martyrdom about 165. Wrote *Liber contra omnes haereses* and *Apologia prima et secunda*.

Jute is the fibre of *Corchorus capsularis* and *olitorius* (order Tiliaceae). Indian annuals from 5 to 10 ft. high, with stalks as thick as a finger. The name is taken from the Orissa *jhot*, which is derived from the Sans. *jhat*, to "be entangled." It appears to flourish best in a hot, damp atmosphere, with a heavy rainfall and rich alluvial soil. The plant is utilized in a variety of ways. The tops serve as potherbs, the leaves as manure, the stalks for fences, the seed for oil-cake, the root for paper, and the inner bark for fibre. Although India is the great source of *J.* supply, the plants yielding it have long been cultivated in Chi. and the E. Until 1890 it was practically unknown to Europe, and was used in the native manufactures as the material for gunny-bags. At first only used for cordage and coarse bagging, successive improvements in its treatment have made it also available for other purposes. Carpets are now made from it, and it is mixed with cotton and silk for dress-stuffs. As it will serve for every kind of coarse textile fabric, it is manufactured in a variety of forms. *J.* is easily dyed, but the beautiful colors it so readily takes up are fugitive except when carefully executed. It is readily brought to a rich cream-color, either in the fibre, yarn, or cloth, but until very lately it was considered next to impossible to bring it to a full white without injuring the strength of the fibre. [From orig. art. in *J.'s Univ. Cyc.* by WILLIAM E. A. AXON.]

Jutland [Dan. *Jylland*], a Dan. peninsula between the N. Sea, the Skagerrack, and the Cattegat.

Juvenalis (DECIMUS JUNIUS), b. probably in the latter part of the 1st century at Aquinum; studied rhetoric and declamation. D. in the 82d yr. of his age. Sixteen satires have come down to us under his name.

Juven'tas, in Rom. mythology, the goddess of youth, corresponding to the Gr. Hebe. She was worshipped in Rome at a very early period.

Jux'on (WILLIAM), D. D., b. at Chichester, Eng., in 1583; ed. at St. John's Coll., Ox., of which he became pres. in 1621, and vice-chancellor of the univ. in 1626; dean of Worcester in 1628, bp. of Hereford in 1633 and of Lond. in the same yr. and high treas. of Eng. in 1635. He suffered deprivation during the Commonwealth, but remained faithful to King Charles, whom he attended in his imprisonment, at his trial, and on the scaffold. After the Restoration he was made abp. of Canterbury 1660. D. June 4, 1663.

K.

K, a palatal mute, the 11th letter in our alphabet. It has but one sound in Eng., the same as that of *C* hard. As an abbreviation it stands for *king*; in chem. it is the symbol of potassium (kalium).

Kaa'ba [Ar. *Al-Kaabah*, "square house"], a stone building inclosed in the great mosque at Mecca. At the N. E. corner of the building, 4 or 5 ft. from the ground, is a black stone, of an irregular oval shape, about 7 inches in diameter, which received idolatrous worship from the Ars. before the time of Mohammed, and is still the most sacred object of veneration to his followers. The Sabaeans and Guebeans also worshipped this stone, which is thought to be of meteoric origin. None but Mohammedans are admitted within the K., but every follower of Islam is bound, if possible, to visit this sacred spot at least once during his life.

Kabbala. See CABBALLA.

Kabul. See CABOOL.

Ka'desh [Heb. "holy"], or **Kadesh-barnea**, city and encampment of the Israelites during their journeys in the wilderness, at the S. E. border of Pal., near Edom. To this point they had penetrated when they were turned back by the hostility of the Edomites, and compelled to seek the circuitous route E. of Edom and Moab.

Kaff'ia, or **Ka'ia**, country of E. Afr., S. of Abyssinia, consists of an extensive table-land rising about 5000 ft. above the sea. Coffee is indigenous here, and is said to have received its name from this country. The inhabs. profess to be Chrs., and are governed despotically by a king. Pop. about 6000.

Kaffirs, or **Caffres** [Ar. *Kafir*, "unbeliever" or "heathen"], first applied by the Arab slave-dealers of the E. coast of Afr. to all the natives. In after yrs. the term was limited to the tribes inhabiting the coast-country on the E. side of S. E. Afr., and more recently it is applied to the tribes living in the country between the Cape Colony and Natal. The K. form a very large family, extending beyond the equator, and are closely allied to a great part of the Central and N. Afr. tribes. Their features are often regular, and instances occur in which but for its color the countenance might be taken for that of a European. (See the various works of LIVINGSTONE and ANDERSON.)

Kafir'ia, (*Proper or Independent*), the name of the E. coast-region of S. Afr., extending N. to the river Umzimkulu, in lat. 30° 26' S., and S. to the Great Kei or Keiskamma, which separates it from the Cape Colony, to which in 1896 the so-called Brit. K. was annexed. Area, 15,569 sq. m. The inhabs., whose number is estimated to be 400,500, are Kaffirs, and live as nomads in tribes which bear the names of the chiefs.

Kafiristan, a country of Central Asia, between 35° and 36° N. lat. and between 69° 20' and 71° 20' E. lon. It received its name, "the land of the infidels," from the surrounding Mohammedan people. The inhabs. are an isolated race, resembling Europeans in their features, lang., and in many of their habits.

Ka'hau, or **Proboscis Monkey**, the *Sennophicus nasutus*, a most grotesque and hideous monkey of Borneo. It is of gregarious habits, and is extremely active, noisy, mischievous, and even savage in character. The native name is derived from the cry of the beast. Its nose is nearly 6 inches long and subconical with inferior nostrils.

Kai'eteur, a waterfall in Brit. Guiana, on the Potaro River, a tributary of the Essequibo, 822 ft. in height. The river is here nearly 400 ft. wide and 15 ft. deep.

Kaisari'jeh, town of Asia Minor, not to be confounded with Kaisarijeh in Syria, which was built by Herod, bore the name of Caesarea Palestine, and, though now in ruins, was in the 1st century one of the most splendid Gr. towns in Asia. K. in Asia Minor is surrounded by ruins, but it has still 10,000 inhabited houses.

Kaiser, k'izer [from Lat. *Cæsar*], the Ger. word for emperor, applied formerly, and especially in the Middle Ages, to the Ger. emps., who inherited this title from the Rom. Cæsars, themselves succeeded by Charlemagne, who is considered the first emp. of Ger.

Kalakau'a (DAVID), b. at Honolulu Nov. 16, 1836, and descended from an anc. king of the islands of Hawaii. Together with Lunalilo and other hereditary chiefs, he was ed. in the royal school of Honolulu; in 1860 visited Cal. When Lunalilo d. (Feb. 3, 1874), K. was elected king (Feb. 12) by the legislature, 39 votes being given to him and only 6 to the queen-dowager, Emma. A riot took place in favor of Emma, but was speedily put down by aid from the Brit. and Amer. ships of war, and K. was installed the 7th king of the Hawaiian Islands; made Emp. of Hawaii 1891.

Kalamazoo, R. R. centre and cap. of Kalamazoo co., Mich., 40 m. from Lake Michigan and 143 m. from Detroit, on the river of the same name, with splendid water-power. It has 2 female sems., a coll., and the Mich. asylum for the insane. Pop. pt. 1870, 10,447; 1880, 13,552; city, 1884, 13,988.

Kalamazoo College, Mich., was incorporated as a coll. in 1855. It had previously been a branch of the Univ. of Mich. Its founders were Baps., and a majority of its

board of trustees are of the same denomination. It admits both sexes to an equal share in its instruction and to the same courses of study.

Kalb (JOHN), BARON DE. See DE KALE.

Kalb/leisch (MARTIN), b. at Flushing, in the Netherlands, Feb. 8, 1804; paid special attention to chem.; went as a supercargo to Sumatra, and afterward became a merchant in Fr.; in 1826 came to the U. S., where he acquired wealth as a manufacturer of colors and chemicals; took a prominent place as a Dem. politician, became M. C. in 1862, and chosen mayor of Brooklyn, N. Y., in 1867. D. Feb. 12, 1873.

Kale, a variety of *Brassica oleracea*, the species of cruciferous plant to which the cabbage, turnip, etc. belong.

Kaleidoscope [Gr. *καλός*, "beautiful," *εἶδος*, "form," and *σκοπεῖν*, to "see"], an instrument consisting of a tube containing 2 or more longitudinal strips of glass mirror, whose reflecting surfaces are inclined to each other at an even-numbered aliquot part of 4 right angles. At one end of the tube is an eye-piece; at the other, 2 plain glasses, the outer one ground. Between these glasses are bits of brightly-colored glass, diaphanous beads, and the like. The reflection of these objects is multiplied by the mirrors, and constitutes a symmetrical image often of great beauty.

Kaliha'i Desert, a large terr. of S. Afr., mostly between lon. 20° and 30° E., and between lat. 21° and 28° S. Without springs or streams. Rain is very rare.

Kalkaska, Mich. See APPENDIX.

Kalmia [named in honor of Peter Kalm], a genus of shrubs of the order Ericaceae, evergreens and natives of N. Amer. The U. S. have at least 6 species, of which the mt. laurel, spoon-wood, or calico-bush (*K. latifolia*) is the best known. It is a large, handsome shrub, with beautiful flowers, highly ornamental in cultivation. The leaves of *K. angustifolia* are poisonous to sheep, hence called lambkill.

Kalmuks, the name by which the W. Mongols are known to their Tur. neighbors and to the Rus. *Kalmuk* is considered by Fischer a corruption of *kulpak*, the Tur. name for the fur cap worn by the K. They are nomads. The 4 great tribes are Sungars, Derbets, Torguts, and Khoshotes. The 87,000 K. in Rus. are Lamaists in religion. (See HORTON'S *Hist. of the Mongols*.) R. D. HITCHCOCK.

Kalong. See FLYING FOX.

Kama, river of Rus., which after a course of 1100 m. joins the Volga. It is navigable 40 m. from its sources, and forms a very important line of traffic.

Kambalu, the anc. cap. of the Chi. empire, under Kublai Khan, the founder of the Mongol dynasty, was visited by several Europeans in the 13th century, who have described its magnificence. Its ruins have recently been found a few m. to the W. of Peking.

Kamee'ia, or **Kama'ia**, a drug consisting of a red-brown powder from the capsules of *Rottlera tinctoria*, a small euphorbiaceous tree of India, Chi., and Australia. It is used for killing the tapeworm; is a smart cathartic, and is used for skin diseases; also as dyestuff, making a deep red.

Kamehameha I., the first king of the entire group of the Hawaiian (or Sandwich) Islands, at the death of his uncle, Kalanipou, king of Hawaii, in 1781, inherited the headship of a part of that island. With the advantage of some foreign-built vessels and the aid of firearms in the hands of a few Europeans, he soon conquered the other chiefs of that island, and one after another the other islands fell under his sway, so that in 1811 he was the acknowledged sovereign of the group. He was vigilant and strict, placing authority only in trustworthy hands, and keeping near him and under control those conquered and rival high chiefs from whom he had the most to fear. D. May 8, 1819.

Kamehameha II. (LIHOLIHO), son of the preceding, was intemperate and given to pleasure, but by abolishing idolatry and the more oppressive tabus he prepared the way for the missionaries, who received permission to land and commenced their labors in Mar. 1820. In Nov. 1823 he sailed for Eng. with his favorite queen, a few chiefs, and servants. They were well received by the sovereign and people, but, taking the measles soon after their arrival in Lond., both king and queen d. in July 1824.

Kamehameha III. (KAVIKAOUU), brother of Liholiho, b. in 1814, came to the throne in 1833; was ed. by Amer. missionaries; in 1840 gave his people a written const. and a simple code of laws, and in 1852 a very liberal const. With the concurrence of the chiefs he gave in 1848 lands in fee simple to the common people, so that nearly all heads of families were landholders. Treaties were made with the U. S. and with several European countries, and great progress was made in education, civilization, agriculture, and commerce. On Feb. 28, 1842, Lord George Paulet forced him to cede the islands to G. Brit., but Admiral Thomas, commander-in-chief of the squadron, restored the flag and sovereignty July 31, 1843. In 1846 a new code, establishing a more systematic govt., with courts of various grades, was promulgated. The more responsible offices were filled by foreigners. D. Dec. 15, 1854.

Kamehameha IV. (ALEXANDER LIHOLIHO), b. Feb. 9, 1834, succeeded his uncle in Dec. 1854; was ed. in the young Chief's School; in 1849-50 visited the U. S., Eng., and Fr. June 2, 1856, he married Emma, adopted daughter of Dr. T. C. B. Rooke; was in accomplishments and talents superior to any other of his race; took an active interest in the introduction and progress of the "Reformed Catholic Mission." The Queen's Hospital in Honolulu was established in 1860 by the aid of subscriptions solicited by him in person. D. Nov. 30, 1863.

Kamehameha V. (LOT KAMEHAMEHA), b. Dec. 11, 1830, succeeded his younger brother in Nov. 1863. He had been minister of the interior and commander-in-chief of the forces. While prince he had been dissipated, but before he became king he reformed. On coming to the throne he declined to take the oath to the const. of 1852. In 1864 he called a convention to make a new const., but disagreeing with the third estate he dissolved the convention, granted

the present const., and took the oath to support it. Want of sympathy between the king and that part of the foreign community who were of radical, democratic, and progressive tendencies had the effect to make him suspicious and exclusive. His disposition to engage in trade and speculation did not increase his estate, and in the latter part of his life he got the reputation of being avaricious and grasping. He gave liberal aid to the Reformed Catholic Mission and its schools. D. Dec. 11, 1872.

Kameke von, (GEORG ARNOLD CARL), b. June 14, 1817; entered the military service in 1834; in 1850 was made a capt. in the staff, and from 1856 to 1858 was military attaché to the Prus. ambassador at Vienna. He took part in the war of 1866 against Aus. as maj.-gen. and chief of staff of the 2d army corps. In the war of 1870-71 with Fr. he first commanded the 14th inf. division, occasioned the battle of Saarbrücken (Aug. 6, 1870), and took part in the battles of Aug. 14, 16, and 18. After the surrender of Metz he was ordered to take Thionville and lay siege to Mézières and Longwy. Hence he was called to Paris to superintend the works during the siege. In 1874, when Gen. von Roon retired, he was made minister of war.

Kamptulicon, a floor-covering composed of gutta-percha and caoutchouc (or linseed oil), mixed with naphtha and powdered cork, and rolled into sheets, calendered, dried, and painted or printed in imitation of floor-cloths.

Kamchatka, a peninsula of S. E. Siberia, 850 m. long, and at its greatest width 250 m. broad, extending between the Sea of Kamchatka and the Sea of Okhotsk, and terminating in a long, narrow tongue forming Cape Lopatka. It is traversed from N. to S. by a range of volcanic mts., whose craters mostly are extinct. The land is unfit for agriculture on account of the severity of the climate. The inhabs., numbering from 5000 to 6000, live by hunting and fishing.

Kanaris (CONSTANTINE), b. in the island of Ipsara in 1790, and commanded a small merchant vessel when the Gr. war of independence broke out. June 19, 1822, he burned a Tur. squadron in the canal of Chios; Nov. 22, another in the harbor of Tenedos; Aug. 17, 1824, a third at Cape Troglon. In 1825 he conceived the idea of burning the Egyptian fleet, which lay at anchor in the harbor of Alexandria. On Aug. 5 the fire-ships were launched, but the wind turned and drove them away from the Egyptian vessels. In 1826 he commanded the frigate Hellas, and in 1827 a squadron, with which he drove the Tur. flag out of the Gr. waters. Under King Otho and King George he was constantly a member of the Gr. diet, and was minister of war several times. In 1865 became inspector-gen. of the Gr. navy. D. 1877.

Kanawha River. See GREAT KANAWHA.

Kandahar. See CANDAHER.

Kandy, or **Candy**, town of Ceylon, nearly in the centre of the island, on an elevation 1676 ft. above the sea. It has many Chr. chs., Buddhist temples, and Mohammedan mosques. Close by is a beautiful artificial lake, 1½ m. long and from 100 to 500 yards broad. Pop. 7000.

Kane (ELISHA KENT), M. D., b. in Phila. Feb. 3, 1820, was ed. at the univs. of Va. and Pa.; took his med. degree in 1843; entered the navy; was phys. to the Chi. embassy; travelled in Asia, the Levant, and W. Afr.; served in the Mex. war, in which he was severely wounded; sailed in 1850 in the first Grinnell expedition in search of Sir John Franklin; commanded the second Grinnell expedition (1853-55), and discovered an open polar sea; wrote narratives of both expeditions. D. Feb. 16, 1857.

Kane (SIR ROBERT), M. D., LL.D., F. R. S., b. at Dublin in 1810; was long prof. of chem. in Apothecaries' Hall; was founder and (1832-34) ed. of the *Dublin Journal of Med. Science*; was 1844-47 prof. of nat. hist. to the Royal Dublin Society; was for a time pres. of Queen's Coll., Cork; knighted in 1846. Is the author of the *Elements of Chem.* and the *Industrial Resources of Ire.*

Kane (THOMAS L.), b. at Phila. Jan. 27, 1822; brother of Dr. E. K. Kane; was ed. in Paris; admitted to the bar in 1846, but abandoned the law for civil engineering; visited the Mormon settlements in 1847, and in 1858 was sent to Ut. by the U. S. govt. as confidential agent to prevent the outbreak of hostilities. Returning to the profession of an engineer in W. Pa., raised and commanded, in Apr. 1861, the regiment known as the Bucktail Rifles; was wounded at Dranesville and Harrisonburg; was taken prisoner at the latter engagement, exchanged in Aug. 1862, and appointed a brig.-gen. of volunteers. D. Dec. 26, 1883.

Kangaroo, a name given to numerous species of marsupial or pouched animals living exclusively in Australia, belonging to the family Macropodidae, but more especially to the large species of the genus *Macropus*. K. is a native name. The K. is characterized by a remarkable disproportion between the anterior and posterior extremities, and particularly by the presence in the region of the abdomen of a curious pouch, within which are the mammae. The male is without this development. The head is small and resembles that of the deer. The hind feet are provided with 4 toes, the middle one being much larger than the others, of great strength, and provided with a hoof-like claw. The tail, which is very stout and strong, aids very materially in the leap. The fore legs are very short, and are provided with bent claws with which they hold food when eating. K. are exclusively herbivorous in diet, associating in small herds under the guidance of older males. They vary in size greatly. The young are produced in a very imperfect state. The new-born creatures are conveyed by the mouth to the pouch, where they attach themselves to the teats, which they do not leave until able to walk. [From orig. art. in *J's Univ. Cyc.*, by J. B. HOLDER, M. D.]

Kangaroo Apple, the *Solanum laciniatum*, a kind of tomato of S. Amer., Australia, and some of the Pacific islands. It is useful as food, but not until perfectly ripe.

Kankakee, city and R. R. centre, cap. of Kankakee co., Ill., 50 m. S. of Chicago, on the Kankakee River. It has excellent water-power and stone-quarries. Pop. 1880, 5651.

COUNTIES.	*Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Lincoln.....	5-F	516	8,582	Lincoln.....	422
Lion.....	6-K	12,174	15,598	Mound City.....	443
Lyon.....	6-I	6,014	17,326	Emporia.....	4,631
Marion.....	6-H	768	12,453	Marion.....	857
Marshall.....	4-H	6,901	16,136	Marvsville.....	1,249
McPherson.....	6-G	738	17,143	McPherson.....	1,590
Mead.....	8-C	11,725	296	.....	2,312
Miami.....	6-K	4,485	17,802	Paola.....	1,835
Mitchell.....	4-F	7,564	18,213	Independence.....	2,915
Montgomery.....	6-H	2,255	9,265	Council Grove.....	1,042
Morris.....	4-I	7,339	12,462	Seneca.....	1,203
Nemaha.....	7-J	10,206	15,131	Eric.....	31
Ness.....	6-D	7	3,722	Nes City.....	634
Norton.....	4-D	7,618	6,998	Norton.....	719
Osage.....	6-I	31	12,517	Osborne.....	1,084
Osborne.....	4-E	2,127	10,507	Minneapolis.....	1,066
Ottawa.....	6-F	179	5,396	Larned.....	309
Pawnee.....	7-D	7,448	16,350	Phillipsburg.....	114
Phillips.....	4-D	7,448	16,350	Westmoreland.....	1,540
Pottawatomie.....	4-H	7,448	16,350	Iuka.....	238
Pratt.....	7-E	.....	1,890	Lyons.....	2,105
Rawlins.....	4-B	.....	1,823	Manhattan.....	411
Reyno.....	7-D	.....	12,826	Atwood.....	509
Republic.....	4-G	1,281	14,913	Hutchinson.....	1,311
Rice.....	6-F	8	9,292	Belleville.....	.....
Riley.....	4-H	5,105	10,430	Leons.....	.....
Rooks.....	4-D	.....	8,112	Manhattan.....	2,105
Rush.....	5-B	116	5,490	Sneketon.....	411
Russell.....	5-E	116	7,851	Rush Centre.....	.....
Saint John.....	5-B	538	686	Russell.....	861
Saline.....	5-G	4,246	13,908	Wallace.....	173
Scott.....	6-B	.....	43	Salina.....	3,111
Sedgwick.....	7-G	1,995	18,758	.....	.....
Sequoyah.....	7-B	.....	595	Wichita.....	4,911
Seward.....	8-B	.....	5	.....	.....
Shawnee.....	5-I	13,121	29,093	Topeka.....	15,452
Sheridan.....	4-C	.....	1,867	Kenneth.....	.....
Sherman.....	4-A	.....	13	.....	.....
Smith.....	4-E	66	13,883	Smith Centre.....	254
Stafford.....	7-E	.....	4,155	Saint John.....	56
Stanton.....	7-A	.....	5	.....	.....
Stevens.....	8-B	.....	12	Wellington.....	2,694
Sumner.....	8-G	.....	20,812	.....	.....
Thomas.....	6-D	162	141	Wabunsee.....	415
Trego.....	5-D	22	2,535	Wa Keeney.....	362
Wabunsee.....	5-I	3,362	8,756	Alma.....	675
Washington.....	4-G	4,081	14,910	Washington.....	.....
Wichita.....	6-B	.....	13	.....	.....
Wilson.....	7-I	6,694	12,775	Fredonia.....	242
Woodson.....	4-F	3,837	9,535	Yates Centre.....	359
Wyandotte.....	5-K	10,015	19,143	Wyandotte.....	6,149
Total.....		364,399	996,056		

History.—That portion of K. lying E. of the 100th meridian formed a part of the La. purchase of 1803. By the Mo. Compromise act of 1820, in all this region lying N. of lat. 36° 30', excepting only such part thereof as was included within the limits of the State of Mo., slavery was forever prohibited. As a result of the Mex. war the terr. of the U. S. was extended from the 100th meridian westward to the Pacific as far S. as 32° 30' N. lat. In 1853 settlers had already entered the terr. in great numbers. It soon became evident that the fertile lands of E. K. were to be the objects of contention between the friends and opponents of slavery. Both sides were terribly in earnest; in Mass. an emigrants' aid society was chartered with ample funds in Mar. or Apr. 1854, to assist emigrants to remove to K. and to furnish them with weapons of defence against those who might attack them; in Conn. a similar co. was chartered in May or June of the same yr. In May 1854 Cong. passed the Kansas and Nebraska bill, organizing these 2 Terrs., and expressly declaring that the Mo. Compromise of 1820 was inoperative and void in regard to them. The emigrants entered the Terr. in considerable numbers in 1854, able and willing to contend for their new homes; but the pro-slavery men of Mo. and Ark. were as determined to secure the prize for themselves, and a series of raids and conflicts ensued, in which many settlers as well as invaders were killed. Four successive const. for the Terr. were voted upon: between Dec. 1855 and Oct. 1859. The const. adopted by the convention of Wyandotte, July 5, 1859, and ratified by the people Oct. 4, same yr., is the present const. of the State. K. was admitted into the U. Jan. 29, 1861.

Governors.

TERRITORIAL.	Thomas Carney.....	1861-65
A. H. Reeder.....	1854-55 Samuel J. Crawford.....	1865-69
Wilson Shannon.....	1855-56 James M. Harvey.....	1869-73
John W. Geary.....	1856-57 Thomas A. Osborn.....	1873-77
Robert J. Walker.....	1857-58 George T. Anthony.....	1877-79
James W. Denver.....	1858 John P. St. John.....	1879-83
Samuel Medary.....	1858-59 George W. Glick.....	1883-85
Frederick P. Stanton.....	1859-61 John A. Martin.....	1885-87
STATE.		
Charles Robinson.....	1861	

REVISED BY A. R. SPOFFORD.

Kansas City, important R. and commercial centre, Jackson co., Mo., on the Missouri River, just below the mouth of Kansas River, and 1 m. from the boundary-line between Mo. and Kan., 283 m. W. of St. Louis, at the point where the Mo. River finally bends to the E. The Mo. River is spanned by a bridge nearly 1400 ft. in length, built at a cost of \$1,000,000. It has 3 med. colls., a R. Cath. sem. and hospital, a city hospital, orphan asylum, workhouse, woman's home, and 2 opera-houses. It is the centre of the live-stock trade for States W. of the Miss., and received in 1882, 439,671 cattle, 963,036 hogs, and 80,724 sheep; is also a leading beef and pork-packing city and an extensive grain market. Pop. 1870, 32,360; 1880, 55,785.

Kant (IMMANUEL), b. in Königsberg, Ger., Apr. 22, 1724. He studied in the Königsberg Univ., and subsequently entered upon his career as prof. at the univ., which he kept up till 1797, when old age compelled him to retire. D. Feb. 12, 1804. He never left his native city except for a few miles' walk out in the country. In his first lectures at the

univ., K. followed pretty closely the Wolfian school of philos., then prevalent all over Ger. Still, his dissatisfaction with the existing state of the science of philos. is discernible. The great works of the Fr. and Eng. sceptical writers completed the change that was taking place in his views.

In 1781 he pub. the *Critique of Pure Reason*, which was soon followed by the *Critique of Practical Reason* and the *Critique of the Power of Judgment*. The distinguishing feature of the new system in these works is, that instead of treating philos. as a transcendental science, it treats it from a transcendental point of view. Philos. can only explain and prove truth, and its problem is to discover and apply the touchstone by which this proof can be made. Now, all theoretical propositions that may be made are either identical (like $A = A$), and these need no proof, or synthetical (A is A and something else too). Of the synthetical propositions, again, all those which are empirical can be proved only by experience, and hence pure reason is required only to prove those synthetical propositions which are not empirical—that is, which are *a priori*. It is this class of conceptions which require a rule whereby their proper application can be secured, for it is only by their improper application that disputes have become possible between philos. When quarrels have arisen, for instance, as to whether God was the cause of the world, or whether the soul was a substance, etc., the dispute would have been settled at once if a rule had been known whereby it could have been determined whether the synthetical conception of cause could have been predicated of God, or that of substance of the soul. K. discovered this rule, or the "supreme principle of all synthetical judgments," to be, that synthetical propositions *a priori* are valid only in so far as it can be shown that consciousness could not otherwise be possible. But not all the propositions of human reason are of a theoretical character. Theoretical reason always explains by the categories of causality, substantiality, and reciprocal relation, but all these categories explain only the *a priori* synthetical propositions or phenomena that occur within reason; not, however, reason itself. If reason itself has an explanation, therefore, it is the Freedom, the Self-determination, or the Categorical Imperative, which manifests itself in each individual as the Moral Law. If this categorical imperative is once admitted, if any individual confesses that he has ever done a moral act, then it can be shown that he also admits a Supreme God and immortality. For no one could rationally perform one moral act if he did not presuppose that he could rise to such a perfection as to make all the acts of his life moral—a perfection to which finite beings can attain only in an infinite life. Nor could he rationally perform such an act did he not presuppose that his act would accord with all the other acts performed by moral beings—an accord which can be realized only by a God. The remaining problem now was, How can reason become conscious of its free acts—i. e. of itself as practical reason operating upon an outside world—if that outside world can be cognized only by its theoretical faculty: that is to say, under the categories? This question K. solved in his *Critique of the Power of Judgment* by showing that we do view the outside world under other forms than those of theoretical reason—viz. under the forms of purposes or designs—forms which can be referred either to the outside world itself, in which case we arrive at teleological views of the world, or to our own reason, in which case we pass æsthetic judgments upon outside objects. In either case we posit ourselves as free judges. [From orig. art. in *J.'s Univ. Cyc.*, by A. E. KROEGER.]

Ka'olin (Chi. *Kao-ling*, the name of a hill of porcelain clay), the common name of a hydrated silicate of alumina or clay used for the manufacture of porcelain. The proportions of silica to alumina vary largely in different countries. Large beds of K. are found in Chi., Japan, Eng., Fr., and various parts of the U. S.

Kara (GEORGE). See CZERNY (GEORGE).

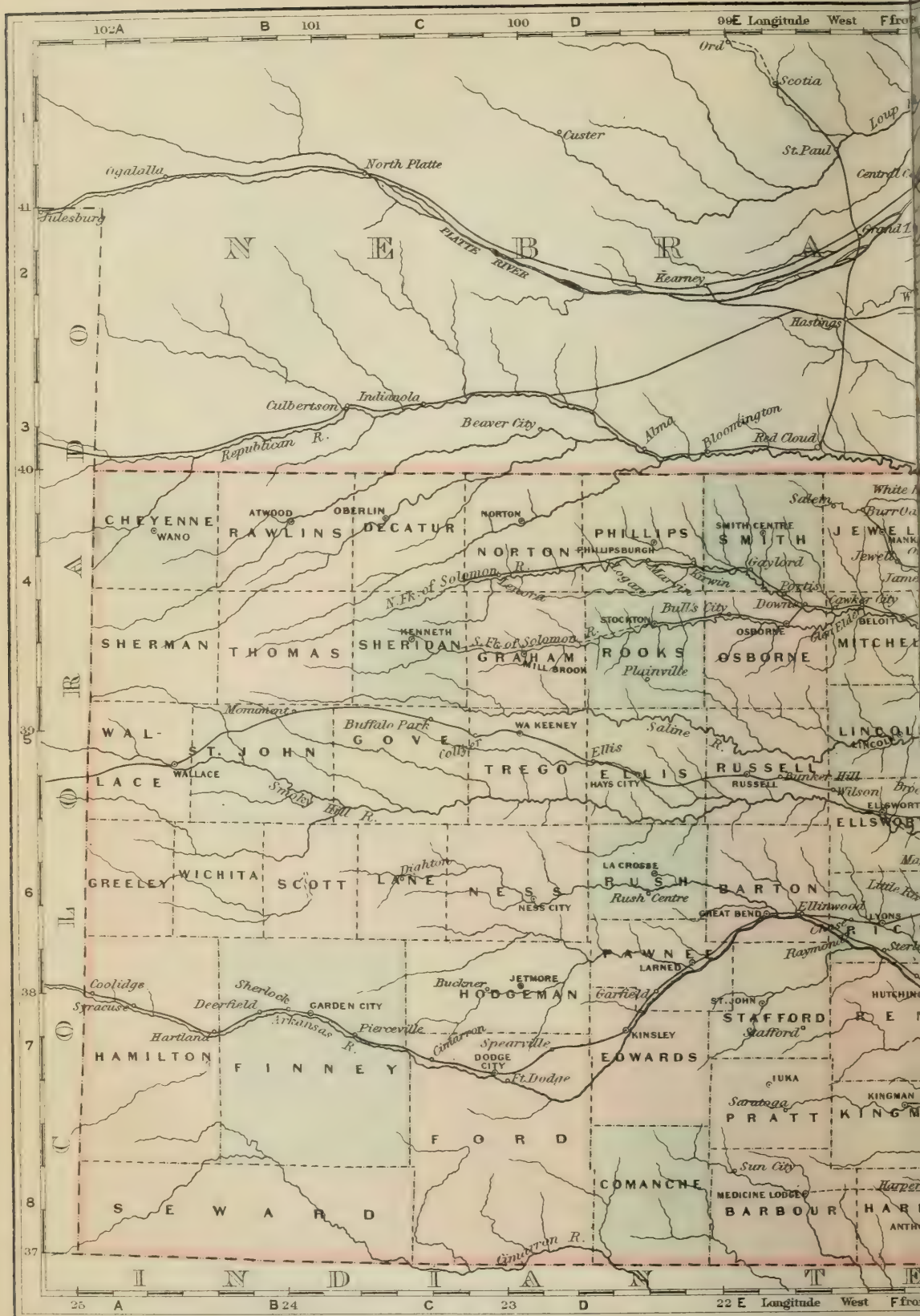
Karabissar. See AFUM AFUM-KARA-HISSAR.

Ka'raites, a Jewish sect. In the early part of the Middle Ages congregations of this name were settled in Babylonia, Pal., Egypt, Syria, the Crimea, and Lithuania. At the present day a few feeble congregations in the E., in Poland, and Rus. are all that remain of them. Their chief settlement was in the Crimea, in a v. among the mts. called Tshufut Kale, but the place is now deserted.

The name Karaite, or, as they also style themselves, Bene Mikra ("sons of Scripture"), is derived from the fundamental doctrine that marks their peculiarity as a sect. It consists in their acknowledging Script., and nothing but Script., to the exclusion of the Talmud and the traditions of the rabbins, as the source of their religion. The rise of this sect is wrapped in obscurity. One account assigns their origin to the age of John Hyrcanus (135 B. C.). According to a second account, their founder was Anan, who flourished about 760 A. D. A third view identifies them with the anc. sect of the Zadukim (Sadducees). The accounts of the K. themselves appear to be unreliable. At one time they acknowledge Jehuda ben Tabbai, an ancient teacher, as the founder of their sect; again, this honor is reserved for Anan, already mentioned; while at the same time they claim that their doctrine is as old as Judaism itself; that the principles they advocate were those of Moses and the prophets.

Though these different accounts are without adequate historical basis, they indicate the direction in which the truth is to be found. The correct view seems to be: As compared with the Bible, it cannot be denied that the rabbinic system marks a new departure. Like every innovation, it encountered opposition at the very outset. This opposition was gradually silenced, but could not be completely destroyed. It continued to exist as a strong undercurrent, and when the occasion was presented rose with new energy to the surface.

Rabbinism struck root shortly after the return from the captivity in Babylon. The Sadducees opposed the move-

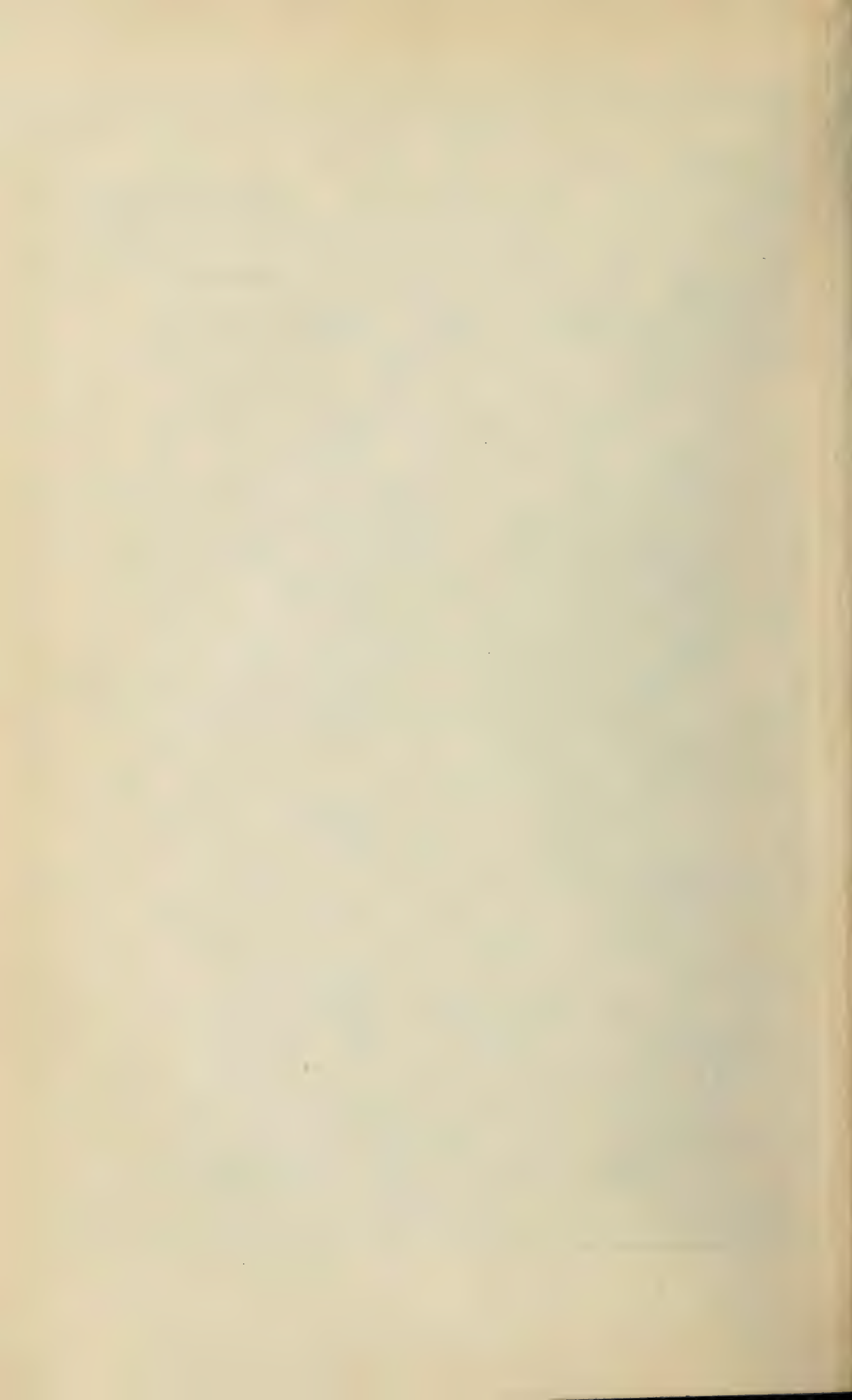




MAP OF
KANSAS

Drawn and Engraved on Copper-Plate
EXPRESSLY
FOR
JOHNSON'S CYCLOPEDIA.

Scale of Miles
0 10 20 30 40 50



ment, but were at last forced to succumb. The contest was renewed from time to time until the 8th century after Christ, when Babylonish rabbinism became intolerable. Anan ben David, belonging to a noble family, settled in Bagdad, and in 760 was an unsuccessful candidate for the post of "Prince of the Captivity," which belonged to him in right of birth. He and his adherents were subjected to persecution, and fled to Jerusalem, where he cut loose from the authority of the Talmud and founded the first congregation of the K. The divergence between the K. and the rabbinites became greater and greater; but it is worthy of note that even when the animosity of the contending sects was most pronounced, no one ever thought of declaring the opposing party without the pale of Judaism. The lit. of the K. presents some works of great value. Its centre was for some centuries at Jerusalem, but was afterward transferred to Constantinople, where it remained until 1640, after which the Crimea, and to some extent Lithuania, became the chief seats of K. scholarship. [From orig. art. in *J's Unt. Cyc.*, by REV. S. ADLER, PH. D.]

Karakorum is used as the name both of the whole W. part of the Kuen-lun Mts. and of one of the few passes (18,400 ft. high) by which this range can be crossed. It was also the anc. cap. of Mongolia, the city of the mythical Prester John, and was for a time the cap. of Genghis Khan. Its ruins have been sought in vain by modern travellers.

Karamzin (NIKOLAI MIKHAILOVITCH), b. Dec. 13, 1766. In early life he was imbued with mystical ideas. His first prominent literary production, which gained him great reputation, was his *Letter of a Rus. Traveller*. Until 1803 he devoted himself entirely to journalism and lit., writing poems, criticisms, and tales. In 1803 he was appointed by the emp. historiographer, and withdrew to Moscow and to the country, giving himself up entirely to historical studies. Being led by these studies to extreme conservative or retrograde views, in 1811 he presented to the emp. Alexander a *Memoir on Old and New Rus.* In 1816 he returned to St. Petersburg, and was well received by the emp., who set apart 60,000 rubles for the publication of his *Hist. of the Rus. Empire*. The rest of his life he passed quietly in St. Petersburg and the vicinity. D. June 3, 1826.

Karens, a people of N. Burmah, belonging to the Mongolian, or perhaps to the Tibetan family, the independence of whose country was recognized by treaty between Eng. and Burmah in June 1875. They are chiefly known from the success among them of the missions of the Amer. Bap. Missionary Society, soon followed by numerous others.

Karlstadt (ANDREAS RUDOLF), b. at Karlstadt, in Franconia, in 1480; his true name was BODENSTEIN. He studied at different places, and was appointed prof. in theol. at the Univ. of Wittenberg in 1513. He became one of the most energetic champions of the Ref.; but differing from Luther in several points, especially in his views of the Lord's Supper, a controversy broke out between them. K. was twice banished from Sax. In 1523 he went into exile for the first time. In 1525 he returned, and was reconciled with Luther. But when the contest between Luther and Zwingli began again, in 1528, K. was once more banished. At last he found refuge with the Swiss Reformers, with whom he agreed concerning the Lord's Supper. His prin. writings are *De utraque specie (conce and Auslegung der Worte: Das ist mein Leib*, D. 1541.

Karmathians [from *Hamdan Karmat*, one of their early leaders], a Mohammedan sect, originally a branch of the Ismailis, and like them became free-thinkers. They were at one time very powerful, and held nearly absolute sway over Ar., Per., and Syria. In 900 A. D. they made great advances; in 928 threatened Bagdad; in 930 attacked Mecca, then full of pilgrims, whom they slaughtered, desecrating the Kaaba, and carrying away the Black Stone, which they kept for 20 yrs. Their cap. was Lahsa, where they were in power in the 11th century. Relics of them exist.

Karnak, a modern v. of upper Egypt, on the Nile, occupying part of the site of Thebes, renowned for its magnificent architectural remains. Chief among these is the great temple, 1200 feet long, 330 feet broad, with gigantic colonnades, colossal figures, sculptures of various kinds, in colored sandstone, marble, red and dark granite. Fragments have been found bearing the name of Sesortosis (B. C. 2300). The arch. is due in large part to Mœris, who adorned the palace with a list of his royal predecessors. There are memorials of the glory of Amenophis (A. C. 1500). The great hall was built by Sethos (A. C. 1340). The chief temple contains sculptures with inscriptions of the time of Rameses the Great, or Sesotris (A. C. 1396-28). The great tablet of K. was shown and explained by the priests to Germanicus (A. C. 16).

Karoo' Bokadam', the *Cerberus cinereus*, a fresh-water snake of India, nearly 4 ft. long and quite harmless.

Kars, town of Armenia, ceded to Rus. in 1878, on a tableland between 6000 and 7000 ft. above the sea. In 1855 it sustained a long siege by the Rus., but was compelled to surrender Nov. 30. It was stormed by the Rus. Nov. 18, 1877. Pop. 12,000.

Kashgar, city of E. Toorkistan, on the Kizil-Darya, in a plain between 4000 and 5000 ft. above the sea. It was the capital of the insurgent kingdom of Yakub Beg, on whose death in 1877, it was recaptured by the Chinese. Pop. 112,000.

Kashmir. See CASHMERE.

Kasson, on R. R., Dodge co., Minn., 50 m. W. of Winona, first surveyed in 1806. Pop. 1870, 515; 1880, 1054.

Kasson, (JOHN A.), b. near Burlington, Vt., Jan. 11, 1822, grad. at the Univ. of Vt. in 1842; studied law in Mass., and practised at St. Louis until 1857, when he removed to Ia.; became assistant P. M.-gen. in 1861; elected to Cong. in 1862; com. to international postal cong. at Paris in 1863; again elected to Cong. 1864, 1872, 1874, 1880, and 1882; became U. S. minister to Aus. 1877, and to Ger. 1884.

Kastamooni, town of Asiatic Tur., cap. of the eyalet of the same name, in Asia Minor. Pop. 48,000.

Katab'din (or **Katadn**), **Mount**, the highest summit in Me., 5385 ft. above the sea.

Ka'ter (HENRY), F. R. S., b. at Bristol, Eng., Apr. 16, 1777; went to India in 1796, where he was engaged for several yrs. on the trigonometrical survey; rose to the rank of lieut., and retired on half-pay in 1814. He invented about 1825 the trigonometrical instrument called a *floating collimator*; experimented on telescopes; was prin. author of Lardner and Kater's *Treatise on Mechanics*, and wrote *An Account of the Construction and Verification of Certain Standards of Linear Measure for the Rus. Govt.* D. Apr. 26, 1835.

Kathay, or **Cathay** (*Khitaï*, in Oriental form), is the name by which Chi. is styled by nearly all the nations which know it from the direction of Inner Asia, including the Rus., the Pers., and the nations of Toorkistan, yet it originally pertained to a people who were not Chi. The Khitaï or Khitai were a nation probably allied to the modern Tunguses, whose chiefs, in the early part of the 10th century, overran the Chi. provs. N. of the Yellow River, and established their empire over them also, under the name of Liao or the Iron dynasty. This Khitaï empire subsisted for 2 centuries, terminating in 1123, when it was in turn subverted by a new invasion from the N. And it must have been in those 2 centuries that the name *Khitaï* became indissolubly associated with Chi.

The Khitaïan dynasty was displaced by a tribe akin to the Manchooks, who reigned under the name of Kin or *Golden* dynasty, and were displaced (1214-34) by the Mongols of Genghis Khan. European travellers soon made their way into the region, and brought back accounts of Cathay. Noted among these was William de Rubruquis (1253), a Fr. Dominican monk, who says of the people: "Those Cathayans are little fellows, speaking much through the nose, and, as is gen. with those Eastern people, their eyes are very narrow. They are first-rate artists in every kind of craft. They do their writing with a pencil such as painters paint with, and a single character of theirs comprehends several letters, so as to form a whole word."

During this and the succeeding century Cathay was visited by several travellers, notable among whom were Marco Polo (1295) and Francesco Pegolotti (1340). About this time the house of Genghis began to totter, and its fall in 1368 closed all communication with the W. world. When the veil was lifted, a century and a half later, by Port. and Sp. navigators, a new name for the region was heard, and by and by it began to be suspected that this China was the Cathay of Marco Polo.

One aspect of Cathay is of special interest. It was Cathay, with its outlying islands of Zipangu, or Japan, that Columbus, penetrated by his intense convictions of the smallness of the earth and of the vast extension of Asia eastward, sought to reach by sailing W.; and to the day of his death he was full of the imagination of the proximity of the domain of the Great Khan to the islands and coasts which he had discovered. [From orig. art. in *J's Unt. Cyc.*, by MAJ.-GEN. H. YULE.]

Kato'nah, on R. R., Westchester co., N. Y., 42 m. N. of New York. Pop. not given in U. S. census of 1880.

Ka'trine, Loch, a lake of Scot., in the co. of Perth. It is 8 m. long, $\frac{3}{4}$ m. wide, and remarkable as well for the depth and purity of its water as for its beautiful scenery.

Kattimandoo, or **Cuttimundoo**, the milky sap of *Euphorbia nereifolia*, an E. I. plant. It resembles gutta-percha, and has considerable value in med. and the arts.

Ka'tydid (*Cyrtophyllus concavus*), a large green orthopterous insect of the U. S., belonging to the group Locustaræ, found throughout a great part of the country. It is so called from its note, produced in the early part of the night, somewhat resembling the words "Katy did." This noise is produced by the friction of transparent membranes attached to the wing-covers.

Kauf'man (MARIA ANNA ANGELICA), b. at Coire, in the Grisons, in 1741, became eminent in portraits in oil. She, however, owed her fame and fortune as much to personal attractions and social accomplishments as to her art, which was mannered, conventional, and monotonous. Her pictures are graceful and pleasing, harmonious in color, correct in drawing, and sweet in expression, but are not thought deserving of the praise lavished on them. Her most brilliant success was in Lond., where the duchess of Brunswick sat to her, and where she painted portraits of the queen and son of George III. Her attempts at historical painting were ambitious failures. D. Nov. 1807.

Kaufmann, von (C.), Rus. gen., made himself famous by his successful expedition into Central Asia. In 1807 he was appointed gov.-gen. of the vast regions which now have been united into the military circle of Toorkistan. Immediately after his arrival in Toorkistan he took up a position on the S. frontier of his terr., and entered on long negotiations with the hostile emir of Bokhara. In Mar. 1808 he commenced to march southward. The emir declared war. K. succeeded in defeating the force of the emir, and in the middle of May he occupied Samarcand. The result was a peace, by which the emir ceded Samarcand and a large terr., and became a submissive friend of Rus. K. now used the humiliation of Bokhara for the subjugation of the khan of Khiva. After several cautious reconnoitring, K. moved, in Mar. 1813, 3 columns, consisting of 12,000 men, from the Caspian Sea, from Orenburg, and from Tashkend, toward Khiva, and after great hardships on the long march he entered the hostile cap. June 10. He compelled the khan to a peace advantageous to Rus., and defeated the wild tribes of the Toorkomans and Jomudes. The absolute authority of Rus. in Central Asia was established. D. May 1882.

Kaul'bach, von (WILHELM), b. at Arolsen, in the principality of Waldeck, Oct. 15, 1805; studied at the Acad. of Dusseldorf under Cornelius, whom he followed to Munich in 1825, remaining there for the rest of his life. His first pictures are *Apollo and the Muses*, on the ceiling of the Odeon, and the 16 wall-pictures in the palace of Duke Max

illustrative of the myth of Cupid and Psyche, all executed in fresco. Nearly at the same time appeared his *Lunatic Asylum*, and his celebrated illustrations to *Reinhold Fuchs*. But his true genius did not fully reveal itself until 1837, when he finished the *Battle of the Huns* for Prince Raczynsky; next yr. followed the *Destruction of Jerusalem* for the Pinakothek in Munich. His largest and most celebrated productions are the decoration of the stairway in the Museum of Berlin, commenced in 1847; *St. Michael, the Patron Saint of Ger.*, finished shortly before his death, and others. D. at Munich Apr. 7, 1874.

CLEMENS PETERSEN.

Kaunitz (WENZEL ANTON), PRINCE, count of Rietberg, b. at Vienna Feb. 2, 1711; studied at Leipsic and Leyden, travelled through Fr. and It., and entered the diplomatic career in the Aus. service in 1735. By the skill with which he negotiated the Peace of Aix-la-Chapelle in 1748, and still more by his success in forming an alliance between Aus. and Fr., while ambassador in Paris (1750-52), he acquired great fame as a diplomat, and in 1753 Maria Theresa made him chancellor and placed him at the head of the Aus. gov't. This position he held for nearly 40 yrs. Under the reign of Joseph II. his influence decreased, especially after the failure of his negotiations for the annexation of Bavaria to Aus. D. June 27, 1794.

Kauri Pine, the *Dammara australis*, and other species of the same genus, produced in Australasia and adjacent regions; coniferous trees of noble size, and the best quality as timber; produce kauri gum or New Zealand dammar, extensively used in making varnishes.

Kautz (August Valentine), b. Jan. 5, 1828, near Pforzheim, grand duchy of Baden; came to the U. S. in 1838 with his parents, who settled in Brown co., O., in 1831; grad. at W. Pt. 1852; first lieut. 1855, capt. 6th cav. May 1861, col. 2d U. S. Cav. Sept. 1862, brig.-gen. of volunteers May 1864; served during the c. war in the Va. Peninsular campaign 1862; in the Army of the O. 1863, with the Army of the James, commanding cav. division, 1864-65; member of the military commission for the trial of the assassins of Pres. Lincoln; lieut.-col. 34th Inf. July 1866; transferred to 15th Inf. Mar. 1869; col. 8th Inf. June 1874. Author of *Company Clerk, Customs of Service for Non-commissioned Officers and Soldiers, and Customs of Service for Officers*.

Kavanaugh (HUBBARD H.), D. D., b. near Winchester, Ky., in 1802; was Meth. local preacher in 1822; joined Ky. conference in 1823, and for 50 yrs. was a successful itinerant; was supt. of public instruction in Ky. in 1839, and became bp. of the M. E. Ch. S. in 1854.

Kawi, the anc. sacred lang. of the island of Java, is based chiefly upon the Sans. It gradually became corrupted by the ordinary Javanese tongue to the extent of about $\frac{2}{3}$ of its vocabulary. The name signifies "learned" or "wise," and has been applied only since it began to be distinguished from the aboriginal langs. by the composition of a lit. This took place in the early centuries of the Chr. era. In the 15th century the sacred lang., as well as the religion taught by it, was driven to the neighboring small island of Bali, where some knowledge of it is still retained.

Kazan', town of Rus., on the Kazanska, 4 m. from its influx in the Volga. It was destroyed by fire in 1815 and 1842, but rebuilt each time. In the neighborhood is the magnificent Semiozernoi convent. Pop. 94,179.

Ke'gy (JOHN M.), M. D., b. in Lancaster co., Pa., about 1795; taught chiefly in the public high school at Harrisburg, where he wrote his *Pestalozzian Primer* in 1827, a book made up largely of "thinking lessons," the modern "object lessons." He advocated, and to some extent practised, the mode of teaching a child to read words "as if they were Chinese symbols."

Kean (CHARLES JOHN), son of Edmund Kean, b. at Waterford, Ire., Jan. 18, 1811; made his first appearance on the stage at Drury Lane Theatre on Oct. 1, 1827, in the character of Norval. His reception was cold, and success came to him slowly. In 1830 he visited Amer., and appeared as Richard III. at the Park Theatre; returned to Eng. Jan. 1833, and played in the provincial theatres; made a professional trip to Hamburg; came to Lond. in 1838, and took position, as Hamlet, in the front rank of his profession. Mr. K. gained his chief reputation in the tragedies of Shakespeare—*Hamlet*, *Macbeth*, *Richard II.*, *Richard III.*, *Romeo and Juliet*—but he did not sustain the grand traditions of his father. D. Jan. 22, 1863. O. B. FROTHINGHAM.

Kean (EDMUND), b. in Lond. Mar. 17, 1787; d. in Richmond May 15, 1833. His first appearance on the Lond. stage was at Drury Lane Jan. 26, 1814, in the character of Shylock. His success was immediate, and was raised to the highest point by his impersonations of Hamlet, Richard III., Macbeth, Othello, Iago, Lear, Sir Giles Overreach, Sir Edward Mortimer, etc. He visited the U. S. in 1820, and again in 1825; his last appearance was in 1833, with his son Charles as Othello; his strength failed him in the middle of the play, and he was borne out in the arms of his son. K. was a man of genius and accomplishment, a student in his profession, of extraordinary powers of mimicry and conversation, but irregular in life, capricious in temper, and eccentric in habit. He was small of stature, but graceful, and when under the influence of passion effective, and even grand. His countenance was expressive, his eye brilliant, his action free and noble, his voice flexible and strong. His power of impersonation was wonderful; in his best moments "he seemed to clutch the whole idea of his character."

O. B. FROTHINGHAM.

Keane (JOHN), LORD, b. at Belmont, Ire., in 1781; entered the Brit. army; served in Egypt, and in Sp. during the Peninsular war, gaining the rank of maj.-gen.; commanded the Brit. expedition against New Orleans in 1814 until superseded by Pakenham; was wounded at the battle of New Orleans; commanded the W. I. forces 1823-30, and acted for some time as gov. of Jamaica. In 1833 he was sent to India, and during the Afghan war (1839) captured Ghuznee. D. Aug. 24, 1841.

Kearney, city and R. R. junc., cap. of Buffalo co., Neb., 198 m. W. of Omaha. First town-lots were sold Sept. 9, 1872. Pop. 1880, 1782.

Kearney, KARNE (LAWRENCE), b. at Perth Amboy, N. J., Nov. 30, 1789; entered the U. S. N. as mdpn. in 1807; served on the coast of the S. States during the war of 1812; destroyed pirates in the W. I., Gulf of Mex., and in the Levant; commanded the Chl. squadron in 1841, securing Amer. commercial rights; returned in 1844; became com. in 1866. D. Nov. 29, 1868.

Kearny (PHILIP), nephew of the succeeding, b. in New York June 2, 1815; grad. at Columbia Coll. and studied law, but in 1837 accepted a lieutenancy in the dragoon regiment of which his uncle was col., and soon after visited Europe to examine and report upon the tactics of the Fr. cav. service. Here he attended the Polytechnic School at Saumur, and subsequently served as a volunteer in Algeria, winning the cross of the Legion of Honor. Returned to the U. S. in 1840, and was attached to the staff of Gen. Scott 1841-44, under whom he served in the Mex. war; capt. of dragoons in 1846, and brevetted major for Contreras and Churubusco. In the final assault on the city of Mex. he lost an arm; subsequently served in Cal. Resigned Oct. 1851, and went to Europe; served in the It. war of 1859, being engaged at Magenta and Solferino, and was a second time decorated with the cross of the Legion of Honor. The news of the outbreak of c. war in the U. S. caused his return home. Appointed a brig.-gen. of volunteers, he was assigned to the command of a brigade of N. J. troops. In the Peninsular campaign of 1862 he commanded a division. Arriving at Harrison's Landing, he was promoted to be maj.-gen. of volunteers in the second battle of Bull Run he was again conspicuous, and at Chantilly, where he was killed while reconnoitring in advance of his troops. D. Sept. 1, 1862.

Kearny (Gen. STEPHEN WARRE), b. at Newark, N. J., Aug. 30, 1794; on the outbreak of the war with G. Brit. he abandoned his studies at Columbia Coll. and entered the army as first lieut. of inf. Mar. 1812; in the following Oct. he was distinguished in the assault on Queenstown Heights, and promoted to be capt. Apr. 1813; was retained in the army, rising to be brig.-gen. in 1846. In the war with Mex. he commanded at the commencement of the army of the W., which made conquest of the prov. of N. M.; continued his march to Cal., and Dec. 6, 1846, fought the battle of San Pascual, where he was twice wounded; subsequently commanded in the battles of San Gabriel and Plains of Mesa, Jan. 8 and 9, 1847. He was gov. of Cal. from Mar. to June 1847; joined the army in Mex., and was gov. of Vera Cruz Mar. 1848, and May 1848 of city of Mexico. For his services he was brevetted maj.-gen. Wrote *A Manual for the Exercise and Manoeuvring of U. S. Dragoons, Organic Law, and Laws for the Govt. of the Terr. of N. M.* D. Oct. 31, 1848.

Kear-sarge, Mount, in Carroll co., N. H.; height, 3250 ft. The vessel which sunk the Alabama in 1864 was named after this mt. Another one of the same name, in Merrimack co., N. H., formerly called *Kyar-Sarga*, by the Indians Cowisewaschook, height 2950 ft., has been erroneously claimed for this honor. G. V. Fox.

Keats (JOHN), b. in Lond. in 1796; served 1810-15 an apprenticeship to a surgeon, and then studied in Lond.; wrote in 1817 a vol. of verses, followed in 1818 by *Endymion*, and another vol. of poems in 1820. D. Feb. 24, 1821.

Keayne (Capt. ROBERT), b. probably in Lond. in 1594 or 1595; was a merchant tailor; aided Plymouth colony by donations as early as 1624, and became one of the founders of the Mass. colony, settling at Boston in 1635. He was frequently representative for Boston from 1638 to 1649; was a liberal donor to Harvard Coll., and by legacy founded a free school at Boston, now the Lat. Gram. School. His singular will covers over 50 pages, being perhaps the longest on record in Amer.

Ke'ble (JOHN), M. A., b. at Fairford, Eng., Apr. 25, 1792; passed B. A. at Corpus Christi, Ox., 1810; became a fellow of Oriel 1811; was public examiner at Ox. 1814-16; took deacon's orders 1815, priest's 1816; was a tutor at Ox. 1818-23; became prof. of poetry 1831; was one of the original Tractarians, and a leader of the Anglo-Catholic movement; became vicar of Hursley 1836. He wrote the *Chr. Year*, a vol. of sacred poetry; *Lura Innocentium*, several vols. of *Sermons*, and other works. Memoir of him has been written by Sir John T. Coleridge. D. Mar. 29, 1866.

Keesketmet, town of Hungary. The annual cattle-fair held here is the most important in the country. Pop. 44,887.

Keen (WILLIAM WILLIAMS), M. D., b. in Phila. Jan. 19, 1837; entered Brown Univ. in 1859 and Jefferson Med. Coll. in 1862; studied 1864 at Paris, Vienna, and Berlin; returned in 1866, and began practising in Phila.; became proprietor of the Phila. School of Anat.; lectured on anat. at this inst. and on pathological anat. at Jefferson Med. Coll., and was appointed trustee of Brown Univ. and Crozer Theological Sem., and surgeon to St. Mary's Hospital, Phila. His prin. writings are *Gunshot Wounds, Practical Anat., Anatomical, Pathological, and Surgical Uses of Chloral*.

Keene, city and R. R. centre, cap. of Cheshire co., N. H., 92 m. N. W. of Boston. The public buildings consist of a c.-h., city hall, and high-school building. Central Square is planted with trees and contains a soldiers' monument. Pop. 1870, 5971; 1880, 6784.

Keen'er (JOHN C.), D. D., b. in Baltimore 1819; ed. at Wesleyan Acad., Wilbraham, Mass., and at Wesleyan Univ., Middletown, Conn.; was ed. of the *New Orleans Chr. Advocate* (M. E. Ch. S.) from 1865 to 1870, and was elected bp. in that yr. In 1873 he visited the S. Meth. missions in Mex., which were at that time intrusted to his superintendence. He is author of *Post Oak Circuit*.

Keeseville, Essex co. and Clinton co., N. Y., lying on both sides of the Au Sable River, which is the boundary between those cos., 4 m. W. of Lake Champlain and 150 m. N. of Albany. Iron and nail works are the principal industry. Pop. 1880, 2181.

Keifer, kee'fer (JOSEPH WARREN), b. in Bethel, O. Jan. 30, 1836; studied at Antioch Coll.; admitted to the bar in 1858; major 3d O. Inf. Apr. 27, 1861; lieutenant-col. Feb. 12, 1862; col. of 110th O. Inf. Sept. 30, 1862; was severely wounded in battle of the Wilderness 1864; having served in W. Va., Ky., Tenn., Ala., and Ga., was brevetted brig.-gen. Nov. 30, 1864; brig.-gen. Dec. 1864; maj.-gen. by brevet July 1, 1865; resumed practice of law 1865; elected to O. senate 1868, serving till 1870; delegate to Rep. National Convention 1876; M. C. 1876; re-elected 1878 and 1880; commander of Grand Army of Republic, dept. of O., 1868-70; became vice-commander-in-chief May 8, 1872; speaker House of Reps. Dec. 5, 1881, to Mar. 4, 1883; again M. C. 1883-85.

Keith, keeth (GEORGE), b. at Aberdeen, Scot., about 1640; was ed. for the Presb. ministry at the Univ. of Aberdeen; adopted Quaker principles about 1664. In 1682 he took charge of a Quaker school at Edmonton, and was imprisoned for preaching without license (1684). Soon afterward he came to Amer.; became surveyor-gen. of E. Jersey, and in 1689 took charge of a Quaker school in Phila. He became involved in controversy with his own sect, and came into collision with William Penn, whom he charged with deism, and by whom he was denounced as an apostate. K. thereupon founded a sect known as Keithians, Chr. Quakers, or Bap. Quakers, but ultimately entered the Ch. of Eng. From 1702 to 1705 he made a tour of the N. colonies, converted and baptized many Quakers. Returning to Eng. in 1706, he was appointed rector of Edburton in Sussex. Wrote many theological tracts both for and against Quakerism, also a *New Theory of the Longitude*. D. about 1715.

Keith (GEORGE KEITH-ELPHINSTONE), ADMIRAL, VISCOUNT, b. at Elphinstone, Scot., Jan. 12, 1746; entered the navy, and as post-capt. commanding the frigate *Perseus*, took part in the action of Bunker Hill. In 1793 he served under Lord Hood at Toulon, and as admiral was despatched in 1795 to operate against the Dut. colonies. He took possession of Cape Colony in S. Afr., Ceylon, Cochín, Malacca, and the Molucca Islands; in Aug. 1796 captured a Dut. squadron near Saldanha Bay, W. Afr., and was created an Irish peer. In Mar. 1800 he blockaded Masséna in Genoa, co-operating with the Aus., who took that city. He aided Abercrombie in the Egyptian expedition, and in 1815 commanded the Channel fleet, which prevented the escape of Nap. I. In 1814 he was created Viscount Keith of the peerage of the United Kingdom. D. Mar. 10, 1823.

Keith, kit (LAWRENCE M.), b. in Orangeburg dist., S. C., Oct. 4, 1824, grad. at the State Coll., Columbia, in 1843; studied law, and was admitted to practice in 1845; was elected to the State legislature in 1848, and to Cong. in 1853, which position he held until he resigned it in the winter of 1860-61. He was then elected to the Confed. Cong., which met in Montgomery Feb. 4, 1861; acted a conspicuous part in the formation of the consents for the Confed. States; entered the military service with a col.'s commission, and fell at the head of his regiment, in repelling the assault at Cold Harbor, June 3, 1864.

Kelat, the cap. of Belochistan, in a narrow valley 6000 ft. above the sea. It is surrounded with walls, and has some importance as a fortress. Pop. estimated at 30,000.

Kellermann (FRANÇOIS CHRISTOPHE), b. at Strasbourg, 1735; was brig.-gen. when the Revolution of 1789 broke out, and was made gen.-in-chief. He won the battle of Valmy in 1792 against the allies, who were marching on Paris; was arrested in 1793, and remained in prison until 1794. He commanded in 1795 the armies of the Alps and of It., and Nap. made him duke of Valmy and marshal of Fr. On the fall of the empire in 1815 he rallied to the Bourbons. D. 1820.

Kelley (WILLIAM DARRAH), b. in Phila. Apr. 12, 1814. He was (1835-39) a jeweller of Boston, Mass.; was admitted to the Phila. bar in 1841; became a leading Dem.; was atty.-gen. of Pa. 1845-46, a judge of the common pleas court 1846-56; in 1854 became a Rep.; was M. C. 1861-82.

Kellogg (CLARA LOUISE), b. in Sumterville, S. C., July 1842, of N. parentage and ancestry. A yr. after her birth the family removed to New Haven, Conn., and resided there till 1856, when they went to New York. Here the young girl's musical education was begun under teachers of the first rank. She studied with intense industry, ambition, and passion for art, and was brought out in the character of Gilda (*Rigoletto*) at the Acad. of Music in the season of 1861-62. In 1867 she appeared in Lond. at Her Majesty's Theatre. Returning to the U. S. in 1868, she made a brilliant tour through the States till 1872, when she again accepted a Lond. engagement, and sang at Drury Lane with Nilsson. About 1877 she determined to establish in Amer. on a popular basis the Eng. opera. Into this enterprise she threw herself with all her accustomed energy, assuming the direction of the pieces, the training of the singers, and in gen. the conduct of the business. Her labors were crowned with complete success. In the W. cities her popularity is immense. Miss K. has a fine musical organization, great capacity for labor, a retentive memory, severe conscientiousness as an artist, an ardent enthusiasm, and a voice of great compass and purity. O. B. FROTHINGHAM.

Kellogg (FRANCIS W.), b. at Worthington, Mass., May 30, 1810; removed at an early age to Mich., and became a lumber-merchant. After serving in the legislature he was elected M. C. in 1858, re-elected in 1860 and 1862, and appointed in 1865 collector of internal revenue for the dist. of Ala.; was returned to Cong. from Ala. in 1868.

Kellogg (STEPHEN WRIGHT), A. M., b. at Shelburne, Mass., Apr. 5, 1822, grad. at Yale in 1846; became a lawyer of Waterbury, Conn.; clerk of the State senate 1851; was in both houses of the legislature; judge of probate 1854-60; elected in 1871 as rep. in Cong., and re-elected in 1873, but defeated in 1875.

Kellogg (WILLIAM), b. in Ashtabula co., O., July 8, 1814; removed to Ill. in 1837; studied law; was member of the State legislature 1849-50, judge of the circuit court for 3 yrs.; elected to Cong. in 1856, re-elected in 1858 and 1860; appoint-

ed in 1864 minister resident in Guatemala, and in 1866 chief-justice of Neb.

Kellogg (WILLIAM PITT), b. in Vt. in 1830; removed in 1848 to Ill.; became a lawyer in 1854, chief-justice of Neb. in 1861; served as a col. in the c. war, and became a brig.-gen.; was collector of the port of New Orleans; U. S. Senator from La. 1868-71; was in 1872 declared elected gov. of La. for the term ending in 1877; again U. S. Senator 1877-83; M. C. 1883-85.

Kelly (ROBERT), LL.D., b. in New York Dec. 10, 1808, grad. at Columbia Coll. 1826; joined his brothers in mercantile business, retiring in 1837 to devote himself to the cause of education. He was regarded as the founder of the Free Acad.; was pres. of the board of education and a regent of the Univ. of the State; also a trustee of New York and Madison univs., and one of the founders of Univ. of Rochester. He was pres. of board of managers of the House of Refuge; became city chamberlain. D. Apr. 27, 1856.

Kelly (WILLIAM), b. in New York Feb. 4, 1807. His father d. 1825, leaving 3 sons, John, William, and Robert, all minors. The two first, aided by Robert after leaving coll., ably conducted business until 1837, when John having d. in 1836, the other brothers retired. In 1842 William purchased an estate near Rhinebeck, and became a farmer; pres. of N. Y. State Agricultural Society 1854; one of the founders of the State Agricultural Coll. at Ovid, and pres. of its board; was many yrs. pres. of the trustees of Rochester Univ. and of the board of Vassar Coll.; pres. of the Bap. educational commission, and active in many charitable, religious, and business enterprises; was N. Y. State senator 1855-56, and Dem. candidate for gov. in 1860. D. Jan. 14, 1872.

Kelp, **Barilla**, or **Varec**, names applied to the ashes or products of incineration of *sea-weeds*. These products were once the sole source of the valuable alkali soda, for making soap and glass. At present the chief interest that attaches to K. is as the prin. material from which the element *iodine* is obtained.

Kemble, a name distinguished from first to last in the records of the Eng. stage. The founder of the family, Roger, himself an actor and theatrical manager, b. in Hereford, Eng., Mar. 1, 1721, d. in 1802, had 12 children, the eldest of whom, Sarah, married an actor named Siddons. (See Mrs. Siddons.) The oldest son was JOHN PHILIP, b. in Prescot, Lancashire, Eng., Feb. 1, 1757. This was the "great Kemble." He made his first appearance at Wolverhampton Jan. 8, 1776, in the character of Theodosius; made his first appearance in Lond. at Drury Lane, in Sept. 1783, as Hamlet. In 1817 he took leave of the Lond. stage, and took up his residence at Lausanne, Switz., where he d. Feb. 26, 1823. Mr. K.'s style of acting was more suited to the lofty and majestic than to the pathetic and tender. His person was of heroic mould, his action was stately, his declamation noble and true. In moments of passion he rose to great power. But his form lacked suppleness, his limbs were rigid, his voice was husky and unmusical, and a constitutional asthma gave a labored character to his utterance.—GEORGE STEPHEN, brother of the foregoing, b. in Kingston, Herefordshire, May 3, 1758; d. June 5, 1822.—ELIZABETH (Mrs. Whitlock), sister of the above, b. in Warrington, Lancashire, Apr. 2, 1761; d. Feb. 27, 1836.—CHARLES, 11th child of Roger, b. at Brecon, S. Wales, Nov. 27, 1775; d. in Lond. Nov. 12, 1854.—FRANCES ANNE (commonly called "Fanny"), daughter of Charles, b. in Lond. in 1811. She made her first appearance at Covent Garden on Oct. 29 as Juliet to her father's Romeo. In 1832 she came to the U. S. with her father. In 1834 she married Mr. Pierce Butler, a Phila. gentleman of wealth, and retired from the stage. The marriage being unhappy, she obtained a divorce in the courts of Pa. Since 1848 Mrs. Kemble has been known as a reader of Shakspeare in the chief cities of the U. S. and in G. Brit.—ADELAIDE, younger sister of Frances, b. in Lond. in 1820. Her talents were brilliant, but her marriage in 1843 to Mr. Edward Sartoris prevented her pursuing her career.—Her son, ALGERNON CHARLES, married the daughter of Pres. Grant in May 1874. O. B. FROTHINGHAM.

Kemble (GOVERNMENT), b. in New York Jan. 25, 1786, grad. at Columbia Coll. in 1803; visited the leading countries of Europe, then agitated by the wars of Nap.; visited the Mediterranean ports, and transacted business for the U. S. at the time of the war with Algiers about 1815; established in 1817 the W. Pt. Foundry at Cold Spring; was M. C. 1837-41, and of the constitutional convention of N. Y. in 1846; was one of the most active advocates of the Hudson River R. R., and an efficient friend of the Panama R. R. He was one of the last 9 survivors of the Tontine Association of New York, organized in 1790, and at his death the accumulated profits were divided. D. Sept. 16, 1875.

Kemp (JAMES), D. D., b. in Scot. in 1764, grad. at Marischal Coll., Aberdeen, in 1786; came to the U. S. in 1787; took orders in the P. E. Ch. in 1789; held various rectorships in Md., in which diocese he became in 1814 a suffragan, and in 1816 the diocesan bp. He was 1816-27 provost of the State Univ. D. Oct. 28, 1827.

Kemp (JOHN), CARDINAL, b. at Wye, Eng., in 1380; was ambassador to Aragon in 1415; bp. of Rochester in 1419, of Chichester in 1421, of Lond. in Nov. of the same yr.; chancellor and abp. of York in 1436; resigned the Great Seal in 1432; joint ambassador to Fr., and made cardinal-priest in 1439; endowed the Coll. of Wye in 1447; again chancellor in 1450; made cardinal-bp. and abp. of Canterbury by papal bull in 1452. D. Mar. 22, 1454.

Kemper (JACKSON), D. D., LL.D., b. in Pleasant Valley, N. Y., Dec. 24, 1789, grad. at Columbia Coll. in 1809; in 1811 took deacon's orders in the P. E. Ch., and in 1812 was ordained a priest. After holding rectorships in Phila. for 20 yrs., and one for some time in Norwalk, Conn., he was made missionary bp. of Ind. and Mo., and was afterward transferred to Ia., Wis., etc. In 1854 he became bp. of Wis. D. May 24, 1870.

Kemper (JAMES LAWSON), b. in Madison co., Va., in 1824, grad. at Washington Coll., Va., in 1844; studied law; was 10

yrs. member of the Va. legislature, 2 yrs. speaker; col. of 7th Va. regiment C. S. A. in 1861; brig.-gen. 1862, maj.-gen. 1864; distinguished himself at most of the battles on the Peninsula; was wounded and taken prisoner at Gettysburg; elected gov. of Va. in 1873.

Kempis (THOMAS A.), b. at Kempen, near Cologne, in 1339; his family name was HAMERKEN (Lat. *Malleolus*). In 1400 he entered the monastery of Mt. St. Agnes, of which his elder brother was prior, and in 1413 was ordained priest; in 1425 was elected sub-prior. He wrote several books. But the book which sent his name to the remotest corners of the world is his *De Imitatione Christi*, which, with the exception of the Bible, is the book most read in the whole of Chr. lit. D. July 26, 1471.

Ken (THOMAS), b. at Berkhamstead, Eng., in July 1637; was ed. at Winchester and Ox.; travelled on the Continent 1674; became in 1679 chaplain to Mary, princess of Orange (the future queen of Eng.); was chaplain to Lord Dartmouth in the Tangier expedition, and subsequently (1684) to Charles II., by whom he was made bp. of Bath and Wells. On the accession of James II. he was one of the 7 bps. committed to the Tower for refusing to obey illegal commands of that monarch. He, however, refused to take the oath of allegiance to William III., and was deprived of his bishopric. D. Mar. 19, 1711.

Ken'dall (AMOS, LL.D., b. at Dunstable, Mass., Aug. 16, 1789, grad. at Dartmouth in 1811; in 1814 became a lawyer of Lexington, Ky., where he was for a time a tutor in Henry Clay's family. He afterward removed to Georgetown, Ky., where he was P. M. and ed. of the *Argus*, a Dem. newspaper. In 1829 Jackson made him 4th auditor of the treas. He was 1835-40 P. M.-gen. In 1845 he became manager of Prof. Morse's interest in the telegraph business. He founded the deaf and dumb asylum at Wash., and was a benefactor of Columbian Coll. and of the Bap. ch., with which he was connected. He wrote a work on his *Life and Times and a Life of Andrew Jackson*. D. Nov. 12, 1869.

Kendall (GEORGE WILKINS), b. at Amherst, N. H., in 1807; became a printer; in 1835 he settled in New Orleans, where, with F. A. Lumsden, he founded the *Picayune* newspaper. He took part in the Santa Fé expedition of 1841, and during the Mex. war was with Gens. Taylor and Scott as correspondent for his newspaper. He wrote *Narrative of the Texan Santa Fé Expedition and The War between the U. S. and Mex.*, with costly illustrations. In 1862 he removed to Comal co., Tex., where he had a large grazing rancho. D. Oct. 21, 1867.

Kendall Creek, on R. R., McKean co., Pa. Pop. 1880, 2639.

Ken'dallville, city and R. R. junc. of Noble co., Ind. Pop. 1870, 2164; 1880, 2373.

Ken'drick (ASAHEL CLARK), D. D., LL.D., b. at Poultney, Vt., Dec. 7, 1809, grad. at Hamilton Coll. in 1831; was prof. first of anc. langs., and subsequently of the Gr. lang. alone, in the literary and theological sem. at Hamilton (which afterward became Madison Univ.) from 1831 to 1850; afterward prof. of Gr. in the Univ. of Rochester. He wrote several introductory Gr. text-books; prepared editions of the *Anabasis* of Xenophon and of *Select Orationes of Demosthenes*; wrote a *Life of Mrs. Emily C. Judson* and a *Commentary on the Epistle to the Hebrews*; Amer. reviser of N. T.

Kendrick (HENRY L.), b. in N. H. in 1812, grad. at W. P. 1835; was retained at the Acad. for 12 yrs. as assistant prof. of chem., mineralogy, and geol., in the mean time having attained the rank of capt. in 1846. In the war with Mex. he was engaged in the siege of Vera Cruz, battle of Cerro Gordo, and defence of Puebla, where he gained the brevet of major. From the close of the war he served principally in garrison and on frontier duty; was for 5 yrs. in command of a post in N. M.; prof. of chem., mineralogy, and geol. at the Military Acad. 1857-82.

Ken'ites [Heb. *Keniti* and *Kayni*; Gr. *Kenaioi*], a collective name for a tribe or race which resided in the dis. adjoining the land of Canaan at the time of the Heb. Exodus. They were distinguished from the mass of those tribes by their friendship with the Hebs. Jethro, the father-in-law of Moses, was a K.

Kennebec River rises in Moosehead Lake, Me., although its prin. head-stream, the Moose River, rises more than 50 m. W. of that lake. The river falls some 1000 ft. in 100 m., reaching tide-water at Augusta, where the river is crossed by a large dam, affording great water-power.

Kennebunk, Me. See APPENDIX.

Ken'edy (ANTHONY), b. at Baltimore, Md., in 1811; removed in childhood to Va.; studied law, and became a planter and cotton-manufacturer; in legislature of Va. 1839-43; returned to Baltimore in 1850; was elected to Md. legislature in 1856, and was U. S. Senator 1857-63.

Kennedy (JOHN PENDLETON), LL.D., b. in Baltimore, Md., Oct. 25, 1795; was ed. at the Univ. of Md., where he grad. in 1812; took part as a volunteer in the battles of Bladensburg and N. Point; studied law, and was admitted to the bar in 1816; became chief ed. of a new publication entitled *The Red Book*, issued every 2 weeks, and made up of miscellaneous articles in prose and verse. In 1820 he was returned as a member of the house of delegates of the State legislature. In 1832 he pub. a work of fiction entitled *The Swallow Barn*, which consisted of a collection of sketches of Va. country life soon after the Revolution. In 1835 appeared his celebrated *Horseshoe Robinson*. The hero was a Revolutionary soldier of S. C. In 1835 appeared his *Rob of the Bowl*. In this yr. he was elected M. C. from Md. In the Presidential canvass in 1840 he was one of the electors for his State on the Harrison ticket. In this yr. he pub. the annals of *Quodlibet*, which was a burlesque or satire on the political issues of the day. In 1846 he was again returned to the house of delegates of the State legislature, of which body he was made speaker, and took an active part in the measures which were then adopted to resume the payment of the State debt and for the restoration of the public credit. In

politics Mr. K. was an ardent and earnest Whig of the Henry Clay school. In 1849 he pub. the memoirs of the life of William Wirt. In the same yr. (1849) he was chosen provost of his *alma mater*. He was also v.-p. of the Md. Historical Society. In 1852 he was appointed by Pres. Fillmore sec. of the navy. It was under his auspices that the Japan expedition of Com. Perry and the second Arctic exploration of Dr. Kane were mainly due. During the late war Mr. K.'s sympathies were entirely on the Federal side. D. at Newport, R. I., Aug. 18, 1870. A. H. STEPHENS.

Kennedy (JOSEPH C. G.), LL.D., b. at Meadville, Pa., Apr. 1, 1813; ed. at Allegheny Coll.; was supt. of the U. S. census of 1850 and 1860, sec. to the National Inst. and U. S. Agricultural Society in 1854; sent as com. to Europe in 1851 to investigate the administration of census; appointed U. S. examiner into the condition of national banks; wrote *Census of 1850 and 1860, Hist. and Statistics of Md.*

Kennett Square, Pa. See APPENDIX.

Keno'sha, city and R. R. centre, cap. of Kenosha co., Wis., on Lake Mich., 51 m. N. of Chicago and 34 m. S. of Milwaukee, almost in S. E. corner of the State. It has a good harbor and 2 public parks, and is hence styled the "Park City." Pop. 1870, 4309; 1880, 5039.

Ken'rick (FRANCIS PATRICK), D. D., b. in Dublin, Ire., Dec. 3, 1797; studied at Rome, where he was ordained a priest in 1821. He was sent to Amer., and was for 9 yrs. conductor of the R. Cath. sem. at Bardstown, Ky. In 1830 he was made bp. of Arath in *partibus*, and coadjutor to Bp. Conwell of Phila., to which see he was translated in 1842. He founded the sem. of St. Charles Borromeo; in 1851 became abp. of Baltimore, in 1852 apostolic delegate, and in 1859 honorary primate of the U. S. He pub. *Theologia Dogmatica, Theologia Morales*, and several other works, mostly polemical. D. July 8, 1863.

Kenrick (PETER RICHARD), D. D., a brother of the preceding, born in Dublin in 1806; was trained at Maynooth; became a R. Cath. priest in Ire.; emigrated to the U. S., and was vicar-gen. to his brother. In 1841 he was made bp. of Drasa in *partibus*, and coadjutor to the bp. of St. Louis, to which see he was translated in 1843. In 1847 he became the first abp. of St. Louis. He has written *The Holy House of Loreto, Anglican Ordinations*, etc.

Ken'sett (JOHN FREDERICK), b. Mar. 22, 1818, at Cheshire, Conn., d. in New York Dec. 14, 1872; worked as a lad with his uncle, Alfred Daggett, an engraver; went to Eng. in 1840, and began the practice of landscape art in 1845; passed several yrs. in Eng. and Europe, studying nature in Switz., in Sic., and in It. In 1848 he returned to Amer., and was equally faithful in his study of native scenery. Mr. K. belonged to the "realistic school," as it is called, but was polished, harmonious, sweet, and sympathetic. He was made a member of the National Acad. of Design in 1849.

Kent, R. R. junc., Portage co., O., 31 m. S. E. of Cleveland, on the Cuyahoga River, which here affords a fine water-power. It is noted for the manufacture of superior window-glass from the pure white sand rock which abounds here. Pop. 1880, 3309.

Kent (EDWARD), LL.D., b. at Concord, N. H., Jan. 8, 1802, grad. at Harvard in 1821; engaged in legal practice at Bangor, Me., 1825; was a member of the legislature 1829-33, mayor of Bangor for 2 yrs. and gov. in 1838 and 1840. In 1843 he was com. for settling the Me. boundary-line under Ashburton treaty; consul at Rio Janeiro 1849-54; in 1859 associate justice of State supreme court. D. May 19, 1877.

Kent (EDWARD AUGUSTUS), DUKE OF, b. Nov. 2, 1767, was the fourth son of George III.; joined the army; was appointed gov. of N. S. and commander-in-chief of the Brit. forces in N. Amer. On his return to Europe he married (May 20, 1818) a Ger. princess, MARIA LOUISA VICTORIA (b. 1786, d. Mar. 16, 1861), widow of the prince of Leiningen, daughter of the duke of Saxe-Coburg. From this marriage the reigning queen of Eng., Alexandrina Victoria, was b. in 1819. D. Jan. 23, 1820.

Kent (JAMES), LL.D., b. at Philippi, N. Y., July 31, 1763, grad. at Yale in 1781; was admitted to the bar in 1787, and settled at Poughkeepsie; was a member of the legislature in 1790 and 1792. In 1793 he removed to New York, and became a master in chancery, a leader among the Federalists, and prof. of law in Columbia Coll. In 1797 he became recorder of New York; in 1798-1804 was a puisne judge of the supreme court of N. Y., and in 1804-14 chief justice. In the latter yr. he was appointed chancellor of N. Y., which office he held till 1823. He was in 1822 a member of the constitutional convention at Albany; in 1824 resumed his professorship in Columbia Coll. His prin. work is *Commentaries on Amer. Law*. D. Dec. 12, 1847.

Kent (JOSEPH), M. D., b. in Calvert co., Md., Jan. 14, 1779; was ed. as a phys.; was M. C. 1811-15 and 1821-26; gov. of Md. 1826-29, and U. S. Senator 1833-37. D. Nov. 24, 1837.

Kent Island, the largest island in Chesapeake Bay, belongs to Md. It is 15 m. long, is very fertile, and is the site of the earliest settlement in the State; was colonized in 1631 by William Claiborne. Pop. 1870, 1847; 1880, 2137.

Kentland, Ind. See APPENDIX.

Ken'ton, R. R. junc., cap. of Hardin co., O., on headwaters of the Scioto River, near the centre of the State. Pop. 1870, 2610; 1880, 3940.

Kenton (SIMON), b. in Fauquier co., Va., Apr. 3, 1755; went to Ky. at the age of 18; associated with early pioneers; acted for some time as a spy for Lord Dunmore, the Brit. gov. of Va.; participated in the war of independence W. of the Alleghenies; returned to Va. in 1784; removed his family to Ky., and continued to take part in all Indian wars until Wayne's campaign in 1793. He "took up" immense tracts of land, but when they became valuable they were invariably lost to him through the invasion of settlers; took part with the Ky. troops in the second war with Eng., fought at the battle of the Thames; finally hardlands confirmed to him by the legislature of Ky. and a pension by the U. S. Cong. D. Apr. 29, 1836.

Kentuck'y, one of the central States of the Miss. Valley, between 82° 3' and 89° 26' W. lon., and between 36° 30' and 39° 6' N. lat.; extreme length from E. to W. about 400 m.; greatest breadth from N. to S., 172 m.; bounded N. E. by W. Va., N. N. E. by N., and N. W. by O., Ind., and Ill., S. by Tenn., and S. E. by Va. Area, 40,400 sq. m. or 25,856,000 acres. The State lies wholly within the Miss. Valley, and all but about 1000 sq. m. of it in the sub-valley of the O.



Topography—*Mountains, Rivers, Etc.*—K. is divided into: (1) the mt.-dist., in the E. and S. E. sections of the State, covering about 4000 sq. m.; (2) the table-land, including all the region W. to the Miss. Through this table-land the rivers of the State plough deep furrows. The mt.-dists. have the gen. characteristics of the Alleghany range, being simple regular curves of great N. and S. extension, but comparatively narrow in an E. and W. direction—Pine Mt. for instance, having a length of 70 m. and an average width of not over 5 m., and rising in the ridges of Pine Mt. and Cumberland Mt. to the height of fully 3000 ft. The State is well watered. The river-valleys are deeply incised, have a gen. N. W. and S. E. trend, with considerable stretches of table-land lying between, and an average elevation of 400 ft. above the streams. The river-valleys are rarely more than 2 m. in width. As we proceed eastward from the Miss., the table-lands rise gradually. Lexington is 1070 ft. above the sea, and from it the land slopes in every direction. About 850 m. of the boundaries of the State are river-line, including the Big Sandy, the O., and the Miss. The 2 largest tributaries of the O. (as well as many smaller ones), the Cumberland and Tenn., have their ultimate sources in the mt.-dist. of the State, and both, after a wide detour to the S., return to the State, and, crossing it, pour their waters into the O. Other affluents of the O. are Clark's River, Tradewater River, Green, Salt, Kentucky, and Licking rivers, and still farther E. the Little Sandy. The Miss. has a few small tributary streams in the State. With the completion of the slackwater navigation improvements, K. will have nearly 4000 m. of navigable waters in her bounds.

Geology and Mineralogy.—The most important of the mineral resources of K. are its rich and abundant deposits of coal and iron. The whole coal-area is about 14,000 sq. m., of which 10,000 are in the E. and 4000 in the W. basin. Most of this coal, especially in the W., is a soft bituminous coal, though some cannel is found; it resembles the Eng. coal. The iron dist. of the State covers about 20,000 sq. m., in almost all of which ores of such richness as to pay well for working are found. Lead exists in the Trenton and Cincinnati limestones and in the Carboniferous limestone, but has not been successfully worked. Building-stone of excellent quality exists in several sections, and is exported to some extent. Silver ore has been found near Cumberland Falls. A more remarkable contribution to economic geology is that afforded by the salt springs or licks of the State. The skeletons of the buffalo and the deer, and below these of the elephant, the mastodon, and mammoth, the fossil elk, and a species of musk-ox, lie in countless numbers. Big Bone Lick in Boone co. has in an area of about 60 acres many thousands of these fossil skeletons. There are numerous medicinal springs of great virtue in the State; those of Harrodsburg, Blue Lick, etc. contain considerable quantities of sulphur. Saltpetre, gypsum, and selenite abound in the caves. The caverns of the State form one of its most remarkable features; the Mammoth Cave is the most widely known of the thousands in the State. In some places there are "sink-holes," considerable tracts often containing trees of large size, under which the roof of the cavern has given way and precipitated these patches (which are from 50 to 150 ft. or more in diameter) to the floor of the cavern, often 200 or 300 ft. below. In some cases these sink-holes become partially filled with water; in others the trees and shrubs continue to grow and stretch up toward the light.

Soil and Vegetation.—The soil of the Cincinnati basin, which includes the entire blue-grass region, is formed by the disintegration of the rocks of the Cincinnati group. This crumbling blue limestone, which falls to pieces on exposure to the air, renders the soil derived from it one of surpassing fertility. Hemp and tobacco, both exhausting crops, can be produced on these lands in undiminished quantities for a score or more of yrs. in succession, and their rich and gigantic growth is nowhere surpassed; and the grasses and grains of the region are remarkable for their luxuriance and their nutritive qualities. The region of the Sub-carboniferous limestone owes its fertility, which is almost as great as that of the blue-grass country, to the same cause, the disintegration of fossiliferous limestone. These 2 tracts comprise about 1/3 of the area of the State. The other 2/3 are less suited to the culture of grain and the best grasses, except the overflooded lands of the river-bottoms, which have soils of remote derivation. There is very little really barren land in the State. The peculiarity of the soils is manifested in the

distribution of the forests. On the Sub-carboniferous limestone there are grand forests on the uplands where the blue ash and the black walnut mark the richest tracts. Rich but less fertile soils have extensive forests of beech. On the sandstone soils the forests are of oak, of which there are 6 or 7 species. In the richer lowlands the tulip tree and the sweet gum form considerable forests. The open parks of the blue-grass region are mainly of the sugar-maple and other maples, the tulip tree, blue ash, black walnut, etc. In the swamps of the S. W. the cypress is the prin. constituent of the forests. In the mountainous dist. of E. K. there are limited areas of pine.

Animals.—Very few of the larger surviving wild animals of the Miss. Valley are found here. The buffalo or bison became extinct before the beginning of the present century. The elk may have disappeared a little earlier. Bears and wolves are very rare. Deer are found in considerable numbers, and the raccoon, the opossum, the badger, and ground-hog are not uncommon. There are at least 2 species of the hare or Amer. rabbit, and 5 or 6 of the squirrel; moles, dormice, rats, field-mice, etc. are sufficiently plenty. Of game birds, the wild-turkey is found in most of the counties of the State, and grouse, partridges, quails, etc. abound. The rivers contain a good supply of most of the fresh-water fish, and fresh-water mollusks, including the fresh-water lobster, etc., are found in great abundance. There are many fossils in the caves, but except some insects, crustaceans, and fishes, none of them are peculiar to the State. The so called eyeless fish of the Mammoth Cave is not known elsewhere.

Climate.—The mean annual temperature is about 55°, and the extremes, not often reached, are zero and 100°. The winter commences late in Dec., and the cold weather seldom lasts long after Mar. 1. The winter and spring months are the seasons of greatest rainfall, the summer and autumn being usually somewhat dry. The summers are long and somewhat hot. In the S. counties cattle are not sheltered in winter, and very little hay is cut. The blue grass, falling down as it ripens, protects the lower portion of its stalk, and furnishes as nutritious grazing in winter as in summer.

Agricultural Products.—The large proportion of exceedingly fertile soil in the State, its capacity for producing a great variety of crops, and its extraordinary facilities for conveying its crops to the best markets, are good and sufficient reasons why, in proportion to its area, K. should be one of the best agricultural States in the U. That these great advantages have not been so fully developed as they should have been is doubtless true; yet the agricultural position of the State is very creditable to her. By the census of 1880 K. produced 72,852,363 bushels of Indian corn, 11,356,113 of wheat, and 4,580,738 of oats. The yield of tobacco was 171,120,784 lbs., being more than double that of any other State. The wool product in 1880 was 4,592,576 lbs.

Farm Animals.—In 1880 there were 372,648 horses, 843,794 cattle, 1,000,269 sheep, and 2,225,225 swine.

Manufactures, Etc.—K. has extensive manufactures, those of iron and steel alone having in 1880 a cap. of \$5,493,085; hands employed, 4,095; wages paid, \$1,344,400; total value of products, \$5,090,029. Amount of coal mined in 1880, 935,857 tons. The city of Louisville had 1108 manufacturing establishments; cap. \$21,767,013; hands employed, 17,448; wages paid, \$5,835,545; amount of products, \$35,423,203.

Railroads.—There were in operation in 1880, 1590 m. of railway, costing, \$69,261,896, and paying in interest and dividends \$2,480,604, out of net earnings of \$4,037,131.

Finances.—The assessed value of taxable property in 1880 was \$350,563,971, real and personal; State tax, 45½ cents on \$100; amount of State debt, \$1,089,856; total debts, State, county, and municipal, \$14,977,881.

Commerce.—The internal trade and transportation of K. is very large, both by R. Rs. and rivers, tobacco and hemp constituting the leading items of export.

Banks.—K. had, in Oct. 1881, 50 national banks, with a cap. of \$10,435,100; circulation, \$8,885,111; U. S. bonds to secure circulation, \$9,994,706; deposits, \$4,402,941. There were also 52 State banks and trust cos., with a cap. of \$5,083,503 and deposits of \$7,005,484; and 23 private bankers, with deposits of \$1,936,815. The insurance cos. received in premiums in 1880, \$1,219,741, and paid losses, \$560,000.

Education, Etc.—In 1880 there were of school age (6-20 yrs.) 545,161 children, of whom 265,581 were enrolled in public schools, with average daily attendance of 192,331. Cost of public schools, 1880, \$1,162,944, of which \$1,025,659 was for teachers' salaries. There are 15 colls., with 139 instructors and 1916 students. Number of newspapers and periodicals in 1882, 189, of which 12 were daily.

Charitable Institutions, Etc.—There is an inst. for deaf mutes at Danville, Ky., organized in 1823, one of the earlier insts., the 4th organized in this country. There is an inst. for the education of the blind at Louisville, founded in 1842, with property valued at \$90,000, and receiving from the State annually \$16,000, which covers its expenditures. There are 3 orphan asylums, all at Louisville, expending annually about \$15,000. Of 7 other orphan asylums in the State there is no recent report. There is an inst. at Frankfort for feeble-minded children. There are 2 insane hospitals in the State—the W. at Hopkinsville, and the E. at Lexington—both well managed. The Ky. penitentiary is at Frankfort.

Churches.—K. has about 3800 chs. The Baps. are the most numerous denomination, having 1702 chs. and 161,190 members; Christians (Disciples), 595 chs., 79,525 members; Meths., 425 ministers and 86,820 members; Cumberland Presbys., 229 chs., 12,002 members; R. caths., 149 chs. Besides these, there are 30 other denominations.

Population.—In 1880, 1,155,684; 1870, 1,321,011; 1860, 1,648,690 (white 1,377,179, colored 271,511, including 10 Chi. and 50 Ind.).

Principal Cities and Towns.Pop. 1880—Louisville, the chief city, 123,758; Covington, 29,720; Newport, 20,433; Lexington, 16,656; Paducah, 8086; Frankfort (cap.), 6958; Owensboro, 6231; Henderson, 5365; Paris, 3204; Danville, 3074.

COUNTIES.	Ref.	Pop. 1870.	Pop. 1880.	COUNTY TOWNS.	Pop. 1880.
Adair	4-G	11,065	13,078	Columbia	549
Allen	5-F	10,296	12,089	Scottsville	295
Anderson	3-H	5,348	9,361	Scottsbluff	638
Ballard	4-B	12,576	14,378	Blandville	476
Barren	5-G	17,780	29,391	Glasgow	1,510
Bath	3-I	10,145	11,982	Owingsville	773
Bell	3-J	3,731	6,055	Pinville	83
Bell	3-I	10,496	11,896	Burlington	dist. 1,640
Bourbon	3-I	14,763	15,956	Paris	3,204
Boyd	2-K	8,573	12,165	Cattlettsburgh	1,225
Boyle	3-H	9,515	11,930	Danville	3,074
Bracken	2-I	11,409	13,509	Brooksville	378
Breathitt	4-J	5,728	7,492	Jackson	88
Breckenridge	5-F	13,440	17,486	Hardinburg	299
Bullitt	3-G	7,781	8,531	Shepherdsville	299
Butler	4-E	9,404	12,181	Morgantown	204
Caldwell	4-D	10,426	11,282	Princeton	1,284
Calhoun	5-C	9,410	13,295	Murray	636
Campbell	2-I	27,406	37,446	Brownsville	20,432
Carroll	2-H	6,188	8,953	Carrollton	1,332
Carter	2-J	7,509	12,345	Grayson	447
Casey	4-H	8,884	10,983	Liberty	.....
Christian	5-E	32,227	31,682	Hopkinsville	4,229
Clark	4-I	10,882	12,115	Winchester	2,277
Clay	4-I	8,297	10,222	Manchester	87
Clinton	5-H	6,497	7,212	Albany	dist. 2,031
Crittenden	4-D	9,381	11,688	Marion	355
Cumberland	5-G	7,680	8,894	Burkessville	434
Daviess	3-E	20,714	27,730	Owensborough	6,231
Edmondson	3-F	4,459	7,222	Brownsville	116
Elliott	3-J	4,433	6,567	Sandy Hook	.....
Estill	3-I	9,198	9,860	Irvine	dist. 1,676
Fayette	3-H	26,656	29,023	Lexington	16,555
Fleming	2-I	13,398	15,221	Flemingsburgh	811
Floyd	2-K	10,577	10,172	Prestonsburgh	963
Franklin	3-H	15,300	18,699	Frankfort	6,958
Fulton	5-B	6,161	7,977	Hickman	1,264
Gallatin	2-H	5,074	4,832	Warsaw	666
Garrard	3-H	10,376	11,704	Lancaster	1,284
Gentry	3-I	9,550	13,083	Williamstown	151
Graves	5-C	19,398	24,138	Mayfield	1,829
Grayson	4-F	11,580	15,784	Leitchfield	491
Green	4-G	9,379	11,871	Greensburg	620
Greenup	2-J	11,463	13,371	Greenville	833
Hancock	3-E	8,435	8,633	Hawesville	812
Hardin	3-F	15,705	22,584	Elizabethtown	2,526
Harlan	5-J	4,415	5,278	Harlan	.....
Harrison	2-H	12,993	16,504	Cynthiana	2,101
Hart	4-G	13,687	17,133	Munfordville	274
Henderson	3-D	15,457	24,515	Henderson	5,365
Hickman	5-G	11,066	14,492	New Castle	506
Henry	5-B	8,453	10,651	Clinton	.....
Hopkins	4-D	13,827	19,122	Madisonville	1,544
Jackson	4-I	4,547	6,678	McKee	88
Jefferson	3-G	118,953	146,010	Louisville	123,758
Jessamine	3-H	8,435	10,861	Hodgesville	2,303
Johnson	3-K	7,494	9,155	Painville	310
Kenton	2-H	36,096	43,983	Covington	29,720
*Knott	4-J	.....	.....	Hindman	.....
Knox	5-I	8,294	10,587	Barbourville	250
La Rue	4-G	8,295	9,793	Hodgesville	352
Laurel	4-I	6,016	9,131	London	215
Lawrence	3-K	8,497	13,262	Louisa	493
Lee	3-I	3,055	4,254	Beattyville	146
Leslie	4-J	.....	3,740	Hvden	57
Letcher	4-G	4,608	6,601	Whitesburg	80
Lewis	2-J	13,115	15,115	Manchester	1,048
Lincoln	4-H	10,947	15,080	Stanford	1,213
Livingston	4-C	8,200	9,165	Smithland	570
Logan	5-E	20,429	24,355	Russellville	2,058
Lyon	4-D	6,233	6,768	Eddyville	390
Madison	3-I	4,844	22,051	Richmond	1,941
Maguffin	3-J	4,844	6,941	Salersville	dist. 1,096
Marion	4-G	12,838	14,693	Lebanon	2,054
Marshall	5-C	9,455	9,647	Benton	277
Martin	3-K	.....	3,057	Inez	.....
Mason	4-B	18,266	20,469	Maysville	5,220
McCracken	4-C	13,988	16,262	Radcliff	2,056
McLean	4-E	7,614	9,293	Calhoun	484
Meade	3-F	9,485	10,323	Brandenburg	587
Menifee	3-I	1,985	3,755	Frenchburg	143
Mercer	4-G	13,144	14,142	Harrodsburgh	2,202
Metcalf	4-G	9,433	10,323	Harrodsburgh	2,202
Monroe	5-G	9,231	10,741	Tompkinsville	248
Montgomery	3-I	7,557	10,566	Mt. Sterling	2,087
Morgan	3-J	5,975	8,455	West Liberty	225
Muniburg	4-E	12,638	15,098	Greenville	866
Nelson	4-I	14,804	16,609	Barstow	909
Nicholas	2-I	9,129	11,869	Harford	624
Ohio	4-E	15,561	19,669	La Grange	490
Oldham	2-G	9,027	7,667	Owenton	654
Owen	2-H	14,309	17,401	Booneville	201
Owsley	4-I	3,889	4,542	Hazard	997
Pendleton	2-I	14,609	16,702	Pikeville	246
Perry	4-J	4,274	5,607	Stanton	98
Pike	4-K	9,562	13,001	Somersett	805
Powell	3-I	2,599	3,639	Mt. Olivet	317
Polaski	4-H	17,670	21,318	Mt. Vernon	163
Robertson	2-I	5,399	5,714	Morehead	121
Rock Castle	4-I	7,145	9,670	Georgetown	2,061
Rowan	3-I	2,991	4,420	Georgetown	2,061
Russell	5-H	5,809	7,591	Franklin	1,686
Scott	3-H	11,607	14,965	Taylorsville	537
Shelby	3-G	15,733	18,813	Campbellsville	775
Simpson	5-F	9,713	10,641	Elkton	874
Spencer	3-G	5,956	7,040	Ediz	646
Taylor	4-G	8,226	9,259	Bedford	771
Todd	5-E	12,612	15,994	Morganfield	744
Trigg	4-D	13,686	14,849	Bowling Green	5,114
Trimble	2-G	5,577	7,171	Springfield	610
Union	3-D	13,640	17,809	Monticello	354
Warren	5-F	21,742	27,331	Waverly	298
Washington	3-G	12,464	14,419	Whitely C-H	.....
Wayne	5-H	10,602	12,512	Campton	102
Webster	4-D	14,846	17,846	Versailles	2,126
Whitley	5-I	8,278	12,000	.....	.....
Wolfe	3-J	3,603	5,638	.....	.....
Woodford	3-H	8,240	11,900	.....	.....
Total		1,321,011	1,648,890		

* Reference for location of counties. See map of Kentucky and Tennessee in article TENNESSEE.

† Formed since census of 1880.

History.—K. was during the greater part of the 18th century the favorite hunting-ground and home of powerful and warlike tribes of Indians, who had given it the name of Kentucky—i. e. "the dark and bloody ground." In 1769 Daniel Boone, an enterprising hunter and pioneer, came thither, and established himself where now is Boonesboro'.

Within the next 6 or 7 yrs. other pioneers settled in the Terr. Va. claimed this whole region as a part of her terr. On May 23, 1775, the settlers met at Boonesboro', and in convention organized themselves as the "Assembly of Transylvania," but when their doings came to the knowledge of the Va. legislature they were pronounced null and void. In 1776 the legislature of Va. erected its terr. S. of the O. into the co. of Kentucky, embracing the country between the Big Sandy River and the Miss. In 1783 this co. was constituted a dist., and the decisions of its courts were declared to be subject to appeal to the State courts of Va. Harrodsburg had been founded in 1774, and Lexington probably in the autumn of 1775. During the Revolutionary war the number of settlers rapidly increased; they had numerous conflicts with the Cherokees and other Indian tribes. On Aug. 19, 1782, a bloody and desperate battle took place between the whites, who numbered only 182, and an Indian force of about 600, near Blue Lick Springs. Col. Boone was prominent in the battle, and lost a son in it. The Kentuckians were finally defeated. In 1784 the people of the dist. urged that they might be recognized as a State and admitted into the U. They held repeated conventions in 1785, 1786, and 1787, and the Va. legislature passed an ordinance in 1785 granting a separate organization, but with conditions which caused delay and discontent. In Jan. 1787 the people in convention agreed to form a State and adopt a const., but hindrances on the part of Va. and intrigues on the part of the Sp. viceroy in La. and of emissaries from Canada kept it in constant turmoil. In 1790 it was made a separate Terr. of the U. S., and on Apr. 19 the delegates of the people assembled in convention at Danville and reported a State const., which was soon after ratified, under which K. was admitted into the U. as a State on June 1, 1792. For the next 12 or 14 yrs. the State was often in an agitated condition. In the war of 1812 K. bore an honorable part, though she suffered severely at the battle of Frenchtown, and some of her best citizens were sacrificed in the attempt to relieve Ft. Meigs. Somewhat later a civil contest in the State, known as the "Old Court and New Court controversy," was decided, greatly to her honor. In the Mex. war the State sent more than her quota of volunteers to the conflict, and their gallant conduct in the field won them lasting renown. In the late c. war the State declared at first its strict neutrality, but after the invasion of the S. troops in Aug. 1861, finally gave in its adhesion to the U. Nov. 27, 1861. The State furnished the battle-fields of Mill Spring, Perryville, etc.

Governors.

Isaac Shelby	1792-96	John J. Crittenden	1848-50
James Garrard	1796-1804	John L. Helm (act'g)	1850-51
Christopher Greenup	1804-08	Lazarus W. Powell	1851-55
Charles Scott	1808-12	Charles S. Morehead	1855-59
Isaac Shelby	1812-16	Beriah H. Magoffin	1859-61
George Madison	1816	James F. Robinson	1861-63
G. Slaughter (acting)	1816-20	Thomas E. Bramlette	1863-67
John Adair	1820-24	John L. Helm	1867
Joseph Desha	1824-28	J. W. Stevenson (act'g)	1867-68
Thomas Metcalfe	1828-32	John W. Stevenson	1868-72
John Breathitt	1832-34	Preston H. Leslie	1872-75
J. T. Morehead (act'g)	1834-36	James B. McCreary	1875-79
James Clark	1836-37	Luke P. Blackburn	1879-83
C. A. Wickliffe (act'g)	1839-40	J. Proctor Knott	1883-87
Robert P. Letcher	1840-44	.....	.....
William Owsley	1844-48	.....	.....

REVISED BY A. R. SPOFFORD.

Kentucky River flows in a tortuous N. W. course some 250 m., reaching the O. at Carrollton. Large sums have been expended in improving its navigation; steamboats ascend to Frankfort, 60 m., and flatboats to 150 m.

Kenyon College, Gambier, O., comprises 3 distinct schools—the theological sem., Kenyon Coll., and the gram. school. It was founded in 1825. Its property—real estate, buildings, farm-lands, and endowments for professorships—amounts to \$550,000.

Keokuk, city and R. R. and commercial centre, cap. of Lee co., Ia., on the W. bank of Miss. River, near its confluence with the Des Moines, about midway between Burlington and Quincy, 135 m. S. E. of Des Moines and 200 m. above St. Louis. It lies at the foot of the lower rapids, which are 12 m. long with a fall of 24 ft., and is at the head of navigation for large steamboats; is a port of delivery, and being in the extreme S. E. corner of the State has received the name of "Gate City." It is built on limestone bluffs 150 ft. high, overlooking the river. An iron R. R. and highway bridge, 2300 ft. long, spans the Miss. It has a U. S. court-room, a public library, and med. coll. The U. S. govt. has constructed a ship-canal, 9 m. long and 300 ft. wide, around the lower rapids, by which first-class water-power has been secured. Pop. 1870, 12,766; 1880, 12,117; 1885, 20,000.

Kepler, or **Kepler** (JOHANN), b. at Magstatt, Württemberg, Dec. 27 (or 21), 1571. His father was a soldier, his mother was unable to read or write. In childhood he served as waiter in a miserable inn his father had set up, but the father enlisted as a soldier against the Turks and was never heard from again. Young K. sought refuge with an only sister married to a Prot. minister; in 1588 he was sent to the Univ. of Tübingen to prepare for the ministry, but he abandoned his theological studies, turned to the astronomical theories of Copernicus, and in 1594 was made prof. of math. at the Univ. of Grätz in Styria, where he prepared an almanac, and in 1596 a cosmographical treatise filled with crude fancies.

In 1599 religious persecutions began in Styria, and culminated 2 yrs. later in the expulsion of the Prot. profs. from the Univ. of Grätz. K. accepted an invitation from Tycho Brahe to aid him in the calculation of a new set of "Rudolphine" astronomical tables ordered by the emp. Rudolph II. Tycho d. Oct. 1601, and K. succeeded to his post, with a nominal salary of 1500 florins, but the payments being rare and irregular, he had to eke out a livelihood by casting nativities, and wrote *De Fundamentis Astrologiæ*. A treatise on

optics, *Panopticonum ad Vellendum*, exhibited accurate researches into the structure of the eye, and furnished the formulas which have been ever since employed in the calculation of eclipses. In a work pub. in 1606, *De Stella Nova in pede Serpentarii*, etc., K. described a new star in the constellation of the Serpent, and made the correction of 4 yrs. in the era of the birth of Christ which has since been accepted.

In 1609 appeared his *Astronomia Nova*, compiled from the observations of Tycho Brahe, supplemented by his own, in which the motions of the planet Mars were made the basis for 2 of the important corrections of the received astronomical theories known as Kepler's Laws—viz. the ellipticity of the planetary orbits, and the fact that the Radius Vector of every planet passes over equal areas in equal times. These brilliant discoveries were, as he said, "wrought out by persistent research extending over many years." His worldly position was not improved by these researches. His salary was 12,000 crowns in arrears; the emp. refused him permission to accept a professorship elsewhere. A conflict arose between Rudolph and his brother Matthias for the crown of Bohemia. Rudolph d. Jan. 1612, and Matthias, having become emp. of Ger., confirmed K. as imperial astron., allowed him to accept the professorship of math. at the Univ. of Linz, and in 1613 summoned him to the diet at Ratisbon to persuade the Prot. princes to accept the Gregorian correction of the calendar.

At Linz K. was denounced as not only a heretic, but as the son of a witch. During all these sufferings he had worked out the third and greatest of his immortal laws—viz. "that the squares of the periods of revolution of any two planets are to each other as the cubes of their mean distances from the sun." This discovery was made on May 15, 1618, after 17 yrs. of study upon the observations of Tycho; it was pub. in 1619 in a vol., *Harmannus Mundi Libri I*.

Ferdinand II., deposed as king by the states of Bohemia in the same month that he was elected emp. of Ger. (Aug. 1619), offered to pay K.'s arrears of salary and to enable him to issue the "Rudolphine Tables," but the breaking out of the Thirty Years' war postponed for yrs. the fulfilment of the promise. At last, after a delay of a quarter of a century, they were pub. at Ulm in 1627. At the invitation of Wallenstein K. removed in 1629 to Sagan in Silesia, and soon after received an appointment as prof. at the Univ. of Rostock. Having gone to Ratisbon in 1630 to negotiate in vain for the payment of his long arrears of salary, he d. there, Nov. 15, 1630, and was buried in St. Peter's churchyard, the spot being now covered by a temple-monument erected to his memory in 1803. Beside the works already mentioned, he wrote *Epitome Astronomiæ Copernicæ*, a treatise on *Dioptrics*, and many minor works. His pub. works were 33 in number, and he left 22 vols. of MSS., all of which were printed.

PORTER C. BLISS.

Kep'pel (AGUSTUS), Viscount, b. Apr. 2, 1725, was a son of the earl of Albemarle; entered the navy in 1740, circumnavigated the world with Lord Anson, was made rear-admiral in 1762. For many yrs. he was very successful in isolated naval engagements, commanding a single vessel or a small squadron. In his only gen. engagement with the Fr., which took place near Ushant in July 1778, the victory remained uncertain, and K. was tried by court-martial, but acquitted, and his conduct approved. He was several times first lord of the admiralty; was in 1782 made Viscount Keppel of Elvedon. D. Oct. 2, 1786.

Ker'atine (Gr. *κεράς*, "horn") [another name that has been proposed is **Elastine**], a chemical term which has been introduced to designate a supposed specific substance forming the basis of a large class of animal substances, such as *horns, hoofs, nails, claws, wood, hair, feathers, cuticle*, etc. No sufficient correspondence has yet appeared, however, in analyses of preparations made by any of the methods yet tried upon these substances, to justify the establishment of a specific name for all.

Kératry, *kā-rah-tre'*, **de** (EMILE), COUNT, b. in Paris Mar. 20, 1832; served as a volunteer during the Crimean war, then as a Fr. guerillero in the Mex. campaign 1863-65, and wrote afterward articles denouncing the imperial intervention in Mex.; in 1869 was returned to the Corps Législatif as an opposition deputy by the Brest electoral dist. When the revolution of 1870 burst out he was made at first prefect of police at Paris; then as gen. of division he organized nearly 50 battalions in Bretagne; was prefect of Toulouse and of Marseilles under the Thiers govt. (1871-72).

Ker'foot (JOHN BARRETT), LL.D., b. in Dublin, Ire., Mar. 1, 1816; was ed. at Flushing Inst. and St. Paul's Coll., N. Y., whence he grad. in 1834; was ordained deacon 1837, priest 1840, and bp. of the diocese of Pittsburg 1866; received the degree of D. D. from Columbia Coll., N. Y., in 1850, and from Trinity Coll., Conn., in 1865; and the degree of LL.D. from the Univ. of Cambridge, Eng., in 1867; was pres. of St. James's Coll., Md., 1842-64, and of Trinity Coll., Hartford, Conn., 1864-66; wrote coll. addresses, sermons, episcopal addresses, and charges. D. July 10, 1881.

Kerguelen (ker-gā-lon') **Land**, an island in the Indian Ocean, taking its name from the Fr. navigator who discovered it in 1772; 100 m. long and 50 m. broad, is situated in lat. 49° 54' S. and lon. 70° 10' E. It has many bays and inlets, and a harbor at the N. extremity was one of the stations for Amer. and Brit. observers of the transit of Venus in Dec. 1874. The island is barren, covered with moss, and has but a few flowering plants.

Kerlite. See INDIA RUBBER.

Kermanshah', town of Persia, is noted for the manufacture of Per. carpets. In the vicinity is the rock of Behistun, whose trilingual inscription furnished the key to the Assyrian and old Per. langs. Pop. 35,000.

Ker'mes [Ar. "little grub"], or **Scarlet Grain**, a dyestuff formerly used extensively for producing a blood-red. It is the dried bodies of *coccus ilicis*, an insect of the kermes oak, an evergreen shrub-oak of Sp. and the Levant.

Kermes Mineral, amorphous trisulphide of antimony,

The preparation used in med. contains oxide of antimony, and is hence called oxysulphide of antimony.

Ker'messe [Flemish, *kerkmees*, from *kerk*, "church," and *mees*], formerly religious and parochial festivals, but now more exclusively ordinary and secular enjoyments. The K. of Flanders are the more known because attention was called to them through paintings of Teniers and other great Flemish artists.

Kern (JEAN CONRAD), LL.D., b. at Berlingen, Switz., in 1808; studied at the gymnasium of Zurich, at the univs. of Bale, Berlin, Heidelberg, and Paris, devoting himself first to theol. and afterward to law; sat in the diet of 1833; became in 1837 pres. of the supreme court of his native canton, Thurgau; aided in revising the Swiss const. in 1848, and became distinguished for eloquence as a member of the National Assembly. In 1857 and 1861 he was sent as plenipotentiary to Paris, and in 1875 became pres. of the Swiss Confederation.

Kernan (FRANCIS), b. at Tyrone, N. Y., Jan. 14, 1816, grad. at Georgetown Coll., D. C.; studied law, entering upon practice at Utica in 1839; was reporter of the court of appeals 1854-57, and in 1862 was elected by the Dem. party to Cong. In 1872 he was the candidate of the same party for gov. of N. Y.; U. S. Senator 1875-81.

Kern Lake, Cal., is connected with Kern River by a slough. Its size varies with the rainfall.

Kern River, Cal., flows S. and S. W., and finally divides into 2 parts—one flowing N. W. and N. into Tulare Lake, and one into the tule-region about Kern and Buena Vista lakes, with which it is connected. Its waters are finally discharged into Tulare Lake.

Kerosene (Gr. *κερός*, "wax," and *ελαϊον*, "oil"), a term applied in 1846 to oil distilled from coal in Prince Edward Island. It has since become the gen. term for those hydrocarbon oils which are suitable for burning in lamps, from whatever source obtained. Most of the K. now used is refined petroleum. (See PETROLEUM.)

Kerr (JOHN BOZMAN), son of the succeeding, b. at Easton, Md., Mar. 5, 1809, grad. at Harvard in 1830; admitted to the bar in 1833, elected a member of the gen. assembly of Md. in 1836, Rep. in Cong. in 1848; was sent in 1851 as *chargé d'affaires* to Guatemala, where he saved the lives of prominent citizens during a revolution and received the thanks of the govt. of that republic; resumed the practice of law at Baltimore, and was afterward deputy solicitor of the court of claims at Wash. D. Jan. 27, 1878.

Kerr (JOHN L.) b. near Annapolis, Md., Jan. 15, 1780, grad. at St. John's Coll. in 1799; became distinguished at the Md. bar; was Rep. in Cong. 1825 to 1829 and 1831 to 1833, and U. S. Senator from 1841 to 1843. D. Feb. 21, 1844.

Kerr (MICHAEL C.), b. near Titusville, Pa., Mar. 15, 1827; studied law at the Univ. of Louisville; settled at New Albany, Ind.; was elected to the State assembly in 1856; reporter to the State supreme court in 1862; in 1864 was elected as a Dem. to Cong., and re-elected in 1866, 1868, 1870, and 1874; became in 1875 speaker of the House. D. Aug. 19, 1876.

Ker'shaw (J. B.), b. in S. C., was a prominent actor in the Amer. c. war from the first battle of Bull Run, July 1861, where he commanded a regiment of S. C. volunteers; subsequently, as brig.-gen., commanded a brigade throughout the Va. Peninsular campaign of 1862; at the second battle of Bull Run; engaged in the capture of Harper's Ferry, Sept. 15, 1862, and in the battle of Antietam 2 days later; at the battle of Fredericksburg, where his command held the strong position of Marye's Heights; at Chancellorsville and at Gettysburg; transferred to the W. with the corps of Longstreet, he was engaged in the battle of Chickamauga and the siege of Knoxville. Returning to Va. in 1864, now maj.-gen., he commanded a division in the final campaign of Lee's army.

Kertch [the anc. *Panticapæum*], town of Rus., on the E. side of the Crimean peninsula, on the Strait of Kaffa. It was a flourishing town when in 1855 it was taken by the allied Fr. and Eng. in the Crimean war, and sacked by the soldiery, but recovered rapidly. Pop. 21,000.

Kes'trel, called also **Windhover**, from its habit of maintaining itself in one place in the air, with its head to the wind, one of the smallest and most abundant of European hawks, the *Falco tinnunculus*. It is a great devourer of mice.

Ketch'o, or **Cacha'o**, town of Anam, in Farther India, on the Tonquin River. Its trade is large. Pop. 150,000.

Ketchum, *Id.* See APPENDIX.

Ket'ones, or **Ac'etones**, a large class of chemical compounds, consisting of carbon, hydrogen, and oxygen, of which acetone is the most common example. They contain the group carbonyl with 2 monatomic alcohol radicals.

Ket'teler, **von** (WILHELM EMANUEL), b. at Münster, Westphalia, Dec. 25, 1811; studied first law, and entered the civil service of his native city; then theol., and was ordained a priest in 1844. In 1849 he was made a provost of the Hedwigskirche of Berlin, and in 1850 bp. of Mentz; became one of the leaders of the Ultramontane party, and a prominent member of the R. Cath. Ch. in Ger.

Ket'tell (SAMUEL), b. at Newburyport, Mass., Aug. 5, 1800; mastered no less than 14 langs.; assisted Mr. Goodrich in preparing the "Peter Parley" books, and was (1848-55) chief ed. of the Boston *Courier*. He edited *Specimens of Amer. Poetry*, etc. D. Dec. 3, 1885.

Kew, village and parish of Eng., co. of Surrey, opposite Brentford, in Middlesex, 8 m. from Lond. Kew Gardens and the pleasure-grounds extend along the Thames from Kew Green to the borders of Richmond. It was in these grounds that Bradley's observations upon the fixed stars were made about the middle of the 17th century, with a telescope constructed by Mr. G. Molyneux. Kew Palace, an unpretending brick house of moderate size, became royal property in the early days of George III., who here played his favorite part of "Farmer George." The later interest of Kew centres in its gardens and botanical collections. The large and choice collections of living plants,

maintained for 70 or 80 yrs. as the private property of the sovereign, were of much botanical importance. In 1838 the grounds became national property, and the now celebrated establishment was founded. Under the liberal support of Parl. the royal gardens at Kew have become the largest and most important, as well as the most popular botanical establishment in the world. ASA GRAY.

Kewanee, on R. R., Henry co., Ill., 132 m. W. of Chicago. In the vicinity are inexhaustible beds of bituminous coal. Pop. 1870, 4225; 1880, 4207.

Kew-Kiang, or **Kiu-Kiang** [Chi. "Nine Rivers"], one of the oldest cities of Chi. on the Yang-tze River, near the N. extremity of Poyang Lake, 227 m. S. W. of Nanking. It is the emporium of the great tea-dists. S. of Poyang Lake, and in 1880 the value of its exports amounted to 8,824,966 taels. In 1853 it was taken and nearly destroyed by the Taeping rebels, but it soon recovered after the settlement of the Europeans in the place. Pop. 53,000.

Key (DAVID M.), b. in 1824 in Greene co., E. Tenn.; grad. at Hiwassee Coll. 1850; admitted to the bar 1853; in the Confed. army 1861-65; was appointed Andrew Johnson's successor in the Senate in 1875; was in Pres. Hayes's cabinet 1877-80 as P. M.-gen., and was then appointed U. S. dist. judge in Tenn.

Key (FRANCIS SCOTT), b. in Frederick co., Md., Aug. 1, 1779, ed. at St. John's Coll.; practised law in Frederick, Md., and in Wash., D. C. He was the author of *The Star-Spangled Banner*, composed while a prisoner in the Brit. fleet during the bombardment of Ft. Mchenry. A vol. of his poems has been pub. D. Jan. 11, 1843.

Key (THOMAS HEWITT), M. A., F. R. S., b. at Southwark, Eng., Mar. 20, 1799, grad. at Trinity Coll., Cambridge, in 1821; studied med., and was appointed prof. of math. in the Univ. of Va. in 1824. Returning to Eng. in 1827, he was for 13 yrs. prof. of Lat. in the newly organized Univ. of Lond., after which he became prof. of comparative gram. and headmaster of the preparatory school. He wrote a *Lat. Gram., Language, its Origin and Development*, and many philological essays. D. Nov. 1875.

Key (THOMAS MARSHALL), b. in Ky. about 1818, grad. at Yale Coll. in 1838; studied law, and settled at Cin. He was repeatedly elected to the O. senate; was in 1861 sent as com. to the govt. of Ky. in the interests of the U.; member of the staff of Gen. McClellan; author of first bill passed by Cong. for emancipation of slaves, and also of that for emancipation of the slaves in D. C. D. Jan. 15, 1869.

Keyes (EMERSON W.). See APPENDIX.

Keyes, keez (ERASMUS DARWIN), b. at Sturbridge, Mass., June 1810, grad. at W. Pt. in 1832; was instructor at the Military Acad. from 1844 to 1848; engaged in Indian wars on Puget Sound in 1856; commanded a brigade at the battle of Bull Run; brig.-gen. May 1861; was in battles before Richmond in command of the 4th corps; was maj.-gen. of volunteers and brevet brig.-gen. U. S. A.

Keyport, N. J. See APPENDIX.

Keyser, ki'zer (PETER D.), M. D., b. at Phila. Feb. 8, 1835; studied at Delaware Coll. until 1851; entered the chemical laboratory of Prof. F. A. Genth at Phila.; went to Europe in 1854; grad. in the med. dept. of the Univ. of Jena in 1864; returned home same year, and became acting assistant surgeon U. S. A. In 1868 he became surgeon in charge of the Phila. Eye and Ear Infirmary; in 1870 also ophthalmic surgeon to the med. dept. of the Ger. Society of Phila., and in 1872 one of the surgeons to Wills Eye Hospital in Phila.

Key West [a corruption of the Sp. *Cayo Hueso*, "bone reef"], cap. of Monroe co., Fla., is the extreme S. boundary of the U. S., and forms the entrance to the Gulf of Mex., being distant about 68' from the coast of Cuba. It is on an island of the same name, 7 m. long by 1 to 2 wide, of coral formation, elevated only 11 ft. above the sea, and covered with a thin layer of soil, on which tropical fruits are successfully cultivated. The town is a naval station, has a large depot for U. S. stores, etc.; it possesses a good harbor; is in connection by steamers with ports of the U. S. On the S. W. point is a light-house, with a fixed light 73 ft. above the water, situated in 24° 33' N. lat. and 81° 47.3' W. lon. Pop. 1880, 9890.

Khalidun' (IBN), otherwise called WALY EDDIN ABU ZEID ABDALRAHMAN, b. at Tunis, Afr., in 1332; studied for some yrs. in Granada; was then employed in the service of his own sovereign, and in that of the sultan of Fez; made the pilgrimage to Mecca in 1382, and settled at Cairo, Egypt, as instructor in several colls.; was sent as ambassador to the conqueror Timour at Damascus about 1400; was chief cadî at Cairo in 1384, and again in 1400. He was one of the most distinguished of the Arab writers, and left a vast *Hist. of the Arabs, the Pers., the Berbers, and the Nations among whom they have Lived*. D. 1406.

Khal'ed (surnamed "The sword of God"), b. in Ar. in 582; commanded the cav. of the Koreish against Mohammed at the battle of Ohud in 623; was converted to Islam in 629; saved the army of Mohammed at the battle of Muta the same yr., gaining the surname by which he was ever afterward known; invaded Per. in 632; took Bozrah, besieged Damascus, and defeated the gens. of Heraclius at Aiznadin in 633; stormed Damascus in 634, took Aleppo in 638. D. 642.

Khalkas', the name of the N. part of Mongolia, a part of the Chi. empire, extends between Siberia, the river Amoor, the desert of Gobi, and the Altai Mts. It consists mostly of vast steppes. Ranges of mts. traverse the country, beautifully terraced and well wooded, and here are the seats of immense Buddhist monasteries. The inhabs. are Mongolian Tartars, and profess Buddhism.

Khan [formerly spelled *cham* in many cases], a title given to many Tartar magnates and kings, also to E. I. princes under the Moguls.

Khang-Hi, or **Kang-Hi** [Mantchoo, "inalterable peace"], second emp. of Chi. of the present Mantchoo dynasty, b. in 1654; succeeded to the throne in 1662, under

the regency of 4 mandarins; assumed the govt. in 1667; introduced the teaching of the European system of astron. 1667; suppressed a revolt made by the prince of Yunnan 1673; annexed Kwang-Tung (1680), Fo-Kien (1681), and Formosa to the empire; concluded with Rus. a treaty of peace and limits at Nijichow (Sept. 3, 1689); annexed Thibet about 1700; authorized a persecution of Chrs. in 1717. He is esteemed the greatest of the Chi. sovereigns; caused the publication of important works on the lang., hist., and lit. of Chi., and directed the topographical survey by which Chi. geog. is best known. D. Dec. 20, 1722.

Kharkov', town of Rus. on the Kharkova, an affluent of the Don. It has 4 annual fairs which are much frequented, especially the wool-fair in spring. Pop. 101,175.

Khartoom'. See APPENDIX.

Khatmandoo', or **Katmandu'**, the cap. of Nepaul, Hindostan. It is poorly built, many even of its temples being built of wood. Pop. 50,000.

Khazars, or **Chazars**, a tribe of Finnic or Magyar stock, settled N. of the Caucasus, on the Volga.

Khedive, kâ-dê'vâ [Per-Ar. *Khâdîm el-Mîr*, or king of Egypt], is since 1866, the official title of the viceroy of Egypt. The viceregency is hereditary in the family of Mehmet Ali since 1841, according to the Tur. law of succession, and since 1866 in direct line—that is, from father to son. The first K. of Egypt was Ismail, son of Ibrahim Pasha, b. in 1830; he succeeded his uncle, Saïd Pasha, Jan. 18, 1863. The second K. is the present sovereign, Mohamed Tewfik, who succeeded to the throne, on the abdication of his father, Aug. 8, 1879. He married, Jan. 10, 1873, Princess Eminah, daughter of El Hamy Pasha. He has 2 sons, Abbas, b. July 14, 1874, and Mehmet Ali, b. in 1876.

Kherson', town of Rus. on the Dnieper. It was founded in 1778 by Potemkin. Pop. 49,807.

Khiva, khanate of Toorkistan, in Central Asia, which until recently was held to extend from the Sea of Aral on the N. to the Per. frontier on the S., and from Bokhara on the E. to the Caspian Sea on the W., comprising a region mostly desert. As the result of a war with Rus. in 1873, the new E. boundary is the river Amoor, or Amu-Darya (the anc. Oxus), from Kukertli to the Sea of Aral, and thence S. W. along the so called "anc. bed of the Oxus" to the Caspian. The Khivan terr. E. of the Amoor was ceded to Rus., and a portion was transferred by Rus. to the khanate of Bokhara, and Khiva may be considered as reduced to the oasis N. of the Desert of Toorkistan or Kharesm, and S. W. of the lower Amoor River, a dist. not exceeding 30,000 sq. m. in area, with a pop. of 280,000. The oasis of K. is watered by irrigation from numerous canals fed by the Amoor, and produces wheat, rice, cotton, apples, peaches, pomegranates, melons, and vines. The climate is variable, frosts prevailing from Oct. to Apr., while the heats of mid-summer are excessive. Manufactures of brass and earthenware, woollen goods, shawls, and silk are carried on, and horses, asses, and camels are abundant. Trade is carried on by caravans, the articles of importation including firearms, sugar, muslin, chintz, and fancy goods. The pop. of K. is of several nationalities. The anc. pop. called Sarts or Tajiks still form the large class, furnishing most of the laborers. They are all of Per. affinities. The Turkomans or Yomuts, Kirghiz, and Karakalpaks constitute the nomadic pop. of the desert. The dominant race is that of the Uzbeks, of Tur. origin. K. in the widest geographical sense comprehends a part of Chorasnia, Sogdiana, and Bactria, which filled a large space in early Asiatic hist. During the Middle Ages it became an independent kingdom under the name of Khovaresm; was conquered by Genghis Khan in the 13th century, by Tamerlane in the 14th, and by the Uzbeks early in the 16th century, the latter being the founders of the existing khanate. A Rus. expedition, sent against K. by Peter the Great in 1717, was defeated, and another similar undertaking in 1839 was resisted. In 1873 the ill-treatment of Rus. captives afforded a pretext for a campaign conducted by Gen. Kaufmann, who invaded K. with 3 corps of 5000 each, took Kungrad May 20, and occupied the cap. June 10. The khan, Seïd Mohammed, had fled, but soon returned to tender his submission and arrange terms of peace. The boundaries were defined as before mentioned, slavery was abolished (July 25), and the slave-trade prohibited; an indemnity of 2,200,000 rubles was imposed; the right of making treaties with foreign powers was surrendered, and the Turkoman tribes were to be punished for their hostilities against Rus. The independence of K. was recognized, but K. became really a Rus. dependency. More recent events (1874 and 1875) having demonstrated the inability of the khan to comply with some of his engagements, the Rus. occupied the cap. anew by request of the native ruler, and the region extending from Bokhara to the Caspian, and S. to the Atrek River, was occupied as Rus. domain under the name of "Trans-Caspian Territory," with the cap. at Krasnovodsk, a port on the Caspian. The inhabs. of K. are Soönite Mohammedans; they have some taste in music and poetry, and a considerable lit. (See Vambéry's *Central Asia and the Anglo-Rus. Frontier Question* and Schuyler's *Turkistan*).

PORTER C. BLISS.

Khokan', or **Kokan'**, formerly one of the 3 independent khanates of Toorkistan in Central Asia, bounded on the S. W. by N., and N. E., by the Rus. prov. of Sir-Darya, E. and S. E. by Kashgaria or E. Toorkistan, and S. by the Pamir plateau and the Karateghin, but now included in the Rus. prov. of Ferghana. The W. part of the khanate, the lower basin of the Sir-Darya, with the cities of Tashkend and Khojend, was annexed to Rus. in 1864, and the remainder in 1874. The area is only 28,270 sq. m., and the pop. 900,000. K. is chiefly in the valley of the river Sir-Darya, forming a dist. about 165 m. long and 65 m. wide; the climate varies from extreme cold to extreme heat, according to location. The valley is bounded on the S. E. and S. by mts., the chains of Tian-Shan or Muz-Tagh and Asferah-Tagh forming watersheds between the basin of the Sir-Darya and

those of the Kashgar and Amu-Darya rivers, which flow E. and W. from the Amir plateau. The country is abundantly watered, and produces fine crops of rice, wheat, cotton, and barley, as well as hemp, flax, tobacco, sorghum, and madder. Fruits of many kinds abound; silk of excellent quality is grown and manufactured. Domestic animals are reared in sufficient numbers; turquoise, iron, coal, naphtha, and petroleum are among the mineral products. The pop. consists of Uzbeks, of Tartar origin, Tajiks or Sarts, of Per. or Arayan origin, and the Kara-Kirghiz and Kiptchak nomadic tribes, of Tur. blood. The present khan, named Khudayar, commenced his reign in 1843. The chief cities of K. are the cap., bearing the same name, a handsome place of 50,000 inhabs.; Marghilan, and Andijan.

PORTER C. BLISS.

Khorsabad [corruption of *Khorsabad*, "the abode of Khorsu or Chosroes"], a v. of Asiatic Tur., on the Tigris, 13 m. N. E. of Mosul, occupying the site of one of the royal cities of Assyria. The palace of Sargon, excavated at the expense of the Fr. govt., afforded the first historical inscriptions in cuneiform characters found in any Assyria. (See BOTTA and FLANDIN'S *Mémoires de Ninive*.)

Khorsu, or **Chosroes** (Gr. *Χοσρόης*), the name of 2 Per. monarchs of the Sassanid dynasty: I. NUSHRVAN ("noble spirit"), called the Just, third son of Kobad or Cobades, by whose will he succeeded to the throne at Ctesiphon Sept. 12, 531. The hereditary war between Grs. and Pers. had broken out afresh in 521, and was carried on in Armenia, Syria, and Mesopotamia until the accession of K. Justinian concluded with K. an ignominious peace (533). During the preceding reign a politico-religious sect, called after their founder Mazdak, had arisen in Per., inculcating communistic or socialistic principles. Kobad had endeavored to subdue them, seizing the leaders and massacring many of the sectarians. A formidable c. war was the result, continuing into the reign of K., who suppressed the sect. K. divided his empire into 4 viceroyalties—Assyria, Media, Per., and Bactriana. K. marched an army into Syria in 540, imposed contributions upon the cities, took Antioch and destroyed it. Belisarius, the conqueror of Afr., was sent to conduct the war (541), and by a bold irruption into Mesopotamia forced K. to return. Belisarius being recalled, the invasion of Syria was renewed (542); the return of that gen. to the field caused the Pers. to recross the Euphrates, and his second recall for the It. campaign (543) again gave the victory to K. After a brief truce the war was renewed, and continued until 562, when the Byzantine emp. consented to pay an annual tribute of 40,000 pieces of gold, and remained in possession of the disputed provs. S. Ar. was soon afterward conquered by K.; the Armenians revolted from him in 569 with the support of the emp. Justin II., and the war between the 2 empires was renewed in 571. Syria was again ravaged by the Pers., but K. was defeated at Melitene in Lesser Armenia in 576, and d. at Ctesiphon in Mar. 579, leaving the throne and the hereditary war to his son Hormuz (or Hormisdas) IV.

II. PURWIZ or PERWIS ("the generous"), grandson of Khorsu I., succeeded his father, Hormuz IV., who was deposed in 590 by a rebel gen. named Bahram. The young K. took refuge with the Gr. emp. Mauritius, by whose aid he regained the throne, and in recompense ceded a great part of Mesopotamia, beside paying a large sum of money. On the murder of Mauritius by Phocas (602), K. made war upon the usurper, and within a few yrs. conquered Syria, Egypt, and Asia Minor, thus bringing the war to the gates of Constantinople. With the wealth of so many kingdoms he built a palace of unparalleled magnificence at Dastagerd. After 12 yrs. of defeats the emp. Heraclius began a series of campaigns in which he recovered all his lost possessions. In consequence of his misfortunes K. was murdered by his son Shirweh (Siroes) in Feb. 628. It was during his reign that Mohammed proclaimed the doctrine of Islam.

PORTER C. BLISS.

Khy'ber Pass, in the Khyber Mts., a gorge nearly 30 m. long, inclosed by cliffs rising almost perpendicularly on both sides to the height of 1000 ft. It is the prin., and for artil. the only available road between Hindostan and Afghanistan.

Klabou'ca, or **Amboyne Wood**, a beautiful wood, imported for inlaying purposes. It is richly mottled, and is of a reddish hue. It is sawed in thin slips from knots and wens upon the *Pterospermum Indicum*, a tree of the E. I.

Kiang-Chow. See KIANG-CHOO.

Kidd (WILLIAM), the "Robert Kidd" of popular tradition, was the son of a Scotch preacher. He became a sailor, and in 1691 received an award of £150 from the council of New York for services in behalf of the colony. In 1696 he sailed from Plymouth, Eng., in command of the Adventure galley, fitted out for the suppression of piracy, but, according to gen. belief, he became a pirate himself. He came in 1698 to New York with a large amount of treasure, which was seized by the earl of Bellomont, and an additional treasure which he had buried on Shelter Island was recovered. He was sent to Lond., where he was hanged for the murder of a seaman. There is some reason for believing that he was not guilty of the crimes which have made his name so notorious. D. May 24, 1701.

Kid'der (DANIEL PARISH), D. D., b. at Darien, N. Y., Oct. 18, 1815; studied at Hamilton Coll., N. Y., and grad. at the Wesleyan Univ., Conn., in 1835. He preached in N. J. conference, 1840-44; was prof. of practical theol. in Garrett Biblical Inst., Evanston, Ill., in 1855, and afterward became prof. at Drew Theological Sem., Madison, N. J. Wrote *Brazil and the Brazilians*, *Mormonism and the Mormons*, etc.

Kiddermister. See APPENDIX.

Kid'doo (JOSEPH B.), b. in Pa.; on the outbreak of c. war enlisted as private, and was engaged at the siege of Yorktown, the battles of Williamsburg, Fair Oaks, Malvern Hill, etc.; promoted to be major 101st Pa. Volunteers; subsequently, as lieut.-col. 137th Pa. Volunteers, he was engaged in the battles of S. Mountain, Antietam, and Fredericksburg,

and as col. at Chancellorsville. In Oct. 1863 he was appointed major 6th, and June 1864 col. 22d U. S. colored troops, operating during the siege of Petersburg with the Army of the James, being severely wounded Oct. 1864. He was brevetted brig.-gen. and maj.-gen. U. S. volunteers, and col. and brig.-gen. U. S. A. In July 1866 he was appointed lieut.-col. 43d U. S. Inf., but owing to disability arising from wounds received in service, was retired, Dec. 1870, upon the full rank of brig.-gen. D. Aug. 19, 1880.

Kid'napping [from Ger. *kind*; Provincial Eng. *kid* "child," and Prov. Eng. *nep*, to "seize"] is a criminal offence, defined by Blackstone to be the forcible abduction or stealing away of a man, woman, or child from his own country and sending him into another. The term is commonly employed to denote the stealing and carrying away of children, but in law it is applied to all persons. This offence was treated, at common law, as an aggravated kind of abduction or false imprisonment, and was punished by fine and imprisonment. At the present day the nature of this crime is generally defined by statute, and the carrying of the person taken into another country is not usually made a necessary ingredient in the offence. Fraudulently inveigling, enticing, or decoying a person away, with intent to imprison or secrete him or detain him from his home, is frequently declared to be K. as well as an abduction by the use of force. There are frequently special statutory provisions in regard to the K. of children.

Kidney Diseases. See RENAL DISEASES.

Kiel, town of Prus., in the duchy of Holstein, on the Kieler Fiord, is the seat of a univ. Its harbor is one of the best on the Baltic, and strongly fortified. Pop. 43,594.

Kienchow. See KIANG-CHOO.

Kien-Lung [Chi. "celestial blessing"], 4th emp. of Chi. of the present Mantchoo dynasty, b. in 1709; succeeded his father, Yung-Ching, in 1735; made war upon the Tartar tribes 1754-60, and upon the kingdom of Ava 1768; pub. an edict against Christianity 1753; received the first Eng. embassy under Lord Macartney 1793; abdicated in favor of his son, Kia-King, 1795; was a protector of lit. D. Feb. 7, 1799.

Kie'pert (HENRICH), b. at Berlin July 31, 1818; devoted himself to the study of geog.; explored Asia Minor in 1841-42; was director of the geographical inst. of Weimar 1845-52; returned to Berlin and became prof. at the univ. in 1859. Pub. *Atlas von Jiddas und den hellenischen Colonien*, maps to Robinson's *Palestina*, *Historisch-geographische Erläuterung der Kriege zwischen dem alt römischen Reich und den persischen Königen der sassanidischen Dynastie*, *Neuer Hand-atlas der Erde*, *Atlas der alten Welt*, etc.

Kiev, ke-ey', town of Rus., on the Dnieper; one of the oldest cities of Rus.; consists of 3 towns, each with its own walls—viz. Petchersk, with the monastery of Petcherskoi, containing the tombs of Rus. saints; K. proper, with the cathedral of St. Sophia, built in 1037; Podol, occupied by the middle and lower classes. K. has a univ. and other educational insts. Its trade is important. Pop. 127,351.

Kilauea, a volcano in Hawaii, one of the S. I., one of the largest in the world. It is in constant activity. The crater is 8 m. in circumference and from 800 to 1500 ft. in depth. Mauna Loa, another volcano, is 16 m. distant.

Kilbourne City. See APPENDIX.

Kil'bourne (JAMES), b. at Farmington, Conn., Oct. 19, 1770; in 1800 was ordained as deacon, and at times officiated in the pulpit. He was a liberal benefactor to various public insts., and in 1802 removed to O. with a numerous following, and founded the town of Worthington; was M. C. 1813-17, and again 1839-41; was frequently elected to the State legislature; was surveyor of public lands, com. to settle the boundary-line between the public lands and the great Va. reservation; col. of a frontier regiment; pres. of board of trustees of Worthington Coll. 35 yrs. D. Apr. 9, 1850.

Kil'deer, the *Charadrius vociferus*, a N. Amer. plover, common in summer on the interior plains, and in winter frequenting the sea-coast from Tex. to Mass. It is named from its cry, which is constantly repeated. Its flesh is not prized very highly.

Kil'ham (ALEXANDER), b. at Epworth, Eng., July 10, 1762; joined the Wesleyan Conference in 1785, and in 1796 was expelled for advocating a more equal distribution of powers among laymen and preachers. The next yr. was organized the "Kilhamites" or "New Connection of Wesleyan Methodists." D. 1798.

Kil'ian, SAINT, b. in Ire. early in the 7th century; devoted himself to missionary labors in Thuringia, Ger., where he was murdered in 689, being afterward canonized.

Kilimandjaro, a mt. of Afr., situated on the W. border of Zanzibar. Its top is covered with perpetual snow, and its height is about 18,700 ft. above the level of the sea.

Killarney, market-town and parish of Ire., Kerry co., 44 m. N. N. W. of Cork, situated in the midst of the most beautiful scenery, and within about 1 m. of the lakes to which it gives its name; contains several hotels, chs., and chapels, and a magnificent R. Cath. cathedral, a dispensary and fever hospital, a poorhouse, etc. Pop. 5187. The lakes, 3 in number, are connected with each other. They receive several streams, and are interspersed with numerous islands. On a projecting peninsula stand the picturesque ruins of Muckross Abbey and Ross Castle.

Kill'er, a name applied to cetaceans of the genus *Orca*, family Delphinidae, or dolphins, and given in allusion to their sanguinary and ravenous habits. They are noted enemies of the right whales, as well as other delphinoids, seals, fishes. The K. of the Atlantic U. S. coast is *Orca gladiator*, and that of the Pacific coast *O. alba*.

Killicrauk'ke, a pass through the Grampian Mts. in Perthshire, Scot., N. W. of Dunkeld. At the N. extremity the revolutionary army, under Gen. Mackay, was defeated on July 17, 1689, by the royalists, under Grahame of Claverhouse, who was killed at the moment of victory.

Kilns, kilns [A. S. *clyn*, from *cylene*, "a furnace or kitchen"], a name given to various kinds of furnaces or ovens

constructed of brick or stone, in which a high and uniform heat can be applied to bodies for the purpose of drying, baking, or charring them, such as brick-kilns, pottery-kilns, charcoal-kilns, etc. The best kiln for any special purpose is that in which the requisite intensity of heat can be produced and maintained under the most perfect control at the least expense for fuel. *Intermittent* kilns are those in which the fire is allowed to go out after each burning, to be again started after the kiln is recharged. For burning lime with wood-fuel the upright kiln is the simplest. It may be built of brick; if of other masonry, it should have a brick lining. On the inside it is circular in horizontal section, tapering slightly, by a curve both up and down, from the circle of largest diameter, which is from 4 ft. to 6 ft. above the bottom. A kiln of 10 to 11 ft. in largest diameter may be about 25 to 28 ft. high, 5 to 6 ft. diameter at top, and 7 to 8 ft. at bottom. There is an arched opening on one side at the bottom, 5 to 6 ft. high, through which the wood is introduced and the burned lime removed. It is advantageous to have a horizontal grating 1 to 2 ft. above the bottom, on which to maintain the fire. These kilns are usually located on a hillside, so that the top is easily accessible for charging the kiln, and the bottom for supplying fuel and drawing out the lime. In charging, the largest pieces of stone to be burned are first selected, and formed into a rough, dome-like arch, with large open joints, springing from the bottom of the kiln to a height of 5 or 6 ft. Above this arch the kiln is filled in from the top, taking the larger stones for the lower layers, and topping off with those that are smaller. When starting a fire under the dome, the heat should be raised gradually to the required degree, in order to prevent a sudden expansion and probable rupture of the stone forming the dome, which might either cause a downfall of the entire mass above, or choke the draught by the stone breaking up into numerous small fragments. After a bright red heat is once reached through the mass of stone, it should be maintained to the end of the burning, as indicated by a large shrinkage in volume of contents, the choking up of the voids between the fragments, and the ease with which an iron rod can be forced through the stone from the top.

Kilo [Gr. χίλιοι, "thousand"], a prefix used in the Fr. metrical system to denote a thousand times the measure indicated by the word to which it is prefixed; as KILOGRAM, a thousand grams, the unit of commercial weight; KILOLITRE, a thousand litres, a measure of capacity; KILOMETRE, a thousand metres, the unit of linear measure; KILOSTERE, a thousand steres, a measure of solidity.

Kilpatrick (HUGH JUDSON), b. near Deckertown, N. J., Jan. 14, 1836, grad. at W. Pt. May 6, 1861; was commissioned capt. 5th N. Y. Volunteers May 9, and wounded at Big Bethel June 10. On his recovery was commissioned lieutenant. 2d N. Y. Cav. Volunteers, of which regiment he became col. Dec. 1862; participated in the Rappahannock campaign, in the second battle of Bull Run and many minor actions, and in the Md. campaign; promoted to be brig.-gen. of volunteers June 1863. At Gettysburg commanded a brigade and division. In Apr. 1864 he was ordered to duty with Gen. Sherman in the W., and at the battle of Resaca, May 1864, was severely wounded. During Gen. Sherman's march to the sea and subsequent campaign through the Carolinas he commanded the cav. In June 1865 he was promoted to be maj.-gen. of volunteers. He resigned his commission in the regular army Dec. 1865, and his volunteer commission Jan. 1, 1866. In Nov. 1865 he was appointed U. S. minister to Chili; recalled in 1868; reappointed Apr. 1881. D. at Santiago, Chili, Dec. 4, 1881.

Kimball, Dak. See APPENDIX.

Kimball (HEBER C.) b. in 1801; joined the Mormons in 1832 at Kirtland, O.; in 1835 became one of the 12 apostles of that sect; in 1837-38 was a missionary in Eng.; in 1838 went to the Mormon colony in Ray co., Mo.; removed thence to Nauvoo, Ill., and in 1846 became head priest of the order of Melchizedek at Salt Lake City. D. June 22, 1868.

Kimball (RICHARD BURLEIGH), b. at Plainfield, N. H., Oct. 11, 1816, grad. at Dartmouth in 1834; studied law in Europe; practised at Waterford, N. Y., and removed in 1840 to New York. Author of *Cuba and the Cubans*, etc.

Kimchi, Kim'kee (DAVID), RABBI, b. at Narbonne, Fr., in 1160; was one of the most distinguished Heb. writers of the Middle Ages; in 1232 was designated by the Fr. and Sp. rabbis as arbiter to settle the controversies growing out of the doctrines advanced in Maimonides' *More Nevochim*. His works consist of commentaries on nearly all the books of the O. T., a Heb. gram., and lexicon bearing the name of *Meikol* ("Perfection"), and a *Refutation of Christianity*, based upon the denial of Messianic predictions in the Psalms. D. in 1240. His father, JOSEPH, and his brother, MOSES, were also distinguished rabbis of Provence, the former having been driven from Sp. by Mohammedan persecution.

Kincaid (EUGENIO). See APPENDIX.

Kinderergarten is the name given by Friedrich Froebel to a company of children between the nursery age and that of the primary schools, who are to be educated according to a certain method. The literal meaning of the word *kinderergarten* is "garden of children." Up to Froebel's time the method of educating had been to *drill*, a process which expressed the method of proceeding from the outward inward, instead of from the inward outward. Froebel proposed that educators should prepare themselves to cultivate young children—first by acquainting themselves with the gen. laws and conditions of human nature, for the purpose of bringing forth the common sense and common conscience; and secondly, by a careful study of the individual possibilities of beauty and power of the several children committed to their care. He sought and found the clew to the true method of education by analyzing the instinctive play of mother and child, when she studies its instincts and spontaneities in order that she may help him to enjoy his body, which is the first world that circumscribes him. Having found that the child takes possession of his own

body and develops his organs of sense by first acting, and then realizing his action as a conscious fact, Froebel discovered that in the same manner he must be brought to take possession of the universe outside of his body. The reaction his activity provokes gives him impressions which rise into thoughts, by expressing themselves in words that re-echo his impressions, and later, into knowledge, by embodying themselves in transient effects, or productions more permanent, which reflect his inner being to his individual consciousness. But as the sympathizing mother assisted the child to know and use his organs of sense and locomotion in nursery play till he could run alone and began to speak, so the kindergarten must superintend his production of effects, and assist him to express himself freely in conversation, making outward things a stepping-stone, not a stumbling-block, of progress. As when the child runs alone and speaks, the nursery education merges in the K., so when the child can manipulate cleverly, converse intelligently, and begins to invent, the K. merges in the school. He is then ripe for learning to read and write. Elementary materials for the child's production, by which he is educated, were gradually elaborated by Froebel in 50 yrs. of experimenting. Beside these manipulations, the instinctive desire to work upon the earth is not allowed to die out. The vegetable world is always at hand, and affords subjects for examination and analysis, which engage attention next after the works of his own hands.

The methods of using Froebel's materials for education are indicated in the manuals prepared for aiding kindergarten, written under the direction of Froebel's disciple, the baroness Marenholtz-Bulow. In the beginning of his career Froebel pub. *Menschen-Erziehung* ("Education of Man"), in which the word *kindergarten* does not occur. Later in life he pub. *Mutter-Spiel und Kose-Lieder*, a kind of nursery manual. [From orig. art. in *J. of the Univ. Cyc.*, by ELIZABETH P. PEABODY.]

King (AUSTIN A.), b. in Sullivan co., Tenn., Sept. 20, 1801; became a lawyer in 1822, removed to Mo. 1830; was circuit judge of Ray co. 1837-48, and again in 1862; gov. of Mo. 1849-53, M. C. 1862-64. D. Apr. 22, 1870.

King (CHARLES), LL.D., son of Rufus King, b. in New York Mar. 16, 1789; ed. at Harrow School, Eng., and at Paris, while his father was U. S. minister to G. Brit., serving afterward in the banking-house of Hope & Co., Amsterdam. In 1806 he returned to New York; entered in 1810 into mercantile business; served for a time in 1814 as a volunteer in the war with Eng.; was sent to Eng. as com. to investigate the treatment of Dartmoor prisoners; was associate with Verplanck in editing the *New York American* 1823-27, sole ed. 1827-47, and afterward associated in the editorship of the *Courier and Enquirer*; was pres. of Columbia Coll. 1849-64. He wrote a sketch of the Croton Aqueduct, *Hist. of the New York Chamber of Commerce*, etc. D. Sept. 27, 1867.

King (HORATIO), b. at Paris, Oxford co., Me., June 21, 1811; learned the printing trade, and pub. a newspaper called *The Jeffersonian*; was appointed clerk in the P. O. dept. at Wash. in 1839; became first assistant P. M.-gen. in 1854; was appointed P. M.-gen. in 1861; retired from office on the accession of Pres. Lincoln, but remained in Wash.; rendered various services during the c. war.

King (JOHN P.), b. Apr. 3, 1799, near Glasgow, Barren co., Ky. His father soon after moved to Bedford co., Tenn., where the son remained until 1815, when he made his way to Ga.; studied law, and was admitted to the bar in Augusta in 1819, before his majority. In 1822 he visited Europe, where he attended lectures in Edinburgh and Paris; on his return he rose rapidly in his profession amid the most formidable competition. In 1833 he was chosen a member of the constitutional convention of Ga. of that yr. In this body he greatly distinguished himself. He was a Jackson Dem., and by his superior talents took the lead of that party in the convention. Before this his reputation had not extended beyond the limits of Richmond co., but by his debates in this convention he rose in one bound to the forefront of the ablest and most eloquent men in Ga. The next yr. he was sent to the U. S. Senate, but some of his party presses of the State having censured a speech he made against some of the leading measures of Mr. Van Buren's administration, he promptly resigned his trust, retired to private life, and resumed his profession in 1838. In 1841 he became pres. of Ga. R. R. and Banking Co. A. H. STEPHENS.

King (JONAS), D. D., b. at Hawley, Mass., July 29, 1792; grad. at Williams Coll. in 1816 and at Andover Sem. in 1819; preached for a time in S. C.; was 1823-26 a missionary in Syria, and 1828-69 a missionary at Athens. He was the author of numerous writings in the modern Gr. lang., and by reason of some of his publications was sentenced in 1852 to 15 days' imprisonment and expulsion from the kingdom, but an official protest saved him from the fulfilment of the sentence. D. May 22, 1869.

King (MITCHELL), LL.D., b. in Scot. June 8, 1783; removed in 1806 to Charleston, S. C., and became a prof. in Charleston Coll., of which he was afterward for some time pres. In 1810 he was admitted to the bar; in 1819, and again in 1842-44, judge of city court.

King (MOSES). See APPENDIX.

King (PHILIP PARKER), ADMIRAL, b. on Norfolk Island Dec. 13, 1798; entered the navy in 1807; commanded an exploring expedition in Australian waters in 1817 and on the coasts of Patagonia in 1825, publishing in both cases the hydrographical results of the survey. He was appointed rear-admiral in 1854. D. Feb. 1855.

King (PRESTON), b. at Ogdensburg, N. Y., Oct. 14, 1806, grad. at Union Coll. in 1827; became a prominent lawyer, journalist, and Dem. politician of St. Lawrence co., N. Y., and held various offices; M. C. 1843-47 and 1849-53; a Rep. U. S. Senator 1857-63; became in 1865 collector of the port of New York; was drowned in New York harbor Nov. 13, 1865.

King (RUFUS), son of Charles, b. in New York Jan. 26, 1814, grad. at W. Pt.; was appointed brevet second lieut. of

engineers 1833; resigned Sept. 1836, and for 2 yrs. was assistant engineer on the Erie R. R., and for 4 yrs. (1839-43) adjutant-gen. of the State of N. Y. Associated until 1845 in the editorial conduct of the *Albany Evening Journal*, in the latter yr. he removed to Wis. and assumed charge of the *Milwaukee Sentinel*; in 1861 was appointed U. S. minister to Rome, but the outbreak of the c. war caused him to tender his services to the govt., and in May 1861 he was appointed a brig.-gen. of volunteers, serving in Va. until Oct. 1863, when he resigned from the army and assumed his duties at Rome as U. S. minister. Recalled July 1, 1867. D. Oct. 13, 1876.

King (RUFUS), LL.D., b. at Scarborough, Me., Mar. 24, 1755, grad. at Harvard in 1777; studied law under Theophilus Parsons; was on the staff of Gen. Glover in the R. I. campaign of 1778; admitted to the bar; commenced practice at Newburyport in 1780; elected to the gen. court of Mass. in 1782 and succeeding yrs., and was chosen in 1784 as delegate to the Continental Cong. at Trenton, N. J. One of his earliest acts in Cong. was to move a resolution (Mar. 1785) "that there be neither slavery nor involuntary servitude in any of the States described in the resolution of Cong. of Apr. 1784 [the N. W. Terrs.], otherwise than in punishment of crime whereof the party shall have been personally guilty." This resolution was referred to the committee of the whole, and not further acted upon until 2 yrs. later, when its provisions were embodied in the ordinance for the govt. of the N. W. Terrs. presented to Cong. July 11, 1787, by Nathan Dane of Mass. Elected a member of the convention for framing the Federal const., K. participated actively in the debates, and was one of the committee on revision of style and arrangement of the articles; was a member of the Mass. State convention for the consideration of that instrument, and was instrumental in securing its ratification. In 1788 he removed to New York, and in 1789 was elected one of the first Federal Senators for N. Y. under the newly established constitution, and was re-elected in 1795. On the formation of the earliest national political parties, K. ranked as one of the leaders of the Federalists. His defence of Jay's treaty with Eng. (1794) brought him into favor with Washington, who offered him the secretaryship of state on the resignation of Edmund Randolph, and in 1796 appointed him minister to Eng. He remained in Lond. 8 yrs., notwithstanding the accession of the opposite party to power in 1801. Returning to the U. S. in 1804, he settled on a farm at Jamaica, L. I.; was re-elected to the U. S. Senate 1813; opposed the war with G. Brit., but aided in passing the measures necessary for its prosecution. His policy after the war was directed toward the speediest recovery of national prosperity; he was instrumental in securing the navigation and commercial acts of 1818; opposed the establishment of a national bank, and procured the enactment of a measure regulating the sales of the public lands. In 1816 he was nominated by the Federalists for govt. In 1819 he was elected to a fourth term in the Senate, during which he was chiefly conspicuous as leader of the opposition to the admission of Mo. as a slave State. On Feb. 16, 1825, he offered a resolution for devoting the proceeds of the sales of public lands to the purchase and emancipation of slaves and their removal to some foreign country. Later in the same yr. he accepted a new appointment as minister to Eng., but resigned and returned home the following yr. on account of ill-health. D. Apr. 29, 1827.

PORTER C. BLISS.

King (THOMAS BUTLER), b. in Hampshire co., Mass., Aug. 27, 1804, was ed. at Westfield Acad.; studied law, and moved to Ga. in 1823, where he married a lady of wealth and devoted himself to planting. He was from 1832 a member of the State senate for a number of yrs., in which body he distinguished himself by his efforts in the cause of public works for cheap transportation. He was M. C. from Ga. 1839-43, and 1845-49. While in Cong. naval affairs chiefly occupied his attention. In 1849 Gen. Taylor sent him on a special mission to Cal., where he rendered important service in procuring law and order where no organized civil govt. existed. While in Cal. he established interests of an individual character. Was opposed to the policy of secession, yet when Ga. in 1861 adopted that measure, he cast his fortunes with those of the State. D. May 10, 1864.

King (THOMAS STARR), b. in New York Dec. 16, 1824; d. in San Francisco, Cal., Mar. 4, 1864. His father was a Unit. minister in Charlestown, Mass. From 12 till 20 he labored first as clerk in a store, afterward as a teacher, preparing himself in leisure hours for the ministry. His first preaching was in Woburn, Mass., his first settlement in Charlestown, over his father's parish. In 1848 he accepted a call to the Unit. ch. in Hollis st., Boston, and remained there till the spring of 1860, when he went to Cal. to take charge of the Unit. ch. in San Francisco. The outbreak of the c. war roused all his remarkable powers as a writer, speaker, and man, and to his influence is ascribed the change of public opinion in the State from lukewarmness toward the Northern cause to devoted loyalty. Through his exertions the U. S. Sanitary Commission obtained the generous sums of money that enabled it to carry on its work at the critical period of the war. He contributed frequently to the *Unit. Quarterly*, but he pub. but one book, *The White Hills, their Legends, Landscapes, and Poetry*. A few of his papers were collected after his death—*Patriotism, and other Papers*.

King (WILLIAM), brother of Rufus, b. at Scarborough, Me., Feb. 9, 1768. After residing at Topsham for some yrs., he settled at Bath as a merchant about 1800; was for several terms a member of the Mass. legislature; was one of the leading advocates of the separation of Me.; pres. of the convention which framed the const. of Me., and first gov. of the new State. In 1821 he was made U. S. com. for the adjutant of Sp. claims; was a gen. of militia, collector of customs at Bath 1831-34, and a patron of insts. of learning. D. June 17, 1852.

King (WILLIAM), b. at Antrim, Ire., May 1, 1650; studied at Trinity Coll., Dublin; entered the Ch. in 1674; became

dean of St. Patrick in 1688, in which yr. he was twice imprisoned for sympathizing with the Eng. revolutionists. He became bp. of Kerry in 1691, abp. of Dublin in 1702; was one of the lords justices of Ire. in 1717, 1721, and 1723. He wrote several controversial works against Catholicism, but is best known by a Lat. treatise on the origin of evil, and by a sermon on predestination, in which he maintains that the moral attributes of God are different from the qualities bearing the same name among mankind. D. May 8, 1729.

King (WILLIAM RUFUS), b. in Sampson co., N. C., Apr. 7, 1786, grad. at Chapel Hill Univ. of N. C. in 1803; studied law, and was admitted to the bar in 1806. The same yr. he was elected to the legislature from his native co., and in 1807 was appointed State solicitor for the Wilmington circuit. In 1809 he was again returned to the State legislature; in 1810 he was elected M. C. from his dist.; in 1816 became sec. of legation under William Pinckney, Amer. minister, first to Naples, and then to St. Petersburg. During his Congressional term he was an advocate of the war-policy and measures of Mr. Madison's administration. On his return from Europe in 1818 he moved to Ala. In 1819 he was a member of the constitutional convention of the Terr. of Ala., and upon the admission of Ala. as a State into the U. he was elected one of the 2 U. S. Senators (1819 to 1844). During the whole of his Senatorial career Mr. K. was a supporter of Gen. Jackson. He advocated his election to the Presidency in 1824, 1828, and 1832; he also sustained the policy of Mr. Van Buren. In 1844 he accepted the appointment of minister to Fr. The special object of this mission was to prevent Fr. from uniting with Eng. in a joint protest against the incorporation of Tex. into the Federal Union. Having been successful in this mission, Mr. K. returned to the U. S. Nov. 1846, and remained in private life until 1848, when he was appointed to fill the unexpired term in the U. S. Senate of Arthur P. Bagby, and was again elected to the U. S. Senate for another full term of 6 yrs., beginning Mar. 4, 1849. Upon the accession of V.-P. Fillmore, on July 9, 1850, to the Presidency, Mr. K. was elected pres. of the Senate. He presided over this body with great urbanity, dignity, and ability. At the Presidential election of 1852 he was the Dem. candidate for the office of V.-P. of the U. S. with Gen. Franklin Pierce for the Presidency; both were elected by large majorities, but Mr. K. did not live to perform the duties of his office. D. in Dallas co., Ala., Apr. 1853. A. H. STEPHENS.

Kingbird, the *Tyrannus Carolinensis*, a familiar little bird found throughout the N. Amer. continent. It belongs to the tyrant flycatcher family.

King-crab, or **Horse-shoe Crab**, the *Limulus Polyphemus*, a remarkable articulate of the Atlantic shores of the U. S. having a horse-shoe shape. It is used in the U. S. as a fertilizer for land, being hardly edible.

Kingfish, or **Opah** (*Lampris guttatus*, Retz), a fish which is the sole representative of a peculiar family (Lamprididae). It is widely distributed.

Kingfishers, or **Alcedinidae**, a family of birds belonging to the order Insessores, and so named from their peculiarly piscivorous habits. This family is represented in N. Amer. by the genus *Ceryle*.

Kingkitaou, or **Kienghitao**, called by the Chinese **Hanching** or **Wangking**, and by the Fr. **Séoul** or **Sioul**, the cap. of Corea, near the centre of which it is situated. There are no reliable accounts of its pop.

Kinglake (ALEXANDER WILLIAM), b. at Taunton, Eng., in 1811; ed. at Eton and at Trinity Coll., Cambridge, where he grad. in 1832; was called to the bar in 1837, and acquired an extensive chancery practice, but retired from the law in 1856. Soon after finishing his studies he made an extensive tour in E. countries, of which he pub. an account under the title of *Euhen*. He accompanied Lord Raglan to the Crimea, and wrote a *History of the Crimean War*. He entered Parl. 1857; prominent for his anti-Napoleonic attitude upon the conspiracy (1858) and annexations of Savoy and Nice (1860).

Kinglets, the (*Regulus*, Cuv.), constitute a genus of the extensive family of Sylviide (warblers). The common Amer. species are the ruby-crowned (*R. calendula*) and golden-crested (*R. satrapa*) wrens or kinglets, which are both closely allied to the golden-crested wren (*R. cristatus*) of Europe, the smallest of the Old-World birds.

Kingman, Kan. See APPENDIX.

Kings (Books of). First and Second, 2 of the canonical books of the O. T., following the second book of Sam. and preceding the first book of Chron., contain the annals of the kings of Judah and Israel from the death of David to the Captivity. The Septuagint and Vulgate versions call them the third and fourth books of Kings, reckoning the 2 books of Sam. as belonging to the same work. Modern Ger. critics go still further, reckoning Judg. and Ruth to belong to the same work, which they call the "Great Book of the Kings," while suggestions have not been wanting that large portions of the Pentateuch and book of Josh. originally belonged to it, making an unbroken series of annals from the creation of the world to dispersion of the Heb. race.

Kingsbury (CHARLES P.), b. in New York 1818, grad. at W. Pt. 1840; served as assistant and in command of various arsenals; accompanied the army of occupation to Tex.; during the Mex. war was Gen. Wool's chief ordnance officer; was engaged at Buena Vista on the staff of Gen. Taylor; was supt. of the U. S. armory at Harper's Ferry in Apr. 1861; was chief of ordnance in the Army of the Potomac 1861-62; served on special duty until July 1865, when he was placed in charge of the U. S. arsenal at Watertown, Mass. He was the author of various professional works and a frequent contributor to periodicals. D. Dec. 25, 1879.

King's Evil *scrophulous*, a disease which was professionally cured by the touch of the kings of Eng. and Fr. The practice is traced to the times of King Edward the Confessor (1043-66). Charles II. of Eng. (1660-84) carried the practice to the greatest extreme, having "touched" nearly 100,000 patients. It was last employed in Eng. by Queen Anne (1703-15). The "Young Pretender" attempted to gain ad-

herents by touching for the K. E., and Louis XVI. of Fr. performed the same ceremony at Rheims.

Kingsley (CALVIN), D. D., LL.D., b. at Annsville, N. Y., Sept. 8, 1812; licensed as Meth. preacher in 1835; grad. at Allegheny Coll., Pa., in 1841. The same yr. he was appointed prof. of math. in that inst., and was afterward pastor at Meadville and Erie, Pa. In 1856 was elected ed. of the *Western Chr. Advocate* at Cin., O., and again in 1860. He took an earnest part against slavery, and was elected bp. in 1864. In 1869 he started on an episcopal tour of the world. He pub. *On the Resurrection of the Body*, and left a posthumous work on his travels *Around the World*. D. at Beyroot, Syria, 1870.

Kingsley (CHARLES), b. at Holne, Eng., June 12, 1819; grad. at Magdalen Coll., Cambridge, studied theol., took orders in the Ch. of Eng., becoming in 1844 rector of Eversley; devoted himself to the improvement of the condition of the working classes; was the chief originator of the school of ethics styled "Christian socialism." His earliest publication was *Twenty-five Village Sermons*, followed by a dramatic poem, the *Saint's Tragedy*, and in 1850 by a novel, *Alton Locke, Tailor and Poet*. In 1859 he was chosen prof. of modern hist. at Cambridge; resigned in 1869, in which yr. he became canon of Chester, and subsequently of Westminster and chaplain to the queen. Among his works are *Westward Ho*, *Yeast*, *Hypatia*, and *Health and Education*. In 1873-74 he visited the U. S. on a lecturing-tour. D. Jan. 24, 1875.

Kingsley (JAMES LUCE), LL.D., b. at Windham, Conn., Aug. 28, 1778, grad. at Yale in 1799; was a tutor there 1801-05, librarian 1805-24, and prof. of Heb., Gr., and Lat., and of ecclesiastical hist. 1805-51. He wrote a *Hist. of Yale Coll.* and a *Life of Pres. Stiles*, etc. D. Aug. 31, 1852.

King's Mountain, a mt.-range, some 16 m. long N. and S., with lateral spurs abounding in marble and iron, mostly in Gaston co., N. C., near the E. border of Cleveland co. Its S. extremity is in York co., S. C. The highest point is Crowder's Knob, 3000 ft. high and precipitous. Here took place (Oct. 7, 1780) a severe action between the Brit. and Amer. troops, in which the former were defeated.

Kings-ton, cap. of Jamaica, on the S. coast, 12 m. from Spanish Town, the former cap., is situated in a plain at the foot of the Blue Mts., surrounded by sugar-plantations, villas, and gardens; the climate is hot and unhealthy; yellow fever is a frequent visitor; the city is well built, with regular and spacious streets; it has recently been provided with good drinking-water. The harbor is defended by several forts, and the city is important as a commercial station between Europe and Central Amer. Pop. 38,586.

Kingston, city and R. R. centre, cap. of Frontenac co., Ont., Canada, near the lower extremity of Lake Ontario, opposite the Thousand Islands. It was founded in 1784 on the site of the old Fr. fort Frontenac, 161 m. E. of Toronto, and is strongly fortified. It is the seat of a R. Cath. bp. and the see-town of the Anglican bp. of Ontario; has a custom-house, a jail, a penitentiary, and is the site of Queen's Univ. and Coll., including a med. coll. It has also an inst. called Regiopolis Coll. K. is a naval station, and contains the royal dockyards. A long bridge has been built across Cataragui Bay. Pop. 14,091.

Kingston, city and R. R. centre, cap. of Ulster co., N. Y., 90 m. N. of New York and 55 m. S. of Albany, on the W. bank of the Hudson River and N. bank of Rondout Creek; is the E. terminus of the Del. and Hudson Canal, and is connected by steam-ferry with Rhinebeck, immediately across the river. K. was incorporated as a city 1873, by the junction of the former incorporated villages of Kingston, Rondout, and Wilbur. It is the location of the largest cement manufactory in the country. It received a charter in 1661 under the name of *Witwick*, was first settled in 1665, and was incorporated by patent in 1667. On Feb. 19, 1777, the first State convention adjourned from Fishkill to K., and the first State const. was proclaimed in front of the c-h. Apr. 22, 1777. The legislature met here in Sept. of the same yr., but was dispersed by the approach of a Brit. force under Sir Henry Clinton Oct. 7, when the town was burned. Being afterward rebuilt, it was incorporated as a village in 1805. Pop. of city in 1870, 6315; 1880, 18,344; 1885, about 19,000.

Kingston, on R. R. Luzerne co., Pa., in the anthracite coal region, and on the N. branch of the Susquehanna, opposite Wilkesbarre, and connected by a bridge. The massacre of Wyoming took place in the tp., and is commemorated by an imposing monument. Pop. 1870, 1143; 1880, 1418.

King-te-Ching, dist. of the prov. of Kiang-Si, Chi., and the seat of the celebrated manufactures of porcelain, in which nearly 1,000,000 persons are engaged.

King-wood, the wood of a species of *Triptolomia*, a Brazilian leguminous tree. The wood is very beautiful, and is used in ornamental joinery.

Kinkajou, the *Cercopithecus caudivolutus*, a small bear-like carnivorous mammal of tropical S. Amer., hardly as large as a cat. It is placed in a family, Cercopithecidae. It is a graceful nocturnal creature, arboreal in its habits, and excessively fond of honey.

Kinkel (JOHANN GOTTFRIED), b. at Obercassel Aug. 11, 1815; studied theol. at Bonn and Berlin; became prof. first of theol., and then of the fine arts, at Bonn, and pub. a vol. of poems. On account of his participation in the revolutionary movements in Rhenish Prus. in 1848, he was sentenced to 20 yrs. imprisonment at Spandau, but escaped, lived for some yrs. in Lond., and removed in 1866 to Zurich as prof. of the hist. of the fine arts. Of his writings, the most noticeable, beside his poems, are *Die altchristliche Kunst*, and *Nimrod*, a tragedy. D. Nov. 1882.

Kin, Next of, a term employed in law to denote the nearest blood relatives of a deceased person, among whom his personal property is distributed, after the payment of debts and legacies, according to the provisions of the statute of distributions. This is the ordinary technical sense of the phrase, though it is sometimes used, with a wider extent of meaning, to designate a person's nearest relations by blood, without regard to this statute. The relationship must be

by consanguinity, either lineal or collateral, and not by affinity. (See CONSANGUINITY.) Upon the death of a person intestate who was the owner of personal property, there are 2 important rights to which his next of kin are entitled: one is to administer upon his personal estate, and the other to share it among themselves, either wholly or partly, according to the statute of distributions. In case of administration by the next of kin, one or more are selected from among them as administrators, preference being given to those who are most nearly related to the intestate, according to the civil-law method of reckoning. Of persons in equal degree any one may be taken. Children are usually preferred to parents, parents to brothers or sisters, brothers or sisters to grandparents, grandparents to uncles, aunts, nephews, and nieces, etc. But statutes may modify these rules. (See ADMINISTRATION.) After the payment of debts by the administrator, and of various expenses, as funeral expenses, taxes, etc., the residue of the personal property is distributed among the next of kin and the husband or widow of the deceased, in accordance with the provisions of statutes of distribution which have been enacted in Eng. and the several States of this country. Thus, if a man die, leaving a widow and children, the widow receives $\frac{1}{2}$ of the property, and the children share the residue equally. If there be no widow, the children receive the whole. If other relatives than these survive, distribution is made in accordance with special rules.

GEORGE CHASE.

Kinnickinnick, or **Killickinnick** [Chippeway, a "mixture"], a name given by the N. Indians to various substances used for mixing with tobacco before smoking, such as the inner bark of the red willow and the leaves of the mt.-cranberry (*Arctostaphylos Uva-Ursi*).

Kino, an astringent drug, the hardened juice of *Pterocarpus marsipium*, a lofty tree, natural order Fabaceæ, growing in the E. I., and also of other trees in the W. I., S. Amer., Afr., and Australia. E. I. K. is the only variety in gen. use. It is in small shining, brittle fragments, of a deep reddish-black color and bitterish, highly astringent taste. It forms a deep red solution in water and alcohol. It owes its astringency to tannic acid (tannin), and is used in med. to check morbid discharges in bowel complaints.

Kinston, N. C. See APPENDIX.

Kiong-Choo, town of China, cap. of the island of Hainan, on the N. coast, surrounded with walls of hewn stones. Leather, hides, sugar, grass-cloth, silk, etc., are exported. Is said to have 200,000 inhabs.

Kioto. See MIAKO.

Kip (Rt. Rev. WILLIAM INGRAHAM), D. D., b. in New York Oct. 3, 1811, grad. at Yale in 1831; took deacon's orders in the P. E. Ch. in 1835; was rector of St. Peter's, Albany, 1838-53, and in the latter yr. was consecrated bp. of Cal. He is the author of many works, among which are *The Lenten Fast*, *Early Jesuit Missions in N. Amer.*, *Christmas Holidays in Rome*, *The Catacombs of Rome*.

Kiptchak, or **Kaptchak**, a Tartar or Mongolian race which gave name to a khanate founded in the 13th century by the Golden Horde. It extended from the Jaxartes in Toorkistan to the limits of Rus. proper, and comprised all the region N. of the Caucasus traversed by the Dnieper, Don, Volga, and Ural.

Kirby (EDMUND), b. in Brownsville, N. Y., 1840, grad. at W. Pt. 1861; was at once ordered to Wash., and assigned to the duty of drilling the newly arrived volunteers; upon the movement of the army he was assigned to Rickett's battery, with which he served at the battle of Bull Run; was next engaged in the combat of Ball's Bluff, Oct. 1861; in the Va. Peninsular campaign of 1862 he commanded a battery at Yorktown, Fair Oaks, Savage Station, Glendale, and Malvern Hill, and in the Rappahannock campaign at Fredericksburg and Chancellorsville; at the latter received fatal wounds. For his gallant services at Chancellorsville he was appointed on his death-bed a brig.-gen. of volunteers. D. May 28, 1863.

Kirby (WILLIAM), b. at Winesham, Eng., Sept. 19, 1759, grad. at Caius Coll., Cambridge, in 1781; took orders, and obtained the living of Barham. He was widely known by his work on *Entomology*, written in conjunction with Spence, and by his *Habits and Instincts of Animals with Reference to Natural Theology*. D. July 4, 1850.

Kirchbach, von (HUGO EWALD), b. May 23, 1809; ed. at the military acad., and entered in 1826 the Prus. army. In 1866, in the war against Aus., he led with distinction the 10th division as lieutenant-gen. In 1870, in the war against Fr., he led the 5th army corps. At its head he opened the war by the attack on Weissenburg, and 2 days afterward he took a most important part in the battle of Wörth, Aug. 6. In the battle of Sedan K. assumed the command of the 11th army corps, and performed the decisive manœuvre by which the Fr. army was surrounded. During the siege of Paris he held Versailles and its vicinity.

Kircher, ker'ker (ATHANASIUS), b. at Geisa, in Hesse, May 2, 1602; joined the Jesuits in 1619; was ed. at Würzburg, where he was prof. of philos. and the E. langs.; was in the Jesuits' coll. at Avignon in 1633-35; prof. of math. in the Coll. of Rome 1635-43. He wrote much upon physics, archaeology, philology, etc. D. Nov. 28, 1680.

Kirchhoff, keerk'hof (GUSTAV ROBERT), b. at Königsberg, Prus., Mar. 12, 1824; studied math. and natural science at the univ. of his native city; lectured on physics at Berlin in 1848 and at Breslau in 1850, and was appointed prof. of natural philos. at Heidelberg in 1854. His researches concerning heat, elasticity, magnetism, and electricity attracted great attention, but his most brilliant discovery was that of the spectroscopic method in connection with Bunsen, and its application for the spectrum analysis.

Kirgheez, **Kirgheez-Kaizaks**, or **Cossacks**, a nomadic people of Central Asia, numbering about 2,000,000, and occupying the Kirgheez Steppes, about 850,000 sq. m., stretching from the Caspian Sea to the Altai Mts. and from the Sea of Aral to the Tobol and Irtysh, traversed by mt.-

ranges, between which are large barren plains dotted with salt lakes. It is divided into the provs. of Orenbourg, W. Siberia, and Toorkistan. The climate is exceedingly cold in winter, excessively hot in summer. A few dists. along the rivers are tilled, the remainder is pasture-land. The K. are divided into the Little, Great, and Middle Hordes. They are of E. or Turco-Tartaric origin. Their lang. is a Tur. dialect, their religion a mixture of Islamism and idolatry. Their state of civilization is low.

Kirk (EDWARD NORRIS), D. D., b. in New York Aug. 14, 1802, grad. at Princeton in 1820; studied law and theol.; served as agent for the foreign mission board; held 1828-36 a Congl. pastorate at Albany, N. Y., and in 1839 became sec. of the Foreign Evangelical Society; in 1842 he became pastor of the Mt. Vernon ch., Boston. He was the author of several vols. of sermons and lectures, and many occasional discourses, beside some translations. D. Mar. 27, 1874.

Kirk (JOHN FOSTER), b. in 1824 at Fredericton, N. B.; in 1842 removed to Boston, where for 11 yrs. he was sec. to the historian Prescott. Wrote *Hist. of Charles the Bold*, and in 1870 became ed. of *Lippincott's Magazine*.

Kirkaldy (SIR WILLIAM) of Grange, b. in Scot. early in the 16th century; was one of the earliest Protts. of Scot.; joined a conspiracy against Cardinal Beaton in 1546; surrendered to the Fr. at St. Andrew's in the summer of that yr., and was imprisoned, but escaped to Fr., where he became distinguished in the court and army of Henry II.; returned to Scot. in 1559; took part in the movement against Mary queen of Scots; narrowly escaped assassination by Bothwell at the battle of Carberry Hill, and pursued that nobleman to the coast of Nor. (1567); contributed to the defeat of Mary at Langside, and became gov. of Edinburgh Castle May 1568; espoused the cause of Mary, and defended the castle for her from 1570 to 1573; surrendered May 28, and was hung at Edinburgh, with several of his followers, Aug. 3, 1573.

Kirkbride (THOMAS S.), M. D., LL.D., b. near Morrisville, Bucks co., Pa., July 31, 1809; received his early education in the schools of the Society of Friends; grad. M. D. from the Univ. of Pa. in Mar. 1832, and was immediately appointed resident phys. of the Friends' asylum for the insane at Frankford, Pa. In 1833 he was elected resident phys. of the Pa. Hospital in Phila. In 1835 he opened an office for gen. practice in Phila., but in Oct. 1840, just before the completion of the new Pa. Hospital for the insane W. of the Schuylkill, he was elected its supt. and phys.-in-chief. He entered upon his duties at the opening of the hospital, Jan. 1, 1841. He was convinced that not more than 250 insane patients should be treated at one time in a single hospital, and commenced in 1853 the effort to raise money for a second inst. The hospital grounds included a tract of 113 acres, and by dividing the pleasure-grounds and placing his new hospital a third of a mile distant from the other, he could keep the 2 entirely distinct, though under the same gen. supervision and treatment. In 1859 he had erected a hospital for the insane, which has been a model for all those since erected. To this hospital he transferred all his male patients, and while retaining the gen. superintendency over both, placed his most trusted assistant at the head of the male dept. In all appertaining to mental alienation Dr. K. ranked as one of the ablest men in the profession. Wrote *Rules and Regulations for the Pa. Hospital for the Insane and The Construction, Organization, and Gen. Arrangement of Hospitals for the Insane*. D. Dec. 17, 1883. L. P. BROCKETT.

Kirkdale, parish of Yorkshire, Eng., in the Vale of Pickering, remarkable for a cave 245 ft. long. A great abundance of fossil bones of extinct species of animals was found there—hyænas, tigers, elephants, rhinoceroses, hippopotamuses, cave-bears, and horses.

Kirkland (CAROLINA MATILDA STANSEY), b. in New York in Jan. 1801; married Prof. William Kirkland of Hamilton Coll. (1800-46), spent some yrs. in W. N. Y. and Mich., and afterward in New York, where for a time she taught a school for young ladies. Under the pseudonym of Mary Clavers she wrote several works on W. life; edited the *Union Magazine* (1847-49), assisted in the management of *Sartain's Magazine* (1849-51); made 2 visits to Europe (1848 and 1850). Her prin. works are *A New Home, Who'll Follow? Forest Life, W. Clearings, and Holidays Abroad*. D. Apr. 6, 1864.

Kirkland (JOHN THORNTON), D. D., LL.D., b. at Little Falls, N. Y., in 1770, d. in Boston Apr. 26, 1840, son of Samuel Kirkland, missionary to the Indians; Harvard Coll. 1786; Congl. ch., Summer st., Boston, 1794; pres. of Harvard Coll. 1810-28. He pub. occasional pamphlets and a life of Fisher Ames (1809). His name is identified with Harvard Coll. as one of its most distinguished residents.

Kirkland (SAMUEL), b. at Norwich, Conn., Dec. 1, 1744, grad. at Princeton in 1765; was ordained a Congl. minister 1766; lived much as a missionary with the Six Nations, and was appointed in 1775 by the Cong. of Mass. to procure their favor or neutrality; was afterward an army chaplain. He may be regarded as the founder of Hamilton Coll., since he established the acad. from which it sprang. In 1789 he received from the govt. a grant of land 2 m. square, now in the town of Kirkland, N. Y. D. Feb. 28, 1808.

Kirkpatrick (ANDREW), b. at Mine Brook, N. J., Feb. 17, 1756, grad. at N. J. Coll. in 1775, and began the study of theol., but soon devoted himself to the law; was admitted to the bar in 1785; practised at Morristown, and afterward at New Brunswick; became judge of the supreme court in 1797, and was chief-justice 1803-24. D. Jan. 7, 1831.

Kirksville, R. R. junc., cap. of Adair co., Mo., 6 m. E. of Charlton River, 300 m. N. W. of St. Louis. Has a State normal school. Pop. 1870, 1471; 1880, 2314.

Kirkwood (DAVID), A. M., LL.D., b. in Harford co., Md., Sept. 27, 1814; was a mathematical instructor in York co., Pa., 1838-43; prin. of Lancaster (Pa.) high school 1843-48; of Pottsville acad. 1848-51; prof. of math. 1851-54 in Del. Coll.; its pres. 1854-56; became in 1856 prof. of math. in Ind.

Univ.; author of *Comets and Meteors* and of important astronomical papers.

Kirkwood (SAMUEL J.), b. in Harford co., Md., Dec. 20, 1813, ed. at Wash., D. C.; admitted to the bar in O. in 1843; was for 4 yrs. prosecuting atty. of Richland co., and a member of the State constitutional convention of 1850; removed to Ia. in 1855; was elected to the State senate in 1856; was gov. of Ia. 1860-63, and was distinguished as one of the great "war governors"; was chosen U. S. Senator (1866-67) to fill the unexpired term of James Harlan, vacated by his acceptance of the secretaryship of the interior; in 1875 again elected gov. of Ia., and in 1876 elected U. S. Senator. Was appointed sec. of the interior by Pres. Garfield Mar. 5, 1881; resigned 1882.

Kirschwasser [Ger. for "cherry-water"], or **Kirsch**, an alcoholic *liqueur* prepared in Europe from cherries. The ripe fruit is first stoned and then fermented. Afterward the broken pits are thrown into the mash, and the whole is distilled. An imitation is made of ordinary spirits flavored with cherry-laurel water. It is a dangerous compound.

Kirland (JARED POTTER), M. D., LL.D., b. at Wallingford, Conn., Nov. 10, 1793; studied med. at the med. schools of Yale and Pa. univs.; began practising at Wallingford; removed in 1818 to Poland, O.; was appointed prof. of the O. Med. Coll. at Cin. in 1837, of the Willoughby Med. School in 1841, and of the Western Reserve Coll. in Cleveland in 1843, which latter chair he filled to 1864. His scientific researches and experiments were principally in the sexual relations of the naiads, in the rearing of bees, and in the cultivation of fruit trees. D. Dec. 10, 1877.

Kirwin, on R. R., Phillips co., Kan. Pop. 1880, 807.

Kisfaludy, the name of 2 brothers who in the beginning of this century exercised great influence on Hungarian lit. They were both ed. at the gymnasium of Raab, entered the Aus. army, and made campaigns in It. and Ger., but retired, and engaged in literary pursuits. The elder, SÁNDOR, was b. at Sümeg, the family estate, Sept. 22, 1772; his poem, *Himfy's Love*, and his ballads made a great impression. D. Oct. 28, 1844.—The younger brother, KÁROLY, was b. at Tété Feb. 6, 1788; wrote dramas, took his subjects from national life, and treated them with great skill. D. Nov. 21, 1830.

Kishenev, or **Kishinev**, cap. of the prov. of Bessarabia, on the Buk, an affluent of the Dniester. Railways to Odessa and Jassy. The rapidly growing city is the seat of the authorities of Bessarabia, and has about 20 chs., a synagogue, good schools, etc. It has large markets for cattle and corn. The inhabs. cultivate fruit and tobacco. Plums are exported in immense quantities. Tallow, wool, wheat, hides, etc. are sent to Odessa and Jassy. Pop. about 120,000.

Kishon, a small river of Central Pal., rises near Mt. Tabor and flows N. W. into the Mediterranean, draining the plain of Esdraelon and the mts. of Carmel and Samaria. In biblical hist. it affords the scenes of the defeat of Sisera by Deborah and Barak, and of the slaughter of the priests of Baal by Elijah.

Kiss (AUGUST), b. at Pless, in Upper Silesia, Oct. 11, 1802; studied at the acad. of Berlin, under Rauch. The plaster model of his famous group, *The Amazon and the Panther*, was exhibited in 1839, and created such enthusiasm that a public subscription was opened. He subsequently produced a bronze equestrian statue of Frederick the Great for the city of Breslau, 2 statues, one colossal in size, of Frederick William III., *St. Michael and the Dragon*, a gift to Frederick William IV., an equestrian statue of *St. George*, of colossal size. D. Mar. 24, 1865. O. B. FROTHINGHAM.

Kissingen, town of Bavaria, on the Saale, has 3 mineral springs, from which 500,000 bottles of water are annually exported. In summer the place is much frequented, the water being drunk and used for bathing. The battle of Kissingen took place July 10, 1866, between the Prus. and the Bavarians. The Prus. were victorious.

Kist'nah, or **Krishna**, one of the largest rivers of Hindostan, rises in the W. Ghauts, flows S. E. across whole breadth of peninsula of Deccan, and enters Bay of Bengal near Masulipatam. Precious stones are found in it.

Kit'chel (HARVEY DENISON), D. D., b. at Whitehall, N. Y., Feb. 3, 1812, grad. at Middlebury Coll., Vt., 1835; studied theol. at New Haven; held Congl. pastorates at Thomaston, Conn., 1839-48; at Detroit 1848-64; pastor of Plymouth ch., Chicago, 1864-66; became pres. of Middlebury Coll. 1866, and resigned that post in 1875.

Kitch'en-mid'dens are large mounds consisting of oyster-shells, bones, and other refuse. They are found along the coasts of Den., in places where the anc. inhabs. assembled to celebrate their religious festivals; they contain numerous specimens of weapons and utensils, and show the life which at that time was led in these regions.

Kite [Welsh, *cidd*], a toy employed for ages and in many countries by boys as a plaything, and which has also had its scientific uses, having been employed to obtain the electric spark from the clouds, to carry lines across deep chasms, and in removing the passengers of stranded ships. The k. is a light frame of wood covered with strong paper, and held by a string so as to be acted upon by the wind. A tail is usually added, which gives the K. steadiness.

Kite, or **Elanet** (*Elaenetus*), a genus of birds of the Falconidae. The bill is toothless, the toes short, the tail double rounded, and the wings long, with the second primary longest. The black-shouldered hawk (*Elaenetus pleururus*) is found in the U. S.

Kite, the *Mitrus regalis*, a common bird of prey in Europe, distinguished by the beauty and ease of its rapid flight and the deep forking of its tail.

Kit-Kat (or **Kit-Cat**) Club, a society consisting of about 50 gentlemen of ability and rank interested in promoting the Prot. succession in the house of Hanover. It was instituted in 1703, and took its name from Christopher Kat, a pastry-cook who lived near the tavern where they met in King st., Westminster, and supplied the members with pies. The association lasted about 30 yrs.

Kittanning, cap. of Armstrong co., Pa., on R. R. and the Allegheny River, 44 m. N. of Pittsburgh and 35 m. from Parker City. It has a coll. and other educational insts. Pop. 1870, 1889, 1880, 2624.

Kittatinny, or **Blue Mountain**, takes its rise near Shawangunk, Ulster co., N. Y., passes S. W. through a corner of N. J., crosses the Del. at the Water Gap, trends W. S. W. through Pa., crosses the Susquehanna a few m. above Harrisburg, and the Potomac near Berkeley Springs, and continues with gradually lessening altitude through Va., N. C., and Tenn. into Ala. The average elevation is from 800 to 2500 ft.

Kit-ti-wake, a popular name for sea-gulls of the genus *Rissa*, named from their cry, which resembles their name somewhat slowly pronounced.

Kit-to (JOHN), D. D., b. at Plymouth, Eng., Nov. 4, 1804; learned the shoemaker's trade, but devoted all his time to books; pub. in 1825 *Essays and Letters*, which attracted much attention; learned the printer's art in the Islington Coll.; travelled extensively in the East 1829-33; pub. the *Pictorial Bible and Pictorial Hist. of Pal.*; edited and largely wrote the *Cyc. of Biblical Lit.*; founded and edited the *Journal of Sacred Lit.* and many other works, of which the most popular was *Daily Bible Illustrations*. D. Nov. 25, 1854.

Kiu-Siu, **Kioo-Sioo**, or **Xi-mo**, the southernmost of the 3 prin. islands of Japan, is separated from Corea by the Strait of Corea, and from the island of Nippon by the Strait of Sikokf. Nagasaki is on this island.

Kiz'il-i-mak (Tur. "red river"), the anc. Halys, the prin. river of Asia Minor, rising in the E. of the peninsula and flowing to the Black Sea, near Sinope. It forms the boundary between Anatólia and Sevas. Its prin. affluent is Kara-Soo or Kastamoonce River, the *Melas* of Strabo.

Klapka, klop'koh (György), b. at Temesvár, Hungary, Apr. 7, 1820; was ed. in the artill. school at Vienna, became an officer in the emp.'s life-guards, and in 1847 obtained a command in a border regiment. When Hungary revolted in 1848 he was made chief of staff of Gen. Kis, and in 1849 commander of an army corps; was made minister of war by Kossuth. After the defeat of the Hungarians he shut himself up in the fortress of Komorn, where he repulsed during several weeks the attacks led by Haynau. He spent many yrs. in exile in Ger., Eng., Fr., and Tur., and entering the German service attempted to raise Hungary against Aus. in 1859 and 1866. He was naturalized as a Swiss citizen, and elected a member of the federal council in 1856. In 1867 he returned to his native country, and was employed in the army. In 1873 he was in the military service of Tur., and visited Egypt in 1874. He wrote *Memoirs of the War of Independence in Hungary*, *The National War in Hungary and Transylvania*, and a work on *The War in the East* (1855).

Klaproth, klap'ró't (MARTIN HEINRICH), b. at Wernigerode, Ger., Dec. 1, 1743; was employed for 7 yrs. in an apothecary's shop at Quedlinburg, and afterward at Hanover and Berlin, where he made a methodical study of chem.; became prof. of chem. in the Berlin School of Artill. 1787, and in the Univ. 1789. Among his discoveries were the metals zirconium, titanium, and uranium, the sulphate of strontium, and the molybdate of lead. His numerous writings were chiefly pub. as papers in the *Denkschriften* of the Berlin Acad.; he also edited a *Chemical Dict.* and a *Chemical Manual*. D. Jan. 1, 1817.

Klaproth, von (HEINRICH JULIUS), son of the preceding, b. at Berlin, Prus., Oct. 11, 1783; applied himself when 14 yrs. of age to the study of Chi.; studied at Halle and Dresden, and finding in the Dresden library a fine collection of Oriental MSS., he established in 1802 the *Asiatisches Magazin*. In 1804 the Rus. govt. appointed him interpreter to an embassy already on its way to Chi. He set out alone, overtook the embassy in Siberia, and accompanied it into Mongolia (Jan. 1806), but the refusal of the Chi. govt. to receive a Rus. envoy prevented his penetrating into Chi. proper. Returning to Europe he acquired a knowledge of the geog. of Central Asia and of the langs. of the inhabs. In 1807 he was sent to explore the Caucasus, after which he was appointed prof. at the Univ. of Wilna. He left Rus. in 1812. He then put forth his *Travels in Caucasus and Georgia*, his *Geographico-Historical Description of E. Caucasus*, and his *Description of the Rus. Provs. between the Caspian and Black Seas*. On the final establishment of the Bourbons in Fr. he settled in Paris, where he spent the remainder of his life engaged in the production of a series of works upon Asia, especially Central Asia and Chi. Among these were *Asia Polyglotta*, with a linguistic atlas; *Tableaux historiques de l'Asie*, and numerous papers in the transactions of learned societies. D. Aug. 20, 1835.

Klausenburg (Hung. *Kolozsvár*), the cap. of Transylvania, situated 225 m. S. E. of Pesth. Pop. 29,923. It has a univ., a Unit. coll., a fortified castle, manufactories of porcelain, and considerable trade. The inhabs. are Magyars.

Kléber, kla-bair' (JEAN BAPTISTE), b. at Strasburg in 1755, was son of a stonemason. Abandoning his first calling as an arch., he enlisted in the military service of Aus., but soon returned to Fr., in 1792 entered the republican army as a private, and rose rapidly to the highest rank. After the siege of Mayence, K. was sent against the royalists of Vendée, then to the armies of Sambre-et-Meuse and of the Rhine, and won the battles of Altenkirchen and Friedberg in 1795. As he was a strong republican, the Directory did not want to employ him, but Nap. gave him a command in the expedition to Egypt, and left him there as gen.-in-chief. After the departure of Nap., K. defeated the Turks at Heliopolis; in 1800 again subdued Egypt, and was murdered at Cairo by a fanatical Moslem. D. June 14, 1800.

Kleene-Boc [Dut. for "little buck"], the *Cephalophus pygmaeus*, one of the smallest of the antelope group, an active little animal of S. Afr. It is 1 ft. high at the shoulders, and is of a dark slate-color.

Kleist, klí'st, von (HEINRICH), b. at Frankfort-on-the-Oder Oct. 10, 1776. He left the military service in order to

study philos. and math., and these studies he left in order to accept a position in the Prus. civil service. This he gave up in 1806, and determined to devote himself exclusively to lit., but more than once he abandoned lit. too with disgust. He grew tired of life, and Nov. 21, 1811, he shot himself at Wansee, near Potsdam. His dramas, *Der zerbrochene Krug*, *Kälchen von Heilbronn*, *Die Hermannsschlacht*, and *Der Prinz von Homburg*, belong to the standard pieces of every stage in Ger.; and his novels, among which *Michael Kohlhaas* occupies the first place, have taken rank beside Goethe's. It is now generally acknowledged that K. was one of the richest and most original poetical geniuses which the Ger. people has produced. CLEMENS PETERSEN.

Kleptomania. See INSANITY.

Klipp'springer [Dut.], the *Oreotragus saltatrix*, a beautiful and graceful S. Afr. mt. antelope, resembling in its habits the chamois. It is an extremely agile and swift little creature, less than 2 ft. in height.

Klopstock (FRIEDRICH GOTTLIEB), b. in Quedlinburg, Prus. Sax., July 2, 1724. He studied theol. first in Jena, where he (1745) wrote the first song of his great epic poem, *Messiah*; then in Leipzig, where he (1748) pub. the first 3 songs of that poem in *Bremische Beiträge*. But, although he had touched the very heart of his nation, he found no support and little encouragement at home. He was supported by foreigners. The Dan. king gave him a pension, and on this he lived, partly in Copenhagen, partly in Hamburg, where he d. Mar. 14, 1803. CLEMENS PETERSEN.

Knapp (CHAUNCEY L.), b. in Berlin, Vt., Feb. 26, 1809; learned the printing trade at Montpelier; was for some yrs. ed. of the Vt. *State Journal*; sec. of state from 1836 to 1840; removed to Mass., and was sec. of the senate in 1851, and was M. C. from 1855 to 1859. He had nominated Gen. Harrison for the Presidency in 1836, obtaining for him the electoral vote of Vt. 4 yrs. before the campaign in which that Pres. was elected.

Knapp (JACOB), b. at Otego, N. Y., Dec. 7, 1799; was ed. as an Episcopalian, but joined the Bap. Ch.; studied at Madison Univ., and taught school at Springfield, where he entered the ministry in 1822. In 1830 he removed to Watertown; was active in a revival there, after which he entered upon the wider field of itinerant preaching. He wrote his *Autobiography* a few yrs. before his death. D. Mar. 2, 1874.

Knapp (SAMUEL LORENZO), LL.D., b. at Newburyport, Mass., Jan. 19, 1783, grad. at Dartmouth in 1804; became a lawyer; commanded a militia regiment in the war of 1812-14; from 1824 to 1828 edited various journals in Boston. In 1827 he entered upon the practice of law in New York. He was the author of many works, among which are *Sketches of Public Characters*, *Lives of De Witt Clinton*, of Daniel Webster, and Aaron Burr. D. July 8, 1838.

Kneeland (ABNER), b. in 1774; was for a time a Bap. minister, then a Unit., and finally a deist. He was (1821-23) ed. of a Univ. periodical in Phila.; in 1828 ed. of the *Oliver Branch*, New York; in 1832 founded the *Investigator* at Boston, and in 1836 was tried before the supreme court on a charge of blasphemy. He wrote *The Deist*, *Lectures on Universal Salvation*, a *Review of the Evidences of Christianity*, and other works. D. Aug. 27, 1844.

Kneeland (SAMUEL), M. D., b. in Boston Aug. 1, 1821, grad. at Harvard in 1840 and at the Mass. Med. School in 1843; studied in Paris, and practised med. in Boston 1845-50; served as an army surgeon in the late war. In 1866 he became sec. of the Mass. Inst. of Technology, and prof. of zoology and physiology there. He has contributed much to scientific and other lit., and edited (1866-69) the *Annual of Scientific Discovery*.

Kneller (Sir GODFREY), b. at Lübeck in 1646; was sent by his father to Lond. to study math. and fortification. Having more taste for painting, he went to Amsterdam and to Rome; in Venice gained a reputation by painting the portraits of eminent persons. His fame was earned in Lond., whither he repaired in 1674. The duke of Monmouth, being attracted by a portrait of his sec. which K. had painted, sat for his own, and persuaded the king, Charles II., to sit also, and the artist's fortune was made. The number of his portraits is as astonishing as the quality of his subjects. He painted the likenesses of 10 sovereigns—Charles II., James II., William III., George I., Louis XIV., Peter the Great, Charles V., and queens Maria, Mary, and Anne. D. in 1723. O. B. FROTHINGHAM.

Knight [Teut. *Knecht*, defined by Grimm as *puer, famulus, servus*, "attendant or servant"]. Knighthood, as associated with chivalry, is of N. origin. A certain value of land, called in Eng. a "knight's fee," was allotted to a tenant, who bound himself to follow his lord to battle. But its real hist. begins with the Crusades. During these wars the younger sons of noble families enlisted under the banners of wealthy lords, in whose service they might hope to gain such honor and riches as would raise them to an equality with their elder brothers. It was not long before knighthood won by voluntary service became more esteemed than that feudal sort which was the right of the eldest born. During the Crusades knighthood became almost identified with religion. Every K. pledged himself to aid in recovering the Holy Land; chivalry was held to be little lower than the Ch. itself, and the two were united in the persons of those monk-soldiers who, while under vows of poverty, chastity, and obedience, were also fiercest in battle. Their deeds were supposed to increase the renown of the order to which they belonged, and such devotion to a common interest aroused that *esprit de corps* which made knighthood a universal brotherhood. Another trait of knighthood was the worship of women. Women gave the prize in tournaments; the K. wore his mistress's favor in real as in mimic battle; God and the ladies (*Dieu et notre Dame*) were associated on the lips of every true K. In Fr. knighthood came nearest to the ideal standard. During the Middle Ages many orders of religious knighthood were founded. The chief of those orders were: *The Hospitalers*, or brothers

of St. John of Jerusalem, founded 1043. After leaving the Holy Land they occupied first the island of Rhodes, and then Malta, whence they were expelled by Nap. (1798). The *Templars*, founded 1118 for the protection of pilgrims; after quitting Pal. they had establishments in several European countries. Having been accused of heresy, they were (1311) suppressed by Pope Clement V., at the instigation of Philip the Fair, king of Fr. The *Teutonic* order, instituted at the close of the 12th century, in the 13th century conquered Prus., Livonia, and Courland. The Sp. order of *St. James of Compostella* was founded for the defence of pilgrims to the shrine of that saint, and the K. were continually engaged in warfare with the Moors. [From orig. art. in *J.'s Univ.* (1906), by JANET TUCKER.]

Knight (CHARLES), b. at Windsor, Eng., Mar. 19, 1791; served an apprenticeship with his father, who was a bookseller; established a newspaper, the *Windsor and Eton Express*, which he edited from 1812 to 1826. Removing to Lond., in 1820, he purchased the *Guardian* newspaper, which he edited for 2 yrs., when he commenced business as a pub. The most important venture of the new house was *Knight's Quarterly Magazine* (1823-24). Shortly afterward he conceived the plan of "a cheap series of books which should condense the information contained in voluminous and expensive works." The scheme being too large for a single pub., a part was given to other houses, and it was adopted by the Society for the Diffusion of Useful Knowledge, then just formed. As a consequence of the commercial crisis of 1826 K.'s publishing-house went down, but in the following yr. he commenced business again as supt. of the publications of the U. K. Society. The *Brit. Almanac and Companion to the Almanac* were commenced in 1828. In 1829 he recommenced business as a pub. in his own name for the purpose of bringing out the *Library of Entertaining Knowledge*. In 1832 he commenced the *Penny Magazine*, which reached a sale of 200,000 within a twelvemonth, and led to the *Penny Cyc.*, commenced in 1833. With the co-operation of John Kitto and others, he next brought out a series of illustrated works, which had a great success. In 1854 he commenced the *Eng. Cyc.* He also wrote or compiled many vols. The *Popular Hist. of Eng.*, which occupied his declining yrs., is his greatest original work. His last work was an autobiography, entitled *Passages of a Working Life during Half a Century*. D. Mar. 9, 1873.

PORTER C. BLISS.

Knight (HENRY COGSWELL), b. at Newburyport, Mass., about 1788, grad. at Brown Univ. in 1812; was ordained in the Epis. Ch., and put forth 2 vols. of sermons, but was never settled over a congregation. He wrote 2 vols. of verse, both of which were republished with additions. He left an autobiography, extracts from which were given in a vol. entitled *Thorn Cottage, or the Poet's Home*. D. 1835.

Knight (JONATHAN), b. in Bucks co., Pa., Nov. 22, 1787; received only a common-school education, but made much progress in the study of math. At 21 he was engaged as a teacher, at the same time pursuing his occupation as a surveyor; in 1816 he made for the State a survey of Washington co.; was elected county com. 1817-20; in 1822 he was elected to the State legislature, and for 6 sessions was re-elected to the senate or house of representatives; U. S. com. (1825) for extending the National Road from Wheeling to Ill., and for many yrs. chief engineer of the Baltimore and Ohio R. R. D. Nov. 22, 1858.

Knight (JONATHAN), M. D., b. at Norwalk, Conn., Sept. 4, 1789, grad. at Yale in 1808; studied at the med. school of the Univ. of Pa. 1811-13, became prof. of anat. and physiology at Yale Coll. in 1813, and in 1838 was transferred to the chair of surgery; was pres. of the Amer. Med. Association in 1853. He obtained in 1862 the establishment of a U. S. military hospital at New Haven. D. Aug. 23, 1894.

Knights Templars. See **TEMPLARS**.

Knights-town, Henry co., Ind., on R. R. and Blue River, 34 m. E. of Indianapolis. Pop. 1870, 1528; 1880, 1670.

Knipfperolling (BERNHARD), b. in Münster, Ger., near the end of the 15th century; adopted in Swe. the doctrines of the Anabaptists, and, returning to his native prov., was associated with Matthias, Johann Bockold or Bockelson (called John of Leyden), and other fanatics in the socialistic crusade proclaimed in Münster in 1534. K. was elected burgo-master, and then stadtholder, John of Leyden being proclaimed king. Equality of property and community of wives were among the cardinal doctrines of this sect. On the suppression of the movement, K. was taken prisoner and put to death, after frightful tortures, Jan. 23, 1536.

Knot, Gray-back, or Robin Snipe, the *Tringa canula*, a sandpiper of the Atlantic States and of Europe. It is some 10 inches long, and is a good game-bird.

Knowles, nölz (JAMES SHERIDAN), b. at Cork, Ire., in 1784. His father, a schoolmaster and teacher of elocution, was ed. of an improved edition of Walker's *Pronouncing Dict.* In 1792 the family removed to Lond. At the age of 12 young K. composed a play, which was represented by a company of school-boys. In 1806 he made his first appearance as an actor at Dublin, and afterward taught elocution at Belfast and Glasgow. He had already written 4 or 5 dramas, but in 1815 met with his first success by the production of *Caius Gracchus*. In 1820 *Virginia* was produced at Drury Lane, with Macready in the leading part, and K. was thenceforward recognized as one of the chief dramatic authors of Eng. He produced 14 other dramas, sometimes taking part in their presentation. In 1843 his *Dramatic Works* were collected; in 1845 he abandoned the stage from conscientious scruples, devoting himself to lit., and in 1849 a pension of £200 was granted him. In 1852 he joined the Bap. denomination, and became a preacher distinguished for fervor. His most esteemed dramas are *William Tell*, *The Hunchback*, *The Wife*, *A Tale of Montan*, and *The Love Chase*. He also wrote 2 novels, *Henry Fensmore* and *George Lovell*, and 2 controversial works against Romanism. D. Nov. 20, 1862.

Know-Nothings, the name applied to a secret politi-

cal society in the U. S. first organized in 1853, and which appeared in the elections of 1854, and swept several of the N. States, including N. Y. Its cardinal idea was opposition to foreign citizenship. In the Presidential campaign of 1856 the K.-N. appeared as the "American party," presenting Millard Fillmore as its candidate, but the growth of the slavery issue extinguished the question of foreign citizenship.

Knox, Clarion co., Pa. Pop. tp. 1870, 656; 1880, 767.

Knox, (HENRY), b. in Boston July 25, 1750; became a bookseller in Boston, and devoted much study to military tactics. When the battle of Bunker Hill was impending he offered his services to Gen. Ward at Cambridge, and acted as a volunteer aide during the battle. In the siege of Boston he was engaged as engineer and artil. officer, and attracted the attention of Washington by his skill in fortification. He was soon after placed in command of the artil. in New York, took part in the battles of Trenton and Princeton, and was elected by Cong. brig.-gen. of artil. and sent to N. Eng. to raise a battalion of that arm. In the battles of Brandywine, Germantown, and Monmouth the artil. under K. bore a leading part. He was a member of the court-martial for the trial of André; was repeatedly sent to N. Eng. as com. to obtain money and recruits; was at the siege of Yorktown, after which he was made maj.-gen.; put in command at W. Pt. and appointed to superintend the disbanding of the continental armies, and com. to arrange with Sir Guy Carleton the terms of the surrender of New York. In 1785 he succeeded Gen. Lincoln as sec. of war and of the navy, retaining that post for 6 yrs. of Washington's administration. In 1795 he removed to Me., where he acquired an enormous landed estate. D. Oct. 25, 1806.

Knox (JOHN), b. at Gifford, Scot., in 1505. His education began at Haddington. At the Univ. of St. Andrew's (1524) he learned that councils are above popes, and that nations give authority to kings, can depose kings, and put them to death. Before 1530 he was ordained priest. From Jerome and Augustine he went to Holy Script., and the result was that he made a distinct avowal of his Prot. convictions in 1542, withdrew from his position as teacher at St. Andrew's, and sought a covert from the wrath of Cardinal Beaton. Wishart, his friend, was tried for heresy Mar. 1, and burned Mar. 28, 1545. Cardinal Beaton was assassinated May 29, 1546, and the castle of St. Andrew's was held by the conspirators. K. took refuge in the castle, and when it was surrendered to the Fr. July 1547, was among the prisoners. Under the charge of being concerned in the death of the cardinal he was condemned to the galleys and chained to the oar. He was liberated in Feb. 1549, went to Eng., was recommended to the Eng. council, and was sent by Cranmer to preach at Berwick. Cited by Tonstall, he defended the cause of the Ref. with such ability that he was appointed one of Edward's chaplains (Dec. 1551). He was summoned to Lond. Apr. 1553, and was in full royal favor at the time of Edward's death, July 6, 1553. The accession of Mary (1553) made Eng. a dangerous place for K. He landed at Dieppe Jan. 20, 1554. In Feb. he went to Switz., and in Geneva he found a friend in Calvin; took temporary charge (Nov. 1554) of the ch. of Eng. exiles at Frankfort-on-the-Main; recrossed the Channel Aug. 1555; returned to the Continent July 1556. The clergy of Scot. adjudged his body to the flames and burned him in effigy. For the next 2 yrs. he was pastor of the Eng. ch. at Geneva. In 1558 appeared his *First Blast of the Trumpet against the Monstrous Regiment of Women*. The women specially aimed at were Mary of Guise, queen dowager and regent of Scot., the princess Mary, then heiress, afterward occupant of its throne, and Queen Mary of Eng. The prospects of the Ref. seeming brighter, K. was recalled, and (Jan. 1559) left Geneva for Scot. He was refused passage through Eng. under the regiment of Elizabeth, who had just come to the throne. He landed at Leith May 2, and was at once proclaimed an outlaw and rebel. His preaching at Perth was followed by an insurrection. He was forbidden to preach at St. Andrew's June 9, and preached there with the greater zest June 10-13, and the officials and people destroyed the images and pictures and pulled down the monastery on the 14th.

K. was formally ordained at Edinburgh in 1560. The Confession of Faith, mainly his work, was adopted by the Parl. Aug. 17. The Ref. was officially established Aug. 24. The first Gen. Assembly of the Kirk was held Dec. 20. Of the 40 members, there were but 6 ministers, of whom K. was one. The clouds which had been swept away in 1560 began to gather again in the following yr. The young queen of Scot. had returned from Fr. (Aug. 21, 1561). The first interview of K. with her took place early in Sept. 1561, and another May 2, 1562, after the queen had been told of a sermon in which he condemned the festivities in the palace, believed to have been prompted by the massacre of the Fr. Prots. in Mar. at Vassy. At Lochleven K. again saw the queen (May 2, 1563), who exerted on him all her powers of pleasing. Her success with him was little, but it was great with her Prot. nobles at the Parl. May 30, and K. came to an open rupture with the earl of Murray. He now spoke in the pulpit with freedom of the apostasy of the nobility, and of the reputed marriage of the queen to a papist. K. was deserted by some of his nearest friends. The queen sent for him. "I cannot get quit of you," she cried; "I vow to God I shall be once revenged!" At this time powerful efforts were made to crush K. A calumny against his personal purity was set afloat, but was promptly met and exposed. In Dec. he was accused of high treason; he was not only acquitted, but commended.

He was brought before the privy council for a sermon preached in St. Giles's (Aug. 19, 1565) in the presence of Darnley, in which he had quoted certain texts which the new-married king, not without good reason, applied to himself and the queen. K. was prohibited from preaching while the royal pair remained in the city. Mary entered the Catholic League for the extirpation of the Prots. Feb. 2, 1566. Rizzio was assassinated Mar. 9. On the return of the queen K. left

Edinburgh. The queen became the instrument of Darnley's overthrow; he was murdered Feb. 10, 1567. The queen married Bothwell May 15, and one month later was a prisoner at Lochleven Castle. Ten days later (June 25) K. was present at the Gen. Assembly in Edinburgh. He preached at the coronation of James VI., an infant 13 months old (July 29). K. urged the capital arraignment of Mary on the charge of adultery and murder. The assassination of the regent Murray (Jan. 23, 1570), and the civil troubles which followed, greatly depressed him. In Oct. he had a stroke of apoplexy, which left him weak, but did not long keep him from the pulpit. He had enough of his old vigor and his old mode of using it to give such offence to Kirkaldy, gov. of the castle, as to make it prudent to retire (May 5, 1571) to St. Andrew's. He returned to Edinburgh Aug. 1572. The tidings of the massacre of St. Bartholomew (Aug. 24) helped yet further to break his declining strength. He made his last appearance in the pulpit Nov. 9.

K. was physically small and feeble. His voice was weak. He was profoundly pious, indomitable in purpose, yet not without tenderness, and that vein of melancholy which so often attends them. He hated bad things rather than bad men. He abhorred every species of tyranny, and roused a spirit in his native land which broke violence with violence. His writings are full of vigor, originality, and simplicity. He wanted nothing but a wider sphere to take rank in the first order of the historic men of his age. Perhaps a wider sphere could not have been given him, for as none but Scotland could have produced a Knox, none but Scotland would have endured him. Carlyle says: "A most clear-cut, hardy, distinct, and effective man; fearing God without any other fear. There is in Knox throughout the spirit of an old Hebrew prophet—spirit almost altogether unique among modern men. A Heaven-inspired seer and heroic leader of men."

K.'s *Hist. of the Ref. in Scot.* appeared in 1586. His entire works have been edited by Laing. The older sketches of him are by Beza, Adam, and Verheiden. The best *Lives* are by McCrie, Niemeyer, and Brandes. The gen. hist. of the Eng. Ref. and Ch. of Eng.; of the Prot. Ch. and sects of G. Brit., more particularly the hist. of Scot.—gen., as Robertson and Tytler, or special, as McCrie and the work of D'Aubigné, *Three Centuries of Struggle*, are of value. D. Nov. 24, 1572. C. P. KRAUTH.

Knox (JOHN J.), b. at Canajoharie, N. Y., May 18, 1791; settled at Knoxboro', N. Y., in 1811; trustee and pres. of corporation of Hamilton Coll. 48 yrs.; of Oneida Co. Bible Society 24 yrs.; of Bank of Vernon 24 yrs.; appointed brig.-gen. of cav. by De Witt Clinton in 1826; Presidential elector in 1840 and 1860. D. at Knoxboro' Jan. 31, 1876.

Knox (JOHN JAY), b. in Knoxboro', N. Y., Mar. 19, 1828, grad. at Hamilton Coll. in 1849; was a banker until 1862, when he received an appointment from Sec. Chase, and subsequently had charge of the mint coinage correspondence of the treas. dept.; in 1867 he was appointed deputy comptroller of the currency. A bill which he proposed was passed with a few modifications, and is known as "the Coinage Act of 1873." In 1872 appointed comptroller of the currency; resigned 1884 and became pres. of U. S. National Bank of Republic, New York City. Author of *U. S. Notes* (1884).

Knoxville, city, on R. R., Knox Co., Ill., 50 m. W. of Peoria and 50 m. E. of Burlington, Ia., is the seat of the Epis. diocesan school of Ill. for girls, and is largely engaged in coal-mining. Pop. 1870, 1883; 1880, 1600.

Knoxville, R. R. centre, cap. of Marion co., Ia., 40 m. S. E. of Des Moines. Pop. 1870, 800; 1880, 2577.

Knoxville, city and R. R. centre, cap. of Knox co., Tenn., at the head of navigation on the Tenn. River. It has a U. S. c. h. and P. O., in which the Federal courts and the State supreme court meet; Tenn. Univ., State Agricultural Coll. (\$500,000 endowment), a female inst., free public library, State deaf and dumb school and insane asylum, an orphans' home, and is an important commercial and manufacturing centre. Pop. 1870, 8682; 1880, 9693.

Knyphausen, nip'how-zen (DODO HENRY), BARON, b. in Alsace in 1730; entered the military service of Prus. at an early age, and took part in the campaigns of Frederick the Great against Aus.; became lieut.-gen., and was second in command of the Hessian troops sent to Amer. during the Revolutionary war; was engaged in the battles of L. I., White Plains, Ft. Washington, Brandywine, and Monmouth, and temporarily commanded the forces in New York in June 1780, when he made 2 raids into N. J. D. May 2, 1789.

Koa'la, the *Phasciarctos cinereus*, a syndactyl marsupial mammal of Australia and of the family Phasciarctidae. It is ursine in its gen. appearance, nocturnal and arboreal in its habits, and extremely slow in its movements.

Ko'bold (Ger.), a kind of elf. In gen. the K. were beneficent, but some were malicious. They particularly haunted the mines; they were little, decrepit old men and women, dressed in miners' clothes. They heaped up precious stones, and though they dreaded to be seen by men, they were fond of doing mankind favors in secret.

Koh-i-noor (the "mountain of light"), a diamond which for many centuries was in the possession of the monarchs of India, and now in that of Queen Victoria. Successive cuttings reduced its weight from 900 to 103.75 carats, being rose-cut, and valued at about \$600,000.

Kohl-rabi (Ger., perhaps originally meaning "rape cabbage" or "beet cabbage"—*Kohl-rübe*), a variety of the *Brassica oleracea*, the species which includes the cabbage, turnip, etc. The thickened edible portion is the leafy stem, and above ground, instead of the root beneath, as in the turnip. It is cultivated in the U. S., but much more extensively in Europe, and is prized for cattle and for table use. Its cultivation is precisely that of the cabbage.

Ko'komo, city and R. R. centre, cap. of Howard co., Ind., 54 m. N. of Indianapolis. Pop. 1870, 2177; 1880, 4042.

Ko'kra, or **Cocus-wood**, the *Aporosa dioica*, a rather small tree of the E. I., order Euphorbiaceae. The hard wood is used for making flutes, etc.

Kong Mountains, a mt.-range of Central Afr., at a distance of about 200 m. from the Gulf of Guinea, and forming the N. frontier of Ashantee. The height is not more than 2500 ft. The Kong dist. is noted for its trade in gold, and the town of Kong for manufactures of cotton cloth.

Konieh, ko'ne-eh, the anc. *Iconium*, town of Asiatic Tur., the cap. of the prov. of Karamania, Asia Minor; has some manufactures of carpets and morocco, but is mostly in a decaying state, although its walls, its mosques, and minarets give it an imposing appearance at a distance. Pop. between 40,000 and 50,000.

Königgrätz, kō'nig-grets, a fortified town of Bohemia, on the Elbe. The Aus. under Gen. Benedek were defeated here by the Prus. under Gen. Moltke, July 2, 1866. Pop. 5061.

Königsberg, ken'igs-berg, the cap. of the prov. of Prus. and a fortress of first rank, is situated 20 m. from the Baltic on the Pregel, whose 2 arms unite within the city. It is the seat of a univ., of the provincial govt., of the staff of the 1st army corps, and has a numerous garrison. It is not a handsome place; the streets are narrow, and there are few conspicuous buildings. Altstadt is the oldest part, and contains the palace and the town-house. The palace was founded in 1257 by King Ottokar of Bohemia. Other remarkable buildings are the cathedral, a Gothic structure commenced in 1335; the old univ. building, Collegium Albertinum, founded in 1544. The museum, the royal library, the observatory, the monuments of the philos. Kant and the minister Schön are interesting. Excellent scientific and benevolent insts. are the botanical garden, the zoological museum, the sem., 3 gymnasiums, a mercantile school, an acad. of art, asylums for the deaf and dumb, for the blind, lunatics, and orphans, and several hospitals. The manufacturing industry is considerable. Iron foundries, machine-shops, breweries, and dyeworks are in operation. Iron goods, chemicals, soap, paper-hangings, leather, and tobacco are manufactured. K. was built by the Teutonic order of Knights in 1255 as a fortress against the pagan Samlander, and rose to importance through its corn-trade. About 1533 it became the cap. of the duchy of Prus. The philos. Kant taught here from 1755 to 1804. Pop. 140,909.

Königsmark (MARIA AURORA), COUNTESS, b. at Stade, Hanover, in 1666. Her father was a Swe. gen.; her mother was a daughter of the Swe. field-marshal Wrangel. She received a brilliant education at the courts of Stockholm, Hanover, and Brunswick, and was exceedingly beautiful. In 1694 she went to Dresden, where August II. had just ascended the throne, and in 1696 she bore him a son, the famous Maurice, marshal of Sax. In 1702 the king sent her to the camp of Charles XII. in Courland to persuade him to make peace, but he declined to see "the most famous woman of two centuries." The rest of her life consists merely of anecdotes and gossip. D. Feb. 16, 1728.

Königstein, small town of the kingdom of Sax., on the left bank of the Elbe. Behind it rises a huge rock, inaccessible except through a narrow passage to the N. W. On the top of this rock is built the fortress of K. with bomb-proof casemates, and a well 1172 ft. deep, to which the crown jewels and the treasury of the kingdom are brought in times of war.

Koo'doo, a splendid antelope of S. Afr., the *Strepsiceros K.*, one of the largest of the family. It has an extensive range in the wooded regions, is easily domesticated, and its flesh is highly esteemed. Its large and spirally twisted horns are characteristic of the species.

Koo'fa, or **Kufa**, the ruins of a town of Asiatic Tur., in the prov. of Koordistan, was founded by Omar, who was murdered here. It was a seat of learning, and the anc. Arabic characters called *Cufic* received their name from this place. When, at the end of the 8th century, the residency was removed to Bagdad, K. sank into ruins.

Koordistan, or **Kurdistan**, an extensive region of W. Asia, is divided between Tur. and Per., though its relations to both are loose. Its area is estimated at 100,000 sq. m., the number of its inhabs. at 3,000,000, of whom $\frac{1}{4}$ are Koords. The country is mountainous, some of the peaks rising to 13,000 ft., intersected by valleys along the rivers, which in great number flow down to the Euphrates and Tigris. The Koords, who are Mohammedans, live mostly as nomads. They are a fierce race, engaged in the rearing of cattle, sheep, goats, and horses, of which great numbers are exported both to Tur. and to Per., where they are highly esteemed—the goats for their silky hair, the horses for their strength.

Koorile Islands. See KURILE ISLANDS.

Ko'ran, the book of the Mohammedan religion and the foundation of the Mohammedan lit., is the conservative power of the Arabic lang. and the source of its refined system of gram. Its influence extends from India to Morocco, from Tur. and the borders of the Rus. empire to the central and S. parts of Afr. It may be regarded as a lateral wave from that great tide of religious thought and feeling which came down from the earliest times of human hist., bearing in its mid-channel the Jewish theocracy and culminating in the Chr. Ch.

The name *Koran* (*Al Koran*, with the article, *The Koran*) is derived from an Arabic verb *qara'*, to "read." The Koranic name was from the idea of *dictation* to Mohammed himself. The medium of this dictation was the angel Gabriel. Hence also the Koranic name *Tanzil*, or the "descent." There is unquestionably a conviction of truth, a sense of some destined mission, and a fervent enthusiasm prevailing throughout this work. There is a tenderness of conscience in respect to his supposed mission which one guilty of imposition would seem incapable either of feeling or affecting. As having the same bearing, may be mentioned the places where he speaks of Jesus, acknowledging him as one greater than himself—a reverence which he also pays to Abraham and Moses. Passages elsewhere which are interpreted as teaching persecution or the enforcement of religion by the sword, are to be regarded as coming from a change of

temper, and as having been still further perverted by the fanatical bigotry of his immediate followers. It may be doubted whether they were ever meant to be applied to Jews and Chrs., of whom Mohammed speaks so charitably. Throughout the better part of the book the Kaifrs, or *unbelievers*, who are to be forced into truth and purity by the *cleansing* sword of Islam, are the unclean and bloody pagan idolaters. The K. is a book which can only be interpreted on the ground that the author himself strongly believed in it as coming from some other source than his own conscious and voluntary mental exercises regarded in their normal condition. There have been too many well-attested cases of the ecstatic trance, of abnormal visionary states, of clairvoyant and somnambulant utterances, to warrant the summary rejection of such explanations. Mohammed's epileptic condition of body made him a fit subject of such influences, from whatever sphere we may regard them as coming. His high genius gave them a more intensive form and a more elevated character than ordinarily characterize such utterances in our times.

There are other names for the K. to be found in the book itself, such as *Al Kitab*, "the Scripture," *Dikr*, "memorial," *Al Furkan*, etc., which are of little significance in determining either its form or the nature of its contents. There are mentioned 7 prin. editions or anc. copies—2 named from Medina, 1 from Mecca, 1 from Cufa, 1 from Basra, a 6th called the Syrian, and a 7th styled the common or vulgar edition. There can be no doubt of a very anc. writing, whether made by Mohammed himself or by some of his devoted followers, but the prin. means of promulgation in the beginning was most probably by oral recitations made by those who had committed to memory particular Suras, and in some cases the entire K. The solemn recitation of Mohammed, believed, as it was, to have come from the angel, must have made a deep impression upon the minds of his early disciples, thus aiding the memory in receiving and retaining the remarkable words. The K. belongs to the side of positive theol., having for its ground, like the Jewish and Chr., the fear of a personal God, instead of the mystic nature-worship that characterizes the systems of the remoter East. In opposition to their elusive pantheism stands out the lofty theism of the K. Its doctrine of Allah's sovereignty, of his immovable throne, of his eternal decrees, of his continual personal providence, is the antithesis of their phys. fate. So does its teaching in respect to a great judgment to come, a resurrection day of final account, the "meeting of his sins that have gone before him," and above all, its rigorous doctrine of prayer, place it in direct contrast with the barren worldliness which is all that we get from the best selections made from the writings of Confucius. The K. produced a salutary reformation in its own times. Neither the Ishmaelite nor the Joktanite Ars. had wholly lost the old patriarchal monotheism. But it had become much darkened and corrupted by Sabæanisms, and some still grosser forms of creature-worship that had come in. The change in this respect produced by the promulgation of the K. was sudden and extensive. It was also the means of a reformation of morals, and the putting away of some barbarous and revolting customs. Thus, infanticide was very commonly practised, especially the putting to death of female children, and even burying them alive. This was done, not in a cold humanitarian way, but by an appeal to the deepest religious feeling. There are 2 things in the K. which may be regarded as positive deformities. One is its doctrine of polygamy, and the other the sensual aspect it gives to the happiness of Paradise. In regard to the second it may be said that the representation of the beautiful females was adapted to the Ar. ideas, and is therefore adopted among the other symbols of spiritual joy, such as "the gardens, the fair rivers, the perennial fruits," which enter also into the biblical pictures. There is an evident intention to make it as pure as the human conception will allow.

For the fullest details respecting the K., see Sprenger's *Leben und Lehre des Mohammed*; Freytag, *Einführung in das Studium der arabischen Sprache*; Herbelot, *Bibliothèque orientale*, arts. "Koran" and "Mohammed;" and Sale's *Introduction*. [From orig. art. in *J.'s Encic. Cyc.*, by PROF. TAYLER LEWIS, LL.D., L. H. D.]

Kordofan, a terr. of Soudan, Central Afr., belonging to Egypt, bounded on the E. by Sennar, and on the W. by Darfour. Area, 12,000 sq. m. Pop. 500,000. The inhabs. are a mixture of negroes and Arabs professing Mohammedanism. K. is a savannah, dry in the hot season, but covered with verdure during the rainy season. The breeding of horses, cattle, and camels is the chief pursuit of the inhabs.

Körner (KARL THEODOR), b. at Dresden, Sax., Sept. 23, 1791; fell in a skirmish at Wöbblin, in Mecklenburg, Aug. 26, 1813. His whole life was consecrated to the one idea of rousing his countrymen against the despotism which Nap. exercised over them, and he saw the idea of his life realized. Of his dramas, *Zriny* is the only one which deserves attention. After his death his songs were collected under the title *Leier und Schwerdt*.

Kosciusko, MISS. See APPENDIX.

Kosciusko, KOS-SE-US'KO (THADDEUS), [*Tadeusz Kosciuszko*], b. Feb. 12, 1746, in Lithuania, of an anc. princely race. Ed. in Warsaw, Paris, and other European caps., he was made an officer in a regiment; but having sued in vain for the hand of a daughter of the vice-grand-gen. of Lithuania, to whom K. had been a tutor, he sailed in 1775 from Dantz for the U. S., by way of Martinique. In 1776 he was made col. of engineers. He served through the war of the Revolution, was made a member of the Cincinnati, a brig.-gen. by brevet, and received the thanks of Cong. Returning to his native land, he fought in the wars of 1792-94 against the partitioners of Poland; but, notwithstanding the prodigies of valor performed by the Poles, with K. at their head, they were overpowered at Maciejowice, where their commander fell covered with wounds. Imprisoned at

St. Petersburg, he was set free in 1796 by the emp. Paul, from whom he refused the offer of a sword. He revisited the U. S., where he received a pension and a grant of land, but in the following yr. he retired to Fr. In 1816 he fixed his residence at Soleure, Switz., and in the following yr. set free the serfs on his paternal estate. D. Oct. 16, 1817.

Kosciusko, Mount, the highest peak of the Australian Alps, 7176 ft. high, is situated on the boundary between the provs. of New S. Wales and Victoria, about equidistant between Sydney and Melbourne. The great Murray and Murrumbidgee rivers take their rise nearly at its base.

Kossuth, KOSH'OOT (LOUIS, or LAJOS), b. at Monok, Hungary, Apr. 27, 1802, of a family originally Slavic, and not Magyar, but of noble rank and of the Lutheran faith; in 1822 became a successful advocate of Monok; removed in 1831 to Pesth; was a member by proxy of the upper house of the diet of 1832-36, and by his activity as a writer and journalist did much to disseminate liberal principles; was imprisoned at Buda 1837-40 as a political offender; was ed. of the *Pesth Journal* 1841-44; entered the lower house of the diet in 1847, and became the leader of the liberals; headed the deputation of 1848 demanding a new ministry, in which he became minister of finance; proposed in 1849 the independence of Hungary; was during the Hungarian war for liberty provisional gov. of Hungary, Apr.-Aug. 1849; escaped to Tur., where he was protected, notwithstanding the demands of Aus. and Rus. for his extradition. In 1851 he was allowed to go on board the U. S. steamer *Mississippi*, which had been sent out for him by the U. S. govt.; visited Eng., made the tour of the U. S. 1851-52, and delivered eloquent though fruitless appeals for the influence of the U. S. in behalf of the principle of non-intervention; since 1852 resided chiefly in Lond. and Turin. During the wars of Aus. against Fr. (1859) and Prus. (1866) he was actively engaged in preparing for insurrections in Hungary. He has been several times elected in his absence to the diet of Pesth, and since the reorganization of the Austro-Hungarian empire (1867) has been free to return to his native land, but has declined to do so. K. was one of the most effective of public speakers, and possessed a marvellous capacity for the acquisition of languages.

Kotzebue, von AUGUSTUS FRIEDRICH FERDINAND, b. in Weimar May 3, 1761; studied law at Jena, and after finishing his studies he went in 1781 to St. Petersburg. From that time he was always connected with the Rus. court. Alexander kept him in Ger. to report on the liberal movements. This was considered as espionage, and a young student, Sand, stabbed him at Mannheim, Mar. 23, 1819. He wrote about 100 plays, and succeeded in them all. For more than a generation they reigned absolutely in the theatrical world. But between 1820 and 1830 they disappeared.

Kouli Khan, See NADIR SHAH.

Koumiss, Kumys, or Kumiz [Rus. *kumys*, of Mongolian origin], a fermented beverage made from mare's milk in the steppes of Rus. by the Kirgheez, Tartars, Bashkeers, Kalmuks, etc. The alcohol is derived from the milk-sugar, which is present in mare's milk in larger quantity than in the milk of other animals. The fresh milk is diluted with water, and placed in a sack of goat-skin or the skin from the entire hind quarter of a horse, the wider end serving for the base and the leg portion for the neck. There is generally added some yeast, the sediment from a previous brewing, to induce fermentation. In from 12 to 24 hours the fermentation is complete, the product being known as "young koumiss" or *sauval*. Fresh milk is added daily, and as the product is concentrated by the evaporation of water from the surface of the hide, the old K. is much stronger than the new. K. is an acid liquid of a not unpleasant pungent taste and an ethereal bouquet. It effervesces when poured into a glass. It is very intoxicating to persons not accustomed to its use, and produces drowsiness. Beside alcohol and carbonic acid, it contains the other constituents of the milk, except the sugar, and is consequently very nourishing. It is easily assimilated, even by invalids, and the hardy vigor of the Tartars is attributed to its gen. use among them. K. yields by distillation a strong liquor called by the Kalmuks *arracca*, *rack*, or *racky*. K. has recently attracted much attention among European phys., and its manufacture has been introduced at Moscow, St. Petersburg, Vienna, and Lond. It may be made from the milk of any animal. It is claimed that K. is most valuable for the treatment of extreme debility and all the phases of impending marasmus. It is said to have specific action in diabetes. C. F. CHANDLER.

Kousso, or Cusso [an Abyssinian term], a drug consisting of the flowers and unripe fruit of *Brayera anthelmintica*, a small rosaceous tree of E. Afr.; an efficacious remedy for tapeworm.

Krackowizer (ERNEST, M. D.), b. in the duchy of Styria, Aus., in 1822; studied med. at Vienna and Padua; was involved in the insurrection of 1848, and came to Amer.; practised at Brooklyn, N. Y.; removed to New York; established the Ger. dispensary; assisted in reorganizing the Bellevue Hospital Med. Coll. in 1874, and contributed to med. periodicals. D. Sept. 23, 1875.

Kra'ken [Norse], a fabulous sea-monster described first under this name by Pontoppidan. The tales of it seem to have been exaggerated reports of large cephalopods and whales. Stories of its devouring ships, of its back being taken for an island, etc., recall similar fables in Lucian's and Pliny's works and the *Arabian Nights*.

Krasnovodsk, a Rus. fortress, on a bay of the same name, on the S. E. shore of the Caspian Sea, is an important starting-point for scientific and military expeditions to Central Asia. Peter the Great understood the importance of the point, and used it in an undertaking against Khiva, but afterward it fell into decay, until it was once more equipped and fortified in Nov. 1869.

Kraszewski JOZEF IGNACY, b. at Warsaw in 1812; studied at Vilna, settled in Volhynia; went in 1860 to War-

saw as ed. of *Gazeta Polska*, and removed in 1863 to Dresden. He is the most prolific writer in the modern Polish lit.; has written a large epic, *Anafielas*, a number of novels and romances depicting Polish life, several historical works, travelling sketches, critical essays, etc.

Krauth (CHARLES PHILIP), D. D., b. in Montgomery co., Pa., May 7, 1797; commenced the study of med., but a change in his religious views led him to enter the ministry of the Lutheran Ch.; was licensed 1819, and became pastor in Martinsburg, Va.; went to Phila. in 1827; was pres. of Pa. Coll. 1834-50; prof. of biblical and Oriental lit. in the theological sem. at Gettysburg 1833-67. D. May 30, 1867.

Krauth (CHARLES PORTERFIELD), S. T. D., LL.D., son of the preceding, b. at Martinsburg, Va., Mar. 17, 1823; grad. at Pa. Coll., Gettysburg, 1839; became a licentiate in 1841; labored at Baltimore 1842-47; ordained 1842; pastor in Winchester, Va., 1848-55; in Pittsburg 1855-59; in St. Mark's, Phila., 1859-64; had temporary charge of St. John's 1864-65 and 1874-75. He spent 10 months, 1852-53, in St. Thomas and Santa Cruz; for nearly 3 months during the prevalence of yellow fever officiated as pastor in St. Thomas; subsequently pub. *Sketches of a Winter and Spring in the Dan. W. I.* He became ed. of the *Lutheran* 1861; in 1864, Oct. 4, was inaugurated as Norton prof. of systematic theol. and ecclesiastical polity in the Lutheran Sem. in Phila. In 1868 the chair of intellectual and moral philos. in the Univ. of Pa. was offered to him; he was chosen its vice-provost in 1873; in 1874 the dept. of logic was attached to his chair. He is a member of the Amer. committee (O. T. Co.) co-operating with the Brit. revisers of the A. V., and of the Amer. Bible Society's committee on versions. Beside translations he has written many works, among which are *Pastoral Office, Chrysostom, The Bible a Perfect Book, Christ and His Kingdom*. In illustration of the doctrines, hist. and usages of the Lutheran Ch. he wrote *The Evangelical Mass and the Romish Mass, The Lutheran Ch., Her Glory; The Conservative Ref.*, and many others. He has been a constant laborer in the liturgical movements in the Lutheran Ch., and has been associated with the organization of the gen. council of this Ch. in Amer.; was elected pres. of the council 1870. He was one of the associate eds. of *J.'s Univ. Cyc.* D. Jan. 2, 1883.

Kremlin. See MOSCOW.

Kris, or **Crease**, the dagger of the Malays, often curiously twisted, the more seriously to mangle those who are wounded by it. It is of native manufacture and extremely well tempered.

Krishna. See HINDU RELIGION.

Kroe'ger (ADOLPH E.), b. in 1837 at Schwabstadt, in the duchy of Schleswig. In 1848 the family emigrated to Amer. and settled at Davenport, Ia., and soon after he became clerk in a banking-house. From 1857 to 1860 he was translator on the New York *Times*. During the war he served on the staff of Fremont. After the war he settled at St. Louis, Mo. By his translations of Fichte and by numerous essays he has contributed to a better understanding of Ger. lit. and philos. He has also written *The Minnesingers of Ger.*, containing translations of Walter von der Vogelweide, Ulrich von Lichtenstein, etc.

Krüdener, von (JULIANE), b. at Riga Nov. 21, 1764, a daughter of Baron von Wietinghoff. In 1783 married Baron von Krüdener. In 1789 made a journey to Fr., from which she returned in 1791 with M. de Fregeville, a young lieutenant of hussars, disguised as her footman. The fame of Mme. de Staël tempted her into lit. *Valérie*, pub. at Paris in 1803, was a perfect success, which, however, did not satisfy the authoress. Her connections with Jung-Stilling and the Moravian Brethren had now the ascendancy over her mind, and she appeared as a Sister of Charity, a preacher, a prophetess. In 1815 she held a sort of religious reunions in her hôtel in Paris, and the emp. of Rus., Alexander, was among her visitors. From Bâle, where she attempted to continue her religious assemblies, she was expelled; also from Baden, Württemberg, Bavaria, Sax., and Prus. In 1818 she was escorted by the Prus. police to the Rus. frontier, but was forbidden to preach and to appear in St. Petersburg and Moscow. She found, nevertheless, an opportunity of visiting St. Petersburg, and attempted to renew her friendship with the emp. She was banished from St. Petersburg, and went in 1824 to the Crimea in order to found a colony in accordance with her own ideas of human society. On this expedition she d., Dec. 25, 1824.

Krug, KROOG (WILHELM TRAUGOTT), b. at Radis, in Prus. Sax., June 22, 1770; studied at Wittenberg, Jena, and Göttingen; was appointed prof. in philos. at Frankfurt-on-the-Oder in 1801; at Königsberg in 1804, as the successor of Kant; at Leipzig in 1809; resigned in 1834. He was pres. of the Tugendbund, formed after the Peace of Tilsit for the regeneration of Ger. In politics he stood foremost among the liberal agitators; in theol. he wrote *Briefe über die Perfectibilität der geoffenbarten Religion*; in philos. he pretended to have found the true reconciliation between idealism and realism, which he presented in his *Allgemeines Handwörterbuch der philosophischen Wissenschaften*. D. Jan. 13, 1842.

Krummacher, KROOM'kak-er (FRIEDRICH ADOLF), b. at Tecklenburg, Westphalia, July 13, 1768; became minister of the Reformed congregation at Bremen. His *Parables* ran through many editions, and was translated into Eng. D. Apr. 14, 1845.—His son, FRIEDRICH WILHELM, b. at Duisburg, Prus., Jan. 28, 1796, became court chaplain at Potsdam. Among his writings are *Elijah the Tishbite; David, King of Israel*, and an *Autobiography*. D. Dec. 10, 1868.

Krupp (FRIEDRICH). The Krupp cast-steel works at Essen, in Rhenish Prus., were founded in 1810 by Friedrich Krupp. After his death, in 1826, his widow and sons took charge of the establishment in company until 1848, since which time one of the sons, Alfred Krupp, carries on the business alone under the firm-name of Friedrich Krupp. At present the establishment covers an area of more than 400 hectares and employs over 12,000 hands, beside about 500 men engaged in the mines and smelting-houses, 2000 in the

building dept., and 739 in the administration. Most artilleryists consider the K. cannon to be the best in the world. They are most extensively used; more than 13,000 pieces have already been produced.

Krylof (IVAN ANDREIVITCH), b. Feb. 14, 1768; passed the early yrs. of his boyhood in the distant prov. of Orenburg, where his father was serving. His father d. when he was 14, and he was then obliged to enter the govt. service in Tver, and afterward in St. Petersburg, at a salary of 2 rubles a month. His first production, at the age of 16, was *Cofeinitsa*. In 1788 he entered into journalism, in which he continued until 1796, when all the private printing-offices were closed by the emp. Paul. For some yrs. after he resided on the estate of Prince Galitzin. On the accession of the emp. Alexander in 1801, Galitzin was made gov. of Livonia, and appointed K. his secretary; but his passion for cards caused him to leave the service and to wander about Rus. for 2 yrs. In 1805 he wrote his first fables, and from this time his literary activity was entirely confined to fable-writing. His first essays were chiefly adaptations and translations of La Fontaine, but he afterward wrote wholly in the national vein, touching sometimes on politics, though principally on moral and social topics. He occupied a position in the imperial public library 1812-41. D. Nov. 21, 1844.

Ku'blai Khan, the founder of the 20th or Mongol dynasty of emps. of Chi., a grandson of Genghis Khan, b. early in the 13th century in Tartary, of which country he was the reigning sovereign, when about 1250 his aid was invoked by Li-Sung, emp. of Chi., against the Oriental Tartars. This task having been accomplished, K. K. remained in Chi. with his army. After the death of Li-Sung and of his imbecile successor, K. K. assumed the title of emp. of Chi. His undisputed reign dates from 1279, after which he extended his empire by the conquest of Tongkin, Cochinchina, etc. until his limits reached the Arctic Ocean, the Straits of Malacca, and the Euxine. He sent a naval expedition for the conquest of Japan, but it was defeated. Under his reign the celebrated Venetian traveller Marco Polo resided many yrs. at the imperial court.

Kuenen (ABRAHAM). See APPENDIX.

Kuenlun', or **Koukoun**, a mt.-range of Central Asia, which commences near lat. 35° N. and lon. 75° E., from which the Himalayas, the Hindoo-Koosh, and the Bolor-Tagh radiate in 3 different directions, and stretches E., forming the N. boundary of Thibet. The E. parts are almost unknown to us, but the W. part, generally known as Karakorum (which see) and Mustagh, rises to a height of 21,000 ft., is covered with glaciers, which sometimes descend to 10,000 ft., and forms deep fertile valleys.

Kufic Writing. See CUFIC WRITING.

Kugler (FRANZ). See APPENDIX.

Kuhn, KOON (FRANZ), baron von Kuhnfeld, b. in 1817; entered in 1837 the Aus. army as lieutenant; distinguished himself in 1848 and 1849 in the war in Hungary and It.; was in 1859 in the war in Upper It., chief of staff to Gyulay; in the war of 1866 he was made a maj.-gen. and charged with the defence of the Tyrol against Garibaldi. He was successful in the performance of this task, and in 1868 was appointed minister of war for the whole empire, managing with prudence the many difficulties which arose from the discrepancies between Aus. and Hungary.

Ku-Klux Klan, or **Ku-Klux**, a former secret association of ex-Confed. soldiers, first heard of in Tenn. in 1868. The society soon spread into several other States of the S., and many murders and other crimes were committed by its members, who were dressed in fantastic disguises. In Apr. 1871 Cong. made these offenders punishable in the Federal courts, and authorized the Pres. to suspend the habeas corpus act when necessary to the preservation of order. These measures brought the disturbances to an end.

Kul'ja, or **Kuldsha**, prov. of Asiatic Rus., in the govt. of Toorkistan. Area, 27,457 sq. m. Pop. 114,337. It was formerly Soongaria, the extreme N. W. prov. of the Chi. empire, but a few yrs. since it declared its independence under a native sultan, and in May 1871 the Rus. govt. annexed the country in accordance with a previous agreement with Chi. The cap., Kulja, situated on the Eelce River, has considerable trade. Pop. 30,000.

Kulm (Bohemian *Chlum*), v. of Bohemia 8 m. N. E. of Teplitz, is noted for the battle which took place here Aug. 29-30, 1813, and in which a Fr. corps under Vandamme was surrounded by the allied Russian-Austrian army, and compelled to surrender after a desperate resistance, with 80 pieces and 10,000 men, having lost 5,000 men.

Kumquat, the *Citrus Japonica*, a variety of the orange which is perfectly hardy in Japan and Chi., and would probably succeed in many parts of the U. S. The shrub and its fruit are both very small, but the fruit is excellent.

Kung, PRINCE, b. in 1835, was uncle of the late emp. of Chi., and as regent became the virtual ruler at the accession of the former in 1861. In 1860, at the time of the capture of the Pei-Ho forts and of the summer palace of Peking, he advised the emp. to sign the peace with the Fr. and Eng. He agreed with Anson Burlingame, then Amer. minister at Peking, to send him in 1868, as envoy extraordinary of Chi., to the U. S. and European powers. He became afterward prime minister, and concluded peace with Japan Nov. 1874; was accused of having given way to foreign influence, and was condemned to death, but on the following day an imperial decree reinstated him in all his offices, which he retained until the death of the young emp. Jan. 17, 1875.

Kunze (JOHN CHRISTOPHER), D. D., b. in Sax. about 1740; studied at Leipzig and Halle; entered the Lutheran ministry, and came to Phila. in 1770 as associate pastor of the Ger. chs. in that city. For several yrs. he was a prof. in the Univ. of Pa. In 1784 he accepted a pastoral call to the city of New York, where he resided until his death. He was also prof. of Oriental lit. in Columbia Coll. He wrote a *Hist. of the Chr. Religion, a Catechism and Liturgy*, and a *Lutheran Hymn and Prayer Book*. D. July 24, 1807.

Ku'rite (or **Koorile Islands**), a group of 26 islands, forming a chain from Kamchatka to the northernmost island of Japan. Estimated area, 3000 sq. m. Pop. very small. The surface is mountainous, with active volcanoes, one of which is about 15,000 ft. high. The inhabs. of the N. islands resemble the natives of Kamchatka; those of the S. are chiefly Ainos, found also in Yesso. The islands are divided into Great and Little Kuriles. There are iron and copper mines; the seal-fishery and fur-trapping are of some value. Japan has sovereignty over them all.

Kurtz, **KOORTS** (BENJAMIN), D. D., LL.D., b. at Harrisburg, Pa., Feb. 28, 1795; was at 15 an assistant teacher in the Harrisburg acad., and afterward gave private instruction in anc. and modern langs.; was licensed to preach in 1815 by the Lutheran synod of Pa. He was successively assistant at Baltimore to his uncle, pastor at Hagerstown, Md., and at Chambersburg, and in 1833 became ed. of the *Lutheran Observer* at Baltimore. He took an active part in founding the theological sem. at Gettysburg, was a leading manager of the Lutheran Book Co. at Baltimore, and was the chief founder of the Missionary Inst. at Selinsgrove, Pa. D. Dec. 29, 1865.

Kurtz (JOHN DANIEL), D. D., b. at Germantown, Pa., in 1763; studied theol. under the direction of his father, Rev. John Nicholas Kurtz, and was licensed to preach by the synod of Pa. in 1784. In 1786 he was ordained pastor of the prin. Lutheran ch. at Baltimore, and held that post for nearly half a century. He was one of the founders of the General Synod of the Lutheran Ch., a director of the theological sem., and closely identified with all the benevolent insts. of his ch. D. June 30, 1856.

Kurtz (JOHN NICHOLAS), b. at Lutzelinden, Ger., about 1720; studied theol. at Giessen and Halle, and in 1745 came as a missionary to his countrymen in Pa. He was the first Lutheran minister ordained in the Brit. colonies in Amer., and spent much time in perilous missionary journeys through the frontier settlements. He was pastor at York when the Continental Cong. held its sessions there during the Revolution, and gave evidence of his patriotism by his solicitude to relieve the sufferings of the soldiers. At the age of 70 he retired from the ministry. D. in 1794.

Kussnacht, a v. of Switz., in the canton of Schwytz, on an arm of the Lake of Lucerne, at the foot of the Rigi. Here is Tell's chapel. Pop. 2500.

Kutu'soff (MIKHAIL or MICHAEL), b. 1745; entered the Rus. army at the age of 16; became maj.-gen. in 1784; was the leader under Suvaroff in the assault and capture of Ismail; became lieut.-gen. in 1791; was ambassador to Constantinople in 1793, and filled other diplomatic posts up to the Rus. war against Nap. In 1805 he entered Ger. at the head of 50,000 men, defeated Mortier at Dürrenstein, and disappeared of the plan followed by the allies at the battle of Austerlitz. In Aug. 1812 he was appointed gen.-in-chief, and though he could not prevent the capture of Moscow he received the baton of a field-marshal. After the evacuation of Moscow, K. hotly pursued the Fr., inflicted on them great losses in the battles of Malo Jaroslavatz, Krasnoé, and Smolensk, for the latter of which he was created prince of Smolensk, and while pursuing the Fr. d. Apr. 28, 1813.

Kwichepak River. See YUKON.

Kyrianizing. See PRESERVATION OF TIMBER.

Kyrie, the first word in Greek of *Kyrie eleison*, "Lord, have mercy," a petition often occurring in the liturgies, masses, and other offices of the Roman church. Hence the name is used to designate the opening movement of musical masses, requiems, etc.

Kythul, town of Brit. India, in the presidency of Bengal, the cap. of a dist. of the same name. It is a well-built city, with a magnificent palace and 50,000 inhabs.

L.

L, one of the consonants called liquids, representing a sound found in almost every lang. *L* stands for 50.

Labadie' (JEAN), b. at Bourg-en-Guienne Feb. 13, 1610; was ed. by the Jesuits, in whose order he became a prof. In 1639 he left the Jesuits and commenced preaching peculiar doctrines of his own, claiming to have received the spirit of John the Baptist, and predicted the end of the world in 1666. He publicly embraced the Reformed creed in 1650 at Montauban. In 1657 he became pastor at Orange, and in 1659 at Geneva, where he gained many proselytes. In 1666 he became pastor of a Walloon ch. at Middelburg, Hol. In 1669 he removed to Amsterdam and formed a body of followers known as Labadists. Expelled from Hol. in 1670, he went to Erfurt, where the princess palatine Elizabeth protected him and became his disciple. He afterward went to Bremen, and finally to Altona. He held to illumination by the Holy Ghost as the means of salvation, rejected infant baptism and the observance of the Sabbath, and taught communism in property. D. Feb. 2, 1674.

Lab'aree (BENJAMIN), D. D., LL.D., b. at Charlestown, N. H., June 3, 1801, grad. at Dartmouth in 1828 and at Andover in 1831; was ordained 1831; prof. of Lat. and Gr. in Jackson Coll., Tenn., 1832-36, its pres. 1836-37; pres. of Middlebury Coll., Vt., 1840-66; held a pastorate at Hyde Park, Mass., 1869-71.

Labarraque's Solu'tion (*Liquor Sodæ Chlorinatus*), a solution of chlorinated soda formed by mixing the solution of sodic carbonate with that of the best quality of bleaching-powder (the so called chloride of lime).

Lab'arum, the name of the prin. standard of the Rom. armies after the conversion of Constantine. It was a banner borne upon a cruciform standard, and had the monogram of Christ, with the letters alpha and omega.

Labat' (JEAN BAPTISTE), b. at Paris in 1663; entered the order of the Dominicans in 1685; was appointed prof. in math. and philos. at Nancy in 1687, and went in 1693 as a missionary, first to Martinique and then to Guadeloupe,

where he remained till 1705. He founded the city of Basse-Terre and took part in the defence of the island against the Eng. On his return to Europe he lived for some yrs. in Sp., then in It., and afterward in Paris. Wrote *Nouveau voyage aux îles de l'Amérique, Voyage en Espagne et Italie, Relation historique de l'Éthiopie occidentale*. D. Jan. 6, 1738.

Lab'danum, or **Lad'anum**, the resin of species of *Cistus*, small evergreen shrubs growing chiefly in the Levant. It is combed from the beards of goats and the fleece of sheep that browse upon the hills where it grows, and is also collected by drawing a rake over the plants. It is used as an incense, for fumigation, and in plasters.

Labia'tæ [Lat. *labia*, "lips," from the 2-lipped corolla], one of the larger of the monopetalous orders of phænogamous plants well marked by the opposite and mostly aromatic leaves, square stems, bilabiate corolla, 4 didynamous, or only 2 stamens, and a 4-parted ovary, forming 4 seed-like nutlets (naked seeds of the old botanists) around the base of a single style. No plants of the order are known that are in the least degree hurtful. The essential oils which give an aromatic character to many of them are separated by distillation for medicinal purposes or for use in perfumery. Several, such as thyme, summer-savory, and the like, are the "sweet herbs" of kitchen-gardens, and lavender, rosemary, horehound, the mints, and the sages are well known.

Labie'nus, Les Propos de, the title of a bitter satirical invective against the second Fr. empire, and personally against Nap. III., which appeared in Paris in 1865, immediately after the publication of the first vol. of Nap.'s life of Julius Cæsar. The author was M. A. Rocheard, an ex-prof. in a provincial coll. His name was on the title-page, and he was condemned for his pains to 4 or 5 yrs.' imprisonment, but escaped by taking refuge in Brussels.

La'bor [Lat.], in political economy, denotes one of three great agencies by which wealth is produced. A celebrated Ger. economist divides industrial hist. into 3 periods, in the first of which nature is the chief productive agent; in the second, labor; in the third, capital. In the first of the 3 periods wealth consists mainly of natural produce. In the second period, agriculture progresses, handicrafts multiply, considerable manual skill is developed, and *L.* plays the prin. part. In the third period production takes place on a large scale, machinery supersedes handicrafts, and *L.* and land become the ministers of the mechanical powers, materials, money, and credit, at the command of the capitalist. This generalization puts in a strong light one truth—viz. that *L.* is not the only productive agent, that capital gains ground with industrial progress in respect of the contribution which it makes to production, and that all theories on behalf of *L.* which omit to take this fundamental economic fact into account are fallacious. Yet, although capital has become the dominant element in most of the chief depts. of industry, both *L.* and the powers of nature do absolutely much more in our day, though relatively less, for the production of wealth than formerly. Again, wealth increases fastest, and both profits and wages are highest, in the civilized world where natural resources and advantages, such as fertile soils, mines, water-communication, are greatest. A still more important consideration in reference to land, *L.*, and capital, is that their separate ownership is not an essential or a universal condition of things. A peculiar course of national hist. and a peculiar legal system led to a separation of society in G. Brit. into landlords, capitalists, and laborers; and Eng. economists were led to reason as though rent, profit, and wages must belong always to different classes. But the severance of the laborer from landed property is an exceptional fact in the modern world, being peculiar to Brit. industrial economy. And although co-operation is in its infancy, it has succeeded in several forms; and in G. Brit. itself the recipients of wages are in a considerable number of cases partners also in profits. There is in all civilized countries a large class living by manual *L.* and in the receipt only of wages. The causes which determine the material condition of this class and their real income must long retain the highest importance. These causes are not to be summed up in any single law or formula; they vary in different circumstances, in different places, and in different stages of economic progress. What it is desirable to draw particular attention to here is that the rate of wages does not in the majority of cases by itself determine the amount of the real income of the working classes, though it is one of the conditions which do so. Where the laborer is paid altogether in food and other commodities, his wages and his real income are identical. But the decided tendency of modern industrial economy is to substitute money payments for wages in kind; and wherever this change takes place, the real income of the laborer becomes subject to more complex conditions. For the workman then makes not one exchange only, but a number of exchanges, by means, first, of the sale of his *L.*, and subsequently of the purchase of the various commodities which he consumes. The term "real wages," which is still sometimes employed, is in this case inappropriate and misleading, as tending to shut out of consideration some most important elements of the real income of the working classes. It is one of the most important results of the introduction of money as the medium of exchange that the working classes have become directly and deeply concerned in matters which otherwise would only remotely affect them, or not at all. That admirable modern inst. for the economical purchase of commodities, the co-operative store, owes its origin to the change in industrial economy which substituted payments of wages in money for payments in kind. [*From Smith, and in J. S. Mill's Econ. Syst.*, by FROD. T. E. CLIFFE LESLIE, LL.B.]

Laborde, **lab-bord'** (MAXIMILIAN), M. D., b. in Edgfield, S. C., June 5, 1804, grad. at the Coll. of S. C. in Columbia in 1821; took the degree of M. D. in the Med. Coll. of Charleston in 1826. His tastes led him toward the pursuits of lit. and science. He soon became a distinguished contributor to

Russell's Magazine, the *Southern Quarterly Review*, and other like periodicals. In 1842 he became prof. of logic and belles-lettres in his *alma mater*. In the reorganization of that inst. subsequently to the war, Dr. L. was assigned the chair of rhetoric, criticism, elocution, and Eng. lang. and lit. He wrote several books of merit, especially the *Hist. of S. C. Coll.* D. Nov. 6, 1853.

A. H. STEPHENS.

Laboulaye, lah-boo-lā' (ÉDOUARD RENÉ LEFÈVRE), b. at Paris Jan. 18, 1811; studied law while following a mechanical trade, and in 1839 put forth a learned *Hist. of Landed Property in Europe*, on the title-page of which the author announced himself to be a type-founder. The book was crowned by the Acad. of Inscriptions. In 1845 he wrote an *Essay on the Rom. Criminal Legislation*, which again won the crown of the Acad. of Inscriptions, and procured for its author an election as one of the members of that body. In 1849 he became prof. of comparative legislation at the Collège de France. He also began to take a prominent part in politics as an ardent republican. His attention was attracted to the insts. of the U. S. as affording some useful models for introduction in Fr.; he devoted several yrs. to their careful study, and wrote a valuable *Political Hist. of the U. S.* In 1862 he rendered a vast service to the U. S. by an exposition of the causes of the Amer. c. war, in the work entitled *The U. S. and Fr.* In 1863 he pub. perhaps the most popular of his works, *Paris in Amer.* In 1865 he wrote the *Programme of the Liberal Party*. In 1870 he inclined to favor the reforms proposed by Nap. and E. Ollivier; was elected to National Assembly in July 1871, was chairman of committee on higher education, and in 1874 sec. of committee of 30 on the (republican) const., in which capacity he maintained a prolonged battle with the monarchists. In 1873 he was made director of Collège de Fr.; became life senator 1875. D. May 1883.

Labourdonnaix, lah-boor-do-nā', de (BERTRAND FRANÇOIS MAHE), b. at St. Malo, Fr., Feb. 11, 1699; entered the navy early, and became a capt. in 1724. Having served for some time in the Port. navy, returned to Fr. in 1733, and was made gov. in 1734 of Isle de France and Bourbon. During the war between Eng. and Fr. he was very successful against the Eng. in the E. I. In 1746 bombarded and took Madras, and levied a war contribution of 9,000,000 francs. But the Fr. gov.-gen., Dupleix, became jealous, and discharged him. On his return to Paris in 1748, was thrown in to the Bastille, where he lay for 3 yrs. In 1751 a commission declared him innocent of all the charges brought against him by Dupleix. D. Sept. 9, 1753.

Labrador [Port. *Labrador*, "laborer," or *terra laborador*, "cultivable land"], that part of the peninsula lying between the Atlantic Ocean and Hudson's Bay, of which the waters flow neither into Hudson's Bay nor Hudson's Strait. L. proper consists of 2 parts. That part whose waters flow into the Gulf of St. Lawrence constitutes the dist. of L., in Saguenay co., prov. of Que., Canada. This coast is inhabited chiefly by Indians and by Canadians, mostly of Fr. descent. The catching of seals, herring, codfish, mackerel, salmon, trout, halibut, and fur-bearing animals is the prin. industry. The pop. is increasing, the houses generally neat and comfortable, and the prices of goods very moderate. The eggs and feathers of wild fowl are gathered to some extent. At Moisie there are quite extensive iron-works.

That part of L. whose waters flow directly into the Atlantic, and which lies between Cape Chudleigh on the N. W. and the Straits of Belle Isle on the S. E., is the region more generally called Labrador. It belongs to the Brit. empire, but not to the Dominion of Canada. It is at present under the jurisdiction of Newfoundland. This coast is rocky and precipitous, much broken by bays and inlets. Small islands abound. The native inhabs. are mostly of the Esquimaux race. The country is so rocky and rough, and the climate so intensely cold in winter, that L. would be worthless were it not that its coasts abound in the harp and hooded seals, and that the sea is abundantly stocked with codfish and herring of the best quality. The streams abound in salmon-trout. Furs and feathers are collected to some extent. Seal and fish-offal are exported for fertilizers. The land products are few in number. The interior is rough and barren, having a rocky surface, with sandy valleys and numerous swamps and lakes. The Newfoundland seal fisheries employ numerous sailing vessels and quite a number of steamers. The pop. of that part of L. under the jurisdiction of Newfoundland is 2479, exclusive of the aborigines. The population of the whole peninsula, with 420,000 sq. m. of area, is, including the few wild aborigines, only about 12,000.

Labradorite, a soda-lime feldspar crystallizing in the triclinic system, and originally obtained from the coast of Labrador. Some specimens when turned in different lights display to perfection a "change of colors."

Labrador Tea (*Ledum latifolium*), an evergreen shrub of the heath family, found in marshy soils from Pa. northward, the leaves used in Labrador as a substitute for tea.

La Bruyère, lah brue-e-yair', de (JEAN), b. at Dourdan, in Normandy, probably in 1646, and held a little office in the civil service at Caen, when Bossuet called him to the court of Versailles as teacher to the prince of Condé. The rest of his life he spent at Versailles, Chantilly, and Paris, always belonging to the court, but occupying a retired though dignified position. Wrote *Caractères de Théophraste, traduits du grec, ou les mœurs de ce siècle*. D. May 11, 1696.

Labuan, an island in the Malay Archipelago, or rather in the China Sea, 60 m. from the N. coast of Borneo and 600 m. N. E. of Singapore. Area, 45 sq. m. Pop. 4893. Its chief importance is derived from its central position with regard to Borneo, Anam, the Fr. colony of Cambodia, and the Sp. colony of the Philippines. There is a fair port, a good supply of water, and abundant mines of coal. Sago, camphor, birds' nests, and pearls are the chief exports.

Laburnum [Lat.], the name of the *L. vulgare* and *alpinum*, 2 ornamental European small trees or shrubs of the leguminous family, bearing abundant yellow flowers in early summer. The wood is hard, heavy, dark-colored.

Laby'rinth [Gr. *λαβύρινθος*], in Gr. archæology, a subterranean cavity, with intricate passages. The most famous, that of Egypt, was near Arsinoë and beyond Lake Meris. It had 1500 subterranean rooms, and as many above ground, and had a wall around it. The Cretan L. where the Minotaur was kept, is believed to be mythical.

Labyrinthodon'tia [Gr. *λαβύρινθος*, a "labyrinth," and *ὄντος*, a "tooth"], an extinct order of amphibians, including the order Labyrinthodon, etc., which appeared in the Carboniferous period, but attained their greatest development in the Triassic, soon after which they seem to have finally disappeared. They are regarded as belonging with the amphibians, but possess characters allying them with the ganoid fishes on the one hand and with true reptiles on the other. The head is defended by a casque of sculptured bony plates, usually hard and polished. There are 2 occipital condyles. The vomer is divided and supports teeth. The bodies of the vertebrae, as well as the neural arches, are ossified, except in some of the earlier forms, and the former are biconcave. The ribs, when present, are short. There are usually large palatine openings. The body is covered with plates, or scales. The structure of the teeth is complicated and suggested the name for the order.

Lac [Fr. *laque*; Ger. *Gummilack*], **Stick-lac**, **Seed-lac**, **Lump-lac**, **Shell-lac**, and **Lac-dye**, a resinous substance produced by the puncture of the female insect of *Coccus lacca* or *C. ficus* upon branches of several plants which grow in Siam, Assam, Pegu, Bengal, and Malabar. The female insect is of the size of a louse—red, round, flat, and wingless. Soon after it is punctured the twig becomes incrustated with a mammillated resinous substance, red, hard, and nearly transparent. It serves the double purpose of protecting the eggs and of supplying food for the young maggots in a more advanced state. The mothers are held by the adhesive fluids which exude from the punctures, and contribute their substance to the mass. The characteristic constituents of the incrustation are the lac-resin, derived from the tree, and the lac-dye, analogous to that of the cochineal, *Coccus cacti*, contained in the insects. The most valuable product is obtained by breaking off the twigs before the brood escapes, and drying them in the sun.

Stick-lac.—These dried twigs are called stick-lac, and from them the other products are prepared. That from Siam is the best, the incrustation being often a quarter of an inch thick all around the twig. It is insoluble in water, to which it, however, imparts its red coloring-matter. It is partially soluble in alcohol, coloring it red; is insoluble in fatty and essential oils.

Seed-lac is the resinous concretion separated from the twigs, coarsely pounded, and washed with water, by which much of the coloring-matter is removed. When it is desired to secure the lac-dye also, hot water is used, to which a little soda is often added.

Lump-lac is simply seed-lac melted into lumps.

Shell-lac is prepared from seed-lac by placing it in bags of cotton and warming it over a charcoal fire. When the resin begins to melt the bag is twisted, and the clear resin is allowed to flow over the smooth stems of the banyan tree or planks of fig-wood, when it cools in thin layers or scales.

Lac-resin is very valuable, much harder than colophony, and easily soluble in alcohol. It may be obtained pure by treating shell-lac with cold alcohol, and filtering the solution in order to separate a yellow-gray pulverulent matter. When the alcohol is again distilled off, a brown, translucent, hard, and brittle resin, of specific gravity 1.139, remains. It melts in a viscous mass with heat, and diffuses an aromatic odor. Anhydrous alcohol dissolves it in all proportions. Dilute hydrochloric and acetic acids dissolve shell-lac readily, nitric acid slowly, strong sulphuric acid not at all. Like most other resins, it has a strong affinity for bases, with which it forms definite compounds. It dissolves in aqueous potash, soda, carbonate of soda, etc. It deprives the caustic alkalis of their alkaline taste. The solution in caustic potash is of a dark-red color, and dries into a brilliant, transparent, reddish-brown mass, which may be redissolved in both water and alcohol. Borax renders 5 times its weight of shell-lac soluble on boiling with water. This solution is equal for many purposes to spirit varnish, and is an excellent vehicle for water-colors, as when once dried water has no effect upon it. India-ink rubbed up with this liquid forms a most valuable *label-ink* for the laboratory, as it is not affected by acid vapors. Sal-ammoniac is also a solvent for shell-lac, and the solution has been suggested as a substitute for the alcoholic solution.

Bleached Shell-lac.—By passing chlorine in excess through the dark-colored alkaline solution the lac-resin is precipitated in a colorless state. When this precipitate is washed and dried, it forms with alcohol an excellent pale-yellow varnish, especially with the addition of a little turpentine and mastic. By exposure in thin shreds to the sun's rays or in a finely divided state to chlorine-water, or by reducing it to a fine powder, suspending in water, and passing hydrochloric acid vapor into the menstruum, the dark-colored varieties are bleached. When this is done, however, the resin loses many of those qualities that so admirably recommend it for some kinds of varnishes, but it answers well for making sealing-wax.

Uses of Shell-lac.—In India lac is fashioned into rings, beads, and other trinkets. It is the material of which the best modern sealing-wax is made. Turpentine is added to promote fusibility and prevent brittleness. Earthy matters are added to increase weight and to prevent too rapid fusion. Shell-lac is used for the preparation of varnishes and for japanning, the ordinary shell-lac varnish being a simple alcoholic solution. It is used for stiffening hat bodies and many other purposes. Its solution in sal-ammoniac and water is capable of numerous applications. It is made by placing 3 parts white shell-lac, 1 part sal-ammoniac, and 6 to 8 parts water in a close vessel for 12 hours, then boiling with constant stirring till the shell-lac is dissolved. The

solution may be used as a stiffener, waterproofer, or vehicle for pigments and dyes, as paint or varnish.

Lac-dye and **lac-lake** are the secondary or by-products of the purification of stick-lac. The coarsely powdered stick-lac is macerated with hot water, to which a little soda is sometimes added. The red liquid thus obtained is strained through canvas and evaporated over a charcoal fire or in the sun. The residue is made into little cakes, which are known as **lac-dye**, and, as they appear in commerce, contain about 50 per cent. of coloring-matter, 25 of resin, 25 of earthy impurities. **Lac-lake** is obtained by precipitating with alum the decoction from stick-lac, prepared with weak caustic soda. The precipitate is pressed, moulded into cakes, and dried. It contains coloring-matter 50, resin 40, alumina 9, impurities 1. Messrs. Brooke, Simpson & Spiller of Manchester, Eng., have introduced into commerce a lac-dye superior to that imported from India. They treat stick-lac with weak ammonia, and precipitate the solution with chloride of tin. The coloring-matter of lac-dye is analogous to that of cochineal, carminic acid, but its absolute identity has not been established. The shades produced by it are less bright, but more permanent. Lac-dye and lake are chiefly employed for dyeing woollen fabrics scarlet; 2 or 3 parts produce the same effect as 1 of cochineal. The solvent for the dye is either sulphuric or hydrochloric acid; the mordant is chloride of tin and tartar. C. F. CHANDLER.

Lac (Hindustanee), the sum of 100,000 rupees, worth about \$50,000. One hundred lacs make one *crore* of rupees.

La Caille, de (NICOLAS LOUIS), b. at Rumigny, in Champagne, Mar. 15, 1713; studied math. and astron.; made himself known by his participation in the survey of the Fr. coast and in the measurement of the arc of the meridian, and was appointed prof. in astron. at the Collège de Mazarin at Paris in 1741. In 1750 went to the Cape of Good Hope, and in 127 nights determined 9800 stars hitherto undetermined; and in connection with Lalande established the distance of the moon, Mars, and Venus. He wrote *Astronomie Fundamenta, Tabule Solares*, beside elementary handbooks and essays on navigation. D. Mar. 21, 1762.

Lac-cadives (Sans. lakke, "a hundred thousand," and *dive*, "island"), a numerous group of small islands in the Indian Ocean, consisting of 20 clusters, 100 m. from the Malabar coast. Area, 744 sq. m. Pop. 11,287. They are of coral formation, the largest being only 7 m. in length, and most of them are barren rocks. The natives are called Mopays, are Mohammedans, of Ar. descent, and live in stone huts. The only commerce is in cocoa-fibre and betel-nuts. The islands pay tribute to Cananore in the presidency of Madras. They were discovered by Vasco da Gama in 1499.

Lace, an ornamental open-work of thread, twisted, plaited, or woven into patterns. It is derived from 2 most anc. kinds of work, netting and embroidery, the former of which was used by the Egyptians to ornament the borders of some festival garments. The Grs. and Roms. bordered their robes with embroidery, called *opus Phrygianum*, from the skill with which it was executed by Phrygian workers. Among early Chrs. it was customary for women to wear veils during public worship, frequently interwoven with gold or silver. A-S. embroidery, known as *opus Anglicanum*, was esteemed even in Rome.

Lace may be divided into 2 prin. classes—point and pillow lace, the former being of much the greater antiquity. We cannot decide when point was first made. The lts. probably derived it from Byzantium, since its earliest development may be traced to towns engaged in commerce with the Gr. empire. The oldest point is of 2 kinds—*lacs*, or *point comblé* ("counted stitch"), and cut-work (*point coupé*). *Lacs* usually consisted of netted squares, made in the ordinary way on a mesh, then joined with the needle, and darned or embroidered in a pattern, like the modern "guipure d'art;" or designs cut out of linen were laid on the netting and secured to it by embroidery. For cut-work, threads were stretched netwise across a piece of linen, called *quintin* from the place of its manufacture, and a pattern was made by sewing round with button-hole stitch those parts of the linen intended to remain, and cutting the rest away. By degrees skillful workers arrived at making the thick part entirely with the needle, using variations of 2 stitches (Figs. 1 and 2), similar to those in modern point. Embroidery, *lacs*,

FIG. 1.

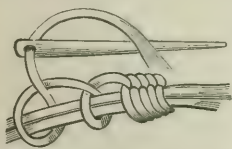
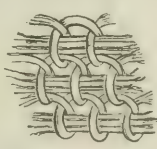


FIG. 2.



and cut-work were often combined in one piece, squares of darned netting alternating with squares of cut and embroidered linen; and this work, which was used chiefly for large articles, such as coverlets and altar-cloths, was sometimes white or unbleached, sometimes varied with gold, silver, or colored threads. In the 16th century lace became a very gen. ornament of both male and female dress, and was frequently mentioned in royal edicts and accounts. For "ruffles," those much reviled yet long triumphant articles of dress, pillow-lace, being lighter than point, was a favorite edging. This work, usually supposed to have been invented by Barbara Uttmann, wife of a master-miner of St. Annaberg, in Sax., is by Joseph Séguin pronounced of lt. origin. Be that as it may, Belg. is now the special home of this beautiful fabric. The lace-pillow is a round or oval board forming the base of a hard cushion; the worker places it upon her knees, lays on it a strip of parchment pricked with holes which indicate a lace-pattern, and sticks a pin through each hole so that its point enters the pillow. The thread for making the lace is wound on bobbins, small pieces

of wood, bone, or ivory about the circumference of an ordinary lead-pencil, having round their upper ends a groove or neck to receive the thread; by the twisting and crossing of these the lace is formed. The ground or "mesh" is made by plaiting (Fig. 3) or twisting the threads (Fig. 4); the pat-

FIG. 3.

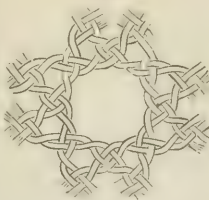
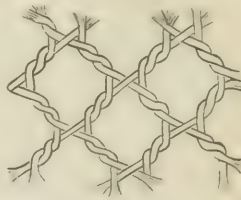


FIG. 4.



tern technically called "gimp," by weaving or "clothing" (Fig. 5). Early pillow-lace was of stiff design. But toward the close of the 16th century lace of all kinds changed from the geometrical to the flowing style, and every yr. it was more generally and profusely worn. In Fr., and all countries where Fr. fashion-laws were obeyed, lace during the 17th and 18th centuries was used lavishly for nearly all articles of dress. The falling collars and cravats which succeeded ruffs were either made of lace or deeply bordered with it. Great sums were spent upon lace, and as it was nearly all brought from It.,

Venice and Genoa were enriched with the fortunes of Fr. nobles. Colbert resolved that Fr. should have a lace manufacture of its own, sent to It. for workers, and established them near Alençon, where they instructed a number of Fr. girls in the art of making point. Point d'Alençon, the most costly and complicated of needle-laces, is made in small segments and by 12 different workers, each of whom has her special province. The art of making this lace, which was very strong and effective, is entirely lost. Pillow-lace is either worked in one piece on the cushion, in which case it cannot be of any great width, or is made in separate flowers, afterward connected by "brides" or applied on net. Of the latter kind are Brussels, Honiton, and guipure de Bruges. The best Brussels lace is made of wonderfully fine thread, the flax for which is grown in Brabant and steeped at Courtrai, the Lys water being very clear. The most costly Brussels lace has a fine needle-made ground, called *point à l'aiguille*, rarely used except for royal trousseaux; the pillow-made ground, though much less expensive and durable, is also of great value, and is commonly replaced by fine machine net made at Brussels for the purpose. A piece of Brussels lace passes through 7 different hands, each worker having her own dept., and knowing nothing of the intended effect, which is decided by the head of the establishment. [From orig. art. in J.'s Univ. Cyc., by JANET TUCKEY.]

Lace-Bark Tree, the *Lagetta linearia*, a large tree of the order Thymelacææ, growing in the W. I. Its white inner bark, after maceration in fresh water, is stretched out into a material curiously resembling coarse lace.

Lacedamon. See LACONIA and SPARTA.

La'chish, a city in S. Pal., among the mts. separating the terr. of Judah from the plain of the Philistines. It was an almost impregnable hill-fortress, but was taken by Joshua and fortified by Rehoboam. It resisted for a long time the assaults of the Assyrian army under Sennacherib, and was afterward taken by Nebuchadnezzar at the downfall of the kingdom of Judah. Its ruins have been identified with the modern v. *Um-Lakis*, on a round knoll covered with heaps of stones, on the left of the road between Gaza and Hebron.

Lachmann, lak'man (KARL), D. D., LL.D., b. at Brunswick, Ger., Mar. 4, 1793; studied at Leipzig and Göttingen; founded at the latter a philological society in union with Bunsen and Schulze; entered the army as a volunteer in 1813, and served in the Waterloo campaign; became prof. extraordinary at Königsberg in 1818 and at Berlin in 1825; ordinary prof. in 1828, and member of the Acad. of Sciences in 1830. His life was chiefly devoted to the preparation of critical eds. of the classics, of the N. T., and of the masterpieces of early Ger. lit. His great work was his ed. of the Gr. text of the N. T., the first which had any pretensions to be called critical. D. Mar. 13, 1851.

Lach'ryme Christi Lat. "Christ's tears," a sweet but very spirited wine of the group called muscated. It has a fine bouquet, and is produced chiefly upon Monte Somma, near Naples, in It.

Lackawanna, or **Lackawannock**, a small river in Pa., rises near the N. E. corner of the State, flows S. W., and enters the Susquehanna River at Pittston. Its lower course for 30 m. passes through the largest and most abundant anthracite coal-basin in Amer., to which it gives name, though it is sometimes called the Wyoming basin.

Laclede, lah-k'lad' (PIERRE LIQUESTE), the founder of St. Louis, Mo., a native of Fr., was in 1762 a resident of New Orleans, when he established the La. Fur Co. under a charter from the director-gen. of the colony, giving it the exclusive right of trading with the Indians on the Mo. The pioneers under his direction made the first settlement on the site of St. Louis Feb. 15, 1764, erecting a large house and 4 stores, and named the place in honor of Louis XV., then king of Fr.

Lacmus. See LITMUS.

La'con, on R. R., cap. of Marshall co., Ill., on Ill. River, 130 m. S. W. of Chicago. Pop. 1870, 2105; 1880, 1814.

Laco'nia, or **Lacedæmon**, the southernmost division of the anc. Peloponnesus, was bounded W. by Messenia, N. by Arcadia and Argolis, and E. and S. by the Argolian Gulf,

the Myrtoan Sea, the Laconian and Messenian Gulfs. To the S. it ended in the 2 promontories of Tanarus and Malea, the present Cape Matapan and Cape Malio.

Laconia, on R. R., cap. of Belknap co., N. H., 28 m. N. of Concord and 102 m. N. of Boston, upon the Winnipiseogee River, between the lake of that name and Grand Bay. Pop. tp. 1870, 2309; 1880, 3790.

Lacordaire (JEAN BAPTISTE HENRI), b. May 12, 1802, at Recey-sur-Ource, in the Department of Côte d'Or, France; studied first law, afterward theology, was ordained a priest in 1827, entered the order of the Dominicans, and created a great sensation by his peculiar blending of ultramontanist in religion and radicalism in politics, which he expounded both in his journal *L'Avenir* and in his *Conférences* in the cathedral of Notre Dame. But in 1853 he was ordered to leave Paris, and he afterward lived in retirement at Sorèze, where he died Nov. 23, 1861. He published four volumes of sermons: *Conférences*, 1844-51, *Vie de Saint Dominique*, 1840, *Discours sur le Droit et le Devoir de la Propriété*, 1858, *Lettres à un Jeune Homme*, 1858, etc.

Lacquer, lak'er [from Lac (which see)], a varnish for covering wood, papier-mâché, leather, or metal. It is of many kinds. In most of them lac is an important ingredient. L., well made and skillfully applied, will take a high polish and withstand hot and cold water, and even alcohol. The Japanese and Chi. excel in the art.

La Crosse, city and R. R. centre, cap. of La Crosse co., Wis., 196 m. W. of Milwaukee, on the E. bank of the Mississippi, at mouth of Black River from the N. and the La Crosse River from the E. It has a court-house, where the U. S. courts for the W. district of Wis. meet, an opera-house, and a custom-house. Pop. 1870, 7785; 1880, 14,505; 1885, 23,000.

Lac Sulphuris (milk of sulphur), finely divided sulphur, precipitated by acids from solutions of alkaline and alkaline-earthly persulphides.

Lactantius (FIRMIANUS), one of the Chr. Fathers, b. about the middle of the 3d century, either at Firmum, It., or in Afr.; studied rhetoric, became a distinguished orator, and one of the most learned men of his time. At the invitation of the emp. Diocletian he settled at Nicomedia as prof. of Lat. eloquence (301), became a Chr., and wrote in defence of the new religion. He was called by the emp. Constantine to Treves as tutor to his son, and is supposed to have d. there. He was called the "Christian Cicero;" wrote *Divinarum Institutionum, De Ira Dei, and De Officio Dei*. D. about 325.

Lactic Acid [Ger. *Milchsäure*; Fr. *acide lactique*], the acid which is formed in milk when it turns sour, and which exists therefore in buttermilk. It is formed from lactose or milk-sugar. Sucrose undergoes the lactic fermentation like lactose, under the influence or impulse of the same special ferments. Braconot found it in sour beer, sour meal, sour beet-juice, fermented rice, and many other places, and, supposing it new, called it *nanceic acid*, after his birth-place, Nancy. Berzelius appears first to have announced that it occurs as a normal constituent of flesh, deducing important physiological conclusions. Liebig denied its occurrence in flesh, but afterward found therein *sarcocollactic acid*, an isomere or metamere of L. A., which Strecker found to be convertible into ordinary L. A. by heat. Mitscherlich first prepared *pure* L. A. by decomposing lactate of zinc with sulphuretted hydrogen. A colorless syrupy liquid; deliquescent; does not freeze at 12° below zero F.; density = 1.215. It is strangely like *glycerine* in its properties, though intensely sour, while the latter is very sweet.

L. A. has been produced by many artificial chemical transformations; probably the most interesting being that of Lippman, who formed it by synthesis, by combining olefiant gas and oxychloride of carbon, which gives *paralactic chloride*. This, with alkalis, gives salts of paralactic or Liebig's sarcocollactic acid, which then, by heat, as aforesaid, will give us the ordinary L. A. of buttermilk. L. A. has a great solvent power over *phosphate of lime*, and to this some attribute its known medicinal virtues. The lactic fermentation of sugars is referred by Pasteur and others to the action of the common fungus *Penicillium glaucum*, as the alcoholic fermentation to that of *Torula*. [From orig. art. in *J. S. Univ. Cyc.*, by HENRY WURTZ, Ph. D.]

Lactin and Lactose. See SUGAR.

Lactometer [Lat. *lac*, "milk," and Gr. μέτρον, "measure"], a graduated cylinder for estimating the amount of cream in milk. The term is often applied to the *galactometer*, a hydrometer for showing the specific gravity of milk.

Lactucarium [Lat. *lactuca*, "lettuce"], a drug consisting of the dried milky juice from the mature stem of different species of *Lactuca* or lettuce. It was introduced into med. in 1799 as having the property of allaying pain and procuring sleep.

Lacustrine Villages, or Lake Dwellings. See PALEOLITHS AND PRE-HISTORIC MAN.

La Cygne, lah sin, Linn co., Kan., city, on R. R. and Mo. River, 63 m. S. of Kansas City, has superior water-power. The town site was laid out in 1870. Pop. 1880, 835.

Ladakhi, or Middle Thibet, an independent terr. in Central Asia, between Great Thibet in E. and Little Thibet in W., and separated N. from Toorkistan by the Karakorum, S. from Cashmere by the Himalayas. Area, estimated at 30,000 sq. m. Pop. 150,000. It is a mountainous region along the upper course of the Indus, of a sterile soil and with a severe climate, but well cultivated, and its inhabs., who are Mongolians, professing a kind of Lamaism and governed by a theocratical despotism, raise large crops of wheat, barley, and buckwheat, beside rearing sheep, which supply wool used in Cashmere. The mts. contain iron, copper, and lead, and a transit-trade between Chi. and Hindostan is carried on. Cap. Leh.

Ladd (WILLIAM), b. at Exeter, N. H., May 10, 1778, grad. at Harvard in 1797; was for some yrs. a capt. in the merchant marine; was one of the founders of the Amer. Peace

Society, of which he was for many yrs. pres. He edited the *Friend of Peace*, and afterward the *Harbinger of Peace*, and wrote an *Essay on a Cong. of Nations*. D. Apr. 9, 1841.

Lading, Bill of. See BILL OF LADING.

La'dislas, or Lancelot, king of Naples, surnamed THE LIBERAL and THE VICTORIOUS, b. about 1375; succeeded his father in 1386; was driven from Naples in July 1387, by Louis II. of Anjou, whom Pope Clement VII. (of Avignon) had invested with the crown; was reinstated by Otto of Brunswick the same yr.; repulsed 2 invasions made by Pope Urban VI. in 1388; was crowned May 29, 1390, by a legate of the new pope, Boniface IX.; maintained a war for several yrs. against Louis II., who was in possession of the cap.; recovered that city July 9, 1399; was a candidate for the throne of Hungary, and crowned Aug. 5, 1403, but soon withdrew his claims; attempted to seize Rome in Aug. 1405; was excommunicated by the pope June 18, 1406; entered Rome in 1408, retiring in a few months; after a long series of alternations of fortune, again took and plundered that city June 8, 1413. D. Aug. 16, 1414.

Ladislas I. (LOKTEK), king of Poland, b. in 1260; succeeded to the dukedom of Poland in 1296; was deposed in 1300; restored in 1304; carried on a long war with the Teutonic Knights; assumed the title of king of Poland in 1320; defeated the Teutonic Knights at Płowce Sept. 27, 1321. D. Mar. 10, 1333.

Ladislas II., king of Poland. See JAGELLONS.

Ladislas III., king of Poland. See LADISLAS V.

Ladislas IV., king of Poland, b. at Cracow June 9, 1595; succeeded his father, Sigismund III.; Nov. 13, 1632; compelled the Rus. to raise the siege of Smolensk (1632); defeated the Turks in Moldavia (1634), and the Tartars of the Crimea; made a truce for 26 yrs. with Swe. (1635); began a war with the Cossacks (1637); married a daughter of the Ger. emp. Ferdinand (1637). D. May 19, 1648.

Ladislas, or Ladislaus, the name of 7 kings of Hungary: LADISLAS I., THE SAINT, called also LANCELOT, b. about 1041; succeeded his brother in 1075; was victorious over the Wallachians, Bohemians, Rus., Cumans, and Poles; conquered Croatia and Dalmatia (1087); promulgated a new code of laws 1092; aided Boleslas II. in obtaining the throne of Poland; projected the delivery of the Holy Land; erected many chs. and monasteries, and favored the clergy in their efforts to civilize the Hungarians. D. July 29, 1095. He was canonized by Pope Celestine III. in 1192.—LADISLAS II., b. about 1134; crowned July 15, 1161, and d. Jan. 14, 1162.—LADISLAS III., b. about 1185; was elected in 1204 to succeed his father Emerich, but d. May 7, 1205.—LADISLAS IV., surnamed THE CUMAN, b. about 1250; succeeded his father, Stephen IV., in 1272; made war upon and at first defeated the Cumans 1282, but the latter, reinforced by vast hordes of Tartars or Mongols from the plains N. E. of the Black Sea, overran and ravaged all Hungary (1285). He then made terms with the Cumans, repudiated his wife, and married one of their princesses, whence his surname, but was assassinated by them July 19, 1290.—LADISLAS V. (III. of Poland), b. Oct. 31, 1424; succeeded his father Ladislas II. (Jagellon) as king of Poland in 1434; was elected king of Hungary in 1440 by the influence of John Huniades, by whose aid he defeated the Turks in 2 great battles (1442-43); made a 10 yrs. truce with the sultan Amurath II. in June 1444, acquiring the sovereignty of Wallachia; obtained a papal dispensation from his oath, and invaded Bulgaria, where he was defeated and killed, with a great part of the Polish nobility, at Varna, Nov. 10, 1444.—LADISLAS VI., THE POSTHUMOUS, son of Albert of Aus., emp. of Ger. and king of Bohemia and Hungary, b. Feb. 22, 1440, several months after his father's death, when Ladislas V. had already been placed upon the throne; was elected king in 1445; assumed the govt. in 1451; crowned king of Bohemia Oct. 28, 1453, and d. Nov. 23, 1457.—LADISLAS VII., eldest son of Casimir IV. of Poland, b. about 1456; was designated as his successor by George Podiebrad, king of Bohemia, July 19, 1469; crowned at Prague Aug. 16, 1471; entered Hungary with an army on the death of Mathias Corvinus in 1490; was proclaimed king and crowned Sept. 21; fought against the Turks, and repulsed the army of Bajazet in 1501; made peace at Buda Aug. 20, 1503; permitted the proclamation of a crusade against the Turks in 1514, and D. Mar. 13, 1516.

Ladmiraull, lah-mê-rô, de (RENÉ PAUL), distinguished himself in the war with Ger. (1870-71); commanded a corps in the battles of Courcelles, Aug. 14, Vionville, Aug. 16, and Gravelotte, Aug. 18, 1870; on the capitulation of Metz became a prisoner of war, but after the conclusion of peace received the command of the territorial division of Paris, and was appointed gov. of the cap. When in 1873 the arrangement of territorial divisions was abolished, he retained his position of military gov. of Paris.

Ladoga, lah'dô-ga, the largest lake of Europe, comprising an area of 6804 sq. m., situated in Rus., between the govts. of Viborg, Petersburg, and Olonetz. It receives the water from the lakes of Onega, Saima, and Ilmen, and sends it through the Neva to the Baltic.

Ladrones, or Marianne Islands, a group of 20 islands in the Pacific Ocean, belonging to Sp., situated between 13° and 21° N. lat., and between 144° and 146° E. lon. They are of volcanic origin, have a warm climate, and comprise an area of 1254 sq. m. of fertile land. Only a few, including Guam and Rota, are inhabited. They were first discovered by Magelaens in 1521, and called Las Islas de los Ladrones (the Thieves' Islands). In 1667 the Spaniards established a regular settlement, and called the islands Marianne Islands, after Queen Maria Anna, Pop. 6000. Prin. town, San Ignacio de Agaña, situated on Guam.

Lady-bird [Ger. *Marienkäfer*, "Mary-bug"], a common name for coleopterous insects of the family Coccinellidae. They are extremely useful to farmers, destroying vast numbers of aphides or plant-lice. They are usually of an oblong-oval shape, frequently have bright colors, and are often spotted. The species are difficult to distinguish.

Lady Day, the 25th of Mar., the feast of the Annunciation of the Blessed Virgin Mary.

Laennec, lah-nek' (RENÉ THÉODORE HYACINTHE), b. at Quimper, Fr., Feb. 17, 1781; studied med. in Paris; became prin. phys. at the Necker Hospital in 1816, and prof. of med. at the Collège de France in 1822. Was the inventor of the stethoscope, and wrote *Traité de l'auscultation médiate et des maladies des pommans et du cœur*. D. Aug. 13, 1826.

Laestrygones, the name of a race of giants mentioned by Homer (*Odyssey*, x, 80, 132).

Lætare Sunday, Mid-Lent, or **Dominica de Rosa**, the 4th Sunday in Lent, the day on which the pope blesses the Golden Rose. On this day only is the organ played during Lent.

La Farina, lah fah-ree'nah (GIUSEPPE), b. at Messina in 1815. In 1837, after an ineffectual attempt to detach Sic. from the dominion of the Bourbons, he fled to Tuscany. The following yr. he was amnestied and returned to Sic., but after about 3 yrs. he was once more forced to retire to Tuscany. Here he occupied himself with literary pursuits and in efforts to promote It. independence. The revolution of 1848 took him back to Sic.; he was elected deputy to the Sicilian Parl., then appointed com. to Turin, Florence, and Rome, and became minister of war and of the marine. In the spring of 1849, when the liberal cause was lost, he escaped to Paris, where he continued till 1853; established himself at Turin in 1854. He co-operated with Cavour in the war of 1859, and with Garibaldi in organizing the volunteers. In 1860 he was elected deputy to the It. Parl. from 6 dists. He wrote *La storia d'Italia*. D. 1863.

La Fayette, on R. R., cap. of Chambers co., Ala., 80 m. N. E. of Montgomery; has a male high school and a female coll. Pop. 1870, 1382; 1880, 1061.

Lafayette, city and R. R. centre, cap. of Tippecanoe co., Ind., on the Wabash River and Wabash and Erie Canal. It has an opera-house and State agricultural coll. (Purdue Univ.). Pop. 1870, 13,506; 1880, 14,869; 1885, about 20,000.

La Fayette, de (MARIE PAUL JEAN ROCH YVES GILBERT MOTIER), MARQUIS, b. at the château Chavagnac, Auvergne, Sept. 6, 1757. His father was killed at Minden, and on his mother's death in 1770 he fell heir to large estates; married in 1774 a grand-daughter of the duc de Noailles; entered the guards, and while a capt. of dragoons in 1776 determined to join the Amer. revolutionists; fitted out a yacht at his own expense, and landed Apr. 24, 1777, near Georgetown, S. C.; served as maj.-gen. 1777-83 without pay, furnishing also clothing and camp equipment at his own expense to the needy patriots; was wounded at Brandywine, and fought at Monmouth; was in Fr. 1779-80, where he induced the king to send Rochambeau to Amer.; conducted the campaign in Va., which ended in the capture of Yorktown, and then returned to Fr.; visited the U. S. again in 1784; exerted himself to procure the abolition of slavery in the Fr. colonies, and freed and educated his own slaves at Cayenne; was in the Assembly of Notables, Paris, 1787; demanded the convocation of the States-Gen., to which he was a deputy, 1789; became v.-p. of the National Assembly, commandant of Paris, and chief commander of the national guards, which he organized, 1789; founded the clubs of Feuillants 1790; protected the king and queen from the mob of Oct. 5 and 6; commanded successfully the army of Flanders 1792; denounced the Jacobins, from whom he escaped to Flanders, but was imprisoned for 5 yrs. by the Aus. at Olmütz; was liberated by Nap. and returned to Fr. in 1799, but would never become a partisan of Nap.; lived principally upon his estate of La Grange; was in the Fr. House of Repr. 1815, in the Chamber of Deputies 1818; visited the U. S. in 1824-25, and received a grant of \$200,000 and a township of land; was chosen to the Chamber of Deputies 1827; took part in the revolution of 1830, and commanded the national guard, but not in person. D. May 20, 1834. His son, GEORGES WASHINGTON LA FAYETTE (1779-1849), and his grandsons, OSCAR (b. 1816) and EDMOND (b. 1818), have figured in Fr. politics as republicans.

Lafayette College at Easton, Pa., at the junction of the Del., Lehigh, and Bushkill rivers, and of many canals and R. Rs., was chartered in 1826. Rev. George Junkin, D. D., was the first pres. Since 1855 it has been known for its course of A.-S. and Eng. in connection with comparative philology under Prof. F. A. March, LL.D. It is also known to the scientific world as in some sense the head-quarters of meteorology in Amer. Since 1865 it has still further become a centre of scientific and technical instruction for the coal and iron regions of Pa. and N. J. The flora of Pa. is the most complete in existence. The A.-S. and Early Eng. dept. of the library is probably the best in the country. The coll. now offers 5 schools of 4 yrs. each, leading to degrees; 2 of gen. culture—the classical and the scientific; and 3 technical—mining engineering, civil engineering, and chem. A law school was organized 1875. There are 22 resident profs. and tutors and 289 students.

Lafitau (JOSEPH FRANÇOIS), b. at Bordeaux in 1670; became a Jesuit priest; came to Canada as a missionary in 1712; was stationed at the Iroquois mission at Sault St. Louis. Returning to Fr. in 1717, wrote *Mœurs des Sauvages américains et Histoire des découvertes des Portugais dans le Nouveau Monde*. D. July 3, 1746.

Lafitte (JEAN), b. in Fr. about 1780, one of 3 brothers whose privateering operations led him to Galveston Island, and then to Barataria, keeping as agents in New Orleans his 2 brothers. At the period of the taking of Guadeloupe by the Brit. (1806), most of the privateers commissioned by the govt. of that island, and which were then on a cruise, made for Barataria, there to dispose of their prizes. Most of the commissions granted to privateers by the Fr. govt. at Guadeloupe having expired some time after the declaration of the independence of Colombia, many of the privateers repaired to her port of Carthagena for the purpose of obtaining from the new govt. commissions for cruising against Sp. vessels. Having duly obtained their commissions, they

blockaded for a long time all the ports belonging to the royalists, and made numerous captures, which they carried into Barataria. Public auction-sales were made of the cargoes of their prizes. Preparatory to the expedition against New Orleans, Lt.-Col. Nicholls, commander of the Brit. forces in the Floridas, made overtures by letter, dated Pensacola, Aug. 31, 1814, to L., "with his brave followers, to enter into the service of Great Britain;" he is offered the rank of capt., and lands are to be given to "all in proportion to respective ranks." The letter was delivered by Capt. Lockyer, R. N., who personally offered him, beside the rank of capt., the sum of \$30,000. Subsequently (about the middle of Dec.), when the invasion of New Orleans was imminently pending, the govt. of La. issued a proclamation inviting, and Gen. Jackson accepted, the services of L. and his men, a portion of whom formed a corps under Cpts. Dominique and Beluche, and were employed on the lines, where with distinguished skill they served two 24-pounders in batteries Nos. 2 and 3. Others enlisted in one or the other of the companies of mariners.

On Feb. 6, 1815, Pres. Madison issued a proclamation stating that "it had been long ascertained that many foreigners, flying from the dangers of their own home, and that some citizens forgetful of their duty, had co-operated in forming an establishment on the island of Barataria, near the mouth of the river Mississippi, for the purpose of a clandestine and lawless trade. . . . But it has since been represented that the offenders have manifested a sincere penitence; that they have abandoned the prosecution of the worst cause for the support of the best, and, particularly, that they have exhibited in the defence of New Orleans unequivocal traits of courage and fidelity;" and granting full pardon for acts therein defined, provided that certificate in writing be produced from the govt. of La. stating that the person "has aided in the defence of New Orleans." J. G. BARNARD.

La Fontaine, de (JEAN), b. at Château Thierry, Fr., July 8, 1621; was protected by the duchess of Bouillon, by prince of Condé, Fouquet, and Henrietta of Eng.; but was too open-spoken to secure the favors of Louis XIV. Had for friends Molière, Racine, Boileau, and was member of the Fr. Acad. Wrote at first his *Contes*, short, lively, but rather licentious novels; but his great work is his *Fables*, some of them taken from Æsop and Phædrus, which have been translated into every lang. He had a larger heart than most Fr. writers of that period; held fast to his protector, Fouquet, after the ruin inflicted on him, through a personal jealousy by Louis XIV. D. Apr. 13, 1695.

La Fourche, lah foors'h, a bayou in S. E. La., an outlet of the Miss., which begins at Donaldsonville on the right bank, and flows S. E. to the Gulf of Mex., with a total length of 150 m. It is navigable by steamboats for about 100 m. from its mouth, and is one of the prin. channels of communication between the Gulf and the interior.

Lager Beer. See BEER, by PROF. C. F. CHANDLER.

Lago Maggiore, lah'go mad-jó'ra, the longest of the lakes of N. It., situated between Piedmont, Lombardy, and the Swiss canton of Ticino, and traversed by the river Ticino, which carries its waters to the Po, is 40 m. long and 2 m. broad.

La'gos, a Brit. colony on the coast of Dahomey, W. Afr., extending from the river Yerewa to Ode. Pop. 62,021. The prin. settlement is on the island of Lagos in the Bight of Benin, at the mouth of the Ikorodu Lagoon. The terr. under Brit. protection extends 10 or 12 m. inland. The trading-posts are Badagry, Palma, and Leckie, the exports being palm oil, cotton, indigo, and ground-nuts. The town of Lagos has a pop. of 36,000, is the seat of Catholic and Wesleyan missions. Was conquered in 1861, and ceded to G. Brit. in 1861.

Lagos, lah'góce, city, cap. of a canton of the same name in the state of Jalisco, Mex., near the frontier of the state of Guanajuato, noted for its chs. and factories, and for the deposits of iron ore in the vicinity. It is a central point in Mex. Pop. about 25,000; of canton, 90,000.

Lagosto'mine [from *Lagostomus*, *lagos*, "hare," and *στομα*, "mouth," and *-mine*], a sub-family of the family Chinchillidae, whose only known species is distinguished by a rat-like form, but with a bushy tail, a broad muffle, upper lip with a vertical groove like a hare's, moderate ears, and imperfect feet. But one species is known; it is a characteristic animal of the pampas of S. Amer., where it burrows in a clayey or sandy soil.

La Grange, city and R. R. junc., cap. of Troup co., Ga., 41 m. S. W. of Atlanta; has 2 female colls and a male high school. Pop. 1870, 3053; 1880, 2865.

La Grange, cap. of La Grange co., Ind., on R. R., 45 m. N. W. of Ft. Wayne. Pop. 1870, 1098; 1880, 1367.

La Grange, city of Lewis co., Mo., on R. R. and Miss. River, 175 m. above St. Louis, 11 m. above Quincy, Ill., and 30 m. below Keokuk, Ia.; was incorporated as a city 1853; is the seat of a coll. Pop. 1870, 1576; 1880, 1336.

La Grange, cap. of Fayette co., Tex., on R. R. and Col. River, 25 m. from Columbus. Pop. 1870, 1465; 1880, 2225.

Lagrange, lah-gronz'h (JOSEPH LOUIS), b. at Turin Jan. 25, 1736; d. at Paris Apr. 10, 1813. At the age of 19 he was made a prof. of geom. in the Royal School of Artill. In 1766 he was invited to Berlin by Frederick II. to succeed Euler as mathematical director of the Acad., of which he was made pres. Here he wrote his *Mécanique Analytique*. After the death of Frederick (1786) he received invitations from the sovereign of his native Sard., as well as those of Naples and Tuscany, but ultimately accepted one in 1787 to take his residence at Paris, where the rest of his life was passed.

The method of the Variation of Parameters, expounded to a certain point by Euler, but perfected by L., is one of his important contributions to analytical mechanics. The ellipse which a planet would describe around the sun, were there no other attraction, undergoes fluctuations of form by attractions of other heavenly bodies. The essence of the

method in question is that, holding fast to the idea of the simple curve—the ellipse—though it be never realized, the actual motion of the body is conceived to be on an elliptic curve, the *parameters* (or elliptic elements) of which are ever varying through the disturbing action of foreign attractions. To subject this motion to analytical calculation, and to determine the influence of each planet in disturbing the elliptic motion of others, was the problem the solution of which is in great degree due to L. As a natural sequence to this problem arising out of this perpetual change in the planetary orbits comes the greater problem of the *stability and permanence of the solar system*, the establishment of which is L.'s greatest achievement. The orbits being thus in constant fluctuation, it is of the highest interest to know whether the resulting changes be necessarily limited in amount, or whether they will progressively increase until the *stability* of the solar system shall be destroyed. L. demonstrated that the fluctuation of the orbital elements is limited to small amounts, and is periodic, extending, however, through long periods of time. Thus, *e. g.* the eccentricity of the earth's orbit, now diminishing, will continue to do so for 24,000 yrs., and then begin to increase. At the same time the apses and nodes are in motion. The grand cycle of the earth's perihelion, which coincided with the vernal equinox 4089 yrs. B. C., will be completed in 110,000 yrs.

La Guayra, lah gw'rah, town of Venezuela, S. Amer., the harbor of Caracas, situated between the sea and the wall of the inland plateau, which rises at once to a height of about 3000 ft. It is the prin. port of Venezuela, and the importation of manufactured goods and the exportation of coffee, cacao, cotton, sugar, indigo, and hides are extensive. Pop. about 8000.

La Hontan, de (ARMAND LOUIS DE DELONDARCE), BARON, b. in Gascony, Fr., about 1667; came to Canada, probably as a private soldier, in 1683. In 1688 he was sent to Michilimackinac and Sault Ste. Marie, was at Green Bay in 1689, and pretended to have explored the head-waters of a branch of the Miss.; sailed for Fr. in 1690; came back the following yr., and was sent with despatches to the Fr. govt. The vessel put in to Placentia, Newfoundland, and he rendered such good service in defending that port from the Eng. that he received a command as lieutenant. In 1693 he became involved in difficulties with the gov., made his escape to Port., and thence passed to Sp., Den., and Eng. Having been dismissed from the Fr. service, he wrote in 1703 his adventures in Amer., under the title *Nouveaux Voyages de M. le baron de Lahontan dans l'Amerique Septentrionale*, which is entirely untrustworthy, though long relied upon by compilers. D. 1715.

Lahore, the prin. city of the Punjab, Brit. India, situated on the W. bank of the Ravee, is surrounded with a high brick wall, and consists of narrow, dirty, and overcrowded streets between high houses. But it has many magnificent Mohammedan mosques and Hindoo temples, and its extensive bazaars are well stocked. Outside the wall are other fortifications inclosing gardens with monuments and ruins of the former splendor of the city, when it was the residence of the Mogul emps. Since 1849 it has been a Brit. possession. Pop. 98,924.

Lang, LANG (ALEXANDER GORDON), b. in Edinburgh Dec. 27, 1794, entered the Brit. army; served some yrs. in the W. I., and was in 1820 aide-de-camp to the gov. of Sierra Leone. Was employed in negotiations with Afr. chieftains for the suppression of the slave-trade, and explored the upper course of the Niger. Returning to Eng., was promoted to the rank of major, and in 1826 undertook an overland journey from the Mediterranean to the Gulf of Guinea. Setting out from Tripoli in July with a caravan of native traders, reached Timbuctoo in Aug., but was soon after murdered near that city. Had written an account of his earlier explorations, *Travels to the Sources of the Rokelle and Niger*. D. 1826.

Lake [Lat. *lacus*; Fr. *lac*; Ger. *see*], a body of water nearly or quite surrounded by land. L. derive their forms and character from the nature of their basins and the region in which they are found. Mt.-L., being valleys filled by running streams, are long and narrow, rarely of great size, but often of great depth. L. George and L. Champlain in the Appalachian Mts., the L. of Constance, Zurich, Lucerne, and Geneva on the N. side, Lago Maggiore and Lago di Como on the S. side of the Alps, all renowned for the beauty and loveliness of their shores or the grandeur of the surrounding scenery, are fair examples. Their length exceeds their width 20 or 30 times. The depth of Lago Maggiore, which is hardly 3 m. wide, reaches, according to the It. engineers, 2613 ft. below its surface, or more than double the depth of L. Superior, and 1926 ft. below the level of the ocean. Sometimes their forms are very irregular, for the water of a mt.-L. often covers several contiguous valleys, as in the Lago di Como, with its 2 long branches, and the L. of Lucerne and Lugano, which owe their strange and crooked form to the fact that each fills 4 distinct valleys, crossing each other almost at right angles. L. in plains and plateaus, being simple depressions in a uniform surface, are generally of larger size, and wider compared to their length, but relatively of no great depth. The largest L. of the globe, the so-called Caspian and Aral seas in Asia, the equatorial L. of Central Afr., the great N. Amer. L., and L. Titicaca in S. Amer., all belong to this class. Their vast expanse and the tameness of their shores deprive them of the picturesque beauties which adorn the mt.-L. Most L. receive and send forth large rivers, of which they seem to be an expansion. In their basins the wild alpine torrents spend their force, and their muddy waters flow out purified and transparent. The L. are thus the regulators of the mt.-streams, preventing destructive freshets there, and also in the low plains.

Salt Lakes.—Numerous L., however, in the interior of the continents, though receiving affluents, have no outlet, some of their water losing itself in the sandy ground, but the greater portion passing into the atmosphere by evaporation.

These are usually filled with salt water. All the surface of the continents being an old sea-bottom, the presence of salt is very natural. Fresh-water rivers and L. can only be found after the surface has been thoroughly washed and the salt carried away by streams having access to the ocean. The Caspian and the Aral seas, at the bottom of the vast depression which lies between Europe and Asia, are the most extensive salt L. The Caspian Sea, though receiving the Volga, the largest river of Europe, and many others of considerable size, evaporates so much water that its surface has been found by the Rus. academicians to be 83 ft. below the level of the Mediterranean, and varying with the seasons. Many L. in the neighborhood ooze away during the summer, leaving a pure, white crystalline crust of salt. One of them, the Elton L., between the Volga and Ural rivers, furnishes thus an annual crop of over 100,000 tons of salt. More remarkable than all is the Dead Sea, which lies in the deepest part of a long valley, sunk from 4000 to 5000 ft. below the surrounding country, its surface being 1286 ft., and its bottom over 2500 ft. lower than the level of the Mediterranean. Its feeder, the river Jordan, alone among the streams of the earth, accomplishes nearly its whole career below the level of the sea. When expanding into the L. of Tiberias, the beautiful sheet of water whose shores witnessed so many of Christ's miracles, it is nearly 620 ft. below the surface of the Mediterranean. By another long step of over 640 ft. downward its fresh waters mingle with the bitter floods of the Dead Sea. In this last reservoir the salt has accumulated so as to transform the water into a heavy brine, which may be the remnant of an anc. sea of much larger extent gradually reduced by evaporation to its present size. The other continents have also their salt L., and N. Amer. can boast of the Great Salt L. of Utah as one of the finest specimens of its kind.

Geographical Distribution of Lakes.—L. are not uniformly spread over the continents. They are most numerous in the N. regions of Asia, Europe, and N. Amer., but more thinly scattered farther S. and in the S. continents. Asia is pre-eminently the land of the salt L. Both in its N. W. steppes from the Caspian to L. Balkash, and in its vast central highlands, they occur in countless numbers. The Altai and Daourian mts., however, contain the largest alpine L., among which the kingly Baikal, nearly 500 m. long, holds the first place. In Europe the most characteristic and celebrated are the mt.-L. which adorn the Alps of Switz. and Scandinavia and the more modest chains of the Brit. Isles. But the greater number and the largest are found on the slight swells and in lowlands which surround the Baltic Sea in N. Ger., W. Rus., Finland, and Swe. The L. of Ladoga and Onega in Rus., and those of Wener and Wetter in Swe. are the most extensive among the European L. In Afr. the great plateau-L. are typical of the continent. The majestic Ukerewe, or Victoria Nyanza, and the Albert Nyanza at the sources of the White, the Tzana at the head of the Blue Nile, L. Bangweolo and Tanganyika, head-waters of the Congo, Lake Nyassi in the Zambesi basin, are all crowning, or sunk in, the table-lands of Central Afr. But N. Amer. is peculiarly rich in this respect. No continent presents a more remarkable chain of large L. than that which stretches from N. W. to S. E. in the Arctic plains, along the line of contact of the oldest geological formations, to the Appalachian Mts., comprising the Great Bear and Great Slave L., Athabasca, L. Winnipeg, and the 5 great L. from Superior to Ontario, forming together the largest extent of fresh water on the face of the earth. This abundance of L. in the N. part of the continent renders their almost complete absence in the basin of the Miss. the more remarkable.

ARNOLD GUYOT.

Lake. This term is applied to pigments prepared by combining animal or vegetable dyes with metallic oxides, usually alumina or oxide of tin. Almost all coloring-matters may be made to produce L., but in practice a few only are found available for this purpose. L. are used as pigments for painting, for wall-paper, and in calico-printing. Red L. are prepared from cochineal, madder, and Brazil-wood. A violet L. is prepared from logwood, a purple L. from alkanet. Yellow L. are prepared from Per. or Fr. berries, fustic, quercitron, weld, and annatto; the latter as well as turmeric yields an orange L. Blue L. are obtained from logwood and from indigo. Coffee and indigo furnish green L.; a kind of L. is now made by combining aniline colors with starch, or aurine with metallic oxides. C. F. CHANDLER.

Lake (GERARD), VISCOUNT, b. in Eng. July 27, 1744; entered the army in 1758; served in the closing campaigns of the Seven Years' war, in the Amer. war (1781), and in Hol. (1793-94); rose to the rank of gen.; was commander-in-chief in Ire. during the insurrection of 1797-98; defeated the insurgents, and recovered Wexford June 21; defeated the Fr. under Humbert at Killala Sept. 8; was made commander-in-chief in India in 1800; conducted the Mahratta war (1803), taking Delhi (Sept. 12), Agra (Oct. 17), and winning the victory of Laswaree (Nov. 1), which brought the Mogul emp. into vassalage to Eng., for which he was made (Sept. 1, 1804) Baron Lake of Delhi and Laswaree. He defeated Holkar near Bhurtpoor Apr. 2, 1805; returning to Eng. in 1807 was made viscount and gov. of Plymouth. D. Feb. 20, 1808.

Lake Charles, La. See APPENDIX.

Lake City, on R. R., cap. of Hinsdale co., Col. Pop. not given in U. S. census of 1880.

Lake City, on R. R., Wabasha co., Minn., 93 m. below St. Paul. The scenery on Lake Pepin is admitted to be of the most beautiful on the Upper Miss. Pop. 1880, 2596.

Lake Forest, on R. R. and Lake Mich., Lake co., Ill., 8 m. S. of Waukegan and 28 m. from Chicago; is seat of Lake Forest Coll., and has a female sem. Pop. 1880, 877.

Lake Geneva, Wis. See GENEVA.

Lake of the Woods, on the boundary between Pembina co., Minn., and the Dominion of Canada. A small detached portion of Minn. lies on its N. W. side. Its prin. affluent is the Rainy Lake River, and its waters flow N., through the Winnipeg River into Lake Winnipeg. It con-

tains many small wooded islands, a part of which are in Mimm and a part in Canada. It is about 97 ft. above the sea-level, being 598 ft. lower than Lake Itasca. Wild rice (*Zizania aquatica*) grows along its shores abundantly.

Lake Survey. The U. S. shore line of the great lakes and their connecting rivers, if measured in steps of 25 m., is about 3000 m., but if the indentations of the shore and the outlines of the islands are included, the developed shoreline is about 4700 m. in length. Where a lake is narrow and along rivers it is necessary for navigation that both shores be surveyed. This increases the actual shore-line to be covered by the survey between St. Regis and Duluth to about 6000 m. The necessity of accurate soundings and accurate charts is evident on remembering that, in the frequent storms and fogs on these lakes, vessels are never many hours from shore, and that during the summer their commerce is equal to that of all the rest of the U. S.

The first appropriation of \$15,000 was made in 1841; previous to 1862 the largest annual appropriation was \$75,000. Since that time it has varied between \$50,000 and \$175,000. The first chart was pub. in 1852. The work has been under the sec. of war, at first under the direction of the chief of topographical engineers, and since the junction of the 2 corps under the direction of the chief of engineers, U. S. A. As connected with the L. S., determinations of the magnetic elements are made at various points, the heights of the lakes above the sea are being determined, and their fluctuations are observed. The existence of solar and lunar tides in Lakes Mich. and Superior has been established, and their values determined. [From orig. art. in *J. S. Univ. Cyc.*, by GEN. C. B. CONSTOCK.]

Lake Village, on R. R. Belknap co., N. H., at the outlet of Lake Winnepesaukee, 37 m. N. of Concord. Pop. not given in census of 1870 or 1880. Is about 2300.

Lakshmi, *lakshmi*, a goddess of the Hindu Pantheon, at once the Ceres and the Venus of India, the bride of the Preserver Vishnu, who sprang in the full perfection of maidenly beauty from the foam of the sea. She is also represented as the counterpart of Vishnu, the beneficent protector and preserver. Vishnu is meaning, L. is speech. She is intellect, he is understanding. He is righteousness, she is devotion. He is Creator, she is creation. He is the male energy, she is the female. As the goddess of fertility she is widely worshipped by agricultural laborers. She is a very favorite subject of Hindu art. In painting and sculpture she is represented as a very young girl, with the full breasts of a mature matron, thus typifying budding beauty conjoined with full fertility. [From orig. art. in *J. S. Univ. Cyc.*, by R. C. CALDWELL.]

Lallemand, *lahl-mon'* (Gen. CHARLES FRANÇOIS ANTOINE), BARON, b. at Metz June 23, 1774; entered the army in 1792; was brigadier and baron in 1811, and was made lieutenant-gen. on Nap.'s return from Elba. He accompanied the emp. in the Waterloo campaign, and was sent as com. to treat for his surrender to the Eng. navy. He was sent a prisoner to Malta, and on his release went to Tur., Per., and Egypt, after which he made his way to the U. S., where he proposed to found a colony of Fr. imperialist refugees. With his brother, Baron Henri Lallemand, located a *Champ d'Aile* in Tex., then belonging to Mex., where in 1817 he assembled 150 colonists. Driven from Tex. by the Sp. authorities in Mex., L. and his companions, aided by a bountiful subscription opened in Paris, bought lands in Ala., and founded the so called *state* or *canton* of Marengo, on the Tombigbee River. L., however, took no personal part in the Marengo colony. After devising many wild projects he settled in La. in 1819, and opened a correspondence with Nap., whom he proposed to carry away from St. Helena. The ex-emp., dying in 1821, bequeathed 100,000 francs to L., but the Fr. gov't. opposed obstacles to his receiving it. In 1823 he fought in the Sp. war; went afterward to Brussels; entered Fr. without molestation; returned to the U. S., and established a school in New York. After the revolution of 1830 he was restored to his military and political honors (1832), took his seat in the chamber of peers, and was for 2 yrs. military commander in Corsica. D. Mar. 9, 1839.

La'ma, or Llana, the *Anchusia glauca*, a quadruped of the family Camelidae, an artiodactyl ungulate mammal of the Andes of S. Amer. The L. is domesticated, and employed as a beast of burden, though to a much smaller extent than in the age of the old Peruvian incas. Its flesh is eaten, and its wool is employed as a textile material.

La'maism [from Thibetan *lama*, "priest" or "lord"], the present religion of Thibet, Mongolia, and a great part of Tartary, is Buddhism modified by Shamanism and Sivaism, and containing some relics of the anc. Thibetan faith. Its chief characteristic is the worship of grand lamas, in whom Booddha is supposed to be incarnate. These priest-gods are numerous. The most important are: the *rGyeltsa Rin-po-chhi*, or *Dalai Lama*, at Liassa; the *Pan-tchen Rin-po-chhi*, at bKra-Shiss-Lhun-po, in Farther Thibet; the *Guison Tamba*, at the lamastery of the Great Kouren, on the river Toulia; the *Tchangu-Kia-Fo*, at Peking; and the *Sa-Deba-Fo*, at the foot of the Himalayas. After the grand lamas rank the *khotaktus*, or incarnations of celebrated Booddhistic saints; and next to these come the *khubilghans*, in whom dwell the souls of former founders of lamasteries. The lower classes of lamas are incarnations of nobody in particular, and gain consideration only by superior learning or talents; among them are found scholars, scribes, artists, phys. and sorcerers, prayer-makers, and artisans. The hist. of Thibetan Booddhism may be divided into 2 periods. The first began in the 7th century A. C., when King Srong-Tsan-Gambo married 2 princesses from Nepal and Chi. Both ladies brought to their new home the Booddhistic faith, to which the king became a convert. He encouraged the building of temples and colls., and Booddhism continued to flourish until the close of the 10th century, when King Langtarma nearly extirpated it. In the 11th century it was revived by learned Thibetans, and from this second period dates its

division into sects. In the 14th century Tsong-Kaba, a native of the prov. of Amdo, effected a revolution in Thibetan Booddhism. He gained a reputation for sanctity, and was joined by many lamas. The new sect spread over all Thibet and Tartary. Its founder d. in 1419.

The title of *rGyeltsa Rin-po-chhi* ("precious" or "holy majesty"), proper to the grand lama of Thibet, was given toward the end of the 15th century. The Mongols call him *Dalai Lama*. His territorial power dates from 1640. There has since then been a constant succession of Dalai Lamas. These Thibetan sovereigns have no share in secular business, which is transacted by a viceroy called *nomekhan* ("spiritual emperor") and 4 ministers chosen from the lama class. The Dalai's office is to sit cross-legged in his temple and silently receive the adoration of the faithful, toward whom he occasionally extends his hand in token of blessing. An incarnate Booddha never dies. He quits his body only, after a brief period, to enter that of a young child. A lamastery consists of numerous huts built around a temple. The lamas live according to their wealth, which is sometimes considerable. Each lama has under him one or more chabls, who act as his servants, and are instructed by him in religion and the Thibetan lang. Lamai temples are built in the Indo-Chi. style, and are adorned with paintings and sculpture. Opposite the prin entrance is a broad flight of steps surmounted by an altar, upon which are the Booddhic images. In front of the chief idol sits the living Booddha. The lamas are called to prayer by a blast blown upon a sea-shell. They enter in procession, bow before the incarnate Booddha, and place themselves in a circle according to their rank. The service is chanted, a bell is rung at intervals, there is loud music, and incense is used. Beside the *chamans*, or monk-lamas, there are hermits (*galpos*) who inhabit cells or caves. Also a large class of wandering lamas. Female lamas, or nuns, form a part of the Thibetan-Booddhic system. (See E. R. Huc, *Travels*.)

Lamar (LUCIUS QUINTUS CINCINNATUS), b. July 15, 1797; studied law at Judge Gould's Litchfield school, Conn.; admitted to the bar, removed to Milledgeville, Ga., in 1819. He was chosen by the legislature to compile the statutes of the State from 1810 to 1820. In 1830 he was elevated to the circuit court bench. The duties of this office he discharged with great dignity and ability. Universally beloved and esteemed, surrounded by a happy family, with the brightest prospects of a high career, and without any known cause, he fell, at his home in Milledgeville, by his own hand, on July 4, 1834.

A. H. STEPHENS.

Lamar, Mo. See APPENDIX.

Lamantin. See MANATEE.

Lamar (LUCIUS QUINTUS CINCINNATUS), LL.D., son of L. Q. C. Lamar, b. in Jasper co., Ga., in 1826; graduated at Emory Coll., Ox., Ga., with the highest honors; studied law, was admitted to the bar; subsequently moved to Miss. and settled at Ox. in that State; was elected to Cong. in 1856; was re-elected to Cong. (the 36th), and resigned his seat in that body after Miss. passed her ordinance of secession in 1861. At the outbreak of the war he accepted a colonelcy in the provisional army of the Confed. States, but was afterward sent on a European mission. On his entrance into Cong. in 1857 Mr. L. took a very high position as a debater and orator. In 1872 he was again elected a member of the House from Miss. to the 43d Cong. In this body his position was among the foremost. U. S. Senator from Miss. 1877-85. Became Sec. of Interior, 1885.

A. H. STEPHENS.

Lamar (MIRABEAU B.), b. at Louisville, Ga., Aug. 16, 1798; became a merchant and planter; established in 1828 a State Rights newspaper, the *Columbus Inquirer*; removed in 1835 to Tex.; was distinguished at the battle of San Jacinto; became a maj.-gen., atty.-gen. of Tex., and sec. of war; in 1836 was chosen v.-p., and was (1838-41) pres. of Tex. In 1846 he fought at Monterey and on the Comanche frontier; was appointed in 1857 U. S. minister to the Argentine Republic, and in 1858 to Costa Rica and Nicaragua. D. Dec. 19, 1859.

Lamarck, de (JEAN BAPTISTE PIERRE ANTOINE DE MONET), CHEVALIER, b. at Barentin, Fr., Aug. 1, 1744; studied at the Jesuits' Coll. at Amiens; entered the army at the age of 17, serving in the Seven Years' war, and at its close devoted himself to med. and phys. science at Paris. In 1779 he was chosen to the Acad. of Sciences; became botanist of the Jardin du Roi 1788; edited the *Dictionnaire de Botanique*, and was prof. of zoology at the museum 1794-1818. His prin. works are *Système des animaux sans vertèbres*, *Philosophie Zoologique*, in which he announced substantially what is now called the law of evolution; *Histoire naturelle des animaux sans vertèbres*, and *Traité zoologique de la Botanique*. D. Dec. 8, 1829.

La Mar'mora (ALFONSO), MARQUIS, b. at Turin in 1804; left the military acad. in 1823 with the rank of lieu. of artill.; in 1830 was struck with the Prus. military system, and on the accession of Charles Albert was intrusted with the formation of mounted batteries. In 1831 he established a school for non-commissioned artill. officers and soldiers, and between that time and 1848 visited almost every country in Europe for purposes of military study. He took part in the battles of 1848; was sent on a mission to Fr., and on his return was made minister of war. In 1849 he was sent to Tuscany to restore the grand duke; then to Genoa to suppress the republican insurrection there. In Oct. 1849, being again minister of war, he established the system of obligatory instruction in the regiments, and improved the quality of the troops. In 1854 he took command of the 15,000 troops sent to the Crimea, led them to the victory of the Tchernaya, and returned to Piedmont to resume his post as minister of war. In 1859 accompanied Victor Emmanuel to the field, and after the peace of Villafranca became pres. of the council. In 1861 was sent as minister to Prus., where he laid the foundation of the Italo-Prus. alliance, which he concluded in 1866. Sent minister to Paris in 1867, and was gov. of Rome in 1870-71. Wrote *L'opinion*. D. Jan. 5, 1878.

Lamartine, *lah-mar-tin'*, de (ALPHONSE MARIE LOUIS,

L. at Mâcon, Fr., Oct. 21, 1790. He was brought up by his mother with a delicacy and tenderness of sentiment which is reflected in the *Méditations*, his first poetical production. After the first fall of Nap. I. he took service in the body-guard of Louis XVIII. When Nap. came back from Elba L. travelled 4 yrs. in It. and along the shores of the Mediterranean. In 1820 he issued his vols. of poetry, *Les Méditations*, *Le Lac*, etc. He acted afterward as attaché to the Fr. legation at Naples, Lond., and then as *chargé d'affaires* in Tuscany. A young Eng. lady, possessed of a large fortune, became enthusiastic of L., and he married her. In 1832 he made his journey in the E., of which he wrote an account. From 1834, having been elected deputy to the Fr. Assembly, he divided his life between politics and lit. His *Hist. of the Girondists* (1846) built up his reputation as a liberal, and in 1848 he acted as the leader of the provisional govt. of the Fr. republic, in the capacity of minister for foreign affairs. After the insurrection of June 1848 he retired into private life; wrote some works, with the expectation that their sale would pay up the tremendous debt which he had incurred. But all his efforts were fruitless, and he lived almost in poverty until 1867, when the Corps Législatif voted him a large annuity. A public subscription was started after his death, and in 1874 a statue was erected to him near Mâcon, at Milly, a v. where he had spent his youth. Beside the books already mentioned, he wrote a *Hist. of the Revolution of 1848*, *Toussaint L'Ouverture*, a drama; *Graziella*, etc. D. Feb. 28, 1869.

Lamas (ANDRÉS), b. at Montevideo, Uruguay, about 1817, received an excellent education, and at an early age became distinguished both in lit. and politics. He was prefect of Montevideo during a portion of the 9 yrs. siege; minister of finance, and several times plenipotentiary to Brazil and Buenos Ayres. He has written several vols. of a vast *Collection of Memoirs and Documents relative to the Hist. and Geog. of the Rio de la Plata*, and numerous poems and historical treatises.

Lamb (CHARLES), b. in Lond. Feb. 18, 1775. His father was a servant to one of the benchers of the Inner Temple; he was ed. at the school of Christ's Hospital from his 7th to his 15th yr., Coleridge being a fellow-pupil; in 1789 obtained a clerkship in the South Sea House. In 1792 he became an accountant in the office of the E. I. Co., and remained at this post until 1825, when he retired on a pension. There was a tendency to insanity in the family, which manifested itself in Charles for a short time in 1795, and in his sister Mary the next yr., when she killed her mother with a knife. In 1797 he printed a small vol. of verses written by himself, Coleridge, and Charles Lloyd. He devoted much attention to early Eng. lit., and issued in 1807 *Tales from Shakespeare*, and in 1808 *Specimens of Eng. Dramatic Poets who lived about the time of Shakespeare*. He printed in 1801 a tragedy, *John Woodvil*, and in 1806 a farce, *Mr. H—*, which was brought out at Drury Lane. Neither of these plays had the slightest success. Several *Essays* had appeared from time to time in various periodicals, and in 1820 he began the *Essays of Elia* in the *Lond. Magazine*. In 1833 he added the *Last Essays of Elia*. After his retirement in 1825 from office-labour the remaining yrs. of his life were passed in the companionship of literary friends, and their Wednesday evening sessions at L.'s house were for several yrs. a marked feature of literary life in Lond. L., though somewhat hesitating in his speech, was an admirable entertainer, and his table-talk, of which fragments have been preserved, abounds in the rarest wit. A biography and selection from his letters was pub. by T. N. Talfourd in 1840, and his *Final Memorials* in 1848. D. Dec. 27, 1834.—His sister, MARY ANNE LAMB (b. 1765, d. May 20, 1847), possessed considerable literary talent, and took part in some of her brother's works, especially the *Tales from Shakespeare*. She resided through life with Charles, who was tenderly attached to her. PORTER C. BLISS.

Lamb (MRS. MARTHA JOANNA READE NASH), Amer. historian, daughter of Arvin Nash, b. at Plainfield, Mass., Aug. 13, 1829; residence, New York City. Mrs. L.'s first pub. works were 8 books for children. Wrote a series of historical sketches and papers, and many important illustrated articles, "Lyme," the birthplace of Chief-Justice Waite; "Newark, N. J.," the "Tombs of Old Trinity," etc. Her chief work has been a comprehensive *Hist. of the City of New York*. She was ed. of *The Homes of Amer.*, and in 1883 became ed. of *Magazine of American History*.

Lambert (DANIEL), b. at Leicester, Eng., Mar. 13, 1769, was remarkable for his great size; he attained in 1793 a weight of 448 lbs., and ultimately 739 lbs. He was only 5 ft. 11 inches in height. D. June 21, 1809.

Lambert (JOHN), b. at Kirkby Malhamdale, Eng., Sept. 7, 1619; studied law, and on the outbreak of the great rebellion entered the Parliamentary army as capt.; was conspicuous in the prin. battles of the war; col. at Marston Moor (1644) and maj.-gen. in the Scots war (1650); was appointed lord deputy of Ire. in 1652; a member of Cromwell's council and Parl. (1654); and aided Cromwell to become Protector, but opposed his assumption of sovereign power in 1657, and was dismissed with a pension. On the accession of Richard Cromwell in 1658, L. headed the confederacy of military commanders which deposed that feeble ruler. In May 1659 he was chiefly instrumental in the reinstallation of the "Rump Parliament," defeated the royalists at Chester in Aug., and forcibly dispersed the Rump in Oct., thereby becoming virtual ruler of Eng. He started with an army to oppose Monk (Nov.), but the troops deserting he was seized by order of Parl. (Jan. 1660) and cast into the Tower, whence he escaped and reassembled forces against Monk; but being captured a second time he was tried and condemned to death (June 1662) by the new court of king's bench under Charles II., but his sentence was commuted to banishment. D. 1692.

Lambertville, city and R. R. junc., Hunterdon co., N. J., 14 m. above Trenton and 44 m. from Phila. It has excellent water-power. Pop. 1870, 3842; 1880, 4183.

Lambèse, small town of Algeria, in the prov. of Constantine, is used by the Fr. as a penal colony. It stands on the site of the anc. *Lambesie*. Ruins of an amphitheatre, a temple of Esculapius, and a wall with 40 gates are extant.

Lambruschini, lah-mroos-kee-ne (RAFFAELLO), ABBÉ, b. at Genoa in 1788; passed some yrs. at Rome in the study of theol., after which he returned to his father in Tuscany, to devote himself to agricultural and philanthropic pursuits. The habit of training plants suggested to him the true method of training men, and he established a boarding coll. for boys at his villa. In 1836 he took the direction of *La Guida dell' Educatore*. In 1848 he was elected deputy to the Tuscan assembly. In 1849 issued his *Libri della Educazione*, then his *Dialoghi sulla Istruzione*. In 1859 he was made inspector-gen. of the schools in Tuscany, afterward of all the elementary schools of the kingdom, and supt. of the *Istituto di Studi Superiori*, in which he was prof. D. 1873.

Lamennais, lah-mā-nā', de (HUGUES FÉLICITE ROBERT), ABBÉ, b. at St. Malo, Fr., June 19, 1782; received the tonsure in 1811, and took holy orders in 1817. He thought that lack of true religion was the cause of all the troubles from which the age suffered, and that the regeneration of the time depends on a religious revival. The first work in which he set forth his idea with full power was his *Essay sur l'Indifférence en Matière de Religion*, a brilliant apology for the Ch. and the monarchy. In his next following works, this idealization of the existing Ch. and monarchy developed into a tendency toward reform of both, and after the revolution in 1830 he openly broke with the old monarchy, and tried in his journal, the *Avenir*, to establish an alliance between the Ch. and the free constitutional govt. He was immediately denounced at Rome, and the pope condemned in 1832 the views set forth in the *Avenir*. At first he submitted to the papal condemnation, and the *Avenir* was suspended. But after a yr.'s silence he wrote his *Paroles d'un Croquant*, which was translated into all European langs. The pope condemned it, and L. answered by his *Affaires de Rome* (1836). By these 2 books he broke absolutely with the Ch., and in his subsequent works (*Du Pussé et de l'Avenir du Peuple*, etc.) he appeared as the apostle of the democracy. In 1849 he was a member of the Constituent Assembly; after the *coup d'état* he lived in absolute retirement. D. Feb. 27, 1854.

Lamentations, Book of, a canonical book of the O. T., following the book of Jer., and generally ascribed to that prophet. It consists of 5 chaps., each composed of 22 verses (except the 3d, which has 66), according to the number of letters in the Heb. alphabet, and is an acrostic, each verse beginning with a distinct letter. The contents are a series of dirges upon the downfall of Israel.

Lameth, lah-mā', de (ALEXANDRE THÉODORE VICTOR), COUNT, b. at Paris Oct. 28, 1760, was one of 3 brothers who figured in Fr. politics during and subsequent to the Revolution. After serving in the Amer. war of independence on the staff of Rochambeau, he became a col. in 1785, and was elected a deputy to the States-General in 1789, taking part in the destruction of the privileges of the nobility and clergy; was chosen pres. of the National Assembly Nov. 20, 1790; afforded protection to Louis XVI.; was a member of the constitutional committee; had frequent conflicts with Mirabeau, and opposed Robespierre and the Jacobins. On the outbreak of war with Aus. (1792), he served as field-marshal; was accused by the Assembly, together with La Fayette; escaped from Fr., was seized by the Aus., and imprisoned 3 yrs.; repaired to Eng. in 1795, but being ordered to leave the country, joined his brother Charles at Hamburg, opening there a commercial house. Under the consulate and empire he was prefect of several depts.; was appointed lieutenant-gen. by Louis XVIII. in 1814, and was a leader of the opposition in the Chamber of Deputies. He wrote a *Histoire de l'Assemblée constituante*. D. Mar. 18, 1829.

Lameth, de (CHARLES MALO FRANÇOIS), COUNT, brother of the preceding, b. at Paris Oct. 5, 1757; served as capt. on the staff of Rochambeau in the Amer. Revolutionary war; was wounded at Yorktown, and promoted to be col. His career was singularly like that of his brother; like him, he was at one time (July 5, 1791) chosen pres. of the National Assembly, served as field-marshal, had to flee after the events of Aug. 10, 1792, and settled at Hamburg. From 1809 to 1814 he served in the army under Nap., obtaining the rank of lieutenant-gen. After the Restoration he lived in privacy until elected to the Chamber of Deputies in 1829, and co-operated in the revolution of 1830. D. Dec. 28, 1832.—His elder brother, COUNT THÉODORE, b. at Paris June 24, 1756, also served in Amer.; was a deputy and a field-marshal, but took little part in politics. He wrote a biography of his brothers. D. Oct. 19, 1854.

Lamina'ria [Lat.], a genus of sea-weeds, of which *L. digitata*, *bulbosa*, and *saccharina*, all deep-sea plants, are prized in Europe for the rich supply of iodine afforded by them when burned as kelp. The stem of *L. digitata* (sea-tangle, girdle) is manufactured into bougies and uterine tents for surgeons' use.

Lammas Day, the festival of St. Peter's chains (Aug. 1), so called because it was a practice to make an offering of bread as the first fruits of the yr.: "loaf-mass," corrupted to Lammas.

Lammergeyer, lam-mer-gi'er [Ger. "lamb-vulture"], called also **Griffon** and **Bearded Vulture**, the *Cypæus barbatus*, one of the largest, perhaps the largest, of the birds of prey (since the condor has by recent authors been described as rather inferior to the L. in size), an Old-World bird, a vulture in appearance but an eagle in habits, rarely feeding upon carrion. It is a strong and bold hunter, sometimes reaching 10 ft. in expanse of wing.

Lamorière, lah-mo-re-se-air', de (CHRISTOPHE LOUIS LÉON), b. at Nantes Feb. 6, 1806; was a pupil of the Polytechnic School; entered the army, took part in the campaigns in Algeria, and captured Abd-el-Kader in 1847. After the revolution of 1848 he was elected to the National Assembly, and fought against the Paris insurgents; was ap-

pointed minister of war June 28, 1848, but resigned on the election of Louis Nap. as Pres., and in the Assembly opposed the Bonapartist policy. On the night of the coup d'Etat, Dec. 2, 1851, he was sent as prisoner to the fortress of Ham, and thence exiled from Fr. In 1860 he commanded the papal troops, but was defeated at Castelfidardo; having been pardoned by Nap. III. he returned to Fr. D. Sept. 10, 1865.

Lamotte, de (ANTOINE HODDARD, b. at Paris in 1672; studied in a Jesuit coll.; obtained success in writing operas, and with 4 tragedies, of which *Leucade* has maintained a place on the Fr. stage. He became blind at 40; was admitted to the Acad. in 1710; was dramatic censor. He wrote many fables, odes, and eclogues, and brought out an "improved and corrected" *Iliad* in Fr. verse. D. 1731.

Lamotte, de (JEANNE DE LUZ DE SAINT REMY DE VALEIS), COUNTESS, b. at Fontèze, Fr., July 22, 1756; was ed. by the countess of Boulainvilliers, and received a pension of Louis XV. on account of descent from house of Valois. After marrying count de Lamotte, a penniless adventurer, she settled in Paris about 1780, and soon began the intrigue with Cardinal Rohan which became famous under the name of the "necklace story." It ended with her conviction May 31, 1785. She was whipped, branded, and put in the Salpêtrière. In 1787 she escaped to Lond. D. Aug. 23, 1791.

Lampasas, TEX. SEE APPENDIX.

Lamp/black. This term is applied technically to carbonaceous pulverulent matters deposited during the imperfect fuliginous combustion of carburetted gases or vapors, in the presence of inadequate supply of air or oxygen. The quality, both as regards fineness and color, for use in pigments, blacking, and printing inks, varies greatly with the materials burned in the manufacture and with the methods employed. For the cheaper commercial qualities the materials employed are gas-tar, wood-tar, petroleum, soft resinous woods like pine, pitch, gum, and even bituminous coals. For special uses L. of special kinds are sometimes prepared from costly oils and resinous substances, for which extravagant prices are required. For instance, it is said that the finest genuine India inks are made of soot obtained by burning the costly material camphor. The natural gas of the gas-wells in different sections of the U. S. is converted into fine qualities of L. on a large scale. L. in crude form always contains some oily, tarry, or resinous matters, and sometimes, according to Reichenbach, a little naphthalene. When printer's inks or oil colors are to be prepared, these impurities are immaterial, but when water-colors are wanted, as when to be ground with gum-water to make imitation India inks, etc., the resinous and tarry matters must be removed beforehand. This may be done by careful calcination, but not without detriment to the quality of the finer blacks. A better way, therefore, is to work into a paste with heated oil of citrid, which chars and destroys the hydrocarbonaceous matters. Thorough washing with water yields then a very superior material for India ink. [From *art. and. anal.*, in *Chem. Mag.*, by HENRY WERTZ, Ph. D.]

Lamprey, or Lamp, **Eel**, the common name of the Petromyzontida, cartilaginous fishes of the group Hyperoartia, class Marsipobranchii, having an eel-like body, a round sucking mouth with numerous teeth, and having 7 round gill-holes on each side of the neck. Europe has 2 abundant species; the U. S. has a number of species. The L. are represented in Australia by the pouched L., which has an enormous pouch upon the throat.

Lamp-shell, a name applied in a large sense to all the Brachiopoda, but especially to those of the family Terebratulidæ. The valves are united, and the pedicle for attachment passes out through a foramen of the projecting one, as the wick passed out of an anc. lamp; hence the name. Shells of several species of mollusks are also used as lamps, as the *Fusus antiquarius* in Sicily. THEODORE GILL.



Lamps, Safety. SEE SAFETY LAMPS.

Lanark, on R. R., Carroll co., Ill., 21 m. S. W. of Freeport. Pop. 1870, 972; 1880, 1158.

Lancaster, Ky. SEE APPENDIX.

Lancaster, on R. R. and Conn. River, cap. of Coos co., N. H., 27 m. N. of Concord. Pop. 1880, 1400.

Lancaster, city and R. R. centre, cap. of Fairfield co., O., on the Hooking River, 21 m. N. E. of Circleville and 30 m. S. E. of Columbus; has a fine c-h., and near by is the State reform farm for boys. Pop. 1870, 4725; 1880, 6803.

Lancaster, city and important R. R. centre, cap. of Lancaster co., Pa., 68 m. W. of Phila. was in 1818 the largest inland town in the U. S. It was at one time the cap. of Pa., and when the Brit. troops occupied Phila. the Continental Cong. met here. It has a c-h., a hospital, almshouse, prison, and a home for friendless children. It is the seat of Franklin and Marshall Coll. and Theological Sem., under the control of the Ger. Reformed Ch. Pop. 1870, 20,233; 1880, 25,760.

Lancaster, city, on R. R., cap. of Grant co., Wis., 25 m. N. W. of Galena, Ill., and 20 m. N. of Dubuque, Ia. Pop. 1880, 1069.

Lancaster, DUCHY and COUNTY PALATINE OF, a territorial division of Eng. nearly corresponding to the co. of Lancashire, but distinguished from it in law as a separate administrative entity. It derives its origin from a royal charter of Edward III.: became a Crown possession on the accession of Henry IV. to the throne in 1399, at which time the order of succession to the duchy was declared to be independent of the succession of the Crown. On the accession of the house of York in 1461, Edward IV. confiscated it to the Crown. The result has been that down to the present time the govt. of the duchy has been vested in the sovereign as duke of L.

Lancaster (SIR JAMES), b. in Eng. about 1550; commanded 2 naval expeditions to the E. I. in 1591 and 1601, which opened trade with Ceylon, Sumatra, Java, and other islands, and was largely concerned in promoting the search after a N. W. passage to Asia. Lancaster Sound was named from him. D. 1620.

Lancaster (JOSEPH), b. in Lond. Nov. 1778, opened a school for children in 1798 on the principle of mutual instruction, and devoted himself to the popularization of his method. He came to the U. S. in 1818, where he had some success, and obtained from the legislature of Canada a grant for the purpose of establishing his system of instruction. He was a Quaker. D. Oct. 24, 1838.

Lancaster Gun, devised by Mr. Lancaster, an Englishman, had a twisted elliptical bore and an elongated elliptical shot, but the gun never.

Lancaster, House of. SEE ENGLAND, JOHN OF GALENT, HENRY IV., etc.

Lancaster Sound leads from Baffin's Bay to Barrow Strait, between N. Devon on its N. side and minor islands on its S. It is 250 m. long, forms the entrance to the N. W. passage, and was discovered in 1616 by Baffin.

Lance wood, the wood of *Quercus virgata* and *laurifolia*, W. I. anacaceous trees, used (especially the former) for the shafts of carriages.

Land-crab, a name applied to a rather large number of tropical crabs, remarkable as being gilled animals, which in the perfect state are air-breathers. In the U. S., *Gelasimus rostratus*, or fiddler, distantly represents them.

Land'er (FREDERIC WEST), b. at Salem, Mass., Dec. 17, 1822; studied at the Military Acad. at Norwich, Vt., and conducted 2 perilous surveys for a R. R. to the Pacific, being the only survivor of the second expedition. In May 1861 he was appointed a brig.-gen., and distinguished himself in the Va. campaigns. D. Mar. 2, 1862.—His wife, JEAN MARGARET DAVENPORT, b. in Wolverhampton, Eng., May 3, 1829, was a distinguished actress previous to her marriage in 1860; acted as a hospital nurse during the war, and in 1865 returned to the stage.

Landit', a celebrated historical *foire*, or fair and market, which was the type of those of the same kind so numerous in the Middle Ages, and which are now continued in Fr. only by the famous *foires* of Beaucaire and the ham and gingerbread fairs held in Paris during the weeks preceding and following Easter. The name *landit* is a corruption of *Lundi*, Monday; for the L. fair opened both in Paris and in St. Denis on the first Monday after the 11th of June, St. Barnabas's day.

Land Law and Ownership, U. S. SEE APPENDIX.

Land'or (WALTER SAVAGE), b. at Ipsley Court, Eng., Jan. 30, 1775; studied at Rugby school; was rusticated from Trinity coll. in 1794 and never returned; pub. poems 1795 and 1798; volunteer in Peninsular war, with rank of col., 1806; settled in Florence 1815; pub. Latin poems 1820-24, and his chief work, *Imaginary Conversations of Literary Men and Statesmen*, 1824-26. D. Sept. 7, 1864.

Land'scape Gardening is a branch of horticulture, the highest results of which may be attained by processes of a comparatively simple character. This article will be chiefly given to establishing the definition and limitation of the gen. end proper to the art.

There are 2 other branches of horticulture, which are often confounded with that of L. G. One of them is the cultivation of plants with special regard to an interest in their distinctive individual qualities; the other is the cultivation of plants with a view to the production of effects on the principles commonly studied in the arrangement of precious stones, etc. in jewelry, or of flowers when arranged for decoration. We now turn to consider what the leading motive of L. G. may be.

Derivatively, the word "landscape" applies only to such a scene as enables the observer to comprehend the shape of the earth's surface far before him. Consistently with this view, it will be found that those scenes which would be most unhesitatingly classed as landscapes are distinguished by a certain degree of breadth and distance of view. It will also be found that in each of those scenes there is a more marked subordination of various details to a characteristic effect of the scene as a whole. But there are many situations where the area to be operated upon is so limited, or so shaped and circumstanced, that the depth and breadth of a landscape scene must be considered impracticable of attainment. As a gen. rule, so many purposes require to be served, that the only rule of art that can be consistently applied is that of architecture, which would prescribe that every plant, as well as every moulding, shall bear its part in the "adornment of a service." But it may happen that where there would be scant space for more than 2 or 3 middle-sized trees to grow, there will be yet room for a great deal of careful study and of success in producing effects. As an example, suppose a common dooryard, in which are found a dozen trees of different sorts planted 20 yrs. before, and that among them, standing a little way from the centre, is our linden (*T. heterophylla*). Trampled under and half starved, youth may yet have left it in such condition that, all the rest being rooted out, sunlight given, watered, drained, guarded from insidious enemies, its twigs will grow long, delicate, and plant, its branches low and trailing, its bark become soft, its upper leaf-surface like silk, and it will also acquire a stateliness of carriage unusual in a tree of its age and stature. If L. G. is for the time to take its order from this princess of the fields, the original level surface of the ground need be but slightly modified, yet it may perceptibly fall away from near her. There cannot be too much pains taken to spread over it a velvet carpet of perfect turf. Looking from the house, it should seem to be margined on all sides by a thick bank, generally low in front, and rising as it recedes, of shrubs and flowering plants. A very few plants of delicate character may stand out in advance. Of further details of art-

ficial ornaments there must be next to none. The fence will best be a wall of cut stone, with decorated gate-piers; or with a base of stone it may be of iron touched with gilt. The gateway being formed in a recess of the fence nearly opposite the tree, the house-door being on the side, the approach to it will bend in such a way as to seem to give place to the tree, and at the same time allow the greatest expanse of unbroken lawn-surface. Near the gateway, and again near the corner farthest from it, there may be a small tree or a cluster of small trees or large shrubs, forming low, broad heads. If there is a tall building over the way with signs, or which otherwise offends, and the sidewalk space outside admits, we will plant upon it 2 trees only, adjusting them, as to both kind and position, so that they will almost repeat the depressed line of the nearer foliage, at no greater distance than is necessary to obscure the building.

But suppose it to be an aged beech that we have found, storm-bent, lop-limbed, and one-sided; its trunk furrowed, patched, scaly, and spreading far out to its knotted roots. If we had wanted a fine dressy place, this would have been cut away though it were the last tree within a mile; and nothing can be less like L. G. than to attempt to make a smooth and even surface under it. Let it be acknowledged that there should be some place before the house of repose for the eye, and that nowhere can we risk danger of a dusty or a muddy surface. Starting from the corner nearest the tree, and running broader and deeper after it has passed it, there shall be a swale of cleanly turf. Now, to carry this fine turf right up over the exposed roots of the beech would be the height of L. G. indelicacy; to let it come near would be a barbarism. What is required is a management under which the turf in rising from the lower and presumably more humid ground shall become gradually thinner and looser, and at length darning with moss, and finally patched with tufts of clover and locks and mats of loosestrife, liverwort, and dog-tooth violets; even plantain and sorrel may timidly appear. The surface of the ground will continue rising, but with a broken swell toward the tree, but nowhere will its superior roots be fully covered.

Suppose that we are to come to this house from the side opposite to where the beech stands; our path then shall strike in well over on that opposite side and diagonally to the line of the road. Slanting and sagging off from a ring-bolt in the porch there is to be a hammock slung. There shall be a seat, too, under the tree, of stout stuff, deep, high-backed, armed, fitted by jointing. It may even be rough-hewn, and the more checked, weather-worn, and gray it becomes, without dilapidation or discomfort to the sitter, the better. We will have nothing in front to prevent a hedge, but must that mean a poor pretence of a wall in leafage? Perhaps it must have that character for a few yrs. till it has become thick and strong enough at bottom, and always it may be a moderately trim affair on the roadside. But its bushes shall not be all of one sort, and in good time they shall be bushes in earnest. Yet from the house half their height shall be lost behind an under and outgrowth of brake and bindweed, dog-rose, etc. Here and there a spray of low brambles shall be thrown out before all, and the dead gray canes of last yr. shall not be every one removed. Inside the gate, by the pathside, and again down by the porch, there may be cockscobs, marigolds, pinks, and pansies. But nothing of plants tied to the stake; above all, no priggish little spruces and arbutovites. Finally, let the roadside be managed as before. Then, if the gate be left open, not much will be lost by it. Yet from the porch, the window beyond, or the old seat under the tree there will be nothing under view that is raw or rude or vulgar; on the contrary, there will be a scene of much refinement as well as of much beauty.

The same will be equally true of the result of the very different kind of gardening design first supposed. We come thus to the question, What is the distinctive quality of this beauty? In each case there has been an ideal in view, and in each element introduced a consistent pursuit of that ideal, but it is not in this fact of consistency that we find the beauty. We term it landscape beauty, although there is none of the expanse which is the first distinguishing quality of a landscape. This brings us to the consideration that from the point of view of art or of the science of the imagination we may ask for something more in a landscape than breadth, depth, composition, and consistency. Landscapes of particular type associate naturally and agreeably with certain events. Their fitness in this respect is due to the fact that, through some subtle action on the imagination, they affect the same or kindred sensibilities.

The merit of L. G. consists largely in the degree in which their designer has been inspired by a spirit congenial to elements of locality and occasion which are not, strictly speaking, gardening elements. The grounds for an ordinary modest home, for instance, may desirably be designed to give the house, gardens, and offices an aspect of retirement and seclusion. The grounds of a great public building will, on the other hand, be desirably as large in scale, as open, simple, and broad in spaces of turf and masses of foliage, as convenience of approach will allow, and every tree arranged in subordination to and support of the building. The site and plan of no building can be judiciously determined except in connection with a study of the leading features of its approaches and grounds. Also in the design of roads, walks, lakes, and bridges, of the method of dealing with various natural circumstances, as standing wood, rocks, and water; in a determination of what is possible and desirable in respect to drainage, water-supply, distant prospects to be opened or shut out, the avoidance of malaria and other evils—all these and many other duties are necessarily intimately associated with those of gardening (or the cultivation of plants) with a view to landscape effects.

From orig. art. in J's Univ. Cyc., by FREDERICK LAW OLNEY.

Land'seer (CHARLES), b. in 1799; studied in the schools

of the Royal Acad., and exhibited in 1828; was chosen an associate in 1837, a member in 1845, and keeper in 1851. He was a painter of historical pieces. His *Pandering of Basing House*, *Charlotte Harlowe in Prison*, *The Departure of Charles II. in Disguise*, etc. are well known. D. July 22, 1879.

Landseer (Sir EDWIN), younger brother of Charles, b. in Lond. in 1802; excelled while a boy in the painting of animals; became a student of the Acad. in 1816; began to exhibit when only 14 yrs. old. In 1820, at the suggestion of Haydon, he took advantage of the death of a lion at Exeter Exchange to study the anat. of the animal, and subsequently he painted *The Lion Resting*, *The Lion Disturbed*, *Van Amburgh and the Lions*. The 4 bronze lions at the base of the Nelson Monument in Trafalgar Square were his work. L. was beyond question the greatest animal painter of his time as respects anatomical truth, vigor of treatment, and power of characterization. He was elected an associate of the Royal Acad. in 1836, and a member in 1831. In 1850 he received knighthood from the queen. D. Oct. 1, 1873.

Landseer (THOMAS), A. R. A., elder brother of Edwin and Charles, an engraver of ability and repute. The plate of Rosa Bonheur's *Horse Fair* gave him fame. D. Jan. 20, 1880.

Lands'hut, a quaint old town of Bavaria, cap. of the dist. of Lower Bavaria, on the Isar. It has large breweries and manufactures of tobacco, and many interesting buildings, among which are St. Martin's ch., built in 1450; the old castle, built in 1232; a royal palace, with beautiful frescoes. Pop. 14,141.

Land'slip, a sort of avalanche of earth and rocks from the sides of mts. or hills. Earthquakes, frost, and the action of water are causes. Soils resting on inclined planes of smooth rock or upon beds of loose gravel are liable to slide *en masse* during long continued rains. Elevated peat-swamps have been known to absorb so much water as to burst and deluge lower regions with torrents of mud. Underlying strata of clay may become liquefied and gush out, leaving the surface to topple in.

Lane (EENEZER), LL.D., b. at Northampton, Mass., Sept. 17, 1793, grad. at Harvard in 1811; studied law; removed in 1817 to O., and in 1822 became a resident of Sandusky. He was 1824-30 a judge of the common pleas; of the State supreme court 1830-37; chief-justice 1837-45, and afterward a R. R. manager. D. June 12, 1866.

Lane (Rev. GEORGE W.), b. in Wilkesbarre, Pa., Jan. 15, 1815; was licensed to preach in Ga. in Mar. 1834; was classical teacher in the manual labor school near Covington, Ga., and then, for 10 yrs., prof. of langs. in Emory Coll. D. Sept. 21, 1848.

Lane (HENRY S.), b. in Montgomery co., Ky., Feb. 24, 1811; was admitted to the Ind. bar; was in Cong. 1841-43; lieut.-col. of volunteers in the Mex. war; chosen U. S. Senator in 1859, but unseated; elected gov. of Ind. 1861; U. S. Senator 1861-67. D. June 18, 1881.

Lane (JAMES HENRY), b. at Lawrenceburg, Ind., June 22, 1814; was admitted to the bar in 1840; enlisted in the 3d Ind. Volunteers in 1846 as a private, but became a col., and at Buena Vista commanded a brigade; was 1847-48 col. of the 5th Ind. In 1848 he was chosen lieut.-gov.; was in Cong. 1853-55; removed in 1855 to Kan.; was a member of the first Free State govt.; was pres. of both the Topeka and the Leavenworth (1857) constitutional conventions, and maj.-gen. of the Free State forces. In 1856 he was chosen by the Free State legislature as U. S. Senator, but was not allowed a seat, and in the same yr. was indicted for high treason and compelled to flee. In 1858 he was indicted and tried for murder, but was acquitted. In 1861 and 1865 he was sent from Kan. to the U. S. Senate. He served for some time in the c. war as a brig.-gen. of volunteers. In 1866 he received a paralytic stroke, and took his own life July 11, 1866.

Lane (Rev. JOHN), b. in Va. Apr. 8, 1789; entered the ministry in the S. C. M. E. conference in 1814, and in 1816 became a pioneer of Methodism in Miss. He was also a probate judge in Warren co. D. Oct. 10, 1855.

Lane (JOSEPH), b. in Buncombe co., N. C., Dec. 14, 1801; removed in youth to Ind., where he engaged in mercantile pursuits and in politics; served as col. of volunteers in the Mex. war, and was made a brig. and brevet maj.-gen.; became in 1848, and again in 1853, gov. of Or. Terr.; was a delegate in 1851-59, U. S. Senator 1859-61; in 1860 was nominated for V.-P. on Breckenridge ticket. D. Apr. 19, 1881.

Lane (Sir RALPH), b. in Eng. about 1530; entered the service of Queen Elizabeth in 1563 as quarry; served in the rebellion of 1569, and in Ire. in 1583-84, and was appointed by Sir Walter Raleigh, in Feb. 1585, gov. of Va. He abandoned the prov. in the following yr., returning to Eng. with Sir Francis Drake; was col. in Drake's expedition against Port. in 1589; wounded in an Irish campaign in 1591, knighted in 1593. D. 1604.

Lanesborough, on R. R., Fillmore co., Minn., 50 m. W. by S. of La Crosse, Wis. Pop. 1870, 655; 1880, 1032.

Lan'franc, b. at Pavia, It., about 1005; studied at Bologna, and taught jurisprudence and dialectic at Pavia; removed to Fr., and probably in 1039, settled at Avranches; entered the Benedictine abbey of Bec 1042; was made prior in 1046; took part 1050-69 in the controversy with Berengarius; became abbot of Caen 1066, and was appointed abp. of Canterbury by William the Conqueror 1070. He was one of the founders of scholasticism. His most important existing works are *De corpore et sanguine Domini* and commentaries on the Pauline Epistles. D. May 24, 1089.

Lanfrey (PIERRE), b. in 1828 at Chambéry, Savoy, then a part of the kingdom of Sard. His father was a Frenchman who had been a military officer under the empire. Pierre entered the Jesuit coll. at Chambéry, but left on account of having written a pamphlet against his instructors, and completed his studies at the Collège Bourbon in Paris, where he qualified for the bar, but afterward turned his attention to philosophical and historical studies. His first work, *The Ch. and the Philos. of the Eighteenth Century*, made a considerable sensation, which was deepened by *An Essay*

on the Fr. Revolution, *The Political Hist. of the Popes, Political Studies and Portraits, and The Restoration of Poland*. In 1867 he commenced the publication of a *Hist. of Nap. I.* He served in the *mutilles* of Savoy during the Franco-Ger. war, was elected to the National Assembly in Feb. 1871, and in Oct. was appointed by Thiers minister to Switz., but resigned in 1873; elected life senator in 1875. D. Nov. 15, 1877.

Langdale (SIR MARKADKE), b. in Eng. about 1500; was sheriff of Yorkshire in 1642; embraced the Royalist cause, and became one of the bravest gens. of Charles I., defeating the Scotch at Corbridge and raising the siege of Pontefract Castle (1644); commanded at the battle of Naseby June 14, 1645; joined Montrose; was defeated; escaped to the Isle of Man; went thence to the Continent; joined the Scotch royalist army in 1648; took Berwick by surprise (May); defeated by Cromwell at Preston (Aug. 17); captured and imprisoned in Nottingham Castle; escaped to Flanders; was made baron by Charles II.; was lord lieut. of Yorkshire on the Restoration in 1660. D. Aug. 5, 1661.

Langdell (CHRISTOPHER COLUMBS), LL.B., b. in Hillsborough co., N. H., May 22, 1826; entered Phillips Exeter Acad. in 1845, and Harvard Coll. in 1848; left coll. to pursue teaching in 1849, and did not graduate with his class; in 1850 began the study of law, and attended Harvard Law School in 1851. At the annual commencement in 1853 he received the degree of LL.B.; removed to New York, where he practised law until he was appointed Dane prof. of law in Harvard Univ. He was appointed dean of the law faculty at the beginning of the academic yr. of 1870-71.

Langdon (JOHN), LL.D., b. at Portsmouth, N. H., in 1741; became a successful merchant. In 1774 he assisted in securing for the colonies the ordnance stores in the fort near Portsmouth. In 1775 he was sent to the Cong. In 1776 he became navy agent, speaker of the N. H. assembly, and judge of the common pleas. He gave the money with which Stark's brigade was equipped, and in person commanded a company at Bennington, Saratoga, and elsewhere. In 1779 he was pres. in the N. H. convention and Continental agent. In 1789 he was sent to Cong., and was afterward more than once speaker in the N. H. legislature. He was pres. of N. H. in 1785, and in 1787 was in the convention which drafted the Federal const. In 1788 he was gov., and again in 1805-09 and 1810-12. He was a U. S. Senator 1789-1801, and declined the secretaryship of the navy and the Vice-Presidency of the U. S. D. Sept. 18, 1819.

Langdon (SAMUEL), D. D., b. in Boston Jan. 12, 1723, and grad. at Harvard in 1740. He became master of a gram. school at Portsmouth, N. H.; was a chaplain in the Louisburg expedition 1745; assistant minister and afterward (1747-74) pastor of the First Congl. ch. at Portsmouth; pres. of Harvard Coll. 1774-80, and afterward a minister at Hampton Falls, N. H. He was prominent in the public affairs of the State, and put forth many sermons and several vols. upon theological and religious subjects. D. Nov. 29, 1797.

Langdon (WOODBURY), brother of John Langdon, b. at Portsmouth, N. H., in 1739; served in Cong. 1779-80; judge of the N. H. supreme court 1782, and again 1786-90, and held other public offices. D. Jan. 13, 1805.

Lange (JOHANN PETER), b. Apr. 10, 1802, at Sonnborn, Prus.; acquired his first education by his own energy; attended for a yr. and a half the gymnasium of Düsseldorf; studied theology at Bonn; preached in several places, and was appointed prof. of theol. at Zurich in 1841, and in 1854 at Bonn. His *Leben Jesu, Christliche Dogmatik, und Apostolische Zeitalter* exercised a widespread influence. Of his *Theologisch-homiletische Bibelwerk* an Eng. edition has been prepared under the title of *Lange's Commentary*, by Prof. Philip Schaff, LL.D.

Langensalza, town of Prus., in the prov. of Sax., numbering 10,538 inhabitants; was several times the theatre of battles. On Feb. 15, 1761, the allied Prus. and Eng., under Sydow and Spörcken, defeated the Gers. under Steinville; Apr. 17, 1813, the Prus. defeated the Bavarians; June 27, 1866, the Prus. defeated the Hanoverians.

Langeron, lonzh-rôn', de (ANDRAULT), COUNT, b. at Paris Jan. 13, 1763; served in Amer. as sub-lieut. during the closing yr. of the war of the Revolution; rose to be col. in 1786; emigrated from Fr. at the outbreak of the Fr. Revolution; took service in Rus. in 1790, first against Swe. and afterward against Tur. (1790-91); was with the Aus. forces in the invasions of the Low Countries and of Fr. 1792-94; returned to Rus., and rose to the rank of lieut.-gen. and count (1799); commanded a Rus. division at Austerlitz, and on the Danube in the Tur. war from 1807 to 1812; bore a distinguished part in resisting Nap. in the invasion of Rus. (1812-13), in the victory of Leipsic (Oct. 18), and the advance upon Paris (1814); was gov.-gen. of New Russia in 1822; served in Tur. war 1828-29. D. July 4, 1831.

Langevin (HECTOR LOUIS), C. B., b. at Que. Aug. 15, 1820; was ed. at the Que. Coll. and in Montreal; became an advocate in 1850; was for a time a journalist in Montreal, and afterward in Que.; was mayor of Que. 1857-60, and a member of the Provincial Parl. 1858-66. In 1864 he became solicitor-gen., and in 1866 P. M.-gen. He was (1866-69) sec. of state in the Dominion cabinet, and 1869-72 minister of public works.

Langham, de (SIMON), CARDINAL, b. probably at Langham, Eng., about 1310; became a monk in Westminster in 1335, prior and abbot in 1349, high treas. of Eng. 1360, bp. of Ely 1362, chancellor 1363, and abb. of Canterbury by papal provision July 22, 1366. He removed Wycliffe from the wardenship of Balliol Coll., Ox., in which he was supported by Pope Urban V., who signaled his approval by making L. a cardinal-presbyter (1368), while the king, Edward III., was favorable to the Reformer. The new cardinal was forced to resign his archbishopric (Nov. 1368), and retired to Avignon, where he became a trusted counsellor of Pope Gregory XI. D. July 22, 1376. After the accession of Richard II. his remains were removed to Westminster Abbey in 1379.

Langhorne (JOHN), D. D., b. at Kirkby-Stephen, Eng.,

in Mar. 1735; entered Clare Hall, Cambridge, in 1760; became curate of St. John's, Clerkenwell, and of Blagden, Somersetshire, and was some time assistant preacher of Lincoln's Inn. In 1768 he removed to Folkestone, where his brother William was perpetual curate, and with him made a translation of Plutarch's *Lives*. He wrote many poems, tales, and sermons, and in 1777 became prebend in the cathedral of Wells. D. Apr. 1, 1779.

Langston (JOHN MERCER), LL.D., b. at Louisa C.-H., Va., Dec. 14, 1829. By birth a slave, he was emancipated when 6 yrs. old; ed. at Oberlin Coll., where he grad. in 1849, and from the theological dept. of the same coll. in 1853; studied law, being admitted to the O. bar in 1854; pursued his profession for 13 yrs. in O., when he was made prof. in the law dept. of the Howard Univ. at Wash.; became dean of the faculty, and in 1873 v.-p. and acting pres. of the univ.; was appointed in 1871 a member of the board of health of D. C., of which in 1875 he was elected sec. Author of addresses and papers upon political, biographic, literary, and scientific subjects.

Langstroth (LORENZO LORRAINE), b. at Phila. Dec. 25, 1810, grad. at Yale 1831; tutor there 1834-35; pastor of the S. Congl. ch., Andover, Mass., 1836-39; prin. of Abbott Female Sem., Andover, 1838-39; of Greenfield (Mass.) High School 1839-43; pastor of Second Ch., Greenfield, 1843-48; prin. of a young ladies' school, Phila., 1848-52. Since 1858 has resided at Oxford, O. He invented the movable-comb hive, which has wrought a revolution in bee-keeping, and wrote the *Hive and Honey-Bee*, etc.

Langton (STEPHEN), CARDINAL, b. in Eng. about 1160; ed. at Paris, taking degrees in philos. and theol.; became a prof. and chancellor of the univ. and canon of Notre Dame; was a fellow-student with Lothario Conti, who became pope in 1198, and was named a member of the papal household. In 1206 he was made a cardinal, and in Dec. of the same yr. was by order of the pope elected abp. of Canterbury in opposition to the will of King John. Though consecrated by the pope in June 1207, he was not permitted to take possession of his see until the submission of King John to the papacy in 1213, when he joined the insurgent barons in their conflict with that monarch, assisted them (Nov. 20, 1214) in drawing up the basis of Magna Charta, and headed the list of baronial signers of that instrument (June 15, 1215). For this conduct he incurred the censure of the pope, and was suspended from his functions in Dec. of that yr., but restored Feb. 1216. He returned to Eng. in 1218, crowned Henry III. in 1220, presided at the Council of Osney in 1222, watched over the observance of Magna Charta, and in 1223 again placed himself at the head of the barons to demand his confirmation from Henry III. The divisions of the Bible into chapters has been commonly attributed to him. D. July 9, 1228.

Language. The word *language* comes from the Lat. *lingua*, "tongue." It signifies, then, utterance by the tongue, but this in 2 ways. First, we mean by *language* the gen. power or faculty of expression of thought by articulate utterance. Secondly, we mean a particular body of articulate utterances used in some definite community as their means of expression, intelligible between members of that community, but not to outsiders.

The external body of L., the audible sounds, are produced by an apparatus located in the throat and mouth, supplied with material by the lungs. The lungs send forth a current of air through the throat and mouth. This receives tone and pitch in the larynx by the action of the vocal cords, which are the membranous edges of a pair of half-valves, capable of being brought close together and made tense across the passage of the throat, so that the expelled air causes them to vibrate like the tongue or reed of an organ-pipe; and this vibration, transmitted to our organs of hearing by the sympathetic movement of the air, is cognized by us as sound. Above this vibrating apparatus is set the cavity of the pharynx, the mouth, and the nose, in the manner of a sounding-box; and voluntary changes made in the walls and apertures of this box differentiate the sound, giving rise to a great variety of distinguishable products, which are our alphabetic sounds. The most important division of the system is into vowels and consonants. The vowels are the opener sounds, those in which the modifying action of the mouth-organs on the intonated currents of breath is least, which are therefore mainly tone; the consonants are the closer sounds, those in which the element of oral action prevails more or less over that of tone. There is a class of consonants—*p, b, k, g, t, d*—in which the interference of the mouth-organs with the stream of breath is carried to the extreme of complete stoppage; these are called mutes (stops, checks). There is another in which the organs are so closely approached that a rustling or buzzing is heard at the orifice: these are called fricatives; they are divided into sibilants—such as *s, z, sh, zh* (of *azure*)—and spirants—such as *f, v*, the two *scandals* (*then*), and the Ger. *ch*. Another very distinct class is that of the nasals or resonants; in these there is a complete closure of the mouth-organs at the same points as in the utterance of the mutes, but the nasal passage is unclosed, so that the sounds are sonorous and continuable—as *m, n, ng* (in *singing*). One more class of consonants remains, the semi-vowels, *y, w, l, r*. There are in the mouth 3 places of complete closure, producing mutes—a front, or labial, at the lips (*p* and *b*); a back, or palatal (*k* and *g*), and an intermediate, or lingual (*t* and *d*). Usually there is a corresponding nasal to each mute closure. But the other consonants also tend toward the same organs of production: the *f* and *v* are more labial; the *th*, the *s* and *z*, and the *r* and *l*, are lingual; and the *ch*, the *sh* and *zh*, and the *y* are more palatal. There is one more principle of relationship to be noted: that of sonant to non-sonant or surd sounds. The *s* and *z*, for example, are uttered with the same articulating position of the mouth-organs, but the former with simple breath, the other with intonated breath or sound: and the difference of *t* and *d* is the same. But in the opener positions the mere breath is not sufficiently characterized to

give an alphabetic constituent for each position, and we throw all the different products together as *h*. Alphabets are of different character as regards both the number and the identity of the sounds. And *L*. differ not only in their sounds, but in the combinations of sounds allowed in forming syllables, and in the combinations of syllables allowed in forming words. Some have hardly more than a dozen articulations, all told, while the Sans. and Eng. each possess near 50; some allow only 1 consonant in a syllable, and that always before the vowel, while the Eng. makes combinations, as *twelve*, *twelfth*, some (as Chi.) admit only words of 1 syllable while Amer. Indian *L*. sometimes count the syllables of a word by the score.

We have said that articulate sounds are produced by the voluntary action of their utterers. Of course this does not imply that the speaker understands at all the mechanism which he sets in motion, or commands it otherwise than as he commands the mechanism of locomotion or of gesture. But each person grows up to produce by imitation just those sounds which he hears others make about him. Some sounds, however, are easier and sooner learned than others: the norm in every *L*. is given by the practised adult speakers, and the child, beginning by reproducing only imperfectly what he hears, gradually acquires the same facility and accuracy as his fellows possess. The "gift of language," then, is a gen. power of expression. It consists in such gifts of mind and of body, and in such command over them, that any human being can possess himself of any of the systems of expression established and current in the world, and make use of it, more or less perfectly, for communication and for the operations of his thought. Men are makers as well as learners and users of *L*. If the whole life of *L*. consisted in simple teaching and learning, every *L*. would continue the same from age to age. Nothing is plainer than that whatever new knowledge and altered conceptions may arise in a community must somehow find expression in its speech—that the passing out of mind of old conceptions is accompanied by the oblivion of their signs; and then there is a kind of wear and tear of words, by which they change shape or disappear, and a constant production of new material to take the place of what is lost, and to extend and improve the means of expression.

The changes of *L*. may be best grouped under 3 heads: (1) alterations of old material; (2) loss of material; (3) additions of new material. Alterations of old material are made either in the external audible form of words or in their internal content. Each kind of alteration is independent of the other; and for the reason that the tie between form and meaning is only one of the convenience of use. Each is determined by the requirements of the convenience of the users; and this so far as alteration of outward form is concerned, makes toward ease of utterance, economy of the muscular effort of enunciation. By this means especially the endings which once showed the grammatical forms of words are worn out and lost. But also the constituent elements of words that are spared become variously altered. The character and extent of the spoken alphabet are all the time slowly changing. Old sounds go out of use; new ones are introduced; both vowels and consonants are shifted to other places and modes of utterance. All such transitions of sound are reducible to rule, being governed by the phys. relations of sounds and by the gen. tendencies of *L*., as modified by the special tendencies and habits of each particular community. Assimilation is the head under which the larger part of them fall; both on the smaller scale, making difficult combinations more pronounceable, and on the larger scale, approximating the whole vowel and consonant systems to one another, making the vowels closer and the consonants opener, and thus filling up the alphabetic system with intermediate, more slightly differentiated sounds. The changes of internal content or meaning of words are as various as those of form, and even more irreducible to systematic order. But much the greater part of them may be classified under 2 great heads—restriction and extension. By restriction or specialization is meant the taking of a gen. word expressive of quality or action, and making of it the specific appellation of some thing or class of things possessing that along with other qualities. But a name, once won, becomes the appellation of a class of related things, and the limits of classes are constantly shifting and spreading by direct and indirect means. The second general division of linguistic change is that of loss. As *L*. is maintained only by use, disuse causes disappearance of any of its elements. A word is lost when the conception for which it stood dies out of men's knowledge and remembrance. A more important dept. of loss consists in the disappearance of the signs of grammatical distinctions, and with these of the consciousness of the distinctions themselves, chiefly as a result of the wearing-out processes of phonetic decay. The third division of change includes additions to the material of *L*. First, the addition of new meanings to old words. External additions are of 2 kinds: those made by borrowing from abroad, and those made by the development of native material.

All these methods of change are carried on in the interest of convenient expression. There is new knowledge of every kind to be provided for new facts, new classifications, abstractions, deductions; and there are, not so indispensable, but as inevitable, changes of the instrument of expression itself in its uttered form, in its apparatus of connection and relation. It is easy to find, in the antithesis of individual action and that of the community, the explanation of dialectic variation. Every *L*. is all the time changing; it changes by specific items, which begin with individuals and spread by communication, by imitation, through the whole mass of the community. So long as they do thus spread, the *L*. of the community remains homogeneous throughout its whole terr. But if the parts A and B and C become separated from one another so that the changes initiated in A do not spread into B and C, nor those made in B or C into the rest, then the local differences begin at once to be

multiplied, and different *L*. are the result. The state of *L*. throughout the earth is precisely what the principles here laid down would lead us to expect. The world is full of dialects, some closely and obviously akin with one another, others having resemblances discoverable upon closer examination, others apparently unrelated.

The *Indo-European family*, also called *Aryan*, or *Indo-Germanic*, is the family to which most of the *L*. of Europe and those of S.W. Asia belong. It is divided into 7 prin. branches. There is (1) the *Indian*, or *Sanskritic*, an intruder into India from the N.W., probably not more than 3000 to 3000 yrs. B.C. Its oldest *L*. is the Sans., the earliest parts of the lit. of which, the hymns of the *Veda*, go back probably to near 2000 B.C. The great groups of dialects known as *Hindi*, *Bengali*, *Mahratti*, are the modern representatives of the branch; between them and the Sans. lie the *Prakrit* dialects and the *Pali*, the sacred *L*. of S. Buddhism. (2) The *Iranian* branch, occupying the great Iranian plateau between the borders of Mesopotamia and of India. The oldest records of the branch are the cuneiform inscriptions of Darius and his successors (from about 500 B.C.); in part older is the Bible of the Zoroastrian religion, the *Avesta*; its *L*. is called the *Zend*, or *Avestan*, or *Old Bactrian*. Of considerably later date is the problematical *Huzvares*, or *Behlevi*; and the *Parsi* but little precedes the modern *Per*, which has a great lit., beginning from about 1000 A.D. To this branch belong the *Kurdish*, the *Ossetic* in the Caucasus, the *Afghan*, and the *Armenian*. (3) The *Greek* branch has in the poems of Homer the oldest monuments of the family outside of India. (4) The *Italic* branch included a considerable number of the *L*. of It.; but all the *Oscan* and the *Umbrian*, *Volscian* and *Sabine*, were wiped out by the *Lat.* dialect of Rome, which extended itself through S. Europe, giving rise to the modern group of the *Romantic L.*, the lits. of which commence between the 10th and 13th centuries; fragments of *Lat.* come down from the 3d century B.C. (5) The *Celtic* branch formerly occupied a very broad space in Europe; now they survive only on the farthest W. edges of their old terr. The *Welsh*, the *Cornish*, and the *Armorican* constitute the *Cymric* division; the *Gadhelic* includes the *Irish*, the *Gaelic* of *Scot.*, and the *Manx* of the *Isle of Man*. (6) The *Slavonic*, or *Slavo-Lettic* branch, the seat of which is in E. Europe. The earliest members of the E. subdivision are *Rus.*, *Bulgarian*, and *Serbian*; of the W. *Polish* and *Bohemian*. The earliest *Slavonic* record is a Bible version made in the 9th century. (7) The *Germanic* (or *Teutonic*) branch, divided into 4 sub-branches, the *Meso-Gothic*, or dialect of the *Goths* of *Moesia*; the *Scandinavian* sub-branch fills *Den.*, *Swe.*, *Nor.*, and *Iceland*; the more proper *Ger.* is divided into *High-Ger.* and *Low-Ger.*; *Netherlandish* or *Dut.* has an independent culture and lit., and *Eng.* is its colony.

The *Scythian* or *Ural-Altaic family*.—This group of *L*., widely coterminous with the *Indo-European*, is often also called the *Turanian*, and is generally reckoned to contain 5 great branches: (1) The *Finnic-Hungarian*, chiefly European in locality, including, beside *Finnish* and *Hungarian*, or *Magyar*, the *Lappish* and the dialects of a host of unimportant tribes stretching through N. and E. Europe across the *Ural* chain. (2) The *Samoyed*, along the shores of *Siberia*, from the *White Sea* to the *Yenisei*, and up that river to the *Altai Mts.*, probably its original seat. (3) The *Tur.*, recent occupants of *Asia Minor*, and overlapping the border of Europe, extending over a vast tract of *Central Asia*, and having an important branch, the *Yakut*, even on the *Lena*, to its mouth. (4) The *Mongolian*, yet farther E., but nowhere reaching the ocean. (5) The *Tungusic* or *Manchoo*, beyond in the N.E. end of *Asia*, save its peninsulas and islands; the *Manchoos* have also held *Chi.* in their grasp during the past 2 centuries. The *L*. of the first or westernmost branch do not differ remarkably in their gen. character from the *Indo-European*, but have more of what is called the "agglutinative" type: that is to say, root or theme and ending are less intimately united, the ending retaining a more independent character: this results both in a greater regularity and a greater intricacy of formation. But the 2 easternmost members are of a much less developed character, verging on the stiff inexpressiveness of monosyllabism, and this casts some doubt on the coherence of the family. There is neither abundance nor antiquity of literary productiveness among the *Scythian* races; the wild and curious mythic popular poetry of the *Fins* (the *Kalevala*) is their most original work. Of the *L*. of the N.E. Asiatic waters, the *Japanese* is, though highly polysyllabic, of an exceedingly simple structure; the *S. E.* of *Asia* is filled with *L*. which have monosyllabism as their distinctive characteristic. The *Chinese* is the most prominent among them. Its monuments go back to 2000 B.C. It is composed of only some 500 different words. The *Burmese*, *Siamese*, etc. have lits. of no great antiquity; the same is the case with the *Thibetan*. Off this corner of *Asia* lies the array of the *Isles of the Pacific*. They are occupied by 3 independent *L*-families. *Australia* and *Tasmania* are the home of one, the *Australian*. *New Guinea*, part of *Borneo*, and the more inaccessible parts of several other islands are inhabited by a black race with frizzled hair, the *Papuan* or *Negrito*; its dialects are almost entirely unknown. But the great islands nearest *Malacca* and the shores of the others just mentioned, and the scattered groups within the limits marked by *Formosa* and *New Zealand*, by *Madagascar* and *Easter Island*, are the home of an immense family, the *Malay-Polynesian*, in 3 branches—*Malay*, *Melanesian*, and *Polynesian*. The *Dravidian* group of *L*., of *S. India*, is of an agglutinative type, somewhat resembling the *Scythian*. Its prin. members are the *Tamil*, *Canarese*, and *Telugu*. The *Caucasus* region is filled with dialects akin with no others, and unrelated even with one another.

The *Semitic family*.—Its home is in the peninsula of *Ar.*, with *Pal.*, *Syria*, *Mesopotamia*, and with an outlier in *Afr.* It is usually divided into 3 branches—*Syriac*, *Ar.*, and *Assyrian*. The members of the central branch are the *Heb.*, the *Phœnician*, and the *Syrian* or *Chaldee*. Among the *L*. of

Afr., those nearest to Asia, grouped together as the *Hamitic family*, are often claimed to be akin with the Semitic. The family is reckoned to comprehend 3 branches—the Egyptian, the Libyan or Berber, and the Ethiopian; the most conspicuous members of the last are the Galla and Somali. The Egyptian of the modern period is the Coptic. The anc. Egyptian is the L. of the hieroglyphs. The extreme S. of Afr. is occupied by the Hottentot and Bushman dialects, which have been recently claimed to be connected with the Hamitic family. N. of them, and up to the equator, are found the branches of a well-defined family, the *S. Afr.* (or Bantu Kafir). Between the S. Afr. L. and the Great Desert lies a perfect Babel of L. and races. Even the best authorities are discordant in their treatment of it. The Basque, on the border between Fr. and Sp., by the Bay of Biscay, is the only other L. of the Old World which calls for mention. It is unrelated with anything else in the world. The polysynthetic structure characterizes the L. of the New World, and is the only tie by which they are to be connected together as a single family.

The question of the origin of L. has assumed a new aspect in consequence of the recent progress of linguistic science. It is clearly seen that L. as a concrete possession is in no proper sense of the word a gift, but rather an accumulated acquisition, the outcome of certain faculties which belong to man. To hold that he was put in possession at his birth of a developed speech is analogous to holding that he was provided with houses and clothes and instruments and machines. The formal structure of L. we see to have been developed by degrees out of a simple body of formless roots, in the same manner and for the same reason that instruments and machines have been developed out of simple sticks and stones and flakes of flint. To investigate the origin of L. is to inquire how these rudiments of speech were produced. The inquiry is not a part of the historical science of L., but it is an essential part of linguistic philos., as a branch of anthropology. To express himself is natural to man, and he has for that purpose a variety of instrumentalities—viz. gesture, grimace, and utterance. All are capable of being put to use between human beings anxious to understand one another. That any one of them should be employed with the intent to communicate is enough to constitute an act of L.-making. It is by the addition of this intent that they pass over from the condition of natural to that of conventional expression. The sphere of natural expression is limited to the feelings of the expresser: it is purely subjective, and it does not include articulations. While human expression remains instinctive and emotional, it is not L. But when, for instance, a cry which was at first the direct outburst of pain is repeated or imitated for the purpose of giving to another an intimation of pain, etc., then the making of L. is begun. (See M. MÜLLER'S *Lectures on the Science of Language*; H. WEDGWOOD'S *Origin of Language*.) [From orig. art. in *J. S. U. Rev. Crit.*, by PROF. W. D. WHITNEY, LL.D.]

Language of Flowers, a sentimental system of floral symbols by means of which it is intended that the more tender feelings and passions should be expressed. It has received much attention among the Turks and Pers.

Lanman (CHARLES), son of the succeeding, b. in Monroe, Mich., June 14, 1819; was a clerk in New York from 1835 to 1845; was associate ed. in 1846 of the *Cin. Chronicle*, and after making a canoe-tour of the Miss. and through Lake Superior, returned as journalist to New York; in 1848 he travelled extensively through the U. S.; settled at Georgetown, D. C., and held the positions of librarian of the war dept., librarian of copyrights in the state dept., and private sec. of Daniel Webster, librarian of the interior dept., and librarian of the House of Reps. Among his numerous works are *Essays for Summer Hours*, *A Summer in the Wilderness*, *Private Life of Daniel Webster*, and *Dict. of Cong.* From 1871 to 1882 he was Amer. sec. of the Japanese legation, and has written *The Japanese in Amer.*

Lanman (CHARLES JAMES), b. at Norwich, Conn., July 5, 1795, grad. at Yale in 1814; was admitted to the bar at New London, Conn., in 1817; removed to Frenchtown, now Monroe, Mich., and held various public offices (1823-32); returned in 1835 to Norwich, where he was mayor in 1838; removed to New London 1862. D. July 22, 1870.

Lanman (JAMES), b. at Norwich, Conn., June 14, 1769, grad. at Yale in 1788; was admitted to the bar in 1791; held important State offices; was a U. S. Senator 1819-25; held judgeships in the State courts 1826-29; was mayor of Norwich 1831-34. D. Aug. 7, 1841.

Lanman (JOSEPH), U. S. N., b. July 11, 1811, in Conn.; entered the navy as mdpn. Jan. 1, 1825; became passed mdpn. in 1831, lieutenant in 1835, commander in 1855, capt. in 1861, com. in 1862, rear-admiral in 1867. Commanded the Minnesota at the attack upon Ft. Fisher, Jan. 15, 1865. D. Mar. 13, 1874.

Lannes, lahn (JEAN), b. at Lectoure, Fr., Apr. 11, 1769; was apprenticed in his 15th yr. to a dyer; in 1792 enlisted in the army, where he soon rose to the rank of col.; was discharged in 1795, at the reorganization of the army, but in 1796 followed Nap. to It. as a volunteer; distinguished himself in every battle, and was made a brig.-gen. in 1797; in 1798 accompanied Nap. to Egypt, returned with him in 1799, and rendered him great services on Nov. 9, 1799, in reward for which he was made a gen. of division in 1800, and commander of the consular guard; led the vanguard when in the same yr. the army crossed the Alps and gained a victory over the Aus. at Montebello. On the establishment of the empire he was made a marshal. He led the siege of Saragossa, and compelled the city to surrender Feb. 21, 1809, and at Ratisbon he was the first who put the scaling-ladder to the ramparts. Nap. considered him one of his best gens. He was mortally wounded at the battle of Essling (May 21, 1809). D. May 31, 1809.

La Noue, lah-noo, de (FRANÇOIS), b. in 1531, in the vicinity of Nantes, Fr.; embraced the Reformed creed, and distinguished himself in the army of the prince of Condé. At

the siege of Fontenayle Comte, in 1570, he lost his left arm, and had it replaced by one of iron, whence he received his surname, *Bras de Fer*. In 1572 he went to La Rochelle to bring about a reconciliation between the city and the king. Having failed in this, he took the command of La Rochelle, and defended the city for 4 yrs. After the conclusion of peace in 1578 he went to Flanders, entering the service of the Low Countries; was taken prisoner, and retained at Madrid for 5 yrs., but was exchanged in 1585 for Count Egmont. Under Henry IV. he again fought for the cause of his religion. During his several imprisonments he engaged in lit., and his *Discours politiques et militaires* are well known. D. from a wound Aug. 4, 1591.

Lansdowne (HENRY PETTY-FITZMAURICE), THIRD MARQUESS OF, b. in Lond. July 2, 1780, second son of William Petty, first earl of Shelburne, who in 1784 was created marquis of Lansdowne. He was ed. at Westminster School and at Edinburgh; grad. at Trinity Coll., Cambridge, in 1801, and under the name of Lord Henry Petty was chosen as a Whig in 1802 to a seat in Parl. for the borough of Calne. He was elected member for the Univ. of Cambridge in 1806, and in the same yr. became chancellor of the exchequer in the ministry of Grenville and Fox, retiring in 1807. On the death of his elder brother in 1809, he succeeded to the title, and became one of the heads of the Liberal party in the House of Lords, being an early advocate of Catholic emancipation, the abolition of slavery, parliamentary reform, and free trade. On the return of the Whigs to power in 1827, he became sec. of the home dept. under Canning, sec. of foreign affairs under Lord Goderich (1838), lord pres. of the council under Earl Grey from Nov. 1830 to Nov. 1834, under Lord Melbourne from Apr. 1835 to Sept. 1841, and under Lord John Russell from July 1846 to Feb. 1852. For many yrs. he had been the Liberal leader in the upper house; resigned that position in 1852, but in Dec., on the formation of the Aberdeen ministry, he consented to take a seat in the cabinet without a portfolio, and again in the first Palmerston ministry, Feb. 1855 to Feb. 1858. He formed a splendid library and collection of art-treasures, was a patron of lit., and made Lansdowne House the centre of polite society in Eng. He was a trusted adviser and friend of the queen, but refused a dukedom and the premiership. D. Jan. 31, 1863.—His son, HENRY, fourth marquis, b. in 1815, d. in July 1866; his grandson, HENRY CHARLES KEITH FITZMAURICE, fifth marquis, b. Jan. 14, 1845, was lord of the treas. (1868-72) and under-sec. of state for war (1872-74), in second Gladstone ministry.

Lansdowne (WILLIAM PETTY), MARQUESS OF, See SHELBURNE, EARL OF.

Lan'sing, city, Allamakee co., Ia., on R. R. and Miss. River, 81 m. N. of Dubuque. Pop. 1870, 1755; 1880, 1811.

Lansing, city and R. R. centre, Ingham co., cap. of the State of Mich., is situated on Grand River, about 100 m. from its mouth, at its confluence with the Cedar. It was laid out by the State as a cap. in 1847, and a city govt. was organized in 1859; is situated on high land on both sides of the river, with fine water-power; is 84 m. W. of Detroit and 60 m.



New State Capitol, (Lansing, Mich.)

S. W. of Saginaw. It has an opera-house, a commercial coll., State Agricultural Coll., State Reform School, State Inst. for the Blind, State Library of 40,000 vols., and a noted mineral spring. The State capitol, completed in 1877, cost \$1,500,000. Pop. 1870, 5241; 1880, 8319; 1881, 9779. [From orig. art. in *J. S. U. Rev. Crit.*, by J. W. KING, ED. "REPUBLICAN."]

Lansing (JOHN), b. at Albany, N. Y., Jan. 30, 1754; studied law in Albany and New York; served in the Revolutionary war as military sec. to Gen. Schuyler; was for 7 yrs. a member of the legislature, for 4 yrs. mayor of Albany; member of the Old Cong. 1784-88; member of the State convention for considering the U. S. const., which he opposed, leaving the convention; com. in 1790 to settle the Vt. controversy; appointed judge of N. Y. supreme court Sept. 28, 1790, chief-justice Feb. 15, 1798, and chancellor of the State from Oct. 21, 1801, to 1814. D. Dec. 12, 1829.

Lan'singburgh, on R. R., Rensselaer co., N. Y., 3 m. N. of Troy, on the Hudson River, nearly opposite the confluence of the Mohawk; is connected with Troy by a street R. R., and with Waterford by a bridge across the Hudson. Named from the founder, Abraham J. Lansing, who settled here in 1771. Pop. 1850, 4372; 1880, 7432.

Lanta'na, a genus of mostly tropical shrubs of the

vervain family; several cultivated for ornament in green-houses and summer gardens, having showy flowers, some of changeable colors.

Lan'tern-fly, a name given to some insects of the family Fulgoridae, which are reputed to emit a light from the forehead. They are nearly 3 inches long, and are among the largest of the Hemiptera.

Lanthanum [Gr. *λανθάνειν*, "to escape notice"], an elementary metal of rather rare occurrence, to which Mosander, its discoverer, in 1839 gave this name, because it had remained concealed, in combination with cerium, for 36 yrs. The 3 rare and curious metals, cerium, lanthanum, and didymium, are usually found in combination in the minerals *cerite*, *allanite*, *monazite*, *mosandrite*, etc. *Carbonate of lanthanous oxide*, or *lanthana*, is a white oxide, like lime or magnesia, very heavy, density about 6, which absorbs carbonic acid and water from the air, and slakes with water, like lime, to a hydrate.

Lan'za (GIOVANNI), b. in 1815 at Vignola, Piedmont; studied med.; in 1848 was elected M. P.; in 1855 entered the cabinet of Cavour as minister of public education, and in 1858 exchanged this office with the ministry of finance; in 1859 resigned; in 1864 took charge of the ministry of the interior under La Marmora, but retired in 1865; as pres. of Parl. he opposed the financial policy of the ministry of Menabrea, and resigned his presidency when the ministry triumphed. His re-election in 1869 caused the dissolution of the ministry, and he now undertook to form a new cabinet himself. He became minister of the interior, and tried to introduce the greatest possible parsimony, but as the annexation of the papal states in 1870 took place while he held office, large expenses for the army and navy were necessary. The cabinet of L. was overthrown in 1873. He continued, however, to sit as a member of the Chamber of Deputies. D. Mar. 9, 1882.

Laocoön, la-ök'-o-on [Gr. *Λαοκόων*], a Trojan priest who opposed the introduction of Sinon's wooden horse into Troy, and was, with his 2 sons, slain by 2 great serpents from the sea. The death of L. and his sons is the subject of a noble group now existing in the Vatican. It was executed by Agesander, Athenodorus (his son), and Polydorus, Rhodian artists who probably lived in the time of Titus.

Laodicea [Gr. *Λαοδικαία*], the name of 6 Gr. cities built by the Seleucide, monarchs of the Syrian empire, who after the death of Alexander the Great were inheritors of his E. conquests, 5 of them having been named in honor of Laodice, wife of Seleucus Nicator, and one in honor of the wife of Antiochus Theos.—I. **LAODICEA COMESTRA** [Gr. *Καλαϊνὴ*, the "burned"], now *Ladik*, situated to the N. W. of Iconium on the high-road from Gr. to the Euphrates, and variously assigned to Lycaonia, Pisidia, and Galatia, as the boundaries of those provs. were changed. Imperial coins of the reigns of Titus and Domitian show that it must have been a large city.—II. **LAODICEA AD LYCUM**, now *Eski-Hissar*, a city in the S. E. of Phrygia, near Colossæ, 40 m. E. of Ephesus and 6 m. W. of Hierapolis, situated on the spur of a hill between the valleys of the Asopus and Caprus rivers, which here fall into the Lycus, was originally called *Diospolis* and afterward *Theos*, and having been rebuilt by Antiochus II. (Theos), 260 b. c., was named from his wife **LAODICE**. From the Syrian monarchs it passed to the kings of Pergamus, and was annexed to the Rom. empire on the death of Attalus III., 133 b. c., when it became the cap. of the vast prov. of Greater Phrygia, and was the official residence of Cicero during his proconsulate in Asia (49-50). It was one of the earliest seats of Christianity in Asia Minor, the ch. having been founded by Paul. The city was nearly destroyed by earthquakes in the reign of Tiberius, but restored, and was the seat of 2 important gen. councils of the Chr. Ch. It was again overthrown by an earthquake in 494, was captured by crusaders in 1199, by Turks in 1255, and destroyed by Tamerlane in 1402.—III. **LAODICEA AD MARE**, a city of Syria, founded by Seleucus Nicator, now *Latakia*.

Lao'ni [Late Lat. *Laudunum*], town of Fr., the anc. *Lugdunum Clavatum*, the *Bibrax* of Caesar, cap. of the dept. of Aisne, is situated on the top of a hill, and surrounded by a wall flanked with towers. Its Gothic cathedral, built 1114, crowns the top of the hill. This city was the scene of an ecclesiastical council in 948, was taken by the Eng. in 1429, was memorable in the wars of Nap. I. and in the Franco-Ger. war of 1870, having capitulated to the Gers. Sept. 9. Pop. 10,368.

Lao's, country of Farther India, in the centre of the peninsula S. of Chi., bounded N. by the Chi. prov. of Yunnan, E. by Tonquin and Anam, S. by Siam, and W. by the Shan states. Area and pop. entirely uncertain. L. is traversed by the Me-kong or Cambodia River, the valley of which is productive of sugar, rice, tobacco, gums, betelnuts, and other fruits, which with teak, sandal-wood, and gold-dust form the chief exports. The tribes of L. have since the 18th century acknowledged a nominal dependence upon Siam. The people are related to the Burmese. Cap. Chiengmai.

Lao'u-Tsze, otherwise **Lao-Tseu**, **Lao-tsée**, or **Lao-kiun**, a Chi. moral philos., whose teachings have many points in common with those of Sankhya Booddha, of whom he was contemporary. He was b. about 604; was state librarian and keeper of the records at the imperial court; having resolved to retire from Chi. to India, he remained for a short time on the border, Han-kow, where he was persuaded by the gen. Yün-hi to at least leave some record of his doctrines in a book. He did so, the result being the *Lao-tse Tao-te-king* ("The Road to Virtue"). L.-T. makes all things proceed from and live in an infinite First Cause, which he calls *Tau*. He placed moral perfection in the individual, in independent realizing of truth, and in self-discipline, being in all respects the opposite of Confucius, who exhorted blind obedience to old customs and the doctrines of the anc. sages. From his disquisitions on *Tau*, the great cause and spring of life and morals, or that which

with him takes the place of the Deity or the Absolute, L.-T. became the head of one of the great religions of Chi., known as the Tautist. L.-T. lived in a great age. "He was contemporary with Booddha in India, with Jeremiah, Habakkuk, Daniel, and Ezekiel in Judea, with Thales, Anaximander, Pythagoras, Heraclitus, and Xenophanes in Gr., while at the same time an immense reformation of the doctrines of Zoroaster took place in Persia." It seems impossible to doubt that some of this Western influence had reached him. (See *The Speculations of the Old Philos. Laws on Metaphysics, Polity, and Morality*, by John Chalmers.) [From orig. art. in *J.'s Univ. Cyc.*, by C. G. LELAND.]

La Paz de Ayacucho, city of Bolivia, the cap. of the dept. of La Paz, at an elevation of 12,236 ft. on both sides of the river Chuqueapo; well built, with an agreeable climate, and beautifully situated; was founded in 1548; is the chief commercial city of Bolivia; has a beautiful cathedral, a univ., schools of law, etc. Pop. from 70,000 to 80,000.

Lapeer, city and R. R. junc., cap. of Lapeer co., Mich., 60 m. N. of Detroit. Pop. 1870, 1772; 1880, 2911; 1884, 2897.

La Pérouse, lah-pä-rooz', **de** (JEAN FRANÇOIS DE GALUP), COUNT, b. near Albi, Fr., Aug. 22, 1741; entered the navy in 1756; served in the Amer. war of independence, and was placed at the head of an exploring expedition which Louis XVI. fitted out, and which left Brest Aug. 1, 1785. Doubling Cape Horn, he followed the Amer. coast to Monterey, Cal., crossed the Pacific, and followed the Asiatic coast from Manila to Petropaulovsk. From this place he sent his journals and charts to Paris, and in Sept. 1787 he started southward. A letter was received from him dated Botany Bay, Feb. 7, 1788, whence it was his intention to go to the Isle de France by way of Van Dieman's Land, but nothing more was ever heard of him. It is probable that he was shipwrecked in 1788 at Vanikoro, in the New Hebrides group of islands.

Lap'ham (INCREASE ALLEN), LL.D., b. at Palmyra, N. Y., Mar. 7, 1811; was a civil engineer and employed on the Miami, Welland, and Louisville canals; sec. of the O. canal commission 1833-35, and early won fame as a botanist and geologist. In 1836 he removed to Milwaukee, Wis., where he held many public offices. In 1862 he became pres. of the Wis. Historical Society; pub. valuable papers and works on the geog., geol., mineralogy, and hist. of Wis., and prepared a memorial to Cong. showing the necessity of storm-predictions, the suggestions of which were subsequently carried out. In 1873 he was appointed to take charge of a geological survey of the State, which he conducted for 2 yrs., until, in consequence of a political revolution, he was superseded. D. Sept. 14, 1875.

Lap'idary [Lat. *lapidarius*, a "stonecutter," from *lapis*, a "stone," but limited to one who works on precious stones]. By some writers a distinction is observed between the engraver of *gems* and *cameos* and the L., the latter being supposed to merely prepare precious stones for jewelry by cutting and polishing them. Of late yrs., as a great demand has sprung up for imitations of anc. Scotch jewelry and for Ger. beads, all of agate, carnelian, and other third-class stones, the L. has been chiefly devoted to this class of work.

Lapidary. In writing, this word is applied to a style peculiar to inscriptions, and which derives its name from *lapis*, a "stone," from being commonly applied to monuments. As it was developed at a time when Lat. was principally used for such purposes, its rules are in reference to that lang. It has its special rules, its consecrated abbreviations, its ready-made formulas, and its conventional archaisms. It affects to be anc. and unchangeable by perpetuating words no longer in common use, and exerts itself chiefly to be concise, without neglecting great words or pompous forms. It is very difficult to write well, and in anc. forms is much more difficult to read, owing to the abbreviations, by which words are often represented by single letters.

Lapis Lazuli [Lat. *lapis*, "stone," and *azul*, "heaven"], a natural silicate of lime and alumina, with a small amount of sulphurets, crystallizing in the monometric system, and of a beautiful Berlin-blue color. It is highly valued for the manufacture of ornamental articles.

Lap'ithe [*Λαπιθαι*], in Gr. mythology, a race of Thesallians, the descendants of Lapithes, a son of Apollo, whose king was Pirithous, son of Ixion. They overcame the Centaurs in a bloody war, but were humbled by Hercules.

Laplace, lah-plahss', **de** (PIERRE SIMON), MARQUIS, b. at Beaumont-en-Auge, in Normandy, Mar. 23, 1749; ed. at the Coll. of Caen and the military school of Beaumont; at the age of 18 Paris became his residence; 2 papers on the Theory of Probabilities printed at the Acad. during the ensuing 5 or 6 yrs. are mentioned by the Acad. as chosen for publication among many. He was elected an associate, and in 1785 a member. His more important investigations are his improvements of the lunar theory, his discovery of the cause of the great inequality of Jupiter and Saturn's motions, his theory of the tides, his work on probabilities. Newton's newly discovered law of gravitation had been so successfully applied to the lunar motions as with one important exception to reconcile them to the requirements of the theory; the unexplained exception was "that the *mean motion* of the moon has been accelerated from century to century by a minute quantity, which, in the lapse of thousands of yrs. has become recognizable." The earliest authentic observations of eclipse, made at Babylon in the yrs. 719, 720, 721, show that they occurred 134 hours *sooner* than if the present mean motion of the moon then obtained. The interval has been *longer* than it should have been found to be, and hence the motion *less* rapid in former centuries. As regards the moon's orbit, "the effect has been that at each lunation she approaches nearer to the earth than during the last by one *fourteenth* of an inch," thus describing a spiral of almost infinitely slow convergence."

To understand the solution of this apparent anomaly as finally given by L. it must be remembered that under the action of central forces the angular velocity of a satellite

about its primary will be increased by an increase of the central force; that the effect of the sun's attraction on the moon and earth is, on the whole, to diminish the central force between these bodies by a minute quantity proportional to the inverse cube of the sun's distance. The disturbing effect, therefore, of the sun's attraction is to make the moon's motions less rapid than they otherwise would be; and whatever diminishes this disturbing effect accelerates the moon's motion. Now, though the earth's mean distance from the sun has not varied, the eccentricity of its orbit has been diminishing from the earliest historic times, and with it the average inverse cube of the distance. Hence, the secular acceleration of the moon above described; which, however, as also its approximation to the earth, must cease with the attainment of minimum eccentricity by the earth's orbit, when the reverse effects will ensue. The amount of acceleration is now about $10''$ of lon. in a century.

A comparison of anc. observations with modern revealed an acceleration of the mean motion of Jupiter and a retardation of that of Saturn, whereas modern observations alone show a contrary effect to be in progress. «The revealing after many yrs. of study of the source of the resulting discrepancy between astronomical tables and observation is regarded as one of the proudest achievements of its author. Tidal theories, previous to L.'s investigations, presumed the earth to be at rest, and the waters of the ocean to be in motionless equilibrium between the forces of gravity and the solar and lunar attractions. L. had the boldness to attempt the solution of a problem in which account is taken of the motions (relatively to the earth) which the fluid particles must receive in order to produce the tides; in other words, of the forces required to produce them. The doctrine of Probabilities—the subjecting to the rigor of mathematical methods subjects which *know no laws, i. e. of chance*—furnishes the most subtle and at the same time the most fascinating of problems, occupying as it were a borderland to Metaphysics, Logic, and Mathematics. The *Théorie analytique sur les Probabilités* of L. is regarded as the ablest specimen of mathematical writing of his age. L. is the inventor of the most powerful calculus, known generally as that of Laplace's Coefficients. His longest, and most systematic work, the *Mécanique Céleste*, is a compendium of the problems of phys. astron. which had been accumulating for a century, but which are treated by methods mainly original with himself. This work is justly considered his most imperishable monument.

For a short time L. was one of Nap.'s ministers. The cause of disagreement is unknown, but his was not the character of mind best fitted for politics or diplomacy, and he was evidently out of his element. D. Mar. 5, 1827. His last words were: «*Ce que nous examinons n'est peut-être chose; ce que nous ignorons est éternité.*» J. G. BARNARD.

Lapland and the Lapps. Lapland («the land of the Lapps») is the name given to a terr. of N. Europe stretching along the Arctic Ocean from the Atlantic to the White Sea. It is divided between Nor., Swe., and Rus. The gen. aspect of the country is rather forbidding. A severe winter of 9 months, during which the sun does not rise for 2 months; a short hot summer in July and Aug., during which the sun does not set; a spring and a fall of a couple of weeks—such is the climate. Forests of pine and birch cover the S. parts of the country; barley and potatoes may be raised as far as 70° N. lat., but only in a few valleys. On the large table-land nothing grows but lichens and mosses, on which the large herds of reindeers feed. The Lapps belong to the Laponian subdivision of the Tschudic races, of the Finnic group of the Turanian family. They entered Europe from the S., with other Finnic tribes, before the European historical period. Their dwellings on the E. side of the continent extended as far S. as the lower Volga, but they were long ago driven from their old home by the pressure of Finns, Slavs, and others, until they have been crowded into their present seat. The Lappish countries now are Lappmark in Swe., Rus. L. to the White Sea, and Finnmark, or the March of the Finns, in Upper Nor., where many of them live. The Lapps subject to Rus. are—(1) those of the duchy of Finland, N.; (2) those of the govt. of Archangel.

The Lapps of the Rus. empire have as provincial natives of non-Rus. stock an organization and rights distinctly recognized by the govt. But a narrow policy is exercised toward them, and less done for their improvement than in Nor., and more especially in Swe. They seem to be physically inferior to the Finns, though they are hardy and courageous. The Laplanders are wild, savage, and dull, small of stature, with large head, short neck, small gray-reddish eyes, hair dark brown, beard short, hands long, legs thin, abdomen projecting, the result of improper or insufficient food, complexion light, chin protruding, cheek-bones prominent. In disposition they are peaceable, but too slavish. They appear frank and simple, but are knavish and treacherous. The Lapp is a herdsman. Like the Finn, he catches the fish of the lakes, but his reindeer is his prin. means of subsistence. In winter the mt. Lapp of Finnmark hunts or fights the wolf. In the summer the reindeers go by habit or instinct to the coast, each owner marking his own herd in the ears. Latterly, steam communication between Bergen, Trondheim, and Hammerfest has given a new impulse to trade. But from Hammerfest N. and N. E. reindeers complete the line of communication.

The Lapps of L. resemble those of Scandinavia, but are much behind them in education, being unable to read and write. Their lang. differs more and more from the Lappish of Nor. and Finland, the extreme Lapps scarcely understanding each other. There is much heathenism among them. Their Christianity, nominally Greek, consists in little more than mumbling a prayer. The Swe. and Nor. Lapps are Lutherans, and of these all the adults are able to read. The Lapps believe in supernaturally wise men. Their noaids or magicians are both their oracles and physicians, the medium between the human and the divine, able to control the

spirit world in a degree to make it favorable to mankind. The Lapps are subject to nervous excitement. In ch. a contagious furor sometimes takes place. Some Lapps claim to have the power of selling favorable winds to sailors, and this superstition is believed in by Swe., Nor., and Rus. peasants. [From orig. art. in *J.'s Univ. Cyc.*, by E. TORREY.]

La Plata. SEE ARGENTINE CONFEDERATION.

La Plata, Rio de. SEE PLATA, RIO DE LA.

Laporte, city and R. R. centre, cap. of Laporte co., Ind., 59 m. E. of Chicago and 12 m. S. of Lake Mich., is the seat of Ind. Med. Coll., and is close to a chain of 7 beautiful lakes, traversed by steamers. Pop. 1870, 6581; 1880, 6195.

Laporte City, la SEE APPENDIX.

Lap'penberg (JOHANN MARTIN), LL.D., b. at Hamburg July 30, 1794; studied med. at Edinburgh and law at Lond., Berlin, and Göttingen; was for a time minister resident for Hamburg at Berlin; became in 1823 keeper of the archives at Hamburg, and was in 1850 plenipotentiary in Frankfort conference. His best work, *Geschichte von England*, is the standard authority for early Eng. hist. D. Nov. 28, 1865.

Lap'wing (so called from the flapping of its wings in flight), or **Pee'wit** (named from its note), the *Vandellus cristatus*, a game-bird common throughout a great part of the Old World, of the plover family.

Laramie City, on R. R., cap. of Albany co., Wyo. Terr., 57 m. N. W. of Cheyenne, and 7122 ft. above the level of the sea, laid out in Apr. 1868, when the R. R. reached this point; lies in the midst of the Laramie Plains. A stream of clear cold water passes through the city, fed by a spring at the foot of the Black Hills, a few m. E. Pop. 1880, 3696.

Laramie Mountains, a range rising at the Red Buttes, near the Sweetwater River, Wyo. Terr., and extending in a curve S. to the Ark. River, near Long's Peak in Col., forming a wall which closes in the Laramie Plains to the N. E. and E. Geologically, it is composed of a nucleus of red syenite, with margins of fossiliferous formation, Carboniferous, Triassic, Jurassic, Cretaceous, and in some places lignite Tertiary, the beds inclining from a central axis at different angles. This range is connected with the Big Horn Mts. and the Black Hills by low anticlinals extending across the prairie, the most beautiful in the Rocky Mt. region. The numerous branches of the Platte rise in this range, of which the prin. summit is Laramie Peak. Coal has been found in them.

Laramie Plains, an elevated table-land in Wyo. Terr., lying S. of the N. fork of the Platte, between the Laramie Mts. on the N. E. and the Medicine Bow spur of the Rocky Mts. on the S. W., watered by the Big and Little Laramie and Medicine Bow rivers. The tops of some of the surrounding mts. are covered with perpetual snow, and the mean altitude of the plain being above 7000 ft., the summer is always short and the winter severe. Beds of iron and coal have been found.

Larch (Gr. *Λάριξ*), trees of the genus *Larix*, conifers with deciduous leaves. The *Larix Europæa*, called «Scotch larch» in this country, is not a native of G. Brit., though very extensively grown there. Its wood is valuable. (For the Amer. L., see HACKMATTACK.)

Lard (Fr. *lard*, from Lat. *lardum*), the oily part of hog's fat, extracted by melting at the temperature of boiling water, extensively used for culinary purposes and for the manufacture of candles, illuminating oil, pomades, unguents, and soaps. The composition of L. is 62 parts oleine to 38 of stearine and palmitine, the former, called *lard oil*, being used for lubricating machinery and for illumination, while the latter is chiefly employed for the manufacture of hard candles. L. is the chief material employed in pharmacy, in combination with vegetable balsams and oils, for the preparation of unguents and cerates, for which purpose, however, only the best quality can be advantageously used. L. oil is exported from the U. S. in immense quantities, chiefly to Fr., where it is largely used for the adulteration of olive oil. L. oil is often mixed with 25 per cent of rosin, the latter substance forming an acid which protects the oleine from its tendency to rancidity when exposed to dampness, and also increasing its power of illumination. The melting-point of pure L. varies from 78° to 87° F.

Lard'ner (DIONYSIUS), LL.D., b. at Dublin Apr. 3, 1793, grad. at Dublin Univ. 1817; remained in his coll., of which he was for a time chaplain, until 1827; became in 1828 prof. of astron. and physics in the Univ. of Lond.; resided 1840-45 in the U. S., and afterward in Paris. The greatest of his works was the publication of the *Cabinet Cyc.* in 134 vols., composed of a series of treatises, partly written by himself; also produced a work on the *Steam-Engine* and a series of *Handbooks* upon science. D. Apr. 29, 1859.

Lardner (JAMES L.), U. S. N., b. Nov. 20, 1802, in Pa.; entered the navy as midpn. May 10, 1820; lieut. 1828, commander 1851, capt. 1861, com. 1862, rear-admiral on the retired list in 1864; commanded U. S. frigate *Susquehanna* at battle of Pt. Royal, where he distinguished himself by his skill and bravery. D. Apr. 12, 1881.

Lardner (NATHANIEL), D. D., b. at Hawkshurst, Eng., June 6, 1684; studied at Utrecht and Leyden 1699-1703; was long minister of Crutched Friars, Lond. Wrote *The Credibility of the Evangelical Hist., as Hist. of the Apostles and Evangelists*, and other works. D. July 24, 1768.

Lare'do, R. R. junc., cap. of Webb co., Tex., on the left bank of the Rio Grande, 200 m. above its mouth, at the crossing of the high-road between San Antonio, Tex., and Saltillo, Mex., 400 m. S. W. of the former city, was founded by Sp. settlers in the latter part of the 18th century as a frontier town of Mex. On the annexation of Tex. to the U. S. many of the Mex. inhabs. moved across the river and founded Nuevo Laredo. Pop. 1870, 2046; 1880, 3521.

La'res [pl. of *lar*, Etruscan for «lord»], in the religion of anc. Rome, were tutelary spirits. The domestic L. were originally the spirits of the departed members of the family. The L. differed from the Manes, which were spirits that were supposed to hover near the tomb. The Penates in-

cluded other domestic spirits, not ancestral. Public L. had care of highways, ships, fields, etc.

Laricio, or **Corsican Pine** (*Pinus Laricio*), a large pine of the S. of Europe, which grows well in the most barren sands and has been extensively planted in the Landes of S. W. Fr., transforming a waste into valuable plantations.

Larimore, Dak. See APPENDIX.

Lark [*A. S. laferc*; Scotch, *lavrock*], a popular name of several passerine birds of the group Oscines (singers). The true L. are of the family Alaudidae, of which the skylark of the Old World (*Alauda arvensis*) is the typical spirit. This most interesting bird is a great favorite, from its sweet song, which it sends forth while soaring aloft in clear weather. It is to some extent naturalized in the U. S.

Larkspur, a popular name of the herbs of the genus *Delphinium*, of the Ranunculaceae family. They are poisonous herbs, and have a limited use in med. Several are favorite garden flowers.

Lar'ned, city, cap. of Pawnee co., Kan., on R. R. and Ark. River, is station for Ft. Larned. Pop. 1880, 1066.

Larned (WILLIAM AUGUSTUS), b. in Thompson, Conn., June 23, 1806, grad. at Yale 1826; taught in Salisbury, N. C., 1826-28; tutor and theological student at Yale 1828-31; was ordained 1834-35 pastor of a Congl. ch. at Millbury, Mass.; instructor in Heb. and Gr. in a theological school at Troy, N. Y., 1835-37; prof. of rhetoric and Eng. lit. in Yale Coll. 1839-62. Prepared an ed. of Demosthenes *On the Crown*; ed. of *New Englander* 1854-55. D. Feb. 3, 1862.

La Rochefoucauld, lah rosh-foo-kô', de (FRANÇOIS), DUKE, prince of Marsillac, b. at Paris Dec. 15, 1613; served for some time in the army; took part in the contest between Anne of Aus. and Richelieu, which ended with his banishment from Paris. On the death of the cardinal in 1642 he returned to the court, but being poorly rewarded by the queen, he sought an alliance with the leaders of the Fronde, but after 1660 he gave up all ambitious plans and lived solely for lit. and social enjoyment. In 1662 appeared his *Mémoires*, and in 1665 his *Reflexions*. D. Mar. 17, 1680.—Another member of the same family, FRANÇOIS ALEXANDRE FRÉDÉRIC DE LA ROCHEFOUCAULD-LIANCOURT, b. at Paris Jan. 11, 1747, was pres. of the National Assembly in 1789; emigrated in 1792; lived in Eng. and the U. S.; returned to Fr. in 1799; was much in public life under the Restoration as an advocate of liberal measures. He was a very voluminous writer; established first model-farm in Fr., introduced vaccination, founded a school for industry and art, which developed into École des Arts et Métiers of Châlons, brought the method of mutual instruction into use, and established the first savings bank in Fr. D. Mar. 27, 1827.

La Rochejacquelein, lah rosh-zhahk-lan', de (HENRI DU VERGER), COUNT, b. at the château de La Durbellière, Fr., Aug. 1772; became a leader in the first Vendean war. He took part in all the early battles fought in Vendée against the republicans, and after he had been chosen chief of all the royalist armies he defeated twice the army of the National Convention around Autrain, and occupied Le Mans, La Flèche, Laval, and other cities. Killed at the battle of Nouaillé, Mar. 4, 1794.

Larrey, lah-rä' (DOMINIQUE JEAN), BARON, b. at Baudéan, Fr., July 1766; studied surgery with his uncle, Larrey, a surgeon of Toulouse; went in 1787 to Paris; entered the navy; returned to Paris; joined the army in 1792; invented the *ambulance volante* 1793, and was made surgeon-in-chief; served in Egypt, Ger., and Sp.; was made a baron on the field of Wagram 1809; was wounded at Austerlitz and Waterloo; made numerous improvements in operative and clinical surgery, and important observations in gen. med. D. July 25, 1842.

Larrey (FELIX HIPPOLYTE), M. D., BARON, son of the preceding, b. Sept. 18, 1808; entered the army, and in 1832 received his degree at Paris; became prof. of pathology at Val de Grâce 1841; sanitary inspector of the army 1858; chief surgeon in It. campaign 1859, and wrote med. and surgical books and professional papers.

Lartet (ÉDOUARD), b. at St. Guérand, Fr., in 1801; was for many yrs. prof. of fossil paleontology in the Museum of Nat. Hist. at Paris. Among his numerous discoveries are the mammalian remains in the Miocene deposits of Gers, including entire skeletons of *Mastodon angustidens*, and affording the first proof of the existence of fossil monkeys in Europe. Subsequently he worked in developing the palaeontological results of excavations in the Miocene beds of Pitermi, and aided in exploring the caves of Périgord and publication of the results in the *Reliquiae Aquitanice*.

Lar'va [Lat. for "mask," so called because it was once believed to conceal a perfect insect], in the life of most insects and of many inferior invertebrate animals, the condition or stage of development which follows the hatching of the egg, and which in most insects is succeeded by the pupa or chrysalis state. The larvæ of flies (Diptera) are called maggots; those of coleopterous insects are grubs; those of moths and other Lepidoptera are caterpillars.

Laryngitis, lah-in-jit'is (from Gr. *larynx*, "larynx"), an inflammation of the mucous membrane lining the larynx. The cause is generally "a cold," or exposure to sudden changes of temperature; the symptoms consist of hoarseness, a sensation of tickling and dryness in the throat, and more or less cough and expectoration. Inhalations of infusion of hops may be used every 2 or 3 hours with decided advantage. (See THROAT, DISEASES OF.)

Laryngoscope, lah-ring-go-skôp [Gr. *larynx*, "larynx," and *σκοπεῖν*, to "examine"], an instrument employed for examining the condition of the diseased larynx, and also for observing the action of the vocal cords during phonation. It consists of 2 mirrors; the larger one, concave, throws light upon the smaller, which is held in the throat of the patient and illuminates the interior of the larynx, at the same time presenting a reversed image of the glottis, vocal cords, and surrounding parts. It is of great value in treating local diseases of the throat.

La Salle, city and R. R. centre, La Salle co., Ill., on the Ill. River, 99 m. S. W. of Chicago. It is at the head of navigation on the Ill., and is connected with Chicago by the Ill. and Mich. Canal. The adjoining city of Peru is practically a suburb of L. S. There is a good supply of bituminous coal within the city limits. Pop. 1870, 5200; 1880, 7847.

La Salle, de (JEAN BAPTISTE), D. D., b. at Rheims, Fr., Apr. 30, 1651; became a cathedral canon at Rheims when 17 yrs. old; became a priest 1761; devoted himself to the instruction of the poor; founded the Brothers of the Christian Schools, an order which received papal approval in 1725. Numerous miracles are credited to him, and in 1840 he was declared "Venerable" by Gregory XVI. D. Apr. 7, 1719.

La Salle (RENÉ ROBERT CAVALIER), SIEUR DE, b. at Rouen, Fr., in 1633; became a Jesuit, but, renouncing his profession, embarked for Canada in 1666; became a fur-trader; in 1669 set out to find the N. W. passage by way of the great lakes; explored Lake Ontario, and in 1671 discovered the Ohio; went to Fr. in 1674; was ennobled and received important grants in Canada. Returning in 1678 from another voyage to Fr., he explored the great lakes; descended the Ill. and the Miss., reaching the Gulf of Mex. Apr. 9, 1682, and named the region Louisiana. In 1683 he went to Fr., and tried in 1684 to plant a colony in La., but landed, in Mar. 1685, in Matagorda Bay, Tex., and built a fort. His followers were much reduced in numbers, and having decided to go by land to Canada, he was murdered by his own men on the banks of a branch of Trinity River, Mar. 19, 1687.

Las'ear [Hindoo, *lashkar*, an "army"], properly an E. I. camp-follower, but the name is now applied in the E. I. to boatmen, sailors, and other low-caste menials.

Las'earis, the name of 2 Gr. grammarians who took refuge in W. Europe after the overthrow of the Gr. empire by the Turks. ANDREAS JOANNES, b. about 1445, at Rhyn-dacus in Phrygia, whence he received the surname RHYNDACENUS, lived in It. and Fr. at the court of Lorenzo de' Medici, for whom he produced his *Anthologia Græca*; of Louis XII., who employed him in several diplomatic missions; and of Leo X. and Paul III. D. in 1535.—CONSTANTINE LASCARIS lived mostly at the court of Francesco Sforza in Milan, where he wrote his *Grammatica Græca*, but he also taught in Florence and Naples. D. in 1493.

Las'ker (EDWARD), b. Oct. 14, 1829, at Jarocin, Posen; studied jurisprudence and math.; spent 3 yrs. in Eng. studying Eng. const. and law, and received in 1856 an office in the Prus. govt. Since 1865, in which yr. he was elected a member from Berlin to the Prus. house of deputies, L. has devoted himself to his parliamentary career. At first his political conviction allied him with the progressive party, but when it became evident that Bismarck's policy aimed at the establishment of a united Ger., L. became one of the founders of the national liberal party, which still has the majority in the Parl. In the internal development of the empire he always stood for the strict fulfilment and judicious development of the law, and in pursuing this aim he paid regard to none. On all important laws of a more recent date, especially on those concerning trade and traffic, usury, imprisonment for debt, loans with premiums, etc., he exercised a decisive influence. The later development of Bismarck's internal policy he strenuously opposed. D. in New York, Jan. 4, 1884, on a visit to America.

Las'sa, **Lhassa**, or **H'Lassa**, the cap. of Thibet, situated in lat. 29° 30' N. and lon. 91° 40' E., on a plain 9500 ft. above the sea and encircled by lofty mts. It is a very lively and well-built town, with a pop. estimated at from 40,000 to 80,000, and an extensive trade in precious stones, gold, etc. Its prin. importance it derives from the Booddha-la, a temple, with adjoining palaces, monasteries, and schools. The Booddha-la is the residence of the Dalai Lama. Thousands of pilgrims come annually to visit it, and all of them leave behind them a present.

Lassalle (FERDINAND). See APPENDIX.

Las'sen (CHRISTIAN), b. at Bergen, Nor., Oct. 22, 1800; studied at Christiania, Heidelberg, Bonn, Paris, and Lond.; attracted great attention by his *Essai sur le Pali* and his ed. of *Hilopadesa*; became prof. in Indian langs. at the Univ. of Bonn in 1830. By his critical eds. and linguistic, archaeological, and historical writings he became the founder of the study of Indian lang., lit., and hist. in Europe. His prin. work is his *Indische Alterthumskunde*. D. May 9, 1876.

Las'so [Sp. *lazo*], or **Lariat** [Sp. *la riata*], a long thong of hide or rope used by Sp.-Amer. herdsmen and hunters for catching cattle, horses, or game. A running noose at the end is dexterously cast over the neck or legs of the beast, the other end of the L. being fastened to the saddle.

La'sus [Λᾶσος], son of Chabrinus or (according to Schneidewin) Charminus, a Gr. dithyrambic poet and hymn-writer of Hermione in Argolis, flourished about 510 B. C. He was the reputed teacher of Pindar. Only a fragment of a hymn to Demeter remains.

Las Vegas, on R. R., cap. of San Miguel co., N. M., 70 m. E. of Santa Fé, on the Pecos River; has hot mineral springs. Pop. not in census; about 1500.

Latakia'h, or **Ladiki'yeh**, the anc. Laodicea ad Mare, town in Syria, on the Mediterranean. It has many mosques and a considerable trade with Egypt, especially in tobacco; bears a gen. aspect of downfall. Pop. 10,000.

Lat'eran is the name of a place in Rome occupying the site of the estates of the anc. Rom. family *Lateranius*. The 2 prin. buildings situated in the place are the ch. of S. Giovanni and the palace. In the Lateran palace Gregory XVI., in 1843, established the Museum Gregorianum Lateranense for antiquities, the Vatican and Capitoline museums affording no more space. The ch. S. Giovanni in Laterano was for centuries the prin. ch. in Christendom. Five great ecumenical councils were held in its vaults. The popes are still crowned here, and from the balcony of its front façade the Holy Father blesses the people on Ascension day.

Lat'eran Coun'cils, held in the ch. of St. John Lateran in Rome, comprise 5 great ecumenical councils—viz. (1)

that convened by Calixtus II. and opened Mar. 18, 1123, by which the strife between the popes and the Ger. emps. concerning investiture was ended. (2) That convened by Innocent II. and opened Apr. 20, 1139, by which the anti-pope, Anacletus II., and all who had received office under him, were deposed. (3) That convened by Alexander III. and opened Mar. 2, 1179, by which it was established that henceforth the election of the popes shall be confined to the college of cardinals, and $\frac{2}{3}$ of the votes shall be required to make a lawful election. (4) That convened by Innocent III. and opened Nov. 11, 1215, by which a crusade was determined, the Waldenses were condemned, and the doctrine of transubstantiation established. (5) That convened by Julius II., opened May 3, 1512, and closed 1517. The acts of the Council of Pisa were annulled, the concordat concluded between Francis I. and Leo X.

Latés [properly *lato* or *latus*, Gr. *ἀλός*], a genus of large Perciform fishes, of which the type is *L. niloticus*, from which Latopis in Egypt took its name. This fish is the largest in that stream; it is 3 ft. long and of fine flavor. *L. nobilis* is an excellent food-fish of the tidal parts of the Ganges.

Lat'ex [Lat. for "juice"], the thick, milky juice of certain plants, as the milk-weed,celandine, etc. It is distinct from the true sap, and is contained in a set of tubes called "laticiferous vessels." Many important products, such as opium and caoutchouc, are the dried L. of some one or more species of plants.

Lat'ham (JOHN), b. at Eltham, England, June 27, 1740; studied med. and nat. hist.; established himself in 1763 as a phys. at Dartford, and was one of the founders of the Royal Society and of the Linnean Society. Beside papers on med. and nat. hist., he was the author of a *Gen. Hist. of Birds*. D. Feb. 4, 1837.

Lat'ham (MILTON S.), b. at Columbus, O., May 23, 1827, grad. at Jefferson Coll., Pa., 1845; became a lawyer of Ala., and was clerk of courts in Russell co. 1848-50; clerk of recorder's court, San Francisco, Cal.; dist. atty. 1850-51; M. C. from Cal. 1853-55; collector of port of San Francisco 1855-57; gov. of Cal. 1860; U. S. Senator 1861-67. D. Mar. 4, 1882.

Lat'ham (ROBERT GORDON), M. D., F. R. S., b. at Billingsborough, Eng.; was ed. at Eton and Cambridge, where he became a fellow of King's Coll. and received degrees in arts and in med.; became a lecturer at Middlesex Hospital; in 1841 prof. of Eng. lit. in Univ. Coll., Lond. Wrote *Nat. Hist. of Man, Man and his Migrations*, and several philological works, among which is a revised ed. of Johnson's *Dict.*

Lat'he [Fr. *tour*; Ger. *Drehbank*], a machine for shaping materials by the process called turning. It has a great variety of forms, as the "foot-lathe," the "engine-lathe," the "lathe for turning irregular forms." In the L. the material to be shaped is sustained by 2 "centres," between which it is given a motion of revolution, while a turning-tool, held by the hand of a workman or by a tool-holder attached to and moved by a "slide-rest," cuts away the exterior, and gives the mass the shape required in the finished piece.

The L. was known in very early times. Its invention is claimed by Diodorus Siculus for Talus, the grandson of Dædalus, or for Theodore of Samos (740 B. C.). It had previously been used in turning vases and other forms in clay; and the potter's wheel, which is a kind of L., was in use among the anc. Very rude L. were used in Europe at a period which antedates hist., and they are still met with in some parts of the country. Turned objects in wood were exhibited at the international exhibition at Vienna in 1873, made by the peasantry of Galicia, among the Carpathian forests, on these old L. The figure represents this lathe.



L. were adapted to other than cylindrical forms of revolution in comparatively modern times. The engine-L., with its slide-rest, was the invention of Joseph Bramah, an Eng. mech., in 1794. The L. for turning irregular forms was invented by an Amer. mech., Thomas Blanchard, about 1820. The metal-worker's engine-L. has been variously modified by many inventors. The most efficient and perfect machines of this class are built by the leading manufacturers of machine tools in the U. S. This is the most generally useful and most indispensable tool of the whole collection of the metal-worker, and it is hardly less important in wood-working. [From orig. art. in *J. S. Univ. Cy.*, by Prof. R. H. THURSTON.]

Lat'hop (JOHN HIRAM), LL.D., b. at Sherburne, N. Y., Jan. 22, 1799, grad. at Yale in 1819, and afterward taught in 1822-26; became a lawyer in 1826, and afterward taught in Norwich, Vt., and Gardiner, Me.; prof. of math. and natural philos. in Hamilton Coll. 1829-35; of law, hist., etc. 1835-40; pres. of the Univ. of Mo. 1840-49, chancellor of the Univ. of Wis. 1849-50, pres. of Ind. Univ. 1850-60, prof. of Eng. lit. in the Univ. of Columbia, Mo., 1860-62, and its pres. 1865-66. D. Aug. 2, 1866.

Lat'imor (HENN), D. D., b. at Thurcaston, Eng., about 1490, son of a yeoman; was ed. at Clare Hall, Cambridge, where he was chosen a fellow 1509; passed a bachelor 1510, and a master 1514; was cross-bearer to the univ., and in 1516 became Gr. prof.; was ordained a priest at Lincoln; became a Prot.; was dismissed from the univ. as a heretic 1527; became chaplain to Henry VIII. 1530, rector of W. Kingston 1531; was excommunicated, but absolved on his submission, 1532; chaplain to Anne Boleyn 1534; bp. of Worcester 1535; resigned 1539, not being able to accept the Six Articles, and

was imprisoned; was afterward silenced by authority and shut up in the Tower 1546-47; declined his former bishopric 1548; was preacher to Edward VI. 1549-50; imprisoned in the Tower by proclamation of Queen Mary 1553, transferred to Ox. 1554, tried and condemned 1555, and burned at the stake with Ridley Oct. 16, 1555.

Latimer (JAMES ELIJAH), A. M., S. T. D., b. at Hartford, Conn., Oct. 7, 1826, grad. in 1848 at Wesleyan Univ.; entered M. E. ministry; for many yrs. an instructor in sems. of his Ch., and held pastorates in N. Y. 1861-69; became in 1870 prof. of systematic theol. in Boston Univ. D. Nov. 27, 1884.

Lat'in Church, a name applied to the R. Cath., the Occidental, or W. Ch. It is antithetical to Gr. Catholic, as the title of the Oriental or E. Ch. After the separation of the Gr. Ch. from the Rom. (9th to 11th century) the Catholics of the W. were called Latins, because of their retention of the Lat. lang. in the ch. service. In association with this distinction we speak of the Lat. Fathers after (not before) the separation, the Lat. ritual, the Lat. clergy. (See MILMAN, *Lat. Christianity*.) C. P. KRACHT.

Latin Language is a member of the Indo-European family of langs., which embraces the Sans., Per., Lithuanian, Gr., Lat., and the Romance tongues, Celtic, Ger., and Eng. The Sans. is the oldest of them all, and throws light on the obscurities of all the rest. In former times it was customary to regard the L. lang. as descended, and that very directly, from the Greek. Others, who discovered in the L. lang. words and forms which occur in the Ger. and the Celtic, were led to believe that the L. was largely derived from the Celtic. We can only assert that the L. belongs to the same family as the above, but more closely resembling the Gr. in its oldest elements than any other member, and afterward, in historic times, following the development of the Gr. Certain langs. of It., the Oscan, Umbrian, Celtic, Messapian, and Etruscan, have affinities to the old L., and have substantially the same alphabet with it. The remains of the Sabine and Oscan belong to a period when the Sabines had mixed themselves up with the conquered Ausonians, and had learned their lang.; of this we have certain specimens. The most important of these are the *Bantine Table*, the *Cippus Abellanus*, and the *Tablet of Agnone*. The Bantine Table, now in the Museo Borbonico, is a bronze tablet found in 1793 at Oppido, on the borders of Lucania, and called *Tabula Bantina* from the name *Bantse* in the inscription, a city of *Bantia* in Apulia. The Cippus Abellanus, a stone tablet, was moved from Avella Vecchia to the modern v. of this name in 1685, and there used as a doorstep till in 1745 it was noticed and removed to the museum of Nola. The bronze tablet of Agnone was so called from the place near which it was found in 1848. The relics of Umbrian are contained on 7 tables in a state of perfect preservation. They were discovered in 1444 in a subterranean chamber at La Scheggia, near the anc. city of *Iguvium*, now *Gubbio* or *Ugubio*, and hence styled the *Iguvine* or *Eugubine* tables. They relate chiefly to matters of religion, and are written, some in Umbrian or in Etruscan, and others in Rom. characters. While the relation of the Celtic to the early L. is very obscure, yet there is reason to believe that the relation was important in earlier as in later times. The Celts had preceded all other races in the westward movement. There must have been a substratum of Celts in It. at a very early period, for anc. authorities assert their connection with the Umbrians. They are known also to have occupied the neighboring Liguria. The Messapians or Iapygians were settled in the S. of It. Scanty fragments of their dialect are found in the Terra d'Otranto; they are in Gr. letters, and almost always written from left to right. This dialect seems to have preserved the Lithuanian elements with little change; and, subjected to no influences but that of the Gr. colonists, it may be regarded as a pure remnant of the old It. The Etruscans were called, by the Grs., *Tyrrheni* and *Turseni*; by the Romans, *Tusci* and *Etrusci*; and by themselves, *Rasēna* or *Rasenna*. According to Herodotus, the Tyrrheni were originally Lydians, who during a grievous famine sought a new home, and under Tyrsenus came to the country of the Umbrians, which was thence called after him *Tyrsēnia*. Their lang. has been preserved in a great number of inscriptions on monuments and fictile vessels. The longest of these is one of 46 lines from Perugia. Their alphabet is the medium through which the Oscan and Umbrians seem to have derived their characters. The inscriptions are written in almost all cases from right to left.

The Alphabet.—The Semitic alphabet had originally 16 characters; the Oscan and the Umbrian had 20 each; the Etruscan 19, and the old L. 21. The Etruscan letters seem to be a modification of the Gr., with some new characters. But beside this Gr. alphabet borrowed from the earliest Hellenic settlers, there was a later set of Gr. characters, which the L. derived from the Grs. of Cumæ. But the Romans, showing in this their practical tendency, suppressed letters for which they had no sounds. In Cicero's time the number of letters was 21, but before his death classical L. confined itself to the use of the following 23 letters: A B C D E F G H I K L M N O P Q R S T V X Y Z. The Grs. retained the names of the old Phœnician hieroglyphics, but the Romans named the signs by their sounds.

The Old Latin.—We have some interesting remains of the old L., such as it was before Gr. civilization had begun to work upon it. For the earlier centuries we have only a few brief inscriptions of religious and legal import. As we approach the Punic war the inscriptions become more numerous, but we are here near the time when the L. lang. began to be modified under the pressure of Gr. influence. One of the most anc. specimens of the genuine Rom. lang. is the *Carmen Prætorium Arreianum*, the Song of the Arval Brothers, discovered on marble tablets in 1777. These tablets are probably not older than b. c. 219, but there is every reason to believe that the song itself was sung in the earliest ages of Rome. Two relics of a similar character have been preserved by fate. Further discoveries relating to the *Prætor*

Arvales were made in 1866 at the 4th milestone of the Via Portuensis, consisting of 72 lines containing the acts of the order. Several fragments of the Salian Hymns also have been handed down by Varro. Fragments of the oldest Rom. laws have been preserved by Varro, Pliny, and Festus, but the most copious as well as the most important are the remains of the *Duodecim Tabulae*, the Twelve Tables. These were engraved on tablets of bronze, and publicly set up in the Comitium B. C. 449. The *Epitaphs of the Scipios* are important specimens of early L. The inscription of the *Colonna Rostrata*, contained on a bronze tablet found at the foot of the Capitol in 1565, commemorates the naval victory of C. Duilius B. C. 260.

CHARLES SHORT.

Latin Literature. The literary life of the Romans may be divided into 3 periods: (1) The Archaic Period, beginning B. C. 240, when Livius Andronicus exhibited the first regular drama in L. at Rome; (2) The Middle Period, the Ciceronian and the Augustan age, which begins B. C. 83; (3) The Imperial Age, beginning A. D. 14.

The Archaic Period.—The earliest lit. was poetic, and the earliest author Livius Andronicus. He translated the *Odyssey* of Homer into Saturnians, and also rendered from the Gr. tragedies, imitating the easier Gr. metres. Cn. Naevius began to exhibit plays with more originality than Andronicus. T. Maccius Plautus was a prolific writer of comedy. He borrowed his plots from the Grs., but worked them up with great ability. Q. Ennius had a higher social and political position than the literary men that preceded him, and was the first to attain the full privileges of a Rom. citizen. His greatest work was the *Annales*, or hist. of his nation, from the arrival of Æneas in It. down to the poet's own time. He also wrote tragedies, mostly after Euripides, and *Saturne*. We possess them only in fragments. M. Pacuvius, the nephew of Ennius, was a painter and a poet. There are extant fragments of his tragedies imitated from Sophocles; we have the titles of 12 of his plays. To this period belong Statius Cæcilius, imitator of the Greek New Comedy, and Lucius Lavinius, the rival of Terence. P. Terentius came from Carthage to Rome. We have of him 6 comedies, and probably these are all that he wrote. Rom. prose was reached by an intermediate step, the earliest Rom. historians employing the Gr. lang. These were Q. Fabius Pictor and L. Cincius Alimentus. M. Porcius Cato was the first real L. prose-writer. His writings were numerous and various. He wrote *Origines*, but only his *De Re Rustica* has been preserved entire. There were orators of this period, as Fabius Maximus, M. Cornelius Cethegus, the Gracchi, and others; and also jurists, as Sextus Ælius, who wrote the first Rom. treatise on law. L. Attius or Accius wrote tragedies after the Gr., and dealt also with pure Rom. subjects. L. Afranius wrote *Fabula Togata*, of which we have the titles. C. Lucilius was the father of satire proper. An important literary work of Sulla's time has come down to us in the *Rhetorica ad Herennium*.

The Middle Period is the Golden Age of L. lit., and may be subdivided into the Ciceronian and the Augustan Age.

The Ciceronian Age.—M. Terentius Varro was an extensive writer, whose prose writings embraced lit., eloquence, hist., jurisprudence, gram., philos., geog., husbandry, etc. M. Tullius Cicero possessed, to a marvellous degree, the Rom. power of appropriating and assimilating foreign ideas. He enriched Rom. lit. by introducing into it several depts. not previously attended. He became the creator of a standard prose so refined and so suited to the genius of the L. lang. that it was never afterward surpassed. The real business of Cicero's life appears in his legal and political speeches, and here his ability shows to the greatest advantage. His later compositions also included political science, ethics, the philos. of religion, and theoretic philos. Beside all this, his extensive personal connections and his social disposition led to a voluminous correspondence. C. Julius Cæsar had the most varied talents; he was second as an orator only to Cicero—was an historian, a grammarian, a great statesman and gen. Of his literary works the most important has come down to us. Cæsar's style is a model of simplicity, precision, and directness, with little rhetorical ornament. Cornelius Nepos, the friend of Cicero and Atticus, and also of Catullus, was a somewhat voluminous writer of hist. and biography. T. Lucretius Carus, in his *De Rerum Natura*, in 6 books, treated of physics, of metaphysics, and the Epicurean ethics, in imitation of Empedocles and Ennius. C. Sallustius Crispus devoted the last yrs. of his life to hist. He was the first Rom. historian who wrote according to fixed rules. Like his great model, Thucydides, he was sententious and concise, sometimes even to obscurity. C. Valerius Catullus developed rich lyrical talent which was ripened by love and a bitter experience of life. The 116 pieces that have come down to us refer to such a variety of topics that it is hardly possible to classify them. P. Vergilius Maro, by way of eminence the Rom. poet, was alike distinguished for ability, learning, delicacy, and amiability. In the *Æneid*, which has taken its place among the great epics of the world, Vergil partly availed himself of Greek models, and partly relied on his extensive studies in It. legends, hist., and localities. Q. Horatius Flaccus has shared with Vergil the greatest popularity among all the Rom. poets. The branch of poetry he first cultivated was satire. He afterward resolved to transplant Alcæus and Sappho into Rom. soil, and the result is the 3 first books of the *Odes*. These are the most elaborate of all his works. The *Epistulae* are of the same gen. character as the *Satire*, but have higher qualities and are in a more perfect form; the third of the second book, the *Ars Poetica*, is the most famous of the Epistles. Albius Tibullus followed the Alexandrine poets in his choice of amatory subjects; his representations are natural and his style very simple. Sextus Propertius was also an elegiac poet, and a disciple of the Alexandrines, learned and often obscure, but lively and original. P. Ovidius Naso, the most prolific of the great poets of Rome, was carefully bred as a pleader, but from natural bent turned off into

the path of poetry. Wrote *Heroides*, *Libri Amorum*, *Ars Amatoria*, *Remedia Amoris*, *Metamorphoson Libri XI.*, etc. Ovid had a most fertile mind, possessed great mastery of form, and treated his subjects with inimitable ease and grace. T. Livius of Patavium (A. U. C. 695-770) was the most important prose-writer of the Augustan age; his great work was his hist. of Rome from the foundation of the city to A. U. C. 745. For his matter he drew especially on Polybius and the later annalists; but his manner, eminently natural and lively, of relating events and of depicting moods and characters, was his own.

The Imperial Age, the Silver Age of Roman Literature.—The First Century, A. D. 14-117.—M. Velleius Paterculus (A. D. 30) treated the hist. of the empire in his abridgment of Rom. hist. in 2 books. To the same period belongs Valerius Maximus, who wrote *Factorum et Dictorum Memorabilium Libri IX.* A. Cornelius Celsus, of the time of Nero, wrote on various practical matters. Phædrus, partly under Tiberius and partly under his successor, pub. his book of *Æsopian Fables*. L. Annaeus Seneca (A. D. 65) was the most brilliant figure of his time. His works were on a great variety of subjects, but composed with an aim to brilliancy rather than accuracy. Q. Curtius Rufus, under Claudius, wrote *Historia Alexandri Magni*, in 10 books. Contemporary with Seneca was Columella of Gades, who wrote *De Re Rustica*, in 12 books. Under Caligula or Claudius, Pomponius Mela wrote his *De Chronographia*, in 3 books, the earliest geog. we possess. A. Persius Flaccus (A. D. 34-62) wrote 6 satires. M. Annaeus Lucanus, a friend of Persius and nephew of Seneca (A. D. 39-65), wrote *Pharsalia*, in 10 books, an unfinished epic on the c. war between Pompey and Cæsar. In Nero's time arose that ethical novel which we have under the name of Petronius Arbiter, *Cena Trimalchionis*. C. Plinius Secundus, Pliny the Elder (A. D. 23-79), was a person of great literary activity. Of his works there is extant only his *Naturalis Historia*. The only poet of the time of Vespasian that has come down to us is Valerius Flaccus, whose *Argonautica*, in 10 books, is an imitation of Apollonius of Rhodes. Under Domitian, C. Silius Italicus (A. D. 25-101) wrote the *Punica*, a poem in 17 books. At the same period (A. D. 45-96) lived P. Papinius Statius, who wrote the *Thebais*, in 12 books; *Achilleis*, *Silvae*, in 5 books. Mostly under Domitian also lived M. Valerius Martialis (A. D. 42-102); we have by him 15 books of epigrams, turning on the social life of Rome in those days. M. Fabius Quintilianus (A. D. 35-95) holds a high place among the prose-writers of this period. He composed a work on the causes of the decay of oratory, *Institutio Oratoria*, in 12 books. Sextus Julius Frontinus (A. D. 40-103), a distinguished engineer, has left *Stratagemata* and *De Aquis Urbis Romæ*. The most eminent poet of the time of Trajan is D. Junius Juvenalis (A. D. 47-130). We have by him 16 satires, the last of which betray the infirmities and faults of age. Among the prose-writers of the time of Trajan, the first place has been conceded to C. Cornelius Tacitus (A. D. 54-119). His extant works are *Dialogus de Oratoribus*, *Agricola*, *Germania*, *Historia*, a narrative chiefly of the Flavian dynasty (A. D. 69-96); *Annales*, or *Ab Excessu Divi Augusti*, a hist. of A. D. 14-68. C. Plinius Cæcilius Secundus, Pliny the Younger, nephew and adopted son of Pliny the Elder (A. D. 62-113), was a fluent, smooth, and interesting writer. Wrote *Panegyricus*, *Epistulae*, and *Epistula Plinii ad Trajanum*.

Of the second century of our era are Suetonius, the author of the *Lives of the Twelve Cæsars*; Florus, who wrote an abridgment of Rom. hist.; Terentius Scaurus, the grammarian; the historian Appian, who wrote in Gr.; the jurists Ulpian and Gaius; the critic Aulus Gellius, author of the *Noctes Atticæ*; Appuleius, author of the *Metamorphoses*; Minucius Felix, whose *Octavius* is the earliest extant work of Chr. L. lit.; Tertullian, a defender of Christianity; Acron and Porphyry, the classic commentators; the *Versio Velut* of the Bible, afterward revised and called the *Vulgata*. In the third century we find the jurists Ulpian and Julius Paulus; Cyprian, bp. of Carthage, chiefly an apologist; Nonius the lexicographer; Terentianus Maurus, a writer on metres; Arnobius, a Chr. apologist; and Lactantius his pupil, the most elegant of all the Chr. Latinists. To the fourth century belong the grammarians Victorinus and Donatus; Eutropius the historian; the theologian Hilary; the poet Ausonius; Damasus, one of the earliest writers of Chr. hymns; Ammianus the historian; the grammarian Servius; St. Ambrose, whose hymns approach classical perfection; St. Jerome, the translator of the Bible and reviser of the earlier version; Prudentius, the greatest of the Chr. poets; Claudian, the last classic poet; and St. Augustine, the theologian, the greatest of the L. Fathers. This period, the period of decay, cannot well go beyond the time of the philos. Boethius, A. D. 500, and certainly not beyond the age of Justinian, under whom the great *Corpus Juris* was drawn up, in the middle of the 6th century. CHARLES SHORT.

Latînus, a king of Latium, was a son of Faunus and the nymph Marica, and the father of Lavinia, whom he gave in marriage to Æneas.

Latitude, on the earth, is the distance of a place from the equator measured on the meridian passing through the place, and expressed in denominations of circular measure. To the anc. geogs. the largest dimension of the known world was that which lay in the direction E. and W. Hence distances measured E. or W. from a meridian assumed as an axis of reference were called longitudes (Lat. *longitudo*, "length"), and those measured in the transverse direction latitudes (Lat. *latitudo*, "breadth"). Geographical L. is the angle made by the vertical (or perpendicular to the horizon) at the place and the plane of the equator; but as the earth is not truly spherical, this vertical is not usually coincident in direction with the radius drawn to the place from the earth's centre. The angle made by this radius with the plane of the equator is called the geocentric L. L. in the heavens is the distance, in angular measure, of any celestial object from the ecliptic, or plane of the earth's orbit, meas-

ured on a secondary (that is, a circle perpendicular to the ecliptic). The L. is geocentric if given as it would seem if observed from the centre of the earth, and heliocentric if given in like manner as if observed from centre of sun.

Latitudinarians, a former Broad-Ch. party in the Ch. of Eng. Their chief seat was Cambridge, and the reign of Queen Anne was their most flourishing period. They attempted to unite the Puritan and Presb. elements with the national Ch. They were Prot. and Low Ch. in their feelings, and Arminian or indifferent in doctrine.

La'to'na (Gr. *Leto*), the mother of Apollo and Diana by Jupiter. Pursued by a serpent sent by Juno, she fled to the floating island of Delos, which Jupiter fixed firmly for her, and where she bore him 2 children.

Latour d'Auvergne, lah-toor' dō-vārn', de (Théophile MALO CORRET), b. at Carhaix, Fr., Nov. 23, 1743; entered military service in 1767; served for some time in the Sp. army; was a capt. at the outbreak of the Revolution; fought in the republican armies of the Alps and the Pyrenees, and became the commander of a vanguard of 8000 men, which soon became famous as "the infernal column." In 1795 he retired from service, and making a sea-voyage he was taken by an Eng. cruiser and held as a prisoner of war till 1797. He re-entered the army, fought under Massena in Switz., and then at the head of his own company in Ger., where he fell at Oberhausen. His heart was embalmed and carried in a silver vase by his company, and his name continued to be called at roll till 1814, the oldest sergeant answering, "Died on the field of honor." D. June 27, 1890.

La Trappe, a valley in the dept. of Orne (Normandy), Fr., where in 1140 a Cistercian abbey was founded under severe rules. From this originated the Trappists.

La'tro (M. PORCIUS), of Sp. birth, flourished in Rome in the time of Augustus. He is highly spoken of by Quintilian, and also by the elder Seneca. He d. b. c. 4, having taken his own life while suffering from a severe fever. His writings have perished.

Latrobe, R. R. junco, Westmoreland co., Pa., 41 m. E. of Pittsburg, on the Loyalhanna Creek; is the seat of the Convent of St. Vincent and St. Xavier, and of a coll. Pop. 1870, 1127; 1880, 1815.

Latrobe (BENJAMIN HENRY), b. in Eng. May 1, 1767; was ed. at the Univ. of Leipzig; served in the Prus. army (1785); returned to Eng.; studied arch.; became surveyor of public offices of Lond. (1788); came to the U. S. in 1796, built the bank of Pa., the Schuylkill water-works, the cathedral and exchange at Baltimore, completed the capitol of the U. S., and rebuilt it after its destruction in 1815; built steamboats at Pittsburg in the same yr. D. Sept. 1820.

Latrobe (BENJAMIN H.), b. in Phila. Dec. 19, 1806, grad. at St. Mary's Coll., Baltimore, 1823; studied law, and was admitted to the bar; after practising his profession in N. J. and Baltimore for a few yrs., became a C. E.; in 1830 was appointed assistant to the chief engineer of the Baltimore and O. R. R. Co., locating the Wash. branch of that road and that between Point of Rocks and Harper's Ferry, and many other important divisions; was chief engineer of the Baltimore and Port Deposit R. R., locating and completing it; in 1842 became chief engineer to the Baltimore and O. R. R., and finished the road to Wheeling, Va.; was chief engineer and pres. of various R. Rs., beside consulting engineer for the U. S. and for various States. D. Oct. 19, 1873.

Latter-Day Saints. See MORMONISM.

Lattimore (SAMUEL ALLAN), Ph. D., LL.D., b. at Liberty, Ind., May 31, 1828, grad. in 1850 from Asbury Univ., Green- castle; became prof. of Gr. at the same univ. in 1852, of natural science at Genesee Coll., Lima, N. Y., in 1860, and of chem. at the Univ. of Rochester in 1867.

Laube, löw'beh (HEINRICH), b. at Spottan, in Silesia, Sept. 18, 1806; studied at Halle and Breslau, settled in Leipzig; was often persecuted, and several times imprisoned, for his participation in the revolutionary movements of his time; was director of the Burg theatre of Vienna from 1849 to 1867, and of the theatre of Leipzig in 1868-69. His writings are partly historical—*Das Burgtheater*, etc.; partly travelling sketches and novels—*Das junge Europa*, etc.; partly dramas—*Die Carlschüler*, *Graf Essex*, etc. D. July 31, 1884.

Laud (WILLIAM), b. at Reading, Eng., Oct. 7, 1573, was the son of a rich clothier; entered St. John's Coll., Ox., in 1589; became a fellow in 1593; took his degree as M. A. in 1598, and was ordained a priest in 1601. From 1601 to 1621, in which latter yr. he was consecrated bp. of St. David's, he held several minor positions. In 1607 was appointed vicar of Stanford, Northamptonshire; in 1609 rector of W. Tilbury, Essexshire; in 1611 pres. of St. John's Coll., Ox., and in 1615 archdeacon of Huntingdon. In 1617 he accompanied King James to Scot., and an attempt was made to introduce episcopacy into the govt. of the Scotch Ch., but it failed. After the accession of Charles I., L. was removed to the see of Bath and Wells in 1626, and in 1628 to that of Lond. In 1624 he was made a member of the court of high commission, in 1627 a privy councillor, and after the assassination of Buckingham he actually became prime minister. In 1630 he was chosen chancellor of the Univ. of Ox., and in 1633 he was made abp. of Canterbury. These powerful and influential positions he used with more passion than prudence, and more energy than justice, to carry through his ecclesiastical views. The result was a deep and implacable hatred. In 1635 a new attempt was made to introduce the episcopacy into the Scotch Ch., and this time it led to the Scotch rebellion, which ushered in the Eng. revolution. When in 1640 the Long Parl. met, the abp. was impeached for high treason, and by order of the Commons brought to the Tower. There he remained 3 yrs., exposed to many indignities. At last his trial came on, and although he defended himself admirably, and was not found guilty by the Lords, the Commons sentenced him to death and gave order for his execution, which took place June 10, 1644.

Lau'danum, the tincture of opium, made by soaking

the dried and powdered drug in alcohol. It is a valuable opiate, though of variable strength. It ought never to be given to young children as a domestic remedy. It has a more stimulant and astringent effect than morphine.

Lau'der (Sir THOMAS DICK), BART., b. near Edinburgh in 1784; was a contributor to *Blackwood's Magazine* from its commencement, and so successfully imitated Sir Walter Scott that several of his tales were attributed to the author of *Waverley*; was member of scientific and antiquarian societies, and edited several works on nat. hist. D. May 29, 1848.

Lau'derdale (JAMES MAITLAND), EIGHTH EARL OF, b. in Scot. in 1759; entered Parl. in 1780; was one of the managers of the impeachment of Warren Hastings in 1788; succeeded to the title in 1789, and was elected one of the representative peers of Scot.; favored the Fr. Revolution; visited Fr. and formed an intimacy with the leading Girondists; opposed all the war-measures of Pitt; resigned his seat as representative peer, became a citizen of Lond., and on the accession of the Whigs in 1806 became a baron of the United Kingdom, privy councillor and chancellor of Scot. In Aug. 1807 he was charged with an unsuccessful mission to Fr. to treat for peace; resigned the chancellorship the same yr.; continued in the House of Peers to oppose the war-policy; in 1816 endeavored to obtain the release of Nap. from St. Helena by act of Parl. He wrote *An Inquiry into the Nature and Origin of Public Wealth* and a treatise on the system of govt. for India. D. Sept. 13, 1839.

Lauderdale (JOHN MAITLAND), DUKE OF, b. at Lethington, Scot., May 16, 1616; ed. as a Covenanter; was com. to treat with Charles I. in his prison in the Isle of Wight, and obtained the signature of the treaty known as the "Engagement" (Dec. 26, 1647), by which the king was again recognized in 1647; was taken prisoner at the battle of Worcester (Sept. 1651), and remained 9 yrs. in the Tower and other prisons; was made sec. of state and high com. in Scot. by Charles II. in 1660; received in succession all the highest posts in Scot., of which he was the virtual ruler for many yrs.; was created duke of Lauderdale in 1673, raised to the Eng. peerage in 1674 as Earl Guilford, and sworn of the privy council, forming a member of the celebrated *Cabal* ministry. D. Aug. 24, 1684.

Lau'don, von (GIDEON ERNST), BARON, b. at Trothen, Livonia, Oct. 10, 1716, of a Scot. family; entered the Rus. military service, but was dismissed with the rank of lieutenant; offered his services to Frederick II. of Prus., but was not accepted; went to Vienna, was employed as a capt., and fought in the Bavarian and in the second Silesian war. After the peace he was removed to a regiment stationed on the Tur. frontier. In the first yr. of the Seven Years' war he distinguished himself as col., and in 1757 was made a gen. At Kunersdorf (Aug. 12, 1759) he turned the victory which the Prus. had gained over the Rus. into a complete rout of the Prus. army. Having been made a field-marshal he defeated the Prus. at Landshut (June 29, 1760), and took Schweidnitz (Oct. 1, 1761). After the peace he lived in retirement, until Joseph II. placed him at the command of the whole Aus. army in the war against the Turks, who were repeatedly defeated and Belgrade was taken. In the Bavarian war of succession he commanded the Aus. army. The Aus. empire gave him the title of generalissimo. D. July 14, 1790.

Lau'enburg, duchy of N. Ger., bounded by Holstein, Mecklenburg, Hamburg, and Hanover. Area, 454 sq. m. Pop. 49,185. Cap. Ratzeburg, the only other towns being Lauenburg and Mölln. In 1864, after the Dan. war, it was ceded to Aus. and Prus., and by the convention of Gastein (1865) it was acquired by the king of Prus. for the sum of 1,875,000 thalers, paid from his own pocket, whereupon he became its duke.

Laughing Gas. See NITROGEN.

Laughing Jackass, or Dace'lo, a kind of Australian kingfisher, a rather large and handsome bird. It takes its popular name from its harsh, dissonant cry, which greatly resembles the so called laugh of the hyena.



Laughing Jackass.

Laughlin (JAMES L.), Ph.D. See APPENDIX.

Laughter, laf'ter [A.-S.

lithian] is the expression, principally through the muscles of the face and of respiration, of certain emotions, usually of a pleasurable character. The angles of the mouth are drawn backward and upward, the upper lip is slightly raised, the lower eyelids partially closed, and to a less extent the upper lids, smoothing the brows and wrinkling the skin at the outer angle of the eyes. The latter acquire a bright appearance. With an increase of emotion the mouth opens, and the facial movements mentioned become more decided. A deep inspiration occurs, followed by short, jerky expiratory movements, particularly of the diaphragm, producing, by the expulsion of air between the vocal cords, the voice sounds recognizable to the ear as a laugh; differing from a cry of distress, in the latter having a short inspiratory and a prolonged expiratory sound. When L. becomes violent the respiratory movements are greatly increased; the heart beats excitedly; the face becomes congested; tears flow; the whole body may be arched forward, more frequently backward, and various purposeless movements are made by the arms and legs, while involuntary exertions may take place.

According to several writers, incongruity is the prime cause of L., but the incongruous does not always produce L. Spencer states that liberated nerve-force, which produces what we call feeling, must expend itself in some direc-

tion, and if, of the several channels it may take, one or more are wholly or partially closed, the discharge must be more intense along the remaining ones. It is the tendency of nervous excitation, if sufficiently intense, to result in muscular action. If, then, the nervous energy can expend itself in setting up activities in other parts of the brain—i. e. if the emotions are exhausted in setting up a train of thought or other emotions, no muscular expression will follow; but if this outlet of force is insufficient, or the process is suddenly arrested by the substitution of an excitation insufficient to give rise to feelings of equal or greater intensity, the emotion will result in muscular action. L. naturally results only when consciousness is, unawares, transferred from great things to small—i. e. when the totally unlike state of consciousness, suddenly produced, is inferior in mass to the preceding one. Aside from incongruity, L. may be produced by an exuberance of pleasurable feelings, particularly in the young and those who have little voluntary control over the emotions; also from tickling, cold, pain, and certain disorders of the nervous system, as the hysterical laugh, so frequently associated with weeping. There is also the sardonic laugh. L. is naturally involuntary and purposeless, but is imitated as a means of expression when it becomes both purposive and voluntary. Man and monkeys are the only animals that truly laugh. Bibliography: HERBERT SPENCER, "The Physiology of Laughter," in *Illustrations of Universal Progress*; DARWIN, *The Expression of the Emotions in Man and Animals*. W. R. BIRDSALL.

Laugier, lō-zhe-ā' (ANDRÉ), b. at Paris Aug. 1, 1770; was employed early in the Fr. Revolution in collecting the bells from the chs. to be melted into cannon; was afterward at the head of the office for the manufacture of powder; served in the med. corps of the army; became prof. of pharmacy and chem. at several insts., assistant prof. at the Museum at Paris in 1802, and prof. in 1810. He made important chemical discoveries; was long a member of the dept. of public instruction, and with Fourcroy was the organizer of a large number of colls. and lyceums; and wrote *Cours de Chimie générale*. D. Apr. 18, 1832.

Laugier (AUGUSTE ERNEST PAUL), son of the preceding, b. in Paris Dec. 22, 1812; studied astron.; obtained a post in the observatory at Paris; made discoveries in regard to magnetism, comets, eclipses, meteors, and solar spots; made improvements in astronomical clocks; determined the exact lat. of the Paris observatory (1853), correcting previous errors, and wrote astronomical papers; was long associated with Arago in researches on terrestrial physics, and was for some yrs. pres. of the Acad. of Sciences. D. Apr. 5, 1872.

Laurææ [from *Laurus*, the typical genus], a natural order of exogenous plants, chiefly trees, often of great size, mostly tropical, produces trees of great economic value. Among its products are cassia, cinnamon, and camphor. The sassafras, bay, and a few other shrubs and trees of the U. S. are laurææous.

Lau-rel [Lat. *Laurus*], a name properly belonging to the *Laurus nobilis* or bay tree of the Old World. Its essential oil is employed in perfumery; its fruit yields a fixed oil, used in veterinary med.; its flowers afford rich bee-pasture; its leaves were the material of the laurel crown of victors in war and of successful poets and artists. The name is often loosely extended to all the Laurææ, to which this tree belongs. The Californian L. is of this family, and is notable for its valuable wood and its pungent foliage. Shrubs of the genus *KALMIA* (which see) are called L. in the U. S., and the larger rhododendrons of our country are called mt.-L. The evergreen cherry trees are called CHERRY LAUREL (which see). In Eng. they are simply called laurel.

Laurel Hill, a cemetery within the limits of the city of Phila., on the left bank of the Schuylkill. The grounds comprise more than 20 acres, picturesquely situated upon several hills, and are ornamented with great taste.

Laurence (RICHARD), D. C. L., b. at Bath, Eng., in 1760, grad. at Corpus Christi Coll., Ox., in 1782; took orders in the Ch. of Eng.; preached the Bampton lectures 1804; was appointed soon after to the rectory of Mersham; became regius prof. of Heb. and canon of Christ Ch., Ox., 1814; abp. of Cashel 1822. He was one of the restorers of Oriental studies in Eng., and recovered from Ethiopic MSS. several apocryphal works, often quoted by the early Fathers, but supposed to have been lost. He wrote *A Dissertation on the Logos of St. John*, a treatise *On the Existence of the Soul after Death*, and numerous occasional essays and sermons. D. Dec. 28, 1838.—His elder brother, FRENCH LAURENCE, LL.D., regius prof. of civil law at Ox., wrote *Critical Remarks on Detached Passages of the N. T.* and other works, but is best known by his *Correspondence with Edmund Burke*. D. 1809.

Lau-rens (HENRY), b. at Charleston, S. C., in 1724, of Huguenot stock; acquired an ample fortune in mercantile business, and was conspicuous in the contests with the Crown admiralty judges. He went to Eng. in 1771, and strove to avert a war; became in 1774 pres. of the S. C. cong.; in 1776 was sent to the General Cong., of which he was pres. 1777-78. In 1779 he was sent as U. S. minister to the Netherlands, but was made a prisoner by the Brit. while at sea, and kept a close prisoner in the Tower for 15 months. In 1781 he was released, and appointed by Cong. one of the coms. to negotiate a peace, with Franklin and Jay as his colleagues. By a direction in his will his body was burned and the bones afterward buried. Many of his pamphlets and other papers have been reprinted. D. Dec. 8, 1792.

Laurens (JOHN), son of the preceding, b. in 1753, was ed. in Eng., and in 1777 joined the army, and was placed upon the staff of Washington. From Monmouth to Yorktown he was in all of Washington's battles. He wounded Gen. Charles Lee in a duel. In 1780 he went as a special minister to Fr., and negotiated a loan. Returning, he served under Greene, and was killed in the contest on the Combahee, Aug. 27, 1782.

Laurentian Mountains, the prin. range of Brit. Amer., forming the watershed between Hudson's Bay, the

St. Lawrence, and the great lakes, and between the same bay and the Mackenzie River. It rises near the Atlantic sea-coast of Labrador, sweeps S. W. across the Ottawa River to Lake Ontario at its outlet, thence curving N. W. skirts Georgian Bay, Lakes Huron and Superior, and thence N. to the Arctic Ocean, with a total length of 3000 m. The fundamental series of rocks consists of highly metamorphosed sedimentary deposits of hornblende and micaceous gneiss, alternating with mica schist, and abounding in beds of crystallized limestone and of magnetic oxides of iron, as well as vast masses of granite, syenite, and greenstone. This system is believed to be the oldest on the globe.

Laurentius, SAINT, was, according to tradition, a pupil of Sixtus II., who made him deacon, and afterward archdeacon and treas. at Rome. In 258 A. D. the magistrate, during the Valerian persecution, commanded L. to reveal the treasures of the Ch.: the saint collected a company of poor, sick, lame, and blind persons, and presented them as the required treasures, for which act he was condemned to be broiled alive.

Laur'estine, or **Laurestinus**, the *Viburnum Tinus*, an Old-World shrub, one of our finest cultivated evergreens, belonging to the order Caprifoliaceæ. It has somewhat poisonous qualities.

Laur'ic Acid [Lat. *laurus*, "laurel"], **Laurostearic Acid**. This fat acid belongs in the fatty group of monatomic acids, and was first described by Marsson from the fat of the bay tree (*Laurus nobilis*). Gideon E. Moore also found it in the wax of *Myrica cerifera*. L. A. also exists in other like vegetable bodies, sometimes in connection with myristic acid, as in *Myrica cerifera* and the so called Dika bread (*Mungifera Gabonensis*), and in a salve-like fat obtained from *Coccus Azin*, the *Age* or axin of the Mex. In connection with many other fatty acids, it exists in spermaceti and in the oil of the cocoa-nut. It fuses at about 43° C. to a colorless oil, and solidifies to a scaly crystalline white mass, and crystallizes from its alcoholic solution in white tufts and silky needles, or sometimes in nearly translucent scales. It dissolves readily in alcohol, and yet more freely in ether. Its alcoholic solution has a feebly alkaline reaction. It is quite insoluble in water, but when boiled in it volatilizes with the vapor. The sodium, potassium, and barium salts of lauric acid are soluble in water.

Lau'rine [Lat. *laurus*, "laurel"], or **Bayberry Camphor**, a crystalline body from berries of the bay tree.

Lauriston, de (JACQUES ALEXANDRE BERNARD LAW), MARQUIS, b. in Pondicherry, India, Feb. 1, 1768; was a companion of Nap. at the military school of Paris, and distinguished himself in war and diplomacy during the Revolution, the Consulate, and the Empire. The battle of Wagram was decided by his valor and judgment, and he was the negotiator of the marriage of Nap. with Maria Louisa. He was favored by Louis XVIII., being made a marquis in 1817 and marshal of Fr. in 1821. D. June 10, 1828.

Lausanne, lō-zan' [anc. *Lausannum*], city of Switz., cap. of the canton of Vaud, on the N. shore of Lake Geneva, built on 2 hills, connected by a bridge of granite, has a beautiful Gothic cathedral, commenced about 1000, many good educational insts., and several manufactories of tobacco, leather, and gold and silver ware. L. is famous in literary annals from having been the residence of Haller, Voltaire, and Gibbon. Byron wrote here his *Prisoner of Chillon*. An ecclesiastical council was held here in 1449, a conference between Calvin, Farel, and Viret in 1536, leading to the adoption of the creed of the Reformed faith; it has been the scene of a peace cong. (Sept. 1871) and a Masonic universal convention (1875). Pop. 30,179.

Lauzun, lō-zun, de (ARMAND LOUIS DE GONTAUT), DUKE, b. in Paris Apr. 15, 1747; commanded a naval expedition which captured Senegal and Gambia from the Eng. (1779); took part in the Amer. war (1780-83); afterward succeeded to the title of duc de biron; was a deputy to the States-Gen.; a confident and secret agent of the duke of Orleans; appointed gen.-in-chief of the army of the Rhine 1792; of the army of the coasts of La Rochelle 1793; took Saumur, and defeated the Vendéans at Parthenay. He then tendered his resignation, but being accused of too great lenity to the Vendéans, he was deposed, thrown into prison, tried for conspiracy before the Revolutionary tribunal, and executed the same day. D. Dec. 31, 1793.

La'va [Lat. *lavare*, to "wash"], the material which has escaped from a volcanic crater. The term is applied generally to those volcanic rocks which are filled with ragged cells. If very light and loose, it is called scoria or slag.

Lava Ornaments are made of iron slag, which is manufactured into small ornamental articles.

Laval, de (FRANÇOIS DE MONTMORENCY), b. at Laval, Fr., Mar. 23, 1632; became a priest in Paris 1645; declined the bishopric of Cochinchina in 1651; became archdeacon of Evreux in 1653; bp. of Petrea in *partibus* and vicar-apostolic of New France in 1658. In 1663 he founded the sem. of Que., and in 1666 consecrated the parish ch. of Notre Dame. In 1674 he was bp. of the new see of Que., from which he retired in 1688 to his sem., to which he gave his possessions. He was *de facto* ruler of Canada, in civil as well as ecclesiastical affairs. The Laval Univ. at Que. commemorates his name. D. May 6, 1708.

La Vallière, lah vah-le-air', de (LOUISE), b. in 1644 in the prov. of Touraine, Fr.; was one of the "filles d'honneur" of the duchess of Orléans (Henrietta of Eng.), when she became in 1661 the mistress of Louis XIV. She entered a convent as soon as the passion of Louis XIV. for others allowed her to bury herself in a religious life. The king took her forcibly once from the convent in 1670, but at last, in 1675, she took her religious vows under the name of *Sœur Louise de la Miséricorde*. She left *Letters and Reflections on the Mercy of God*. D. 1710.

Lavandu'la Spica, the broad-leaved lavender, yields oil of spike (the true but not the common commercial article), valued by painters and artisans, and used in farriery.

Lavater, lah'vah-tet (JOHANN CASPAR, b. at Zurich, Switz., Nov. 15, 1741; studied theol., and in 1764 was appointed preacher, first of the orphan house, then of St. Petri ch. in his native town, which position he held till his death, in 1801. Though he was one of the supporters of true religion in an age of barren rationalism, his theological writings have been forgotten. But his *Physiognomische Fragment*, which he pub. 1775-78 in 4 large vols., profusely illustrated and very expensive, will never cease to interest mankind.

Lavender, the *Lavandula vera*, a labiate shrub, a native of S. Europe, extensively cultivated for its volatile oil, much used in perfumery for L-water, spirit of L., etc.

La'ver, a name applied to several edible sea-weeds, such as *Ulva latissima*, *Porphyra laciniata*, and *P. vulgaris*. These are quite commonly eaten as luxuries in Europe, either pickled or stewed.

Lavialle (PIERRE JOSEPH, D. D., b. at Mauriac, Fr., in 1820; came when 23 yrs. old to the U. S.; was ordained a R. Cath. priest; served for a while in New York, and subsequently became pres. of St. Mary's Coll., Ky., 1855-65. In the latter yr. he was made bp. of Louisville, and founded a number of schools and charitable insts. D. May 11, 1867.

Lav'ington (GEORGE, D. D., b. in Eng. in 1683; became canon of St. Paul's, Lond., in 1732, and in 1747 bp. of Exeter. Becoming involved in a controversy with Wesley and Whitefield, he wrote in 1749 *The Enthusiasm of the Methodists and Pietists Compared*, and in 1755 *The Moravians Compared and Detected*. He subsequently partially retracted his lang. toward Wesley, D. 1762.

Lavoisier, lah-vwah-ze-ä' (ANTOINE LAURENT), b. at Paris Aug. 16, 1743; studied at the Collège Mazarin; pursued astronomical knowledge under La Caille; learned bot. under Bernard de Jussieu; worked in Rouelle's chemical laboratory in the Jardin des Plantes; became an associate of the Acad. in 1768; obtained a farmer-generalship in 1769; took a prominent part in public affairs; discovered the composition of water in 1783, and made many important researches in physics. In chem. he made important discoveries and great inventions in apparatus and in methods of work; was the destroyer of the theories of Stahl and Priestley, and the prin. inventor of the system of chemical nomenclature which prevailed for more than 50 yrs. after his death. He was guillotined by the Jacobins on account of his former connection with the farming of the taxes. The most important of his works are *Traité de Chimie* and *Mémoires de Physique et de Chimie*. D. May 8, 1794.

Law (EDMUND, D. D., b. near Carmel, Eng., in 1703; was ed. at St. John's Coll., Cambridge, of which he was chosen fellow in 1723; obtained the rectory of Greystock in 1723; became archdeacon of Carlisle in 1743, master of Peterhouse Coll., Cambridge, in 1754, librarian of the univ., prof. of casuistry, and archdeacon of Lincoln, soon afterward prebendary of Durham in 1767, and bp. of Carlisle in 1768. Among his works are an *Enquiry into the Ideas of Space and Time*, *Considerations on the Theory of Religion*, *Reflections on the Life and Character of Christ*, and *Considerations*, to which has been added a *Life* by Dr. Paley, D. Aug. 14, 1787. — His eldest son, EDWARD, was the first Lord Ellenborough; another son, GEORGE HENRY (1761-1845), became bp. of Chester in 1812 and of Bath and Wells in 1824; and a third son became bp. of Elphin.

Law (JOHN, of LAURISTON, b. in Edinburgh Apr. 21, 1671, eldest son of a goldsmith and money-changer who accumulated a fortune and bought the estate of Lauriston. At the age of 20 L. settled in Lond., and soon became prominent in financial circles. Having killed an antagonist in a duel (1694), he was condemned to death, but escaped to Fr., travelling thence into It. and Hol., and was for some time connected with a banking-house in Amsterdam. Returning to Scot. in 1700, he wrote a pamphlet advocating a state bank. For several yrs. he led a wandering life in European capitals, gaining large sums at the gaming-table, until the death of Louis XIV. in 1715 opened a field for his grand scheme. A private "general bank," with a cap. of 6,000,000 livres, was chartered May 1716, and began to emit vast quantities of notes redeemable in specie, discounting bills of exchange, and accepting at par govt. paper, then at 80 per cent. discount. L. was hailed as a national benefactor, and in a few months had issued notes for nearly 20,000,000 livres, and in Apr. 1717 the govt. decreed that they should be accepted in payment of imposts. Another feature was added to the scheme in Aug. 1717, by the formation of the Miss. or W. I. Co., with a cap. of 100,000,000 livres, a monopoly of trade with Canada, and sovereign rights over the terr. of La. Parl. in Aug. 1718 prohibited the receipt of L.'s bank-notes in payment of taxes, but the decree of Parl. was declared invalid. By royal edict of Dec. 4, 1718, the "general bank" was transformed into a royal bank, with L. as director and the king as security. Another edict of May 1719 conferred a monopoly of E. I. and Afr. trade upon the organization, which now absorbed the E. I. Co., took the name of "Company of the Indies," and undertook to pay the national debt, agreeing to lend the king 16,000,000 livres at 3 per cent. A fever of speculation now carried the shares to 30 or 40 times their original value, and nearly 20,000,000 notes were issued. On Jan. 5, 1720, L. received the appointment of controller-gen. of the finances, and in Mar. he united the royal bank to the Company of the Indies. The govt., becoming alarmed, issued an edict deposing L. from the controllership, abolishing the bank, and depriving the company of its home monopolies and its connection with the state revenues; the company disappeared in Nov., and in Dec. L. quitted Fr., carrying with him only a few hundred louis-d'or. He travelled on the Continent for some time, returned to G. Brit., received a pardon for his early crime, and was presented at court. A friend in Fr. gave him for some yrs. a pension of 20,000 livres. He gradually fell into obscurity, and d. in poverty Mar. 21, 1729. (See THIERS'S *Histoire de Law* and MACKAY'S *Memoirs of Extraordinary Popular Delusions*.)

PORTER C. BLISS.

Law (JOHN), b. in New London, Conn., in 1796, son of Lyman, grad. at Yale Coll. 1814; was admitted to the bar in 1817; emigrated to Ind. and located at Vincennes, where he was successively elected prosecuting atty., member of the legislature (1823), and judge, holding the latter office 8 yrs. In 1838 he was appointed receiver of public moneys, in 1855 judge of the court of land claims; was elected M. C. in 1860, and re-elected in 1862. He drew up and reported the bill assigning a pension to the surviving soldiers of the Revolution.

Law (JONATHAN), b. at Milford, Conn., Aug. 6, 1674, grad. at Harvard in 1695; studied law and practised at Milford; was a magistrate for more than 30 yrs., having been chief-justice from 1735 to 1741, and gov. from 1741 until his death in May 1741.

Law (LYMAN), b. at New London, Conn., Aug. 19, 1770, grad. at Yale Coll. 1791; studied law with his father, Richard; served in the State legislature, of which he was at one time speaker, and was M. C. 1811-17. D. Feb. 3, 1842.

Law (RICHARD, LL.D., b. at Milford, Conn., Mar. 17, 1733, son of Gov. Jonathan, grad. at Yale 1751; studied law, and practised at New London, where he became chief judge; delegate to Continental Cong. 1777-78 and 1781-84; mayor of New London for more than 20 yrs.; justice and chief-justice of supreme court of State, and dist. judge by appointment of Washington, D. Jan. 26, 1806.

Law (WILLIAM), b. at King's Cliffe, Eng., in 1686; was admitted into Emmanuel Coll., Cambridge, 1705; became a fellow 1711; grad. as M. A. 1712; took orders, and preached for a time in Lond., but on the accession of the house of Brunswick to the throne (1714) forfeited his fellowship, by refusing as a Jacobite, to take the oath of allegiance. In 1717 the bp. of Bangor, having in a sermon before the king given rise to the famous "Bangorian controversy," L. wrote in reply *Three Letters to Bp. Hoadley*, which placed him in the front rank of the defenders of authority both in Ch. and State. In 1729 he wrote his masterpiece, the *Serious Call to a Devout and Holy Life*. Between 1733 and 1736 he became acquainted with the writings of the Ger. mystic, Jakob Böhme, and adopted his teachings. In 1740 a wealthy widow, Mrs. Hutcheson, and Miss Hester Gibbon resolved to spend their lives in a quasi-conventual manner, devoting their fortunes to charity, and engaged the services of L. as chaplain and almoner. The three thenceforth resided at King's Cliffe, and L. prepared a series of works expounding the doctrines of Böhme. D. Apr. 9, 1761.

Lawes (HENRY), b. about 1600 at Salisbury, Eng., where his father was vicar-choral in the cathedral. Educated as a classical musician, he became about 1625 one of the "gentlemen of the royal chapel" to Charles I., and acquired celebrity as a composer of music for masques and songs. Milton's *Masque of Comus* was set to music and brought out under his personal direction at Ludlow Castle. The music of L. was of the It. style, and was of very unequal merit. He remained in the service of the king until 1649, and composed the anthem for the coronation of Charles II. He put forth in 1653 *Agnes and Annabones, for One, Two, and Three Voices*, comprising 150 pieces. D. Oct. 1662.

Law'ler (JOAB), b. in N. C. June 12, 1796; was ed. for the ministry, and became a Bap. clergyman; served from 1826 to 1831 in the Ala. legislature; was elected State senator 1831; was receiver of public moneys 1832-35, treas. of the Univ. of Ala. 1833, and M. C. 1834. D. May 8, 1838.

Lawn, from the Old Eng. *læwand*, an open clear place, meant formerly an open space between woods, but is now mostly restricted to a space of ground covered with grass for ornamental purposes. The soil should be well provided with manure, and worked so deeply as to allow the plant to extend its roots below the stratum generally reached by a surface-drought. The seed should be a mixture of red-top and white clover, in the proportion of 3 parts of the former to 1 of the latter. A third and indispensable condition is frequent mowing, and each spring a little top-dressing, especially on any poor spot.

Law of Nations. See INTERNATIONAL LAW.

Law'rance (JOHN), b. in Eng. in 1750, came to New York in 1767; was admitted to the bar in 1772; was aide-de-camp to Washington in 1777, and judge-advocate at the trial of André; member of old Cong. 1785-86, of the new Cong. 1789-93; U. S. dist. judge 1794-96; U. S. Senator 1796-1800, presiding over the Senate in 1798. D. Nov. 10, 1810.

Law'rence, city and R. R. centre, cap. of Douglas co., Kan., on both sides of the Kansas River, which affords good water-power; 38 m. S. W. of Leavenworth; is the seat of the State Univ. L. was founded in 1854 in the midst of the struggle for a free State, and was the head-quarters of John Brown and other noted leaders; was burned in 1863 by the Quantrell raid, but rebuilt. Pop. 1870, 8320; 1880, 8510.

Law'rence, city and important R. R. centre, one of the caps. of Essex co., Mass., on both sides of the Merrimack River, 26 m. N. W. of Boston; was until 35 yrs. ago an almost uninhabited waste, forming portions of the towns of Andover and Methuen. The river flowed over a bed of rocks, having a descent of 26 ft. without any sudden fall, for the distance of about $\frac{1}{4}$ m., affording unrivalled water-power, which in 1845 led to its selection for a manufacturing centre. The Essex Co. was incorporated in that yr., proceeded to construct a dam of solid granite across the rapids, and opened a canal 90 ft. wide and $\frac{1}{4}$ m. long for the utilization of the water. This dam, 900 ft. long and 30 ft. high, was completed Oct. 14, 1847, and on Feb. 24, 1848, the first wheel was set in motion by water from the canal. A second canal has been built, on the opposite side of the river. The leading manufactures are of cotton and woolen, upon a very extensive scale. The city received its name in honor of the Lawrence family; was incorporated as a town Apr. 19, 1847, and as a city Mar. 21, 1853. It has a public library (24,000 vols.), very fine high and gram. school-houses, a beautiful common (17 acres, with miniature lake), 3 parks, c-h., city hall, Masonic temple, Odd Fellows' hall, opera-house, and

numerous beneficent insts. Pop. 1870, 28,921; 1880, 39,151. [*From orig. art. in J. S. Unit. Cyc.*, by ED. "AMERICAN."]

LAWRENCE, SAINT. See LAURENTIUS, SAINT.

LAWRENCE (ABBOTT), L. D., b. at Groton, Mass., Dec. 16, 1792; studied in the acad. at Groton, and became in 1808 a clerk, and in 1814 a partner in the dry-goods business of his brother Amos in Boston. In this business he often visited Europe. He was an early advocate of the protective tariff, engaged largely in manufacturing, and was one of the prin. founders of the city of Lawrence, Mass. He was M. C. 1835-37 and 1839-41; in 1842 a com. to settle the Aroostook boundary question; U. S. minister to G. Brit. 1849-52. He founded the Lawrence Scientific School of Harvard Univ., established scholarships and prizes in public schools; was a liberal benefactor of the Groton Acad., now known by his name, and received in 1854 the honorary degree of LL. D. from Harvard Univ. D. Aug. 18, 1855.

LAWRENCE (AMOS), b. at Groton, Mass., Apr. 20, 1786, and studied in the acad. of his native place. In 1807 he set up a mercantile business in Boston and acquired a large fortune, which he unostentatiously employed for the good of the public and of individuals. Extracts from his *Diary and Correspondence*, with a memoir, by his son, have been pub. D. Dec. 31, 1852.

LAWRENCE (SIR HENRY MONTGOMERY), b. at Matura, Ceylon, June 28, 1806; studied at the Military Coll. at Addiscombe; went to India in 1821 as a cadet in the Bengal artil.; took part in the Afghan war in 1843; was sent in the same yr. as Brit. resident to Khatmandoo; participated in the Sutlej campaign; was resident at Lahore from 1846 to 1849; then chief of the board of administration in the Punjab, agent of the gov.-gen. in Rajpootana (1852), and in 1857 com. in Oude. He conducted the defence of the Brit. residency at Lucknow against the mutineers, until on July 2 he was mortally wounded. D. July 4, 1857.

LAWRENCE (JAMES), b. at Burlington, N. J., Oct. 1, 1781; entered the navy as mdpn. in 1798; became lieut. in 1802; took part in the war with Tripoli (1804-05); was appointed in 1810 to the command of the Hornet; cruised in Com. Bainbridge's squadron on the S. Amer. coast at the close of 1812, and on Feb. 24, 1813, captured, near the mouth of the Demerara River, the Brit. sloop-of-war Peacock, after an engagement of 15 minutes. Returning to New York, he received from Cong. a gold medal, was promoted to be capt. (Mar. 4), and commander of the frigate Chesapeake. On June 1, while he was lying in Boston harbor, the Brit. frigate Shannon came in sight with the express design of fighting the Chesapeake. L. accepted the implied challenge, but he and his prin. officers were soon mortally wounded, and the Chesapeake, being disabled, was taken by boarding, and carried into Halifax, where he d. His exclamation on being carried below, "Don't give up the ship!" became a household word in the U. S. D. July 5, 1813.

LAWRENCE (JOHN LAIRD MAIR), D. C. L., BARON, b. at Richmond, Eng., Mar. 4, 1811; was ed. at Haileybury Coll.; went to India in 1829 as a cadet in the Bengal civil service; filled various administrative and judicial posts, and in 1846, after the first Sikh war, was made chief com. of the Punjab, becoming lieut.-gov. in 1849. In this post, which he retained many yrs., he displayed rare talent, and with such success that the Punjab, instead of joining the mutiny of 1857, was able to send forces to the relief of Delhi. His co-operation with Canning, Havelock, Outram, and Clyde for the suppression of the mutiny gave him popular fame as "the saviour of India." Having returned to Eng. in 1858, the last special court of directors of the E. I. Co., on the eve of its abolition, conferred a pension of £2000 upon L., who also received a baronetcy and was sworn of the privy council. He was viceroy of India from 1863 to 1868, and was created a baron in 1869. D. June 27, 1879.

LAWRENCE (SIR THOMAS), b. in Bristol, Eng., in 1769; d. Jan. 7, 1830. His father was a tavern-keeper. When a mere child he made sketches in chalk; at 10 he used the crayons with skill; at 17 he painted in oil; he was but 13 when he received a silver palette and 5 guineas from the Society of Arts for a copy of *The Transfiguration*; at the age of 22, being younger than the rules required, he was made a "supplementary associate" of the Royal Acad., and painted portraits of the king and queen; in 1794 he was elected an academian; in 1815 he was knighted; in 1820 he became pres. of the Acad. L. came to Lond. in 1789. The most distinguished men and women of the time sat to him. In 1814 the prince-regent commissioned L. to paint the sovereigns, gens., and statesmen who were in league against Nap. The Waterloo gallery at Windsor is the result. In Vienna he painted the emp. of Aus.; in Lond. he painted Blücher and Platoff; in Rome he painted Pius VII. and Cardinal Gonsalvi. His pictures are remarkable for richness of color, a mingled softness and splendor that was of great effect, particularly in the portraits of women. O. B. FROTHINGHAM.

LAWRENCE (WILLIAM), b. at Mt. Pleasant, O., June 26, 1819, grad. at Franklin Coll., O., in 1838, and at the Law School of Cin. in 1840; settled at Bellefontaine, O., and engaged in law-practice; was often in the senate and lower house of the O. legislature; was the founder of the reform school and of the free banking law of the State; a judge of the common pleas 1856-64; for some time col. in the c. war; M. C. 1865-71 and 1873-74. Author of a work on the *O. Civil Code. The Law of Interest and Usury*.

LAWRENCE (WILLIAM BEACH), LL. D., b. in New York Oct. 23, 1800, grad. at Columbia Coll. in 1818; studied law in Europe; admitted to the New York bar in 1823; sec. of legation in Lond. 1826-27; *chargé d'affaires ad interim* 1837-38; resided for some time in Paris, where he translated Barbe Marbois's *Hist. of La.* Returning to the U. S. in 1832, he delivered lectures on political economy at Columbia Coll.; was v.-p. of the New York Historical Society 1836-45; to whose *Proceedings* he was a frequent contributor. In 1850 he became a resident of R. I., where he was lieut.-gov. and acting gov. in 1851. He was lecturer on international law (1852-73)

at the law school of Columbian Coll. at Wash., in which city he was employed for several yrs. as an advocate in cases of international claims. His most important works are *The Law of Charitable Uses, Visitation and Search, a Commentary on the Elements of International Law* (in Fr.), *Administration of Equity Jurisprudence*, and an annotated ed. of Wheaton's *Elements of International Law*. D. Mar. 26, 1881.

LAWRENCBURG, city and R. R. centre, cap. of Dearborn co., Ind., on the O. River, 20 m. below Cin.; is the terminus of the White Water Canal, which affords excellent water-power. Pop. 1870, 3159; 1880, 4668.

LAWRENCE UNIVERSITY OF WISCONSIN, in Appleton, Wis. It was founded in 1847. Amos A. Lawrence of Boston offering to give \$10,000 toward the establishment of a collegiate school, provided an additional \$10,000 should be raised by the Meth. denomination. This was done, and the first classes were formed in the preparatory dept. in the fall of 1849. The library was founded by Samuel Appleton of Boston by a donation of \$10,000. The property of the univ. amounts to about \$180,000. The courses of instruction are 2, classical and scientific; there is also provision for instruction in civil engineering.

LAWSON (JOHN), a native of Scot., in 1700 became surveyor to the prov. of N. C., and in 1709 wrote *A New Voyage to Carolina*, with a map and illustrations. In 1712, while engaged in surveying, he was taken prisoner by the Tuscarora Indians, and burned at the stake as a supposed usurper of their lands.

LAWSON (L. M.) M. D., b. in Nicholas co., Ky., Sept. 10, 1812; grad. in 1837 at Transylvania Univ., where he became prof. of anat. in 1843. He subsequently filled the chair of materia medica in the Med. Coll. of O. (1847), occupied similar posts in the Ky. School of Med. at Louisville (1854), the Univ. of La. at New Orleans (1860), returning to the O. Coll. in 1857 and in 1861. He conducted the *W. Lancet* from 1842 to 1864, and wrote a *Practical Treatise on Phthisis Pulmonalis*. D. Jan. 21, 1864.

LAWTON (Gen. ALEXANDER R.), b. in Beaufort dist. (now co.), S. C., about 1820, grad. at W. P. in 1839; commissioned as second lieut. in the 1st Artil.; studied law at Harvard Law School, Mass.; commenced the practice in Savannah in 1842; was repeatedly elected to the State legislature, first to the house and then to the senate. Upon the organization of the Savannah and Augusta R. R. in 1849, he was chosen its first pres. In Apr. 1861 he was appointed brig.-gen. in the provisional army of the Confed. States; was severely wounded at Sharpsburg, disabling him for a yr., after which he served as quartermaster-gen. until the close of the war. After the surrender in 1865 he resumed the practice of law in Savannah; became a distinguished member of the legislature from Chatham co. A. H. STEPHENS.

LAY (HENRY CHAMPLIN), D. D., LL. D., b. at Richmond, Va., Dec. 6, 1823, grad. at the Univ. of Va. in 1842, and at the Theol. Sem. of Va.; ordained deacon July 10, 1846; was minister in Lynnhaven parish, Va., until June 1847, when he removed to Huntsville, Ala.; ordained priest July 12, 1848; consecrated missionary bp. of the S. W. Oct. 23, 1859, and translated to diocese of Easton Apr. 1, 1869.

LAY (JOHN L.), b. at Buffalo, N. Y., Jan. 14, 1832; entered the U. S. N. in 1861 as assistant engineer; invented the torpedo device with which Lieut. Cushing destroyed the Confed. ram Albemarle, and went, after the fall of Richmond, up the James River in the Spuyten Duyvil, removing the obstructions in advance of Admiral Porter's fleet. After the close of the war he entered the service of Peru, and while there he first conceived the idea of a locomotive torpedo. In 1867 he returned to the U. S., and his idea then ripened into the invention of the so-called "Lay electro-travelling torpedo," which can be sent from shore or from shipboard to any point within its range, all its movements being under the control of the operator.

LAYARD (AUSTEN HENRY), D. C. L., b. of Eng. parents at Paris Mar. 5, 1817; spent several yrs. in Florence, and commenced the study of law in Eng. In 1839 he undertook a course of E. travel extending over several yrs., and learned Per. and Arabic; spent months in 1842 in exploring the antiquities of Susa and S. W. Per.; became interested in the excavations by the Fr. consul, M. Botta, at Khorsabad, the supposed site of Nineveh. After consultations at Constantinople, the Brit. minister, Sir Stratford Canning, offered to assume a portion of the expenses of similar excavations, and L., returning to Mosul in 1845, began that series of researches which has laid the foundation for the reconstruction of anc. Oriental hist. Accounts of these discoveries were given by L. in *Nineveh and its Remains*. The Brit. gov. in 1849 appointed him attaché of its legation in Constantinople, and he undertook for the Brit. Museum a second series of excavations in Assyria and Chaldea, which resulted in another work, *Discoveries among the Ruins of Nineveh and Babylon*. He also prepared 2 vols. of engravings of the *Momuments of Nineveh* and a vol. of inscriptions. In 1852 he was elected to Parl. for Aylesbury, and for a few weeks was under-sec. of state for foreign affairs. He took an active part in the House of Commons in the debates on E. questions, advocating a vigorous policy against Rus. He visited the Crimea in 1854, and examined the condition of the army, concerning which he soon afterward gave testimony before a parliamentary committee. In 1855 he became one of the leaders of the Administrative Reform Association; was chosen lord rector of Aberdeen Univ. in 1855 and 1856; spent some months in India during the Sepoy mutiny of 1857-58; was elected to Parl. for Southwark in 1860, and appointed by Lord Palmerston in July 1861 under-sec. of state for foreign affairs, holding that post until July 1866. In that yr. he became a trustee of Brit. Museum; chief com. of works and privy councillor in Gladstone's administration (Dec. 1868), until in Nov. 1869 he became envoy at Madrid, where he remained several yrs.

Lay'ering, or Laying, the propagation of herbaceous plants by pegging down branches and covering the portion

to be rooted with earth, or of trees by bending down a low branch, pegging it to the ground, and partly covering it with earth. The covered part takes root, and the layer may soon be cut off and planted as a new tree.

Layne, li-neth' (DIEGO), b. in 1512 at Almazan (in Castile; studied at Alcalá and Paris; became the gen. of the Jesuits on the death of Loyola in 1556. It is generally acknowledged that the peculiar spirit which characterized the Jesuits issued from L. D. Jan. 19, 1565.

Lazarists, a body of R. Cath. missionary priests, founded by St. Vincent de Paul in 1624. They are engaged in missions and in the teaching of theol. They are found in most civilized and in several barbarous countries, and have 14 establishments in the U. S.

Lazarus (EMMA). See APPENDIX.

Lazulite [Ar. *azul*, "heaven," and Gr. *lithos*, "stone"], or **Azurite**, a mineral composed of phosphate of alumina, magnesia, and iron, and bearing some resemblance in color to lapis-lazuli.

Lazzaro'ni [It. *lazzaro*, "a leper"], the popular name for the lower classes of Naples, so called from the hospital of St. Lazarus, their place of refuge. The name is ultimately derived from that of the beggar Lazarus in the parable. The L. of Naples numbered at the close of the 18th century 40,000 persons. From the Middle Ages they derived the obligation to wear a peculiar dress, were treated by the govt. as a separate class, electing annually a chief called *capo lazzaro*, and often took part in political revolutions.

Lea (HENRY CHARLES), son of the succeeding, b. in Phila. Sept. 19, 1825; early displayed a talent for science, giving much attention to conchology, and at a later period to the organization of society in the Middle Ages. He became the head of a large publishing house. Among his numerous works are *Superstition and Force*, *The Ordeal and Torture*, and *Studies in Ch. Hist.* He was prominent during the civil war in organizing the system of municipal bounties, has written much on political subjects, and has been for yrs. engaged on a work on the hist. of the Inquisition with special reference to Amer.

Lea (ISAAC), LL.D., b. at Wilmington, Del., Mar. 4, 1792; engaged in mercantile pursuits, devoting his spare time to the study of nat. hist., especially geol. In 1815 was elected a member of the Acad. of Natural Sciences, and began to contribute papers to its *Journal*. From 1821 to 1851 was a partner with his father-in-law, Matthew Carey, in what was then the prin. publishing-house in the U. S., and in 1837 commenced a remarkable series of memoirs upon freshwater and land mollusks, which were continued for nearly 50 yrs. In 1828 he was elected a member of the Amer. Philosophical Society, and chosen pres. of the Acad. of Natural Sciences in 1858. He made important discoveries of saurian remains in the red sandstones of Pa. below the coal-measures. Between 1827 and 1873 he wrote *Contributions to Geol., Fossil Footmarks in the Red Sandstones of Pottsville*, and other works, collected into 13 vols.

Lead [Ger. *Blei*; Fr. *plomb*; Sax. *læd*; Dut. *lood*, also meaning a "ball" (suggesting "load," as of a gun); Lat. *plumbum*, also *Saturnum*, to the modern word is assigned a kindred with "clod" and "clot"]. L. is one of the metals mentioned in the book of Job, and known therefore in the earliest times.

1. *Occurrence in Nature*.—L. is known in nature as a constituent only of solid rocks and soils. It has not been discovered in mineral waters or in the ocean, nor in vegetable or healthy animal bodies. On life it acts as a poison. Its ores are numerous. It is found as sulphide, chloride, and iodide, as oxides and oxychlorides, selenides and tellurides, as sulphate, carbonate, chromate, phosphate, molybdate, vanadate, tungstate.

Native Lead.—Metallic L., as a mineral, has been reported at many localities, but occurs in such minute quantities that it is one of the rarest of all minerals, and difficult to find in mineral collections.

2. *Metallurgy of Lead*.—In the consideration of the extraction of L. from its ores, by far the most important ore is galena, from which very nearly all our L. comes. Galena is sulphide of L., and is the only known compound of this metal with sulphur, containing 86.6 per cent. of L. and 13.4 of sulphur. There are few metallic ores more easily and simply reducible to the metallic or "regulus" form than common galena, and hence, no doubt, the very anc. knowledge of L. possessed by man. Simple roasting of galena in an ordinary fire will drive off the sulphur and furnish melted L. Nevertheless, as L. is a metal required by man in enormous quantities, extreme economy is needed in its metallurgical manipulation, and hence this branch of technology is practically by no means so simple and obvious a business as might be supposed.

Refining of Lead.—Two metallurgical operations coming under this head are of especial interest and importance—the extraction of the silver often contained in it, and the converting of hard into soft L. The former subject will be treated of under SILVER. Hardness in L. is due to several causes, presence of antimony being the commonest. Exposure of the L. in a fused state on the hearth of a furnace to continued currents of air over its surface will gradually remove the antimony and other metallic impurities, and yield a soft or softer L. This operation is stated to be carried on on an enormous scale in Eng., on hard, antimoniferous Sp. L. *Chi. tea chest* L. is one of the hard alloys (with tin) that is thus susceptible of being refined, yielding over 75 per cent. of soft refined L., tin being separated by this method as easily as antimony.

3. *Chemical Constitution and Properties*.—L. is one of the softer and more plastic and sectile of the metals, being only approached in these respects, among the metals in common use, by pure gold. Color, when fresh cut, bluish-gray, with beautiful lustre, but a dull film of an oxygen-compound quickly forms over the surface. The malleability of L. is great, and its ductility also, but its tenacity is so small that

it is drawn into fine wire with great difficulty. It has so little strength that a wire $\frac{1}{16}$ of an inch in diameter breaks with a weight of 20 lbs. It melts at about 635° F., beginning to soften and become pasty, however, at about 617°. Its specific gravity is certainly somewhat variable, being but 11.07 by the lowest determination of Playfair and Joule, and 11.445 by the highest figure given, attributed to no less an authority than the great Berzelius; and for chemically pure L. Herapath gives 11.352, and Karsten 11.3888. It is probably compressible to some degree, which may account in part for the diverse densities. Playfair and Joule found its density in melted form to be 10.563. Fresh-cut L. does not tarnish in perfectly dry air, nor in pure water entirely free from dissolved oxygen, showing that the tarnish is due to conjoint action of oxygen and water. If exposed to both water and air, or immersed in pure water exposed to the free air, it is rapidly corroded, and a portion dissolves. If the water contains carbonic acid or carbonates, however, or, according to some, also sulphates and phosphates, there is formed over the metal a film of an insoluble salt of L., which retards further action. As these insoluble compounds, particularly the carbonate of L., are somewhat soluble in water containing free carbonic acid, some slow action often still continues, and no prudent person will venture to use habitually, for drinking or cooking purposes, water that has stood for any appreciable time in leaden pipes or tanks, or even in a well or cistern into which a leaden pipe has been inserted for connection with a pump—a practice extremely common with plumbers. Waters containing nitrates, not uncommon in well-waters, are believed to dissolve L. with especial rapidity.

4. *Uses of Lead*.—In metallic form L. is used for many purposes too familiar to need enumeration. The prin. compounds of L. that have known uses are litharge, the protoxide; minium, or red lead, the three-four oxide; the carbonate, or white L.; the nitrate, chromate, and acetate of L., all of which will be referred to again; and the several alloys with other metals, which will be treated of first.

5. *Alloys of Lead*.—Few metals form alloys so easily and in such number as L.; and to this fact, together with the great cheapness of this metal, is due to a large extent its high value to the human race.

With Arsenic.—This alloy is white, brittle, and crystalline, and very fusible. It is of practical interest in connection with the manufacture of L. shot, which are formed of a true alloy of L. with metallic arsenic, containing some 2 per cent. of the latter, held by the shot-manufacturers to be absolutely essential to success in the manufacture.

With Antimony.—Here we have alloys of eminent importance, type-metal being the chief. The alloys of these 2 metals are harder and more fusible than either metal, while endowed with peculiar qualities adapting them for making fine and sharp castings. Common type-metal contains 17 per cent. of antimony, the remainder being L., sometimes with a little zinc. Common stereotype metal varies from these proportions within small limits, sometimes a little tin being added. *Musical plates* are chiefly tin, being about 60 per cent. of this metal to 35 of L. and 5 of antimony. Some of the various alloys used for machinery-bearings, called "Babbitt's metal" and the like, contain L. and antimony. A large proportion of this brittle metal, antimony, even 75 per cent., may be added to L. without making the mass brittle, great whiteness, hardness, and capacity for polish being thus attained. Keys of musical instruments, such as flutes, etc., are made of such an alloy, containing $\frac{3}{4}$ of antimony.

With Tin, Etc.—Here we have some of the most valuable alloys of L., including hard and soft solders, pewter, and with bismuth also the common fusible alloys. Three grades of solder are in common use: common solder, of equal parts of tin and L.; fine solder, of 2 parts of tin to 1 of L.; and a cheaper article, of 2 of L. to 1 of tin. The alloy called in Eng. *Queen's metal* contains of antimony, L., and bismuth 1 part each, with 9 parts of tin. Teapots, spoons, etc. are made of it.

With Silver, Gold, Platinum, Etc.—L. has a great affinity for the noble metals. In the process of assaying, when litharge is reduced to metallic L. in admixture with an ore of gold or silver for subsequent cupellation, the L. takes into alloy with itself every trace present of the precious metals, the success of assaying as an art being dependent on the completeness of this combination.

6. *The Useful Compounds of Lead*.—Litharge, the protoxide of L., also called *massicot*. This is chiefly a product of a special cupellation of metallic L., carried on for the purpose of its manufacture. Some of it is sent to market in sealy or flaky form, as it cools quickly from fusion; but the more compact, lumpy portions are ground and constitute *levigated litharge*. The color of the scales is sometimes yellow and sometimes reddish, but there has not been found any chemical difference between the 2 varieties.

Minium, Red Lead.—This is a fine colored red substance, familiar to all from being used extensively as a pigment and for coloring paper. It is poisonous, of course, and should therefore be employed and handled far more circumspectly than is customary. It is a product of the continued action of a low red heat upon litharge while exposed to the air. Beside its use as a pigment, etc. it is employed as one of the most important materials in the manufacture of L. or flint glass. *White Lead, Carbonate of Lead, Ceruse*.—White L. is prepared commercially by 2 methods, the older of which, called the "Dutch process," is somewhat curious and complex in its character. Sheet L. is rolled into loose rolls, each of which is placed in an earthen jar containing a little vinegar at its bottom, the L. not touching the vinegar. These jars are piled up in alternate layers with some material which is fermenting and evolving carbonic acid gas, spent tan-bark being preferred, though formerly stable manure was used and thought essential to success. A large building is thus filled with jars and closed. Basic

acetate first forms on the surfaces of the sheets, which is decomposed by the atmosphere of carbonic acid, forming carbonate and free acetic acid, which latter then acts again on fresh portions of L.; so that but little vinegar is needed to keep the process going on continuously. The heat of the fermentation helps, and in due time, the jars being opened, the L. sheets are found incrustated with white L., which is beaten off, ground, and washed. The product thus obtained is deemed superior in "body," or opacity in mixture with oil, to that of any other method yet discovered, and brings therefore a higher price. Much white L. is made, however, by simpler and more speedy operations, as by boiling solutions of the nitrate or acetate of L. with litharge, which dissolves to form a basic salt. Carbonic acid gas then precipitates a very good quality of white L., not generally accepted, however, as equal in body to that of the old Dut. process. The liquid drained off from the precipitate is boiled again with litharge, and so on. *Nitrate of Lead.*—This is used as a material for the preparation of the carbonate and chromates, and is therefore, in crystallized form, a regular article of commerce. *Acetate of Lead, Sugar of Lead.*—This familiar article has well known uses in med. It is manufactured by dissolving litharge in wood-vinegar or other cheap form of acetic acid. It crystallizes very beautifully, few objects being more beautiful than a mass of fresh crystals of acetate of L.; but on exposure to the air acetic acid is lost, with formation of a basic acetate, with a little carbonate also in time. Hence sugar of L. has an odor of acetic acid, and the transparent crystals gradually fall down to a white powder, to dissolve which in water requires an addition of acetic acid to replace that which has been lost. It is from this circumstance that the *nitrate*, which undergoes no such spontaneous change, but remains clean and uniform, is largely supplanting the acetate in commerce of later yrs. *Chromates of Lead: Chrome Yellow and Chrome Red.*—These are 2 brilliant and valuable pigments, chrome-yellow being especially so. *Chrome-yellow* is prepared by precipitating a solution of the nitrate of L. with chromate of potash. The brilliant yellow precipitate that falls, after thorough washing and drying at a low heat, is ready for grinding with oil for pigmentary purposes. In calico-printing chrome-yellow is formed on the tissue itself by successive application of the above specified compounds of L. and chrome in appropriate ways. This color, however, does not attach itself so well to silken and woollen fabrics. *Chrome-red* is a chromate containing twice as much L. as the yellow chromate: The red pigment is produced from the yellow by several different methods—either by boiling with lime or an alkaline solution, which takes out half the acid; or by digesting with levigated litharge; or by boiling it with neutral yellow chromate of potash, which forms bichromate of potash with half its acid; or by fusing it with saltpetre. Its color is very fine, considered equal in tint to vermilion, but, like all L.-colors, it becomes dingy in the air in time, through the action of sulphur, forming black L.-sulphide. *Chrome-green* should strictly be the green oxide of chromium, but most of what passes under that name commercially at the present day is a mixture of chromate of L. with some blue pigment—prussian blue or ultramarine. A dilute acid will quickly distinguish such mixtures from true chrome-green, which latter should be totally unacted on. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. HENRY WURTZ, Ph. D.]

Lead [A.-S.; Dut. *lood*]. After iron, this is the most abundant and widely distributed of the metals. It is bluish-gray in color, very soft and ductile, but without elasticity. Its specific gravity is 11.35. It fuses at 612° F. and when raised to a white heat in the open air it volatilizes, burning with a blue flame and leaving an oxide known as litharge. Its uses in the arts are for roofing, for lining sinks, cisterns, etc., for shot and balls for firearms, and for the manufacture of pipe. From the facility with which L. pipes are manufactured, and afterward bent, cut, and united, they are almost universally employed as conduits for the distribution of water through buildings in cities; and the employment of L. in this connection has created the plumber's trade, which takes its name from *plumbum*, "lead." Type-metal is formed of an alloy of lead and antimony, and the alloys which go by the name of pewter or solder are composed of L. and tin. L. is found in all the geological formations except the igneous rocks, and deposits of it are known to occur on every considerable portion of the earth's surface. It occurs in several kinds of deposits, but chiefly in gash and fissure veins and in chambers. Gash veins and chambers are confined to limestone formations, and are produced by the enlargement of joints by the solvent power of atmospheric water containing carbonic acid, forming crevices or caves, subsequently lined or filled with L. ore, deposited in gash veins from solutions flowing from the inclosing rock; in chambers from a foreign source. The L. mines of Mo., Wis., etc. are in gash veins; those of Eureka, Nev., are in chambers. Many of the fissure veins of the W. carry L., and argentiferous galena is the most important silver ore.

Among the L.-producing nations of the world the U. S. stands first, her production and consumption of this metal in 1882 amounting to 132,390 tons. Of this, over 2% come from the silver-L. mines of the far W., the remainder from the L.-mines of Mo., Wis., etc.

The salts and oxides of L. are quite numerous, and are somewhat extensively employed in manufactures and med. Of these one of the best known is the protoxide called litharge, used as a drier with oils and varnishes and in the manufacture of glass. Red L., or "minium," is a compound of the protoxide with the peroxide. It is very generally employed as a pigment, either in oil paints or in the coloring of wall-papers, sealing-wax, etc. It is also employed, like litharge, in the manufacture of glass. Perhaps the most important preparation of L. is the carbonate, used as a paint, and commonly known as **WHITE LEAD** (which see).

Some of the salts of L. are highly poisonous, and grave accidents are not uncommon from this cause. The carbonate, the oxide, and the acetate of L. are the most active poisons. They are introduced into the system both by the lungs and the digestive organs. With those who work much in the preparations of L., as painters, plumbers, and those employed in glazing cards, earthenware, etc., cases of L.-poisoning are constantly met with. The use of L. pipe must be regarded as the source of many cases of L.-poisoning. It has been proposed to avoid this danger by lining it with tin, and pipe of this kind is now coming into gen. use.

J. S. NEWBERRY.

Lead City, Lawrence co., Dak. Pop. 1880, 1437.
Lead Plaster, **Diachylon**, or **Emplastrum Plumbi**. This familiar plaster of lead is a lead soap (see SOAP), formed by the action of litharge or plumbic oxide on olive oil in presence of water. These materials are boiled together in the proportion of 6 lbs. of plumbic oxide in fine powder, 1 gal. of olive oil, and water 2 pints, supplying more water as it evaporates, until the oil and lead oxide unite into the consistence of a plaster. The glycerine of the oil, set free by the basic power of the plumbic oxide, remains in aqueous solution, the fatty acids of the oil forming with the lead the L. P., which is made up in cylindrical sticks of a yellowish-white or gray color, brittle when cold, but softening and melting by a gentle heat, when it is readily spread upon leather or cotton cloth for use. It is quite insoluble in water, and nearly so in alcohol. It is without taste, but has a faint peculiar odor. It is employed in surgery on account of its adhesiveness, and for this purpose a portion of resin is added while the diachylon is in a fused state. In this way it is used to hold together the edges of wounds in persons of delicate skins. It is also used, spread on cotton bandages, as a strapping for giving support and causing pressure, as in ulcers of the leg. Its chief use in pharmacy is in the preparation of other plasters. Made from the refuse oleic acid of stearic acid candle-factories, and mixed with a certain quantity of oil or tallow, it has been used as a wheel grease. A compound of lead oxide with the acids of linseed oil, prepared by decomposing the potash soap of linseed oil with solution of acetate of lead, serves, when dissolved in oil of turpentine, for printing on wall-paper previous to gilding it with gold leaf or Dutch metal, or dusting it with wool-shearings for the production of flock patterns. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. F. SILLIMAN, M. D.]

Lead Poisoning, a condition caused by the absorption, through the skin, lungs, or digestive organs, of a certain amount of lead. There are 2 varieties of this disease—viz. *acute* and *chronic*.

Acute L. P. results from the immediate ingestion of a considerable amount of the metal. The symptoms produced are those of an irritant poison.

Chronic L. P. results from the gradual absorption of the poison. Workers in white-lead manufactories and painters are most apt to suffer from this disease. Certain kinds of drinking-water will dissolve a small quantity of the metal if passed through lead pipes, and thus cause L. P. Wines adulterated with litharge will cause it, as also will flour adulterated with carbonate of lead. Cosmetics are also recognized as producing this disease. The symptoms may be classed as primary and special. The primary symptoms, dependent upon the accumulation of lead in the system, are—(1) the formation of a blue line at the junction of the teeth and gums, caused by the local deposition of lead-sulphide; (2) a sweet metallic taste in the mouth and fetor of the breath; (3) a dark yellow condition of the skin, and (4) progressive emaciation. The special symptoms, dependent upon the effect of the accumulated poison upon the sympathetic and cerebro-spinal centres, are—(1) colic; (2) a neuralgic affection of the muscles and joints; (3) paralysis, and (4) brain affections. The treatment is palliative and constitutional. The pain should be relieved by opiates, and the accumulated metal should be removed by iodide of potassium and the alkaline sulphates. JOHN R. HOBBS.

Leadville, city and R. R. centre, cap. of Lake co., Col., on the N. side of California Gulch, which was one of the first containing free gold discovered in the State. It was first settled in 1859, and for several yrs. thereafter placer-mining was carried on by a great number of men; at one time fully 8000 persons were settled there. It has been estimated that \$3,000,000 in placer gold have been taken out of California Gulch. L. is within 5 m. of the head of the Ark. River, and the altitude of the place is about 10,300 ft. In 1878 carbonate ores were discovered here, the first place in Col. where carbonates, being silver and lead, in paying quantities were found, and of these ores many hundred discoveries have been made, and many millions' worth taken out. Pop. 1880, 14,820.

Leaf [A.-S.; Gothic, *laufs*; Ger. *Laub*; denoting something broad and thin], in bot., one of the pieces which make up the expanded portion or green foliage of a plant. L. are the most important part of a plant, being the organs of digestion, wherein the plant mainly converts its food, taken from the soil and the air, into vegetable matter. Considered even as foliage, the word *leaf* is naturally used in more than one sense, both popularly and in descriptive bot.; as (1) for the expanded green blade alone (the *lamina* of the L.); and (2) for this and its supporting footstalk (petiole), and whatever else is normally connected with it. A complete L., in the botanist's sense, consists of blade, footstalk, and a pair of stipules (lateral appendages at the base of the latter); but these 3 parts are very commonly reduced to 2, the stipules being wanting or fugacious, and not rarely to one, the footstalk being absent, and so the blade growing directly out of the stem. Indeed, sometimes the blade is wanting, while the footstalk remains, with or without the stipules, or only the stipules are produced, or there is in the place of the L. a body not distinctly answering to either of these 3 constituent parts. Indeed, what would be a L. often de-

velops into forms and subserves uses quite other than those of foliage: some become storehouses for food, as do the seed-leaves of the bean and pea, the thick scales of bulbs, the fleshy L. of house-leeks; some as bud-scales, some only for protection, some as tendrils for climbing, etc. (See BORSANI and PHYSIOLOGY. VEGETABLE.) ASA GRAY.

Leaf-cutter Bee, a name given to several solitary bees of the genus *Megachile*, which construct, or sometimes merely line, their cells with bits of leaves cut out by their scissor-like jaws. *M. centuncularis*, our most common species, is found also in Europe. It cuts out pieces of rose-leaf for its cells, which are of a very neat and curious structure. The cell it stuffs with pollen, in which it deposits an egg.

Leaf-rollers (Tortricidae), an important family of small lepidopterous insects, characterized by short beak-like palpi. They are mostly nocturnal, and take their name from the fact that many species make a rude tent by rolling up the leaves of trees, often fastening them with silken threads. The number of genera and species is great, and as a rule the insects are great destroyers of useful vegetation. The genus *Tortrix* is the typical one.

League [It. *lega*; Sp. *legua*; Fr. *lieue*, from the Gaelic *leac* or *leachd*, "a stone," as the Gauls used to mark distances by stones] is a measure of length, used in Amer. mostly for distances at sea, but in Europe also upon land. The nautical L. is $\frac{1}{20}$ th of a degree, or 3 geographical m., or 3.457875 statute m. In Eng. the land-L. is 3 statute m.

League, Achaean. See ACHÆAN LEAGUE.

League, Anti-Corn Law, a name taken by an association of Manchester manufacturers, founded in 1839, for abolishing all fiscal imposts on corn. The first Manchester election of members of Parl., which took place in 1832, carried free-trade candidates. In 1834 the first meeting of Manchester merchants was called to consider the question of corn-law repeal. In 1836 a miscellaneous anti-corn law society was formed in Lond., which included 22 members of Parl. In 1838 Mr. Cobden first became prominent in the Manchester Chamber of Commerce for resistance to the restrictive commercial policy of the manufacturing trade of the country.

The Eng. corn laws, which had for their object the restriction of the trade in grain, date as far back as 1300. At that time the prohibition was against exportation. In 1462 an act was passed prohibiting its free importation. The object of the A.-C. L. L. of 1839 was stated by the chairman (Mr. J. B. Smith) "to be the same righteous object as that of the Anti-Slavery Society, which sought to obtain for the negro the right to dispose of himself; and the object of the L. was to obtain for the people the right to dispose of their labor for as much food as could be got for it." The "free traders," as the Leaguers were styled, were opposed by an organized party who took the title of "protectionists," who maintained (1) that protection was necessary to keep certain lands in cultivation; (2) that it was desirable to cultivate as much land as possible in order to improve the country; (3) that if improvement by that means were to cease, there must be dependence on the foreigner for a large portion of the food of the people; (4) that such dependence would be fraught with immense danger; (5) that the advantage gained by protection enabled the landed proprietors and their tenants to encourage manufactures and trade; so much so that were the corn laws abolished half the country shopkeepers would be ruined. The struggle of the L. lasted 7 yrs. and cost half a million of money. But its success came from its inspiration, and its inspiration came from its remarkable leaders. Above all in renown were the great names of Cobden and Bright. Mr. Cobden, denounced as a Manchester enemy of all agriculture and paid emissary of the Socialist insurgents of the Continent, was himself the son of a Sussex farmer, and whose ambition was to die one of that class; and did, seeking and accepting no other distinction than that which his genius cast around his name. He was the logician of the L. Mr. Bright's was a grander and more imposing order of eloquence, at once impassioned and colossal. Cobden presented the facts, Bright put fire into them. These were the great propagandists of political economy who conquered the premier, Sir Robert Peel, who won an imperishable name by repealing in 1846 the corn laws, thus "giving the people bread, no longer leavened," as he proudly said, "by a sense of injustice." [From orig. art. in *J. S. Lib. Opin.*, by GEORGE J. HOLYOAKE.]

League, Holy [Fr. *La Sainte Ligue*], called The League par excellence, was entered into in 1576, by the heads of the Catholic party under the leadership of Guise, for resistance to the spread of Protestantism and opposition to the succession of the Calvinistic princes. This led to the renewal of the bloody c. wars, ended 1590, when Henry IV. won the battle of Ivry.

Leake (Sir JOHN), b. at Rotherhithe, Eng., in 1686; distinguished himself during the war of the Sp. succession by taking Newfoundland from the Fr. (1702), for which he was made admiral and knighted; relieved Gibraltar in Oct. 1704, and Mar. 1705 forced the Fr. and Sp. to abandon the siege; took part in the reduction of Barcelona the same yr., captured Cartagena and Majorca in 1706, became commander-in-chief of the fleet in 1707, took Sard. and Minorca in 1708, became rear-admiral of G. Brit. and lord of the admiralty in 1709; represented Rochester in Parl. for some yrs. D. Aug. 1, 1720.

Leake (STEPHEN MARTIN), F. S. A., b. in Eng. in 1702; was an authority upon heraldry and numismatics; became Clarenceux Herald in 1741, Garter Herald in 1754; wrote a manual of Brit. coins and a *Life* of his uncle, Sir John Leake. D. Mar. 24, 1774.

Leam'ing (JEREMIAH), D. D., b. at Middletown, Conn., in 1719, grad. at Yale in 1745; was ordained to the Epis. ministry in 1748; preached 8 yrs. at Newport, R. I., 21 yrs. at Norwalk, and 8 yrs. at Stratford. During the Revolutionary war he was imprisoned as a Tory, contracting a disease of the hip which rendered him a cripple. On account of in-

firmity he declined in 1783 an election as first bp. of the Amer. Epis. Ch. He wrote a *Defence of the Epis. Govt. of the Ch.*, *Evidences of the Truth of Christianity*, and *Dissertations on Various Subjects*. D. Sept. 15, 1804.

Leap Year. See CALENDAR, by F. A. P. BARNARD.

Learned (EBENEZER), b. in Mass. about 1728; was a capt. in the Fr. war (1756-63); raised the 3d Mass. regiment at the outbreak of the Revolutionary war; was appointed brig.-gen. in Apr. 1777; took part in the relief of Ft. Schuyler (Aug. 1777), and commanded the centre at the battle of Stillwater (Sept. 19, 1777); was at Valley Forge the ensuing winter, and was forced by broken health to retire from service in Mar. 1778. Pensioned in 1795. D. Apr. 1, 1801.

Leather, lether [Sax. *lether*, from *lithe*, "soft;" Ger. *Leder*; Fr. *cuir*], the skins of animals prepared by processes which protect them from putrefaction and render them soft, pliable, tough, and non-transparent.

The manufacture of leather is conducted in 3 entirely distinct ways: I. *Tanning* by the aid of bodies containing tannin; II. *Tawing* with alum and common salt; III. *Tawing* with oil. The whole skin is not converted into L., but only that portion known as the *corium* or *derma*, which possesses a fibrous texture. This is covered on the hair or bloom side by the epidermis, consisting of nucleated cells, and on the flesh side by a fatty tissue, both of which are removed by the tanner.

I. *Tanning*.—The skins of almost all quadrupeds may be converted into L. In practice, the hides of bulls and oxen yield the best L. for soles, harness, and for belting; calves' skins furnish the best upper L. for boots and shoes; lamb, sheep, goat, and buck skins are generally tawed with alum or oil for the preparation of glove, wash, or bookbinders' L. Most of the so called *buckskin* is now prepared by tawing the skins of wild hogs from Afr. Alligators' hides have recently been introduced for boots and shoes. Horse, ass, pig, and seal skins are tanned for trunks and saddlery.

Preparation of the Skins.—(1) Steeping or macerating in water is resorted to in order to soften the skin and to remove blood and dirt. (2) Cleansing the flesh side is effected by supporting the hide on a "tree" or "beam," a stout semi-circular plank, and scraping it with a dressing-knife to remove the fatty tissue, etc. (3) Loosening the hair is effected by sweating, liming, or treatment with depilatories. Sweating is a putrefactive fermentation which is often resorted to for sole L., as lime tends to render the L. brittle. The hides are piled up with the flesh side inward in a tank which can be closed to retain the heat generated by the fermentation. Some salt or wood vinegar is generally rubbed on them beforehand. When the smell of ammonia is perceptible the operation is completed. Liming consists in placing the hides in vats with milk of lime, frequently transferring them from one vat to another, or taking them out and replacing them, to allow the lime to act equally on every part. When the hair is found to be properly loosened the hides are withdrawn. Depilatories are used for skins of the smaller animals, which will sustain neither sweating nor liming. Rhusma, a mixture of orpiment and 2 or 3 times its weight of slaked lime, has long been used. It is rubbed on the hair side of the skin, and allowed to remain in contact till the hair is sufficiently loosened. Sulphide of calcium, which is the active agent in the rhusma, has of late been substituted for it. The refuse lime of gas-works contains a considerable proportion of this compound, and may be used with advantage. In Ger. sulphide of sodium is now used, either in solution (1 part to 100 of water), or as a paste with 3 times its weight of lime and a sufficient quantity of water. The paste is applied with a brush to the hair side, and the hides are then covered with damp matting, to prevent the drying of the paste; the process is complete in 15 or 20 hours.

(4) Removing the hair is effected by scraping on the beam with the dressing-knife. (5) *Bating* is next resorted to for the purpose of removing the lime and the lime soaps which have been formed in the skin. The material employed is the dung of pigeons, fowls, or dogs, mixed with water. The skins are placed in this, and frequently handled to secure uniform action. The dash-wheel is used in large establishments to keep the contents of the vat in constant motion and save handling. (6) Swelling or raising the hides is resorted to in order to swell the fibres, and make the skins more susceptible to the action of the tanning solutions. The swelling bath may consist of (a) barley meal and $\frac{1}{10}$ its weight of sour dough diffused in water, which yield by fermentation lactic and other acids; (b) of spent tan-liquor, which contains considerable lactic and butyric acid; (c) dilute sulphuric acid, 1 part of acid to 1000 or 1500 of water. (7) *Tanning*.—The tanning materials are various astringent vegetable products which contain tannin (tannic acid). Those most used are oak, fir, and hemlock bark, sumac, divi-divi, Valonia nuts, myrobalans, cutch, gamair, catechu, and kino. (See TANNIC ACID.) The impregnation of the hides with tannin is effected by (a) placing them between layers of coarsely crushed bark in a vat, which is then filled with water or old liquors; (b) immersing them in first a weak aqueous infusion of the tanning material, and afterward in a stronger; (c) sewing 2 hides together into a sack and filling this with the tanning solution. The progress of the operation can be ascertained by examining the hide on a freshly cut edge, which shows the depth to which the tannic acid has penetrated. When the appearance is uniform throughout the thickness the tanning is completed. (8) *Curring* is the process by which the tanned skins, after being converted into L., are prepared for use. For sole L. it consists in merely hammering the dried hide to render it more compact. For upper L., used for boots and shoes, it consists of (a) paring with a knife to secure uniform thickness; (b) scraping for a similar purpose; (c) graining with the pommel or graining-board; (d) finishing off with a flattening iron or horn to remove creases, etc.; (e) greasing, which consists in rubbing in a mixture of oil and tallow; the skins are previously moistened, and after the application of the grease are hung

in warm rooms to dry it in: (f) blackening, which is effected by an application of a fresh solution of oak bark, and then of copperas (ferrous sulphate) solution, to which some blue vitriol (cupric sulphate) has been added: (g) greasing again; (h) applying a solution of glue and tallow; (i) polishing with lacquer. Lacquered L., commonly called patent L., is made by applying a varnish to the L., and then placing it in a stove heated to about 120° F. This causes the varnish to become thin, to spread out evenly, and dry to a smooth, polished surface. Cow or split skins are generally used for it.

Yufts or Russia leather is a very strong, pliant and watertight L., usually colored red or black, which has a peculiar penetrating odor, due to the oil of birch with which it is impregnated. Rus. L. is specially useful for bookbinding, the oil of birch repelling insects.

II. Tawing with alumina salts ("white tanning") is generally resorted to for sheep and goat skins, though it is also applied to cow and ox hides for moccasins and lace L. The thick skins are prepared as for tanning. The skins are then immersed in a solution of common salt and alum. After removal from the solution and drying the skins appear shrunken and stiff. In order to restore suppleness and flexibility they are dampened with water, and subjected to mechanical operations which stretch and knead them. Thick hides are greased as described under *Tanning*. Fine glove L. is tawed by a different process. The skins of kids or lambs are most carefully handled to avoid abrading or staining them. They are cleansed and unhaired by lime and branliquors as for ordinary tawing. The tawing is effected by applying a paste composed of wheat flour, yolks of eggs, alum, common salt, and water. As the yolks of eggs aid by furnishing the oil which they contain in the state of emulsion, which gives the kid L. its highly prized suppleness and softness, they may be replaced by an emulsion of almond, olive, or fish oil. The skins are thoroughly soaked and kneaded in the paste, to which 2 or 3 per cent. of carbolic acid is often added to prevent putrefaction, and packed in heaps. They are then stretched by hand and rapidly dried in the air. They are then dampened, placed in linen cloths, and trodden to render them soft. They are then planed, dried, and planed again, polished by rubbing with a heavy glass disk or by the appreture, simultaneously with the application of some white of egg, gum, or fine soap, to give a gloss to the hair side, which is afterward dyed.

Shagreen.—Genuine Oriental shagreen (*saghir, sagri, sagre*) is a variety of tawed L. which has long been celebrated for its hardness and strength. Its appearance is very peculiar, the grain side being covered with globular granules, which are produced by stamping the hard seeds of the wild orch (*Chenopodium album*) into the wet hide, and afterward knocking them out. The name shagreen is also applied to fish-skin prepared for covers and for polishing wood.

III. Tawing with oil ("Samian tawing"), for the preparation of shammy (chamois) or wash L. For this L. the upper or exterior layer of the corium of the thick skins is cut away, as it is too compact and prevents the ready absorption of oil. Thin skins, as those of lambs and goats, are not deprived of the exterior layer. The skins are prepared with lime and the subsequent bran-bath, as in alum-tawing. They are then stretched and rubbed with oil, which is worked in by the fulling-machine. They are then hung in the air. Oiling, stamping in the fulling-machine, and exposure to the air are repeated till a sufficient quantity of oil has been worked into the skin. The skins are then heaped together in a warm room to produce a kind of fermentation, which must be carefully watched, and occasionally interrupted by airing to prevent overheating. The oil becomes rancid by these operations, and appears to combine with the animal fibres of the skin. The uncombined oil is then removed by a tepid bath of potash solution, and the skins are wrung out and dried. The softness and suppleness are restored by dressing. Cordovan or Tur. L. is oil-tawed, without having the hair side removed, while the flesh side is blackened in the usual way. C. F. CHANDLER.

Leather-board, an article used in the manufacture of boots and shoes, etc. It is made of old manila rope, hemp rope, jute or linen canvas, and leather scraps, to which are added certain chemicals and a cement which makes it more impervious to water than leather. The materials are first ground to a pulp, which is then run off by a machine and cut into sheets, usually 2½ by 3 ft.; these sheets are dried, run through calendaring-machines to smooth them, and afterward pressed by still heavier machines to give an even surface and still greater solidity. It is also pressed into different forms, among which are counters or stiffenings for boots and shoes, which by a patent process are made perfectly water-proof. These forms, being pressed by machines into a perfect fit for the various sizes, are considered superior to leather, as they hold their form better, and after being wet retain their original shape. Although much used in the manufacture of boots and shoes, it is not confined to this industry, but is used considerably in the manufacture of toys, chair-bottoms, etc. It was first manufactured in this country in Exeter, N. H., about 35 yrs. ago. Large quantities are annually exported to Eng., Ger., Fr., and elsewhere.

Leath'er-wood, also called **Moose-wood**, or **Wic'opy**, the *Dicra palustris*, a N. Amer. shrub of the Daphne family. Its tough bark was used by the Indians for thongs or cordage, and is acrid. Its wood is very white, soft, and brittle.

Leathes (STANLEY), D. D., b. at Ellesborough, Eng., Mar. 21, 1830, ed. at Cambridge; served as curate in several chs. in Lond.; became in 1863 prof. of Heb. in King's Coll., Lond. He was Boyle lecturer from 1868 to 1870, Hulsean lecturer at Cambridge in 1873, and Bampton lecturer at Ox. in 1874; is a member of the Anglican commission for revision of the translation of O. T., and was a delegate to the Evangelical Alliance in 1873 in New York. His best known work is the *Witness of St. John to Christ*.

Leav'en [Fr. *levain*, from Lat. *levare*, to "raise"], a piece of sour dough used for raising bread. The principle of its action is the same as that of YEAST (which see).

Leavenworth, city and important R. R. centre, cap. of Leavenworth co., Kan., on the W. bank of the Mo. River, 39 m. from Kansas City, Mo., and 312 m. by land above St. Louis. The river is here crossed by a magnificent iron bridge, constructed at a cost of \$1,000,000. L. contains a State normal school, the St. Mary's (Catholic) Acad., and 2 orphan asylums. The State penitentiary is 4 m. S. of city. Ft. Leavenworth military reservation adjoins city on N., and has a military prison and school. L. has 2 coal-mines, daily product 40,000 bushels. Pop. 1870, 17,836; 1880, 16,546; 1884, 25,479.

Leavenworth (ELIAS WARNER), LL.D., b. at Canaan, N. Y., Dec. 20, 1803, grad. at Yale in 1824; began the study of law the same yr. in the office of William Cullen Bryant at Great Barrington, Mass.; spent 2 yrs. at the Litchfield (Conn.) law school; admitted to the bar in Jan. 1827, in which yr. he removed to Syracuse, N. Y., where he practised law until forced by ill health to abandon it. He was mayor of Syracuse in 1849 and 1850, member of assembly in 1850 and 1857, sec. of State 1854-55, pres. of the board of quarantine coms. 1860, regent of the univ. Feb. 1861; appointed Mar. 1861 com. under the convention with New Granada; was in 1865 pres. of a board of coms. to locate the State asylum for the blind, and in the same yr. trustee of the State asylum for idiots, to which post he was twice reappointed; was M. C. 1876-77. Has written the *Genealogy of the Leavenworth Family in the U. S.*

Leavenworth (HENRY), b. in Conn. Dec. 10, 1783; studied and practised law; entered the army in Apr. 1812 as capt. of the 25th N. Y. Inf.; was made major of the 9th Inf. in Aug. 1813; commanded his regiment at the battles of Chippewa (July 5) and Niagara Falls (July 25, 1814), being wounded in the latter engagement; made lieut.-col. and brevet col. for bravery in the above engagements; lieut.-col. 5th Inf. of the regular army in Feb. 1818; commanded expedition against Indians on the upper Mo. River; made brevet brig.-gen. in July 1824, col. 3d Inf. in Dec. 1825. He founded several military posts on the W. frontier, one of which, Ft. Leavenworth, was the nucleus of the present city of Leavenworth, Kan. D. July 21, 1834.

Leavitt, lev'it (JOSUAH), D. D., b. at Heath, Mass., Sept. 8, 1794, grad. at Yale in 1814; studied law, and in 1819 was admitted to the bar; grad. in 1825 at the Yale Divinity School; was pastor of a Congl. ch. at Stratford, Conn., 1825-28; ed. of the *Sailor's Magazine* 1828-31, of the *New York Evangelist* 1831-37, of the *Emancipator* 1837-47, and in 1848 became connected with the *Independent*, which connection he retained till his death. D. Jan. 16, 1873.

Lebanon [Heb. from *labnan*, "to be white"; Assyrian. *Lubnana*; Gr. *Λιβανος*; Lat. *Libanus*; Ar. *Jebel Libnan*], a range of mts. in Syria, extending about 110 m. along the sea-coast from the Nahr-el-Kibir River on the N. to the Nahr-el-Litany on the S., and separated by the elevated valley of El-Bukaa (Coele-Syria), 10 to 20 m. wide, from the parallel range of Anti-Lebanon, extending from near Homs on the N. to the peak of Jebel-esh-Sheikh, a few miles S. of Damascus. In the centre of the valley of El-Bukaa are the majestic ruins of Baalbec. Physically, the mts. of L. are connected northward through their prolongation, the Jebel Nusarieh, with the Taurus, in Asia Minor, and southward, through the lower mts. of Pal. and Moab, with the Sinaitic group and the coast range of W. Ar. Between the mts. and the sea the plain of Phenicia is of varying breadth. The base of the range has an average breadth of 20 m.; the peak of Jebel Timarun attains a height of 10,533 ft., that of Dahar-el-Kudib 10,051, and Sunnin 8500 ft. The elevation decreases toward the S., and falls rapidly from the "twin-peaks" of Tomat-Niha (6500 ft.) to the wild, abrupt ravine of the Litany, whose banks sometimes rise perpendicularly 1000 ft. The mass of L. is a hard, partially crystallized Jurassic limestone, surmounted in many places by a grayish-white cretaceous deposit. The S. section exhibits traces of violent volcanic action, and earthquakes are still frequent. The inhabs. are chiefly Maronites, a Chr. sect. in the N., and Druses, professing a corrupted Moham-medanism, in the S.

Lebanon, Ill. See APPENDIX.

Lebanon, city and R. R. junc., cap. Boone co., Ind., 26 m. from Indianapolis; has acad. Pop. 1870, 1572; 1880, 2625.

Lebanon, R. R. junc., cap. of Marion co., Ky., 67 m. S. E. of Louisville. Pop. 1870, 1925; 1880, 2054.

Lebanon, on R. R., cap. of Laclede co., Mo., 185 m. S. W. of St. Louis. Pop. 1870, 1090; 1880, 1419.

Lebanon, on R. R., Grafton co., N. H., on the Conn. River, 65 m. N. W. of Concord. The West Village is the seat of Tilden Ladies' Sem. Water-power is afforded by the Muscoma River. Pop. tp. 1870, 3094; 1880, 3354.

Lebanon, on R. R., cap. of Warren co., O., 30 m. N. E. of Cin.; has public library, national normal school, co. infirmary, and orphans' home. Pop. 1870, 2749; 1880, 2703.

Lebanon, R. R. centre, cap. of Lebanon co., Pa., on the Swatara Creek and Union Canal, 25 m. E. of Harrisburg and 5 m. N. of great Cornwall iron hills. Copper, marble, and anthracite coal abound. Pop. 1870, 6727; 1880, 8778.

Lebanon, on R. R., cap. of Wilson co., Tenn., 30 m. E. of Nashville and 6 m. S. of the Cumberland River. It has a business and telegraphic coll., 2 female sems., and is the seat of Cumberland Univ., founded in 1842 by the Cumberland Presb. Ch. Pop. 1870, 2073; 1880, 2296.

Lebanon Valley College, at Annville, Pa., 21 m. E. of Harrisburg. It was organized and chartered by the State legislature in 1867. Young ladies are admitted, have equal advantages with young men, and may pursue the same course of study or the one especially arranged for them.

Lebas, leh-bah' (JEAN BAPTISTE APOLLINAIRE), b. in the dept. of Var, Fr., Aug. 13, 1797; studied at the École Polytechnique; was employed since 1823 as an engineer in the Fr. navy; became keeper of the naval museum in 1839. He

transported the obelisk of Luxor, weighing 506,000 lbs., from Thebes in Egypt to Place de la Concorde in Paris, which he described in his *L'Obélisque de Louxor, histoire de sa translation à Paris*, D. 1873.

Le Bœuf, leh-buff' (EDMOND), marshal of Fr., b. at Paris Dec. 6, 1809; received his military education in the École Polytechnique; entered the artil. in 1822, and distinguished himself as officer in the staff during the expedition against Constantine; went in 1854 to Crimea as col. and chief of the staff of the artil.; distinguished himself, both in the battle of Alma and at the attack on Sevastopol, which he partly led; took an important part in the It. war of 1859; he was called upon for the ministry of war; Mar. 24, 1870, he was created a marshal, and 4 months afterward the war with Ger. began. He received the position as chief of the staff of the emp.—that is, of actual commander of the army. But this task was too heavy for the marshal. A short time after (Aug. 12, 1870) Bazaine was made commander-in-chief, and Le B. received the command of the 3d corps. In this position he took part in the battles of Vionville and Gravelotte (Aug. 16 and 18), and fought at Noisseville (Aug. 31 and Sept. 1) with furious stubbornness. At the surrender of Metz he became a prisoner of war, and before the commission on the capitulation he testified against Bazaine.

Le Brun (CHARLES), b. at Paris Mar. 22, 1619; studied under Nicolas Poussin; was made a member of the Acad. of Painting and Sculpture in 1648; first painter to Louis XIV. in 1661; director of the manufacture of Gobelins tapestry and pres. of the Acad. The most prominent of his works are a series of pictures of the hist. of Fr. during the reign of Louis XIV., at Versailles, and another series of pictures illustrating the life of Alexander the Great, in the Louvre; but beside these a great number of historical, religious, and allegorical pictures is scattered through other Fr. and European galleries. D. Feb. 12, 1690.

Lebrun (CHARLES FRANÇOIS), duke of Piacenza, b. at St. Sauveur-Lendelin, Fr., Mar. 19, 1739; was for several yrs. sec. to the chancellor, Maupeou. After the downfall of Maupeou he lived in obscurity until 1789, when his pamphlet, *La voix du citoyen*, attracted attention. He was elected a deputy to the States-General, and acquired influence by his moderation and by his insight in financial matters. Having been imprisoned during the Reign of Terror, he entered, under the govt. of the Directory, the Council of Five Hundred, and was chosen its pres. Feb. 20, 1796. He allied himself to Bonaparte, and was made third consul Nov. 9, 1799. On the establishment of the empire he became minister of finances, in 1806 gov. of Liguria and duke of Piacenza, and in 1810 gov. of Hol., whence he was driven by the allies in 1814. After the first restoration he was made a peer of Fr. by Louis XVIII., but was excluded from the Chamber of Peers on the second restoration. In 1819 he was allowed to take his seat. D. June 16, 1824.

Lecithine, lek'i-thin' (Gr. *λεκιθος*, "yolk of an egg"), a phosphuretted fatty body found in the yolk of eggs, the brain, bile, blood, and in the roe of fish.

Lecky, (WILLIAM EDWARD HARTPOLE), b. near Dublin Mar. 26, 1838, grad. at Trinity Coll., Dublin, in 1859; settled in Lond., devoting himself to historical and philosophical researches. Wrote *The Leaders of Public Opinion in Ireland, Hist. of the Rise and Influence of the Spirit of Rationalism in Europe, Hist. of European Morals from Augustus to Charlemagne, and Eng. in the 18th Century*.

Leclerc, leh-kla'ir' (VICTOR EMMANUEL), b. near Paris Mar. 17, 1772; enlisted in the army in 1791; distinguished himself at Toulon; was appointed military commander of Marseilles in 1795, and made a brig.-gen. in 1797; married in the same yr. Nap.'s sister Pauline, and went in 1801, with a large fleet and an army of 30,000 men, to Hayti to vindicate the authority of Fr. over the colony. After a contest of some months a truce was made, but a new rising took place, and the Fr. army was attacked by yellow fever, to which L. himself fell a prey. D. Nov. 2, 1802.

Lecompton, on R. R., Douglas co., Kan., 10 m. N. W. of Lawrence, on S. bank of Kansas River; was for a time territorial cap. of Kan., and is seat of Lane Univ. (United Brethren). Pop. pt. 1870, 971; 1880, 1004, including 284 in v.

Lecomte, leh-kont' (LOUIS), b. at Bordeaux, Fr., about 1655; was one of the 6 Jesuits selected to undertake a semi-scientific mission in Chi. They embarked at Brest Mar. 3, 1686, with the Chevalier de Chaumont, ambassador to Siam, where they arrived in Sept., and were detained 2 yrs. by the reigning monarch, who prided himself upon his knowledge of math. Arrived at Peking in Feb. 1688, they made astronomical observations in various parts of the empire for several yrs., and had considerable success in making proselytes to Catholicism. L. was sent to Rome in 1692, and wrote *Nouveaux Mémoires sur l'Etat présent de la Chine and Sur les Cérémonies de la Chine*, D. 1729.

Le Conte, le kont' (JOHN), M. D., LL.D., son of Lewis, b. in Liberty co., Ga., Dec. 4, 1818, grad. 1838 with high honors at Franklin Coll., Athens (now Univ. of Ga.); studied med., taking his degree in 1841 from the New York Coll. of Phys. and Surgeons; in 1842 began practice at Savannah, Ga.; contributed largely to the med. journals of the U. S.; elected in 1846 to the chair of natural philos. and chem. in Franklin Coll., and resigned in 1855 to become lecturer on chem. in the Coll. of Phys. and Surgeons, New York; accepted in 1856 the new professorship of natural and mechanical philos. in the S. C. Coll., Columbia; in 1869 became prof. of physics and industrial mechanics in the new Univ. of Cal. at Oakland; pres. 1875-81; is a member of the leading Amer. scientific societies; has pub. his addresses of *Philos. of Med. and Study of the Phys. Sciences*, and contributed *The Nebular Hypothesis to the Popular Science Monthly* for Apr. 1873. In Dec. 1857 delivered a course of lectures on the "Physics of Meteorology" at the Smithsonian Inst., Wash., and in Nov. 1867 one of 4 lectures on the "Stellar Universe" at the Peabody Inst. in Baltimore. He was one of the associate eds. of *J.'s Univ. Cyc.*

A. H. STEPHENS.

Le Conte (JOHN EATON), b. near Shrewsbury, N. J., Feb. 22, 1784; entered the engineer corps of the U. S. A. in 1813; was long employed in surveys and fortifications, and retired with the rank of major in 1831. He was a successful cultivator of natural science, especially bot. and zoology, upon which he wrote a large number of monographs, in several of which he had the benefit of the scientific observations of his brother Lewis. D. Nov. 21, 1860.

Le Conte (JOHN LAWRENCE), M. D., son of the preceding, b. in New York May 13, 1825, grad. in 1846 at the New York Coll. of Phys. and Surgeons; made scientific excursions in the W. States while a student, and subsequently extended his travels to Central Amer., the results of which were communicated to scientific societies and journals. His specialty is the study of N. Amer. Coleoptera. The Smithsonian Inst. pub. in 1861-62 his *Classification of the Coleoptera of N. Amer.*, and in 1863-66 his *List of the Coleoptera of N. Amer.* He entered the army in 1862 as surgeon of volunteers, and became a med. inspector of the regular army. He was a member of the National Acad. of Sciences, and was in 1873 elected pres. of the Amer. Association for the Advancement of Science. D. Nov. 15, 1883.

Le Conte (JOSEPH), M. D., son of Lewis, b. in Liberty co., Ga., Feb. 26, 1823, graduated with distinction at Franklin College, Ga., in 1841, and in med. in New York in 1845; settled in 1848 as a phys. in Macon, Ga.; studied nat. hist. under Agassiz at Cambridge in 1850; became in 1853 prof. of nat. hist. at Franklin Coll., and of chem. and geol. in the Univ. of S. C. from 1856 to 1860; in 1869 took the chair of geol. in the Univ. of Cal.; wrote *The Mutual Relations of Religion and Science*.

Le Conte (LEWIS), M. D., b. near Shrewsbury, Monmouth co., N. J., Aug. 4, 1782, grad. in 1799 at Columbia Coll.; studied med. but never practised; settled in Liberty co., Ga., establishing a botanical garden. In his laboratory he tested the discoveries of chemists; he made 2 scientific excursions to the region of the Altamaha River. Dr. L. devoted much attention to mathematical studies, and MSS. on this subject and on native animals and birds were lost by the burning of Columbia, S. C., in Feb. 1865. D. Jan. 9, 1838.

Lecouvreur, leh-koov-rur' (ADRIENNE), b. near Epernay, Fr., Apr. 5, 1692; after receiving some instruction from the actor Legrand, she entered the stage at Strasbourg in 1716. Next yr. she made her début at the Théâtre Français in Paris, where she attained the first place both in comedy and tragedy. Maurice of Sax. was her lover, and when he was made duke of Courland she sold her diamonds in order to furnish him with the money necessary to take possession of the country. It was alleged that another of his mistresses, the duchess of Bouillon, poisoned her from jealousy, and she d. Mar. 20, 1730.

Le'da, in Gr. mythology, was the wife of Tyndareus, king of Sparta, and by Zeus, who surprised her in the shape of a swan, she was the mother of Castor and Pollux.

Ledru-Rollin (ALEXANDRE AUGUSTE), b. at Paris Feb. 2, 1807, began to be known soon after the revolution of July 1830 by acting as an "avocat" for persons prosecuted by the govt. of Louis Philippe, or by writing pamphlets against its repressive measures. In 1861 he was elected member of the Chamber of Deputies, and upheld openly the doctrines of republicanism. In 1848 he was, as minister of the interior, one of the provisional govt. of the republic. When Cavaignac, and afterward Louis Nap., took the power into their hands, L.-R. continued to fight for liberty in the National Assembly. On June 13, 1849, he was the leader of an insurrection attempted to prevent Louis Nap. from sending Fr. troops to help in the re-establishment of the pope at Rome. The insurrection collapsed, and L.-R. escaped to Eng. His extradition was unsuccessfully asked by Nap. III., under pretext that he had participated in a plot against the life of the emp. He returned to Fr. in 1870, and in 1873 was elected to the assembly, and delivered an eloquent speech in favor of universal suffrage. D. Jan. 1, 1875.

Led'yard (JOHN), b. at Groton, Conn., in 1751; lived for a time among the Six Nations, to whom he intended to become a missionary, and studied in Dartmouth Coll.; but his restless spirit prompted him to embark alone in a log canoe upon the Conn. River and leave coll. forever. He shipped as a sailor to Gibraltar; enlisted as a Brit. soldier, but was soon discharged; returned to Amer. during the Revolutionary war; went to Lond. and sailed as a corporal of marines under Capt. Cook on his last voyage, of which L. kept a diary. In 1782 he deserted from the Brit. service. Assisted by Sir Joseph Banks and others, he started from St. Petersburg (whither he had walked from Stockholm) for the Pacific Ocean. At Irkutsk in Siberia he was arrested and expelled from Rus. In 1788, on his return from Rus., he started for the exploration of Afr., but was attacked at Cairo by a fever, of which he d. Jan. 17, 1789.

Ledyard (WILLIAM), b. at Groton, Conn., in 1738; was in Sept. 1781 commander of Ft. Griswold, near New London, which he defended against an overpowering Brit. force until it was taken by storm, when, with more than 100 of his soldiers, he was massacred by the enemy, Sept. 7, 1781.

Lee, Berkshire co., Mass., on R. R. and the Housatonic River, 99 m. N. of Bridgeport, Conn., and 10 m. S. of Pittsfield. Here are fine marble-quarries which supplied materials for the capitol extension at Wash. and for the Catholic cathedral in New York. First settled in 1760, incorporated in 1777, and named for Gen. Charles Lee; has many paper-mills, first one erected in 1806. Pop. pt. 1870, 3866; 1880, 3939.

Lee, ALFRED, D. D., b. at Cambridge, Mass., Sept. 9, 1807, grad. at Harvard in 1827; was admitted to the bar in 1830, and practised law at Norwich, Conn., 1831-33; studied in the Gen. Theological Sem., N. Y.; was ordained a deacon of the P. E. Ch. in 1837, and a priest in 1838; rector of Calvary ch., Rockdale, Del., 1838-41; consecrated bp. of Del. in 1841, and became also rector of St. Andrew's, Wilmington, Del. Author of *Life of St. Peter, Life of St. John, and Hierarchy of Christ*.

Lee (ANN), b. at Manchester, Eng., Feb. 29, 1736; worked in a cotton-mill, and afterward became a cook; was married to a man named Stanley, and began to take part in the conventicles of John and Jane Wardley, the original "Shaking Quakers," whom she succeeded as the leader of the sect in 1771, soon after which she was for a time confined in a jail, and then in a madhouse. After her release she was acknowledged as a "mother in Christ," and assumed the title of "Ann the Word." In 1774 she went with a few followers to New York, and in 1776 settled at Watervliet, near Albany. Here she was charged with high treason and witchcraft, and imprisoned. This imprisonment, regarded as a persecution, brought her many followers. D. Sept. 8, 1784.

Lee (ARTHUR), M. D., LL.D., b. in Westmoreland co., Va., Dec. 20, 1740, son of Thomas; ed. at Eton and Edinburgh, where he grad. as M. D. in 1765, and practised at Williamsburg, Va.; returned to Europe; studied law, and was admitted to the bar in 1770; became prominent in public affairs in Lond., and in after yrs. served successively as com. of Mass., Va., and finally of the Gen. Cong., in Lond., Paris, Madrid, and Berlin. In 1781 he was in Va. assembly; was in Cong. 1782-85, and held other positions of importance. He was a brother of Francis Lightfoot, Richard H., Thomas L., Philip L., and William Lee. D. Dec. 4, 1792.

Lee (CHARLES), b. at Derrhall, Eng., in 1731, was the son of a col. in the Brit. army. When 11 yrs. old he entered the service; was in Braddock's expedition, and was wounded at Ticonderoga in 1758; distinguished himself in Port., but never rose higher than a half-pay lieutenant-col. He became later aide-de-camp to the king of Poland and a maj.-gen.; entered the Rus. service, and became notorious as a duellist. In 1773 he came to Amer., purchased an estate in Berkeley co., Va., and became a Whig. In 1775 he was chosen maj.-gen. of the Continental army, and in 1776 was taken prisoner at Baskingridge, N. J. In 1778 he was exchanged, and at the battle of Monmouth his insubordination nearly lost the day. He was court-martialed, and suspended for 1 yr. from command, and soon after was wounded in a duel by Col. John Laurens, who challenged him in consequence of language used to Washington. He then retired to Va., where he led the life of a hermit, and a disrespectful letter sent by him to Cong. caused his dismissal from the service. (See his *Life*, by G. H. Moore.) D. Oct. 2, 1782.

Lee (CHARLES ALFRED), M. D., b. at Salisbury, Conn., Mar. 3, 1801, grad. at Williams Coll., and took his med. degree at Pittsfield, Mass., in 1825; settled in 1826 in New York, where he was one of the founders of the N. Dispensary. He held at various times professorships in no less than 10 med. schools, and aided in founding the med. coll. of the Univ. of New York and that of Buffalo. He wrote much on med. and other subjects, and was at one time ed. of the *N. Y. Journal of Med.* D. Feb. 14, 1872.

Lee (FRANCIS LIGHTFOOT), son of Thomas, b. at Stratford, Va., Oct. 14, 1734; received a careful education from a private tutor; inherited an ample estate; served in the house of burgesses from 1765 to 1772, and 4 terms as delegate in the Continental Cong. from 1775 to 1779; was a signer of the Dec. of Ind.; member of important committees, and frequently chairman of the committee of the whole. He rendered important services in framing the old Articles of Confederation, and insisting, as conditions of peace with Eng., upon the right to the navigation of the Miss. and to the Newfoundland fisheries. He seldom spoke in Cong., but exercised great influence. Retiring from Cong. in 1779, he took no further part in politics, except by a brief service in the State senate. D. Apr. 1797.

Lee (HENRY), the father of Robert E. Lee, b. in Westmoreland co., Va., Jan. 29, 1756, grad. at Princeton in 1773; in 1776 entered the army as a capt. of horse, and served in the N. and S. in command of a partisan corps known as "Lee's Legion," while L. himself was familiarly known as "Lighthorse Harry." He retired from the army soon after the battle of Eutaw, in which he distinguished himself. He was in Cong. in 1786; gov. of Va. 1793-95; commander-in-chief of the expedition against the whiskey insurgents 1794; and again M. C. in 1790. In his eulogy on Washington, prepared by direction of Cong., occur the words, "First in war, first in peace, and first in the hearts of his countrymen." In 1809 he was confined for debt in Va., and wrote his *Memoirs of the War in the S. Dept.* In 1814 he was in Baltimore, the guest of Mr. Hanson, whose house was attacked by a mob. L. took part in the defence of the house, and was afterward put into the city jail for safety, but the mob entered the jail and killed or cruelly maimed the whole party. L. never recovered from his injuries. He went for his health to the W. I., and on the return journey d. on Cumberland Island, Ga., Mar. 25, 1816.

Lee (HENRY W.), b. at Hamden, Conn., July 26, 1815; received deacon's orders in 1838; in 1840 became rector of a ch. at Springfield, Mass.; in 1848 received charge of St. Luke's ch. at Rochester, N. Y., where he remained till 1854, when he was chosen bp. of Ia. D. Sept. 26, 1874.

Lee (JESSE), b. in Prince George's co., Va., Mar. 12, 1758; joined the Meth. Ch. in 1773; in 1783 was received into the conference; in 1787 penetrated N. Eng., and preached from the Conn. to the farthest settlements in Me. He formed the first Meth. "class" in N. Eng. at Stratfield, Conn., Sept. 26, 1787, and the first in Boston, July 13, 1792. He was 3 times elected chaplain to the U. S. House of Reps. and once to the Senate. Wrote *Hist. of Methodism in Amer.* D. Sept. 12, 1816.

Lee (LEROY MADISON), D. D., b. in Petersburg, Va., 1808; joined the Va. Meth. Conference in 1828; in 1836 was appointed ed. of the *Richmond Chr. Advocate*; in 1859 resumed the pastoral office. Wrote *Life and Times of Jesse Lee, Advice to a Young Convert*, etc. D. April 21, 1882.

Lee (LUTHER), D. D., b. at Schcharie, N. Y., Nov. 30, 1800; became a travelling preacher of the M. E. Ch. in 1827; lectured in favor of temperance and the abolition of slavery; succeeded on account of slavery from the M. E. Ch. in 1842; joined the new body of "Wesleyan Methodists," became

pastor of a ch. in Syracuse 1843, pres. of the first Wesleyan Meth. gen. conference in 1844, and ed. in New York of the *True Wesleyan*. In 1856 he was chosen pres. of Michigan Union Coll. at Leoni; resigned and spent several yrs. in O.; became in 1864 prof. at Adrian Coll., Mich.; returned to M. E. Ch. in 1867.

Lee (RICHARD HENRY), signer of the Dec. of Ind., son of Thomas, b. at the family seat, Stratford, Va., Jan. 20, 1732; was ed. in Eng., and after his return marched with a company to join Braddock, who contemptuously rejected his services. He was early chosen to the house of burgesses, where he at once took a position on the side of popular rights. He was in Cong. 1774-77, 1784-85, and 1786-87, and was the author of the famous motion of June 7, 1776, "That these United Colonies are, and of right ought to be, free and independent States," etc., and advocated the Dec. of Ind. in a brilliant speech. During 1780 he was for a portion of the time in the field at the head of the militia of Westmoreland co. He was a Senator from Va. 1789-92, and, though not a Federalist, supported the administration of Washington. (See his *Life and Correspondence*, by R. H. Lee, his great-grandson.) D. June 19, 1794.

Lee (ROBERT), D. D., b. at Tweedmouth, Eng., Nov. 11, 1804, entered the Univ. of St. Andrew's in 1824; was ordained in the Ch. of Scot. in 1832. In 1843, on the disruption of the Scot. Ch., was appointed by the town council of Edinburgh to the pastorate of the Old Grey Friars' Ch.; in 1846 he became regius prof. of biblical criticism in the Univ. of Edinburgh. He was charged with inculcating heresy in regard to universal salvation, and vigorously defended himself. In 1858 he was a member of a deputation to appeal before a parliamentary committee on the subject of univ. reform, and his suggestions were embodied in the measure as finally passed. In 1857 he pub. a vol. of *Prayers for Public Worship*, and having employed them in his own parish, was arraigned in 1859 before the presbytery, and later before the Gen. Assembly, on a charge of introducing into public worship a liturgy and certain forms unknown to the Ch. of Scot. He argued his own case, and obtained a verdict in his favor. In 1860 he pub. *The Reform of the Ch. of Scot.*, in which he discussed liturgy, postures in worship, etc. The Gen. Assembly of 1863-64 reported favorably upon these views, and on Apr. 22, 1865, an organ was first opened in his ch. of Grey Friars. The action of 1864 was reversed by the Gen. Assembly of 1865. His great work is an ed. of *The Holy Bible, with about 60,000 Marginal References*, etc. (See his *Life and Remains*, by Rev. R. H. Story.) D. Mar. 12, 1868.

Lee (ROBERT EDWARD), son of Henry Lee ("Lighthorse Harry"), b. at Stratford House, Va., Jan. 19, 1807, grad. at W. Pt. 1829; served in the engineer corps until the breaking out of the war with Mex.; served there first as chief engineer to Gen. Wool, afterward with Gen. Scott; was active in all the operations around the capital; was wounded at Chapultepec, and rose by successive brevets to the rank of col. From Sept. 1, 1852, to the end of Mar. 1855 he was supt. of the Military Acad., resigning in order to assume the duties of lieutenant-col. of the 2d Cav., to which he had been appointed. For several yrs. he now served on the Tex. border; but being on leave of absence, near Wash., at the time of the raid of John Brown (Oct. 1859), he was placed in command of the forces employed in its repression. Having returned to his regiment, he was in command of the dept. of Tex. during the greater part of 1860. On Mar. 16, 1861, he became col. of his regiment by regular promotion, but resigned (Apr. 25) upon the secession of Va. Repairing to Richmond, he tendered his services to the gov. of the State, and was appointed commander-in-chief of its forces, with the grade of maj.-gen. Va. having entered the Confederacy and Richmond become the cap., L. was appointed third in rank of the 5 gens. by virtue of an act of the Confed. Cong. creating that grade. For the time he remained at Richmond, generally consulted by Jefferson Davis concerning military affairs, until the early autumn, when he was assigned to command the forces confronting Gen. Rosecrans, in W. Va., but was, about Dec. 1, 1861, transferred to the command of the coast of N. C., S. C., and Ga. The Confed. Cong. having created the office of commander-in-chief, Mr. Davis, regarding it as an encroachment upon the executive power, vetoed the law, but about the end of Mar. 1862 called L. back to Richmond, and nominally invested him with the functions in question, which were exercised without material control over either the organization or operations of Confed. armies. Gen. Joseph E. Johnston having been wounded at the battle of Fair Oaks, May 31, 1862, L. the following day was appointed to succeed him in the direct command of the army assembled for the defence of Richmond, and his first act was to draw all his troops back to their encampments near the city, and stood upon the defensive, while gathering all possible reinforcements. By the night of June 25, 1862, L. had added from 23,000 to 25,000 men to his forces, including Jackson's veterans, and had at his disposition an army 80,000 strong.

McClellan's position, meanwhile, was peculiarly strong; only his right (some 35,000 men) was at all exposed to attack, but well protected by intrenchments and artill. Thus disposed, there was an army of at least 100,000 men. L., now ready for the offensive, put Jackson in motion with 3 divisions (16,000), to fall upon the U. rear, and leaving Magruder with barely 25,000 men to shield Richmond from the mass of McClellan's force, threw Longstreet with 40,000 men forward to a direct attack upon the U. right under Fitz John Porter, late in the afternoon of June 26. Then ensued the series of engagements known as the Seven Days' battles, the gen. result of which was that Richmond was virtually relieved from the risk of an attack from McClellan and the quarter of James River.

A fresh U. army having been massed soon after in the vicinity of Culpeper C.-H. under Gen. Pope, Jackson was at once detached to confront and stay this fresh danger, and the battle of Cedar Run was won by him on Aug. 9.

Ten days later, leaving a force to secure Richmond from a coup d'état, L. was in movement with his main army for a stroke at Pope—a movement of signal audacity in execution that ended in the complete discomfiture of his opponent in the actions of Aug. 29 and 30, 1862, or second battle of Manassas. Following this success, L. threw his victorious corps swiftly across the Potomac into Md., an operation more boldly and skillfully conceived than thoroughly carried out. The battle of Antietam was fought (Sept. 17), and L. found it expedient to abandon the campaign and retire into Va. The U. army was reorganized during the next month, under Gen. Burnside, who took the offensive with Richmond again as the objective, but Aquia Creek as his base, and reached the N. bank of the Rappahannock at Fredericksburg on the 17th of that month, to find L. ready to dispute his further march. Then came the 13th of Dec., with the bloody conflict of Fredericksburg. With another change of Federal commanders came the battle of Chancellorsville (May 2-4, 1863).

As the whole theatre of war stood after that battle it would seem that the Confed. forces should have been employed in a different operation from that which L. next assayed, as is alleged, against his own judgment and advice—the campaign ending in disaster on the field of Gettysburg (July 1-3, 1863), from which he withdrew shorn of some 27,000 of the very élite of his army. But he repassed the Potomac, leaving his opponent wholly unwilling to seriously adventure the offensive in turn for 10 months.

By that time, Lieut.-Gen. Grant, made commander-in-chief of the armies of the U. S., took the field against L. with an army of over 140,000 men. To meet this formidable army L. had only about 55,000 inf. and artil. The object of Grant was to turn his adversary's position, and reaching an open field beyond the Wilderness, upon L.'s communications, force him to fight for their integrity at mortal disadvantage. But too far-sighted to be thus out-manoeuvred, L. became the assailant at the threshold of the operation. Then ensued the series of severe battles beginning with that of the Wilderness, May 5, 1864, and closing with that of Cold Harbor, June 3.

It now remained for Grant to seek a new line of approach to his objective. Throwing his army across the James and S. of the Appomattox on June 14 and 15, 1864, he opened a new campaign at Petersburg of 300 days. Looking at the force employed against him and his own comparatively petty resources, L.'s stand at Petersburg has no parallel in war. In the course of the 10 months of struggle and combat which ensued, L., foreseeing the ultimate issue, would have evacuated that position early in 1865, but his political superiors were unwilling to give up Richmond until forced away by arms. Reduced to about 40,000 rifles in his trenches, on Mar. 25, 1865, he delivered a skillfully aimed stroke at a vulnerable point in his opponent's lines, but the enterprise miscarried. Grant in turn massed 2 corps and all his cav. for a counter-stroke at L.'s right flank. Before the blow fell, the Confed. gen., concentrating 15,000 men, again smote his adversary with well-nigh his wonted success. But the terrible blow fell soon after upon the Confed. lines at Five Forks, which made them untenable. So L., retreating, was pressed with such vigor and skill that his surrender at Appomattox was an absolute necessity. Although that capitulation embraced only some 27,000 men, but 8000 of whom were armed, it brought the war of secession to an immediate close.

Left at the close of the war without estate or profession, L. accepted the presidency of Washington Coll. at Lexington, Va., to which he gave the same devotion, with the like high sense of duty, which had distinguished his whole career. At the same time, not unmindful of the large influence he had acquired over his section, he lost no opportunity to use that influence to soften and assuage the passions and animosities of his people. But at 63 yrs. of age, with apparent promise of prolonged health, he was taken suddenly ill, and d. Oct. 12, 1870. [From orig. art. in *J. S. Univ. Cyc.*, by GEN. THOMAS JORDAN.]

Lee (SAMUEL PHILIPS), b. Feb. 13, 1812, in Va.; entered the navy as a midpn. Nov. 22, 1825; became passed midpn. 1833, lieut. 1837, commander 1855, capt. 1862, com. 1866, rear-admiral in 1870; retired from active service Feb. 13, 1873. Commanded the Onondaga with distinguished gallantry at the passage of Fts. Jackson and St. Philip and capture of New Orleans. From 1862 to 1864 commanded the N. Atlantic blockading squadron, and from 1864 to 1865 the Miss. squadron. From 1866 to 1867 pres. of board to examine volunteer officers for admission into the navy; 1868 to 1870 chief signal-officer of the navy; 1870 to 1873 in command of the N. Atlantic fleet.

Lee (THOMAS), b. in Va. about the beginning of the 18th century; was third son of Richard Lee, a member of the council, and grandson of Richard Lee, the founder of the family in Amer. He succeeded to the ancestral estate at Stratford, Westmoreland co.; became pres. of the council, and his commission as gov. had just been made out when he d. in 1750.

Lee (WILSON), b. in Sussex co., Del., in 1761; became an itinerant Meth. in 1784; travelled and preached in Ky., and after 1794 went to N. Eng., and shared with Jesse Lee in the founding of Methodism there. D. Oct. 11, 1804.

Leech [A.-S. *leac*], a name vaguely applied to various representatives of the order Bdelloidea or Sanguisugaria, but especially employed for the species of the family Hirudinidae. These have an elongated, flattened, and transversely annulate body, which is narrowed anteriorly and obtuse posteriorly; the anterior extremity has an oval sucker, and within the mouth are 3 jaws converging backward and denticulated in their margins; 10 inconspicuous eyes are developed on the upper lip; the posterior extremity has a large round, obliquely inserted sucker. The sexes are united in one individual. L. afford the least painful means for the local abstraction of blood.

THEODORE GILL.

Leech (JOHN), b. in Lond. in 1817, ed. at Charter-house; was a student at the Royal Acad. His genius appeared in sketches of character for *Bell's Life in Lond.*; in 1847 he began to work as a designer for *Punch*. D. Oct. 30, 1864.

Leeds, municipal and parliamentary borough of Eng., and one of its leading manufacturing cities, situated in the W. Riding of Yorkshire, on the N. bank of the Aire. The most noted public buildings are St. Peter's ch., the town-hall, the gram. school, etc. The city has many benevolent and educational insts. As a manufacturing place L. was conspicuous already in the 16th century, and the products of its industry were at that time nearly the same as now—viz. woollens, linens, and leather. Of late the iron manufactures have grown considerably. Near the city are the beautiful ruins of Kirkstall Abbey. Pop. 309,126.

Leeds (JOHN), b. in Talbot co., Md., May 18, 1705; was for 40 yrs. a clerk of the co. court and a judge of the provincial court; received in 1760 a commission to supervise the returns of Mason and Dixon of the boundaries of Md. and Pa.; wrote *Observation of the Transit of Venus*, and while surveyor-gen. of Md. d. Mar. 1790.

Leek [A.-S. *leac*], the *Allium porrum*, a plant of the onion genus; is extensively cultivated in the kitchen-gardens of Europe. The lower part of the stem is the part eaten.

Leesburg, on R. R. cap. of Loudoun co., Va., 38 m. N. W. of Wash., D. C., near E. base of Kittectan Mt. and 3 m. from the Potomac River. The battle-field of Ball's Bluff is 2 m. from the town. Pop. 1870, 1144; 1890, 1726.

Leeser (ISAAC), b. in Neukirch, Westphalia, Dec. 12, 1806; came to Richmond, Va., in 1824; was at first engaged in commerce, but in 1829 became rabbi of the prin. Jewish synagogue in Phila.; wrote several works relating to Jewish hist. and doctrine, and made a *Translation of the Holy Scriptures*. (O. T.) from the original Heb. In 1845 he established a monthly magazine, *The Occident and Amer. Jewish Advocate*; retired from the ministry in 1850. D. Feb. 1, 1868.

Leete (WILLIAM), b. in Eng. early in the 17th century; came to N. Eng. in 1637; was an early settler of New Haven, Conn.; a founder of the town of Guilford in 1639; was for many yrs. chosen assistant and deputy gov., and was gov. of Conn. from 1661 to 1665. He was frequently a com. of the colonies between 1655 and 1679; befriended the regicides Goffe, Whalley, and Dixwell, in Mar. 1661; was again chosen gov. in 1676, and annually re-elected until his death. D. Apr. 16, 1683.

Leetonia, O. See APHENDIX.

Leeuwenhoek, leu'wen-hook, van (ANTONIS), b. at Delft, Netherlands, Oct. 24, 1632; went to Amsterdam, and entered a merchant's office, but returned after a few yrs. to his native city. He manufactured optical instruments, especially microscopes, and these he applied with brilliant success to his researches in physiology. He discovered the red globules of the blood, the infusorial animalcules, and the spermatozoa. His writings have been collected under the title *Opuscula anatomica, sive tractatus anatomici, microscopiorum detecta*. D. Aug. 26, 1723.

Leeward Islands, See ANTILLES.

Lefebvre, leh-fáv' (FRANÇOIS JOSEPH), duke of Dantzic marshal of Fr., b. at Ruffach, Alsace, Oct. 25, 1755; enlisted 1773 in the Fr. guard. In 1792 he was made capt. of an inf. regiment; in 1794 a brig.-gen. Having been appointed commander of the division to which Paris belonged, he supported Nap. on Nov. 9, 1799, and was made a marshal of Fr. at the establishment of the empire. In the war against Prus. he distinguished himself by the siege and capture of Dantzic (May 26, 1807), whence he derived his title of duke; took Bilbao, Sp., and defeated the Eng. under Blake, Nov. 7, 1808. In 1814 he commanded the left wing of the army opposing the invasion of the allies, but after the abdication of Nap. he submitted to the Bourbons and was made a peer of Fr. by Louis XVIII. D. Sept. 14, 1820.

Lefebvre-Desnouettes, leh-fáv' dā-noo-et' (CHARLES), COUNT, b. at Paris Sept. 14, 1773; served in the Fr. army in Belg. in 1792; was aide-de-camp to Nap. at Marengo; distinguished himself at Austerlitz; became brigadier in 1806, and gen. of division in 1808; began the siege of Saragossa in Sp.; was taken prisoner by the Eng.; escaped from Eng.; took a prominent part in the Aus. (1809), Rus. (1812), and Ger. (1813) campaigns, and in the defence of Fr. from invasion (1814); was made a peer by Nap. in 1815; fought at Fleurus and at Waterloo; was condemned to death, but escaped to the U. S.; joined with Baron Lallemand in the attempt to found a colony of Fr. refugees in Ala.; was in correspondence with Nap. for the purpose of effecting his rescue from St. Helena, and received 150,000 francs by the will of that monarch, and while returning to Europe was lost at sea near Kinsale, Ire., Apr. 22, 1822.

Lefèvre, leh-fáv' (PETER PAUL), D. D., b. at Roulers, Belg., Apr. 30, 1804; ed. in Paris; came to the U. S. in 1828; was ordained a R. Cath. priest in 1831; was stationed at New Madrid, Mo., and afterward became a travelling missionary in the N. W. In 1844 he became bp. of Zela in *partibus* and coadjutor of Detroit. D. Mar. 4, 1869.

Lefèvre (TANNEU) (commonly known as **Tanaquil Faber**, from the Latinized form of his name), b. at Caen in 1615; ed. at the Jesuit Coll. of La Flèche; devoted himself to philos. and classical lit. His works were chiefly annotated eds. of the classic authors, e. g. of Longinus, Elian, Lucretius, Horace, Phædrus, Terence, Anacreon, Sappho, and several others. He translated also into Lat. imitations the *Fables of La Fontaine*, and wrote *Vita dei Philis, grecæ et Melchioris pape, commentum, les Hommes illustres et latins*. D. Sept. 12, 1672.

Lefkosi'a, or **Nicosia**, the cap. of Cyprus, situated nearly in the middle of the island; surrounded with walls, and has many interesting buildings. It has some manufactures of silk, cotton, and leather. Pop. 18,000.

Lefort, leh-fór' (FRANÇOIS), b. at Geneva in 1746, of Scot. descent, and was placed in a merchant's office in Hamburg; ran away in his 14th yr., and enlisted in the Swiss guard in

the Fr. service. In 1674 he left Fr. on account of a duel; entered the service of the Netherlands; went in 1675 to Moscow, where he became sec. to the Dan. ambassador, and afterward capt. in the Rus. army. In 1682 he became acquainted with Peter the Great, at that time only 10 yrs. old. He became his teacher, soon also his friend, and after the revolution of 1689, which made Peter sole ruler of Rus., his influence became almost unbounded. D. Mar. 12, 1699.

Legaré, leh-gree' (HUGH SWINTON), b. in Charleston, S. C., Jan. 2, 1797, grad. at the Coll. of S. C. at Columbia in 1814; practised law in Charleston. In 1830 he became atty.-gen. of the State, and at the same time had charge of the *S. Quarterly Review*, of which periodical he was chief ed. In 1832 he was *chargé d'affaires* from the U. S. to Belg.; 1837 to 1839 M. C. from S. C.; in 1841-43 atty.-gen. of the U. S., and also part of the time was acting sec. of state. D. suddenly at Boston, Mass., June 16, 1843.—His sister, MARY SWINTON LEGARÉ (Mrs. Bullen), b. about 1800, attained considerable success as a painter. She removed in 1849 to West Point, Le co., Ia., where she founded and endowed Legaré Coll. for women. A. H. STEPHENS.

Legates and Legation. Legate, from Lat. *legatus*, a person commissioned, was used of ambassadors and of adjutants in armies. In international law, *legation* is especially used of an embassy and of the right of sending it. The popes called their prin. envoys to Catholic nations *legati a or de latere*. T. D. WOOLSEY.

Legend, lê-jend [Lat. *legendum*, from *legere*, to "read"], applied to portions of Script., and to other writings of religious instruction, appointed to be read in ch. services; it therefore corresponded in signification to the modern *lesson*. In the authorized breviaries used in the Romish Ch. the term *lectio* is now applied alike to extracts from Script. and to lives of saints of post-apostolic ages. The primitive Chr. community consisted of 2 classes of persons—the clergy and the laity. The Scripts., together with essays and narratives of the lives and deaths of saints, sufficed for the instruction of both classes alike. But beside the clergy and the laity there were a number of anchorites or hermits living in seclusion. When these recluses became numerous they acquired the name of *monachi* (our monk). The monks gradually gathered together in small communities, at first in desert retreats, and afterward in cloisters. A new lit., designed for the instruction of persons thus severed from the gen. body of the faithful and devoted to a religious life, sprang up. This is the lit. of the *legend*. The L. of the Romish and other chs. is a professed hist. of sacred persons or miraculous events founded upon tradition, but recognized by the Ch. as authentic, and entitled, if not to faith, at least to reverence. The oldest extant L. which can be affirmed to be genuine are sketches of hermit-life in the *Vite Patrum*, which are referred to known authors. The L. accepted by the early Ch. have monks and monastic life for their object. They were composed for the purpose of holding up that life as the true Chr. ideal. They were intended for those who had retired from the world, and hence the monkish virtues alone, not the social, are exalted. Though the authorship of most old L. is unknown, they were evidently in gen. the work of monks, to whom monastic life gave opportunity for this species of literary occupation. But with the growth of the temporal power of the Ch., and with the increasing influence of monastic corporations, the character of the L. underwent an important change. L. began to be addressed to the parochial clergy and to the laity, whom the dawn of intelligence which preceded the revival of classical learning was rendering accessible to literary influences. The simplicity and true-heartedness disappeared. They became what the Gers. call *Tendenzromane*. Under the influence of the Ref. the L. of the Ch. were superseded by translations of the Scripts. In the Catholic reaction which followed, efforts were made to rehabilitate the old legendary lit. by omissions and the infusion of new elements, and by reports of modern miracles. The L. which have been composed within the last 3 centuries are destitute of all merit.

The lit. of the L. is of vast extent. The most conspicuous collections are the *Vite Patrum*, de *Viti et Verbis Seniorum*, seu *Historia Eremitica*; the *Legenda Aurea*, or *Historia Lombardica*, compiled by Jacobus de Voragine in the 13th century; the *Flos Sanctorum* of the Jesuit Ribadineira; and, finally, the *Acta Sanctorum*, edited by the Bollandists. Of this vast collection, begun in 1643, about 60 folio vols. have appeared. There is an immense number of L. of individual saints, and especially of the Virgin Mary. Of these the most extensively known is the *Glorie di Maria* of Liguori. One of the most remarkable is the *Port. Santuario Mariano*.

GEORGE P. MARSH.

Legendre, leh-zhondr' (ADRIEN-MARIE), b. in Paris in 1752. He early distinguished himself as a teacher of math. in the military school at Paris, and before attaining the age of 30 made his début in the world of science by one of his finest memoirs—that on *The Attraction of Spheroids*—by which he gained admission to the Acad. of Sciences (1783). His equally important investigations of the *Figure of the Planets*, considered as made of spheroidal strata whether homogeneous or otherwise, soon followed, and in 1805 his *New Method for determining the Orbits of Comets*. His *Elements of Geometry* has been translated into all langs., and has become a classic in that species of lit. He assisted De Prony in the calculation of his great logarithmic tables; invented the rule of the least squares of errors; was author of a work, the *Exercices sur le Calcul intégral*, and of researches on the *Eulerian integrals*, both of which were subsequently developed into the great work of his life—the *Traité des Fonctions elliptiques*. L., though inferior in range and power of intellect to either of his 3 great contemporaries—Laplace, Lagrange, and Euler—was nevertheless only inferior to them, and was one of that age who most powerfully contributed to the advancement of mathematical science. D. Jan. 9, 1833. J. G. BARNARD.

Leggett (MORTIMER D.), b. at Ithaca, N. Y., Apr. 19, 1831; removed to O. in 1847; studied law; practised at Zanesville in 1861, when he raised the 78th O. Inf., of which he was appointed col., and which he led at Ft. Donelson, Pittsburg Landing, and Corinth; commanded at the capture of Jackson, Tenn.; defended Bolivar, Tenn., against a largely superior force; appointed brig.-gen. of volunteers Nov. 29, 1862; was wounded at Champion Hills, and again before Vicksburg; was in the Atlanta campaign; commanded a division in Sherman's march to the sea; brevetted maj.-gen. for this latter campaign; became full maj.-gen. Aug. 1875, which office he resigned the next month, and was appointed com. of patents Jan. 13, 1871.

Leg'horn [It. *Livorno*], a maritime town in Central It., stands on a tongue of land between the mouth of the Calabrone on the N. and the lowest spur of the Tuscan Apennines on the S. A navigable canal connects it with the Arno, which enters the sea 7 m. N. of the town. There are 2 harbors, the old and the new, the latter being capable of receiving vessels of heavy tonnage. The import trade embraces cotton, wool, cutlery, hardware, etc. The export trade is in silks, straw hats, borax, coral, and of its own manufactures, oil, soap, tobacco, salt, etc. The port of L. is one of the most frequented in the Mediterranean, and it is every yr. more and more resorted to as a fashionable bathing-place. Pop. 97,605.

Legion, lê-jun [Lat. *legio*, from *legere*, to "gather," "collect"], a military organization of the anc. Roms., combining all the constituent elements of an army, and numbering from about 3000 to about 6000 men. Originally, service in the L. was a privilege reserved to the Rom. citizen of property, but under the exigencies of the c. war all classes were enrolled in the L. In imitation of the Roms. the armies of Fr. in 1534 and 1537 were organized into L., and in 1792 our own army was officially designated as "the legion of the U. S."

Legion of Honor, Order of the, a Fr. order of merit instituted May 9, 1802, by the First Consul, Nap. Bonaparte. It consists of several ranks—viz. grand officers, grand crosses, commanders, and knights. The order possesses considerable wealth. Its distinctions are conferred for civil, but more especially for military, achievements.

Legumine, le-gu'min [Lat. *legumen*, "pulse"], This is one of the vegetable *proteids*, or, as they are sometimes called, *albuminoids*. It is so extremely similar in its chemical properties and composition to animal caseine, the substance of cheese—that is, of curd of milk—that several distinguished chemists have been unable to find any difference, and concluded that they were identical. L. occurs extensively throughout the vegetable kingdom, but is more especially found in various kinds of seeds and nuts. It derives its name from the fact that, with starch, it makes up almost the whole substance of the seeds of leguminous plants, such as peas and beans. Hence, the powerfully nutritious character of these as food—that is, for those possessed of powerful digestion, for vegetable caseine is far from being as readily soluble in the gastric liquids as animal caseine or curd of milk. Peas and beans contain about $\frac{1}{4}$ of their weight of this plant-curd, and are comparable, therefore, so far as richness in nitrogen is concerned, to eggs or to milk when condensed. Ordinary cow's milk, according to the highest determinations on record, contains not more than $\frac{5}{16}$ per cent. of dry caseine by weight; woman's milk contains less than $\frac{1}{4}$ per cent.

Legumino'sæ [Lat. *legumen*, a "pod"], a large and most important natural order of plants, equalled by no other of the dicotyledonous class, except, possibly, by the related order Rosaceæ. Its distinguishing marks are the papilionaceous corolla and the legume (*i. e.* a solitary and simple 2-valved pod, of which the pea-pod is a familiar representative), along with alternate leaves furnished with stipules. But this kind of corolla belongs to only one of the 3 sub-orders. Among the food-plants of the order are beans, peas, and clover, also peanuts. But many have poisonous products, among which the Calabar or ordeal bean, now turned to useful account in med., is remarkable, inasmuch as the plant is nearly related to the common bean. In Australia and Cal. some plants of the pulse family prove to be sheep-poisons. The order yields senna, indigo, copaiava, tolu, kino, catechu, gum-arabic, tragacanth, liquorice, tamarinds, sanders-wood, logwood, Brazil-wood, etc.; among timber trees, the locust and rosewood. ASA GRAY.

Leh, lâ, city of central Asia, cap. of the kingdom of Ladakh, in a valley of the Himalayas, at an elevation of 11,500 ft. above the sea, forms a station on the commercial road between Central Asia and India. It is surrounded with a wall of sun-dried brick, surmounted with turrets, and contains a great palace of the *raja*. Pop. about 10,000.

Lehigh River, in Pa., traverses a region famous for its great production of anthracite coal. Unites at Easton with the Del. It is nearly 100 m. long, and for 70 m. has been fitted for slack-water navigation.

Lehigh Univ. See APPENDIX.

Leibnitz, lib'nits (GOTTFRIED WILHELM), b. June 21, 1646, in Leipsic, evinced love of study and unusual talent. He learned Lat. without the aid of a gram., and at the age of 13 he wrote 300 faultless hexameters within 6 hours. He took chief delight in logic. At the age of 15 he entered the Leipsic Univ. to prepare himself for active life by the study of law; read in 1663 his dissertation *De Principio Individui*, and in 1666 pub. his work *De Arte Combinatoria*; left Leipsic; went to the Univ. at Altdorf, where he obtained the degree of *doctor juris*. During the winter he remained at Nuremberg, studying the works of Kepler, Galileo, Bacon, Gassendi, and Descartes, also continuing his law studies; accompanied Baron Boineburg to Frankfurt, where he began to prepare himself for a political life. He there wrote *Nova Methodus discende docendæque Jurisprudentiæ* (1668), which so pleased the elector of Mentz that he appointed L. assistant to Dr. Lasser in the elaboration of a reformed code of Rom. law, and a member of the court of appeals, the highest judicial

tribunal of the electorate. He was specially interested at that time in effecting a reconciliation between Prots. and R. Caths. The preparations made by Louis XIV. for a war against Ger. led him to enter into politics. To the Ger. electors he submitted a memorial, counselling a friendly feeling toward Fr. and the establishment of a united Ger. To Louis XIV. he pointed out the conquest of Egypt as the key to India and the humiliation of Hol., and Louis XIV. desired an interview with the author. News of his friend Boineburg's death compelled him to visit Lond., where he made the acquaintance of Newton, Boyle, and others. Here the report of the death of the elector of Mentz reached him. When he returned from Eng. he therefore went to Paris. In 1676 he accepted the offer made him by the duke of Brunswick-Lüneburg of a position at his court, having just then made his discovery of the differential calculus. In 1678 the duke conferred the rank of counsellor upon him, which made him a member of the supreme court. Beside his duties he took charge of the duke's mines in the Hartz Mts. When, some yrs. later, the princess Sophia Charlotte of Hanover married the future king of Prus., it was deemed advisable in 1687 to send L. to It. on a political expedition, but chiefly to collect materials for a hist. of the house of Brunswick. L. made this the great literary work of his life. His stay at Rome was one prolonged ovation. After his return to the Hanoverian court, L. was appointed custodian of the Wolfenbüttel Library. He accepted a call to Berlin, and there established the scientific society which has since grown into the Berlin Univ. In 1700 he was sent on a political expedition to Vienna. On his return to Berlin he found that the Eng. scepticism of the Lockian school had made its way there, and wrote his *Théodicée* to combat it. In 1714 L. visited Vienna for the last time, and there wrote his *Monadology*. He went back, finished his hist. of the house of Brunswick, and d. Nov. 14, 1716. [From orig. art. in *J's Univ. Cyc.*, by A. E. KROEGER.]

Leicester, les'ter, town of Eng., the cap. of Leicester-shire, on the Soar. Its manufactures of woollens and hosiery employ 25,000 hands; lace also is made to a considerable extent. Rom. remains are found here. Pop. 122,351.

Leicester (ROBERT DUDLEY), EARL OF, a son of the duke of Northumberland, who was executed for trying to make Lady Jane Grey queen in 1553, b. Sept. 7, 1533; married Amy Robsart 1550; was condemned as a traitor 1554, pardoned 1555; became the favorite of Queen Elizabeth, who made him K. G. and master of the horse 1558. The sudden death of his wife in 1560 aroused suspicions that he was aspiring to the hand of the queen; created earl of Leicester in 1564; in 1566 Elizabeth proposed his marriage with the queen of Scots, and somewhat later his secret marriage with the widow of Essex aroused the anger of the queen; was sent to the Low Countries as capt.-gen. in 1585 and 1587, but displayed no capacity; was in 1588 generalissimo of the troops raised against the Spaniards. D. Sept. 4, 1588.

Leicester (SIMON DE MONTFORT), EARL OF, b. 1206 in Fr., was a son of Simon de Montfort, the vanquisher of the Albigenes. In 1251 his brother, the Count Amaury de Montfort, gave him the honor of Leicester, inherited from his maternal grandmother; for this title Simon did homage to Henry III. in 1251, and in 1259 it was formally granted by the king after his marriage with the king's sister; was for many yrs. gov. of Gascony, and twice refused the Fr. regency; in Eng. he took the part of the barons against the king in the wars of Henry III.'s reign; compelled the king to sign the provisions of Ox. 1265, and after Gloucester's death (1265) became the leader of the baronial party; dictated terms at Lewes 1264; summoned the Parl. of 1265, at which knights of the shire and representatives of the boroughs were admitted—the germ of the future House of Commons; became justiciary of Eng.; was attacked by Edward, prince of Wales, at Evesham, and there defeated and slain, Aug. 4, 1265.

Leidy, J. D. (JOSEPH), M. D., b. at Phila. Sept. 9, 1823, grad. in med. at the Univ. of Pa. in 1844; devoted himself to biological researches, especially comparative anat. and vertebrate paleontology; in 1853 was chosen prof. of anat. in the med. dept. of the Univ. of Pa., and in 1871 prof. of nat. hist. in Swarthmore Coll. During the c. war he rendered important service as surgeon at Satterlee Hospital, Phila. Contributed largely to scientific periodicals. Several of his works have been pub. by the Smithsonian Inst.; *Contributions to the Extinct Vertebrate Fauna of the W. Terrs.* were pub. by U. S. Geological Survey of the Terrs.

Leigh, lee (BENJAMIN WATKINS), LL.D., b. in Chesterfield co., Va., June 18, 1781, grad. at William and Mary Coll.; practised law at Petersburg, and afterward at Richmond; was reporter of the court of appeals; often chosen to the legislature; was a com. to revise the statutes, and again to adjust land questions with Ky.; was in 1835 elected to the U. S. Senate, but resigned in 1837, and passed the rest of his life in retirement. He prepared 12 vols. of *Reports of Court of Appeals and Gen. Court of Va.* D. Feb. 2, 1849.

Leigh (HEZEKIAH G.), D. D., b. in N. C. Nov. 23, 1795. For 35 yrs. he occupied responsible positions in the Va. and N. C. M. E. conferences; was one of the founders of Randolph-Macon Coll. D. Sept. 19, 1853.

Leighton, lā'ton (ALEXANDER), M. D., b. at Edinburgh in 1568; educated at the univ. of that city, in which he was prof. of moral philos. from 1603 to 1613, when he became a Presb. preacher at Lond., where he also practised med.; wrote an *Appeal to the Parl.*, or *Simon's Plea against the Prelacie*, which being deemed libellous with respect to the king, queen, and bps., L. was sentenced by the Star Chamber to be twice publicly whipped, to lose both ears, to stand twice in the pillory, to be branded on the cheek with the letters S. S. (sower of sedition), to pay a fine of £10,000, and to suffer perpetual imprisonment in the Fleet. After 11 yrs.' imprisonment he was released by order of the Long Parl. in 1640, received pecuniary indemnity, and in 1642 was made keeper of Lambeth Palace as a state prison. D. 1644.

Leighton (FREDERICK), A. R. A., b. at Scarborough, Eng., Dec. 3, 1830; entered as student the Royal Acad. of Berlin in 1843, and finished a gen. education at Frankfurt; went to Brussels, where he produced in 1848 *Cimabue finding Giotto Drawing in the Fields*; studied at Paris and Frankfurt, and went to Rome, where he executed the *Cimabue*, which, exhibited at the Lond. Royal Acad. in 1855, was purchased by the queen. Among his works are *Scene from Romeo and Juliet*, *Star of Bethlehem*, *Michael Angelo nursing his Dying Second*, *Syriacum Brovi leaving West Beasts to the Temple of Diana*.

Leighton (ROBERT), D. D., son of Alexander, b. in Edinburgh in 1611; grad. at the univ. of that city (1631), of which he became prin. in 1653; appointed bp. of Dunblane in 1661, in pursuit of the plan of Charles II. to Anglicize the Ch. of Scot.; appealed twice to the king to adopt milder measures in the attempted reform (1665 and 1669); accepted the archbishopric of Glasgow in 1670 upon conditions which were not fulfilled, and he resigned in 1673. Wrote *Sermons, Prelectiones Theologicae, Commentary on the First Epistle of Peter, and Posthumous Tracts*, etc. D. June 26, 1684.

Leipo'a ocella'ta, the "native pheasant" of Australia, a gallinaceous bird of the family Megapodidae, somewhat smaller than the turkey. Its flesh is good and its eggs are excellent. The nest is a mass of leaves, dirt, and sticks, the heat of which, produced by fermentation, hatches the eggs. The L. is a swift runner, but is very stupid, and often tries to escape the hunter by hiding her head in a bush.

Leipsic, līp'sik, city of the kingdom of Sax., is situated in an extensive plain on the Pleisse, which here receives the Parthe and flows into the Elster. It is one of the most important commercial towns of the Ger. empire, the centre of the Ger. book-trade, and the seat of a celebrated univ. In spring and fall a Messe takes place at L.—that is, a market in which merchants from all countries come together in order to do business. The prin. articles in which bargains are made at the Messe are fur (6,000,000 thalers annually), leather, cloth, woollens, linens, and glass. The Gewandhaus, built 1481, is the home of classical music in Ger. L. appears as a town for the first time in hist. in 1015. During the Middle Ages the fortifications of the city protected its commerce. In the time of the Ref. it supported the new doctrine, but suffered much from the war and the Thirty Years' war. Since 1667 it attracted the book-trade, and since the beginning of the 18th century it became the centre of the same in Ger. The Seven Years' war destroyed its enterprise. During the wars of Nap. new calamities came over it, and all great movements in Ger. have affected it on account of its central position. Pop. 149,081.

Leislser, lī'sler (JACOB), b. at Frankfort, Ger.; came to Amer. in 1660 as a soldier in the service of the Dut. W. I. Co.; engaged in trade with the Mohawk Indians, and acquired some wealth. While on a voyage to Europe in 1678 he was taken prisoner by corsairs, obtained liberty by paying a ransom, returned to Amer., settled in New York, and in 1683 became one of the coms. of the court of admiralty. On May 31, 1689, he headed an insurrection "for the preservation of the Protestant religion," took the fort, and declared for the prince of Orange. The deposed lieut.-gov., Francis Nicholson, and Mayor Cortlandt tried in vain to restore authority, and retired, the former to Eng., the latter to Albany. In Aug. the committee of safety appointed L. commander-in-chief with the powers of a gov. In Dec. he dissolved the committee of safety, appointed a council, and assumed the style of a royal gov., on the strength of a despatch addressed "to such (person) as for the time being takes care for preserving the peace and administering the laws in His Majesty's prov. of New York." On the appointment of Sloughter as gov. L. refused to surrender the ft. and the govt. (Mar. 1691) until convinced of the former's identity and authority. For this constructive treason he was imprisoned, with his son-in-law and sec., Jacob Milborne, and both were condemned and executed. The memory of L. was rehabilitated by an act of Parl. (1695), an indemnity was given to his heirs (1698), and his bones and those of Milborne were honorably buried in the Dut. ch. One of the acts of L. during his brief authority was the purchase of lands at New Rochelle as a place of refuge for persecuted Huguenots. D. May 16, 1691.

Leith, leeth, town of Scot., on the Frith of Forth, 2 m. from Edinburgh, whose port it is, and with which it is connected by continuous rows of houses. Its harbor is excellent, 25 ft. deep, provided with a breakwater, and containing 2 wet docks and 3 dry docks. Pop. 58,193.

Lei'tha, or **Leytha**, a river of Aus., forms for some distance the boundary between the 2 divisions of the Austro-Hungarian monarchy, called, after the river, Cisleithania and Transleithania; breaks through the Leitha Mts. into Hungary, and joins the Danube at Altenburg.

Leitner, lī'nēr (GOTTLIEB WILLIAM), PH. D., b. at Pesth, Hungary, Oct. 14, 1830. His father settled in Tur., where the son became proficient in Tur., Ar., and modern Gr.; learned Eng., Fr., and It. at the Brit. Coll. at Malta; went to Lond. and became prof. of Oriental langs. and Mohammedan law in King's Coll. In 1864 he was appointed director of a coll. at Lahore, India; founded societies, schools, colls., and free public libraries; established newspapers in Arabic and Urdu; promoted the study of the Aryan langs., and organized the Punjab Univ. From 1866 to 1888 he was engaged in an exploration of Thibet and other countries N. of the Himalayas, and made known the country of Dardistan, with its interesting group of langs. At a later date he extended his researches to the langs. of Cabool, Cashmere, and Badakhshan, and excavated an important series of Græco-Buddhist sculptures. He has written a *Philosophical Gram. of Arabic* in the Eng., Urdu, and Arabic langs.; *Hist., Songs, and Legends of Islamism*, and a *General Introduction to the Study of the Languages of the East*.

Le'land (CHARLES GODFREY), D. D. Phila. Aug. 15, 1824,

grad. at Princeton Coll. in 1846. after which he spent 2 yrs. travelling in Europe, studying at Heidelberg, Munich, and Paris. Returning to Phila. in 1848, he studied law, but abandoned its practice in favor of the literary vocation. He passed several yrs. in Europe. Among his works are *Meister Karl's Sketch-Book*, *Hans Breitmann's Ballads*, and *Eng. Gypsies and their Lang.*

Leleges was the name of an anc. race which was widely spread over Gr., the W. coast of Asia Minor, and the intermediate islands, but which became incorporated with the Hellenes and disappeared as an independent people.

Lelewel, la-la-vel (JOACHIM), b. at Warsaw Mar. 21, 1786; became prof. of hist. at the Lyceum of Kremenets in 1809, and at the Univ. of Vilna in 1814, but was dismissed in 1824, being suspected of participating in secret revolutionary associations; was elected a member of the Polish diet, and became one of the most prominent leaders of the Polish rising of 1830; fled to Fr. and lived partly at the villa of La Fayette. In 1833 he was banished from Fr. on account of his participation in different Polish conspiracies, and went to Brussels, where he resided for the rest of his life, wholly devoted to science. He wrote numerous works relating to the hist. of his native country, among which are *Hist. of Poland*, *Considérations sur l'Etat politique de l'ancienne Pologne*, *et sur l'Histoire de son Peuple*, and *La Pologne au Moyen Age*. D. May 29, 1861.

Le'ly (SIR PETER), b. at Soest, Westphalia, in 1618; d. in Lond. in 1680; studied at Haarlem; came to Eng. in 1641; devoted himself to portraits; was introduced to Charles I., whose portrait he executed, along with those of William and Mary; succeeded Vanduyke as court-painter; painted the portrait of Cromwell. Charles II. commissioned him to paint the "beauties" of his time for Hampton Court. In the same place are several of the portraits of admirals which the duke of York, afterward James II., engaged this artist to paint. Most of his portraits are of women, and are of a showy and meretricious character. O. B. FROTHINGHAM.

Lemaire, leh-mar' (NICOLAS ELON), b. at Triancourt, Fr., Dec. 1, 1767; studied at the Coll. of St. Ménehould and afterward at Sainte-Barbe in Paris; was appointed prof. of Lat. poetry in the Coll. of Fr.; afterward in same dept. in faculty of letters in Paris, and became dean of the faculty. Louis XVIII. favored the publication of a complete series of the Lat. authors, of which L. was constituted chief ed. The series was completed in 142 vols. D. Oct. 3, 1832.

Le Mars, R. R. junc., cap. of Plymouth co., Ia., 25 m. N. E. of Sioux City. Pop. 1880, 1895.

Lemberg, city of Aus., the cap. of Galicia, situated on the Peltov in a narrow valley surrounded by forest-clad hills. It is the seat of the govt. and of a R. Cath., an Armenian, and a Gr. abp. It has a cathedral built in 1370, 2 synagogues, many palaces, etc. Its univ. is attended by about 1400 students. Its manufactures are not important, but its trade is extensive. Pop. 109,746.

Lémery, lám-re' (NICOLAS), b. at Rouen, Fr., Nov. 17, 1645; studied in his native city, at Montpellier, and at Paris, and gave lectures on chem., abandoning all mystical dreams of a sympathy between the metals and the planets, of an elixir for the prolongation of human life, and other such things. He belonged to the Reformed Ch., and troubles arose. In 1683 he left Fr. and went to Eng., where he was well received. Soon after, however, the political troubles in Eng. caused him to return to Paris, and after the revocation of the Edict of Nantes in 1685, by which he lost his right of practising as an apothecary and phys., he joined the R. Cath. Ch., and continued his activity as a lecturer and writer unmolested till his death. His prin. works are *Cours de Chimie*, *Pharmacopée universelle*, and *Traité des Drogues simples*. D. June 19, 1715.

Lemming, a name applied to rodents of the family Muridae and sub-family Arvicolinae (field-mice), belonging to the genus Myodes. Some species are very abundant in the high N. regions of both continents.

Lemon [Hindostanee, *limbu*, *limu*, or *nimbu*, from which the Ar. *limun*; Sp. *limon*, etc.], the fruit of *Citrus limonium*. It is of Indian origin, and the citron is probably a variety of it. The L. tree does not form the close head of deep green foliage which is so striking in the orange tree, but is of irregular growth, with paler and sparser leaves. The young shoots are dull purple; the corolla externally purplish and internally white; the delicate aroma distinct from that of the orange-blossom. The fruit is pale yellow, ovoid or oblong, usually crowned by a nipple; the rind firm and adherent to the pulp; the juice sharply acid, but in some varieties sweetish. The roughness of the surface of the L. is owing to the imbedded oil-cells. These furnish the oil and essence of L. L.-peel is a well known flavoring ingredient. L.-juice is not only largely used for acidulated drinks and for effervescing draughts, but also for the preparation of citric acid, its important ingredient. Concentrated L.-juice is largely employed on shipboard for the prevention of scurvy in long voyages. The commercial article is derived from the lime and bergamot, as well as from L. The introduction of the tree to Europe is due to the Ars. Its chief cultivation is on Mediterranean coast between Nice and Genoa, in Sic., etc. It endures less cold than the orange, and wherever it succeeds well is more profitable. ASA GRAY.

Lemon (MARK), b. in Lond. Nov. 30, 1809; was author of more than 60 plays and farces, and of several novels, but chiefly notable for his long connection with *Punch*. From the establishment of that paper in 1841 he was assistant ed., and in 1843 assumed the chief management. He was also for many yrs. literary ed. of the Lond. *Illustrated News* and assistant of Dickens in the management of *Household Words*. D. May 23, 1870.

Lemon, Oil of (*Oleum citri*), the volatile oil of lemon-peel, extracted from the grated rind by pressure or by distillation with water. It may also be obtained by putting the grated peel in hot water and skimming off the oil which rises to the surface.

Lemont', on R. R., Cook co., Ill., 26 m. S. W. of Chicago. Pop. 1880, 2108.

Le Moyné, a Canadian family of 11 brothers, 7 of whom acted prominent parts in Fr. explorations, conquests, and settlements in Amer.—Their father, CHARLES LE MOYNE, b. in Normandy in 1626, came to Canada in 1641; lived some yrs. among the Hurons; obtained extensive land-grants; was distinguished in wars against the Iroquois; was held a prisoner by those Indians several months in 1665, and was created in 1668 Seigneur de Longueuil, to which title that of Châteaugay was afterward added. D. 1683.—Of his sons, PIERRE and JEAN BAPTISTE were distinguished in La., gaining the titles of Sieurs de BIENVILLE and d'IBERVILLE.—The eldest brother, I. CHARLES, Baron de Longueuil, b. in Montreal Dec. 10, 1656, served in the Fr. army in Flanders; promoted colonization to Canada; was wounded in the repulse of Phips's assault upon Que. in 1690; gov. of Montreal and baron in 1700; fought against the Eng. in 1711; was in command at Three Rivers in 1720, and at Montreal from 1724 to 1726; D. June 8, 1729.—II. JACQUES, Sieur de Sainte Hélène, b. at Montreal in Apr. 1659, was sent in Mar. 1686 with his younger brothers, Pierre and Paul, in an expedition against the Eng. on Hudson's Bay, where the 3 Eng. forts were captured, as well as a vessel of war, having on board the gov.-gen. of Hudson's Bay, Sainte Hélène having borne a leading part in each action. He was second in command of the expedition which took Ft. Corlear (Schenectady) Feb. 9, 1690, and in the same yr. commanded the batteries which repelled the Eng. squadron at Quebec, and was mortally wounded.—III. PAUL, Sieur de Maricourt, b. at Montreal Dec. 15, 1663, participated in the expedition against Hudson's Bay; remained with his brother Iberville in command of that dist. up to 1690, when he aided in the defence of Que.; took part in Frontenac's expedition against the Iroquois, with whom he negotiated peace in 1701, and in Apr. 1704 lost his life, with 40 others, in a stockade burned by those Indians.—IV. JOSEPH, Sieur de Serigny, b. at Montreal July 22, 1668, became an officer in the Fr. navy, and in 1694 and 1697 commanded vessels in Hudson's Bay in co-operation with the land operations of his brother Iberville. Subsequently he commanded a squadron; brought to La. some of its earliest settlers, and in 1718-19 surveyed the coast of that colony. He was engaged in the capture of Pensacola from the Spaniards (May 14), and repulsed them from Dauphin Island, near Mobile (Aug. 19, 1719); was made capt. of a ship of the line in 1720, and in 1723 rear-admiral and gov. of Rochefort, Fr. D. 1734.—V. ANTOINE, Sieur de Châteaugay, b. at Montreal July 7, 1683; became an officer of the Fr. army; brought colonists to La. in 1704; served under Iberville against the Eng. in 1705 and 1706; was royal lieut. in La. in 1718; was engaged in the Fla. campaign against the Spaniards in 1719; taken prisoner at Pensacola Aug. 7, and commanded at Mobile from 1720 to 1726, when he was recalled to Fr.; sent as gov. to Martinique in 1727, and afterward to Cayenne; returned to Fr. in 1744; was made gov. of Cape Breton in 1745; defended Louisbourg against the N. Eng. forces under Pepperell, and d. at Rochefort, Fr., Mar. 21, 1747. He inherited the title of Sieur de Châteaugay from his brother LOUIS, b. in Jan. 1676, who was mortally wounded in the attack on Ft. Nelson, Hudson's Bay, and d. Nov. 4, 1694. Another brother, FRANÇOIS, b. Mar. 10, 1666, killed in battle with the Iroquois June 7, 1691, was the first Sieur de Bienville, the title having passed on his death to his brother, Jean Baptiste.

PORTER C. BLISS.

Le'mur [Lat. *lemur*, "spectre"], the name of a genus of mammals, bestowed on it on account of the appearance of the animal, and especially its large staring eyes and its nocturnal habits. By the late Dr. Gray the genus was split into 3—viz. *Varecia*, *Lemur*, and *Prosimia*.

Le'mures, in Rom. mythology, was used as the gen. name for all spectres, of which the good ones were called *lares* and the evil *larvae*. More commonly *lemures* was used synonymously with *larvae*. In order to propitiate them an annual festival called *Lemuria* was held the 9th, 11th, and 13th of May. The days on which these rites were performed were considered unlucky.

Lemur'idæ [from *Lemur*, the typical genus, and the family termination -idæ], a family of the sub-order Prosimiæ and order Primates. This family includes the lemurs, or, as they are sometimes called, half-monkeys, and is confined to the island of Madagascar, the equatorial parts of Afr., and India. A considerable range of variation is exhibited by its several constituents in the gen. form and proportions, the shape of the head, the development of a tail (which in some is very large, and in others obsolete), the size of the ears, and the length of the tarsus.

Lemur'inæ [from *Lemur* and the sub-family ending -inæ], the chief sub-family of Lemuridæ. The group includes the typical lemurs, which are readily recognizable by their external appearance; the head is produced into a more or less elongated snout, and somewhat resembles that of the raccoons or foxes. All the living species are confined to the island of Madagascar. Exclusive of *Chirogaleus* (which rather belongs to the Galagidæ), they are grouped in 4 genera—viz. *Lemur*, *Haplorhina*, *Lepidlemur*, and *Micocebus* (Peters, 1874). They are chiefly nocturnal animals, live in the forests of Madagascar in the trees, feed on insects and fruit, and associate together in troops. In repose they roll themselves up in the form of a ball, and wind their tail around the body. Their elongated hind limbs enable them to leap with agility.

Le'na, one of the prin. rivers of Siberia, rises near Irkutsk, in the mts. N. of Lake Baikal, and enters the Arctic Ocean through several branches between lon. 125° and 130° E. It receives the Vitim, Olekma, and Aldan from the right, and the Viliui from the left, passes by Olekminsk and Yakootsk, and is navigable from May to Nov.

Lena, on R. R., Stephenson co., Ill., 132 m. N. W. of Chicago. Pop. 1870, 1394; 1880, 1520.

Lenau, *LENOW* (NIKOLAUS), b. at Csatad, Hungary, Aug. 15, 1802; studied philos., jurisprudence, and med. at Vienna, travelled much; visited in 1832 the U. S.; resided after his return to Europe alternately in Vienna, Ischl, and Stuttgart, but became insane in 1844, and d. Aug. 22, 1850. He pub. his first vol. of poems in 1832; in 1838 followed a second; in 1835 *Faust*, in 1837 *Saragossa*, in 1842 the *Albigenses*, and after his death *Don Juan*.

Lenca's, a tribe of Indians in Honduras, speaking a lang. called *Chontal*—i. e. "barbarian." They are industrious and peaceable mountaineers.

L'Enclos, *LOU-KLO'* (ANNE, called NINON DE), b. at Paris in 1615; left early the parental roof and established an independent household; Scarron, Saint-Evremond, Molière, Fontenelle, Larocheffoucauld, and others read their works in her salon, and it soon became indispensable for all young men of birth, wealth, and elegant ambitions to be introduced to her. One lover followed the other in rapid succession, and this life went on uninterruptedly for more than half a century. Her own son, who had been educated by the father and kept in ignorance of the mother, fell desperately in love with her, and when she was compelled to reveal the secret suddenly to him, the young man blew out his brains in her presence. D. Oct. 17, 1705. CLEMENS PETERSEN.

Len'nap, van (JACOB), b. in Amsterdam Mar. 25, 1802; studied law at the Univ. of Leyden; practised as an advocate; was appointed atty.-gen. for the prov. of N. Hol. He wrote poems and several successful dramas, and inspired by the example of Walter Scott, he treated the hist. of his fatherland in a series of romances, about 50 in all, several of which have been translated into Ger., Fr., and Eng. D. Aug. 26, 1868.

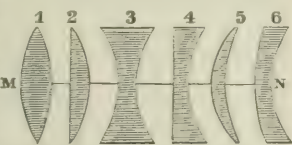
Lennox (EARLS and DUKES OF). See STEWART and RICHMOND.

Lennox (LORD GEORGE HENRY), b. in Eng. Nov. 27, 1737, was second son to Charles Lennox, second duke of Richmond; entered the army in 1751; in the Ger. campaigns was aide-de-camp to the duke of Cumberland (1757) and to the king (1762); entered Parl. in 1761; attended his brother, the third duke of Richmond, in his embassy to Fr. in 1765; became lieut.-gen. in 1777, constable of the Tower of Lond. and gov. of Plymouth in 1784, gen. and member of the privy council in 1793. D. Mar. 25, 1805.

Lennox (LORD WILLIAM PITT), b. in Eng. Sept. 20, 1799, the fourth son of the fourth duke of Richmond; ed. at Westminster; entered the army; was for some yrs. attached to the staff of the Duke of Wellington. Wrote *The Tuff-Hunter, Recollections of a Sportsman, Fifty Years' Biographical Reminiscences*, etc. D. Feb. 17, 1881.

Lenoir (WILLIAM), b. in Brunswick co., Va., May 31, 1751; removed in childhood to N. C.; took part in the campaigns against the Brit. and the Tories in N. C. and S. C.; was for 60 yrs. justice of the peace; often a member of both branches of the legislature; pres. of the senate for 5 yrs., then pres. of the council, and for the last 18 yrs. of his life maj.-gen. of the State militia. D. May 6, 1839.

Lens, *lenz* [Lat. *lens*, a "lentic"], in optics a transparent substance bounded by opposite curved surfaces, or by one plane and one curved surface, the curvature being usually spherical. The property of a L. is to refract or bend the rays of a pencil of light transmitted through it symmetrically toward or from a fixed line called the axis. The axis is fixed by the condition that the tangents to the opposite surfaces at the points where it meets them are parallel to each other and perpendicular to this axis. L. are called converging or diverging L. according to the effect produced by them upon parallel rays. They are of several kinds, distinguished by the character of their curvatures. Six forms are shown in the figure,



the first a double convex, the second a plano-convex, the third a double concave, the fourth a plano-concave, the fifth a meniscus, and the sixth a convexo-concave or concavo-convex, receiving the one or the other of these names according as the incident light falls on the convex or the concave side. The use of L. in optical instruments is to aid vision by forming images of objects, to be viewed instead of the objects themselves; which they do by causing pencils of light from the several points of such object to converge toward or diverge from corresponding points, in the first instance on the opposite side of the L., and in the second on the same side. These points are called *foci*. The image is positive and real when formed by converging rays; negative and imaginary when without being actually formed it seems to exist to the eye receiving the diverging rays. Only one of the pencils from the object can have its axis coincident with the axis of the L.; but every oblique pencil has, nevertheless, an axis passing through the optical centre of the L.; and the focus of each pencil will be found in the axis of that pencil or in the axis prolonged. It is unfortunately true, however, that the rays refracted from the border of a L. of spherical curvature meet the axis at a point less distant from the L. than that in which those nearer the centre meet it. Hence, the focus of a simple L. is not a single point; or rather every elementary ring into which the L. may be supposed to be divided produces its own focus; and the distance on the axis between the focus of the extreme border and that of the rays indefinitely near the centre is called the spherical aberration. It is furthermore true that inasmuch as the rays of the different colors of light are unequally refrangible, these different colors have foci differently distant from the L.; the focus of the red being most distant, and that of the violet least. This separation of the different colors is called dispersion, and the distance along the axis between the foci of the rays of greatest and least refrangibility is

called the chromatic aberration. Spherical L. would therefore be of little use in optics if it were not possible so to combine them as to neutralize the effects of both these 2 kinds of aberration. Chromatic aberration may be corrected by using a convex L. formed of a material of low dispersive power in combination with a concave in which this power is higher. Chromatic aberration cannot be perfectly corrected by a combination of 2 glasses only, because it is not true that the dispersive powers of different media are in precisely the same ratio for each of the elementary colors. Combinations of 3 different L. have therefore sometimes been used in telescopes, in order to correct the very small secondary dispersion which is left in any combination of 2. But this is a refinement which is in gen. hardly necessary. A combination of glasses for the correction of color is called an achromatic combination. A combination designed to destroy the effect of spherical aberration is called aplatic. An achromatic combination may be formed of a double convex crown-glass and a plano-convex flint, which will have 2 aplatic foci in its axis. In 1829 Mr. J. J. Lister of Lond. made the discovery that 2 such combinations could be so arranged as to compensate each other's aberrations entirely. On this discovery have been founded the wonderful improvements of the microscope which have been made within the last half century. F. A. F. BARNARD.

Lent [Ger. *Lenz*, "spring;" according to some writers because the days lengthen; others derive it from *lens*, a "lentic," that food being largely eaten in the Lenten season], the fast of 40 days (not counting Sundays) which begins with Ash Wednesday and ends with Easter Sunday. It commemorates the 40 days' fast of our Lord in the wilderness.

Lentile [Lat. *lens*], the *Errum lens*, an annual leguminous herb of the Old World, resembling the vetch or pea, and extensively cultivated as food. The seed is smaller, more nutritive, and more digestible than the pea. L. flour is used for invalids, and is palatable and excellent.

Le'o, a sign of the zodiac, which the sun enters about July 22 and leaves about Aug. 23. The constellation of the same name, one of the finest in the heavens, occupies the zodiacal region corresponding to the sign Virgo, and contains many remarkable nebulae.

Leo, the name of 6 emps. of the Byzantine empire: **Leo I.**, THE THRACIAN (457-474), b. about 400, was only a military tribune when the emp. Marcian d. in 457. Aspar, the commander-in-chief of the army, raised him to the throne, persuaded that he was too indolent to care for anything more than the attributes of power. L. seized the first opportunity of getting rid of Aspar, whom he caused to be killed in the interior of the palace. He was the first Chr. king who received his crown from the hands of a bp.; he favored the clergy, and is generally called the Great by the orthodox party; the Arians called him *Macella*, the "butcher."—**Leo II.** (from Jan. to Nov. 474) was a grandson of Leo I., and only 4 yrs. old at the death of his grandfather.—**Leo III.**, THE ISLAURIAN (717-741), b. about 680, enlisted in the army; he rose rapidly, and was commander-in-chief against the Saracens in 716, when Theodosius III. deposed and exiled Anastasius II. L. marched his army against Theodosius in the name of Anastasius II., defeated him, and seized the crown for himself. The Saracens besieged Constantinople for 2 yrs., but having been routed several times they were at last repelled. In 726 he ordered all images to be removed from the chs., and thus began the contest between the iconoclasts and iconolaters which disturbed the empire for more than a century. The result was a commotion, especially in the W. provs., and in 728 the exarchate was lost to the Byzantine crown.—**Leo IV.** (775-780), b. in 750, a son of Constantine V., whom he succeeded. He was mild and tolerant, but weak; his gens., however, were successful against the Bulgarians and Arabs.—**Leo V.**, THE ARMENIAN (813-820), arrived from the commandship of the army to the throne through a long series of treasons; but having established himself on the throne by his victories over the Bulgarians and Arabs, he showed himself an able administrator. He persecuted the worshippers of images with great severity. At last a conspiracy was formed, and he was murdered on Christmas day in the ch., before the altar.—**Leo VI.**, THE PHILOSOPHER (886-912), b. in 865, a son of Basil I., whom he succeeded. He was a writer. His *Oracula* is a poem in iambic verses, prophesying the fate of the Byzantine empire. His *Orationes*, numbering 33, are composed mostly on theological subjects. More important was his treatise on military affairs, mostly consisting of extracts from other writers. His reign was a series of stupidities and failures.

Leo, the name of 13 popes: **Leo I.**, SAINT, regarded by many Prots. as the first real pope, and surnamed THE GREAT, b. about 390, probably at Rome; in early life displayed uncommon capacity, and was often employed upon important ecclesiastical and political duties; was chosen pope in 440, though only a deacon. He opposed the Pelagian, Manichean, Priscillian, and Eutychian heresies; labored for the extension of the Rom. primacy; visited Attila in person (452), and induced him to spare Rome, but in 455 the city was sacked by Genseric. D. Nov. 10, 461.—**Leo II.**, SAINT, became pope in 682, and d. in 683.—**Leo III.**, a Rom., became pope in 795; crowned Charlemagne emp. of the West, and freed Rome from Byzantine domination. D. June 11, 816.—**Leo IV.**, a Rom., became pope in 847; built the wall about the Vatican suburb, which is hence called the Leonine City; restored the town of Porto, which he colonized with Corsicans. D. July 17, 855.—**Leo V.**, a Benedictine and cardinal, became pope Oct. 28, and d. in prison Dec. 6, 903.—**Leo VI.**, a Rom., became pope July 6, 928, and d. Feb. 3, 939.—**Leo VII.**, a Rom., became pope in 936, and d. in 939.—**Leo VIII.**, a Rom., was made pope by Otto I. in 963, in place of John XII. D. 965.—**Leo IX.** (*Bruno*), an Alsatian, by June 21, 1002; became bp. of Toul in 1026; was celebrated for learning; was nominated pope at Worms in 1058, and reconsecrated at Rome in 1049; was largely under the influence of Hildebrand, afterward Gregory VII. The great events of his pontificate

were the Berengarian controversy and the exertions of Leo and Hildebrand for the extension of discipline. D. Apr. 13, 1054.—**Leo X.** (*Giovanni de' Medici*), son of Lorenzo the Magnificent, b. at Florence Dec. 11, 1475; received the tonsure and was made an abbot when but 7 yrs. old; became cardinal *in pectore* when 13, and cardinal-deacon when 17 (1492); was exiled with the other Medici in 1494; served under Julius II. against the Fr. as legate and field-marshal; was taken prisoner at Ravenna 1512; by the aid of the emp., the pope, Venice, and Sp., restored the Medici to Florence 1512; succeeded Julius II. as pope 1513. His pontificate is memorable for the splendor of the papal court, his patronage of learning and art, the scandalous and open sale of indulgences, the origination of the Ref. under the influence of Luther, the confirmation and extension of the Sp. power in It., and the final suppression of the Florentine republic.—**Leo XI.** (*Alessandro Ottaviano de' Medici*), a grand-nephew of Leo X., b. at Florence 1535; became bp. of Pistoia 1573, abp. of Florence 1574, cardinal 1583, pope 1605. D. Apr. 27, 1605, after a pontificate of 26 days.—**Leo XII.** (*Annibale della Genga*), b. Aug. 2, 1760; became abp. of Tyre 1793, cardinal in 1816, pope in 1823; extended papal authority, and reformed some points of the temporal and spiritual administration. D. Feb. 10, 1829.—**Leo XIII.** (*Giovacchino Pecci*), b. at Carpineto Mar. 2, 1810; became a cardinal in 1846, chamberlain of the Sacred Coll. in 1877, and pope in 1878.

Leo Africanus (JOANNES), originally named AL HASAN IBN MOHAMMED, b. at Granada, Spain, about 1485, of Moorish parents, who emigrated to Fez after the capture of Granada by the Spaniards. At 16 he accompanied an uncle on an embassy to Timbuctoo, and afterward travelled through several countries of N. and Central Afr., penetrating through Bornoo to Nubia, descending the Nile, and extending his explorations into Per. Returning from Constantinople by sea in 1517, he was captured by corsairs and taken to Rome, where he became a Chr., was patronized by Pope Leo X., whose name he took, learned It. and Lat., and taught Arabic. His *Description of Africa* was written in Arabic. D. 1562.

Leo Allatius [Latinized form of LEONE ALLACCI], b. of Gr. parents in the island of Chios in 1586. He was taken in 1600 to Rome to complete his studies; was employed in 1622 to superintend the transfer to Rome and the incorporation in the Vatican of the Heidelberg library; was appointed by Pope Alexander VII. in 1661 librarian of the Vatican. L. was a prolific writer; his works were partly editions and elucidations of the classic and ecclesiastic writers, and partly treatises on the hist. and doctrines of the Rom. Ch. A complete list of his productions is added to his *Exercitatio de Mensura Temporum Antiquorum*.

Leo Diaconus, b. about A. D. 950 at Caloë in Ionia; was sent to Constantinople to pursue his studies; wrote a hist. of the events that took place in his own time from A. D. 959 to 975, valuable for its information.

Leo Grammaticus, of whose life scarcely anything is known, wrote under the title *Chronographia* (*Χρονογραφία*), a narrative of Byzantine events from 873 to 949 A. D.

Leominster, lem-in-ster, R. N. junce, Worcester co., Mass., on the Nashua River, 18 m. N. of Worcester and 40 m. W. N. W. of Boston. Pop. pt. 1870, 3894; 1880, 5772.

Leon, lee-on, city of Mex., state of Guanajuato, near the boundary of Jalisco, was founded in 1576, but did not acquire importance until the middle of the present century. The chief industries are tanning, saddlery, and manufactures of cotton and woollen stuffs. There are abundant iron-mines at Comanja, a few m. to the N. L. is well built and has become the commercial emporium for an extensive region. Pop. about 100,000.

Leon, town of Nicaragua, and the cap. of the dept. of Leon, in the centre of a well-cultivated plain, 200 ft. above the sea, and with a population estimated at between 20,000 and 30,000. The city was founded by Francisco Fernandez de Cordova in 1523, on the W. border of Lake Managua in Imbita, but on account of various embarrassments of the location the inhabs. removed in 1610 the city to the present place. L. has developed into the best built city of the republic. It has no industry, but some trade through the port of Corinto. The surroundings are very beautiful, and mineral springs are found on many points at the foot of Sierra de los Marrabios.

Leon, on R. R., cap. of Decatur co., Ia., 21 m. S. of Osceola. Pop. 1870, 820; 1880, 1367.

Leonardo da Vinci, veen'chee, painter, sculptor, arch., engineer, inventor, and man of science, b. at Vinci, near Empoli, in the Val d'Arno, in 1452. He was the natural son of one Piero, an obscure notary of Florence, and a woman named Catarina. His father took him home, treated him as his son, and gave him a good education. The boy showed such an aptitude for the arts that Piero placed him with Verrocchio, a distinguished Florentine painter and sculptor, with whom he remained from his 14th to his 20th yr. In 1480 or 1483 he went to Milan, having offered his services to the duke Lodovico il Moro in a remarkable letter, of which an autograph copy exists in the Ambrosian Library at Milan. In the service of Lodovico he executed several important works—the model for the equestrian statue of Lodovico Sforza, the duke's father, the plans for the Martesana Canal, and the famous *Last Supper*, a fresco in oils painted on the wall of the refectory of the convent of Sta Maria delle Grazie. In 1499 L. returned to Florence, but after a short stay he entered the service of Caesar Borgia, who made him his chief engineer and employed him in studying various plans for the improvement of the terr. of the Romagna and Urbino. At this time he was invited by the signory of Florence to paint the walls of the council-hall of the Palazzo Vecchio in conjunction with Michael Angelo. He began the work, but wearied of it, and abandoned it on the invitation of Charles d'Amboise, who called him to Milan, where he governed as the lieut. of Louis XII. of Fr. L. remained in Milan till it was abandoned by the Fr., when he

went to Rome. He found no employment under Leo, and hearing that Francis I. had entered Lombardy, he hastened to join that monarch, who had already in 1507 desired to attach him to his service, and had named him his court-painter. He was welcomed by the king, whom he accompanied to Fr. in 1516, and who gave him a house at Cloux, near his château of Amboise, with a pension of 700 gold crowns. L.'s health failed after his arrival in Fr., and beyond some engineering projects he accomplished nothing during the 3½ yrs. that elapsed between his coming and his death in 1519 (May 2). The authentic existing paintings of L. are few in number, and of these the Louvre possesses the finest. These are the *Virgin of the Rocks*, the *Portrait of Madonna Lisa del Giocondo* (called *Monna Lisa* or *La Joconde*), the *Virgin on the Knees of Saint Anna*, and the *John the Baptist*.

CLARENCE COOK.

Leon, de (FRAY LUIS PONCE), b. near Granada, Sp., in 1527; entered the Univ. of Salamanca, distinguishing himself in classics and philos.; entered the order of St. Augustine at Salamanca in 1543, devoting himself to sacred lit.; became in 1560 a licentiate in theol. and D. D., and in 1561 obtained the professorship of theol.; in 1571 received in addition the chair of sacred lit. He had become known as the most elegant poet of Sp., when, on account of a spirited translation of the Canticle, to which he gave the form of a pastoral eclogue, he was thrown into prison by the Inquisition (1572), upon the double accusation of Lutheranism and of disobedience to the decrees of the Council of Trent in having translated a book of Script. into a modern tongue. He was brought before the high court more than 50 times, being finally condemned to the rack; but this sentence was revoked by the higher court at Madrid, and he was liberated after 5 yrs.' confinement, during which he had written his treatise *On the Names of Christ* and commenced other works. He resumed his lectures Dec. 30, 1576, commencing his address with the words, "As we remarked in our last lecture," thus seeming to forget the long and painful interval of silence. He rose to be gen. and provincial vicar of his order, and passed the remainder of his life in perfect tranquillity. His poems and miscellaneous works were first pub. 40 yrs. after his death, since which time they have been recognized as Sp. classics. D. Aug. 23, 1591.

Leonhard (KARL CÉSAR VON), b. at Rumpenheim, Hesse, Sept. 12, 1779, was prof. of geol. at Heidelberg, and d. there Jan. 23, 1862. He pub. *Naturgeschichte der Erde*, 4 vols., 1836-45, and *Grundzüge der Mineralogie*, 2 vols., 1860, besides a number of minor works.

Leonhardt, la'on-hart (GERHARD ADOLPH WILHELM), b. at Neuhaus in Hanover June 6, 1815; studied jurisprudence at Göttingen and Berlin; entered the service of the Hanoverian govt. in 1837, and became minister of justice in 1865. In 1866 Hanover was annexed to Pruss., and shortly after he was appointed Prus. minister of justice. Both in Hanover and Pruss. many important laws are due to him; he created a new criminal code for the Ger. empire.

Leonidas, king of Sparta, succeeded his half-brother, Cleomenes, about 490 B. C., and was sent in the spring of 480 to defend the defiles of Thermopylae, between Mt. Ceta and the Maliac Gulf, against the Pers. With the co-operation of a fleet in the gulf, the defiles could be defended by a small army, but the Gr. fleet was unfit for battle, and they had neglected to occupy a pathway which led across Mt. Ceta, and which was shown to the Pers. by a traitor. For 2 days the Grs. resisted the barbarian host with great valor, but at daybreak on the third day they learned that the Pers. were coming in masses across the mt. There was still time to retreat, but having sent away his auxiliary troops, L., with his 300 Spartans, remained and fought to the last man.

Leonowens (ANNA HARRIETTE CRAWFORD), b. at Caernarvon, Wales, Nov. 5, 1834, daughter of a Brit. officer who was killed by the Sikhs on the frontiers of Lahore. She married an officer, Thomas Leonowens, upon whose death in India she was left with 2 children dependent upon her, and resided for some time at Singapore. She was selected to fill the post of governess in the family of the late first king of Siam, who desired his children to be educated in the Eng. lang., which he had himself learned. Arriving at Bangkok in 1863, she filled for 4 yrs. not only the position of instructress to the royal household, but of sec. to the king. The present king of Siam, then a boy, was the special object of her training, and shortly after his accession to the throne in 1868 abolished slavery throughout his dominions. Mrs. L., on retiring from her post in July 1867, settled in the U. S. and engaged in literary pursuits. Wrote 2 vols. upon her Siamese experiences—*The Eng. Governess at the Court of Siam* and the *Romance of the Harem*.

Leontius, le-on'she-us, or **Leo Pilatus**, a native of Thessalonica; came to Florence about 1360 A. D., and was employed by the republic to teach his native lang.; was the first who publicly lectured on Homer in W. Europe, and the first who translated that poet into Latin. Leaving Florence, he visited Venice, and went to Constantinople, intending to return to It., but d. while crossing the Adriatic.

Leopard [Lat. *leo*, "lion," and *pardus*, a "panther," it having been anciently believed to be the offspring of the lion and panther], the *Felis leopardus* or *Leopardus varius*, one of the most active and bloodthirsty of the cat family. Its beautifully spotted fur gives it a readily distinguished character.

Leopardi, la-o-par-de (GIACOMO), b. at Recanati, It., in 1798; at 8 began Gr. by himself, and after his 14th yr. pursued his studies without any teacher. At 16 his learning was vast; he was master of classical lit., was familiar with the Fathers of the Ch. and other later Gr. and Lat. writers, had a knowledge of Eng., Fr., Sp., and Heb., and was profoundly versed in his own lang. His phys. strength, however, gave way, and there were already symptoms of the malady which finally ended his life. At 19 he longed for the resources of a larger town; but his father, already alarmed at the sceptical tendencies of his son, refused to consent, and he re-

mained at home until 1822, when the success of the poems entitled *All' Italia, Sopra il Monumento di Dante, Ad Angelo Mai*, etc. induced him to go to Rome. Here he soon made the acquaintance of Niebuhr, who expressed the liveliest admiration for the learning and genius of the young It., and procured for him the offer of the chair of Gr. philos. in the Univ. of Berlin, but the health of the poet forced him to decline this offer. His pecuniary means were soon exhausted, his views on the subject of religion prevented him from accepting employment at the papal court, and he was obliged to return, in the spring of the same yr., to Recanati, where he remained, with occasional long visits to Milan and Bologna, until 1837. In that yr. he went to Florence, where he lived until 1833. D. June 14, 1837. (See MONTANARI, *Biografia del conte Leopardi*.) [From orig. art. in *J's Univ. Cyc.*, by CAROLINE C. MARSH.]

Leopold I., emp. of Ger. (1658-1705), b. at Vienna June 9, 1640, the second son of Ferdinand III. and Maria Anna of Sp. He was ed. for the Ch., but at the death of his elder brother in 1655 he became king of Hungary, and in 1658 succeeded his father as king of Bohemia and emp. of Ger. He had some interest in linguistic studies and a fine ear for music, but was proud, bigoted, and hard. Although very industrious, he left the administration in utter confusion, and in spite of his peaceableness his reign was one long series of wars with Louis XIV., the Turks, and the Hungarians. The point at issue between Aus. and Tur. was Transylvania. The Turks held it, and the Hungarians demanded it. In 1662 the Turks broke into Hungary, but in 1663 L. received aid from other powers, and Aug. 1, 1664, Montecucoli routed the Tur. army at St. Gothard on the Raab. On Aug. 10 an armistice of 10 yrs. was concluded, in which, however, the Turks retained Transylvania. Soon after disturbances arose in Hungary, and the result was a formidable insurrection in 1682. The Hungarians called the Turks to aid, and on July 14, 1683, an army of 200,000 laid siege to Vienna; but the Polish king, John Sobieski, routed the besieging army. In 1687 Archduke Charles of Lorraine defeated the Turks at Mohacs; in 1697 Prince Eugene defeated them at Zenta, and in 1699 a peace was concluded by which the Turks ceded Transylvania, Slavonia, etc. and retired behind the Danube. The Hungarians also submitted, and at the diet of Presburg (1687) the Hungarian crown was declared hereditary in the family of Hapsburg. Nevertheless, they rose once more, and when Leopold d. insurrection raged in his Hungarian countries, and war with Fr. in his Belg., Ger., and It. possessions. D. May 5, 1705.

Leopold II., emp. of Ger. (1790-93), b. at Vienna May 5, 1747, the second son of Francis I. and Maria Theresa. In 1765 he succeeded his father as grand duke of Tuscany, and proved himself a liberal and enlightened ruler. But he was a despotic reformer, and his reforms caused annoyances and disturbances. In 1790 he succeeded his brother in Aus. and Ger., and found the vast empire in a critical state; but he pacified Hungary, quelled the insurrection in Belg., concluded peace with Tur. in 1791, and re-established the friendly relations with Prus. in 1790. Just as he had entered a confederation with Prus. and Sax. for the support of Louis XVI. of Fr., he d. Mar. 1, 1792.

Leopold I., king of Belg. (1831-65), b. Dec. 16, 1790, the youngest son of Duke Francis of Saxe-Coburg; was made a gen. in the Rus. army after the marriage of his sister to the grand duke Constantine, accompanied Alexander I. to Vienna and Paris in 1814, and was married in 1816 to the princess Charlotte Augusta of G. Brit. After her death in 1817 he lived in retirement in Lond. or travelling. In 1830 he refused the crown of Gr., but in 1831 he accepted that of Belg., and married in 1832 a daughter of Louis Philippe, who bore him 3 children. His reign was calm and undisturbed. D. Dec. 10, 1865.

Leopold II., king of Belg., son of the preceding, b. Apr. 9, 1835; was married (Aug. 22, 1853) to Marie Henriette, a daughter of the archduke Joseph of Aus., and ascended the throne Dec. 10, 1865.

Leopold I., prince of Anhalt-Dessau, generally known as the OLD DESSAUER, b. June 3, 1676. In 1688 the emp. Leopold I. made him a col. and chief of a regiment of horse, but in 1693, at the death of his father, who was a Prus. gen.-field-marshal, he entered the Prus. service and received his father's regiment. He served from 1698 to 1713 in high and responsible positions under Eugene and Marlborough in the Netherlands, on the Rhine, and in It., and on the accession of Frederick William I. to the Prus. throne he became the head of the Prus. army, and formed those armies with which Frederick II. founded the power of Prus. His conquest of Rügen and the capture of Stralsund in 1715 in the war against the Swedes were brilliant exploits. Frederick II. valued his capacities as a commander very highly; in the first Silesian war he placed him in command of the army on the Hanoverian frontier, and in the second sent him to invade Sax., where he won the victory at Kesselsdorf which ended the war. D. Apr. 7, 1747.

Leopold II., grand duke of Tuscany (1824-59), b. Oct. 3, 1797, a son of the grand duke Ferdinand III. In 1847 he granted a free const., and although in 1849 he had to flee to Naples, he was recalled shortly after by his own subjects. In 1859 he fled with his family to Vienna. No regard was paid to his abdication in favor of his son. His dominions were incorporated with the kingdom of It. in consequence of a popular vote. D. Jan. 20, 1870.

Leosthenes, an Athenian gen. of whose earlier life nothing is known. In 324, when Alexander the Great ordered all the Gr. states to recall those citizens who had been exiled for political reasons, several of the states rose in rebellion. Alexander dying shortly after, a league was formed for the purpose of driving the Macedonians out of Gr., and L. was placed at the head of the confederate army. He routed the Boeotians, defeated Antipater, the Macedonian gen., and shut him up in Lamia. While besieging this city he was wounded mortally and d. 2 days after, 322.

Lepan'to, Gulf of, also called the **Gulf of Corinth**, an inlet of the Mediterranean, 75 m. long and about 16 m. wide, between Peloponnesus and the mainland of Gr., terminates to the E. in the Gulf of Patras, connected with it by the Strait of Lepanto. In this gulf was fought (Oct. 7, 1571) the battle between Don John of Aus., commanding the allied Sp., Venetian, and papal fleet, and Ali Pasha, commander of the Tur. fleet, from which battle may be dated the decline of the Tur. power in Europe.

Lepidodendron [Gr. *λεπίς*, "scale," and *δένδρον*, "tree"], a genus of fossil trees. Their remains are found in the Devonian rocks and the lower coal-measures. Their surface is marked with scale-shaped spaces, the scars of fallen leaves. Many L. were of great size—40 to 80 ft. high and 3 to 6 ft. through.

Lepid'olite [Gr. *λεπίς*, "scale," and *λίθος*, "stone"], a species of mica, crystallizing in the trimetric system, and in composition, a silicate of alumina, etc. with lithia. It is generally met with in granular masses.

Lepidoptera [Gr. *λεπίς*, "scale," and *πτερόν*, "wing"], are distinguished by the long, slender larvæ (caterpillars), which have usually from 2 to 5 pairs of soft, fleshy, unjointed abdominal legs, beside the 3 thoracic pairs. They are active, and eat vegetable food; the pupa (chrysalis) is inactive, the limbs being soldered to the body, the whole integument forming a solid case; while the adult (imago) is distinguished from all other insects by the want of mandibles fitted for mastication, and by the maxillæ being united and forming a sucking-tube called the "tongue." Other essential characters are the small head with its large clypeus, the minute labrum, the large, globular, compound eyes, the large, scaled labial palpi held up in front of the face and protecting the tongue, and by the usually broad wings densely covered with minute scales. The L. are essentially flying insects; the broad wings are strengthened by hollow rods, the so called veins. As they rarely walk, the legs are slender and weak. The head is small. The thorax, filled with the large, powerful muscles of flight, is very large in proportion to the head. The abdomen, or hind body, is cylindrical, about twice as long as the thorax. Returning to the head, beside the 2 large compound eyes are 2 simple eyes (ocelli) situated behind the former. The most interesting organs are the antennæ, which vary greatly in the different groups. These branched organs are un-



Caterpillar, chrysalis, and butterfly, male and female, of the pine silk-worm moth (*Bombyx dispar*).

doubtedly provided with the sense of hearing, as are the knobbed feelers of the butterflies, which have scattered over the knob little auditory sacs connecting with the antennal nerve. The hairs clothing the body of a butterfly or moth are simply modified scales. Regarding the internal anatomy of the L. we may say that the nervous system is, in its gen. form, much as in other insects. There are 7 ventral ganglia in the adult and 11 in the larva. In connection with the tongue is a sucking stomach, which opens into the posterior end of the cesophagus. The silk-glands of the larva are very large. They are most developed when the caterpillar is about to transform into the pupa state and is about to spin a cocoon.

The metamorphoses of the L. are "complete," the larva being worm-like, the pupa inactive and closely resembling the adult. The eggs of butterflies and moths are more or less spherical, sometimes flattened, usually ribbed. The young caterpillar on hatching often eats up its shell and embryonal membranes. It is then much like the adult, but with the head larger in proportion to the body, and usually without the hairs, spines, and warts characteristic of the older individuals, and which are acquired during the subsequent moults. Previous to moulting the caterpillar stops eating; the old skin, now hardened and tense, splits asunder on the back, and the caterpillar draws its new body out of the rent, and then considerably exceeds its former size. This is a critical period with the insect, and many through weakness and disease die during the process. Before entering upon the pupa state the caterpillar grows restless, stops eating, deserts its food, and spins a silken cocoon. Here it remains for 2 or 3 days. Meanwhile its body contracts in length, and the skin of the pupa grows beneath that of the larva. While the body of the worm-like caterpillar exhibits no difference between the thorax and abdomen, the muscles of the growing pupa variously contract and enlarge beneath the caterpillar skin until the pupa form is complete, when it works its way out through a rent in the back. This

pupa-skin is developed from the *hypodermis* or inner layer of skin, and the rudiments of the pupa and imago exist as small disks of cells attached to fine tracheæ or nerves in the very young caterpillar. The different forms of cocoons are very varied and often beautiful objects. The most complete cocoons are those of the silkworms.

It has long been known that the females of the *Bombyx mori* and a few other moths have in one or more instances been known to lay eggs without being fertilized by the males have hatched out. Connected with this subject of parthenogenesis among the L. is the occurrence of 2 forms of the sexes, or dimorphism. Mr. Wallace has discovered 2 forms of females of *Papilio Memnon*; one form is normal, having its wings tailed, while the second form is tailless, resembling the tailed male. *Papilio Memnon* has 3 sorts of females, and may be said to be trimorphic. *Papilio Ajax* is polymorphous, the same batch of eggs having given rise to *P. Ajax* and varieties *Walshii*, *Telamonides*, and *Marcellus*. [From orig. art. in *J. Soc. Entom.*, by Prof. A. S. Packard, Jr., M.D.]

Lepidosirenidae [Gr. *λεπίς*, "scale," and *σειρήν*, "siren"], the typical family of dipnoous fishes, distinguished by its very elongated eel-shaped body; the pectoral and ventral "fins" or filaments are plain and tapering, and are almost destitute of rayed fringes; there are 5 branchial arches, with 4 corresponding intervening clefts; no external branchial appendage is developed, and the cusps of the dental plates of the palate, as well as lower jaw, are well developed. The family is represented by two genera, *Lepidosiren* and *Protopterus*. The species occurs in the Amazon River, as well as its tributaries, but is rare.



Lepidosiren.

Lepidus, the name of an anc. patrician family of Rome. The most conspicuous member of the family was **MARCUS ENLIVS LEPIDUS**, the triumvir. He was prætor in 49 B.C., when the war broke out between Cæsar and Pompey. He sided with Cæsar, was made his master of horse in 47 B.C., consul in 46 B.C., and in 44 received as his provs. Sp. and Gallia Narbonensis. He was at the head of the only armed force in the city when Cæsar was murdered. He was elected *pontifex maximus*, and having brought about a reconciliation between Antony and the senate, he proceeded to his provs. The agreement between Antony and the senate did not last long, and after the defeat at Mutina, Antony took refuge with L. Octavianus then commenced negotiations which led to the formation of the triumvirate in 43 B.C. By the partition of the provs. L. received Sp. and Gallia Narbonensis, and was left as gov. of Rome while Antony and Octavianus proceeded against Brutus and Cassius. But by the second partition, after the battle of Philippi in 42 B.C., L. received only Afr. This prov. he held till 36 B.C., when Octavianus ordered L. to join him at Sic. against Sextus Pompeius. He came, and believed the opportunity favorable for throwing off the authority of Octavianus, but his soldiers deserted him, and he had to beg for mercy. Octavianus deprived him of his prov., though not of his private fortune or of his dignity of *pontifex maximus*, and banished him to Circei, where he d. 13 B.C.

Leporidae [Lat. *lepus*, "hare," and *-idae*], a family of duplicidentate glirine mammals. The hind legs being much more developed than the fore, the animal progresses by a series of running leaps or short jumps, in which latter case the back is crooked and arched backward, and gives the characteristic physiognomy; the head is high, arched backward, and compressed; the eyes lateral and prominent; the snout rounded, and with the nostrils converging downward to a median furrow which divides the lips; the ears are more or less elongated, and the tail is short and bushy, and turned up. The skull is high and compressed, the rostral portion much produced and broad, and the interorbital area widened by the development of enlarged and expanding supraorbital plates or processes separated generally by narrow fissures from the body of the frontal bones fore and aft; the orbits are ample; the nasal processes of the supra-maxillary bones are perforated in a sieve-like manner; and the lower jaw has the ascending rami very oblique, and the condyles consequently far backward, angular process extensive forward. Imperfect clavicles are developed. Such are the most important characters common to the hares and rabbits. The species are quite numerous, and are most abundant in the arctogeanean regions and the temperate zone.

There is a remarkable difference in habits between the hares and rabbits. The hares never burrow, but simply compose a "form" or nest, in which they rest and bring forth their young, and the young are born covered with hair and with the eyes open. The rabbits, on the contrary, burrow in the ground, and often make extensive tunnels, and in these burrows they live and bring forth their broods; the young are born naked and blind.

THEODORE GILL.

Leporidae [Fr.], a name applied to a remarkable fertile hybrid between the common European hare and the rabbit. Leporides are now extensively bred in Fr.

Leporius, a native of Gaul; entered, in the beginning of the 5th century, a monastery in the vicinity of Marseilles, and acquired reputation for learning and holiness. He afterward fell into the heresy of Pelagius, was excommunicated, and went to Afr. Here he met with St. Augustine, whose influence over him was so great that in 425 he retracted, and was ordained a presbyter by Augustine.

Leprosy [Gr. *λεπρά*, "leprosy"], an incurable constitutional disease of adult life, which is especially prevalent in tropical and sub-tropical climates. It is characterized by an eruption on the skin, by anæsthesia, atrophy of the muscles, ulceration and mutilation of the hands and feet, and tuberculated thickening of the skin, especially of the face,

ears, hands, and feet, ending fatally in from 2 to 15 yrs., by intercurrent disease in some vital organ." The treatment is principally palliative. Good food, clothing, and the prevention of marriage among lepers are the only means we possess to better their condition and decrease their number.

Lepsius (KARL RICHARD). Ph. D., b. at Naumburg, Prus. Sax., Dec. 23, 1810; studied at Leipsic, Göttingen, and Berlin, graduating at Berlin with a thesis on the Eugubian Tables; went to Paris in 1833, and for his *Paleogeography applied to Linguistic Researches* gained the Volney prize; in 1835 made researches in the libraries of It.; devoted his attention to langs., especially to Egyptology; went to Eng. in 1838; projected an expedition to Egypt, which left Eng. in 1842, and returned to Ger. in 1845; became prof. at Berlin in 1846; again went to Egypt in 1866, and discovered at Tanis a bilingual inscription of the time of Ptolemy Euergetes; was placed over the Prus. state library, 1874. Among his works are *Das Todtenbuch der Aegypter*, *Die Chronologie der Aegypter*, and *Über einige ägyptische Kunstformen*. D. July 10, 1884.

Leptandra [proposed for its generic name by Nuttall], the pharmaceutical name of the Culver's physic (*Veronica Virginica*, order Scrophulariaceæ), a tall perennial herb of the Atlantic U.S. with decided cathartic powers. Its impure resinoid is extracted and sold as *leptandra*. It is an agent of considerable value, believed by many practitioners to act decidedly upon the liver; but this is very doubtful.

Leptocardia [Gr. *λεπτός*, "slender," and *καρδιά*, "heart"], the class of vertebrates containing the least organized forms of the branch, and formerly confounded with the class of fishes. Only a single genus (*Branchiostoma*, Costa, or *Amphioxus*, Yarell) is known, and this is believed to be the surviving type of a class which must have been rich in representatives in the distant past, but which has left no recognized remains in the rocks. The brain is of the most rudimentary character and not developed into enlarged lobes, as in all other vertebrates; the skull is also undeveloped, nor are there any rudiments of auditory organs; the skeleton is represented by a simple notocord or embryonic backbone, which is not divided into vertebrae, and has no ribs or other appendages, no scapular or pelvic arches, and consequently no pectoral or ventral fins being developed. The circulatory system is also very simple, and the heart simply tubular and not divided into distinct chambers (and hence the name of the class). The mouth is an elongated aperture bounded by a semi-cartilaginous hoop, which is beset with filamentary processes clothed with ciliated tentacles; this opens into "an expanded pharyngeal chamber," which is split on each side by obliquely transverse clefts, through which the water taken in by the mouth is discharged into an "atrial chamber," and thence through a pore which represents the branchial orifice of the Myxiniæ. Such are the chief distinctive characters of this type. The differences from all others are so great that it is at first difficult to perceive the homologies of the various organs and parts with those of the higher vertebrates.

THEODORE GILL.

Lerdo de Tejada (SEBASTIAN), pres. of Mex., b. at Jalapa Apr. 25, 1825; studied law, and was admitted to the bar in 1851; was chosen rector of the Coll. of San Ildefonso in 1852, and became in Dec. 1855 one of the supreme court of justice. About this time his brother Miguel was appointed minister of finance in the cabinet of Pres. Comonfort, and became the leader of the liberal party. L. gave him efficient aid, and was called to the ministry of foreign affairs June 4, 1857. On the overthrow of Comonfort in Jan. 1858, he devoted himself anew to the direction of the coll. and to practice at the bar. On the restoration of the liberal govt. he was elected to Cong. (Apr. 1861), and re-elected in the following yr. He was pres. of Cong. in May 1863, when the capture of Puebla forced Pres. Juarez to abandon the cap.; accompanied the govt. in its retreat to San Luis Potosí, where he was made minister of justice Sept. 15, and minister of foreign affairs Sept. 24, 1863. Upon the restoration of the national govt. to the city of Mexico in 1867, L. was elected pres. of the supreme court of justice, to which was annexed the vice-presidency of the republic, but continued to discharge the duties of minister of foreign affairs. He retired from the cabinet Jan. 17, 1871; was an unsuccessful candidate for the presidency in July of that yr., and upon the death of Juarez (July 18, 1872) succeeded him by virtue of his office as v.-p. In the election of Oct. 1872 L. was chosen pres. for 4 yrs., and was re-elected in 1876, but a revolution headed by Gen. Porfirio Diaz drove him from power (Nov. 1876), and he took refuge in the United States, residing quietly for several years in New York city.

Lerot. See DORMOUSE.

Le Roy, R. R. junc., Genesee co., N. Y., 25 m. S. W. of Rochester, 50 m. E. of Buffalo, and 10 m. E. of Batavia. It has fine water-power supplied by Otka Creek; is the seat of Ingham Univ. for ladies, and has an academic inst., an art conservatory, and a public library. Pop. tp. 1870, 4627; 1880, 4469.

Leroy (WILLIAM E.), U. S. N., b. Mar. 24, 1818, in New York; entered the navy as a mdpn. Jan. 11, 1832; became passed mdpn. 1838, lieutenant 1843, commander 1861, capt. 1866, com. 1870, and rear-admiral 1874; commanded the Keystone State in a severe engagement with Confed. iron-clads off Charleston, S. C., Jan. 31, 1863, and the Onondaga at the battle of Mobile Bay, Aug. 5, 1864. Retired Mar. 24, 1880.

Leroy de Saint-Arnaud, leh-rwāl' deh sant ar-nō' (JACQUES ACHILLE), b. at Paris Aug. 20, 1801; enlisted in 1816 in the body-guard of Louis XVIII.; became in 1837 capt. in the foreign legion in Algeria, and distinguished himself especially as commander of the prov. of Constantine, and by his campaign against the Kabyles. In 1851 he was made a gen. and commander of one of the military divisions of Paris. In the same yr. he became minister of war, and rendered great services to Nap. Dec. 2, 1852, for which he was rewarded with the title of marshal. In 1854 he commanded the Fr. army in the Crimean war, and won the battle of Alma, but d. Sept. 29, 1854.

Le Sage, Ieh Sahiz (ALAIN RENÉ, D. at Sarzeau, Fr., May 8, 1668; was at first an advocate; afterward devoted himself to lit.; wrote plays, the most prominent of which is *Turcaret*, but is chiefly known as a writer of romances, his best works being *Le Diable boiteux*, and especially *Histoire de Gil Blas de Santillane*. D. Nov. 17, 1747.

Lesbos, or **Mitylene**, an island of the Gr. Archipelago, 10 m. distant from the coast of Asia Minor, and belonging to Tur. Area about 600 sq. m. Pop. about 30,000, more than one half of whom are Turks.

Lescaubot, la-ka-bô' (MARCO), seigneur de St. Audebert, b. at Vervins, Fr., about 1570; was associated with De Mont in the colonization of Acadia (N. S.) in 1605, and was engaged in the settlement of Pt. Royal (now Annapolis) until its abandonment in 1607, when he returned to Fr. He pub. in 1609 a *Histoire de la Nouvelle France*, giving, among other things, an account of Cartier's voyages to Canada and of the enterprise with which he was personally connected, the first attempt at settlement having been made on what is now Boon Island on the coast of Me. The description of the country and the accounts of the Indians are spirited, and probably faithful. The vol. attracted the attention of Hakluyt, and an Eng. translation of the greater part was pub. under the title *Nova Francia, or the Description of that part of New Fr. which is one Continent with Va.* D. about 1630.

Lesches, les-kéz (Λέσχος), b. near Mitylene, one of the class known as the Cyclic poets, flourished about 700 B. C. His poem, the *Little Iliad*, treated of the events subsequent to Homer's great poem, including the destruction of Troy.

Lesley (J. PETER), b. at Phila. Sept. 17, 1819, grad. at the Univ. of Pa. in 1839, and at Princeton Theol. Sem. in 1841; was assistant geologist on the first survey of Pa. in 1839-41; after travelling on foot around Fr. heard lectures in the Univ. of Halle; returned home in 1845, and was employed by the Amer. Tract Society to establish its colportage system in the N. and middle cos. of Pa.; became pastor of the Milton ch. near Boston in 1847; left the ministry in 1850 to settle at Phila. as a geologist; was appointed sec. of the Amer. Iron Association in 1855, sec. and librarian of the Amer. Philosophical Society in 1858, prof. of geol. and mining engineering in the Univ. of Pa. in 1873, and State geologist of Pa. in 1874. Has written a *Manual of Coal and its Topography*, a *Guide to the Iron-works of the U. S.*, etc.

Leslie, Mich. See APPENDIX.

Leslie (CHARLES), b. at Raphoe, Ire., about 1645. His father was successively bp. of the Orkneys, of Raphoe, and of Clogher for more than 50 yrs., and d. in 1671, at the age of 101. L. was educated at Trinity Coll., Dublin; studied law at the Temple, Lond.; took orders in the Ch. of Eng. in 1680, and was chancellor of the cathedral of Connor in 1687, but by refusing to take the oath of allegiance to William and Mary cut off all prospect of ecclesiastical preferment. He then devoted himself to religious and political controversy, and for 33 yrs. was the leading literary champion of the Jacobites; wrote also the *Short Method with the Deists*, the argument of which rests principally upon the Chr. miracles. D. Apr. 13, 1722.

Leslie (CHARLES ROBERT), b. at Clerkenwell, Lond., of Amer. parents, in 1794; studied with West and Allston; was elected associate of the Acad. in 1821, and member in 1826. In 1833 he was appointed prof. of drawing at W. Pt., but held the position for 5 months only. In 1847 he was chosen prof. of painting at the Royal Acad. L.'s productiveness has been very great. His works cover a period of about half a century. His *Anne Page* and *Slender*, *Sir Roger de Coverley going to Church*, *May Day in the Reign of Queen Elizabeth*, are familiar. His works found great favor in Eng. They are full of a sweet humor, elegant in conception, graceful in execution, and finished in style. D. May 5, 1859.

Leslie (Sir JOHN), b. at Largo, Scot., Apr. 16, 1766; was educated at the univs. of St. Andrew's and Edinburgh; spent 2 yrs. (1788-89) in Va. as tutor; settled in Lond. in 1790, and applied himself to science. In 1805 he was elected by the town council of Edinburgh prof. of math. in the univ. of that city; in 1819 succeeded Playfair in the chair of natural philos., which he held through life. He was knighted a few months before his death. His *Experimental Inquiry into the Nature and Propagation of Heat* gained the Rumford medal of the Royal Society. He prepared text-books in geom., the higher math., and natural philos. In 1810 he discovered the process of artificial congelation. D. Nov. 3, 1832.

Lesseps, de (FERDINAND), VISCOUNT, b. at Versailles, Fr., Nov. 19, 1805; entered public life in 1828 as an attaché at Lisbon; held various consular offices; proposed in 1854 cutting a canal across the Isthmus of Suez, and pub. a report, *Perçement de l'Isthme de Suez exposé*. A firman sanctioning the enterprise was granted in 1854, and the work was executed 1859-69. He subsequently projected other vast enterprises, such as a central Asian railway, the conversion of the Desert of Sahara into an inland sea, and the Panama Canal, now in progress.

Lessing (GOTTHOLD EPHRAIM), b. at Camenz, Sax., 1729; studied at Leipsic; moved to Berlin, where he led for several yrs. an exclusively literary life, the most remarkable fruit of which were his *Letters on Literature*. In 1760 he went to Breslau, and while residing there, in the midst of the Seven Years' war, wrote *Minna von Barnhelm*, the first national drama of Ger., and his tragedy, *Emilie Galotti*. In 1769 he went to Hamburg as director of the theatre, and there wrote his *Hamburgische Dramaturgie*, which, together with his *Laokoon*, raised a new issue in modern civilization; from Hamburg went to Wolfenbüttel as librarian at the ducal library, and while in this position pub. the famous *Wolfenbüttelsche Fragmente*, the first and perhaps the strongest attack on the historical basis of Christianity. The *Fragmente* were written by Reimarus, but Lessing defended them against the orthodox Ch. with such superiority of intelligence that the ducal govt. became alarmed and bade him stop. Although a very independent character, he submitted, and later on set forth his religious views in another

form, in his great philosophical drama, *Nathan der Weise*, one of his most perfect works. His philosophical essay on the development of civilization, *Die Erziehung des Menschengeschlechts*, followed next yr. D. in 1781.

Lessing (KARL FRIEDRICH), b. at Wartenberg, Silesia, Feb. 15, 1808; received his first artistic instruction at the school of arch. at Berlin; studied for several yrs. at Düsseldorf, and was appointed director of the gallery of paintings at Carlsruhe in 1858. His paintings are partly landscapes, partly historical; among the latter are *Huss before the Council* and *The Martyrdom of Huss*. D. June 6, 1880.

Les'ter (CHARLES EDWARDS), b. at Griswold, Conn., July 15, 1815; resided for a time in the S. and W.; came to the bar in Miss., and was afterward ordained to the Presb. ministry; was U. S. consul at Genoa 1842-47. Among his works are *The Glory and Shame of Evil*, *Life of Vespaian*, and *Our First Hundred Years*.

Lestock, les-tok' (JEAN HERMAN), b. at Celle, Hanover, Apr. 29, 1692; in 1713 went to St. Petersburg, and was appointed surgeon in the service of Peter the Great, but was banished to Kazan in 1718 on account of his dissolute habits. In 1725 Catharine I. recalled and appointed him surgeon in the service of the princess Elizabeth, and it was by his instigation that she undertook the revolution of Nov. 25, 1741, which made her empress of Rus. The king of Poland made L. a count, the empress gave him a pension of 7000 rubles, and for several yrs. his influence in Russian politics was very great. But in 1748 the vice-chancellor, Bestozhef, succeeded in rousing the empress's suspicion against him. He was arrested, put to the torture, and banished to Oogitch. In 1761 Peter III. recalled him to the court, and Catharine II. gave him an estate in Livonia. D. June 12, 1767.

L'Esrange, les-tran'j' (Sir ROGER), b. at Hunstanton Hall, Eng., in 1616; accompanied Charles I. in 1639 in his expedition against the Scots; during the c. war was captured in an attack on Lynn (1644), and condemned to death; was relieved, but kept a prisoner until in 1648 he escaped and tried to stir up a rebellion in Kent, after which he fled to the Continent. He returned to Eng. on the dissolution of the Long Parl. in 1653. At the Restoration he was appointed "licenser" of the press; established the *Public Intelligence* newspaper in 1665 and the *Observer* in 1679, in both of which and in pamphlets he showed himself a supporter of the Crown; made many translations of anc. and modern books; was knighted on the accession of James II.; elected to the Parl. of 1685, and dismissed from his office of licenser at the revolution of 1688, soon after which he became insane. D. Dec. 11, 1704.

Le Sueur, Minn. See APPENDIX.

Letch'er (JOHN), b. at Lexington, Va., Mar. 29, 1813, educated at Washington Coll.; grad. at Randolph-Macon Coll. Va.; studied law and was admitted to the bar in 1839; in 1850 was a member of the State constitutional convention, and M. C. from 1853 to 1859, when he was elected gov. of Va. This position he was holding when the State passed her ordinance of secession in 1861; he sustained the action of the State with zeal, energy, and ability.

Letcher (ROBERT P.), b. in Garrard co., Ky.; was a lawyer by profession; a member of the State legislature for a number of yrs., and once speaker of the house; was M. C. from 1823 to 1833; was elected gov. of the State in 1840, and was minister to Mex. in 1849. D. Jan. 24, 1861.

Le'the, in Gr. mythology, a river in the lower world, of which the departed souls drank before entering the Elysian Fields, thereby entirely forgetting all about their life on earth. It was also used as a personification of oblivion.

Letter of Attorney. See POWER OF ATTORNEY.

Letter of Credit. See BILL OF CREDIT.

Letters of Administration. See LETTERS TESTAMENTARY, ADMINISTRATION.

Letters of Marque (for privateer). See MARQUE-LETTERS OF.

Let'ters Testamentary, an instrument in writing granted by a surrogate or other judicial officer having jurisdiction of the probate of wills to an executor as evidence of his authority, and empowering him to administer the estate of the deceased. When a person dies intestate, L. of a similar character are granted to the person who is appointed administrator, but they are then termed "letters of administration." L. granted by the surrogate are only valid within the limits of the State in which they are issued. If there are assets of the deceased within a foreign state or country, L. must be issued there to subordinate or ancillary administrators, and the prin. executor or administrator, as such, will have no authority to administer such assets, unless they are remitted to him from the foreign jurisdiction. (See PROBATE, ADMINISTRATION.)

Let'ter-wood, or **Snake-wood**, a rare and costly ornamental wood used for inlaying and veneering, the product of *Brosimum Aubletii*, an artocarpaceous tree of S. Amer. It is so hard that axes of extraordinary temper are required to fell the tree. Its rich brown and beautiful wood has somewhat letter-shaped marks.

Let'tle Race, **The**, forus a subdivision of the Slavic group, belonging to the Indo-European family, and is itself divided into 3 branches—the Lithuanians, the Letts, and the Old Prus. The Old Prus. inhabited the region between the Niemen and the Vistula, but were completely Germanized in the 17th century. The Letts, numbering about 1,000,000, inhabit Courland, W. Livonia, and the adjacent dists. of the govts. of Vitebsk, Kovno, and Pskov. The Lithuanians comprise the Lithuanians proper, numbering about 750,000, and inhabiting the E. part of Courland and the govts. of Vilna and Grodno; the Samogitians or Shamaities, numbering about 500,000, and occupying the govt. of Kovno; and the Lithuanians in Prus., about 150,000.

Lettuce, let'tis (Lat. *lactuca*), an important salad-plant, the *Lactuca sativa*, a composite herb of the Old World. There are many varieties. It is easy of digestion, rather laxative, and gently soporific.

Leucippus, the founder of the atomic school in the Gr. philos., lived probably about 500 B. C. His writings have all perished.

Leutze, Ioh' (sech (EMMANUEL), b. at Emingen, Württemberg, May 24, 1816, son of a mechanic, who left Ger. and made his home in Phila. His early passion for art showed itself in rude portraits. In 1841 he arrived in Amsterdam, and from there went to Düsseldorf and became a pupil of Lessing. At Munich L. became an admirer of Kaulbach. Thence he went to It., came back to Ger., and there lived till 1859; returned to America. D. in Washington, D. C., July 1868. L. painted numerous portraits. But his chosen field of art was the romance of hist. In the capitol his *W. Emigration* is conspicuous. His *Washington Crossing the Del.* is familiar through engravings. Other pieces are *The Landing of the Norsemen*, *Cromwell and his Daughter*, *The Ironclast*, etc.

Levant, **The**, a name of It. origin, *Il Levante*. It denotes the countries bordering on the E. part of the Mediterranean—Asia Minor, Syria, and Egypt.

Levee, **The**. The word *levee* is Fr., and signifies, among other meanings, "raising," "embankment," "embanking," "bank," "causeway," "mole." Levees, embankments, dikes, dams, were used by the anc. during the earliest historical periods. Probably the first to use them were the Egyptians in the Nile valley. Egypt being a rainless country, or nearly so, the valley-lands of the Nile could not be cultivated without irrigation. The Nile system is one of leveeing and irrigation, but the irrigation includes the inundation of the valley-lands throughout, leaving dry only the mounds on which the cities, towns, and villages are built, or the leveed areas from which the water is excluded. Near Cairo the river L. are from 12 to 15 ft. in height, and but very little higher than the river flood-line. In It. the L. system has been in use for many centuries—for reclamation as well as to facilitate irrigation—and the old It. engineers announced some truths, which, though manifest and plain, are not even yet fully recognized among modern engineers, or those of to-day. The L. of Hol., whereby immense areas of land, submerged from 5 to 15 ft. below mean tide in the N. Sea, have been reclaimed, drained, and cultivated, are the most wonderful of any in the world. The whole country is an intricate network of rivers, water-channels, and canals bordered by L. By means of steam machinery and windmills these lands are kept dry.

Levees as Applied to the Mississippi River.—The leveeing of the Miss. River was commenced at New Orleans in about 1720, the engineer Dumont de la Tour having, after locating the future city in 1717, ordered a front L. of 5400 ft. in length by 4 ft. in height and 18 ft. wide at top, as necessary to protect the city. But little progress was made in L. construction from 1763, when Fr. ceded La. to Sp., until 1803, when it passed to the U. S., after having been ceded back to Fr. by Sp. in 1800.

During 150 yrs., since about 1720, the L. system was gradually extended, from New Orleans, about 70 m. below and about 1000 m. above. Every bend, before L. were built around it, was a continuous outlet, for the river flood-line was several ft. higher than the banks in the bends. Even the banks around the points were overflowed before they were leveed, for they were formed by alluvial deposits while inundated, and were leveed because subject to overflow. The lower river was first accommodated to the leveeing up of outlets. The building of L. is nothing else but the closing up of outlets, and the retention between the river-banks and the L. of the waters which previously passed out laterally over the banks. Every outlet except the Bayou Lafourche—the high-water capacity of which is less than the $\frac{1}{100}$ part of the Miss.—has been closed below Red River without adding to the height of the river flood-line in the lower river. Had the L. system been commenced above and extended downward, the first effect would have been different.

Everything indicates that the Miss. River is not and cannot be an exception to the laws which govern the flow of water in all sedimentary rivers, small or great. As the normal maximum quantity of water is increased, the mean velocity of current is accelerated, the area of channel-way is enlarged, and the slopes of the bed and surface are diminished. The L. system, therefore, as applied to such a river as the Miss., is based upon correct principles, and the effect of L., if persevered in and maintained properly, will be to lessen the liability to inundations, and, if anything, to reduce the flood-line; if cut-offs and outlets, which alone interrupt the establishment of a permanent river regimen, are prevented.

Outlets temporarily lower the flood-line of a sedimentary river, but their final effect always must be an increased elevation of the bed and surface of such a river and the contraction of its channel-way; for the law is that the less the quantity of water flowing, as the normal maximum, the greater must be the slopes of bed and surface. Outlets, therefore, cannot be depended upon for lowering the flood-line of the lower Mississippi permanently, and they are not needed, because the extension and perfection of the L. system never has caused, and will not cause, any elevation of the river flood-line. L., and L. alone, if properly constructed and maintained, can be relied upon for the reclamation of all the alluvial lands subject to overflow in the valley of the Miss., and the improvement of navigation will also result from a perfection of the system. By means of L., and afterward of interior drainage, every acre of land in the Miss. Valley, exclusive of drainage channels, may be reclaimed and cultivated. It is estimated that 2,500,000 acres of sugar-land, 7,000,000 acres of cotton-land, and 1,000,000 acres of corn-land may be opened for cultivation and settlement.

The total lengths of L. required to protect the Miss. front may be stated as follows: In La. below Red River, 500 m.; above Red River, 280 m.; in Miss., 380 m.; in Ark., 545 m.; in Mo., 80 m. Total, 1785 m. In La. the interior rivers, bayous, and old river lakes would require about 925 m.

more. The U. S. is engaged in a struggle for the maintenance of her supremacy as the greatest cotton-producer in the world, and the only way to maintain this supremacy is to perfect the Miss. River L. system, and so bring all of the valley-lands into cultivation. The U. S. alone can do this; the States of La., Miss., and Ark. cannot. Surely, the permanent reclamation of the great Miss. Valley, with its 10,000,000 or 12,000,000 acres of the richest alluvial lands in the world, is of sufficient national importance to justify its being undertaken by the gen. govt. [From orig. art. in *J.'s Univ. Cyc.*, by G. W. R. BAYLEY.]

Level and **Leveling** [*A. S. level*]. A level surface is one that is concentric with the surface of the earth—i. e. with the surface as it would be if the earth were covered with water. For most purposes this surface may be regarded as that of a sphere whose radius is equal to the radius of the earth. The difference of L. of 2 points is the difference of their distances from the centre of the earth, and the operation of finding this difference is called *levelling*. The instruments used in this operation are the *level* and the *levelling-rod*. The *level* usually consists of a telescope so mounted that its line of collimation may be made to revolve in a horizontal plane; this plane is tangent to a L. surface, and is called a surface of apparent L. A *levelling-rod* is a rod of wood, graduated to feet and decimals of a foot, the divisions being numbered from the bottom upward. By means of these 2 instruments we can find the difference of apparent L. between 2 neighboring points, and by suitable formulas we can, if necessary, make corrections to take account of the departure of the apparent from the true L.

The method of levelling may be described as follows: A L. is set up at a convenient point, and the line of collimation is brought into such a position as to revolve in a plane of apparent L.; a levelling-rod is then placed vertically at the first of two points, and the height at which the line of collimation meets it is noted; the rod is then placed at the second point and the reading again noted; the first reading diminished by the second is the difference of L. of the corresponding points; the second point, being above the first when the difference is +, and below it when the difference is -; in like manner the difference between the second point and a third is found, and so on. The difference of L. between the first and last points is equal to the algebraic sum of all the partial differences. WM. G. PECK.

Lever. See MECHANICAL POWERS.

Lever (CHARLES JAMES), M. D., LL.D., b. at Dublin Aug. 31, 1806; took the degree of M. B. at Dublin Univ. 1831, and of M. D. at Göttingen; was med. supt. in Londonderry during the cholera season of 1832; phys. to the legation at Brussels; ed. of the *Dublin Univ. Magazine* 1842-45; vice-consul at Spezia 1858-67, and afterward consul at Trieste; attained success as a writer of novels, chiefly descriptive of Irish life and character, among which are *Harry Lorrequer*, *Charles O'Malley*, *Con Cregan*, and *Lord Kilgobbin*. D. June 1, 1872.

Leverett (Sir JOHN), BART., b. in Eng. in 1616; came with his father to Amer. in 1633; held many important positions, both in Mass. and in Eng., where he was an officer in the army of Cromwell. In Mass. he was speaker of the house 1665-71, maj.-gen. 1663-73, deputy gov. 1671-73, and gov. 1673-79. In 1676 he was knighted and made a baronet by Charles II. D. Mar. 16, 1679.

Leverett (JOHN), F. R. S., b. at Boston, Mass., Aug. 25, 1662, grandson of the preceding; grad. at Harvard in 1680; was a judge, lawyer, and speaker in the gen. court, and pres. of Harvard Coll. 1707-24. D. May 3, 1724.

Leverrier, Ioh'-vā-re-ā' (URBAIN JEAN JOSEPH), b. at St. LÔ, Fr., Mar. 11, 1811; studied at the École Polytechnique, Paris; made important discoveries in chem., and in 1846 announced correctly the place in the heavens where would be discovered the planet now called Neptune. He was director of the observatory of Paris 1854-70, to which he was reappointed in 1872; became a senator, and did much to promote popular education. D. Sept. 23, 1877.

Le Vert (OCTAVIA WALTON), b. at Bellevue, near Augusta, Ga., about 1810. Her father, Col. George Walton (son of the signer of the Dec. of Ind. of the same name), removed to Pensacola, Fla., in her childhood, as territorial sec., and for a time acted as gov. Here she acquired such a knowledge of Fr. and Sp. that they were almost equally with Eng. her mother-tongues. Upon the expiration of his term of office, Col. Walton removed to Mobile, where his daughter was married in 1836 to Dr. H. S. Le Vert. She had previously spent one or two winters in Wash., where she acquired distinction for the precision of the reports she wrote of the Congressional debates on the removal of the deposits from the U. S. Bank. In 1853-54, and again in 1855, she travelled in Europe, and recorded her observations in her *Souvenirs of Travel*. She rendered good service in behalf of the Mt. Vernon Association, and was noted for offices of charity during the C. war. D. Mar. 13, 1877.

Levi [*Heb.* "wreathed?"]; in biblical hist. the 3d son of Jacob and Leah, b. in Padan-aram about B. C. 1917, and the ancestor of one of the 12 tribes of Israel, called by his name; with his brother Simeon he perpetrated a massacre upon the inhabs. of Shechem to avenge the wrong done his sister Dinah; went into Egypt with his father and brothers after the elevation of Joseph, and d. there. Moses and Aaron were his descendants.

Levi (LEONE), PH. D., b. at Ancona, It., of Jewish parents, June 6, 1821; removed in 1844 to Liverpool; was one of the founders of the Liverpool Chamber of Commerce 1849; became in 1852 prof. of commercial law, etc. in Univ. Coll., Lond.; became a barrister in 1859; has done much for the reform of commercial law and practice, the utilization of statistics, etc. Author of *Commercial Law*, *Mercantile Law*, *International Commercial Law*, etc.

Leviathan [*Heb.* "wreathed monster?"]; in the O. T. designates the crocodile, but in the Talmudical writers the whale, the fabulous dragon, etc. may be called L. The name is used figuratively for gigantic animals.

Levings (NOAH, D. D., b. in N. H. in 1790; early joined the M. E. Ch., and in 1818 entered its itinerant ministry as a candidate of the New York conference; preached in N. Y., Conn., Mass., and Vt.; was presiding elder over large dists. and a member of the Gen. Conference; in 1844 was appointed one of the secs. of the Amer. Bible Society. After a tour through the S. W. States he was attacked by cholera, and d. at Cin. Jan. 9, 1849.

Levirate Marriage [Lat. *levir*, a "husband's brother"], the marriage of a widow by the brother of the deceased husband. This custom was perpetuated by the Mosaic law. The canon law forbids such marriage, and in G. Brit. it is still unlawful. In the U. S. it is generally permitted to marry the brother of a deceased husband.

Levite, one of the tribe of Levi, a descendant of Levi, one of the sons of Jacob, but in a more limited sense one of those members of that tribe who did not belong to the priestly families of the anc. Hebs. The L. constituted a kind of inferior priesthood.

Leviticus [so named in the Vulgate because it is largely occupied with directions for the Levitical service], the third book of the Pentateuch and of the O. T.

Levulose [Lat. *levum*, "left"], a variety of glucose. It occurs associated with dextro-glucose in honey, in many fruits, and other saccharine substances. Fruit-sugar or invert-sugar is a mixture of equal proportions of these 2 sugars. Cane-sugar is *interverted*—that is, transformed—into a mixture of dextro-glucose and L. by warming with dilute acids, or by contact with yeast, pectase, etc. L. is produced in a pure state by treating inulin with dilute acids. It is a colorless, uncrystallizable syrup, as sweet as cane-sugar, and exhibiting most of the reactions of dextro-glucose. It is more easily altered by heat and acids, less readily by alkalies and ferments. (See *Glucose* and *Sugar*.)

Lewes, LUSS (GEORGE HENRY), b. in Lond. Apr. 18, 1817; was in youth a clerk; commenced the study of med., but abandoned it for that of philos. and psychology, to which he devoted 2 yrs. in Ger.; returned to Lond. in 1840 and devoted himself to lit. His earliest important work was the *Biographical Hist. of Philos. from Thales to Kant*, pub. in 1847. From 1849 to 1854 he was literary ed. of the *Leader*, wrote a compendium of *Comte's Philos. of the Sciences*, *Lives of Robespierre* and of *Goethe*, *Physiology of Common Life*, *Studies in Animal Life*; *Aristotle, A Chapter from the Hist. of Science*, and other works. In 1865 he founded the *Fortnightly Review*, but in Dec. 1866 was compelled by ill-health to retire from its editorship. His most ambitious work, *Problems of Life and Mind*, was left unfinished at his death. D. Nov. 30, 1878.

Lewes, MARIAN EVANS, the celebrated novelist, known by the nom. de plume of GEORGE ELIOT, b. in Warwickshire, Eng., about 1820, was the daughter of a poor curate, but was adopted by a wealthy clergyman, who gave her a careful education. While a girl she had mastered 7 langs., was a good musician, and had read deeply in philos. At 23 she went to Lond. and began a literary life; wrote translations, essays, and reviews, and at 27 was assistant ed. of the *Westminster Review*. In 1846, after having visited Ger., she put forth a translation of Strauss's *Life of Jesus*, and in 1854 a version of Feuerbach's *Essence of Christianity*. She commenced her career as a novelist, when nearly 40, by *Scenes of Clerical Life*, pub. in *Blackwood's Magazine* 1858. This was followed by *Adam Bede*, *The Mill on the Floss*, *Silvia Marner*, *Romola*, *Felix Holt*, *Middlemarch*, *Daniel Deronda*, and the *Impressions of Theophrastus Such*. She also put forth 3 vols. of poems: *The Spanish Gypsy*, *Agnatha*, and *The Legend of Jubal*. D. Dec. 22, 1880. Her life by Cross, 1885.

Lewis, ANDREW, b. in Ire. about 1730; was brought to Va. in 1732 by his father; was a volunteer in the campaign to the O. in 1754; a major in Braddock's expedition; commanded the Sandy Creek expedition in 1756; was taken prisoner by the Fr. 1758 near Ft. Duquesne; was made brig.-gen. in 1774, and commanded the Va. troops in the victory over the Shawnee confederacy at Pt. Pleasant, at the mouth of the Great Kanawha River, Oct. 10, 1774. He was for several yrs. a member of the house of burgesses, took part in the convention of 1775, was appointed a brig.-gen. at Washington's request in 1776; resigned his commission on account of ill-health in 1777. His statue occupies one of the pedestals around the Washington monument at Richmond. D. 1780.—He had 4 brothers who are mentioned in Va. annals: SAMUEL, who commanded a company at Braddock's defeat; THOMAS (1718-90), who advocated Patrick Henry's resolutions in the house of burgesses in 1765, was a member of the State conventions of 1775 and 1776, and of that for the ratification of the Federal const.; WILLIAM (1724-1811), who served under his brother in the Fr. and Indian war, and was col. in the Revolution; and CHARLES, who also became col., and was killed at the battle of Pt. Pleasant, Oct. 10, 1774.

Lewis (DIO), M. D., b. at Auburn, N. Y., Mar. 3, 1823; studied at the Harvard Med. School, and practised for a time at Buffalo, where he pub. a med. magazine, in which he inculcated the importance of gymnastics, and proposed to replace the use of drugs by diet and exercise. He established in 1864, at Lexington, Mass., an acad. for young ladies. In Sept. 1868 the inst. was destroyed by fire, and he then engaged in med. practice in Boston. Has written *The New Gymnastics*, *Weak Lungs*, and *How to make them Strong*, *Our Girls*, *Chats with Young Women*, etc.

Lewis (DIXON HALL), b. in Dinwiddie co., Va., Aug. 10, 1802; was ed. at S. C. Coll.; removed before 1823 to Autauga co., Ala.; entered public life when 23 yrs. old, and took a leading position as a State Rights man; was M. C. 1829-44. U. S. Senator 1844-48. He was excessively corpulent, weighing 450 lbs., but possessed no small degree of phys. activity. He was an able supporter of extreme State Rights views. D. Oct. 25, 1848.

Lewis (ELLIS), M. D., LL.D., b. at Lewisberry, Pa., May 16, 1798; was a printer in his youth, and in 1822 came to the bar; in 1824 was deputy atty.-gen. of Pa., atty.-gen. in 1833;

held various judgeships in the dist. and supreme courts; became in 1854 chief-justice of the latter court, and in 1857 was rechosen. His skill in med. jurisprudence won the honorary degree of M. D. In 1858 he was appointed a com. to revise the criminal code of the State. He wrote *Abridgment of the Criminal Law of the U. S.* D. Mar. 19, 1871.

Lewis (FRANCIS), one of the signers of the Dec. of Ind., b. at Llandaff, Wales, in Mar. 1713, and ed. at Westminster; became a merchant of New York, in 1757 was on staff of Gen. Mercer, and was captured at Oswego and sent to Fr.; received a grant of 5000 acres from Brit.; was 1775-79 a M. C., and was afterward an importer of military stores. His wife and himself were long imprisoned by the enemy, and the greater part of his estates was destroyed. D. Dec. 30, 1803.

Lewis (SIR GEORGE CORNEWALL), BART., b. in Radnorshire, Wales, Oct. 1806, grad. at Ox. in 1828; came to the bar in 1831; entered Parl. in 1847; was an under-sec. of state 1848, sec. of the treas. 1850-52, chancellor of the exchequer 1855-58; became sec. of state for the home dept. 1859, for war 1861. He was one of the translators of Müller's *Hist. and Antiquities of the Horse Race* and of his *Hist. of the Lit. of Anc. Gr.*; author of *Origin of Romance Langs*, *Inquiry into the Credibility of Early Rom. Hist.*, etc.; ed. of the *Edinburgh Review* 1854-55. D. Apr. 13, 1863.

Lewis (JOHN TRAVERS), D. D., LL.D., b. at Cork, Ire., June 30, 1825, grad. in 1846 at Trinity Coll., Dublin; curate of Newtown Butts in 1848; went as missionary to Hawkesbury in Canada in 1850; became rector of Brockville in 1855; was nominated bp. of Ont. in 1862.

Lewis (MORGAN), b. in New York Oct. 16, 1754, son of Francis Lewis, grad. at Princeton in 1773; studied law; joined Washington's army at Cambridge in June 1775; was made capt. of a rifle company in Aug., major of 3d New York regiment in Nov., col. and chief of staff to Gates in June 1776; was at the battle of Saratoga, and was distinguished in Clinton's campaign in the Mohawk Valley. After the war he was admitted to the bar in Dutchess co., became a judge of common pleas, was elected atty.-gen. in 1791, made judge of the supreme court of the State in 1792, and chief-justice in 1801; gov. of N. Y. 1805-06, member of the legislature 1808-11, brig.-gen. in 1812, maj.-gen. in 1813; was in the operations on the Niagara frontier in Apr. 1813, and commanded defences of New York in 1814. He subsequently devoted himself to lit. and agriculture; was pres. of New York Historical Society in 1835. D. Apr. 7, 1844.

Lewis (TAYLER), LL.D., L. H. D., b. at Northumberland, N. Y., Mar. 27, 1802, grad. at Union Coll. in 1820; studied law at Albany, and began to practise, but relinquished this pursuit and devoted himself to the study of the classical langs. and lits. of Heb., Syriac, and Arabic; became prof. in Gr. at the Univ. of New York in 1838, and at Union Coll. in 1849. Beside numerous articles in periodicals, he wrote *The Six Days of Creation*, *The Bible and Science*, and *The Divine Human in the Scriptures*. D. May 11, 1877.

Lewis (WINSLOW), b. in Boston July 8, 1799, grad. at Harvard in 1819; pursued his med. studies in Paris and Lond.; returning to Boston, took a leading position in the profession, and succeeded Dr. Warren as consulting phys. of the Mass. Gen. Hospital; was city phys. of Boston 1861; repeatedly chosen to the State legislature; pres. of the N. Eng. Historical and Genealogical Society 1861-66, and a prominent member of the order of Freemasons, of which he was for many yrs. grand master of Mass. D. Aug. 3, 1875.

Lewisburg, on R. R., cap. Union co., Pa., on W. branch of Susquehanna River, 68 m. N. of Harrisburg. It has 2 univ. and an acad. Pop. 1870, 3121; 1880, 3080.

Lewisburg, W. Va. See APPENDIX.

Lewis'ia, a plant of the *Portulacæ* family, named from its discoverer, Capt. Meriwether Lewis, who found it in the mts. about the sources of the Columbia River. It is found as far S. as Arizona. The root is called *racine amere* by the Canadian voyageurs, and is used for food by the Or. Indians, who call it *spallum*. It yields abundance of starch.

Lewiston, cap. of Nez Percé co., Id., at the junction of the Snake and Clearwater rivers and head of steamboat navigation, 90 m. from Walla Walla, Wash. Terr. It was formerly the cap. of Id. Pop. 1880, 739.

Lewiston, city and R. R. junc. of Androscoggin co., Me., 30 m. N. of Portland, on Androscoggin River, at one of the most powerful waterfalls in N. Eng., the river here falling 50 ft. over a ledge of rocks. It is seat of Bates Coll. (Free Bap.) and theological school; has a public library, and an elegant city building with one of the largest public halls in N. Eng. In the park in the centre of the city is a soldiers' monument surmounted by a bronze statue. Pop. 1870, 13,000; 1880, 19,083.

Lewistown, R. R. junc., cap. of Fulton co., Ill., 60 m. N. W. of Springfield. Pop. 1880, 171.

Lewistown, R. R. junc., cap. of Mifflin co., Pa., on Juniata River and Canal, 61 m. W. of Harrisburg; surrounding mt. scenery is very grand. Pop. 1870, 2737; 1880, 3222.

Lexington, city and R. R. centre, cap. of Fayette co., Ky., on a branch of the Elkhorn River, 65 m. S. E. of Louisville and 20 m. S. E. of Frankfort. It has a library with 16,000 vols., a State insane asylum, and an orphan asylum. Founded in May 1775, the town received its name in commemoration of the battle of Lexington fought the preceding month. It was incorporated in 1782, was for a time the State cap., and was the home of Henry Clay, to whose memory a monument has been erected in the cemetery. Transylvania Univ., the oldest coll. in the W. States, was founded here in 1798, and had law and med. depts. The Ky. State Univ., chartered in 1838, and opened at Harrodsburg in 1859, was removed to L. in 1865, and Transylvania Univ. was combined with it. Pop. 1870, 14,801; 1880, 16,636.

Lexington, on R. R., Middlesex co., Mass., 11 m. N. W. of Boston, was settled in 1642 under the name of "Cambridge Farms," and probably received its name from Lexington (Laxington or Laxton), Nottinghamshire, Eng., of which place Francis Whitmore, an early settler, was a 2d-

tive. Memorable as the spot where (Apr. 19, 1775) the first blood was shed in the Revolutionary struggle, the town possesses many mementoes of that period. A small monument was erected in 1799 upon the spot where the contest began. A granite monument stands upon the v. green. A beautiful memorial hall contains tablets and statues of John Hancock, Samuel Adams, the minute-man of 1775, and of the soldier of 1861. The two former were inaugurated at the centennial celebration of the battle. (See HUNSON'S *Hist. of Lexington*. Pop. tp. 1870, 2277; 1880, 2460.)

Lexington, city and R. R. centre, cap. of La Fayette co., Mo., on the S. bank of the Mo. River, 250 m. W. of St. Louis (370 by the river) and 40 m. E. of the Kansas line; is situated on a high bluff 300 ft. above the river; was settled in 1837. Immense strata of coal underlie the whole co. In Sept. 1861 a U. force of about 2800 men, under Col. James Mulligan, occupied the hill on the N. E. of L., which position was fortified and held against a Confed. force of some 25,000 men, under Gen. Sterling Price, the siege terminating on the 20th in the surrender of the town and garrison. Major Frank J. White retook the town Oct. 16, capturing 60 or 70 prisoners and releasing such of Mulligan's force as were found there. Again, in Oct. 1864, the army of Gen. Price here attacked Gen. Blunt, who after a 2 hours' resistance withdrew. Pop. 1870, 4373; 1880, 3996.

Lexington, R. R. junc., cap. of Rockbridge co., Va., on the N. branch of the James River, 35 m. N. N. W. of Lynchburg. It has unlimited water-power, and is the head of canal navigation on the James River and Kanawha Canal. The celebrated Natural Bridge and the picturesque Peaks of Otter are in the immediate vicinity. Washington Coll. was founded here in 1798 by George Washington, and the Va. Military Inst. established in 1839. The former was reorganized after the c. war as Washington and Lee Univ., under the presidency of Gen. Robert E. Lee. Pop. 1870, 2873; 1880, 2771.

Leyden, liden [anc. *Lugdunum Batarorum*; Fr. *Leyde*], an important city of the Netherlands, in the prov. of S. Hol., on the Old Rhine, 6 m. from its outlet in the N. Sea. It is intersected by canals. It was once a strong fortress, and its siege by the Spaniards in 1573-74 made it famous. For seven weeks there was no bread within the walls. At last the prince of Orange came to their rescue. The dikes were opened, and the waters, which drowned a great number of the besiegers, carried a fleet of 200 boats loaded with provisions to the city. Now the bastions are covered with windmills, and the citadel and the towers transformed into storehouses. As a reward for the valor the city evinced during the siege the prince of Orange founded a univ. here. An immense trade in books developed, and its Elzevir eds. are now renowned. Pop. 40,799.

Leyden (JOHN), b. in Denholm, Scot., Sept. 8, 1775; studied at Edinburgh Univ.; was ordained in 1798, but soon embraced the med. profession, and in 1802 obtained an appointment as assistant surgeon in India. He studied the Oriental langs., and became prof. of Hindostanee in Ft. William Coll., Calcutta; afterward was a judge and assayer-master at the mint, and accompanied the Eng. expedition against Java. Wrote *Historical Account of Discoveries and Travels in Afr.*, an *Essay on the Lungs*, and *Lit. of the Indo-Chi. Nations*, also *Poems and Ballads*. D. Aug. 21, 1811.

Leyden (LUCAS VAN; real name LUCAS JACOBZ), b. at Leyden, Netherlands, in 1494; was a contemporary and friend of Albert Dürer. His genius was precocious and original. He painted in oil, distemper, and on glass, and excelled in hist., portrait, and landscape. His most important picture is a *Last Judgment* in the town-house at Leyden; the *Card-Players*, the *Virgin and Child* in the Munich Gallery, the *Portrait of the Emp. Maximilian* in the Belvedere at Vienna, and the *Descent from the Cross* in the ch. formerly of the Jesuits in Paris are remarkable. As an engraver he held rank with Dürer and Marc Antonio. D. in 1533.

Léys, lis (JOHN AUGUST HENRY), b. at Antwerp Feb. 18, 1815; at the age of 15 entered the studio of Brakeleer, his brother-in-law; exhibited in 1833 a picture, *Combat of a Grenadier with a Cossack*; studied in Fr. and Hol., and on his return till his death, Aug. 26, 1869, lived in his native city. The artist took the subjects for his canvases from the hist. of his own country and the life of the Middle Ages, and painted with the fidelity and feeling of one who describes what he thoroughly knows and is imbued with the spirit of what he depicts. O. B. FROTHINGHAM.

L'Hôpital, lô-pe-tahl', de (MICHEL), b. at Aigueperse, Fr., about 1504; studied jurisprudence; was sent by the Fr. court in 1547 to the Council of Trent; became in 1554 pres. of the court of accounts, and in 1560 chancellor of Fr. By his ability and integrity he gained the respect of all parties, but the measures by which he prevented the establishment of the Inquisition in Fr., and the circumstance that his family became Prot., made him suspected by the Catholic party. In 1568 he resigned his office. D. Mar. 13, 1573.

Lia'na [Fr. *liane*], a name (usually found in the plu.) applied to the climbing and twining woody plants which, in some tropical countries (as Brazil), entwine themselves among forest trees. They belong to a great number of different natural orders.

Lias, The, a group of strata occurring in W. Europe and belonging to the Jurassic period. It is divisible into 2 natural groups, the older of which combines the strata that are known as the Lower and Middle L., which are capped by a highly ferruginous and sometimes arenaceous limestone known as the "Marlstone." Succeeding to the Marlstone we find the Upper L. strata, which are capped by the inferior Oolite limestone of the next formation. In both Ger. and Eng. L. has yielded hundreds of perfectly preserved skeletons of saurians, and *Pterodactyls*, from 70 to 100 species of fish, and a host of Mollusca. Pentacrinoids abounded in the Liassic waters. Crustaceans and Echinoderms left their remains more sparingly, and corals were not so abundantly represented as in some other secondary

formations. The Marlstone of Yorkshire, Eng., has of late yrs. proved to be one of the most valuable sources of iron ore. This Cleveland Ironstone, as it is termed, yields on an average about 30 per cent. of iron.

Libanius, b. at Antioch in 314 or 316; studied at Athens, but acquired his education principally by private study of the old Gr. writers. He set up a school of rhetoric at Constantinople, which became so popular that the schools of the official teachers were deserted. These brought an accusation of magic against him, and succeeded in getting him expelled from the city, about 346. He went to Nicomedia, where he taught with equal success for 5 yrs., but when recalled to Constantinople he was persecuted by his rivals and gave up teaching. Although a pagan, he stood in intimate connection with Julian the Apostate and with St. Chrysostom and St. Basil. His orations, declamations, and letters have been pub. D. about 391.

Libelt, lee'belt (KAROL), b. at Posen Apr. 8, 1807; studied philos. and math. at Berlin, where he gained a prize for his essay *De Pantheismo*, and acquired the degree of Ph. D. in 1829; in 1830 distinguished himself in the battle of Ostrolenka and at the defence of Warsaw; retired after the failure of the revolution to his estates; founded in 1840 the successful periodicals *Tygodnik literacki* and *Rok*; was arrested in 1846 for participation in a conspiracy, but was liberated on the outbreak of the revolution at Berlin in 1848; was member of Slavic cong. at Prague in 1849, and leader of the Polish fraction in second Prus. chamber in 1859. Wrote *Philosophy and Criticism*, *Esthetics*, etc.

Liberia, li-be're-a, a republic on the W. coast of Afr., founded in 1820 by the Amer. Colonization Society, and established as an independent state in 1847, is situated between 4° 20' and 7° 20' N. lat. It has about 600 m. of coast-line, and extends back 100 m. on an average. The shore is elevated and rocky in the S. E., but otherwise low, generally sandy or gravelly, seldom marshy. In the interior the country rises into forest-covered hills and mt.-ranges traversed by valleys. Many streams flow to the ocean. The climate is thoroughly tropical. To the white man the climate is deadly. The natives, on the contrary, are robust, healthy, and long-lived. The soil is very fertile. The prin. farming dists. lie along the banks of the St. Paul. Here the sugarcane grows luxuriantly. Cotton is indigenous, and yields 2 crops annually, and coffee of excellent quality is cultivated. The cereals, maize, rice, wheat, barley, and oats; the vegetables, cabbages, peas, beans, tomatoes, cucumbers, etc.; and the fruits, lemons, oranges, guavas, tamarinds, pomegranates, pineapples, Afr. peaches, etc., are easily raised. The forests contain teak, mahogany, rosewood, hickory, poplar, several kinds of gum trees, dyewoods, medicinal shrubs, and different varieties of useful palms, among which is the nut-bearing palm, from which palm oil is made. Of minerals, iron abounds, and copper is said to occur in the interior. The total pop. is estimated at 1,050,000, all of the Afr. race. Monrovia, the cap., has an estimated pop. of 3000. The Americo-Liberians have a regular system of schools, and are progressing in all branches of civilization. Industrial processes and manufactures have been started among them, and a lively trade has sprung up between the republic and the U. S., G. Brit., Belg., and Hamburg. Palm oil, sugar, cotton, coffee, ivory, camwood, arrowroot, etc., are exported; cotton goods, cutlery, powder, and tobacco are imported. The public revenue is estimated to amount annually to \$85,000, and the expenditure to \$120,000. In Aug. 1871 the republic laid the foundation of a public debt by contracting a loan of \$500,000. The const. of the republic is modelled after that of the U. S. All men are born free and equal. Elections take place by ballot, and every male citizen who possesses real estate has the right of suffrage. But no white man can be admitted to citizenship, and none but citizens can hold real estate in the republic. The pres. is elected for 2 yrs., the senators for 4, the representatives for 2. Each co. sends 2 senators to the legislative assembly, and 1 representative for every 10,000 inhabs. In Jan. 1884 Hilary R. W. Johnson, elected in May 1883, assumed office as pres.

Libertius, SAINT, a bp. of Rome, reckoned in the series of popes after Julius I., whom he succeeded May 22, 350. The Semi-Arians were then in the ascendant, and in the councils of Arles (353) and Milan (355) they condemned the doctrine of Athanasius. L. having refused to sign this condemnation, was arrested by order of the emp. Constantius, who, finding him resolute in maintaining his previous attitude, declared him deposed from the bishopric of Rome, and had Felix, a deacon, consecrated in his place. In 358 L. was restored to his post in consequence of a petition from the prin. ladies of Rome. The Council of Arminum (convened in 359) at first followed the suggestions of L. by confirming the Nicene Creed and condemning Arius, but finally accepted an Arian confession of faith proposed by the emp. L. has been falsely accused of having signed this confession. He built the basilica now called Santa Maria Maggiore. D. in 366, and was succeeded by Damasus I.

Liberty [Lat. *libertas*, "freedom"], in the abstract, is defined to be the power of acting as you will, but this power is confined within the individual's sphere of action. For an infinitely perfect being the highest freedom and the highest moral necessity coincide. "It is impossible for God to lie." In the sphere of the citizen, L. and rights go together. The number of rights is the amount of L. The free man can waive his rights in particular cases, but if the waiver is perpetual, so far he ceases to have L. Political L. consists in a share of political power, as in the right of suffrage, and of holding office, and in a great variety of other guaranties and free actions necessary for their protection. Political L. almost of course has restrictions put on it, such as those of age, sex, habitation; and so a man's capacity to read may determine his power to vote; his old age may incapacitate him for a judge's office, and the like. A free country is one where the fewest of these limitations exist. But the distinction between *cives optimo jure* and *cives non optimo jure*

citizens enjoying the best right, and those enjoying a right that is not the best, can never entirely cease to exist. (See RIGHTS.) T. D. WOOLSEY.

Liberty, on R. R., cap. of Union co., Ind., near the E. fork of the White-water River, 50 m. N. W. of Cin. O., and 70 m. S. E. of Indianapolis. Pop. 1870, 700; 1880, 1096.

Liberty, on R. R., cap. of Clay co., Mo., 16 m. S. of Holt. Pop. 1870, 1700; 1880, 1176.

Liberty, on R. R., cap. of Bedford co., Va., 25 m. W. of Lynchburg, 10 m. from the Peaks of Otter, which rival the White Mts. in grandeur. Pop. 1870, 1208; 1880, 2191.

Liberty Party. See PARTIES, POLITICAL OF THE U. S.
Libocedrus [Gr. *Libos*, "tears," or "frankincense," and *cedrus*, "the cedar"; a genus of coniferous trees, of which 4 species are known—2 in New Zealand, 1 in Chili, and 1 (*L. decurrens*) in Cal., where it was discovered by Fremont, and is there known as "white cedar." This is found only in the mts., generally at an elevation of 4000 ft. or more. It is a beautiful tree, attaining a height of 120 to 200 ft., with a trunk 6 or 7 ft. in diameter, and a peculiar fibrous bark, much like that of *Sequoia*.

Libra [Lat. "The Balance"], the sign of the Zodiac which the sun enters at the autumnal equinox (about Sept. 23). The constellation Libra has no very remarkable stars. It corresponds at present to the sign Scorpio, while the sign Libra corresponds to the constellation Virgo.

Liburnia, in anc. geog., a mountainous dist. of Illyricum extending along the coast of the Adriatic in the present Croatia and Dalmatia. Its inhabs. were famous as sailors, and from them the Romans adopted the small, fast-sailing vessels with the one large lateen sail.

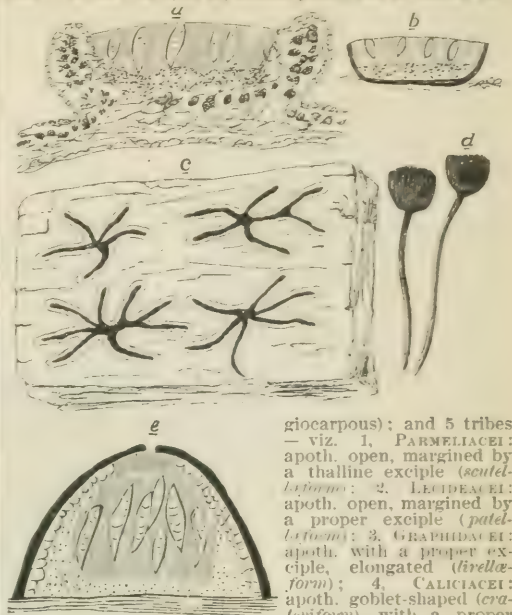
Lib'ya, the name which often was given by the anc. to the whole continent of Afr., but which was generally applied only to that part which is now called the Libyan Desert, extending from Egypt to Fezzan and from the Mediterranean to Darfoor, and consisting of vast stony terraces, sometimes covered with sand and gravel, and sometimes broken by oases, Seewah being the largest.—*The Libyans* occupied in anc. times the whole N. coast of Afr. with the exception of the delta of the Nile. They were a seafaring nation, and harassed the Egyptians with continuous invasions. At the period when the Phœnicians founded Carthage and the Grs. Cyrene, the Libyans seem to have become enfeebled.—*The Libyan Sea*, in anc. geog., was that part of the Mediterranean which is situated between the island of Crete, the delta of the Nile, and the terr. of Carthage. *Syrtis Major* and *Syrtis Minor* were inlets of the Libyan Sea.

License to Trade. In international law this license denotes a permission given by a belligerent govt. through its agent, such as a commander of a squadron, to trade with the enemy. It may be given to a neutral trader or to a fellow-subject; and it generally specifies the kind of articles to be conveyed to the enemy, the port, the time, perhaps the amount. It may allow importation, and not exportation. Being a permission to do something otherwise forbidden, it is of strict interpretation; so that to go beyond its specifications would subject the vessel and cargo to heavy penalties, unless the violation could be shown to be unavoidable. Of course, the enemy is not bound to receive such a licensed vessel into his ports. T. D. WOOLSEY.

Lichenine, *lic'hē-nin* [Gr. *λεχην*, "lichen"], or **Moss-Starch** [Ger. *Moosstärk*], a substance contained in lichens, constituting in some cases, as in that of the so called Iceland moss, *Cripe de roche*, etc., nearly the whole mass. Many other lichens contain similar mucilaginous bodies. Like other starch-isomers, it is converted into a gummy or dextrine-like body by long boiling with water. Glucose is formed by dilute acids, as in the case of common starch, and strong nitric acid forms with it oxalic acid. Iodine does not blue L. when pure, as it does common starch, but forms merely a yellow stain, as with cellulose. L. does not occur in the plant in the cellular or granular form, like common starch; and some investigators have advanced the idea that it is properly not to be classed with starch, but is *cellulose* in a soluble modification. It is stated of late yrs. that strong alcoholic liquors are prepared on a large scale in extreme N. regions from these lichens—an art not difficult to comprehend or to carry out.

Lichens, *lic'hēns* [Gr. *λεχην*], are cellular cryptogamous plants, bearing fruit (*apothecia*) containing free spores in closed sacs (*thekes*), upon a thallus containing green cells (*gonidia*), and often abounding in crystals of oxalate of lime. They rank between Algæ and Fungi, differing from the former in the fruit character, and from the thecasporous groups of the latter (Ascomycetes), in the presence of gonidia and in a great degree in chemical reactions, the hymenium of L. being usually colored blue or vinous-red by iodine, but those of Fungi yellow, though there are some exceptions in both classes. The thallus is, however, sometimes obscure, and in certain parasitic L. wanting. A theory, based partly on the alleged absence of connection between the medullary filaments of the thallus and the gonidia, has recently been maintained by Schwendener and others that L. are compound plants, the thallus being an Alga and the apothecia Fungi, whose mycelium draws nourishment from the gonidia. But it has not found favor with lichenists. L. are found in all climates and at all elevations, mostly preferring exposure to light. They grow on rocks, by their decay forming a soil for higher vegetation; on trees, and on the earth, the individuals being more numerous in the colder, and the species in the warmer regions of the earth. Some are so small as hardly to be perceptible to the eye, and others attain dimensions of several ft. They remain inactive while dry, and vegetate when moist, and sometimes reach a great age. In the northern regions they furnish food for reindeer, are stored as fodder for cattle, and are said to increase the quantity of milk. Bread is also made of some species, and species of *Umbilicaria* (rock-tripe) have furnished an unpalatable food for Arctic travellers in time of need. They yield bitter extracts, but are not poisonous.

L. are divided according to the characters of the apothecia into 2 series: (1) open (gymnocarpous), and (2) closed (an-



Families of Lichens: a, Parmeliaceæ; b, Lecideaceæ; c, Graphidaceæ; d, compacted of (shaded); e, Verrucariaceæ.

giocarpous); and 5 tribes—viz. 1, PARMELIACEÆ: apoth. open, margined by a thalline exciple (*scutelliform*); 2, LECIDEACEÆ: apoth. open, margined by a proper exciple (*patelliform*); 3, GRAPHIDACEÆ: apoth. with a proper exciple, elongated (*trivelliform*); 4, CALICIACEÆ: apoth. goblet-shaped (*crateriform*), with a proper exciple margining a disk (shaded); and 5, VERRUCARIACEÆ: apoth. closed, opening only by a pore at the summit, with an external proper exciple (*perithecium*) surrounding an interior envelope (*amphithecium*), which incloses the nucleiform hymenium. [From orig. art. in J. S. Univ. Cyclopedia, by HENRY WILLEY.]

Lick (JAMES), b. at Fredericksburg, Pa., Aug. 25, 1796; in 1819 was employed in a piano manufactory in Phila.; a yr. later started in the same business for himself in New York, and afterward in various parts of S. Amer. In 1847 he went to Cal., taking with him about \$30,000, which he invested in real estate in San Francisco, and its rapid advance in value made him wealthy. In 1874 he placed his entire property in the hands of trustees, to be devoted to public and charitable purposes. The bequests then made he changed in some respects in May 1875. The total amount thus given was \$1,765,000, of which \$700,000 were for an observatory to be connected with the Univ. of Cal., \$150,000 for free public baths in San Francisco, and \$540,000 for an inst. to be called the California School of Mechanical Arts. For himself he reserved \$500,000, gave his son \$150,000, and each of his relatives sums varying from \$2000 to \$5000. D. Oct. 1, 1876.

Lieber, *lee'ber* (FRANCIS), LL.D., b. at Berlin Mar. 18, 1800. In 1815 he volunteered with 2 of his brothers for the army, and was in the fight at Ligny, and severely wounded at the battle of Namur. At the close of the Waterloo campaign he returned to his studies and joined the Berlin gymnasium; was arrested upon charge of hostility to the govt., and imprisoned for several months; after his discharge without a trial, was prohibited from studying at the Prus. univs. He consequently went to Jena, where he took his degrees in 1820. Hence he went to Halle to continue his studies, and afterward to Dresden. While living there the Gr. revolution broke out, and he resolved to take part in the war. His experience is recorded in his *Journal in Greece*. After suffering great hardships he embarked at Missolonghi in 1822, and made his way to Rome, where Niebuhr, then Prus. ambassador, took so great an interest in him that he invited him to become the tutor of his son. Niebuhr quitted the embassy at Rome in 1823, and L. returned to Berlin. Niebuhr having obtained a promise from the king of Prus. that he should not be molested. But he had hardly arrived in Berlin when he was again arrested and cast into the state prison at Koepnick. After some months he was liberated, but fearing renewed persecution he went to Lond. in 1825, and resided there for a yr.

In 1827 he came to the U. S. with warm recommendations from Niebuhr, arriving at New York June 20, 1827, and proceeded to Boston, where he took up his residence. There he commenced the *Esays* (1828), which he completed in 5 yrs. In 1832 he removed to New York, where he made a translation of De Beaumont and De Tocqueville's work on the penitentiary system. While in New York he received from the trustees of Girard Coll., Phila., the commission of preparing a plan of education and instruction for that inst. This brought him to Phila. in 1833, where he remained 2 yrs. In 1835 he was appointed to the professorship of hist. and political economy in S. C. Coll. at Columbia. He remained there more than 20 yrs., during which he wrote his 3 prin. works, *Mon. of Philip*, *Princ. of Nat. Pol.*, and *Princ. of Nat. Pol.*, and *Liberty and Property*. In 1856 he resigned his professorship in S. C. Coll., and in 1858 was elected to a similar professorship in Columbia Coll., New York, and subsequently to the chair of political science in the law school of the same inst., continuing in the discharge of the duties of that position to the time of his death. Beside the works already mentioned, he wrote many minor

works of great value and able articles on public questions, which appeared in the New York *Evening Post* and other papers. During the c. war he rendered valuable service to the govt. and the country, being frequently summoned to Wash. by the sec. of war for consultation and advice upon the most important subjects. D. Oct. 2, 1872. [From orig. art. in *J. S. Univ. Cyc.*, by HON. M. RUSSELL THAYER.]

Liebig, lee'big, von (JESUS), BARON, b. at Darmstadt, Ger., May 12, 1803; from 1819 to 1822 studied natural science and chem. at the univ. of Bonn and Erlangen, and from 1822 to 1824 in Paris; was appointed prof. of chem. at the Univ. of Giessen in 1824. Here he resided from 1824 to 1852; established a laboratory for practical chem., the first of its kind in Ger., and made his lecture-room the centre of the study of chem. In 1852 he removed to Munich as prof. of chem. at the univ. and director at the chem. laboratory. In 1860 was chosen pres. of the Acad. of Sciences at Munich, and in 1861 foreign member of the Acad. of Sciences at Paris. His works, mostly relating to practical chem., are very numerous. The one which has contributed most to introduce chemical truths and spread sound views with respect to their importance in every-day life is his *Chemische Briefe*, translated into Eng. under the title *Familiar Letters on Chem.* His meat extract is now extensively used, and so is his *Suppe für Säuglinge* ("baby soup"). D. Apr. 18, 1873.

Liechtenstein, lee'k'ten-stine, a small principality, practically though not formally belonging to Austria, comprising an area of 68 sq. m., with 9124 inhabs., and situated between Tyrol and Switz., on the Upper Rhine. Cap. Vaduz.

Lige, leej [Fr. *Lige*; Dut. *Lijk*; Ger. *Lüttich*], town of Belg., cap. of a prov. of the same name, centre of one of the most prosperous manufacturing regions of the country, situated on both sides of the Meuse, at its junction with the Ourthe, and defended by a citadel and by several detached forts. The older part of the city consists of narrow and crooked streets lined with tall, gloomy houses; the more recent parts are very fine. The most remarkable of the public buildings are the cathedral, built in the 13th century; the ch. of St. Martin, burned in 1312, rebuilt in 1542; the ch. of St. Jacques; the Palais de Justice, built in Renaissance style 1508-26. The univ. was founded in 1817. The region around L. is rich in coal and iron; the mines are run even under the city and the river. The products are very varied—cotton goods, cloths, straw hats, chemicals, etc.—but iron, especially as guns, cannon, and machinery, is the prin. branch of manufactures in L. Pop. 121,787.

Lien, le'en [Fr. "bond"]. The word *lien*, as a legal term, is used in so many unlike senses at the present day that it is difficult to define it. In one class of cases it is simply a right to retain possession of a chattel until some demand is paid by the owner to the person thus detaining. In all other classes it is a charge or incumbrance upon either lands or chattels which are not retained in the possession of the creditor, as a security for the payment of some demand, with power to enforce the claim by a judicial proceeding resulting in a sale of the thing and a payment of the demand from the proceeds. L. exist either as the result of some gen. rule of the law, or they may arise from the stipulations of an express agreement. Those which are created by the operation of law are—I. Common-Law L.; II. Equitable L.; III. Maritime or Admiralty L.; IV. Statutory L.

I. *Common-Law Liens*.—The essence of the common-law L. is the possession of the thing over which it extends. It consists in the right of the creditor to retain in his own possession the goods and chattels of another until some debt or demand is paid by their owner. In order that the right should arise at all, the possession must be lawful and valid. When possession is voluntarily surrendered the L. is gone. Common-law L. are either *ordinary* (sometimes called *special*) or *general*. In the case of the *ordinary* or *special* L. the debt or demand must be due for services rendered to or about the very articles themselves which are subject to it; while in that of the *general* L. the debt or demand may be for a gen. balance due for former services of a similar character, rendered in respect of other goods of the same owner. They arise in all cases of bailments for hire, and also in certain other employments which, though not strictly bailments, require that the articles in connection with which the service is rendered should come into the possession of the person employed.

II. *Equitable Liens*.—The L. which belong to this class were created, and are exclusively enforced, by courts of equity. In them possession is not an essential element, and payment of the demand secured can be directly enforced by their means. An equitable L. is therefore a charge or incumbrance upon property not in the possession of the creditor, and it may be enforced by an action and a decree made therein, ordering a sale of the subject-matter and payment of the debt out of the proceeds. The following are the most important instances of such L.: (1) The L. of a vendor or grantor of land as security for the unpaid purchase price; (2) of a vendee, under a contract for the sale of lands, for the purchase-price which he has prepaid; (3) of creditors or legatees on land devised subject to a charge upon it for the payment of debts or legacies; (4) that arising from deposit of title-deeds; (5) of a mortgage in an ordinary mortgage of lands, and of chattels in some States.

III. *Maritime or Admiralty Liens*.—These are created by the law which is administered in courts of admiralty. In their gen. nature they resemble the equitable L. They constitute a charge upon the thing, even though in the custody of its owner, and often follow it into other countries and into the hands of subsequent purchasers. These L. may attach to the vessel, to the cargo, or to the proceeds of each, and to the freight earned by the ship. Purely maritime L. are enforceable by a judicial proceeding in a court of admiralty, which results in a sale and payment out of the proceeds.

IV. *Statutory Liens*.—In addition to the foregoing there are various other L. entirely created or regulated by statute.

In many of the States, and probably in most, a L. is given by statute to mechanics, builders, and furnishers of materials upon the buildings constructed or repaired by them, in order to secure the cost of the materials furnished and the price of the work and labor done. The provisions of the statutes regulating such L. are so various and conflicting that no attempt will be made to enumerate them.

L. created by express agreements depend upon the stipulations which the parties enter into, and admit of no gen. classification. JOHN NORTON POMEROY.

Life. See BIOLOGY, by PROF. THEODORE GILL, M. D.

Life Assurance is the guarantying of money contingently on human life. The guaranty is given by an association or corporation called a *life assurance company*, and is contained in a written instrument termed a *policy of assurance*; the person on whose life or death payment of the sum assured is made dependent is the *person whose life is assured*, and the one to whom the payment is to be made, and who is responsible to the company for the premiums, is the *assured* or *policy-holder*; the consideration to be paid for assurance is the *premium*; the chance of death or life in any given yr., to the person whose life is assured, is the *risk*.

A L. A. company may be *proprietary*, *mutual*, or *mixed*. A *proprietary* or stock company is one formed by a number of persons who subscribe a capital. A *mutual* company is an association of persons, each of whom is an assurer as well as assured. A *mixed* company is one formed upon a combination of the principles of the two preceding. The chance of life or death, the "risk," is determined from a table of mortality. This is a table which shows, for each yr. of life from birth to the highest age attainable, how many persons out of a given number alive at the beginning of any yr. die by the end of it. Policies of assurance are of various kinds. The chief are whole life, endowment, endowment assurance, term, joint life, annuity, survivorship annuity.

I. A *whole-life policy* is a contract in which the company agrees to pay the representatives of the assured a specified amount of money at the end of the yr. in which he may die. The net premium may be paid in several ways. First, in one single payment in advance, known as the *net single premium*; secondly, in equal annual premiums continued for life.

II. A *term policy* is a contract in which the company agrees to pay the representatives of the assured a specified amount of money at the end of the yr. in which he may die, provided his death should occur within a certain number of yrs. named in the policy.

III. An *endowment policy* is one in which the company agrees to pay a specified amount to the assured at a certain future period if he should then be alive to receive it.

IV. An *endowment assurance policy* is one in which the company agrees to pay a stipulated sum of money at a certain future period in case the person on whose life assurance is made should then be alive, or at his death if that should happen before the expiration of the period.

V. A *joint-life policy* is a contract to pay a certain amount on the death of one of two or more persons named, on the joint continuance of whose lives assurance is made.

VI. *Annuity*.—This is a contract in which a company agrees to pay a given sum annually in consideration of a gross sum paid at once by the *annuitant*.

VII. A *survivorship annuity* is an agreement to pay a specified annuity to a nominee during his survivorship of the person on whose life assurance is made.

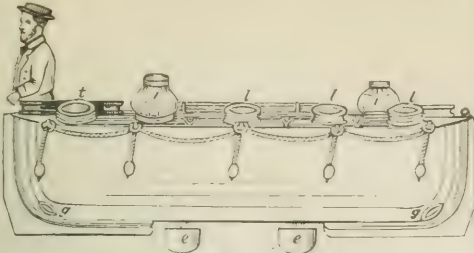
Tontine Dividend or Savings Fund Policy.—The holders of such policies constitute a class by themselves; they do not participate in profits till after the lapse of a certain number of yrs.; in case of death before the dividend period begins, the representatives of the assured will receive the sum secured by the policy; no surrender value will be allowed to any one who may relinquish his policy, and no dividend will be credited to such policies as may become claims before the dividend period arrives; all profits accruing from every source within the class are reserved till the arrival of the dividend period; the accumulated dividends are then to be equitably divided among such policies as are then actually in force.

Forfeiture or Lapse.—In all kinds of policy, in which the continuance of life is of pecuniary advantage to a company, there are certain conditions imposed upon the assured, violation of which will work a forfeiture of the policy. Such conditions are with reference to limits of travel and residence, to certain hazardous occupations, to death by suicide or in consequence of the violation of law, to the accuracy of the statements and declarations made in the application for the policy, and to the prompt payment of the premiums on or before the day or days on which they fall due. [From orig. art. in *J. S. Univ. Cyc.*, by PROF. J. H. VAN AMRINGE.]

Lifeboats, boats constructed for the escape of persons from vessels wrecked or in jeopardy. The inventor of the modern L. was Lionel Lukens, who on Nov. 2, 1785, secured an Eng. patent on his improvements: "To the outsides of boats and vessels of the common or of any other form are projecting gunnels sloping from the top of the common gunnel in a faint curve toward the water, so as not to interrupt the oars in rowing, and from the extreme projection (which may be greater or less according to the size and use the boat or vessel is intended for) returns to the side in a faint curve at a proper distance above the water-line. These projecting gunnels may be made solid, of any light materials that will repel water, or hollow and water-tight, or of cork, and covered with thin wood, canvas, leather, tin, or any other light metal, mixture, or composition." Lukens also proposed that "the spaces under the seats be made water-tight or filled with cork, and a false metal keel fitted." His invention was neglected and disregarded. But in 1789 Henry Greathead presented a plan which met with gen. success. It was almost an imitation of Lukens's invention. About 1805 Christopher Wilson proposed to make the gunnels hollow and to divide them into compartments, so that injury to one portion would leave the other intact. The

same principle is embraced in the Amer. L. of Joseph Francis, which are made of sheet-metal, and are adopted at the 24 life-stations on our coasts. Many alleged improvements in L. have been brought forward. For example,

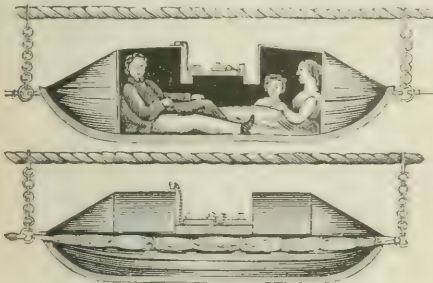
Fig. 1.



Fackrell's Lifeboat.

Fackrell's L., projected during the yr. 1874, embraces the principle of the Greenlanders' kayak, the passengers being placed in circular openings formed in the closed deck or top of the boat, and closely packed around the middle by suitable

Fig. 2.



Francis's Life-car.

water-proof material. The life-car is a kind of boat, closed in on top, and designed to be drawn through the surf between the vessel and the shore. In order to do this a hawser is stretched from one point to the other; the car is attached to the hawser by rings provided on the free ends of suspending chains fixed to the ends of the car. A line attached to each extremity of the car enables it to be drawn to and fro. [From orig. art. in *J.'s Univ. Cyc.*, by PROF. JAMES A. WHITNEY, LL.B.]

Life Insurance. See LIFE ASSURANCE and also JURISPRUDENCE, MEDICAL.

Life-Preserver, a small buoy designed for attachment to the person, and made either of canvas or other fabric stuffed with cork, or of india-rubber and inflated with air. For most forms of L.-P. cork is to be preferred.

Annular Life-Preservers are large rings, either of inflated rubber or cork-stuffed canvas, the hole in the centre receiving the waist of the wearer, the device being worn beneath the arms.

Block Life-Preservers.—Commonly made of blocks of cork inclosed in canvas, 2 blocks being hinged together by a sewn joint in the fabric.

Life-Floats.—Hollow drums, provided with straps and buckles for attaching the apparatus to the person.

Life-preserving Mattresses.—In one the mattress has the

Fig. 2.



Mrs. Cogswell's life-preserving Jacket.

usual wooden side-pieces, but is constructed with an upper and lower thickness of canvas-cased cork, between which

are placed one or more air-filled mattresses. Another and smaller mattress (J. F. Peck's, 1874) is designed to be folded upon the front and back, with the ends held in place by straps passing over the shoulders of the wearer.

Life-preserving jackets may be of either inflated india-rubber or cork. Air-filled jackets were known as long ago as 1724, and cork jackets were used by the Romans, but both varieties have been much improved in modern times. The cork

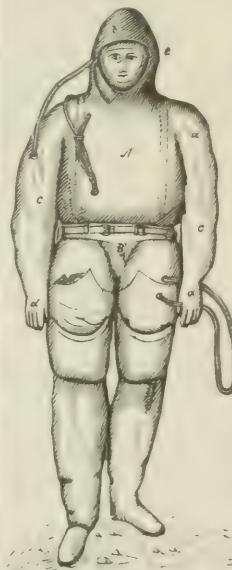
Fig. 3.



Macintosh's life-preserving Trousers.

Life-preserving Suits.—The recent success of Capt. Paul Boyton in crossing the Brit. Channel in an air-filled water-proof dress has given to this variety of life-preservers a prominence never before attained.

Fig. 4.



Merriman's life-preserving Suit.

The apparatus used by Clark S. Merriman of Vallisca, Ia., July 16, 1872, and its object, as set forth by the inventor, "is to provide a water-proof life-preserving dress sufficiently inflated with air to sustain the weight required, while the limbs are allowed full freedom of action in swimming; and the vital heat is retained in the body, the intervention of a stratum of air between the body and the dress acting as a non-conductor of heat."

The dress is made of india-rubber, and comprises a head-dress, jacket, and trousers, the whole so connected as to form an airtight suit which can be inflated, like an ordinary india-rubber life-preserver, with the breath. Boyton is stated to have attached a sail to the suit to assist his progress while at sea.

Life-preserving Buckets are made buoyant with cork. So also are stools, or the latter may be made hollow and tight merely, and air-filled. Among the curiosities of life-preservers may be mentioned Schofield's (1869), in which an annular float is provided for attachment to the head. The float has a mouthpiece and pipe, through which the wearer is expected to breathe when entirely submerged.

Life-Rafts. In the absence of boats, a raft made of spars, doors, etc. is the oldest craft of the shipwrecked. The most feasible of rafts are such as combine some ordinary use, as that of a mattress, settee, bench, or the like, with those of a life-preserver on a large scale. Among the



H. B. Mountain's Life raft.

most recent of these is that of H. B. Mountain 1870, in which a water-proof canvas sack has its lateral edges secured along the centres of 2 mattresses in such manner as to provide an open chamber between them capable of holding several persons, while the downward strain upon the mattresses being exerted centrally and longitudinally thereon, insures their retention in a horizontal position.

Light (Ger. *Licht*; Lat. *lux*; Gr. *phos*; Sans. *dik*, "look" or "see"), the medium of vision and the subject of

the science of optics. Two theories have been maintained in regard to the nature of *L.*, either of which is supported by the authority of very illustrious names. According to the first of these, *L.* is a material emanation thrown off by the luminous body, and its particles constantly traverse and fill the entire illuminated space, so long as the source continues unexhausted. According to the second, there is no transfer of *matter* from the source of *L.* to the surrounding region, but there is a transfer of *force* through the medium of an elastic fluid which fills all space, and whose molecules in contact with the luminous body, being disturbed by that body, transmit the disturbance to those more remote by means of undulations which succeed each other uninterrupted until the cause which produced them ceases to act. The first of these 2 hypotheses seems to have been of very early origin. It received the sanction of Newton, and was made by him the basis of his reasonings in regard to optical phenomena. It is hence commonly called the Newtonian theory. Until an advanced period in the present century it may be said to have been the generally accepted theory. Laplace, in his great work on celestial mechanics, has founded all his investigations in regard to aberration and astronomical refraction upon it. Yet it must be admitted by its advocates—if there remain any who adhere to it still—that it presents, even before we follow it into its applications to the explanation of the phenomena which attend it, many serious difficulties. But, if objections to this description to the material theory of *L.* did not exist, the impossibility of finding in it any satisfactory explanation of the remarkable phenomena which have presented themselves in the later progress of optical discovery, would be conclusive against it; while the opposing theory finds in these very phenomena its strongest recommendation to acceptance. (See OPTICS, COLOR, DISPERSION, RAINBOW, REFLECTION, REFRACTION, SPECTROSCOPE, SPECTRUM, THIN PLATES (COLORS OF), UNDULATORY THEORY OF LIGHT, PHOTOGRAPHY, etc.)

F. A. P. BARNARD.

Light-foot (JOHN), D. D., b. at Stoke-upon-Trent, Eng., Mar. 1602; ed. at Christ's Coll., Cambridge; took orders in the Ch. of Eng.; was minister at Stone in Staffordshire and at Ashley; was identified with the Presbs. during the c. war; a member of the Assembly of Divines at Westminster 1643; became in the same yr. master of Catharine Hall, Cambridge; in 1653 rector of Much-Munden, and in 1655 vice-chancellor of the Univ. at Cambridge. At the Restoration he was deprived of his mastership, but it was subsequently restored to him, and he also obtained a canonry at Ely. He was probably the most learned Heb. scholar that Eng. has ever produced, and his *Horæ Hebraicæ et Talmudicæ* is still a standard authority for the illustration of the Gospels by means of the Talmud and Midrash. D. Dec. 6, 1675.

Lightfoot (JOSEPH BARBER), D. D., b. at Liverpool in 1828, grad. at Trinity Coll., Cambridge, in 1851; became a fellow in 1852, tutor in 1857, Hulsean divinity prof. in 1861, canon of St. Paul's in 1871, and bp. of Durham in 1879. Has written commentaries on several of the Pauline Epistles, with a revised Gr. text; has edited the *Two Epistles to the Corinthians of St. Clement of Rome*, and has written articles in magazines, of which the most notable were directed against an anonymous work on *Supernatural Religion*.

Light-house Construction. A sea-light may be defined as a light so modified and directed as to present to the mariner an appearance which shall at once enable him to judge of his position during the night, in the same manner as the sight of a landmark would do during the day. As the mariner's eye is usually assumed to be 15 ft. above the sea-level—corresponding to a distance of 4.443 m.—we must add this distance to that corresponding to the elevation of the light, to ascertain its range of visibility. Hence, a light 100 ft. high would have a range of, say, 16 nautical m. Should the light be established upon a submerged shoal, this elevation can only be attained by means of a solid material structure as a *light-bearer*.

The first light-bearing tower of which we have record (built by Ptolemy Philadelphus about b. c. 300) figures as one of the Seven Wonders of the World of the ancients. Taking the name, *Pharos*, of the small island in the bay of Alexandria on which it was built, it has originated the generic name (Lat. *pharus*; Fr. *phare*; It. and Sp. *faros*), in the classical langs., for "light-house;" and even in Eng. the word *pharo* was once used. During the Middle Ages the "aids to navigation" were meagre indeed, and the earliest tower which claims attention is the Tour de Cordouan, built (1584-1610) on a reef at the mouth of the Garonne. The tower, 197 ft. high, of imposing architectural design, is surrounded at its base by a high sea-wall on a periphery of 134 ft. in diameter, along the inner face of which are the *keeper's apartments*. There are other essentials to the tower beside that of *light-bearing*—viz. that the light be accessible to the "keeper," and that there be "apartments" not only for the keeper's residence, but for preserving the supplies for his needs and for the sustenance of the light. The earlier L.-H. C. were confined exclusively to convenient locations on the *land*. For such sites the essentials are easily fulfilled. A simple hollow tower bears on its summit the illuminating apparatus. An internal stairway constitutes the means of access, while the lower portion of the tower furnishes space for storage of oil and other supplies, the keeper's dwelling being usually a detached building.

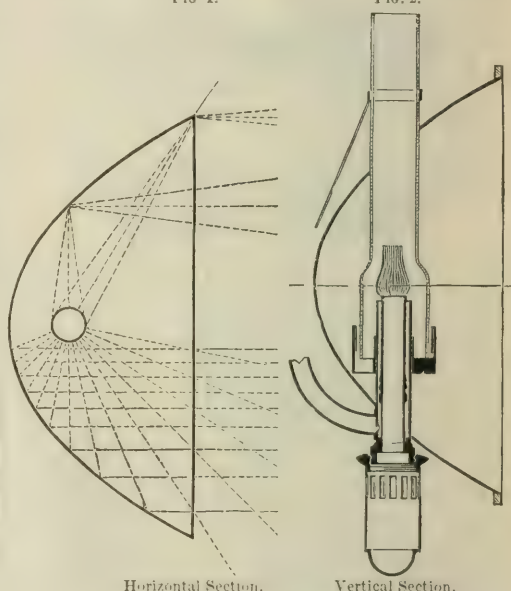
In the earlier periods of open-sea navigation it became apparent that there were dangers which constructions on terra-firma could not palliate. Isolated rocks or sunken reefs distant from the mainland are such. The most noted case is that of the Eddystone, in which was first applied the high art of the engineer to establishing on this contracted rock a stable tower and a permanent beacon. At a locality where the mere process of construction was so difficult, it is not strange that the first of 2 successive structures was carried away. Sounder engineering principles prevailed in the construction of the second. The external shell, a frustum

of a slightly tapering cone, was of heavy timbers, fitted together as are the staves of a brewer's vat, and fastened down by strong iron dovetail ties leaded into the rock. The interior of the tower was loaded to half its height, with well-fitted stones, solid for $\frac{1}{5}$ the height, and leaving (to above limit) only space for staircase *well* above the solid part. This work stood for 47 yrs., and finally owed its destruction to fire (1775). Then, at last, the task was taken up in its true aspect of a great *engineering* problem, with the clear perception of which Mr. Smeaton pronounced *stone*, both from its weight and other qualities, to be the proper material. The first stone was laid June 12, 1757, and the last Aug. 24, 1759. The tower measures 68 ft. in height and 26 ft. in diameter at the level of the first entire course, and the diameter under the cornice is 15 ft. The first 12 ft. of the tower form a solid mass of masonry, and the stones are united by means of stone joggles, dovetailed joints, and oak trenails. Another one has since been built, about 120 ft. S. of this one. The subsequent structures of "Bell Rock" (1808-11), situated in the channel-way to the entrance to the Friths of Forth and Tay, and "Skerryvore" (1838), off the W. coast of Argyllshire, Scot., are only inferior to the Eddystone in fame. Other "rock light-houses" deserve mention—e. g. "Bishop Rock" (1853), off the Scilly Islands; "The Small Rocks," entrance to Bristol Channel; "Hanois Rocks" (1862), Island of Alderney; "Barges d'Olonne" (1861), W. coast of Fr.; "Héaux de Bréhat" (1835), N. coast of Fr.; "Wolf's Rock" (1869), off Land's End, Eng.; and "Alada Reef" (1865), Bay of Bengal. J. G. BARNARD.

Light-house Illumination. For centuries the only

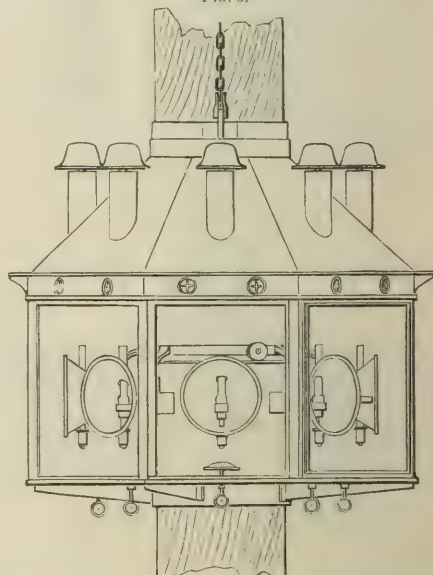
FIG. 1.

FIG. 2.



means employed to warn the mariner at night of his approach to land was the maintenance of simple wood or coal

FIG. 3.

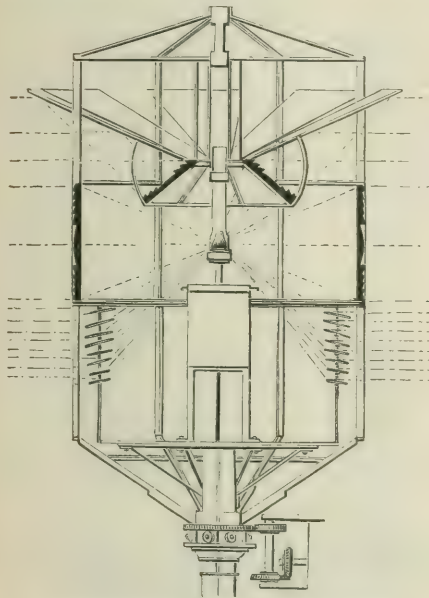


illuminating apparatus for Light-ships in the service of the U. S. fires on the summits of prominent headlands. The first real advance made in L.-H. I. was in the introduction of oil

lamps and reflectors. The lamps had flat wicks, and gave a poor light at best; the reflectors were segments of spheres, and merely reflected without parallelizing the rays; consequently the change in the system at first met with little favor. In 1783 M. Teulère, engineer of the dist. of Bordeaux, was charged with the duty of examining into the defects of the system, and devising remedies therefor. He proposed 3 improvements: *First*, in the reflector itself, by making it paraboloidal, instead of spherical, and placing the flame of the lamp in its focus. As a *second* improvement he proposed to use lamps with cylindrical wicks, supplying air to the interior of the flame as well as to the outside. The *third* improvement proposed was in the use of flashing or eclipse lights. This was to be accomplished by placing several lights with their reflectors on the outside of a polyhedral frame, and revolving the latter about its vertical axis by clockwork. This character of light, formerly called *revolving*, is now known as the *flashing* light. Figs. 1 and 2 represent horizontal and vertical sections through the axis of a paraboloidal reflector. Fig. 3 represents an apparatus for a floating light, such as is in use at the present time on board the light-ships in the service of the U. S. The system of Teulère marks the first real advance in the improvement of the illumination of light-houses, and after a practical demonstration of its advantages it was eagerly adopted by all civilized maritime nations, and continued in use until the later invention of the lenticular system of Fresnel.

Augustin Fresnel was the first to propose and put in successful operation the lens or dioptric system as a means of illuminating light-houses. His system is based on the optical principle of the convex lens, that rays of light emitted

FIG. 4.

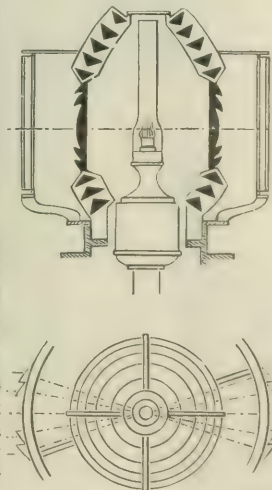


Fresnel's apparatus, designed for the Concorde.

from a luminous point at its principal focus, striking the lens, are refracted in passing through it, and but for the effects of spherical aberration would emerge in a direction parallel to its axis. In the previous system the rays of light had been approximately parallelized by reflection. Fresnel proposed to accomplish the same end by means of refraction. The necessity of having at the focus of the lens a powerful light, led to the no less important invention of the four-wick lamp.

Another apparatus constructed by Fresnel was that which produced a fixed light varied by flashes at regular intervals. This he made by establishing on the outside of an ordinary fixed light apparatus a subsidiary one which revolved around the other. It had 2 dioptric panels composed of vertical prisms held in a frame by means of which portions of the light diverging uniformly over the horizon were united into beams of parallel rays. Fig. 5 represents a plan and section of this apparatus. Shortly before his death he commenced the execution of a fourth

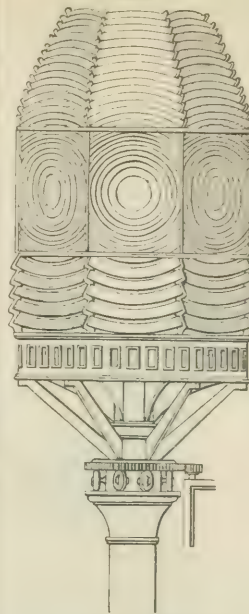
FIG. 5.



Fresnel's apparatus for a light fixed, varied by flashes.

order apparatus, embodying a most important improvement

FIG. 6.

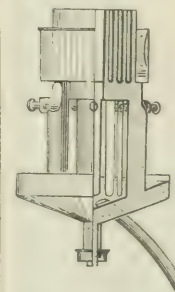


First-order holophotal catadioptric apparatus.

lights. An apparatus, for instance, composed of 8 lenticular panels revolves about the luminous source with a certain velocity, each panel condensing $\frac{1}{8}$ of the effective light. The light from each may be so concentrated that at a certain distance it will give the appearance of a flash of great brilliancy, but of short duration, or one of less brilliancy, but of longer duration.

A most important feature in the Fresnel lenticular apparatus is the lamp. Argand is generally credited with the invention of the double-current-of-air burner. Count Rumford is the first who used lamps with multiple wicks, but Guyton de Morveau made a lamp with 3 concentric wicks in 1787. It was not a success, as he failed to devise the means of supplying oil with sufficient rapidity to prevent the destruction of his burner by the intense heat developed. Carcel at a later period invented a mechanism of clock-machinery, which pumped the oil up with sufficient rapidity to cause a constant overflow, and thus to keep the burner cool. The lamps generally used in the higher orders of apparatus, which are required to illumine the entire horizon, are the result of the studies of Fresnel and Arago, and combine the principles of the double-current-of-air burner, multiple concentric wicks, and the mechanism of pumps worked by clock-machinery for supplying a superabundant quantity of oil. Fig. 7 represents a burner of a four-wick lamp.

FIG. 7.



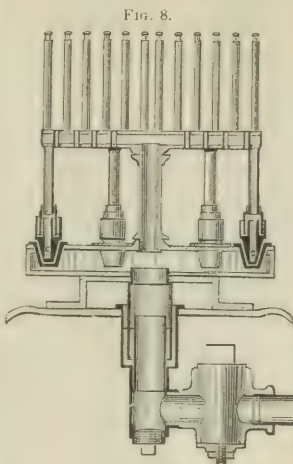
A four-wick lamp burner.

The luminous intensity of a light is measured by means of a photometer, the unit of measurement in some countries being the light of a Carcel lamp consuming a certain quantity of oil per hour, and in others a sperm candle of fixed dimensions, which consumes a certain number of grains per hour. The distance at which a light may be seen is termed its "range;" and were it not for the spheroidal form of the earth its value would depend entirely upon the intensity of the light and the degree of transparency of the atmosphere. The form of the earth's surface introduces another element in the problem of determining the value of the range—that of the height of the light above the level of the sea. We thus have the theoretical or luminous range, and the practical or geographical range.

In order to protect the illuminating apparatus the light-house tower is surmounted by a lantern, in which the light is placed, the size of which is determined by the order of the light. The base, uprights, and dome are generally made of copper or iron, and the sides are glazed with heavy plate glass. It is important that it should be well ventilated.

The oil first generally used as fuel for light-house lamps was the sperm oil of commerce. In Fr. and some other countries of Europe colza, a vegetable oil extracted from the seed of a species of wild cabbage, has long been used, both for domestic purposes and L. H. I. In other countries olive and hempseed oils have been and still are used to some extent. Recently, careful experiments have been made in Europe with a view to the introduction of mineral oil in the place of the vegetable and animal oils formerly used. Fr. was the first to adopt the new illuminant, and

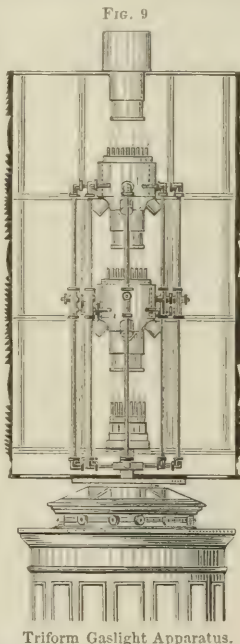
other maritime nations are gradually following its example. The oil used in the Fr. service is known as Scotch paraffine, and is extracted from a kind of cannel coal found in Scot. Gas has never been used to any great extent for L.-H. I. Ire. seems to have taken the lead in the use of gas for L.-H. I., and uses it in several first-order lights. A contrivance for a burner, invented by Mr. J. R. Wigham, is represented in Fig. 8.



Wigham's Gas-burner.

This burner consists of a group of 108 jets arranged in concentric circles, so that the intensity of the light can be regulated by using 28, 48, 68, 88, or 108 jets at a time, the illuminating powers of the flame alone being equal to that of 330, 668, 1002, 1667, and 2577 candles respectively. In clear weather the lamp is designed to burn 28 jets, the diameter of the flame being in this case about the same as that of the first-order four-wick burner. In case the atmosphere becomes hazy, exterior circles of 20 jets each can be turned on until the entire number is put in operation. There is no chimney surrounding the flame, but above it a chimney of mica is suspended, into which the flame is carried by the draught through the cowl of the lantern. The diameter of the flame when the full number of jets is burning is 10½ inches. The triform gaslight apparatus consists of 3 burners like that just described, placed vertically over each other in a single lantern, each being inclosed in a dioptric drum of similar construction to the central drum of an ordinary Fresnel apparatus. (See Fig. 9.) The upper burners are surrounded by air-chambers for supplying fresh and carrying off foul air from that below. The intensity when arranged for a fixed light is estimated at 147,914 candles, and the flashes from a similar flashing apparatus of 8 panels are said to have an intensity of 1,686,228 candles.

The application of the electric light to L.-H. I. has been the subject of investigation for some yrs. In 1863 it was decided that one of the 2 light-houses of La Héve should be illuminated provisionally by the electric light as an experiment. This experiment proved successful. Since then electric lights have been maintained at both. The currents are produced by magneto-electric machines worked by steam-engines, and are carried by conducting cables to the regulators or electric lamps used to regulate the separation of the carbon points between which the light is produced. These points are manufactured from the residuum contained in gas-retorts. The optical apparatus of the electric light is about 1 ft. in diameter. The catadioptric rings are symmetrical, both above and below the central drum. [From orig. art. in *J.'s Univ. Cyc.*, by COL. PETER C. HAINS.]

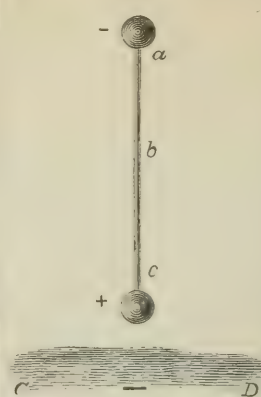


Triform Gaslight Apparatus.

Lightning consists in an electrical discharge between cloud and cloud, or between a cloud and the earth, and sometimes between the upper and lower parts of the same cloud. The air is almost continuously in a state of electrical excitement differing from that of the earth. The electricity of the atmosphere is due to the induction of the earth primarily electrified. That the earth, as a whole, is a great insulated conductor charged with free negative electricity, is a fact established by direct experiments made at points on the surface of the globe widely separated from each other. In Fig. 1 C D represents a portion of the surface of the earth negatively charged, and *a b c* a perpendicular conductor terminated above and below by a bulb. In this condition the negative electricity of C D will act upon each atom of the fluid in the conductor, and tend to draw it down to the lower bulb. If we connect the lower bulb of the rod with the earth by means of a good conductor, the redundant electricity of the lower end will be drawn off into the earth, and the whole will become negative. If, while the conductor is in this condition, we should touch the upper ball with an electrometer, and then bring the latter down to the gen. level of the earth, it would exhibit a negative charge. If we remove the upper ball, leaving a

point in its place, and the positive electricity be drawn off from the lower ball in the form of a spark, the whole will become negative for a moment, and the point, strongly attracting the positive electricity of the air, will receive a new charge and be ready to give off another spark, and so on continuously.

FIG. 1.



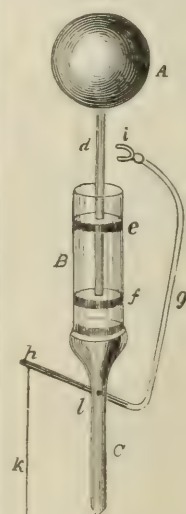
2 straws. To use this instrument in measuring the quantity of electricity from day to day, Saussure attached a small leaden ball to the end of a fine wire, the lower end of which rested upon the knob. He threw this perpendicularly upward, carrying the fine wire with it, and finally detaching it from the electrometer. As the lead bulb rose in the atmosphere by the induction of the earth, it became negatively electrified, or, in other words, the positive electricity of the leaden bulb was drawn down into the electrometer, the leaves of which diverged with positive electricity. But the method most generally employed by Saussure was that of affixing to the top of the electrometer a pointed rod, as shown in Fig. 2, and to the top of this again a burning match. When this instrument was held above the head, it scarcely ever failed in clear and dry weather to indicate an electrical excitement. The rationale of the burning match is not difficult to understand on the theory of induction. Let us suppose a series of hollow pointed cones placed on the top of the rod and thrown off upward one by one through some explosive agency; each cone as it left the rod would leave its positive electricity behind it, on account of the attraction of the earth below, and each would therefore impart an additional quantity of electricity to the rod, which would be indicated by the divergency of the electrometer. The heated air and smoke which continue to arise from the match, since they are partial conductors, would perform the same office as the cones above mentioned.

FIG. 2.



But a more convenient form of arrangement for studying the electrical condition of the atmosphere is that invented by M. Dellman, and shown in Fig. 3. A is a brass ball supported on a glass tube and passing through corks of gum-shellac. The apparatus is fastened to the upper end of a pole which is elevated by a windlass or the hand above the top of a house. When at the height intended, the wire *k*, connected with the earth below, is pulled; the end of the bent metallic lever *g* *h*, pivoted at *l*, is depressed, and the fork *i* brought into contact with the stem of the globe, and thus a metallic connection is formed between the ball and the ground. The wire *k* is then released, the lever falls back, and the ball, the connection of which with the earth is severed, is brought down and applied to an electrometer. Another instrument, introduced by Sir William Thomson, consists in allowing a fine stream of water to flow from an insulated metallic vessel through a pipe which projects below, but without touching, the sash of a window, which is raised a few inches for the purpose, or through some other aperture in the wall of the house. This apparatus, which is called "the water-dropping collector," is represented in Fig. 4. A is the metallic can containing water, which can be discharged through the pipe *c d* by turning a tap. It is supported on a glass stem at

FIG. 3.



ping collector," is represented in Fig. 4. A is the metallic can containing water, which can be discharged through the pipe *c d* by turning a tap. It is supported on a glass stem at

which is surrounded without contact by a cylinder of pumice-stone, moistened with sulphuric acid. The pumice-stone is separated from the metal by a coating of gutta-

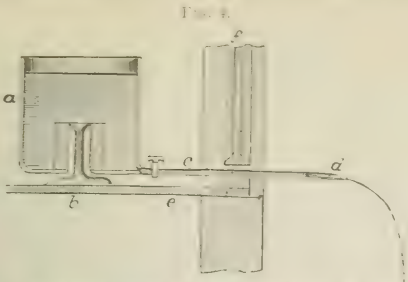


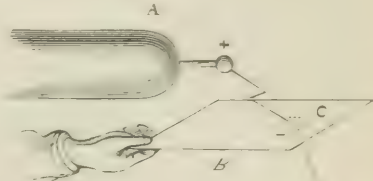
Fig. 5.

have endeavored to exhibit the remarkable currents of air which are observed during a thunder-storm below the cloud. The particles of the upper and lower cloud, being charged with free electricity, tend to repel each other, and hence the cloud will spread out horizontally above and below. The greatest amount of condensation will be produced in the centre of the uprising column, and hence the rain will pour down through the axis of the cloud. As it begins to descend it will be negatively electrified, but passing through the lower portion of the cloud its electricity will be diminished, become neutral, and finally positive. As it falls it tends to bring down the air with it, thus producing a wind at the surface of the earth outward in every direction from the axis of the storm, less perhaps on the W. side on account of the E. movement of the cloud and the exhaustion of the

aqueous vapor on that side. The intensity of this wind will depend not upon the depth of rain at any one point, but upon the quantity which falls on the whole area covered by the rain. This wind is met by a current in the opposite direction rising up under the base of the cloud, and hence a conflict is produced having an upward resultant, which is represented by the arrows in the sketch. This motion of the wind is not a mere deduction from a hypothesis, but an actual representation of facts.

Effects of Lightning.—Since a L. discharge is an immense electrical spark, the effects which it produces differ only in degree from those which are manifested by the electrical machine. In a discharge from the cloud the electricity traverses the line of least resistance, and therefore frequently deviates much from a straight line, its course being marked out by the induction of an opposite condition in the material through which it is to pass. If on the lower side of a thin board B (Fig. 6), a foot or more in extent, a plate of metal

Fig. 6.



C, an inch or two in diameter, is fastened, and to the lower surface of this again is soldered a wire D, leading down to the earth, and sparks from the knob of the prime conductor of an electrical machine be thrown upon the upper surface of this board, they will always strike it in a point immediately above the plate of metal. In like manner, if a good conducting material exist beneath the surface of the ground at any place, such as metal, water, or damp earth, the induction of the cloud will render it negative, and a strong attraction will arise between the two, and a discharge will sometimes take place, when if such a conductor did not exist the air would not be ruptured. If a thunder-cloud highly charged with positive electricity project over a given place, the earth underneath will become abnormally negative, and the body of any animal standing under the cloud will partake of this influence. If in this condition a discharge takes place from a distant edge of the cloud, the restoration of the equilibrium will be so sudden and violent as to produce death. Accidents of this kind are referred to what is called the principle of the return stroke.

It is probable that the noise of thunder is due to the repulsive energy with which the air is thrown apart along the path of the discharge of L. Were the discharge to take place in a perfect circle, the ear being in the centre, a single explosion would alone be heard. But inasmuch as the discharge is approximately in a right line, if the ear be placed near one end of this a series of sound-waves will reach it in succession from points at different distances, and hence a prolonged sound will be the result. [From orig. art. in *J.'s* *Cham. Mag.*, by PROF. JOSEPH HENRY, LL.D.]

Lightning-Rods. The perfect L.-R. is one which attracts the descending bolt to itself, and transmits the discharge harmlessly to the earth. (1) To insure this quality the rod should terminate above in a single point, and to preserve this from the weather, as well as to prevent its being melted by a slight discharge, it should be incased in a hollow cone of platinum. (2) The rod should consist of round iron not less than $\frac{3}{4}$ of an inch in diameter: a larger size is preferable to a smaller one. (3) The rod throughout its whole length should be in perfect continuity: for this purpose it should, if possible, be made of one piece of iron; and when joinings are unavoidable the parts should be firmly screwed together by a coupling ferule. (4) To secure it from rust the rod should be covered with a coating of black paint, which will not sensibly interfere with its power of conduction. (5) The shorter and more direct the rod is in its course to the earth the better: acute angles made by bending the rod at any point along its course should be avoided. (6) In case of powder-houses, where extreme precaution is required against sparks of induction within the edifice, several rods should be used, and these supported on masts at some distance from the sides of the building. (7) The lower end of the rod should be connected with the earth in the most perfect manner possible: and in cities nothing is better for this purpose than to unite it in good metallic connection with the gas-mains or water-pipes in the street; and, indeed, such a connection is absolutely necessary if the house is furnished with gas and water. In the country, where gas and water pipes are not accessible, the rod should terminate below the surface of the water in a well, or it should be extended out from the house under ground for 50 to 60 ft., and then sunk perpendicularly till it reaches moist earth. (8) If within the house there are masses of metal, they should be placed in metallic connection with each other and with the rod by slips of iron or copper, otherwise they are liable to emit sparks by induction during the instant of a discharge. (9) The rod should be placed in preference on the W. side of the house, since the thunder-cloud usually comes from a W. direction; but for a stronger reason it should be placed on the side of a chimney from which a current of heated air

ascends during the summer season: the ascent of warm and rarefied air tends to intensify the action of the conducting soot of the chimney. (10) In case of a small house a single rod may suffice for protection, provided its point be sufficiently high above the roof: the rule being observed that the elevation of the point should at least be half of the distance to which its protection is intended to extend. (11) When the house is covered with a metallic roof, it should be connected with the L.-R., or the perpendicular pipes conveying the water down the gutter at the eaves may be made to act the part of a rod. In this case the roof must be connected with the gutter by strips of copper or iron, and the lower end of the spout with the gas or water pipes, if in the city, or in the country, with the earth. In addition to this, a pointed rod should be elevated above the roof; but in arranging this care must be taken to join the rod in good metallic connection with the roof.

The mode of protecting ships from lightning generally consists in suspending a light chain from the lower end of a pointed rod attached to the upper yard-arms, the lower extremity of the chain being immersed below the surface of the ocean. These chains are not unfrequently destroyed by heavy discharges, though in the act of being broken they serve, in most cases, to protect the vessel from injury.

In regard to the safest position during a thunder-storm, especially in a house not well protected by a L.-R., we would advise a position in the middle of the room, and a horizontal one rather than a vertical. Windows, either open or shut, and chimneys should be avoided. When in the open air trees should be avoided, since the trunk being a bad conductor of electricity, the discharge will leave it and pass through the body of a man or animal near it. [From orig. art. in *J's Cate. Cyc.*, by Prof. JOSEPH HENRY, LL.D.]

Ligne, lén (CHARLES JOSEPH), PRINCE OF, b. May 12, 1735, at Brussels; entered the Aus. army in 1752, distinguished himself in the Seven Years' war, and commanded the vanguard in the Bavarian war of succession. Under the reign of Joseph II. he held the highest military and diplomatic positions, but under Leopold he fell into disgrace, partly on account of his son's participation in the Belg. insurrection (1790). He lived in retirement at Vienna. Wrote *Mémoires militaires, littéraires, et sentimentales*. D. Dec. 13, 1814.

Lignite. See CELLULOSE.

Lignite [Lat. *lignum*, "wood"], the name originally given to bituminized wood, but now applied to most coals which occur in the more recent geological formations; the term is therefore synonymous with brown coal. L. has no definite formula of composition, but different specimens vary much in phys. and chemical character, shading into unchanged vegetable fibre above and true coal below. In gen. terms, it may be said that the L. occupies an intermediate position, both in date and composition, between the peat which is now forming and true coals of Palaeozoic age, and represent a stage in the progressive distillation vegetable tissue passes through when buried, and which results in the formation as residual products of—1st, peats; 2d, lignite; 3d, bituminous coal; 4th, anthracite; 5th, graphite. No sharp lines of demarcation separate these groups, however, as we find them shading into each other by all possible intermediate phases. Since they are successively derivatives one from the other, the series is necessarily continuous. It should also be said that the name *lignite* is applied to woody tissue in which the process of bituminizat. has begun, however modern it may be; and among the forms of recent and superficial bituminized vegetation, that which has been derived from the decomposition of mosses, grasses, etc.—generally a porous, spongy substance—is called peat, while changed wood is called lignite. L. or brown coals are found chiefly in the Cretaceous and Tertiary formations. Here they occur in deposits which rival in area and thickness the coal-beds of the Carboniferous system.

The mode of formation of the beds of L. seems to have been similar to that in which peat is now accumulating, and in which coal was formed in the marshes of the Carboniferous age. In some instances they are underlain by strata of fire-clay, and are overlain by shales, sandstones, and limestones, precisely as the coal strata are; and it is evident that they have a common origin and hist., except that in the L. that hist. has not reached as far as in the coals. It not unfrequently happens, however, that beds of L. have by local causes been changed to the condition corresponding to bituminous coal, or even anthracite. Such instances are furnished by some of the best L. of Col., Ut., and Alaska, which have reached the condition of bituminous coal, and by the anthracites of Ohio Creek, Col., and that of Queen Charlotte's Island. In the last 2 cases beds of Cretaceous L. have been, by local volcanic action, converted into anthracite as bright, hard, and useful as that of Pa. It will probably be found that these modern coals exceed in the extent of their development, and rival in their value to man, the true coal-strata which are recognized as constituting the basis of all the great industries of civilization and the richest source of the wealth of nations.

It happens that the most important deposits of mineral fuel in Europe and E. Amer. are found in the Carboniferous system, but it is not known that any valuable Carboniferous coal exists in other parts of the world. So far as we know, all the great coal fields of Chi., India, Borneo, and W. Amer. are of Mesozoic or Tertiary age. Deposits of L. are also known to exist in Greenland, Arctic Amer., and in Central and S. Amer. The economic value of L. is, as a gen. rule, considerably less than that of true coals. This is due both to their chemical composition and phys. characters. They usually contain from 12 to 20 per cent. of oxygen and 10 to 12 per cent. of water. Their heating power is therefore usually from $\frac{1}{2}$ to $\frac{3}{4}$ that of bituminous coal. In many parts of N. Amer., however—viz. Trinidad, Cañon City, and Crested Buttes, Col.; San Pete valley and Cedar Mt., Ut.—Cretaceous L. are found which coke, and are not inferior in any respect to the average Carboniferous coals.

The material called *jel*, so largely used for ornaments, is a variety of L., which is chiefly obtained from the Lias at Whitby, Eng. L. of similar character occurs in Tex., Alaska, and Col., but none has yet been found in this country quite equal to the Eng. *jel*. J. S. NEWBERRY.

Lignum Rhodium [Lat. "rosewood"], a commercial name for Canary Island rosewood, which yields the so called oil of Rhodium; also for the wood of *Amyris balsamifera*, a tree of the W. I., which yields an oil used as a substitute for that just mentioned. The name is also given to other fragrant woods.

Lignonier. See GUAIACUM.

Lignonier, lig-o-neer', on R. R., Noble co., Ind., midway between Toledo and Chicago. Pop. 1870, 1514; 1880, 2010.

Ligny, leen-ye', v. of Belg., noted for the battle of June 16, 1815, in which Nap. defeated the Prus. under Blücher.

Liguori, le-goo-o'-re, de' (ALFONSO MARIA), SAINT, b. at Naples Sept. 27, 1696; became a lawyer at 16; entered a monastery in 1722, and was ordained priest in 1726; devoted himself to the religious instruction of the poor; founded in 1732 the order of Redemptorists, which received papal approbation in 1749, when L. was confirmed as its superior-gen.; was bp. of Sant' Agatha 1762-75, when he resigned and devoted himself to theological studies and writing. He was declared venerable 1796, beatified in 1816, canonized in 1839, and declared a doctor of the Ch. in 1871. Among his many works are *Theologia Moralis, Homo Apostolicus*, and *Institutio Catechetica*. D. Aug. 1, 1787.

Liguorians. See REDEMPTORISTS.

Liguria, in anc. geog., a dist. of N. It., the land of the Ligures. It comprised the terr. from the Ligurian Sea across the Maritime Alps to the Padus (Po) in the N., and from the Varus in the W. to the Macra in the E. The Ligures were a warlike, quick-witted, and enterprising people, whose true descent is unknown. In the period between the first and second Punic wars the first encounter took place between them and the Romans, and about 125 b. c. they were wholly subjugated.

Lilac, l'ilak [Tur. *leilâk*], cultivated hardy shrubs of the genus *Syringa*, olive family, natives of Asia. Its early-blooming flowers are commonly of the tint called lilac, but often are white or dark purple. Their bark has decided febrifugal powers.

Lilia'ceæ [Lat. *lilium*, "lily"], a large order of petaloidous endogenous plants, characterized by a regular complete perianth, free from the 3-celled ovary, and 6 stamens. Many have bulbs, others tubers or root-stocks. A few are arborescent, such as the larger yuccas, and especially dragon trees (*Dracæna*). The famous dragon tree of Orotava, Teneriffe, described and figured by Humboldt, and which succumbed only a few yrs. ago, was regarded as one of the oldest trees in existence. To the lily family properly belong the tulips, lilies, crown-imperial, and most of the well known and highly prized ornamental plants of the order, as also the hyacinth and the onion tribe. To the Asparagineæ, represented in cultivation by asparagus and by a popular conservatory climber *Mysiphylum* (falsely called *Smilax*), are also referred *Convallaria* (the lily-of-the-valley), *Polygonatum* (Solomon's seal), and its allies, and even the dragon trees. To the colchicum family belongs not only the medicinal and ornamental *Colchicum* (meadow saffron, so called from a resemblance to *Crocus*), but also *Teratrum*, the white hellebore and its allies, which furnish *veratrine*, all having very active acrid-poisonous roots, or corms. Those of squills are likewise very active, while those of garlics and leeks are well known condiments, and those of onions and the young shoots of asparagus are staples of food. The bitter juice of one or 2 species of *Aloe* furnishes aloes, a common purgative. One of the strongest of fibres is New Zealand flax, from the leaves of *Phormium tenax*. ASA GRAY.

Lille, or **Lisle**, leel [Flem. *Ryssel*], town of Fr., the cap. of the dept. of Le Nord, is situated in a fertile plain on the Deule. It is one of the strongest fortresses of Europe. The city is well built, and has many scientific and educational insts. Its prin. importance it derives from its manufactures. Much flax is grown in the vicinity, and the linen manufactures of L. are very extensive. No less important is its cotton-spinning industry. The tobacco manufactory of the govt. produces annually about 11,000,000 lbs. Beet-root sugar, rape-seed oil, gloves, and gunpowder are also manufactured in large quantities, and a very extensive trade is carried on. Pop. 178,144.

Lillebonne, leel-bon' [Lat. *Juliobona*], town of Fr., in the dept. of Seine-Inferieure, noted for the vast quantities of Rom. remains recently found. In its vicinity stands the palace of Harcourt, built by William the Conqueror. Pop. 5126.

Lily [Lat. *lilium*], the popular name of the leading genus of the order LILACEÆ (which see), comprising some of the most valued hardy ornamental bulbiferous plants, natives of the N. temperate zone. Several are indigenous to the U. S., the more showy and common ones being *Lilium Philadelphicum*, with an upright flower, and *L. Canadense* and *L. superbum*, with nodding ones; these orange and orange-red. *L. candidum*, the common white lily of the gardens, came from the Levant and Caucasus. The large and choice Japanese lilies, white or partly so, came from *L. longiflorum*, with long and narrow flowers, and *L. Japonicum*, *L. speciosum*, and *L. auratum*, with very broad and open ones. In the scarlet-flowered *L. Chalcedonicum*, abounding in Pal., we "behold the lilies of the field" of Script. The Martagon lily, *L. Martagon* of the Old World, answers nearest to our *L. superbum*. Finally the name of lily is extended in popular use to various other lily-like flowers, and even to some of the exogenous class, as, for example, the water-lily, *Nymphaea*. ASA GRAY.

Lilyle, or **Lilly** (WILLIAM), b. at Odiham, Hampshire, Eng., about 1466; ed. at Ox.; visited Jerusalem; studied Gr. 5 yrs. at Rhodes and in It.; in 1509 opened a classical

school in Lond., in which Gr. was first taught by an Englishman in his own country. The following yr. he was appointed master of St. Paul's School, just founded by Colet, and in 1513 he brought out his celebrated *Lat. Gram.*, the standard text-book in Eng. for 2 centuries. D. Feb. 1524.

Lily-of-the-Valley, the *Convallaria majalis*, a plant of Europe and Asia, also sparingly indigenous in the Alleghany Mts., prized for its beauty and fragrance.

Lima, lee'mah, the cap. of the republic of Peru, is situated at the foot of the Cordillera, in a fertile plain on the Rimac, 6 m. from Callao, its port on the Pacific, and is terminus of several R. Rs. It is regularly built, and has many chs. with double towers. The streets are long and narrow, and the houses mostly of one story and built of sun-dried brick. Among the 33 public squares, the Plaza Mayor or Principal is the most important, being surrounded on 3 sides by a covered colonnade. On the fourth side stands the cathedral, one of the most beautiful chs. in S. Amer. L. has a univ., a large public library, 70 public schools, many public monuments and charitable institutions, and a large foreign commerce, exporting guano, cinchona, sugar, saltpetre, gold, and silver. It was plundered by the Chilians during their occupation 1881-83. Earthquakes and fevers are frequent. The pop. of L., about 200,000, is very varied—whites, blacks, Indians, and Chl.

Lima, lî'ma, Livingston co., N. Y., 4 m. from R. R., is the seat of Genesee Wesleyan Sem., the oldest inst. of the kind in this part of the State. Pop. 1870, 1257; 1880, 1878.

Lima, city and R. R. centre, cap. of Allen co., O. Pop. 1870, 4500; 1880, 7567.

Lima-wood. See BRAZIL-WOOD.

Limb, lim. In angular instruments, the plate that bears the prin. graduated arc is called the *limb* of the instrument. In the theodolite there are 2 L.,—*horizontal* and *vertical*.

Limbo [Lat. *limbus*, a "border"], in the theol. of the R. Caths., a place upon the borders of hell for the souls of those who have neither merited hell by their sins nor are entitled to behold the beatific vision in heaven. There are 2 L.—one the *limbus patrum*, the other the *limbus infantum*.

Limburg, or **Limbourg**, a terr. extending along both sides of the river Meuse, divided between Belg. and the Netherlands. Along the Meuse the region is fertile, affording pasturage for herds of cattle, but the rest of the country is sterile. Brewing and distilling are carried on. *Dutch L.* comprises an area of 851 sq. m., with 235,135 inhabs. *Belgian L.*, which contains some iron and coal mines, comprises an area of 932 sq. m., with 211,694 inhabs.

Lime [Fr.; from Ind. *leemoo*], the fruit of *Citrus acida* and *C. limetta* (the last called sweet lime), cultivated in nearly all warm regions. L. are used as a substitute for lemons. L.-juice is employed as an antiscorbutic. Citric acid is manufactured from it. L. is the usual Eng. name of *Tilia*, the linden tree.

Lime, one of the alkaline earths, chemically the protoxide of calcium. It forms the base of limestones, marbles, and the shells of mollusks, where it is in combination with carbonic acid, forming the carbonate of L. By the application of heat the carbonic acid is driven off, and the L. is left in the condition of "caustic" or "quick" L. L. is usually white, light-gray, or cream-colored, porous and soft. It rapidly absorbs water, uniting with it chemically, with the evolution of much heat. This process is called slaking or slacking. Pure or "fat" L. when slaked swell very much, and ultimately fall into a snow-white powder. If more water is added, what is called the "milk of L." is formed. The L. is now in the condition of a hydrate, and if exposed to the action of the air it absorbs carbonic acid, and is again converted into the carbonate of L. In the preparation of mortar, sand is added according to the richness or "fatness" of the L.—that is, according to the fineness and uniformity of the powder into which it falls when slaked. Where the powder is very fine, it makes with water a fluid paste which will penetrate the interstices between the grains of sand, however closely they may be crowded. The thinner the film of paste between the grains of sand, the stronger their adhesion will be. Hence, the value of a L. is roughly measured by the quantity of sand it will serve to unite. L. is largely used in agriculture as a dressing on soils which require calcareous matter, in the manufacture of bleaching-powder (chloride of L.), in tanning, as a flux in smelting iron, etc.

The great consumption of L., however, is in the production of mortar, and for this purpose it has been used in construction by all modern and most anc. civilized nations. In the earliest masonry of which any remains have been found, as the Etruscan, that of the island of Cyprus, and anc. Troy, walls were laid up with large stones without mortar ("Cyclopean" masonry), or with smaller ones packed in clay, but by the Egyptians, Hebs., Grs., and Roms. the use of L. for mortar was universal. In the manufacture of mortar from L., as has been stated, the hydrate of L. is formed by the addition of water to quicklime. This is, in part, chemically combined with the L., and produces the first "setting" of mortar. Subsequently, by the absorption of carbonic acid, it is converted into the hydrated carbonate. In process of time a combination is also formed between the L. and some of the silica of the sand with which it is associated, and silicate of L. is produced. By this the strength of the mortar is still further increased. This progressive change has been ascertained by careful analysis of many samples of older and newer mortars. These have shown that in the older mortars—which in some instances are as hard as the stones they join—the percentage of silicate of L. is much greater than in those more recently made. The notion is commonly entertained by archs. and masons that the best L. is produced from the purest carbonate of L., and statements to that effect will be found in many books which treat of this subject. This theory, however, has been proved to be a fallacy, for nearly all the most extensively used and highly esteemed L. contain a large

percentage of magnesia. A similar fallacy prevails in regard to the use of magnesian limestones for fluxes in metallurgy. It is generally believed that pure limestones make much the best fluxes, but abundant experience has shown that magnesian limestones are quite as well adapted to this use as those which contain the carbonate of L. only.

L. is manufactured from limestone, marbles, or shells by calcination, which expels the carbonic acid. This is effected in kilns of various kinds. Formerly, L.-burning was done in kilns having the form of an inverted beehive, with a single opening at the bottom. In these the fuel and stone were mixed, the fire being lighted below. At the end of 3 or 4 days, the fuel having been consumed and the limestone calcined, the charge was allowed to cool partially, and was then drawn out at the bottom. Now, L.-burning is nearly all done in what are called *perpetual* kilns. These are square or round towers 25 to 30 ft. in height, having a cylindrical cavity within, 5 or 6 ft. in diameter. These kilns have usually 2 furnaces, one on either side, situated at about $\frac{1}{2}$ of the height from the bottom. In these the fires are kept perpetually burning, and are fed with wood or soft coal, the flame and heat from which, passing up through the limestone, calcine it so that when it has descended to the level of the furnaces it is deprived of all its carbonic acid. From time to time the limestone is charged at the top and the calcined L. drawn out below. As limestones vary much in the facility with which they are burned, the time required for calcination and the amount of fuel consumed will depend much on the kind of stone used. Something will also depend upon the excellence of the fuel and the pattern of kiln employed. The best results attained are the production of 300 bushels of L. every 24 hours with the consumption of 4 cords of wood. Where coal is used, as is the case in most foreign localities and many in the U. S., a considerable economy of fuel is obtained. When mortar freshly made from quicklime is placed in water, it softens and loses its form; but the L. made from certain limestones which contain a large percentage of silica and alumina, on the contrary hardens under water and forms what is known as hydraulic cement.

J. S. NEWBERRY.

Lime, Medicinal Uses of. *Quicklime* is a powerful caustic, but is little used for this purpose except in the form of the official *potassa cum calce* or "Vienna caustic," which consists of equal parts of the 2 alkalies, mixed to form a powder. *Chlorinated L.* is a valuable desiccant and disinfectant. *L.-water* (a saturated solution of L. in water) and *calcium carbonate* (in the form of prepared chalk and prepared oyster-shell), are used in med., and are valuable antidotes in sulphuric and oxalic acid poisoning. They are among the best of alkalies for neutralizing the undue acidity generated in certain forms of dyspepsia. L.-water is also used as an alkaline wash in many skin diseases, and mixed with equal parts of linseed oil forms the so-called "Carron oil," a favorite application to burns. L.-water rapidly dissolves the false membranes of croup and diphtheria. Mixed with ice-cold milk, in the proportion of 1 to 1 or 2, L.-water has a remarkable effect in allaying nausea and vomiting.

EDWARD CHURCH.

Lime, Chloride of, or Bleaching-Salt. See HYPOCHLORITE.

Limerick, city of Ire., on both sides of the Shannon, which is crossed by 5 bridges and lined with docks. It was the last place in Ire. which surrendered to William III., on which occasion a treaty was signed (1691) granting certain rights to R. Caths. Pop. 43,246.

Limestone, a sedimentary rock composed chiefly of the carbonate of lime, the calcareous deposit of the sea wherever the mechanical sediments—sand and clay, the wash of the land—do not reach. The lime of L. is for the most part derived from the hard parts of marine organisms, the shells of Foraminifera and mollusks, the skeletons of polyps (corals), etc. By the formation of L. carbonic acid is drawn from the atmosphere, and fixed beyond the reach of all natural agents except heat sufficient to calcine the L. As the causes which produce the ordinary metamorphism of rocks, converting L. into marbles, though rendering them more crystalline and often discharging all organic colors and leaving them pure white, does not drive off the carbonic acid, it may be supposed that carbonic acid which is absorbed in formation of L. is, for the most part, permanently withdrawn from the atmosphere.

J. S. NEWBERRY.

Lime Tree. See LINDEN.

Limonite (or *limon*, "iron clay"), the hydrated sesquioxide of iron, often called brown hematite, one of the commonest and most important ores of iron. The deposits of L. are peculiarly local and irregular in character. They are never found forming continuous strata, but are (1) either the superficial deposits of chalybeate waters, filling fissures or cavities or incrusting slopes or accumulating in concretionary or botryoidal masses in sand, clay, or gravel; or (2) they are produced by the oxidation, at and near the surface, of beds of the carbonate of iron or iron pyrites. From their mode of formation the deposits of L. are less extensive and reliable than those of other ores of iron, and their irregularities have often been a cause of disappointment and loss; but some of them are of great extent, and they are so numerous in many countries that they have always constituted one of the great sources from which the supply of iron has been derived. In the U. S. valuable deposits of L. are found in a great number of localities. They occur perhaps in the greatest abundance in a belt which extends along the E. flank of the Appalachians from N. Eng. to Ga. Here they rest on rocks of various kinds, such as gneiss, serpentine, crystalline limestone, slate, etc. From Pa. southward their association with the Lower Silurian limestones and slates is such that they have by some writers been represented as holding a definite geological position in that series of rocks. It is quite certain, however, that they are altogether superficial in position, and form no part of the stratification of this or any other formation. In Ala. and Tenn. deposits of

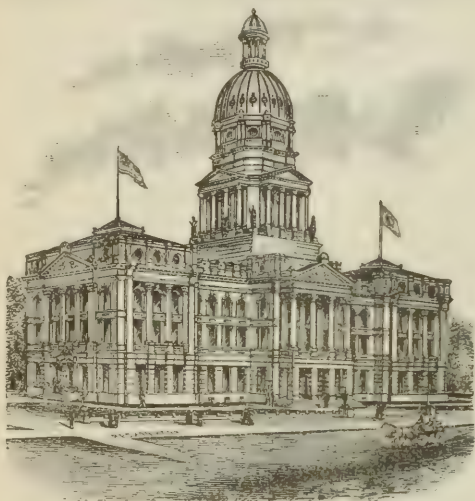
L. of great extent and purity are found along the outcrops of the Lower Carboniferous limestone. In Mo. a belt of superficial L. encircles the dist. which contains the great deposits of specular iron in the central part of the State, and may be supposed to have been formed from the ferruginous drainage of this dist. The L. which are formed by the oxidation of the stratified carbonates are best seen in S. O. and E. Ky., where some of the calcareous ore-beds of the coal-measures are oxidized along their outcrops, and are more or less deeply converted into the hydrated sesquioxide.

Bog-iron ore is a spongy and usually impure L. which accumulates in marshes from the leaching of surrounding beds of sand, gravel, etc. which contain iron. *Lake ore* is the name given to L. which gathers at the bottom of lakes and ponds which receive the drainage of ferruginous strata or soils. Pure L. contains 60 per cent. of metallic iron, but it often contains 10 to 20 per cent. of foreign matter, so that its average yield of iron does not reach 50 per cent. The quality of the iron made from it is sometimes excellent, as is attested by the good repute of the Roxbury and other L. irons. It generally contains too much phosphorus, however, to be successfully used for the manufacture of steel. From their fusibility the brown hematites are very useful adjuncts in the smelting of the more refractory magnetites and specular ores, and their employment in this connection has caused them to be largely mined and highly valued.

J. S. NEWBERT.

Lincoln, link'on, city and R. R. centre, cap. of Logan co., Ill., 28 m. N. E. of Springfield; is the seat of a coll. Pop. 1880, 5639.

Lincoln, city and R. R. centre, cap. of Nebraska and of Lancaster co. It has a new State capitol, a State univ.,



State Capitol (Lincoln, Neb.).

insane asylum, govt. P. O. building, and penitentiary. Pop. 1870, 2241; 1880, 13,003; 1885, about 21,000.

Lincoln (ABRAHAM), the 16th Pres. of the U. S., b. in Larue (then Hardin) co., Ky., Feb. 12, 1809. Of his early life he himself says: "My parents were both born in Virginia, of undistinguished families. My father, at the death of his father, was but 6 yrs. of age, and he grew up literally without education. He removed from Ky. to what is now Spencer co., Ind., in my 8th yr. It was a wild region, with many bears and other wild animals still in the woods. There were some schools, so called, but no qualification was ever required of a teacher beyond *readin', writin', and cipherin'* to the Rule of Three. Of course, when I came of age I did not know much. Still, somehow, I could read, write, and cipher to the Rule of Three, but that was all. I was raised to farm-work, which I continued until I was 22. At 21 I came to Ill.; was employed for a yr. as a sort of clerk in a store. Then came the Black Hawk war, and I was elected a capt. of volunteers; ran for the legislature (1833), and was beaten. The next and three succeeding biennial elections I was elected to the legislature. During this legislative period I had studied law, and removed to Springfield to practise it. In 1846 I was elected to the lower house of Cong.; was not a candidate for re-election."

In Oct. 1854 Stephen A. Douglas, author of the bill repealing the Mo. Compromise, came to Springfield to vindicate his policy in the Senate, and the "Anti-Nebraska" Whigs engaged L. to improvise a reply. This speech was one of the great efforts of his life. It took the audience by storm, and from that moment it was felt that Douglas had met his match. L. was accordingly selected as the Anti-Nebraska candidate for the U. S. Senate, and led in several ballots, but Trumbull was ultimately chosen. The armed conflict on the soil of Kan. soon began; the result was the disruption of the Whigs and the formation of the Rep. party. At the State convention in 1856, where the new party first assumed form in Ill., L. for the first time took distinctive ground against slavery in itself. At the national Rep. convention at Phila. (June 17), after the nomination of Fremont, L. was put forward by the Ill. delegation for the Vice-Presidency, and received on the first ballot 110 votes against 259 for William L. Dayton. In 1858 he was unanimously nominated by the Rep. State convention as its candidate for the U. S. Senate in place of Douglas. The great debate carried on at all the prin. towns of Ill. between these rival candi-

dates resulted at the time in the election of Douglas, but it fixed the attention of the country upon L. as the most convincing exponent of Rep. doctrine. Early in 1859 he began to be named in Ill. as a Rep. candidate for the Presidential campaign of the ensuing yr. The national Rep. convention at Chicago (May 1860) nominated him for the Presidency, at the same time adopting a vigorous anti-slavery platform. The Dem. party having been disorganized and presenting 2 candidates, Douglas and Breckenridge, and the remnant of the "American" party having put forward John Bell, the Rep. victory was an easy one, L. being elected by a large plurality, comprehending nearly all the N. States, but none of the S. The secession of S. C. and the Gulf States was the immediate result, followed in a few months by that of the other slave States and the outbreak of the great c. war.

L. was inaugurated Pres. Mar. 4, 1861. He called to his cabinet his prin. rivals for the Presidential nomination, Seward, Chase, Cameron, and Bates; secured the co-operation of the Union Dems, headed by Douglas; called out 75,000 militia from the several States upon the first tidings of the bombardment of Ft. Sumter (Apr. 15); proclaimed a blockade of the S. ports (Apr. 19); called an extra session of Cong. for July 4, from which he asked and obtained 400,000 men and \$400,000,000 for the war; placed McClellan at the head of the U. army on Gen. Scott's resignation (Oct. 31); appointed Edwin M. Stanton sec. of war (Jan. 14, 1862); and on Sept. 22, 1862, issued a proclamation declaring the freedom of all slaves in States and parts of States in rebellion from and after Jan. 1, 1863. On October 16, 1863, he called for 300,000 volunteers to replace those whose term of enlistment had expired; made a touching, though brief, address at the dedication of the Gettysburg military cemetery, Nov. 19, 1863; commissioned Ulysses S. Grant lieut.-gen. and commander-in-chief of the armies of the U. S. Mar. 9, 1864; was re-elected Pres. in Nov. of the same yr. by a large majority over Gen. McClellan; delivered a notable address at his second inauguration, Mar. 4, 1865; visited the army before Richmond the same month, entered the cap. of the Confederacy the day after its fall, and upon the surrender of Gen. Lee's army (Apr. 9) was actively engaged in devising plans for the reconstruction of the U., when on the evening of Good Friday, Apr. 14, he was shot in his box at Ford's theatre, Wash., by John Wilkes Booth, d. early on the following morning, Apr. 15, 1865, and was buried at Springfield, Ill. (See biographies by J. G. HOLLAND, I. N. ARNOLD, and WARD H. LAMON.)

PORTER C. BLISS.

Lincoln (BENJAMIN), b. at Hingham, Mass., Feb. 3, 1733, was a farmer at the outbreak of the Revolution; had several offices; was sec. of the provincial Cong. in 1774, when he was appointed maj.-gen. of the State troops. He obtained the favor of Washington during the siege of Boston; commanded an expedition which in June 1776 cleared Boston harbor of Brit. vessels; led a body of Mass. militia at the battle of White Plains (1776); brought a new levy of militia to the aid of Washington at Morristown, N. J., in Feb. 1777; was appointed, at Washington's request, a maj.-gen. in the Continental service Feb. 19; co-operated with Schuyler in the summer campaign against Burgoyne, for which he raised a fresh body of N. Eng. militia; joined Gates as second in command Sept. 29; was severely wounded at the battle of Bemus Heights, Oct. 8, and disabled from active service until Aug. 1778; was in Sept. appointed to the chief command of the S. army; joined D'Estaing Sept. 1779, and after the bloody repulse of Oct. 9 returned to Charleston, which in the spring of 1780 was besieged by greatly superior forces; capitulated May 12; was paroled, and being exchanged he joined Washington on the Hudson, took part in siege of Yorktown, and was deputed to receive the sword of Cornwallis on his surrender; sec. of war 1781-84. In 1786-87 he commanded Mass. militia in the suppression of Shays's rebellion; was elected lieut.-gov. of Mass. in 1787; collector of port of Boston 1789-1809. D. May 9, 1810.

Lincoln (ENOCH), b. at Worcester, Mass., Dec. 28, 1788, studied at Harvard; became a lawyer in 1811; settled at Fryeburg, Me., and in 1819 removed to Paris, Me.; was M. C. 1818-26, and gov. of Me. 1827-29. D. Oct. 8, 1829.

Lincoln (LEVI), b. at Hingham, Mass., May 15, 1749, grad. at Harvard in 1772; became a lawyer of Worcester, Mass., in 1775, a judge of probate in 1776; was in constitutional convention of 1780, M. C. 1799-1801, atty.-gen. of U. S. 1801-05, lieut.-gov. of Mass. 1807-08, acting gov. 1809. D. Apr. 14, 1830.

Lincoln (LEVI), LL.D., son of the preceding, b. at Worcester, Mass., Oct. 25, 1782, grad. at Harvard in 1802; became a lawyer in 1805; member of the constitutional convention of 1820; was often in the State legislature, of which he was speaker in 1822 and pres. of the senate 1845; lieut.-gov. of Mass. 1823, gov. 1825-34; M. C. 1835-41, a judge of the State supreme court 1824, collector of port of Boston 1841-43, first mayor of Worcester in 1848. D. May 29, 1868.

Lincoln (ROBERT TODD), b. at Springfield, Ill., 1844, son of Abraham Lincoln; grad. at Harvard; practised law at Chicago; sec. of war 1881-83.

Lincoln University, Chester co., Pa., originated from the Ashman Inst., whose name was changed in 1866 to that of Lincoln University. It comprises preparatory, collegiate, theological, law, and med. depts.

Lind (JENNY), b. in Stockholm Oct. 6, 1821, of humble parentage. Her precocious talent attracted notice, and the manager of the court theatre procured for her admission to the musical acad. She became the operatic star of Stockholm. Her first appearance in Lond. was in May 1847. In 1848 she sang for the first time in oratorio, *Elijah*, at Exeter Hall. In 1850 she came to the U. S. under contract with Mr. P. T. Barnum to give 150 concerts. The enthusiasm was unbounded, the profits were enormous, but the toil and irksomeness were excessive, and in June 1851, after singing 95 times, the contract was terminated by Jenny Lind. In 1852 she married Otto Goldschmidt, a German litterateur of some merit; since 1858 she has resided in Eng., but has not sung in public.

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